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Online Report of Army Aircraft Mishaps

Army Aviation professionals are starting FY13 very well. Diligence by our Aviation Soldiers and leaders is preserving lives and combat power. At the end of the first quarter of FY13, we have experienced three Class A, one Class B, and nine Class C mishaps, compared to first quarter of FY12 when we recorded five Class A, four Class B, and 25 Class C mishaps.

There are two interesting trends developing for this year. The first is the mishaps are not catastrophic, and we have no fatalities. This gives us the opportunity to glean non-fatal lessons to avoid loss of our greatest resource - Soldiers. The second trend is that the Class A mishaps have all involved object/ground strike with main rotor blades (see Utility Helicopter selected mishap brief on the back page). This gave us pause in the Aviation Directorate, and we conducted some research on Aircraft Taxi Mishaps from FY03 to present. The quick research surprised us in the volume of incidents. The three leading accident events are light poles, barriers, and object/building strikes. We've included the information in this edition to assist in risk identification and mitigation.

Our preliminary assessment of the 13 Class A-C mishaps for the first quarter, 10 will likely be attributed to human error. This represents 77%, which is consistent with the about 80% we've seen over the last decade. In the September 2012 Flightfax, we presented an article by Craig Geis that investigated basic functions of the nervous system to better understand human factors; this article received positive feedback. To enable better understanding of human factors in the aviation environment, we have included an article entitled "Understanding the Relationship between Stress and Performance" this month.

We also conducted a study on OEF accident trends and when a deployed unit is most at risk during a deployment. Specifically, we investigated the validity of the "first and last 90 day high risk period" during a deployment. This article will be published in the Aviation Digest in February, and we will provide it here in Flightfax as well.

Until next month, fly safe!

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Understanding the Relationship between Stress & Performance

By Craig Geis • CraigGeis@CTI-home.com

In Part 1 of this series (Sep 2012 Flightfax) we looked at the basic functions of the nervous system. Can you recall ever hearing this conversation? "Watch your airspeed, check your rate of descent, pay attention to your attitude, oh never mind I have the controls." If you are like me you felt stressed and overwhelmed at the moment.

Part 2 of this series will be presented in Part A and Part B. Part A will introduce you to the relationship between stress and performance and Part B will allow you to look at an aircraft accident and go in depth into the physiological, perceptual, and cognitive effects of the different levels of stress.

Part 2A

Any threat we perceive to our well being, either consciously or unconsciously, evokes a stress response in the nervous system. That threat could be an emergency, weather, personal problems, time constraints, etc. The nervous system's response to stress is an evolutionary design whose purpose it is not only to help us cope with the stress, but to make sure we survive whatever happens during the encounter.

When we think of the word "stress" mental-emotional strain usually comes to mind. Anxiety, fear, emergency situations, fatigue, overload, repetitious tasks, dissatisfaction, and frustration also qualify as stress.

The common identifier that qualifies all of the above as stress is the ability to activate the body's stress response. It doesn't matter if the stress is mental-emotional, physiological, or environmental. The body responds with one response to stress; only the intensity of the response varies depending on how threatening the perception.

Figure 1 tracks the five stage stress cycle.

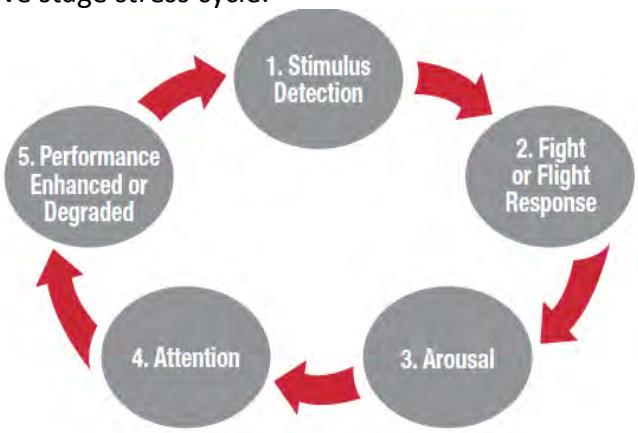

Figure 1: Five Stage Stress Cycle

Stage 1: Stimulus Detection – Incoming stimulus is processed in the brain by a structure in the limbic system called the amygdala, which assesses all incoming stimulus for threat potential. The amygdala deals with memory storage relating to threats with emotional impact. In threatening situations the amygdala gets totally absorbed in managing our response to fear and stress.

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Stage 2: Fight or Flight – This response gives us assistance by releasing stress hormones. The structures involved in the "fight or flight" response include the hypothalamus, pituitary, and adrenal glands.

The level of hormone produced depends on the *perceived* level of stress. It is not the threat/stressor but the individual's perception of the threat that matters. These hormones cause an immediate increase in heart rate.

When we talk about an increased heart rate affecting human performance, either in a positive or negative way, it is critical to understand the cause of the increase in heart rate, because a change in performance comes from the increased heart rate due to stress, *not exercise*.

There are two ways to increase heart rate: through physical exertion or through fear. Physical exertion can take up to 5 minutes to push the heart rate from 60-80 beats per minute (BPM) to 160 BPM. On the other hand, when the nervous system is sufficiently activated through the "fight or flight" response, it is not uncommon for the heart rate to go from 60-80 hormonal beats per minute (HBPM) to 160 HBPM in 1 second, and 200 HBPM in 2 seconds.

Therefore performance changes related to heart rate only occur when the heart rate change is due to stress. **It's not the heart rate that matters but what drives the heart rate that is important.**

Performance is not significantly impacted when the heart rate increases due to exercise. If you don't believe me, imagine yourself on the treadmill, running so hard that you are out of breath and your pulse is pounding. You can still think, plan, and even do math problems in your head! Ever go for a long run just to clear your head and think?

Stage 3: Arousal – Arousal is the impact of stress, and the hormones and neurotransmitters released activate the entire nervous system. Arousal refers to the level of nervous system activation, also known as "the readiness to work." In simple terms, how much of the brain is active and ready at any point in time to deal with a threat?

Arousal is defined and measured by specific elements of our physiology. Those elements are things like mental activity, heart rate, blood pressure, and respiratory rate. The level of arousal is proportional to the level of a person's perceived threat. In other words, the greater the perceived threat, the higher their arousal level will be.

Arousal levels affect a human's physiology which ultimately translates into ability to perform. In Figure 2 we can see that too low or too high a level of arousal will lead to decreased performance.

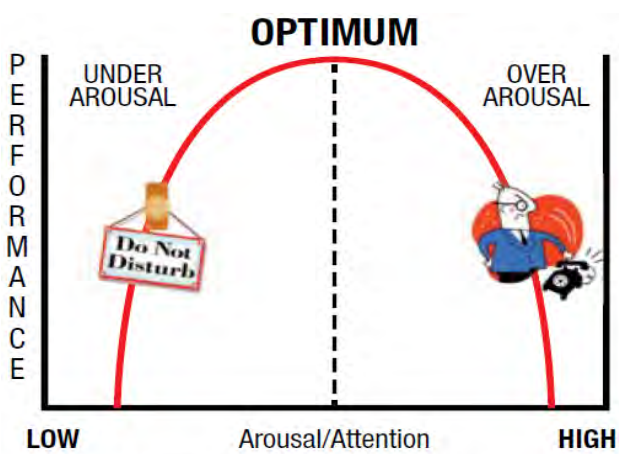

Figure 2: Arousal & Attention

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Stage 4: Attention – Defined as the cognitive process of selectively concentrating on one aspect of the environment while ignoring other aspects. Attention is also referred to as *the allocation of processing resources*. Attention level is determined by our level of arousal. Attention requires mental resources to direct and focus our mental processes. The mental resources available to us are limited; the more attention one task requires, the less attention is available for performing others tasks.

In understanding our limitations it is important that we understand the **basic principles of attention**. We are constantly confronted with more information than we can possibly pay attention to; therefore there are serious limitations in how much we can attend to at any one time. We can respond to some information and perform some tasks with little attention if we have sufficient practice and knowledge. Some repetitious tasks become less and less demanding of our attentional processes.

Attention includes four categories:

1. Inattention
2. Global Attention
3. Selective Attention
4. Hyper-vigilance.

Inattention: At low arousal levels attention really becomes inattention. No perceived threats, we're not paying much attention to anything. The brain shuts down to conserve energy and filters out most of the incoming stimulus. When there are no perceived threats, and arousal levels are low, the brain is essentially running at a low idle. Inattention doesn't mean you are asleep, it just means that you are not effectively filtering the environment for threat signals. This is where complacency occurs.

Global Attention (Vigilance): At our optimal level of arousal we are able to process the maximum amount of information. We also have a heightened ability to concentrate by blocking out elements of information that are not related to the threat. With global attention (vigilance), we are able to process large amounts of sensory input, as long as that information is relatively familiar and not too complicated. In order for this to be the case, we need prior experience or training related to the input. Our capabilities can meet the demands.

Selective Attention: At high arousal levels, when there may be a mismatch between external demand and internal capabilities our arousal increases to cause **selective attention**. Attention under high stress conditions, where arousal is resultantly high, reduces our ability to process information from multiple sources. With selective attention we focus, or attend to the inputs that we perceive to be the greatest threats to survival. The things we don't attend to just get scanned by our senses and often these things are simply not processed by the brain.

Hyper-vigilance (Panic): At the highest levels of arousal the "fight or flight" response gives us a hormone dump. Hyper-vigilance is borderline panic. Under hyper-vigilance a person is constantly shifting attention, from minor to major threats, without discriminating between the threats. This is done in an irrational and frantic attempt to find a way to escape the imminent danger.

Stage 5: Performance Enhanced or Degraded

The Yerkes-Dodson law, originally developed by psychologists Robert M. Yerkes and John Dillingham Dodson in 1908, demonstrates the relationship between arousal and performance. The law dictates that performance increases with arousal, but only up to a point. When levels of

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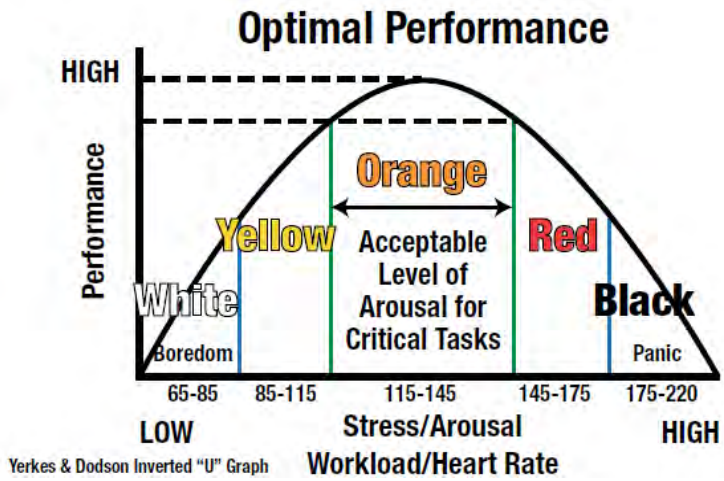
arousal become too high, performance decreases. Figure 3 has been modified significantly to reflect the current science of stress and performance.



On the vertical axis we measure a human's performance level. Performance can relate to physiological, perceptual, and cognitive performance.

On the horizontal axis are the stress/arousal/workload levels from low to high, the heart rate expressed as hormonally induced heart rate, and a color code reference.

Moving from left to right on this curve this is what we see:

• White Zone: 65-85 HBPM. Performance is low here because a person is ***unconsciously*** filtering information. Here there's little threat discrimination.

• Yellow Zone: 85-115 HBPM. Performance is getting better. This is the stage of basic alertness. Here we are starting to be aware of and are discriminating threats around us.

• Orange Zone: 115-145 HBPM. Performance is optimal for most critical tasks. This is the optimal zone of arousal and awareness. Here we are scanning for potential threats rapidly and efficiently.

• Red Zone: 115-145 HBPM. Performance begins to fall off. Things start getting risky because our arousal level is high enough to start inducing selective attention.

• Black Zone: 175-220 HBPM. Performance is low because panic is setting in. In this highest arousal zone our systems begin to shut down and we lose the ability to think rationally.

Key Points to Remember:

1. In high stress events, success depends on a quick, appropriate, trained response.

2. If you are unprepared for an emergency and have no trained response, it will take at least 8–10 seconds under optimal circumstances and much longer under high stress to assess the situation and come up with a plan.

3. Training, planning, and mental rehearsal can reduce the time sequence to 1–2 seconds.

4. If an appropriate response to such an event has been prepared and embedded in the mental database of behavioral plans, then the speed of response can be as fast as 100 milliseconds. *This is an immediate action.* This is the power of habit patterns.

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5. Prepare yourself:

• *Understand Your Limits:* The performance problems discussed in this article are universal.

• *Set Goals:* Constantly setting goals keeps the frontal lobe (thinking part of your brain) active. In emergencies you need to engage in conscious, rational thought. Keeping the frontal lobe engaged will allow you to think clearly and reduce the stress response.

• *Mental Rehearsal:* Works exactly the same in the nervous system as doing the task. Mental rehearsal also creates a memory trace so an unplanned event is not really unplanned.

• *Positive Self Talk – "Can do" vs. "can't do":* We are telling the amygdala that everything is under control and to back off the stress response.

• *Control Breathing:* In high stress situations control you breathing, especially long exhales. This tricks the nervous system into thinking everything is okay.

Craig Geis is Co-Founder of California Training Institute and formerly Geis-Alvarado Associates. He provides instruction for clients worldwide on the subject of Human Factors Threat & Error Management. Mr. Geis was a U.S. Army career pilot, developed the military's Team Resource Management training program to address human error and is a former instructor for the U.S. Military Academy at West Point, Embry Riddle Aeronautical University, University of Maryland, and University of San Francisco. Craig is a Certified Force Science Analyst, and in instructor for CA Police Officers Standards & training. He holds an MA in Psychology from Austin Peay State University, a BA in Management from C.W. Post College in New York, and an MBA in Management from Georgia Southern College.
Additional references and articles are available at www.CTI-home.com. Phone us at (707) 968-5109 or email CraigGeis@CTI-home.com.

Aviation safety depends on commanders. They either push the program or they let it slide.

Unmanned Aircraft Systems (UAS) Standard Operating Procedures

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Since 2007, the UAS Branch of the Directorate of Evaluation and Standardization (DES) has evaluated and assessed many units and assisted with several FORSCOM ARMS Inspections. The goal of the UAS Branch is to identify unit deficiencies in the Aircrew Training Program (ATP) and provide mentorship to unit personnel responsible for training and managing the program. In a majority of the unit assessments, unit SOPs are an area found to be problematic.

In a majority of UAS units, Aircraft Commander (AC), Mission Coordinator (MC), and Mission Briefing Officer (MBO) program development, training, and selection; and Academic programs are areas which are usually found deficient. Many times these programs are not addressed in the SOP. During unit assessments, oral and written evaluations are specifically conducted on AC, MC, and MBOs covering SOP requirements and an overwhelming majority of these evaluations are unsatisfactory. When unit SOPs include training programs, most are vague. Many units do not project academic training on the unit training calendar and the training is not being conducted, tracked or regularly tested. The lack of academic training is made evident by the 40% average score on no notice written evaluations which tests basic knowledge.

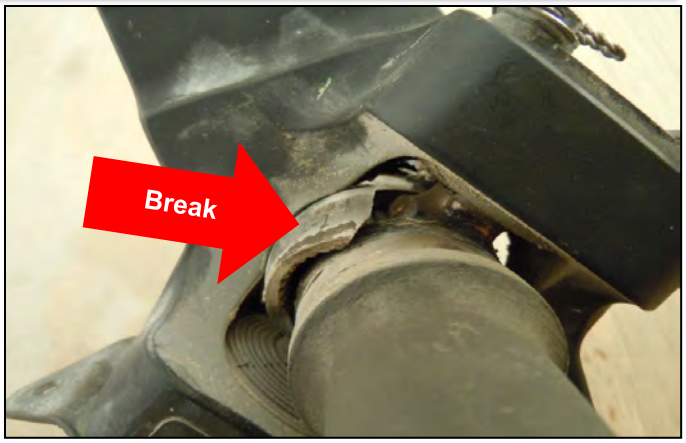
In order to correct deficiencies and increase the effectiveness of the SOP in all areas, the UAS branch recommends reviewing the unit SOP in accordance with the FORSCOM ARMS Checklist, which cites regulatory references and is a great start to developing fundamentally sound and effective programs. When followed, the ARMS checklist will ensure all required ATP and SOP programs are addressed in the unit SOP. The checklist may be found on the DES AKO portal at: https://www.us.army.mil/suite/community/12394047. Leaders should task and delegate sections to the appropriate personnel in the unit to give the unit a simple and efficient method to test the effectiveness of the SOP and required training programs. This checklist should be incorporated as a tool during the unit's Command Inspection Program (CIP) to ensure that assessments are completed effectively and on a regular basis.

A good unit SOP outlines procedures specific to the unit's mission. A majority of SOPs have been copied from other unit's and mostly duplicate information contained in AR 95-23 and the Aircrew Training Manual and do not contain unit specific procedures. Adding current and appropriate references is another recommendation to keep the SOP relevant and current.

Unit leaders are responsible for developing and enforcing the SOP as well in addition to the training and managing of the Aircrew Training Program (ATP). When a majority of unit Soldiers fail to know or understand basic academic or unit operating procedures, a deficient SOP may be at fault. The unit SOP must be fundamentally sound and informative. A deficient unit SOP is not an individual failure but a leadership failure. Leaders must provide Soldier's the tools they need to succeed and a sound SOP and academic program which adheres to the FORSCOM should be the starting point in additional to providing Soldiers the tools they need to succeed.

--CW3 Betsy Sherman, DES UAS Branch Chief, may be contacted at (334) 255-3475, DSN 558.

Mishap Review: OH-58D Loss of TR Thrust



While performing aerial support to troops in contact at an altitude of 538' AGL, the OH-58D experienced a complete loss of tail rotor thrust. The aircraft developed a rapid and uncontrollable right yaw rate with a vertical descent at approximately 4,000 feet/minute just before ground impact. The aircraft was destroyed and both crewmembers fatally injured.

History of flight

The accident aircraft (Gun2) was an OH-58D assigned to a two-ship Scout Weapons Team (SWT). The first of two missions was an armed escort of 2x UH-60s conducting an air movement followed by aerial security/reconnaissance support to ground forces in their AO. The crew's duty day start time was 0400 hours with a daily mission brief conducted at 0500 followed by a 0600 team brief. Crew briefs were conducted at the unit CP followed by aircraft pre-flight and run-up. Weather was clear sky conditions with 9000m visibility and haze. Winds were variable at 06 knots. Temperature was +31C with an altimeter of 29.95.

The SWT launched at 0900 in support of the escort mission. At approximately 1100 hours, after completing the escort mission, the team refueled the aircraft. At approximately 1130 hours the team departed the FARP and began support for friendly forces in contact with the enemy. The aircraft returned for re-arm and re-fuel at approximately 1230.

At 1245 the SWT departed the FARP and continued with support of troops in contact and conducting engagements. At approximately 1320 hours, the accident aircraft was in a high over-watch position covering the movements of the lead aircraft. The accident crew was varying their altitude and airspeed throughout their orbits. While at what appeared to be the apex of one of their orbits at approximately 33 KIAS and 538 feet AGL, the aircraft developed a significant right yaw. The yaw rate rapidly progressed as the flight crew attempted to regain control of the aircraft with a forward application of the cyclic with no corresponding increase in airspeed. Initially the aircraft nose tucked, progressing as far as 50 degrees nose low and the yaw rate progressed from one degree per second to 85 degrees per second. After the initial nose tuck, the crew leveled the aircraft and continued to spin in a relatively level attitude for several seconds followed by a vertical drop building to an approximate descent rate of 4,000 feet per minute before impact with the ground. The aircraft was destroyed and both crewmembers were fatally injured.

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Crewmember experience

The PC, sitting in the right seat, had nearly 1600 hours total flight time, with 1500 in the OH-58D (430 as a PC) and 300 NVD hours and 1100 hours combat time. The PI, flying in the left seat, had more than 1675 hours total time, 1600 OH-58D hours (460 PC) with 350 NVG hours and 1300 hours combat time.

Commentary

The accident board suspects the cause of the accident was a materiel failure of the splined steel trunnion in the tail rotor assembly. The failure resulted in the cross head and pitch change links driving the rotor blades momentarily, with a subsequent overload and fracture at the base of the PC links, resulting in a loss of tail rotor thrust. Further materiel analysis to determine the cause of the splined steel trunnion failure is ongoing. ASAM H-58-13-ASAM-02, Tail Rotor Flapping Bearing was published as a result of this accident.

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Do no disseminate outside DOD without prior approval from the USACRC.
Access the full preliminary report on the CRC RMIS under Accident Overview Preliminary Accident Report
AKO Password and RMIS Permission required

	Aircraft Taxi Class A – C Mishaps			
FY	Class A	Class B	Class C	Cost
2003	0	4	1	2,148,063
2004	0	1	3	539,609
2005	0	1	8	1,122,157
2006	1	3	3	27,714,269
2007	4	0	4	12,901,108
2008	1	2	1	2,319,482
2009	4	1	3	9,918,929
2010	0	1	5	1,206,106
2011	1	0	4	1,500,236
2012	1	2	3	2,900,000
2013	1	0	1	2,050,000
Total	13	15	36	64,319,959

Aircraft Taxi Mishaps FY03 – Present

During the last ten plus Fiscal Years (FY03 – FY13), there were 13 recorded aircraft taxi Class A mishaps, 15 Class B and 36 Class C mishaps. Total cost of these 64 incidents exceeded 64 million dollars. Additionally there were three minor injuries associated with the accidents. Review of the mishaps reveals the following:

100% of the 13 Class A mishaps were caused by human error. All Class B's (15) were human error failures. Of the 36 reported Class C mishaps, 34 (94%) were human error and 2 deer collisions. Fifty-one of the 64 incidents (80%) occurred during daylight conditions with 13 occurring at night. Blackhawks were the predominant airframe with 44 incidents followed by 7 CH-47s, 7 fixed-wing, 3 AH-64Ds, 1 OH-58D, 1 MQ-1C and 1 Mi-17. CONUS accounted for 23 (36%) of the accidents, followed by 22 OIF/OND, 13 OEF and 6 OCONUS.

Leading accident events - 64 Class A – C taxi mishaps (Class A's listed)

- **Light poles**. There were nine accidents associated with the aircraft taxiing into light poles. (1) During ground taxi to a commercial refuel point, the UH-60L's main rotor struck a light pole.
- **Barriers.** There were seven accidents associated with striking barriers while taxiing. (2) UH-60L tail rotor contacted a concrete barrier while taxiing to parking. Tail rotor section was severed. (3) As the UH-60L hovered in the LZ, main rotor blades made contact with a 12 foot concrete barrier wall. (4) UH-60A – while ground taxiing, the main rotor blades struck a concrete barrier.
- **Object/building strikes.** Twenty-five instances of aircraft striking various objects/buildings during taxi. (5) Crew was ground taxiing the UH-60A to a civilian refuel point when the aircraft's main rotor made contact with a hangar. (6) Mi-17 – during ground taxi, the main rotor made contact with the side of a clamshell hangar. (7) During ground taxi following a MEDEVAC mission, the aircraft contacted a stationary hoist with the main rotor blades. (8) While at a hover, metal siding separated from the exterior of a hangar and was ingested into the main rotor system of an AH-64D.
- **Parked aircraft.** Ten accidents involved striking non-operating parked aircraft. (9) During night taxi to parking, a C-12C struck two parked OH-58D aircraft. (10) A CH-47D pulling out of parking contacted the aft rotor of the CH-47D parked directly to his front. Other parked aircraft damaged by flying debris with one minor injury to a passenger.
- **Operating aircraft.** Eleven incidents of two operating aircraft contacting each other during taxi/parking. (11) Flight of three UH-60Ls were taxiing for passenger drop off. Chalk 2's main rotor contacted lead's tail rotor. (12) During ground taxi after passenger drop off under NVGs, one UH-60L's main rotor made contact with the sister aircraft 's main rotor while trying to reposition around the aircraft. (13) Four OH-58Ds were parking when the main rotor blades of #4 made contact with the main rotor blades of a sister ship. Both aircraft sustained significant damage. Flying debris caused one minor civilian injury and damage to an additional aircraft.

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1		5	
	November	1	0	13	0			1	4	
	December	2	2	6	4		2			
2nd Qtr	January	2	0	11	0				3	
	February	2	1	6	0					
	March	1	2	11	0					
3rd Qtr	April	2	1	6	4					
	May	1	0	4	0					
	June	1	0	2	0					
4th Qtr	July	4	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	22	16	81	12	Year to Date	3	1	12	0

as of 15 Jan 13

UAS Class A – C Mishap Table									
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2			2
MQ-5	1		2	3	Hunter	1		3	4
RQ-7		5	20	25	Shadow		1	5	6
RQ-11			1	1	Raven				
MAV									
YMQ-18	1			1					
SUAV			5	5	SUAV			3	3
Aerostat	2	5		7	Aerostat				
Total for Year	9	11	28	48	Year to Date	3	1	11	15

as of 15 Jan 13

Big problems start with small things 14 May 86 Flightfax

Remember the legendary battle that was lost because of a horseshoe nail? The horse lost its shoe, the rider lost his horse….

Okay, so some guy back in the Middle Ages lost his horse, what's the point? The point is that big problems still start with small things. The following accident started out that way. A form wasn't filled out and because of that a helicopter's gearbox wasn't filled with oil, and an aircraft had an accident.

That's the way it usually starts. Somebody doesn't do something they are supposed to do, somebody else doesn't check to see if they did it, somebody else doesn't notice that it wasn't done, and then it happens – an aircraft is destroyed or, in this case, is heavily damaged. Luckily, there were no major injuries in this accident. All too often that isn't the case.

The crew of the UH-60 had been conducting practice in slingload operations. Previous flights had been uneventful, and so was the first part of this mission. Then, on short final, with the copilot flying the aircraft, both pilots saw the master caution light come on and the chip detector light flickered. But, when the PIC recycled the main module chip detector circuit breaker, both lights went out. The pilots and the crew chief thought it was just fuzz burn, because no more lights came on.

The copilot continued the approach, and the aircraft stabilized in a hover about 5 feet above the slingload. Without any warning, the aircraft began a rapid spin to the right. The copilot attempted to stop the spin by applying full left antitorque pedal. The aircraft didn't respond. It continued to spin. The pilot then increased altitude to about 40 feet, to be sure the aircraft cleared the slingload and the riggers perched on top of the load.

The aircraft spun around about four times as it moved to the left rear of the slingload. The riggers also moved to their left, as far away as they could get from the aircraft and the direction in which it was traveling. The pilot, and the copilot, realized by now that the emergency was a loss of tail rotor control. The PIC, who was in the left seat, began trying to place the power control levers in the fuel cutoff position to stop the spin. But, because of the centrifugal force created by the spin, and his position in the left seat on the outside of the spin, he had difficulty reaching the levers. No. 1 engine was retarded to idle, and then to the fuel cutoff position, before No. 2 engine could be retarded to the fuel cutoff position. The spin lessened as the aircraft, in a left-side-low attitude, hit the ground with great force. The three-member crew and passenger left the aircraft under their own power, although the passenger was later placed on a backboard for evacuation to the hospital when he complained of lower back pain. The aircraft missed the slingload and, fortunately, none of the riggers were injured.

The aircraft had a tail rotor gearbox seizure, resulting in loss of antitorque control, causing the aircraft to yaw right and then go into a spin as the pilot increased power to

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maneuver away from the slingload. A hovering autorotation was made from about 40 feet.

The tail rotor gearbox seizure was caused by excessive heat produced by insufficient lubrication. The lack of lubrication resulted from failure to refill the gearbox with oil, following replacement of an input seal which required the gearbox to be drained.

The mechanic failed to record his work

The procedures in TM 55-1520-237-7 clearly state that the tail rotor gearbox must be serviced when an input seal is replaced. The reason it wasn't done this time was the mechanic failed to keep proper records. The fact that the tail rotor gearbox had been drained was not recorded, and the servicing was overlooked.

The technical inspector didn't do an adequate check

The technical inspector is responsible for ensuring that all work is properly performed and properly documented, but the technical inspector didn't do an adequate inspection after the input seal was replaced, and the aircraft was released for test flight although it had a grounding deficiency.

The omission wasn't found by the aircrew

The aircraft received a preflight inspection by the aviators who had flown it for nearly 16 hours following periodic maintenance. How could an aircraft that had a grounding deficiency be allowed to remain in flyable status?

The sight gauge must be checked visually before each flight to ensure there is oil in the gearbox. But the TM doesn't specify that the gauge must be checked from eye level. The sight gauge was checked during each preflight inspection, but the visual inspection was done from the ground – 12 feet from the site gauge. This fact, together with the size of the sight gauge and its placement within the gearbox cowling gave the illusion that the gearbox was properly serviced when, in fact, it was empty. The internal design of the gauge itself added to the problem. The interior glass is ribbed; lubricant collects within the rib, the glass becomes stained, and that adds to the illusion that there is oil in the gearbox.

It started with a small thing, but it ended with an accident

A horseshoe nail, some oil – it all adds up to the same thing; somebody didn't take care of the little things and pretty soon they became big things. Nobody set out to cause this accident: not the mechanic, not the technical inspector, not the aircraft's crew, but they all had a part in what happened. Let's face it; sometimes the small things are a hassle. For instance - recordkeeping. Nobody really likes it, but it's one of those small things that, if not done right, can lead to a big accident. If the records had been kept right, this accident would never have happened.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in December 2012.

Utility helicopters

UH-60

-M Series. Main rotor blades contacted the upslope of a pinnacle. Crew landed the aircraft. Damage sustained to all four MRB, tail rotor blades, and tail pylon. No reported injuries. (Class A)

-A Series. Crew was ground taxiing to a civilian refuel point when the aircraft's main rotor system made contact with a building. Extensive damage reported to the main rotor system, civilian hangar, and possible damage to aircraft within the hangar. (Class A)

Unmanned Aircraft Systems

RQ-7B

-UA experienced sudden engine failure while system was aloft at 7K MSL. Recovery chute was deployed and system was recovered with damage. (Class C)

-Operators lost computer link with system during flight. System was not recovered. (Class B)

RQ-20A

-UA crashed after crew lost link with the system during flight. (Class C)

-Crew experienced uncommanded input during flight after which the system entered a nose-low dive attitude and impacted the ground. (Class C)

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U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Number 22 February 2013

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Online Report of Army Aircraft Mishaps

When is an Aviation Formation at Greatest Risk?

OEF ACCIDENT TREND ANALYSIS FROM FY08-FY12

During fiscal 2012, senior Army leaders shortened deployment cycles from 12 to nine months. Based upon operational Commanders' observations that the first and last 60-90 days of a rotation are highest risk, this change begged a significant question: Will deployed Aviation units be exposed to greater risk since two-thirds of their tour will be spent in the "high risk" zones? Few formal studies and recommendations exist to determine the validity behind this commonly held assumption.

This article will examine risk periods during a rotation to Operation Enduring Freedom (OEF), validate the field's observations about higher risk incurred during the first and last 60-90 days, and determine if Aviation units are encountering greater risk due to shorter deployments. The U.S. Army Combat Readiness/Safety Center Aviation Directorate accomplished trend analysis by searching the Army Safety Management Information System (ASMIS) database for Class A - E (Class D and E as reported on the Army Abbreviated Aviation Accident Report [AAAR]) mishaps in OEF from 2008-2012, with 646 results returned for Active, Reserve, and National Guard Aviation units. Unfortunately, ASMIS does not codify when in a deployment cycle an accident occurs, so that information was not available to determine boots on ground for each entry and associated unit identification code (UIC). To account for the lack of data, we conducted a task force organization study on UICs in ASMIS, identified which battalion and combat aviation brigade task forces the company UICs fell under for command and control during the deployment, and finally determined the dates of deployment for each UIC in ASMIS to verify when in the parent UIC's deployment cycle the accident occurred.

The 646 Class A-E mishaps, charted in 10-day increments, are depicted in figure 1. The left scale represents the number of mishaps; the bottom scale represents days into the deployment.

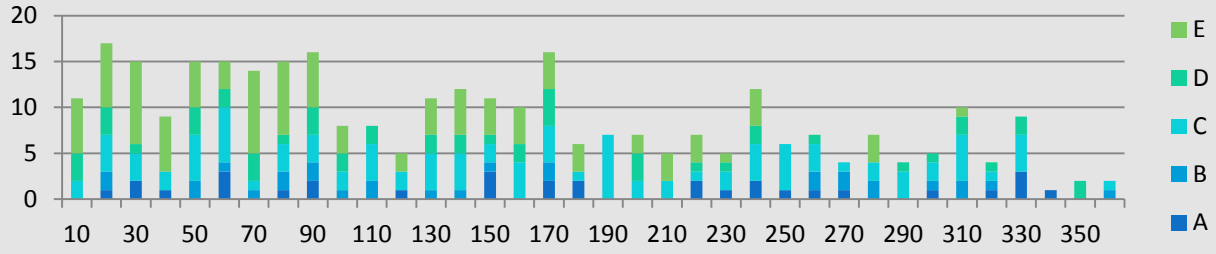

Figure 1: OEF FY 08 – 12 Class A - E Mishaps

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Upon first glance, this chart appears to show that as the deployment progresses, mishaps decrease. Batching the results in 60- or 90-day increments seems to confirm that the longer an Aviation unit is deployed, fewer accidents are experienced. Figure 2 depicts 60-day batching.

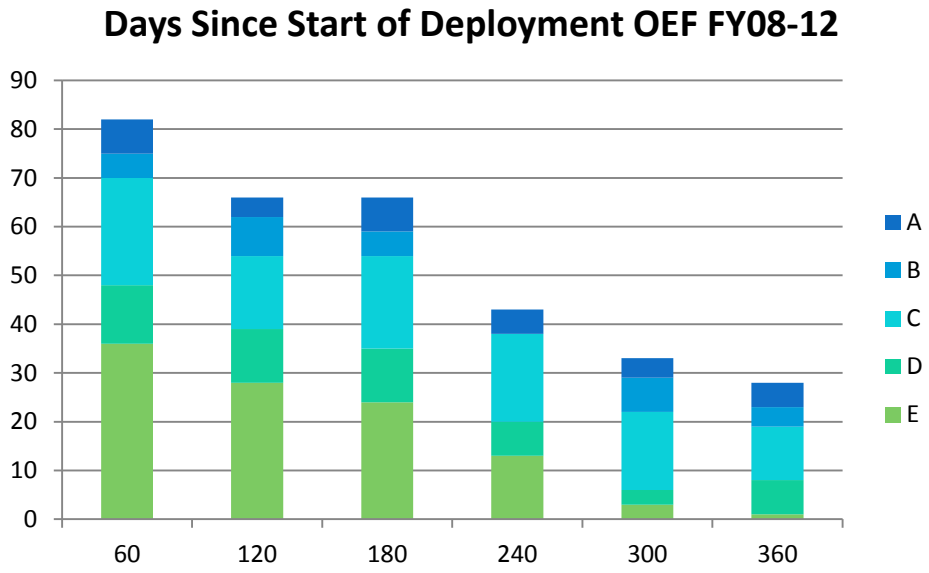

Figure 2: Class A-E Mishaps 60 Day Increments

It becomes obvious that accidents decrease as deployed time increases. However, a noticeable drop in reported Class E mishaps is evident, as highlighted in figure 3b. Currently, there is no reliable method to determine why Class E accidents drop significantly during the last 60 days of deployment, but it is possibly a strong indicator of commanders' instincts and observations about their units (to be discussed fully in a bit). For now, notice that by separating Class D and E mishaps from the data, an observed negative linear progression (less risk over time) is evident in Class A-C accidents in OEF, as depicted in figure 3a.

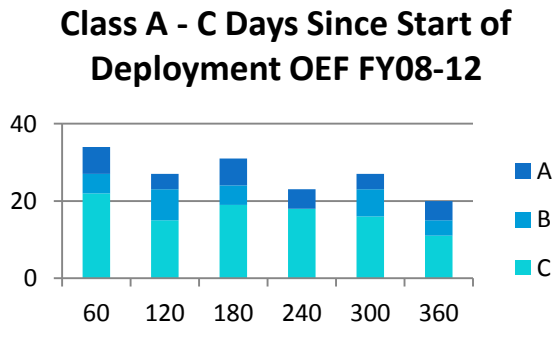

Figure 3a

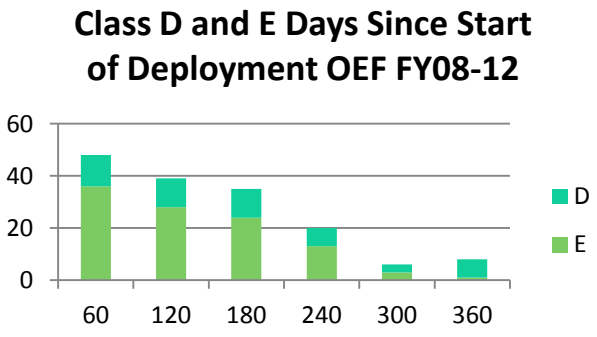

Figure 3b

How significant is the downward trend of mishaps over the period of a deployment? By assessing the number of accidents over time, it becomes evident the trend is definitely downward throughout the rotation cycle. In other words, statistical analysis of the data reveals that as time increases during deployment, mishaps decrease (r = 0.9), as shown in figure 4.

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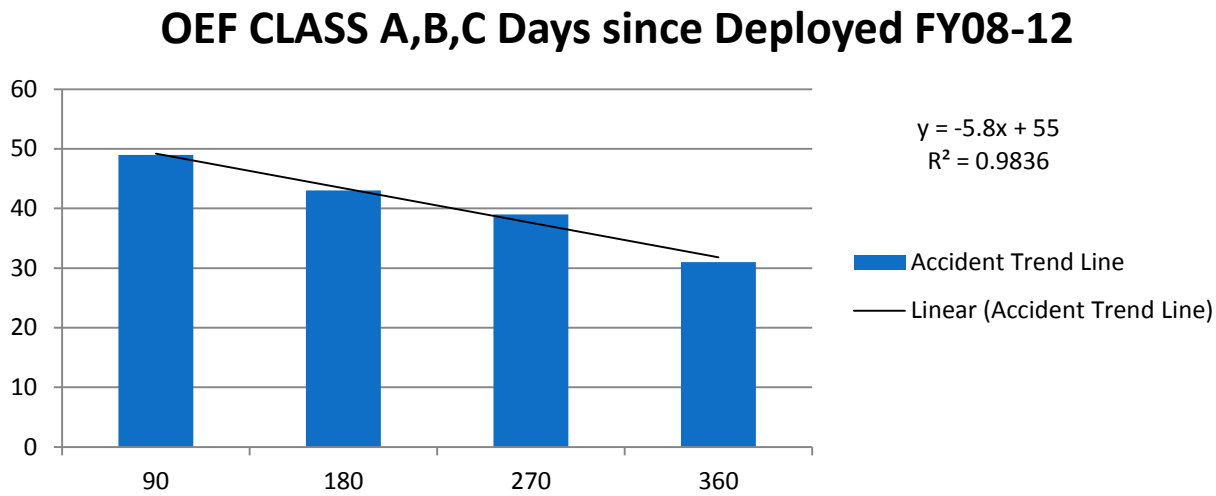

Figure 4

These findings support the belief that Aviation units are less at risk for accidents over time as they become more proficient at command and control, better understand the operating environment and enemy, and thoroughly hone the team across individual, crew, and collective task performance. Yet, there seems to be no statistical validity to the last 60-90 days being a higher risk period during a unit's deployment to OEF.

I am not saying that the observations and instincts of Commanders and those who have deployed is incorrect. I have been in that seat, and have seen firsthand complacency and "get-home-itis" growing within my formation during the final months of a deployment. Instead, based on our hands-on and operational experience, we believe the significant drop in Class E incidents seen in figure 3b is not an actual decrease, but indicative of a lack of accident reporting and tracking. Complacency on the part of ASOs or perhaps command climate or unit safety culture could be to blame, but confirming either assumption will require more study.

Statistics in the aggregate can be misleading. The decreasing accident trend line seen in figure 4 gives the appearance the decrease is completely linear. Now that the clear point that Aviation units experience fewer accidents the longer they are deployed is made, let's look at Class A-C accidents in 10-day increments again (figure 5).

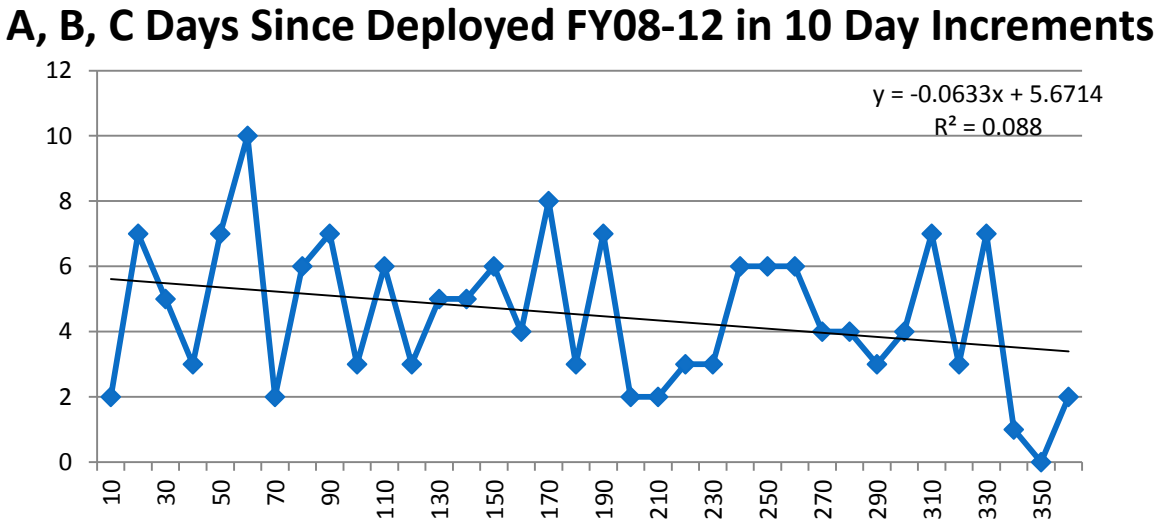

Figure 5

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Clearly, linear analysis still indicates that as time increases during a deployment, mishaps decrease, but when broken down by 10-day increments there is more variation (r = 0.3). What accounts for this? There are some seasonal variations in OEF that affect mishaps, and investigating Class A accidents by month from FY08-12 (figure 6) provides Aviation commanders with valuable information on how the risk environment and other deployed factors affect their units. To what extent do the months and seasons interact with time deployed for each unit? To be honest, more study is required to understand and provide trends on this complex interaction and combination.

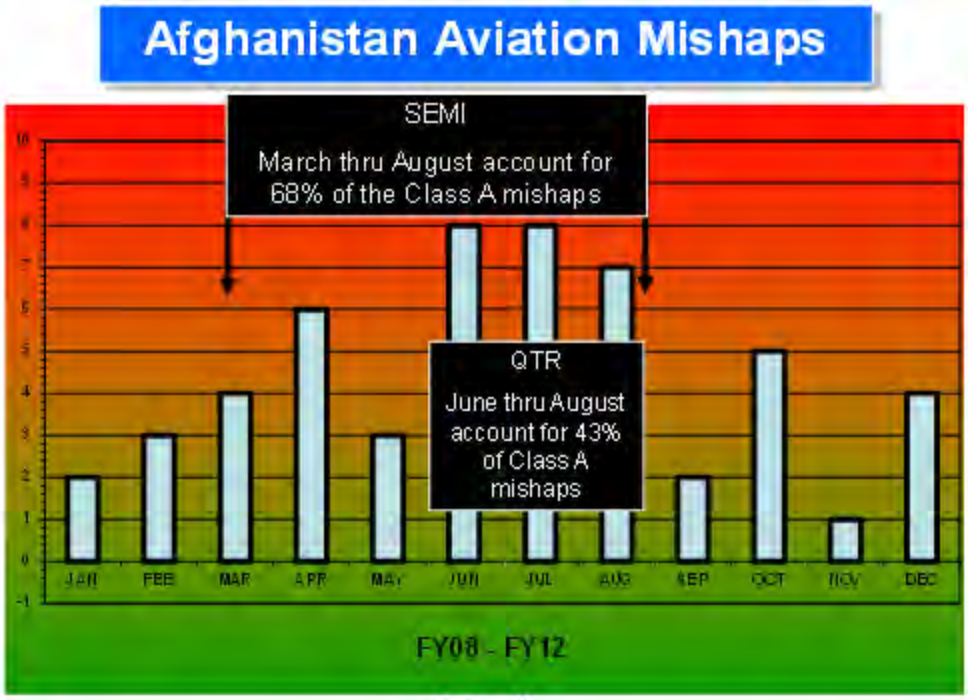

Figure 6

Obviously, further analysis is required to determine seasonal effects and periods of increased risk, and how these collectively impact unit performance and risk over the length of the deployment. What we do know from five years of 60- and 90-day accident data, though, is that unit proficiency at the individual, team, and collective levels, gained over time, transcends and prevails over other factors. Diligence in combating the effects of complacency in the last third of a combat tour has been highly effective for units deployed to OEF, and must continue to be emphasized at all levels of command for current and future deployments.

Until next month, fly safe!

LTC Christopher Prather USACR/SC Aviation Director
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This article was originally published in the January – March 2013 edition of *Aviation Digest*. The Doctrine Division, Directorate of Training and Doctrine (DOTD), U.S. Army Aviation Center of Excellence (USAACE), Fort Rucker, has started publishing *Aviation Digest* quarterly for the professional exchange of information related to all issues pertaining to Army Aviation. *Aviation Digest* is available on the DOTD website: www.us.army.mil/suite/page/432. Welcome back *Aviation Digest.*

Developing a Culture

CW5 Steve C. Dunn
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Nonstandard Branch Chief

Merriam-Webster defines culture as an integrated pattern of human knowledge, belief, or behavior that has been transmitted or passed on to succeeding generations. It can be further defined as shared attitudes, values, goals, and practices that characterize an institution or an organization. Looking at Army Aviation as a whole, it can be considered one large organization comprised of smaller communities titled as Attack, Assault, Cargo, Scout and Fixed-Wing. Through numerous hours flown and training events these communities have passed on practices, attitudes, and a base knowledge that fits the true definition of a culture.

When Army Aviation was in its infancy, the passing of culture was easy due to the limited amount of airframes in the inventory. For those "seasoned" aviators that have been around for more than a day, training in more than one airframe was normal and easy since Bell helicopters were the mainstay at Ft. Rucker. Standardization took minimal effort and supporting training manuals didn't require a doctorate to produce. As airframes advanced and aircraft systems advanced, so did the culture that supported each community. Checklists turned into books, training manuals increased in size, and computer programs became the primary means of flight planning and training. It took a monumental effort on the part of Aviation Directorates (DES, DOTD, DOS, etc.) to standardize practices from the Army level down to the individual aviator.

New airframes such as the UH-72 Light Utility Helicopter (LUH) have also added to the complex effort of standardization. As the first commercial off-the shelf aircraft procured by the Army, the LUH has introduced a whole new realm of standardization issues for both the Active and Guard components. Units have faced many challenges in the fielding of the Lakota, especially in the training area. Initial aircraft fielding was done without traditional Aircrew Training Manuals (ATM), Performance Planning, or the -10s that other aircraft were delivered with in the past. Due to the lack of these materials, the trend has been to revert back to what was done with other airframes, or cultures.

What these units need to understand is that even though the UH-72 is a civilian aircraft, it was purchased for Army use and will be operated under Army regulations. ATM's have been written, performance planning has been developed, and the Rotorcraft Flight Manual (RFM) will suffice as the traditional -10. If anything else is needed for fielding, training, or qualification, it is incumbent on the unit to request support through the proper channels rather than develop these items on their own.

As with the other airframes, or "cultures", tools such as PPC, tabular data, or weight

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and balance are the responsibility of Aviation and Missile Command (AMCOM) not individual aviators. At no point with other airframes has it been acceptable to use “home made” products for Army use and the UH-72 is no exception. Submitting an “Operational Needs Statement” (ONS) to the supporting Project Manager (PM) is the first avenue to getting support for anything needed for a unit to accomplish its mission.

The LUH community has been lucky in the sense that there has only been one Class-A accident since the Army purchased it. The trend in the UH-72 community is that many aviators want to label themselves as “the first”. The first to do a medevac mission, the first to accomplish a paradrop mission, or the first to accomplish sling load operations are all notable feats and were accomplished under approved methods. The first to develop an Ipad application, the first to develop tabular data, or the first to develop a PPC program are not notable and will do nothing but hurt the community and endanger lives as these items are passed around or bought. Being the first to destroy an airframe because an Iphone application was wrong is not the notoriety the Lakota culture wants to grow from.

The UH-72 is a very unique aircraft and should be treated as such. Although it was bought to replace UH-1’s, OH-58’s, and UH-60’s, it is in no way similar to these aircraft other than the rotor system and tail rotor. By embracing it as a new yet different aircraft, we as Army Aviators can help its integration to the fleet and at some point in time will see it as its own “culture”.

The Federal Aviation Administration (FAA) now offers fatigue management tools applicable to helicopter pilots and maintainers online at www.mxfatigue.com. The FAA website and YouTube also host a new cautionary video – Grounded.

Army aviation video worth checking out - Recon: Game Changer. Viewers get an inside look into the latest technology in Army Aviation, including the Apache Block III (AH-64E) and manned-unmanned teaming. Go to http://www.pentagonchannel.mil/recon/

Search: Game Changer (June 4, 2012)

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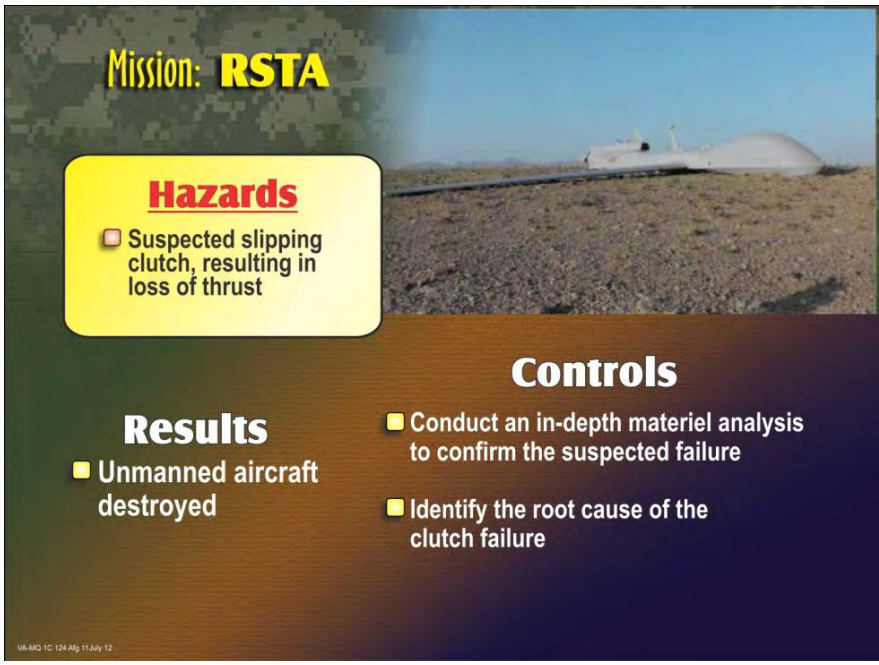
One minute after takeoff, the aircraft leveled off at approximately 100 feet AGL at 75 KIAS and began an un-commanded descent. The aircraft failed to respond to commands from the crew, continued its descent striking the ground two kilometers south of the runway.



An MQ-1C was launched on a reconnaissance, surveillance, target and acquisition (RSTA) mission. The unmanned aircraft (UA) began its takeoff roll by lowering its flaps, applying takeoff power and releasing its brakes. Steering commands were automatically made to maintain runway centerline as the MQ-1C accelerated to rotation and lift off. Once airborne, the flight controls switched to flight mode; landing gear and flaps were retracted and the aircraft continued a climbing profile while navigating to a preset location. Approximately one minute after takeoff , the MQ-1C stopped climbing and leveled off at approximately 103 feet above ground level (AGL) at 75 knots indicated airspeed (KIAS). The MQ-1C then began an un-commanded descent. During the descent, it began pitching up and down, porpoise-like. The operators commanded the engine to 100 percent. The engine was producing less than 50 percent for two seconds after being commanded to 100 percent before it responded. During this time period, the engine RPM dropped from 4,000 to 2,611. The MQ-1C rolled slightly left following the preprogrammed Automatic Takeoff and Landing System (ATLS) route. During the turn, the operator selected the “ATLS Abort” command. The MQ-1C did not respond to the command because ATLS takeoff logic does not allow operator (knobs) control until the MQ-1C reaches 300 feet AGL. The vehicle continued to descend until impacting the ground approximately two kilometers south of the runway.

Findings:

— The UA experienced a loss of thrust, most likely caused by a slipping clutch.
— Operators routinely exceeding duty day limitations.
— The One System Ground Control Station voice recording capability was not set up.

Recommendations:

— Perform additional materiel testing of the failed components to identify the root cause of the failure.
— Evaluate and appropriately adjust fighter management policies and personnel utilization.

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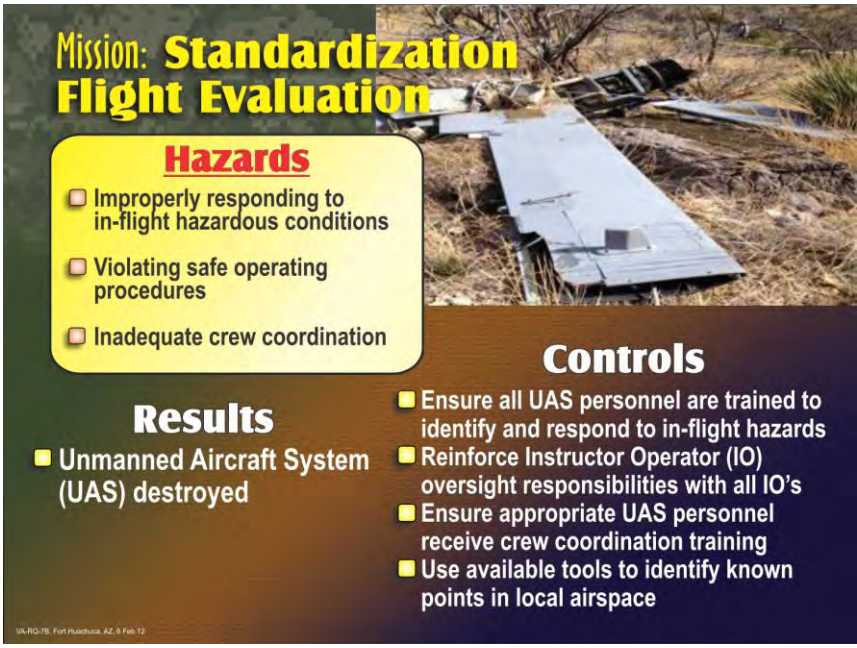
During a launch and recovery mission, the IO instructed the AO to go to a holding location. The AO input the wrong location for the holding procedure. The elevation of the programmed location was higher than the flight altitude of the unmanned aircraft (UA). The UA was destroyed when it flew into the side of a mountain.



After the RQ-7B was launched to complete a standardization flight evaluation, the crew contacted tower requesting an approach to the local runway. After completing the approach and the wave-off, the IO instructed the AO to proceed to a pre-designated holding area. The AO selected Point Nav by clicking the wrong holding area location on the moving map. He selected an area southeast of the appropriate holding location in mountainous terrain. Shortly thereafter, a yellow Terrain Clearance Warning displayed on the AOs computer monitor accompanied by the audio warning. The warning is activated when a UA comes within 3 kilometers of elevated terrain and is less than 500 feet AGL. Eight seconds later, a red Terrain Clearance Warning displayed on the computer monitor accompanied by the audio warning. The red Terrain Clearance warning is activated when an UA comes within 3 kilometers of elevated terrain and is less than 300 feet AGL. The warning will continue until the UA is no longer within 3 kilometers of elevated terrain and is 500 feet above ground. When the IO looked up to instruct the AO on the AV-TALS Recovery procedure, he realized the altitude of the UA was approximately 5400 MSL – lower than he had directed. The UA was 1000 ft MSL lower than the IO had intended and it was flying in the wrong location. The IO tried to prompt the UA to climb without effect. The UA was unable to clear the terrain, crashed and was destroyed.

Findings:

- The AO did not appropriately respond to an in-flight hazardous condition by properly modifying the flight plan.
- The IO did not include the computer warning panel in his scan, failing to respond to a yellow and red "Terrain Clearance Warning" accompanied by an audio warning during the last two minutes of flight.
- The crew failed to properly coordinate and communicate during critical phases of flight.

Recommendations:

- Consider local area orientation training for all UAS operators and requiring overlays clearly depicting the planned holding areas.
- Reinforce proper scanning techniques.
- Ensure all UAS personnel receive required Crew Coordination Training.

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Fixed-wing Five Year Accident Trend Review

During the last five fiscal years (FY08 – 12), there were seven recorded fixed-wing Class A mishaps resulting in three fatalities. Five mishaps occurred during the day with two at night. Two were in OIF and one in OEF. Additionally, there were three Class B and 31 Class C mishaps. A review of the mishaps reveals the following:

- Three (43%) of the seven Class A mishaps were caused by human error. Two (28%) had materiel failure as causal and two were unknown/not yet reported. Class B's consisted of one human error and two materiel failures. Of the thirty-one reported Class C mishaps, 11 (63%) were human error, three materiel failures (10%), and 15 environmental cause factors (lightning, hail, bird, etc).

Leading accident events (Class A)

▪ **Human error**. (1) During aircraft taxi after landing, the accident aircraft struck two OH-58 aircraft resulting in damage. (2) Aircraft landed hard with an excessive vertical rate of descent which caused the airplane to bounce off the landing surface. (3) Aircraft contacted the runway with the landing gear in the stowed position during a demonstrated emergency procedure resulting in Class A damage.

▪ **Materiel failure.** There were two materiel failure mishaps resulting in three fatalities. (4) During the landing phase of a simulated #2 engine failure, a malfunction in the #1 propeller governor caused a left yaw excursion resulting in aircraft departing the runway with subsequent damage to the outboard section of the left wing and damage to the #2 propeller assembly. (5) While returning from a recon mission at night, the aircraft departed controlled flight and initiated a near vertical descent from 25,000 feet MSL and impacted terrain resulting in fatal injuries to all three crewmembers and a destroyed aircraft. Materiel failure suspected.

▪ **Additional.** (6) Crew reported loss of engine power during go-around for engine out training. Aircraft descended to ground impact. Class A damage reported. Cause of power loss not reported. (7) Crew was conducting an RL progression training flight when they experienced a cockpit warning indication/report for a left main landing gear anomaly. They initiated emergency procedures and the landing gear collapsed upon touchdown. Aircraft experienced extensive damage to the left wing and spar. Cause not yet reported.

FW Flight Mishap Rate FY08 – 12

The flight mishap rate for fixed-wing aircraft was 1.16 Class A mishaps per 100,000 hours flown. The rotary-wing aircraft mishap rate for the same time period was 1.57. FY03 – 07 had a FW rate of 0.16 and a RW rate of 2.68.

Fixed-wing CLASS A – C Mishaps																
FY	Class A (7)						Class B (3)					Class C (31)				
	C-12	C-23	C-26	UC35	EO5C	Fatal	C-12	C-23	C-26	UC35	EO5C	C-12	C-23	C-26	UC35	EO5C
2008	2						1					2			1	
2009												7	1		2	
2010	3					3	1			1		5				1
2011												5		1		
2012	1				1							5			1	
Total	6				1		2			1		24	1	1	4	1

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 11 Feb 13
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1		5	
	November	0	1	13	0			1	4	
	December	2	2	6	4		2			
2nd Qtr	January	2	0	11	0				5	
	February	2	1	6	0					
	March	1	2	11	0					
3rd Qtr	April	2	1	6	4					
	May	1	0	4	0					
	June	1	0	2	0					
4th Qtr	July	4	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	21	17	81	12	Year to Date	3	1	14	0

UAS Class A – C Mishap Table									as of 11 Feb 13
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2			2
MQ-5	1		2	3	Hunter	1		3	4
RQ-7		5	20	25	Shadow		1	5	6
RQ-11			1	1	Raven				
RQ-20			4		Puma			3	3
YMQ-18	1			1					
SUAV			1	5	SUAV				
Aerostat	2	5		7	Aerostat				
Total for Year	9	11	28	48	Year to Date	3	1	11	15

What makes a good aviation safety program? September 1992 Flightfax

As the Director of Army Safety, I've done a lot of traveling during the past few months. And whether I'm talking with students at a pre-command course or with brigade and division commanders and sergeants major in the field, I'm asked the same basic question, "What makes a good aviation safety program?"

Leaders want to know how to improve or increase safety awareness in their organizations. Unfortunately, safety cannot be issued like fuel or ammo; it evolves through command leadership, designated safety personnel, proper risk management, training, and a well-defined aviation accident prevention plan. Safety awareness involves many elements and is like morale – it's caught from the environment. Looking into those units that have successful programs, I have found that they all focus on these five important areas.

1. Command leadership. Of a commander's many policy letters and memos, none is more important than his safety philosophy statement. The objective of safety is to help units protect warfighting capability through accident prevention. And the degree of importance the commander places on safety will determine the priority it gets throughout the unit. The commander's safety philosophy must represent his style of leadership and must be written in his own words and backed by action.

Command involvement is paramount to a successful safety program, and safety must be integrated into every aspect of a unit's activities. Preventing an aircraft accident only to lose some crewmember in a POV accident just doesn't accomplish the Army's mission. Cheerleading from the sidelines is not enough; leadership at this position demands personal involvement. Mission briefings, after action reviews, and flight line visits are important. Being involved in drivers' training is another vital command action. And commanders should review safety statistics at every command and staff meeting, not just at monthly or quarterly safety meetings.

Quality leadership is a 24-hour-a-day process. Commanders can use a variety of leadership techniques, but the following command actions are key to success:

•Establish performance criteria

•Ensure all personnel are aware of the performance criteria

•Ensure training is conducted to standard

•Ensure operations are by the book

•Take immediate and effective action against deviations from established performance criteria

2. Designated safety personnel. The commander is the safety officer and needs to know what safety inspections, training, and reports are required. But a commander cannot do it alone. He must have a designated full-time aviation safety officer (ASO), who should be a

Continued on next page

seasoned warrant officer who has the warfighting credentials to serve as a pilot-in-command in the unit. A good safety NCO is also critical. Additionally, every other NCO right on up to the command sergeant major must be involved in safety. They also have a shared responsibility in helping to protect the force, and without their leadership, senseless accidents will continue.

The advice of the ASO and safety NCO can be just as important as that of the flight surgeon or chaplain. Thus, designated safety personnel must fully understand their responsibilities and receive the necessary training to help ensure competency in their positions. Additionally, safety personnel cannot be effective if they are buried under a rock. They need access to and visibility with the commander to reinforce the importance of safety in the unit's mission.

3. Risk management. Risk management should be the cornerstone of any safety program. This five-step cyclic process – identify hazards, assess the hazards, make a risk decision, implement controls, and supervise – can be easily integrated into the decision-making process. Used in a positive command climate, risk management can become a mindset that governs all unit missions and activities.

In addition to setting the example by properly applying risk management principles, commanders must ensure that every unit member has a solid understanding of risk management and can apply the principles effectively. Safety is about preventing accidents, and if practiced by the command and every soldier in the unit, risk management will enhance the mission and help prevent accidents.

But we're missing the boat on risk-management training. Most senior leaders are using risk management properly, but it's the young officers and NCOs who must apply risk-management principles in the cockpits, on the flight lines, and in the maintenance hangars daily. At the Army Safety Center, we're working with TRADOC to integrate risk management into the schoolhouse and our training management doctrine so that we can teach the specifics right down to platoon and squad level.

4. Training. A successful safety program goes back to the basic two-part safety equation: the individual and the leader. Soldiers must be trained to established standards and held responsible for their technical and tactical competence and knowledge of regulations. They must be trained to effectively identify hazards and manage risks, and they must have the self-discipline to consistently perform tasks to standard. And leaders must be ready, willing, and able to enforce standards. For anything less than by-the-book performance, leaders must make on-the-spot corrections and require that soldiers receive remedial training if necessary.

Aviators in units with good safety programs receive individual training to increase capabilities in basic tasks while minimizing limitation in accomplishing required aircrew training manual tasks. And aviators in these units demonstrate a high degree of professionalism and accept responsibility for policing their own.

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Units with good safety programs also carefully plan flight missions and select crews. Crew coordination training is part of every mission. And instructor pilots and instrument flight examiners enforce the safety and standardization program and coordinate for immediate and effective action to be taken against violators of flight discipline. NCOs in these units are trained to perform maintenance operations by the book and require that their mechanics perform to standard, ensuring aircraft are mission ready.

5. Accident prevention plan. Units must have a clearly defined aviation accident prevention plan that formally established the safety program within the unit. That plan should outline personnel responsibilities and provide implementation instructions, goals, and methods the command will use to monitor the success of the safety program. The plan should be based on the philosophy that accident prevention is an inherent function of the commander's yearly training guidance.

The accident prevention plan should require at least monthly aviation safety meetings where current safety issues and lessons learned can be discussed among unit members. A requirement for a semiannual aircraft accident prevention survey should also be included. The commander can use information obtained from the survey to determine the effectiveness of the accident prevention plan. And it's also a good idea to include rewards for good results – such as a day off for no accidents for 90 days.

Following one of my recent briefings to students at the pre-command course at Fort Leavenworth, a student wrote on his critique sheet: "Sending the Commander or anyone from the Army's Safety Center all the way to Kansas was a complete waste of his time and mine! If we do not know all we need to know about safety by now – we are in trouble!" Let me assure you, that young leader is in trouble if he thinks he knows all he needs to know about safety. Last year we killed 372 soldiers. We had 49 Class A aviation accidents and severely damaged about 1,500 ground vehicles. Total accident costs for FY 91 exceeded $500 million. Since we don't budget for these kinds of losses – who's in trouble?

As a former aviation brigade commander and as the Director of Army Safety, I can tell you I do not know all the safety answers today. But I really believe that protecting the force requires command involvement, leadership by designated safety personnel and every NCO in the unit, proper risk management, training, and a well-defined accident prevention plan. These are the key elements to a good aviation safety program. Safety is awareness; being safety conscious will not impede training or readiness, it will enhance it.

Our units that train to standard and put safety in the mission-essential task list business are defining programs that can result in no memorial services or major accidents. We are fortunate to have many organizations that fall into this elite category. Our challenge is for our brigades and divisions to follow this fine example in protecting the force.

- Brig. Gen. Dennis Kerr, U.S. Army, retired, was Director of Army Safety from December 1991 – February 1994 when he wrote this article.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in January 2013.

Utility helicopters

UH-60

-A Series. Aircraft contacted the ground during an APART autorotation with resultant damage to the tail wheel and stabilator. (Class C)

-L Series. Main rotor blade was damaged by a loose panel entering the rotor system on takeoff. (Class C)

LUH-72A

-Aircraft experienced engine overtemp during start. (Class C)

Observation Helicopters

OH-58D

- Left-side engine panel separated from the aircraft while in flight. Post-flight inspection revealed associated damage to a main rotor blade. (Class C)

Cargo helicopters

CH-47

-F series. Aircraft experienced a loss of the tongue ramp during cruise flight. (Class C)

The real pro…

Knows what rules are made for and respects them. The real pro follows them to the letter every time, knowing that his or her own safety and that of a considerable number of other people are dependent on standard by-the-book procedures.

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Online Report of Army Aircraft Mishaps

The Effects of Stress on Our Physiological, Perceptual, and Cognitive Performance

By Craig Geis • CraigGeis@CTI-home.com

In Part 2A of this series (Jan 2013 Flightfax) we looked at the five stages of the stress response. In this article we will discuss in detail the effects of stress on performance and use the Air France Flight 447 accident as a case study to demonstrate the learning points. You should download: How Panic Doomed Air France Flight 447 at www.cti-home.com under articles to refer to. The footnotes referenced in this article refer to the footnotes in the case study. You may not agree with all my personal thoughts in the case but the point is to help you think about and understand the points in this article.

Part 2B

Humans employ three primary systems that aid in survival. Each of these systems will be either enhanced or degraded depending on the perceived stress level.

1. **The Physiological System** is defined by elements of motor performance – simple, complex, and gross motor skills.
2. **The Perceptual System** relates to our ability to process input from our five senses – primarily visual and auditory.
3. **The Cognitive System** deals with the mind and includes the processing of information, judgment, decision making, and memory.

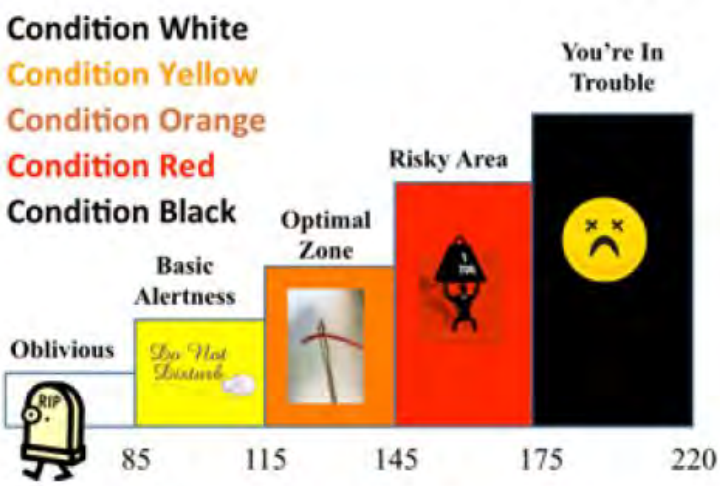

Figure 1: Hormonal Heart Rate & Cooper Color Codes

The color code reference in Figure 1 was originally presented by Lt.Col John Dean "Jeff " Cooper,

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United States Marine Corps, in his book *Principles of Personal Defense (1989).* According to Cooper, the most important means of surviving a lethal confrontation is neither the weapon nor the martial skills. The primary tool is the mindset of the individual. These codes originally designated the various states of awareness that one must have in preparing to handle a threat. Over time these color codes were also used to describe a person's level of alertness. I have adapted the color codes to describe levels of alertness, attention, and arousal associated with varying levels of hormonally reduced heart rates.

The following is a brief summary of performance associated with the hormonally induced heart rate in each zone. As you read, think about personal examples you have experienced and refer to the footnotes in the Air France 447 case study.

Below < 85 HBPM – Condition White: Oblivious to Our Surroundings

Physiological – No impairment, we still have total access to all our motor skills.

Perceptual – Even though all our senses are intact, we are not using them effectively because we are not paying close attention to our surroundings. Our attention process lacks a clear focus and we are susceptible to missing important cues.

Cognitive – Arousal level is low in this zone; therefore the brain is not operating at an efficient level. I call this the FDAH (fat, dumb, and happy mode). This is the zone in which complacency is most likely to occur. [2, 3, 6]

85 – 115 HBPM – Condition Yellow: Basic Alertness

Physiological – This zone is good for the use of fine motor skills and the smaller muscle groups. Hand and eye coordination is excellent for any task requiring precision and accuracy.

Perceptual and Cognitive – This is the perfect zone for solving complex mental tasks and doing meticulous planning. Global attention occurs in this zone, so general awareness and discrimination of tasks is very good.

115 – 145 HBPM – Condition Orange: Optimal Zone

Physiological – At 115 HBPM our fine motor skills start to degrade because blood starts to move away from the fingertips toward the larger muscle groups. The ability to coordinate and execute a series of motor tasks that don't require a great deal of strength will be excellent.

Perceptual – Hearing and eye sight actually improve in this zone.

Cognitive – The brain is active, but not too active, so we aren't at the level at which the mind is overloaded by inputs. We are able to easily discriminate between various inputs and to process the information coming in from our senses. In Condition Orange, we are able to shift from global attention to selective attention easily when the need arises. When one input presents itself as a possible threat we are easily able to shift to selective attention.

145 – 175 – Condition Red: Risky Area – Hypervigilance Zone [1, 7, 14]

Physiological – At the 145 HBPM level not only are fine motor skills gone for all practical purposes, but the complex motor skills start to degrade as well. Reaction time slows, hands may get shaky, but gross motor skills increase making us stronger and faster.

Perceptual – Perceptual narrowing/attention blindness is one of the most important issues when you are in the Red Zone. Because of increased selective attention, most of our informational processing resources are devoted towards that which we are attending to. However, those things

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we are not attending to are not processed – we are essentially blind to those things; hence the term *attentional blindness*. [13] Perceptual narrowing applies to hearing as well and it is called *auditory exclusion*. [11, 12, 15] Sounds either disappear or appear muffled. Often times we are unable to hear what others are saying and miss key information about the threat.

Cognitive – In this zone, our brain is doing something called sensory gating.[9] This occurs when the brain concentrates its mental energy on one stimulus at a time, and shuts out or blunts other stimulus. This is an evolutionary mechanism that is present under stress to help prevent the brain from getting over stimulated. In the 145-175 HBPM zone, we are also going to see decision making problems, and irrational behavior at the top end of this range.[8] We may become distracted when presented with multiple stimuli. We will also see processing times slow down, as well as delays in making decisions.[21] Memory is affected because the stress hormones block access to the long term memory system. Delay begins at 145 HBPM and the brain starts to "lock up" at 175 HBPM. So, at best we have slower reaction times and decision making. At worst we are approaching confusion and panic.

175 – 220 HBPM – Condition Black: Serious Trouble – Confusion and Panic

Physiological – Blood flow is moving rapidly to the large muscle groups which give us maximum gross motor skills and strength resulting in extreme rigidity and clumsiness. A person may experience exaggerated actions when attempting to perform a physical task, even one well established by habit pattern.[10] For example, a non-instrument rated pilot is more likely to over control the aircraft in an inadvertent IMC condition because of their stress level. This phenomena is often seen in "loss of control" accidents.

Perceptual – From the point of view of the perceptual processes, we go on "auto-pilot." It is not unusual to see individuals experience childish or irrational thoughts. At the high end of the Black Zone we also have reports of disassociation, or "out of body experiences."

Cognitive

- The frontal lobe shuts down and the mid-brain takes over. The frontal lobe is responsible for a number of key functions including: short term memory, judgment, impulse control, concentration, inhibition, and rational thought. The frontal lobe is important, so losing access to it makes it impossible to process rational options.[18] The mid-brain is where unconscious processes occur, so in this zone we are only able to employ those things that are either reflexive or those that have been ingrained into our neural pathways because of habit patterns (pre-programmed muscle responses).
- Access to short and long-term memory is greatly affected. The loss of memory precludes any ability to concentrate.[17] Imagine if your computer lost its RAM. Everything you typed into your computer would be lost as soon as you hit the keys on the keyboard. This simulates the challenge the human mind has when the frontal lobe is missing from the equation.
- Overload and confusion: So much data is coming into the brain that it is impossible to process it all. Without a frontal lobe we have no way to discriminate and sort the inputs and we essentially cannot process anything. With no processing power left, we get confused and panic sets in. Because we cannot find a solution to deal with the threat we feel like we are running out of time. Finally, a sense of helplessness creeps in,[19] we experience negative thinking,[20,24] and often employ childish or nonsensical actions. Examples of taking actions in the Black Zone that make no sense include jumping from a skyscraper that is burning, or taking out carry-on baggage after an airplane crash.

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- Negative thinking and acting: The term for this is *perseveration*.[16,22,23] What happens with perseveration is that when presented with a stimulus one reaches back and brings forward the most familiar solution/action to deal with the situation. This is called the default option. However, when the default option does not work, they continue to persist in the course of action because they can't come up with any logical alternatives. For example, settling with power generally requires three key elements to occur, and these conditions should be avoided in combination with one another. These are: A near zero airspeed, up to 100 percent power applied, and a better than 300 foot per minute rate of descent. Once you have all of these situations in occurrence, the aircraft will settle in its own downwash from the rotor system. The only way to recover is to gain forward airspeed and allow the rotor system to fly into "clean air." An example of perseveration is when a pilot just continues to attempt to pull additional power to stop the descent. At this level of stress they can't come up with the logical alternative of gaining airspeed and flying into clean air.
- The phenomenon of *capture error* is prevalent in the Black Zone. As you will recall from Section 1, an intended action can slip off its intended path and be captured by a more ingrained habit pattern or motor response.[16]
- As we continue higher, we move to fixation as the nervous system locks in exclusively on what it thinks is the greatest threat and excludes everything else.
- Our muscles become rigid and stiff and we exceed motor capacity to perform, then we greatly exaggerate the action.
- At 220 HBPM, mental shutdown occurs as the pre-frontal cortex (thinking part of the brain) shuts down. Thinking stops and reflexes take over (fight, flee, submit, freeze).

Key Points to Remember:

1. Depending on the level, stress can have both a positive or negative effect on our physiological, perceptual, and cognitive performance.
2. It is the perception of the stressor/situation that drives our hormonally induced heart rate, not the actual stressor. Everyone will perceive a stressor differently.
3. The White Zone (<85 HBPM) is just as dangerous as the higher stress zones because we are not paying close attention to our surroundings and have a higher probability of being unprepared and caught by surprise. Surprise causes a hormone dump and drives us to the highest stress levels and lowest performance levels.

Craig Geis is Co-Founder of California Training Institute and formerly Geis-Alvarado Associates. He provides instruction for clients worldwide on the subject of Human Factors Threat and Error Management. Geis was a U.S. Army career pilot, developed the military's Team Resource Management training program to address human error and is a former instructor for the U.S. Military Academy at West Point, Embry Riddle Aeronautical University, University of Maryland, and University of San Francisco. Craig is a Certified Force Science Analyst, and an instructor for California Police Officers Standards and training. He holds an MA in Psychology from Austin Peay State University, a BA in Management from C.W. Post College in New York, and an MBA in Management from Georgia Southern College.

What Really Happened Aboard Air France 447

This case is designed to accompany the article "The Effects of Stress on Our Physiological, Perceptual, and Cognitive Performance." The author uses the Air France 447 case to demonstrate the principles that have been addressed in his series of articles.

To download go to:

www.cti-home.com -> Under the Articles TAB -> click on Air France 447 Transcript.

Risk vs. Continuation Training

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U.S. Army Aviation Center of Excellence
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We have all seen this scenario: Your unit is preparing to deploy to a high risk environment, RL progressions still need to be completed, and environmental training needs to be conducted as time continues to move faster and faster. Once the RL progressions have been completed and they have arrived at the deployment site, the trainers can breathe a sigh of relief because everyone is trained to standard.

What about continuation training? Do we really need to worry about it? Once a crewmember completes RL progression or completes a new task, they are then considered trained to the proficiency level necessary to conduct collective training as a member of an aircrew, per TC 3-04.11. What about continuation training?

Army crewmembers fly highly complex and dangerous missions and if a unit is given a mission, they will execute it to the best of their ability using the tools they are given. However, what about the unit which performs the high risk mission without a continuation training plan, or has a plan but is not allowed to complete it due to risk aversion by leadership? This is a recipe for disaster.

The risk of not completing continuation training far outweighs the risk of completing it. Case in point: multi-ship dust landings in the middle of the desert, zero illumination, and limited lead time for mission planning. No worries, we tell ourselves, we completed our environmental qualifications when we arrived in the AO so we are good. Why add the risk of training during combat operations?

Risk Management provides the tools for leadership to properly assess risk and implement controls, keeping risk as low as possible. However, this does not mean we risk ourselves out of either training for the mission or completing the mission. They go hand in hand. You cannot complete one without the other. For success, complete the training at night with a selected number of aircrew and keep it confined to a given area (inside the wire). If necessary, elevate the risk approval to a higher level. These are all tools that can be used to mitigate the risk . By completing a continuation training plan, leaders are providing the skill sets and confidence for their aircrew to complete the higher risk missions safely.

Remember, just because your crewmember has completed required training doesn't mean they can remain proficient in individual tasks indefinitely. They must be provided the opportunity to practice those tasks.

RL progressions will always be a priority in pre-deployment, as will a collective training program. However, once in the deployment, work with leadership to devise a realistic continuation training plan.

Mishap Review: NVG Multi-Ship Insertion

During a multi-ship insertion under NVGs in mountainous terrain, the pilot on the controls placed the aircraft in an excessive nose low attitude while executing a take off from an aborted landing. When power was applied to arrest the rate of descent, the rotor speed bled off and the aircraft struck a rock formation nose first.

History of flight

The mission was a NVG three-ship insertion of ground forces into three separate but nearby mountain HLZs located at an altitude of approximately 8650 feet MSL. The designated flight lead PC conducted the mission planning with the assistance of the other pilots assigned to the mission. On the day prior to mission execution, an air mission crew brief was conducted with all pilots and crewmembers present. Additionally, the AMC completed the risk assessment with an overall risk for the mission calculated as moderate due to NVG mixed aircraft multi-ship; potential brownout conditions; and low illumination. Risk reduction measures included dual PC cockpit and all landings would be into the predicted winds or adjusted for actual. A unit instructor pilot was the mission briefing officer (MBO) and the task force commander provided final mission approval. Both the MBO and commander were involved in the planning and briefings for the mission.

A mission update/go-no go briefing was conducted at 2300 hours the night of the mission, reflecting no changes. The weather forecast for the objective called for clear skies, 5 miles visibility, and winds 200/10 gusting to 16 knots. Temperature was +9 C. with a PA of +8460 feet. Moon illumination was forecast at 95 percent, however, moon set was 0305, effectively making illumination 0 percent at arrival time for the objective. There were no warnings, watches or advisories in effect.

The flight of three Black Hawks departed the airfield at 0227 hours en route to an intermediate location for refuel and then a short flight to a FOB to pick up the designated ground force element. At 0351 the flight departed the PZ for the night insertion. The accident aircraft (Chalk 3) had a total of 12 personnel on board – four crewmembers and eight passengers with combat gear. Planned en route to the HLZ was 13 minutes. At the release point, Chalk 3 shifted to the left of Chalk 2 to line up for approach to their assigned LZ. Arriving at the LZ, the pilot attempted several times to land on the rocky terrain from a hover for approximately one minute. The PC then instructed the PI to execute a go-around to the left. The PI applied forward cyclic and increased collective power. Approximately nine seconds later, the low rotor audio alarm sounded and the aircraft impacted the ground two seconds later. The aircraft was destroyed in the crash sequence resulting in 10 fatalities and two serious injuries.

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Crewmember experience

The PC, sitting in the right seat, had more than 1300 hours total flight time, with 1100 in the UH-60 (480 as a PC) and 340 hours NVG time. He had 680 hours combat time with 312 hours in the current AOR and had been out of flight school just over seven years. The PI, flying in the left seat, had nearly 800 hours total time, 616 hours in the UH-60 (209 PC hours) and 166 hours NVG time. His combat time was 448 hours with 233 in the current AOR. He had completed flight school four years prior to the accident. The CE/SI, located in the right crewchief seat, had a total of 1530 hours with 520 NVG and 235 in the AOR. The gunner, in the left crewchief seat, had 237 hours total time with 98 NVG and 225 in the AOR.

Commentary

The accident board determined that while initiating a takeoff for a go-around, the power demanded exceeded the power available resulting in a decrease in rotor RPM. The aircraft descended and impacted a rock formation. Contributing to the power demand was an excessive nose low attitude on takeoff, requiring additional power that was not available due to environmental conditions. Additionally, the board noted inadequate crew coordination in that over a seven second period the aircraft torque readings increased to max torque available and the pitch attitude lowered to greater than 15 degrees nose low without any verbal or physical reaction from the other crewmembers. After seven seconds, the PC responded verbally, but the crew did not have the power required to recover the aircraft.

All information contained in this report is for accident prevention use only. Do no disseminate outside DOD without prior approval from the USACRC. Access the full preliminary report on the CRC RMIS under Accident Overview Preliminary Accident Report https://rmis.army.mil/rmis/asmis.main1 AKO Password and RMIS Permission required.

Manned Aircraft Class A – C Mishap Table as of 25 Mar 13

	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	11	0		0	0	6	0
	February	2	1	6	0		0	0	2	0
	March	1	2	12	0		3	1	1	7
3rd Qtr	April	2	1	6	4					
	May	1	0	4	0					
	June	1	0	2	0					
4th Qtr	July	3	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	20	17	82	12	Year to Date	6	3	19	7

Mishap Review – A Closer Look

The Mishap Reviews found in Flightfax are designed to inform the readers of recent accidents that have occurred in Army Aviation. Typically, they provide a general synopsis of the event and basic findings an accident board produces during the conduct of their investigation. Units often hear about an accident that occurred but have little knowledge on what caused the crash.

Our goal is to provide general information to the field on reported mishaps as quickly as the preliminary information is available. Final reports, with the associated staffing requirements, can take several months to compile before a final version is documented into the USACR/SC database. Personnel having access to the database through RMIS (typically safety officers), may review accident reports to glean information useful in developing their safety programs. That said, the general information presented in the Mishap Reviews may not be enough to properly address all issues that surface during the conduct of an investigation. As an example – the Mishap Review (NVG Multi-ship Insertion) in this March 2013 Flightfax issue provides a general description of the accident. By reading the commentary, it can be surmised that the aircraft suffered a decreasing rotor condition on an attempted takeoff which led to the crash. Some of the basic elements were included to understand the situation: mountain LZ at 8600'; temp +9; winds out of the SW. Illumination was 0 percent. The accident board determined the pilot on the controls used excessive forward cyclic and collective to conduct the takeoff and the PC was late with corrective action. To assist in fully capturing lessons learned, a closer look at the mission and accident is provided.

Bottom line up front (BLUF). The aircraft crashed because the power demanded exceeded the power available for the environmental conditions causing a decreasing RPM-R (rotor droop) and associated loss of lift.

Point 1. Mission planning. The unit was well trained and exceeded requirements in regards to the mission planning process, products, rehearsals and briefings. The mission was authorized and within the capabilities of the unit, aircraft and crew. No issues with the mission.

Point 2. Risk Assessment and mitigation. As stated in the Mishap Review, the mission was assessed as a moderate risk due to low illumination and the potential for brown-out conditions. The crew itself was considered a low risk based on qualifications and experience. Total time for the two pilots was greater than 2000 hours. Risk mitigation controls included: 1) dual PC qualified pilots; 2) all landings and formations planned into predicted winds and adjusted for actual. The greatest risk for the flight and where it would occur was listed as 'NVG multi-ship dust landing under low illumination'. Mitigation controls were the planned landing into the wind as well as on-call illumination. The unit also had a requirement to maintain a 1000 pound buffer in performance planning to provide the aircrews with an additional 5 percent of out of ground effect power margin. There were no issues with the risk assessment procedures.

It should also be noted the unit conducted extensive pre-deployment training including mountain environmental training in Colorado, as well as continuous training in theater for the mission tasks involving dust, pinnacles, low illum and one/two wheel landings.

Point 3. Performance planning as computed by the accident board: With the stated conditions at the LZ, the aircraft had a max allowable gross weight OGE of 18,400 pounds; 20,500 pounds IGE. Landing weight at the LZ was approximately 17,900 pounds. Predicted hover was 78 percent IGE and 92 percent OGE . Max torque available was 94.5 percent . The aircraft had OGE power

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available but did not meet the unit's 1000lb/5 percent OGE power margin requirement. Power was sufficient for mission requirements.

Point 4. Mission en route. The mission was flown as briefed. The flight stopped en route at a FARP before proceeding on to the PZ. Each crew determined how much fuel they took on at the FARP to meet weight and power requirements. Power checks were completed at the PZ after loading and prior to departure. Power checks were consistent with the aircraft weight. No flight anomalies were noted en route.

Point 5. RP to landing. At the RP, the accident aircraft (Chalk 3) shifted to the left of Chalk 2 to line up for the approach to their assigned LZ. Approach heading was approximately 350 degrees. The PI was flying the aircraft with the PC shadowing the controls.

Point 6. LZ operations. The crew executed the approach to a hover at the LZ. During the next minute, the PI attempted several times to land from a hover to the rocky ridgeline terrain. Light dust was announced but not a factor. Some aircraft drift was discussed by the crewmembers during the hover which the PI acknowledged. Aircraft power required to hover at the LZ was approximately 90 percent at a hover altitude of 20 feet. Following communication by the crewchief that the aircraft could not set down at the current location but needed to go left, the PC announced a go-around. The PI acknowledged the go-around verbally and initiated with a power increase and accelerative attitude. The PC then transmitted the go-around to the rest of the flight. Review of recorded flight data showed the aircraft power was increased to the max torque available/TGT limiting approximately three seconds after initiating the go-around. At that point, the accelerative attitude was five degrees nose low. With the engines at TGT limiting ,the nose down attitude progressed to 14 degrees nose low before the PC verbally questioned the procedure. The low rotor warning sounded and the aircraft impacted a rock formation two seconds after the PC's inquiry. Total time from the initiation of the go-around to aircraft impact was approximately 11 seconds. The time from the announcement of the go-around to the PC asking about the takeoff was approximately seven seconds.

Observations and Discussion Topics

1. Power is important. It needs to be continuously checked and confirmed with the crew. From the time the crew completed the power check following loading in the PZ, there were no additional references to aircraft power requirements. There was no verbal before landing check or confirmation of planned power requirements prior to the aircraft landing or while conducting the LZ operations. There was no confirmation of power prior to initiating the takeoff for the 'go-around.' This wasn't a case of the aircraft not having the power to perform the task. It was a case of not properly using the available power.
2. Wind is important. Wind was forecast to be out of the SW at 200/10 G16. Landing direction was a planned 347 degrees resulting in a possible quartering tailwind condition. En route to the RP one reference was made by the crew describing the winds as light. Confirm forecast winds if possible, prior to landing. Attack and reconnaissance aircraft providing security to the air movement or air assault can be a source to wind direction and velocity. Just because you can land in a certain direction doesn't mean the takeoff in the same direction is worry free. Optimize the winds.
3. Communication is important. Before-landing and takeoff checks provide the crew with the opportunity to review critical items in the landing and takeoff sequence. What is said is also important. Hovering for over a minute, then calling for a 'go-around' conveys an elevated sense of

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urgency to the situation. Announcing a takeoff and return for another landing sets up the crew to complete a before takeoff check, review winds, power, and discuss departure procedures.

4. Use your resources. Difficulties, including aircraft drift, were encountered in trying to find a place to set down for a one or two wheel landing. The IR searchlight or the other available illumination may assist in maintaining a stabilized hover.

5. Do your jobs. The pilot in command (PC) is the individual responsible for and having final authority for operating, servicing, and securing the aircraft he or she pilots. At one point, during the attempt to set the aircraft down, the PI asked the PC to stop fighting him on the controls. If the PC's comfort level is such that guarding the controls to the extent it interferes with the pilot's control inputs, then the PC should consider taking control of the aircraft or query the pilot. The PC must act in a timely manner when tasks are not performed to standard or outside his/her comfort zone. Do not become complacent in the performance of even the most basic tasks. A review of the standard VMC takeoff task reveals several opportunities to prevent this mishap:

Extracted from TC 1-237 - PERFORM VISUAL METEOROLOGICAL CONDITIONS TAKEOFF

Crew actions.

a. The pilot in command (PC) will determine the direction of takeoff by analyzing the tactical situation, the wind, the long axis of the takeoff area, and the lowest obstacles, and will confirm that required power is available by comparing the information from the performance planning card (PPC) to the hover power check.

b. The pilot on the controls (P*) will remain focused primarily outside the aircraft throughout the maneuver to provide obstacle clearance. The P* will announce whether the takeoff is from the ground or from a hover and his intent to abort or alter the takeoff. The P* will select reference points to assist in maintaining the takeoff flight path.

c. The pilot not on the controls (P) and nonrated crewmember (NCM) will announce when ready for takeoff and will remain focused primarily outside the aircraft to assist in clearing and to provide adequate warning of obstacles.

d. The P will monitor power requirements and advise the P* if power limits are being approached. The P and NCM will announce when their attention is focused inside the aircraft and again when attention is reestablished outside.

Note. *Avoid unnecessary nose low accelerate attitudes;* five degrees nose low is recommended for acceleration. However, 10 degrees nose low should not be exceeded.

MOUNTAIN/PINNACLE/RIDGELINE CONSIDERATIONS: Analyze winds, obstacles, and density altitude. Perform a hover power check. Determine the best takeoff direction and path for conditions. After clearing any obstacle(s), accelerate the aircraft to the desired airspeed.

Note. Where drop-offs are located along the takeoff path, the aircraft may be maneuvered down slope to gain airspeed.

Fly with the full awareness of the nature and effects of your decisions.

U.S. ARMY COMBAT READINESS/SAFETY CENTER

During a multi-ship insertion under NVGs in mountainous terrain, the pilot on the controls placed the aircraft in an excessive nose low attitude while executing a take off from an aborted landing. When power was applied to arrest the rate of descent, the rotor speed bled off and the aircraft struck a rock formation nose first.

While conducting a multi-ship deliberate insertion under NVGs in mountainous terrain, the pilot on the controls aborted the landing attempt. As he was executing the takeoff from a pinnacle at approximately 8,650 MSL, he placed the aircraft in an excessive nose low attitude. When the pilot in command recognized the nose low attitude and increasing rate of descent, he applied power to arrest the descent. The environmental conditions, coupled with the aircraft weight, resulted in the rotor speed bleeding off as the pilot in command increased the collective. As a result, the aircraft was unable to produce the power demanded of it and descended nose first into a rock formation. The cabin area and fuselage were torn from the cockpit upon impact and several passengers were ejected from the aircraft as the fuselage rotated in the air. The fuselage came to rest on its right side approximately 50 meters from the cockpit.

Findings:

— PI* over-controlled the aircraft

— PC failed to act in a timely and appropriate manner

— Aircrew failed to utilize proper crew coordination

Recommendations:

— Emphasize importance of proper power management flight techniques

— Reinforce importance of crew coordination

— Ensure tabular data is utilized for performance planning before and during flight

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Mission briefings – necessary for mission success 14 Mar 1984 Flightfax

Too many times, people undertake tasks they don't fully understand or for which they are not prepared. This includes aircrews. If a crew is not properly briefed as to what a mission is all about and is not fully prepared for the mission, the mishap record shows that the results are usually a great deal less than desirable. If there is a gap in communications or a misunderstanding anywhere along the line in planning, coordinating, and briefing the mission, the operation can be in deep trouble before the rotors turn.

Lack of or incomplete mission briefings were cited as factors in the following mishaps. Although this did not definitely contribute to the crash in every case, it could have.

- The aviation company was on a three-day training exercise. The aviation personnel did not receive a briefing before the exercise began. The unit commander was not familiar with the requirement for a briefing, and the unit aviation safety officer did not attend the key personnel planning conference conducted before the exercise. The crews of three UH-1 aircraft were assigned a tactical air assault insertion mission. The air mission commander (AMC) attended a briefing given by the operations officer, but the briefing was not conducted in accordance with the unit field standard operating procedures. The operations officer did not use the checklist to brief the flight crews. Several required items were not briefed. It was almost midnight, and everyone was anxious to get to bed because of the early morning flight. The unit commander created an atmosphere of urgency associated with mission accomplishment. He was trying to make up time lost because of a weather delay. Because of the perceived sense of urgency, the flight was launched the next morning without a weather briefing. The aircraft had been pre-flighted the night before. A walk-around inspection, without the aid of a checklist, was done before the start of the mission. The crew of the lead aircraft checked the aircraft weight and balance computations but did not consider or prepare a performance planning card.

The three aircraft took off and flew to the pickup zone. The commander had told the crews to remove the passenger seats and to hurry up with the mission since they were late. Landing at the pickup zone, the three aircraft were loaded with seven passengers each. The crew of the lead aircraft did not brief their passengers and took off without one of the passengers being secured because they did not want to take the time for the passengers to rearrange themselves so everyone would have a seatbelt. There was also no passenger manifest on file. A few minutes after takeoff, the pilot of the lead aircraft began a shallow approach to a sloping area. The right skid hit the ground about 100 yards short of the intended touchdown point. The pilot tried to maintain control of the aircraft with cyclic inputs, but the aircraft rolled onto its right side. One passenger, who was not wearing his seatbelt correctly, sustained minor injuries. The pilot of the lead aircraft, in addition to operating under an atmosphere of perceived mission urgency, was suffering from fatigue. He had exceeded the unit's established limits for duty for the past 24-, 48-, and 72-hour periods and had slept only five hours in the past 24 and 11 hours during the past 48-hour period.

- Another UH-1 was the lead aircraft of a flight of four moving soldiers from one location to another. The copilot of the lead aircraft, who was at the controls, was unable to attend the pre-mission briefing and received summary-type information from the other pilot on board. There was not a wire hazard map in the field operations office, and a route recon was not done before the

Continued on next page

flight, which was to be conducted below the highest terrain feature.

After flying along a highway for several minutes, the flight went into a tactical trail formation, flying about 125 feet above the ground and 90 knots airspeed. The copilot saw one set of wires and flew over them, watching them out the right side of the aircraft. When he looked back to the front of the aircraft, he saw more wires in his flight path. The pilot, who was navigating, looked up about the same time. The Huey hit the wires and crashed into trees.

- A flight of six aircraft took off in weather conditions below that required for night VFR. The pilot of the No. 2 aircraft lost sight of the lead aircraft and inadvertently placed his UH-1 in a descending left turn after becoming spatially disoriented. The aircraft crashed and the three crewmembers were killed. A current weather briefing was not obtained before the flight, and the mission briefing did not include information on inadvertent IMC breakup procedures. The pilot had graduated from flight school a few months before the crash and had done no instrument work since graduating. The IP on board the aircraft had been on duty more than seven hours beyond the maximum allowable limit and was known to be fatigued.

- A unit was engaged in a field training exercise. The unit had no specific procedures for night operations or airfield operations, and a pre-exercise maneuver briefing was not conducted for the aviation personnel. An AH-1 pilot was assigned a night mission. The pilot did not get a weather briefing, did not prepare or consider a performance planning card, did not determine the correct weight and balance of the helicopter, and completed a through-flight inspection without the aid of a checklist. As the pilot prepared to take off from an unlighted confined area, the aircraft drifted aft and right at hover altitude. The main rotor blades hit several trees, and the AH-1 crashed.

- A UH-1 pilot had no formal mountain training or mountain flying experience, and the copilot's most recent mountain flying experience was nine years before. The aviators were assigned a mission to transport some soldiers to a mountain range, but neither aviator was briefed on the mountainous terrain flight. The helicopter was landed on a mesa, and the soldiers got out and completed their mission. They then got back in the aircraft and takeoff was made. The pilot tried to take off without considering the effects of weight, density altitude, and wind on aircraft performance. The commander did not require pilots to consider and plan operating limits of aircraft in relation to environmental conditions expected during the mission. The aircraft entered effective translational lift and the pilot increased power, reducing the availability of left pedal control. The aircraft then encountered adverse winds near the mesa edge which increased the requirement for left pedal beyond that available. The aircraft spun to the right and crashed.

Planning a unit's mission is management's job. And the chain of command up to the commander must become involved. Mission briefings which define all the parameters of the mission should be given by a member of the chain of command or by the operations officer in accordance with the unit SOP. This is particularly critical for single-ship , single-pilot missions, where the pilot is on his own, out from under direct supervision. While commanders and operations officers can't go on every flight, they can make sure the aircraft crew is prepared for the flight in every way possible. They can make sure before the flight that the crew has a thorough understanding of the mission, how the mission is to be flown, and the risks involved. Making sure the crew is fully briefed is the first critical step toward insuring mission completion.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in February 2013.

Utility helicopters

UH-60

-A Series. #2 engine inlet plug was reportedly still in place during start-up and the experienced a TGT over temp condition. Engine replaced. (Class C)

-A Series. Pilot initiated a hard right bank to avoid a flock of birds. Aircraft contacted a trees resulting in damage to the stabilator. (Class C)

Unmanned Aircraft Systems

MQ-5B

While on takeoff the UA veered off the runway into a concrete drainage ditch. System sustained significant damage. (Class A)

RQ-7B

Crew experienced failure of the right flap servo during landing. FTS chute was deployed and system was recovered with damage. (Class C)

System experienced a right Elerudder failure in flight. Recovery chute deployed and system recovered with damage. (Class C)

Preliminary Loss Reports (PLR)

ARMY PRELIMINARY LOSS REPORT 13043

AVIATION MISHAP CLAIMS FIVE SOLDIERS' LIVES

Five 3rd Combat Aviation Brigade Soldiers were killed in a UH-60L Black Hawk helicopter mishap that occurred on 11 March 2013 at approximately 2130 local in Afghanistan. The UH-60L was on an orientation flight when the mishap occurred. The aircraft was destroyed and all occupants were killed in the crash. The crew and passengers consisted of a CPT, CW2, SSG, SGT and a SPC. Details of the crash are not available at this time. A Centralized Accident Investigation (CAI) team from the US Army Combat Readiness/Safety Center is investigating.

These are the 1st Class A **Aviation** fatalities in FY13 compared to **4** for the same time frame in FY12. This PLR does not identify specific root causes of this incident as the investigation is ongoing. Further details will be available at a later date on RMIS (RMIS Login Required).

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Our Army depends on you to use these PLRs to help Soldiers understand the impact of decisions made on and off duty.

The **U.S. ARMY COMBAT READINESS/SAFETY CENTER** is interested in your comments; please click here to provide feedback on the Preliminary Loss Reports (PLR). FAQs Additional resources can be found on the USACR/Safety Center website at https://safety.army.mil

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

UAS Class A – C Mishap Table — as of 18 Mar 13

	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2	0	0	2
MQ-5	1		2	3	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	1	7	8
RQ-11			1	1	Raven				
RQ-20			4		Puma	0	0	4	4
YMQ-18	1			1					
SUAV			1	5	SUAV				
Aerostat	2	5		7	Aerostat				
Total for Year	9	11	28	48	Year to Date	4	1	14	19

U.S. ARMY COMBAT READINESS/SAFETY CENTER

Report of Army aircraft mishaps published by the U.S. Army Combat Readiness/Safety Center, Fort Rucker, AL 36322-5363. DSN 558-2660. Information is for accident prevention purposes only. Specifically prohibited for use for punitive purposes or matters of liability, litigation, or competition.

Number 24 April 2013

Flightfax®

Online Report of Army Aircraft Mishaps

This Flightfax contains a preliminary report on the 1st Half of FY13 aircraft mishaps. For the first half of FY13, we've experienced 31 Class A-C mishaps; six Class A, three Class B, and 22 Class C. This seems to be an improvement when considering the first half of FY12 with 71 mishaps; nine Class A, eight Class B, and 54 Class C. This comparative improvement has been dampened, though, since it has been a difficult month for safety in Army Aviation with three recent Class A mishaps. The predominant trend you will discern in reviewing the preliminary report is human error. Five of the six Class A mishaps and all three of the Class B mishaps, a staggering 89%, were the result of human error.

Once again in Flightfax, we are pointing out human error as a significant recent trend in Aviation mishaps. This may be a result of an approach to completely eliminate human error, which alone may not be totally effective. Attempting to completely eliminate human error is extremely difficult, if not impossible. This is not meant to convey that a goal of elimination of human error is not a completely worthy goal, or that attempts to reach that goal are not effective prevention techniques. Human error occurs every day, and is seldom catastrophic or fatal; this is a testament to your excellent safety and standardization programs. On the other hand, believing that our programs can make human error extinct may actually lead to crews not prepared to comprehend what is occurring and take action when human error happens. Worthy of further consideration is the idea that as opposed to applying a prevention technique centered on eliminating inevitable errors and system failures, perhaps our safety programs would be even more effective if we enhance training and mitigation to include recovering from human and material failures.

Human mishaps are a fact of life. Unlike our amazing and very capable aircraft, people are not precision machinery designed for accuracy. In fact, we humans are an entirely different kind of machine. It is because of our human creativity, adaptability, and flexibility that we are amazingly error tolerant – because we have the ability to move beyond error. We are superb at finding explanations and meanings from partial and noisy evidence, which is to say that we are extremely flexible, robust, and creative. The same aspects in our nature that lead to such robustness and creativity also produce errors. Our natural tendency to interpret partial information - which is a critical ability for creativity - can cause aviation Soldiers to misinterpret system indications or crewmember behavior in such a plausible way that the misinterpretation can be difficult to overcome or un-do in the cockpit.

Nowhere in life can mistakes be made impossible. In light of this, Wickens et al (1998) outline that human error and their negative consequences are mitigated in one of three ways: system design, training, and personnel (crew) selection. While crew selection and training are extremely important factors, we know that even the best-trained and standards-adhering pilot will still make mistakes. What does this mean? It means that despite our most refined crew selection, mission approval, and briefing process mitigation - even if perfectly executed IAW AR 95-1 - bad things will still occur.

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Enhancing training to be inclusive of error recovery, rather than just error prevention, will make a more successful pilot. This could mean after training to eliminate miscommunication in ACT-E, an effective next step and practice may include what to do once miscommunication occurs; how to go beyond the event and apply and use our strengths of creativity and troubleshooting with limited information. Or, conducting simulator training in recovering from - and keep from turning catastrophic - a screw up from another crewmember or non-rated crewmember or a mechanical failure.

Aviation Soldiers commit errors every day, but not all result in catastrophic and fatal events. The key, perhaps, is going beyond not just diagnosing what went wrong in a catastrophic event, but also finding out what went right in the hundreds of non-catastrophic failures. We can get beyond our error weakness by applying our strengths through approaching mishap prevention from a creative, flexible, and adaptive point of view so that we can become creatures of a proactive safety culture.

Until next month, fly safe!

LTC Christopher Prather USACR/SC Aviation Director
email: christopher.prather@us.army.mil

Wickens, Christopher D., Gordon, Sallie E., and Liu, Yili (1998). *An Introduction to Human Factors Engineering.* Addison-Wesley Educational Publishers Inc., New York, New York.

Manned Aircraft Class A – C Mishap Table as of 22 Apr 13

	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	11	0		0	0	6	0
	February	2	1	6	0		0	0	2	0
	March	1	2	12	0		3	1	4	7
3rd Qtr	April	2	1	6	4		1	1	4	2
	May	1	0	4	0					
	June	1	0	2	0					
4th Qtr	July	3	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	20	17	82	12	Year to Date	7	4	26	9

Preliminary Report on 1st Half FY13 aircraft mishaps

In the **manned aircraft** category, Army aviation experienced 31 Class A - C aircraft accidents this fiscal year. These accidents resulted in seven fatalities. Six of the accidents were Class A's, three were Class B's, and 22 were Class C's. For comparison, the first half of FY12 had 71 Class A – C aircraft accidents – nine Class A's (five fatalities), eight Class B's, and 54 Class C's.

For the first half of FY13, five of the six Class A mishaps and all three of the Class B mishaps were the result of human error (89%). Over half of the 9 Class A and B mishaps occurred at night. Materiel failure (engine failure) was contributing in one Class A. There was one lightning strike Class C and one deer strike after landing (C-12). Five of the 9 Class A and B mishaps occurred in OEF.

Dust landings were contributing factors in one Class A and one Class B mishap. Additionally, there was one Class A UH-60 ground taxi incident, one Class B wire strike, and three tree strikes (all Class C).

	Class A	Class B	Class C
UH/MH-60	3	1	9
AH-64	0	0	2
CH/MH-47	2	1	3
OH-58D	1	0	3
LUH-72	0	0	2
TH-67/OH-58A/C	0	1	0
AH/MH-6	0	0	0
C-12/C-26	0	0	3
Total	6	3	22

Synopsis of selected Class A accidents (OCT – MAR 13). N/NVD denotes night/night vision device mission:

Manned Class A

-CH-47D. Aircraft struck a VSP tower during landing in dust sustaining damage to the forward main rotor system.

-UH-60A. During ground taxi to a civilian refueling point, the aircraft's main rotor blades contacted a hangar resulting in damage.

-UH-60M (NVG). Main rotor blade struck upslope terrain during a pinnacle landing.

-CH-47F (NVG). Flight related. Fatality to a soldier on the ground occurred when a large gate was toppled by rotor wash during a sling load operation.

-UH-60L (NVG). Aircraft crashed during RL progression flight. Five fatalities (See Mishap Review in this issue.)

-OH-58D. Aircraft crashed following engine failure. One fatality. (See mishap review in this issue.)

In the **unmanned aircraft systems** for the first half FY13, we experienced 19 Class A–C incidents with four Class A's, one Class B, and 14 Class C's. For the same time period in FY12

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there were two Class A's, four Class B's, and 18 Class C mishaps. The four FY13 Class A's were two MQ-5B Hunters and two MQ-1C Gray Eagles. The lone Class B was a RQ-7B Shadow. There were 14 UAS Class C category mishaps with seven RQ-7s, three MQ-5s, and four RQ-20A Puma's. Of the 19 total UAS Class A-C mishaps, eight were RQ-7B Shadows. The predominant cause factor for UAS mishaps was engine malfunction.

	Class A	Class B	Class C
MQ-1C Gray Eagle	2	0	0
MQ-5B Hunter	2	0	3
RQ-7B Shadow	0	1	7
RQ-20A Puma	0	0	4
Total	4	1	14

Synopsis of selected accidents (OCT 12 – MAR 13):

UAS Class A

-MQ-1C. Operators experienced engine oil/coolant and gearbox over-temp and FADEC fail indicators during flight. Crew attempted to land to the runway and experienced engine failure. The UA impacted just off the runway.

-MQ-1C. System experienced an engine failure indication during manual transfer of fuel operation. Engine restarts were attempted with no success. UA crashed and was destroyed on impact.

-MQ-5B. Operators experienced engine RPM fluctuations during flight at 7,000 feet AGL. The system continued to lose RPM until the engine failed at 2,000 feet. Wreckage was located and destroyed in place.

-MQ-5B. While on take-off under the ATLS, UA traveled approximately 250' before it veered off the runway into a concrete drainage ditch. System sustained significant damage.

UAS Class A – C Mishap Table — as of 23 Apr 13

	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2	0	1	3
MQ-5	1		2	3	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	1	8	9
RQ-11			1	1	Raven				
RQ-20			4		Puma	0	0	4	4
YMQ-18	1			1					
SUAV			1	5	SUAV				
Aerostat	2	5		7	Aerostat				
Total for Year	9	11	28	48	Year to Date	4	1	16	21

Mission Briefing Process

DAC Charles W. Lent
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala.
H-60 SP/IE, Literature Review

Amy Regulation (AR) 95-1, paragraph 2-14, mandates requirements for the Army Aviation Mission Approval Process. In a vast number of aviation accidents aircrews met the requirements of the procedures but missed the intent of the process. In many cases Mission Briefers are not interacting with the Pilot in Command (PC) and Air Mission Commander (AMC) and effectively mitigating risk. When the important questions are not asked, or a link in the chain of events leading to an accident is not broken, it often leads to catastrophic results.

In 2006, the Mission Approval process was mandated by the Army and integrated into AR 95-1. Since that time it has been embraced by Army Aviation units and become a familiar part of daily business. The direct involvement of Commanders was required, based on information that proved successful Commanders were involved in the unit's mission. The procedures for risk acceptance by the appropriate risk level authority in the chain of command were officially formalized and required written documentation on the DA Form 5484 Mission Schedule/Brief. Prior to 2006, the mission approver and the briefer were one and the same. The intent of separating the mission briefer from the approver was to infuse the process with a Pilot in Command with an in-depth understanding of the unit's mission. This includes a thorough knowledge of mission planning, mission execution, rules and regulations and, most importantly, the experience to recognize when important details were missed in order to mitigate risk. The findings of many aviation accidents determined a breakdown of the mission approval process as a significant contributing factor.

AR 95-1 requires that Commanders establish a training and certification program to ensure standardization and an understanding of the mission approval and risk management process for those responsible for Initial Mission Approval Authority, Mission Briefer and Final Mission Approval Authority responsibilities. The intent of the training and certification is to ensure that designated personnel have a thorough understanding of the process and be able to properly assess and mitigate risk for the command before the risk is accepted by someone in the chain of command. In many instances this is not the case and the training is relegated to a PowerPoint slideshow once a pilot makes PC and added to the list of mission briefers. Many times the training is not documented in the Individual's Aircrew Training Folder and, therefore, not a surprise when mission briefers do not know the minimum required questions to ask during a mission briefing. Mission briefers should be selected based on their experience, maturity, judgment, and ability to effectively mitigate risk. One could make an argument that selecting all PCs to be briefers, while allowing easy access to receive a briefing, may not meet the criteria of experience in the mission profile.

It should be very clearly stated that getting initials on the DA form 5484 and meeting the

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requirements to complete the form is not meeting the intent of a mission briefing process. In many cases the minimum required questions or, more specifically, the right questions pertinent to the mission are not being asked by the mission briefer. VOCO authorization is often obtained and there is no interaction between the briefer and PC/AMC. While VOCO authorization is allowed, it should not be the norm based on the fact that it is nearly impossible to review and assess mission planning over a phone or through a third party. Approval authorities do not have an interaction requirement with the PC or AMC, so it is critical the mission briefer analyze the details of the mission. When the mission briefer does not review the details of a mission the required risk mitigation does not happen and the intent of the process fails. AR 95-1 states that **Interaction between crew and briefer is paramount to identify, assess, and mitigate risk for the specific flight or mission**. Briefing officers are responsible for ensuring key mission elements are evaluated, briefed and understood by the mission pilot in command or Air Mission Commander. **At a minimum, mission briefing officers will review and assess the following key areas** in the mission planning process:

1. The flight is in support of an operational unit mission.
2. The crew understands the mission and possesses situational awareness of all tactical, technical and administrative mission details.
3. Assigned flight crews have been allocated adequate pre-mission planning time and the mission is adequately planned to include performance planning, notices to airmen (NOTAMs), and coordination with supported units.
4. Assigned flight crews are qualified and current for the mission in accordance with this regulation and the commander's flight crew qualification and selection program per paragraph 4–18, to include ALSE with current inspections, air crew reading file currency, and crew experience appropriate for the mission.
5. Forecast weather conditions for the mission, including departure, en route and arrival weather, meet the requirements of this regulation and local directives.
6. Flight crews meet unit crew endurance requirements.
7. Procedures in the commander's risk management program are completed and mitigated to the lowest level possible.
8. Required special mission equipment is operational.

The mission briefer is an integral part of the Mission Approval process and required by AR 95-1 to perform a detailed analysis of the mission in order to mitigate risk for the command. When a detailed mission briefing is not performed by an experienced PC the process fails allowing aircrews and the command to assume more risk than necessary. The mission briefer must be able to mitigate risk in order to break the chain of events that may lead to an aircraft accident. Meeting minimum requirements to complete DA form 5484 should not be confused with conducting a detailed analysis of mission planning and the required application of minimum requirements for the mission IAW AR 95-1.

--DAC Charles W. Lent may be contacted at (334) 255-9098, DSN 558.

Mishap Review: NVG RL Training

While conducting multi-aircraft NVG RL progression training in a low illumination/low contrast environment, the UH-60L entered a right roll and impacted the ground resulting in five crewmember fatalities and a destroyed aircraft.

History of flight

The mission was a day, night and NVG RL progression training flight for a newly assigned PI and two 15T crewmembers. This was the PI's fourth RL training flight and the first for NVG refresher training. The moderate risk mission was approved by the task force commander the day prior to the scheduled training. The weather forecast included ceilings at 7,000 feet; visibility 9000m with light rain and mist; winds 270/05 knots. Illumination for the flight was 0 percent. Aircrews reported there was moderate to heavy rain in the area at the time of the accident.

The accident crew's show time was 1500 hours. Takeoff for the day training was approximately 1700 hours. The aircraft landed at 1830 hours. Following two hours of ground time the crew departed at 2030 hours for NVG training. Initial pattern work was conducted followed by hot refuel. 45 minutes after takeoff, the aircraft joined with a sister ship (which was also conducting single-ship training) to perform formation flight training en route to the test fire area to fire the door guns.

The flight of two departed the airfield at 2124 hours with the accident aircraft as Chalk 2 in a staggered left formation. En route altitude to the test fire area was 1500 feet AGL with an airspeed of 100 knots. Upon arrival, the area was occupied by two OH-58Ds conducting test fires with illumination rockets and .50 cal. Flight lead communicated the intention of holding in a right hand orbit and reducing speed to 80 knots to wait for the range to clear. Following one complete turn in the orbit the aircraft entered a nose low steep right turn with a rapid descent until ground impact. The aircraft was destroyed and all five crewmembers were fatally injured.

Crewmember experience

The IP, sitting in the left seat, had more than 1,250 hours total flight time, with 1,170 in the UH-60 (286 as an IP) and 384 hours NVG time. The PI, flying from the right seat, had 431 hours total time, 349 hours in the UH-60 and 39 hours NVG time. The FI, located in the main cabin, had 620 hours with 243 NVG. The door gunner in the left crew position had 97 total hours documented with 38 NVG but had previously been on flight status as a crew chief. The CE, located in the right crew position, had 11 total hours with two hours NVG.

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Commentary

The accident board determined that while conducting NVG formation flight as Chalk 2, in a right hand orbit with low illumination and no visible horizon, the crew failed to maintain orientation and lost spatial awareness. The aircraft was placed into an unrecoverable attitude and impacted the ground destroying the aircraft and fatally injuring all five crewmembers. Additionally, the board determined the mission briefing process failed to properly identify and mitigate risk for the flight. The PI, in the conduct of NVG refresher training, was placed beyond experience and readiness level by performing multi-aircraft operations – a mission training task.

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ARMY PRELIMINARY LOSS REPORT 13053

AVIATION MISHAP CLAIMS TWO SOLDIERS' LIVES

Two Pennsylvania Army National Guard Soldiers assigned to the 101st Combat Aviation Brigade, were killed in an AH-64D Apache Longbow helicopter mishap that occurred on 9 April 2013 at approximately 0900 local in Afghanistan. The crew was the second aircraft in a flight of two when the aircraft struck the ground. Both pilots, a CW3 and CW2, died in the crash. Further details of the crash are not available at this time. A Centralized Accident Investigation (CAI) team from the US Army Combat Readiness/Safety Center is investigating.

This is the 9th Class A **Aviation** fatality in FY13 compared to **5** for the same time frame in FY12. This PLR does not identify specific root causes of this incident as the investigation is ongoing. Further details will be available at a later date on RMIS (RMIS Login Required).

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ARMY PRELIMINARY LOSS REPORT 13045

FLIGHT RELATED MISHAP CLAIMS ONE SOLDIER'S LIFE

A 3rd Combat Aviation Brigade Soldier died on 13 March after being involved in a flight related mishap that occurred on 3 March 2013 at approximately 0330 local in Afghanistan. The 26-year-old PFC was struck by an 800-pound barrier gate after it was toppled by rotor wash from a CH-47F. The Soldier was transported to a medical center and pronounced deceased after being removed from life support on 13 March 2013. News Article

This is the 1st Class A **Aviation** fatality in FY13 compared to **5** for the same time frame in FY12. This PLR does not identify specific root causes of this incident as the investigation is ongoing. Further details will be available at a later date on RMIS (RMIS Login Required).

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Mishap Review: OH-58D Engine Failure

While conducting day, multi-aircraft gunnery training the OH-58D experienced an engine malfunction. The aircraft impacted the ground and came to rest on its right side resulting in one crewmember fatality and destruction of the aircraft.

History of flight

The mission was a multi-ship RL 2 to RL 1 progression evaluation flight under day, night and NVG conditions. The training incorporated gunnery tasks associated with engaging targets with 2.75 inch rockets and .50 caliber machine guns in a Scout Weapons Team (SWT). The two instructor pilots completed a mission brief and risk assessment the day prior to the scheduled training. The Mission Briefing Officer (MBO) conducted a face-to-face briefing with both IPs and ensured the training for the evaluation flight was understood and correct for the flight. The overall risk was assessed as moderate due to zero illumination conditions and lack of NVG experience. The final approving authority was the squadron commander. The weather forecast was winds at 240/16 gusting to 21 knots; visibility unrestricted; sky conditions few at 5,000 feet; temperature 25 degrees Centigrade.

The accident crew reported for duty at 1130 hours, completed their aircraft preflight and conducted a 'rock drill' walk-through with the crew of the other SWT member. At approximately 1400 hours they received their aircrew mission brief, weather brief and TACOPS/S-2/S-3 updates followed by additional table talk with the two PIs. Upon completion, the crews repositioned to their aircraft and completed run-up procedures.

At 1540 hours the crews completed run-up and communications checks and repositioned to the FARP to upload ammunition. With the accident aircraft in trail position, the SWT departed the airfield at 1600 hours en route to the test fire area. The SWT arrived on station at 1610 hours, completed a range sweep and initiated training. The lead aircraft completed a dry fire engagement using a 040 degree inbound heading. The accident (trail) aircraft began its inbound dry fire engagement as the lead aircraft turned outbound. The trail aircraft completed their dry fire engagement with no noted issues. The accident aircraft executed a right hand turn to an outbound heading of 210 degrees and initiated a climb to 500 feet AGL. On the outbound heading and at an altitude of approximately 400 feet AGL, the low rotor audio tone annunciated, Ng dropped to 78 percent and the aircraft yawed to the left approximately 10-15 degrees. Two seconds after initial indications of a

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malfunction, the main rotor RPM decreased to 79 percent and Ng to 68 percent. Nine seconds after the start of the emergency, the aircraft impacted the ground in a 5 degree left side low attitude and came to rest on its right side.

Crewmember experience

The IP, sitting in the left seat, had more than 4,300 hours total flight time, with 4,200 in the OH-58D (1,200 as an IP) and 3,000 hours combat time. The PI, flying from the right seat, had 189 hours total time, 106 hours in the OH-58D and 29 hours combat time.

Commentary

The accident board determined the aircraft experienced an engine malfunction/power loss. Rotor RPM decayed rapidly with accompanying rapid descent and impact with the ground resulting in one crewmember fatality, one critical injury and the aircraft being destroyed. Additionally, the board determined the crew improperly diagnosed/responded to the low rotor RPM indication by not verifying conditions and adjusting the collective immediately to regain rotor RPM.

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ARMY PRELIMINARY LOSS REPORT 13047

AVIATION MISHAP CLAIMS ONE SOLDIER'S LIFE

A 3rd Combat Aviation Brigade Soldier was killed in an OH-58D Kiowa Warrior helicopter mishap that occurred on 16 March 2013 at approximately 1630 local in Afghanistan. The crew was conducting a Readiness Level Progression training flight when the aircraft struck the ground. One pilot, a CW3, died in the crash while the other, a 1LT, survived. Details of the crash are not available at this time. A Centralized Accident Investigation (CAI) team from the US Army Combat Readiness/Safety Center is investigating.

This is the 7th Class A **Aviation** fatality in FY13 compared to **5** for the same time frame in FY12. This PLR does not identify specific root causes of this incident as the investigation is ongoing. Further details will be available at a later date on RMIS (RMIS Login Required).

Preliminary Loss Reports (PLR) are ***For Official Use Only*** and are to provide leaders with awareness of Army loss as we experience it and to point out potential trends that affect our combat readiness.

Our Army depends on you to use these PLRs to help Soldiers understand the impact of decisions made on and off duty.

The U.S. ARMY COMBAT READINESS/SAFETY CENTER is interested in your comments; please click here to provide feedback on the Preliminary Loss Reports (PLR). FAQs and additional resources can be found on the USACR/Safety Center website at https://safety.army.mil

Leadership: It's Up To You

Article submitted by CW4 Michael Zinski

As professional aviators, we know the safe and effective employment of Army aviation assets ultimately rests with the individual aircrew. Within the crew structure, the pilot in command has final responsibility for the operation of the aircraft, and leadership failure in the cockpit can have serious consequences.

Years ago, when I took my first check ride to become a pilot in command (PC), my evaluator provided some very specific mentorship which, to this day, I think about before each flight. He made sure I understood the PC was responsible for everything that happened, good or bad.

He made it clear that a leader seeks responsibility and takes responsibility for their actions. The Army evaluates aviators for both technical and tactical abilities along with leadership skills. Besides flying skills, their maturity, discipline and decision making processes are also considered. These last three areas are where leadership abilities are assessed to ensure an aviator is ready to be a PC.

Historically, many aircraft losses not attributed to enemy action were blamed on leadership failures in the cockpit. These failures are categorized as individual failures, but many times they can be characterized as indiscipline or poor decision making. This characterization describes the individual leadership failure in the aircraft, and the ultimate leadership failure of the pilot in command. While the action of any one crewmember can lead to mission failure, the ultimate responsibility for the failure rests with the pilot in command.

These leadership failures are not necessarily tied to the youngest and most inexperienced leaders. A new PC may be overly cautious while an experienced PC may be over confident. Both could lead to bad decisions. When senior leaders make bad decisions, they may reflect an isolated lapse of judgment due to a situation. Also, it could be the result of complacency brought on by their perceived knowledge, a repetitive mission and job performance. Regardless of the experience level of the individuals involved, the base line result is a failure to effectively lead in the cockpit.

Unfortunately, these failures are often brought to light and recognized only after a catastrophe. Not all cockpit leadership failures lead to equipment damage or personal injury, but these are the ones which have the greatest effect on the aviation community because of their high visibility. An important question is how common are the failures which only result in a 'close call' and then are never reported due to the fear of repercussions on the aircrew. Unreported leadership failures can provide negative reinforcement for further failures, or make leaders reflect on their performance and seek improvement. The choice is theirs.

Army aviation needs PCs who instill in others the career value of becoming PCs. It's the door opener to advanced assignments and greater responsibility and must not become a 'rite of passage' or an automatic assumption that, after a certain point in a career, one deserves to be a PC. It must remain a position which aviators strive for through technical and professional excellence.

Those who become PCs must be treated as leaders who accept increased responsibility and understand the need to train and mentor new aviators. Providing ongoing professional leadership-based guidance works to reduce any negative trends or failures in Army aviation.

-CW4 Zinski is currently serving as the Safety Officer for the 204th MI Bn (AR), Fort Bliss, Texas

Briefing the other crewmember 14 Mar 1984 Flightfax

As the designation implies, the pilot-in-command (PIC) of an aircraft is in a command position. The PIC is the commander of the aircraft and assumes a lot of responsibility every time he signs his name to the flight plan. That responsibility covers everything from flight plans to emergency procedures – from crew briefings to passenger briefings. With all of these areas of responsibility, no area seems to be more important than a good crew briefing.

Before a mission, the PIC makes all his plans, then he and the co-pilot talk about the mission, the weather, route of flight, transfer of controls, emergencies, crew communication, radio procedures, etc. After all the appropriate steps are taken before the start of the mission, the PIC and co-pilot preflight the aircraft with the crew chief and continue with the mission. This is how it should be – procedures followed, crew briefed, and mission accomplished.

The crew briefing is an essential part of following procedures, achieving maximum crew communication and accomplishing the mission. That briefing is an important asset available to the PIC for the safe accomplishment of the mission. But wait a minute. Isn't something missing? Isn't there another crewmember who needs to know what's going on?

Let's think about what the PIC did. He very carefully planned his mission, he called in his co-pilot and gave him a thorough briefing, he received his weather and filed his flight plan, both he and the co-pilot preflighted the aircraft with the crew chief . . .That's it, the crew chief! What about briefing the "other crewmember," the crew chief? Doesn't he need to know something about the route of flight, weather, cargo, refueling, emergencies, crew communication, and any special instructions pertaining to the mission? These are just a few of the items that should be related to the crew chief to enable him to be an effective member of the crew. The information given to the crew chief is just as important as the information given to the co-pilot. There are times during the flight when the PIC needs to rely on the crew chief just as he relies on the co-pilot. He should have previously coordinated with the crew chief so there can be maximum communication among the crew.

Consider for a minute the crew communication required in ground taxi operations. Is communication with the crew chief essential? You better believe it is. How about clearing the tail of the aircraft in an NOE environment? Is there a need to communicate with the crew chief? You bet.

At some point during aircraft operations, either today or tomorrow, the PIC will need to communicate with the "other crewmember." Prepare that crewmember by telling him what you expect of him. The time you spend briefing the "other crewmember" will be time well spent.

Enhance crew effectiveness by thoroughly briefing **all** of the crew. The PIC is responsible for briefing the crew. The crew includes the crew chief.

- then CW2 Francis White, 243rd Aviation Company (ASH), Fort Lewis, Wash.

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in March 2013.

Cargo helicopters

CH-47

-F series. Aircraft was conducting sling-load operations when an 800 pound barrier gate toppled due to rotor wash. The gate struck and pinned a Soldier resulting in fatal injuries. (Class A)

Utility helicopters

UH-60

-L Series. Aircraft crashed during a NVG low illum training flight. Five fatalities. (Class A)

-A Series. Aircraft contacted wires with the WSPS during low level NVG training on an approved training route. Minimal damage reported to the aircraft. Strike resulted in local power outage. (Class B)

-MH-60K. Aircraft contacted a tree during VMC approach to MOUT site. Stabilator and all four main rotor blades sustained damage. (Class B)

-L Series. Aircraft was in cruise flight when the right cockpit door inadvertently jettisoned. Door was not recovered. (Class C)

-A Series. Engine start was attempted with one blade tie-down rope still attached. Damage occurred to both tail rotor paddles, gearbox cover, tail pylon and one main rotor blade. (Class C)

-A Series. Tail rotor paddle experienced separation of the erosion strip and tip cap causing damage to the main rotor system. (Class C)

Attack Helicopters

AH-64D

-Aircraft contacted a tree executing an evasive maneuver to avoid a bird strike. Stabilator damaged. (Class C)

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U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Number 25 May 2013

Flightfax®

Online Report of Army Aircraft Mishaps

Aviation safety culture: informed and accountable

BG TIMOTHY J. EDENS and LTC CHRISTOPHER PRATHER
U.S. Army Combat Readiness/Safety Center
Fort Rucker, Ala.

Historically, Army flying hours decrease following withdrawal from conflict (figure 1). As we move forward and draw down from more than 11 years of overseas contingency operations, home station resources will be limited due to reduced flying hour programs. Aviation's hands-on experience informs us that as hours decline, proficiency drops. Together, lags in proficiency and overconfidence from combat experience have, at times, had a devastating effect and resulted in catastrophic accidents at home station. To reverse this historical trend in our current drawdown environment, it is imperative that we build a proactive and preventive safety culture in our formations.

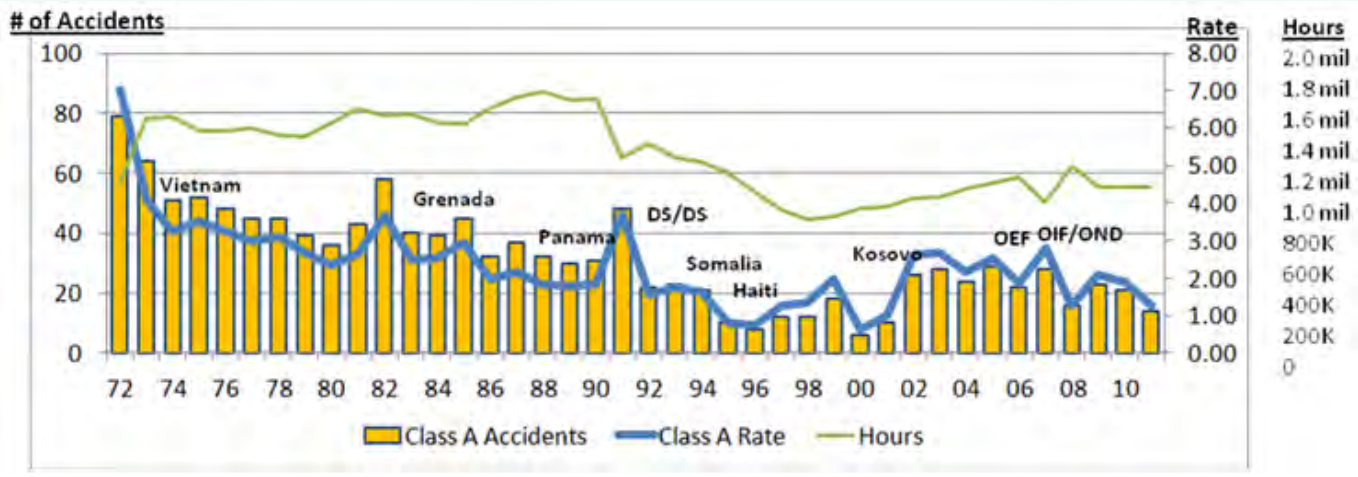

Figure 1. Accident rates and flying hours in context of historical conflicts

Getting to a proactive safety culture is not as simple as making a command decision to reduce accidents and fatalities by an arbitrary number. This technique does not make a workable goal or create an environment where Soldiers buy in to safety through their own participation in risk management. However, safety metrics — when properly developed and managed through effective reporting — can be an important part of your unit's safety culture and provide the incentive and inspiration to meet your risk management goals. Metrics can help you achieve a proactive safety culture in a resource-constrained environment if you (1) stay risk informed, as opposed to risk averse, and (2) establish effective accountability.

Being "risk informed" is often easier said than executed. There is no question that good leaders immediately implement control measures to mitigate risk; the challenge is identifying it early

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enough to prevent the next accident. During the second and third quarters of fiscal 2012, the USACR/Safety Center teamed with a tactical combat aviation brigade to test the Safety Awareness Program-Aviation, an anonymous hazard identification and reporting initiative. This demonstration validated the hypothesis that Soldiers are the most effective means for identifying hazards, and additionally provided valuable lessons learned for establishing hazard reporting programs within Army Aviation. Here is one conclusion that needs little explanation: If Soldiers perceive their reports are treated fairly and lead to immediate and tangible changes in command climate and safety programs, their willingness to report hazards increases exponentially.

The SAP-A demonstration also revealed there is no better predictor of future safety performance than the past. The insurance industry uses a predictive model to determine risk; for example, if a driver receives a speeding ticket, he or she could see an immediate increase in premiums. We know from experience that in most cases the ticket was far from the first incidence of speeding (rather, it was the first time the driver was caught), and the insurance company adjusts rates based on the likelihood of future risk. While the model is certainly not perfect, it is effective. Similarly, data from several thousand anonymous SAP-A reports showed that observed aviation hazard incidents are rarely the first of their kind. Much of the time, indications of deficient training and behavior, as manifested in hazards and incidents, are prevalent prior to an accident.

We are required by regulation to have a detailed process for determining the causes of accidents, which we accomplish through careful investigation. We do not have to wait for a catastrophic event, however, to discern the hazards. Simply looking over our shoulders to learn the pattern of past accidents, coupled with knowledge of past performance and comprehensive hazard reporting, allows us to see and act on emerging patterns of risk.

Effective accountability and hazard communication are critical in implementing a proactive safety culture. As Army Aviators, we have progressed over the years to view mishaps as failures of risk management, not meaningless and uncontrollable events. People and organizations are behind these failures, and this is where we can begin to fix accountability. We must remember, though, that holding people accountable and laying blame are two quite different things. While leaders must never tolerate regulatory or procedural violations, we would do well to remember that threats of punishment do not deter people from making errors, but could keep them from reporting hazards.

Again, safety metrics should be about accountability, not simply numbers. In the end, a proactive and predictive aviation safety program results in an organizational metric that recognizes the importance of dealing with the incidents its people reports, not how many it has or has not experienced. Active and involved leaders who listen to their Soldiers will keep our aircrews and those they support safe!

BG Edens is the director of Army Safety and commanding general, U.S. Army Combat Readiness/Safety Center. LTC Prather is the Aviation Director, USACR/Safety Center. *This article first appeared in the March/April 2013 issue of ARMY AVIATION - the official journal of the Army Aviation Association of America (AAAA).*

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Mitigating the Risk for Night Test Flights

CW5 Charles Miller
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala.
Directorate ME

The combination of threat and high operational tempo (OPTEMPO) has resulted in the necessity of night Maintenance Test Flights (MTF) for many deployed units. The night MTF is generally a more risky event than a day MTF and should only be performed when proper risk mitigation procedures are in place. In order to properly mitigate the risk for night MTFs, commanders must determine if the MTF needs to be done and ensure only a trained and qualified Maintenance Test Pilot (MP) designated in night tasks is performing a night MTF.

Many factors must be considered in the determination for conducting night MTFs. Factors such as: threat, environmental conditions and aircraft availability should be considered. Commanders may decide the assumption of risk is too high and may mandate the MTF being conducted during the day. If it is determined the MTF must be accomplished at night, the commander can mitigate risk by evaluating necessary tasks required verses tasks that can be deferred, and allow only the completion of those tasks needed to bring the aircraft to a mission capable status. Whenever possible, MTFs should be conducted aided using NVD as a risk mitigation instead of flying night unaided. The commander, Standardization Instructor Pilot (SP) and Maintenance Test Pilot Evaluator (ME) must develop a night MTF program for inclusion in the unit SOP. The program for night MTFs should include training, evaluation and briefing requirements that always include the ME.

The unit's ME is responsible for training and evaluating MPs for all MTF tasks. MPs will be trained in night MTF tasks IAW the Aircrew Training Manual (ATM). Upon completion of training, iterations will be tailored based on individual proficiency for tasks selected by the commander in the required night/Night Vision Device (NVD) modes. If more than 12 months have elapsed since a task was completed in the night/NVD mode, MPs must be evaluated by an ME.

The process of integrating night MTF training into the commander's Aircrew Training Program (ATP) should occur during the unit's AFORGEN training cycle so MPs are trained and current in night MTF tasks. Commander's must ensure only experienced MPs are performing night MTFs and ensure crew selection includes task complexity and environmental factors are considered.

Many 4000 series tasks and MTF tasks require the MPs attention to be focused inside the cockpit while performing maintenance checks. When MPs are determining the aircraft airworthiness, an inherent risk is assumed in regards to the possibility of

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maintenance malfunctions occurring and the resultant Emergency Procedure (EP) being performed at night. Commanders should ensure only Fully Mission Capable (FMC) aircraft are used during night MTF training to reduce risk.

Night MTF training can be as simple as a Proficiency Flight Evaluation (PFE) in designated seat positions for experienced MPs or a series of training flights for inexperienced MPs. Upon completion of night MTF training, the individual's DA FORM 7120 series must be annotated to properly reflect the training to include authorized tasks, iterations, modes, and evaluation requirements.

Night MTFs allow commanders to maximize the maintenance effort throughout a 24 hour period. However, commanders must determine if the gain is worth the risk for night MTFs based on mission requirements and the experience of assigned MPs. Night MTFs require a detailed MP training program and a thorough risk mitigation process to help ensure safe operations.

--CW5 Charles Miller, DES ME, may be contacted at (334) 255-1572, DSN 558.

Flight Surgeon Philosophy (17 Nov 1976 Flightfax)

The following was extracted from the flight surgeon's analysis and recommendations in a UH-1H accident report. The aircraft was destroyed as a result of an attempted pinnacle landing over gross weight (computed 9,184 pounds) for the 6,405-foot density altitude (DA) existing at the time.

"If God had intended man to fly, he would have given him wings," seems to be the moral of this accident. Man, however, did not listen to these words of wisdom and for the past 60-odd years has been merrily flying through the skies on wings of his own design and manufacture. At times, these have served him well and at times, they have not.

How often have we seen the osprey unable to lift off the water with its catch due to insufficient lift from its powerful wings? Or seen a hawk strike in midair and then sink to the earth with its prey, its new gross weight above its capability to stay aloft? The bird's usual reaction when this happens is to release its meal and search for smaller game. This is not based on cowardice on the mighty hawk's part, but rather on a realistic instinctive appraisal of the DA, gross weight, aerodynamics, and the expected consequences of being dragged underwater or impacting with the ground at other than zero airspeed.

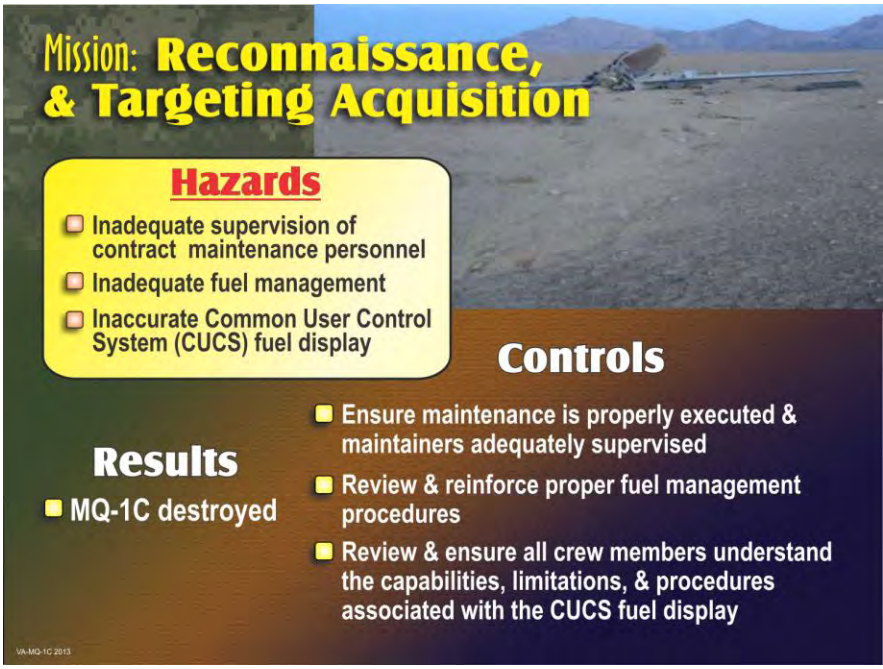
Man on the other hand, has no such God-given instincts to help guide him safely through the skies. He must rely on his acquired knowledge of the abilities of his man-made wings and on his unique asset of rational thought.

In this accident, the aircraft was loaded without supervision by the crew. The crew did not even know the exact number of passengers or the weight of the cargo aboard. As a result, the ship was over gross at a high DA and man, with his man-made wings, again went the way of Daedalus (more specifically, his son Icarus). Until such time as all pilots learn to use their ability to think and to apply their knowledge to the aircraft they fly, i.e., its limitations, characteristics and capabilities, we can expect that the wax of our wings will melt again under the hot sun of careless flying.

This accident should never have happened. Commanders and pilots must see to it that aircraft are flown within their limitations.

U.S. ARMY COMBAT READINESS/SAFETY CENTER

During a Reconnaissance, Surveillance, and Target Acquisition (RSTA) mission a MQ-1C Gray Eagle lost power due to fuel starvation. The MQ-1C subsequently lost altitude and crashed 2.5 NM from the intended landing area resulting in over $11,000,000 in damage. No personnel were injured.



The morning of the mission, the crew chief fueled the mission aircraft with 485 lbs of fuel (320 lbs, forward tank; 165 lbs aft tank). The aircrew received their mission briefing covering two Reconnaissance Surveillance and Target Acquisition missions. Weather briefed for the day was winds 130 at 03 knots, ceilings 20,000ft MSL. The first aircrew completed their pre-flight checks on the aircraft and in the OSGCS and began the mission. The controlling OSGCS experienced internal software problems compelling the crew to perform a control station transfer to another OSGCS, addressed the problem and transferred control of the MQ-1C back to the original OSGCS. The remainder of the first aircrew's shift was uneventful. The first crew completed a crew change over with nothing significant to report. The second crews shift was uneventful and they completed their crew change as scheduled. The third mission aircrew assumed control of the MQ-1C in cruise flight at 70 KIAS and at an altitude of 15,000 feet MSL 4.5 NM from the Forward Operating Base (FOB). The third aircrew identified a fuel imbalance between the forward and aft fuel tanks while completing the cruise flight checklist. The Aircraft Commander/Aircraft Operator (AC/AO) contacted a contract operator to assist with the emergency procedure for a fuel imbalance. While working through the fuel imbalance, the engine failed due to fuel starvation. The crew unsuccessfully attempted to restart the engine during the decent. The AC placed the MQ-1C into a decelerative attitude just prior to impact to minimize the damage to the air vehicle. The MQ-1C was destroyed when it struck the ground 2.5 NM from the FOB..

Findings:

- Maintenance personnel improperly installed the Low Pressure fuel Pump (LPP)
- Crewmembers failed to properly perform fuel management procedures

Recommendations:

- Ensure maintenance personnel perform all maintenance IAW the standards outlined in the OEM service bulletins and Army maintenance publications
- Conduct remedial training with all operators reviewing and reinforcing the specified and implied tasks associated with proper fuel management procedures to include fuel related emergency procedures
- Develop a software patch that enables accurate fuel data readings to be displayed on the CUCS fuel display

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Access the full preliminary report on the CRC RMIS under Accident Overview Preliminary Accident Report

https://rmis.army.mil/rmis/asmis.main1 AKO Password and RMIS Permission required

Know your unmanned aircraft

The RQ-11B (Raven) is the Army's Program of Record for providing the lowest elements of the tactical force with dedicated aerial reconnaissance and surveillance. Raven's are currently operating in both Operation Iraqi Freedom and Operation Enduring Freedom. Raven fieldings have been underway since June 2006 to both active and reserve component Brigade Combat Teams and Armored Cavalry Regiments. In 2008, the Army's Basis of Issue Plans extended the Raven presence into Military Police, Engineer, and Field Artillery units. The Raven system is a critical element of the Intelligence, Surveillance, and Reconnaissance Surge effort. The Raven provides company level and below commanders an organic, on-demand, asset to develop situational awareness, enhance force protection, and secure routes, points, and areas. The Raven conducts surveillance during routine combat operations, much in the manner of an observation post or a screening element. As another asset of an integrated reconnaissance and surveillance plan, the Raven will respond to queuing from other sensor systems or provide queues to those sensors and reaction forces. A second ground control station provided with the system can serve as a remote video terminal for commanders. The Raven system is self-contained and rucksack portable. The Raven's data link was upgraded to a digital link in 2009, providing added security and reliability.

Wing Span	Air Vehicle Weight	Range	Airspeed	Operational Altitude	Max Altitude	Endurance	Payload	GCS/RVT	System Design	Data Link	Flight Modes
4.6 ft	4.4 lbs	10+ km (LOS)	Cruise-30 mph Dash-60 mph	300 ft AGL	10,500 ft MSL	90 min	Electro Optical front & side-look (2592x1944 pixels) Infrared Side Look (320x240 pixels) Infrared w/Laser Illuminator - 25 ft Spot at 500 ft AGL	Handheld (GCS & RVT are inter-changeable) Combined Weight- 9 lbs (13.9 lbs w/mission planning/ RSTA Laptop)	Modular, Kevlar composite, direct-drive electric motor, Li-Ion rechargeable batteries	Digital Data Link (DDL) using IP based protocol with 95 selectable channels-of which 16 may be used in an ops area-locked to specific air vehicle	Autono-mous or Manual

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Reconnaissance, Surveillance, and Target Acquisition (RSTA) kit: Facilitates mission planning, monitoring of mission progress, and observing, recording, and processing of video and still images derived from the Small Unmanned Aircraft Vehicle. The RSTA kit is fielded to units on the same basis as the Raven. The RSTA kit is employed by the SUAS operator as an optional element of their normal mission.

Visualization And Mission Planning Integrated Rehearsal Environment (VAMPIRE): an embedded simulation capability 100% hosted on the RSTA Kit allowing operators to train and rehearse operator and mission-level tasks. Closely integrated and correlated with FalconView™ flight planning software, VAMPIRE simulates operator tasks such as route and mission planning as well as in-flight tasks such as target tracking and reaction to emergency situations. VAMPIRE provides Soldiers with an enhanced ability to train on Raven systems anywhere, anytime.

The system provides day/night reconnaissance and surveillance capabilities to maneuver battalions, significantly enhancing force protection.

Project Manager
UAS Project Office
(SFAE-AV-UAS)
Redstone Arsenal, Alabama 35898

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 22 May 13
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	11	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	2	12	0		3	1	5	7
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0				2	
	June	1	0	2	0					
4th Qtr	July	3	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	20	17	82	12	Year to Date	7	4	30	9

	UAS Class A – C Mishap Table								as of 22 May 13
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2	1	0	3
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	1	8	9
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	4	4
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat				
Total for Year	8	11	28	47	Year to Date	4	2	15	21

Watching and directing

9 Mar 1983 Flightfax

Webster defines supervision as "a critical watching and directing." And aviation accidents continue to occur because supervisors are not critically "watching and directing." Constant supervision and the elimination of substandard performance is the only way to keep aircrews from destroying aircraft and killing themselves and their passengers.

There are several levels of supervision – from the commander on down. No matter what level of supervision you are, the accident prevention program can never be successful unless you understand and believe in the need for integrating safe practices into all (even those so-called routine) phases of operations. By your attitude and example, you can generate the enthusiastic professional approach to flying which is necessary to accomplish the mission.

When supervisors fail to follow prescribed procedures **all of the time** and carefully select the best qualified crew for a mission, accidents such as the following occur:

- Before beginning aviation operations in support of a field training exercise, the unit commander did not insure that aircraft accident prevention procedures were established. Although an SOP existed for night tactical operations, the unit had no specific procedures for night operations or airfield operations as required by AR 95-5. A pre-exercise maneuver briefing was not conducted for the aviation personnel, and aircraft were operating from a confined area at night without sufficient visual aids to insure safe operations. As an AH-1 crew was preparing to take off from the confined area, the aircraft drifted right and the main rotor blades hit several trees.

- A UH-1 pilot had failed an examination on emergency procedures. No action was taken to provide the pilot with additional training or upgrade his knowledge of emergency procedures. Five months later, he reacted incorrectly to an in-flight emergency and crashed.

- An OH-58, flying at an estimated airspeed of 80 to 90 knots and 150 feet above the ground, hit and severed two wires. Control was lost and the aircraft crashed, killing the pilot and passenger. The terrain flight did not conform to FM 1-51. The detachment commander repeatedly emphasized the dominant consideration in mission performance was keeping the supported personnel happy at any cost. He was aware of and consented to the scheduling of his pilots on single-pilot missions when they had received no special or refresher training for the terrain involved in the mission support. Morale in the aviation detachment was low and behavior was undisciplined.

- An OH-6 pilot, taking off from a dusty LZ at night, lost visual reference. He hovered for about 20 seconds and then turned on his landing light, deteriorating his night vision. The helicopter drifted into trees and came to rest on its left side. This accident occurred at 2345. The pilot had slept only 5 ½ hours the night before, arising at 0330. The weather was extremely hot, much hotter than the pilot was accustomed to. The unit SOP did not address crew rest limits and there was no crew rest policy in effect. This led to a general lack of appreciation throughout the unit for the cumulative conditions that can lead to fatigue.

- A UH-1 pilot whose instrument qualification had expired 4 months before attempted flight in instrument meteorological conditions. He became disoriented and the aircraft crashed, killing one person and seriously injuring three others. The unit commander permitted the pilot to fly in

Continued on next page

weather which was conducive to inadvertent IMC.

We could go on and on with examples of supervisory error accidents, but these clearly give you an idea of the costly results of omissions by some supervisors.

Many aviators are willing to try to do more than they are capable of successfully accomplishing. New aviators, particularly those fresh out of flight school, are endowed with a great deal of vitality and curiosity, along with an adventurous spirit. There is nothing they can't do – particularly if they are encouraged to do it, have seen it done, or have been left to their own design while gaining experience. Commanders must know the capabilities and limitations of their aviators. An article on supervision in *AEROSPACE SAFETY* magazine says it best: "The authority to order a flight carries with it an absolute responsibility to supervise. The need for those who authorize flights to consider the flying experience, capabilities and qualifications of the aircrew can never be taken lightly. Whether the flight is to be advanced training by an exceptional pilot or a simple training exercise by an inexperienced student, the person ordering that flight must be certain that the task to be performed is not beyond the capability of the individual involved. If it is clear from the evidence of an accident investigation that an individual was being extended beyond his limits, how much sooner should this fact have been spotted – and remedied – by his supervisor?

"A particularly vulnerable phase in a pilot's career comes in the early stages of his first squadron tour when he is being trained to become a productive operational pilot. Individuals, even of apparent equal ability, progress at different rates; inexperienced pilots generally do not admit to their limitations, even if they know them, and some will have had exhibited potentially dangerous traits in their first months in the squadron. Crews need very close supervision if their self-confidence and skills are to be developed without at the same time overtaxing their ability and confirming bad habits. It is tragic that this care and protection all too frequently are found missing.

A few people may be able to supervise without much conscious effort, but most people have to work hard at it. Most supervisory tasks are governed by orders, regulations, standard procedures, and other instructions. And it's not enough just to insure the existence of these orders, regulations, etc. Supervisors must insure their aviators are familiar with and always abide by them.

Following are some things you, as a supervisor, can do to keep from being listed as a cause factor in an accident:

- As stated earlier, know those who work for you. Learn their personalities and character. Be alert to changes in the behavior of your aviators as they react to personal and professional stresses. Bad habits and disregard for established procedures and regulations often come to light when it is too late.

- Set a good example. "Do as I say, not as I do" won't work. If you don't demonstrate and believe safety, neither will your subordinates.

- If you're a commander, you must become actively involved with the daily flight operations of your unit.

- Insure you have a crew rest policy and it is strictly enforced.

- Tailor your unit training program to specific mission requirements. No two programs will necessarily be exactly alike.

Continued on next page

Blast From The Past continued from previous page

- Closely supervise aviators who have just had pilot-error accidents, whether Class As or Cs. The mistakes involved are often identical. Be firm with those aviators whose accidents were caused by carelessness, inattention, or a breakdown in professional discipline. Only positive corrective actions will prevent them from repeating.
- Be alert to the opinions of each pilot's ability, as expressed by other pilots. Listen to your safety officer.
- Establish an effective system for exposing operational hazards and then eliminate the hazards.
- Refuse to lend the stamp of approval to improper methods or procedures. Once you tolerate unsafe practices, your credibility is in jeopardy.
- Pair your most experienced aviators with your least experienced.
- Attend and participate in safety briefings and safety council meetings.

Remember that while mission accomplishment is paramount, the mission is never accomplished unless the aircrews and aircraft return safely to fly again another day.

TELL US HOW WE'RE DOING

Complete the online Flightfax Reader Survey

The online version of Flightfax is two years old this month. In an effort to keep current with the field, we need your feedback. Please take a few minutes and complete the Flightfax Reader Survey located at:

https://tools.safety.army.mil/Survey/TakeSurvey.aspx?SurveyID=8lKJ7p8 (copy and paste into your browser).

The collected demographics are fine, but the key question **- "How can we improve Flightfax or make it more relevant to your needs?"** - is the information we're seeking.

If you can't do the online survey, feel free to respond with your input via email to the Aviation Directorate, U.S. Army Combat Readiness/Safety Center:

usarmy.rucker.hqda-secarmy.mbx.safe-flightfax@mail.mil

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in April 2013.

Cargo helicopters

CH-47

-D series. Aircraft experienced an NR over-speed during initial XP training. (Class C)

-F Series. Aircraft sustained damage to the forward rotor system from FOD during run-up sequence. (Class C)

Utility helicopters

UH-60

-L Series. Aircraft stabilator contacted a tree during approach to a mountain LZ causing damage. (Class C)

-A Series. Aircraft stabilator contacted the ground on touchdown. Stabilator replaced. (Class C)

Attack helicopters

AH-64D

-Aircraft was trail in a flight of two when lead lost radio contact. Search revealed crash site. Two fatalities. (Class A)

Observation helicopters

OH-58D

-Aircraft experienced NP, NR and NG spike during manual throttle operation. Aircraft touched down hard. Component replacement required. (Class C)

-Aircraft touched down hard during a demonstrated FADEC manual approach. Damage reported to the skids and airframe. (Class B)

AH-6M

-Aircraft had a FADEC failure during a maintenance test flight. NR over-speed (115.3%) occurred during landing descent. (Class C)

Unmanned Aircraft Systems

RQ-7B

UA experienced a drop in RPM followed by a loss in altitude. Recovery chute was deploy and system was recovered with damage. (Class C)

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U.S. ARMY COMBAT READINESS/SAFETY CENTER

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usarmy.rucker.hqda-secarmy.mbx.safe-flightfax@mail.mil

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Flightfax®

Online Report of Army Aircraft Mishaps

TRADOC Capabilities Manager (TCM) for Unmanned Aerial Systems (UAS) describes what unmanned aerial systems provide to operational units. "The Army's experiences in Operation Enduring Freedom and Operation Iraqi Freedom prove that UAS significantly augment mission accomplishment by reducing Soldiers' workload and their exposure to direct enemy contact. UAS serve as unique tools for the commander, which broaden battlefield situational awareness and the ability to see, target and destroy the enemy by providing actionable intelligence to the lowest tactical levels."

Clearly, UAS provides a vital capability to the commander. However, with the loss of a vehicle it can be a distraction for the commander – both in the reduction of available assets and the need to complete the appropriate mishap reporting and investigation requirements.

Year to date, we are tracking Aviation Mishaps as 12 Class A, 6 Class B, and 47 Class C incidents. As a departure from the regularly scheduled regurgitation of stats on the front page of Flightfax, let's look at an interesting point about these numbers. When breaking out the Unmanned Aerial System (UAS) numbers from the totals, it is interesting to learn that 33% of Class A (4 mishaps), 33% of Class B (2 mishaps), and 32% of Class C (15 mishaps) involve UAS. The UAS mishap rate for Class A – C per 100,000 flight hours is approximately 49.3. Comparatively, the manned aviation mishap rate this fiscal year for Class A – C mishaps is approximately 4.41. The stats indicate, when looking at unmanned mishaps rates in the context of manned aviation mishap rates, that more focus on risk mitigation for UAS would enhance mission capability for the commander.

Understanding that UAS when involved in mishaps tend to detract, rather than enhance, the commander's mission capability, makes the next paragraph somewhat alarming.

Many UAS mishaps are not reported. This discrepancy becomes obvious when comparing PM UAS loss and replacement stats to Risk Management Information System (RMIS) data. As an example, this fiscal year there have been nine RQ-7B Shadow Class A – C mishaps reported to the USACR/Safety Center. PM UAS has a total of 28 reported mishaps indicating nearly two-thirds of the Shadow mishaps do not reach the Safety Center's database. The old adage goes "garbage in, garbage out." If mishap information is not reported, then commanders are unable to provide mitigation across training, standards, and maintenance areas. Without the proper submission of incidents, analysis becomes difficult and discerning trends even more challenging.

This Flightfax is dedicated to unmanned systems to enhance UAS awareness and mishap reporting requirements. Even if you are an Aviator not directly involved in UAS operations, aviation is our business as technical and tactical experts in the employment of aviation assets; and it is highly possible that you will recognize commonality in processes, lessons, and trends highlighted in this edition are similar to those in manned aviation.

Until next month, fly safe!

LTC Christopher Prather USACR/SC Aviation Director
email: christopher.prather@us.army.mil

UAS Mishap Reporting Critical To Mission Success

Chief Warrant Officer 3 Brett Horner
UAS Accident Advisor
Aviation Directorate
U.S. Army Combat Readiness/Safety Center
Fort Rucker, Ala.

There's a story behind each UAS mishap, a story that could help prevent another one like it from happening. Our job as Army aviators is to get the facts from mishaps to the people who can take action and preserve our combat resources.

The Army's mishap investigation center, now the U.S. Army Combat Readiness/Safety Center at Fort Rucker, Ala., began as the Army Accident Review Board in 1954, and transitioned to the U.S. Army Board for Aviation Accident Research in 1957.

In 1972 it became the U.S. Army Agency for Aviation Safety (USAAAVS). The USAAAVS mission expanded to include accident prevention education, safety assistance visits, establishment of the Army aviation safety policy, the collection of Army aviation accident data, promotion of system safety, and support of selected aspects of the Army's ground safety program. In 1978 it became a field operating agency and assumed responsibility for both aviation and ground safety and was renamed the U.S. Army Safety Center. On Jan. 31, 2005, it became the more robust U.S. Army Combat Readiness/Safety Center with an expanded mission.

The USACR/Safety Center monitors, among other things, both manned and unmanned flight operations which involve mishaps. When an unmanned aircraft is lost due to a mishap, a sequence of events must take place to preserve and collect data needed for analysis. Completion of this process is essential to obtain the statistical data for, how often mishaps occur, how to develop trends, educate Soldiers and prevent history repeating itself.

After the inception of unmanned aircraft in the Army Military Intelligence community, Unmanned Aircraft Systems (UAS) were moved to the Army Aviation Branch in 2006. This was largely due to the drastic need for aviation oversight of training and standardization development, as well as compliance with Federal Aviation Administration (FAA) regulations and Army Aviation operations and regulations.

As the Army continues to advance technologically, and sophisticated weapon systems become an integral part of our arsenal, it is imperative for the Army to remain vigilant and safety aware. We cannot afford to "re-invent the wheel" with so many resources at our disposal. Thus, we must continue to educate, equip and advance the knowledge base of our evolving force.

UAS is a prime example of this advancing technology. When Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) began, the Army had very few active UAS airframes. However, over the course of two wars and UAS proving essential to full spectrum operations, unmanned aircraft (UA) multiplied within the Army at an unprecedented rate. A majority of the systems in operation today have come into the Army inventory over the last 12 years. For well over a decade, our Army has been at war leaving little time to grow a solid aviation foundation in standardization and safety.

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From 2001-present, the number of UAS mishaps reported in the Army database isn't an accurate representation. For those who have been in this community since the beginning, you probably will agree that the number available in the Risk Management Information System (RMIS) does not reflect actual losses incurred since UAS joined the Army's arsenal. This makes trending and statistical comparisons difficult.

Since the USACR/Safety Center is responsible for "accidental loss areas," how is this data obtained? The information comes from the units in the field when an Installation Accident Investigation (IAI) or Centralized Accident Investigation (CAI) is conducted. How can that data benefit commanders and units? Accident information is only as useful as the data collected and reports that are written and submitted through proper channels. This is how training deficiencies, standards failures, loss reports are generated and trends are developed. Utilization of the proper forms and submission of the data in accordance with Army regulation determines the value of data available for analysis. So, how do we get better? We start by ensuring the process is understood and what the reporting requirements are for each class of mishap. Additionally, understanding what to report and whom to report it to, is equally as critical.

Reporting Requirements AR 385-10 Chapter 3

You have had an mishap in your unit, what now? First, do you have an Army accident? *AR 385-10 Chapter 3-3 (a)-(e) defines an Army accident as:* an unplanned event or series of events, which result in occupational illness to Army military or Army civilian personnel, injury to on-duty Army civilian personnel, injury to Army military on-duty or off-duty, damage to Army property, or damage to public or private property and/or injury or illness to non-Army personnel caused by Army operations (the Army had a causal or contributing role in the accident).

You now have determined you have an Army accident. **Immediate** telephonic notification is required for Class A, B, and C mishaps (reference most current DA PAM 385-40 table 4-1). Begin by filling out the Worksheet for Telephonic Notification of Aviation Accident/Incident DA Form 7305. Once this form is complete, email to: accidentinformation@conus.army.mil or notify USACR/Safety Center by phone at DSN 558-2660/2593/3411 or COM (334) 255-2660/2593/3411. Program managers do not submit accident information to the USACR/Safety Center. So, it is crucial that this form is filled out and sent to the USACR/Safety Center by the unit. This form puts a "mark on the wall" and gives the USACR/Safety Center commander the information needed to determine which investigation (CAI or IAI) is appropriate given the circumstances. The DA Form 7305 should be as thorough as possible. If we are consistently having systemic malfunctions on a particular airframe, this develops the trend and that information needs to be distributed Army-wide to prevent further mishaps.

For class A, B, and C mishaps; abbreviated and full reports are due within 90 days for peacetime, and in combat, abbreviated reports are not to exceed 60 days and final reports are not to exceed 90 days. Additionally, utilization of the UAS Prep Guide will save you time and effort when mishaps occur.

Our Army is operating in a world of fiscal restraints. By reporting mishaps and allowing the system to work properly, we can head off systemic issues, training failures and standards failures that result in needless loss and expending funds on damaged aircraft that could better be used training the force.

Quality Training and Proper Readiness Level Progression

Sergeant First Class Christian Holderith
UAS Standardization Operator
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala.

Quality training is the cornerstone to safe day-to-day operations of unmanned aircraft systems (UAS), and this begins during Readiness Level (RL) Progression. The purpose of readiness levels is to identify the training phase in which to perform assigned missions, while providing a logical progression of individual and crew training based on task and mission proficiency (TC 1-600, paragraph 2-15).

In accordance with (IAW) TC 1-600, unmanned aircraft crewmembers (UAC's) have 90 days to demonstrate proficiency in all base tasks, in all modes of flight, to progress from RL3 to RL2. UAC's also have 90 days to demonstrate proficiency in mission and additional tasks designated by the unit commander in order to progress from RL2 to RL1. UAC's demonstrate proficiency to an Instructor Operator (IO) or Standardization Operator (SO) during a Proficiency Flight Evaluation (PFE), conducted IAW the evaluation sequence (TC 1-600, paragraph 3-16 thru 3-20). During a majority of our assistance visits with units, we do not see evidence that the evaluation sequence is being executed properly. A lot of units fail to complete proper RL progression with UAC's for a number of reasons. Some of these reasons include failure to demonstrate proficiency in all modes of flight (D/N), training and evaluating mission and additional tasks with a UAC that is RL3, successful completion of the Local Area Orientation (LAO) flight prior to RL1 designation (TC 1-600, paragraph 2-32), and failure to demonstrate a working knowledge and understanding of the required academic topics as required by Phase 2 of the evaluation sequence (TC 1-600, paragraph 3-18). With these issues identified, the following corrective action needs to be applied in order to successfully complete RL Progression:

•UAC's must demonstrate proficiency in all base tasks in each mode of flight (day or night) required by the ATM and CTL for each task. The provision pertaining to the more demanding mode of flight does not apply (TC 1-600, paragraph 2-16). Units that conduct flight operations outside of special use airspace and have a restrictive COA which may prohibit or limit flights during either day or night, would need to request an extension or waiver to the portion of RL progression that is effected IAW AR 95-23, paragraph 4-2, Waivers to training requirements.

•Units are combining the training and evaluation of base, mission, and additional tasks. This is a clear violation of TC 1-600. UAC's are not authorized to perform mission tasks until RL2 designation, and we shouldn't expect our RL3 operators to be able to perform mission tasks until they can proficiently perform all base tasks.

•The LAO needs to be completed prior to RL1 designation. The LAO can be completed during RL progression, and once complete, a required DA Form 7122 entry needs to be made recording the completion of the LAO.

•During our assist visits, over 80 percent of all FORSCOM units UAC's fail academic evaluations. This directly reflects of the lack of an aggressive academic training program. A majority of the

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units that do have an academic program rely on the SO/IO to train these academics, instead of utilizing their Unit Trainers (UT) for all non-emergency procedure academic topics. A TTP that has been successfully used is to designate select UAC's as a UT (AR 95-23, paragraph 4-24) and task them to train academic topics. This TTP would assist in lessoning the training burden solely and inadvertently placed on the SO/IO to train all academic topics. It also assists in identifying potential IO candidates.

An RL1 UAS operator is a combat multiplier by which there is no match, but when a UAS operator is not properly progressed, the unit's combat effectiveness and readiness are degraded. We exist to support the units on the ground and we must provide the most effective and efficient support capable within the limits of our aircraft. A degradation of readiness will directly result in lessened effectiveness and efficiency of support to the ground unit. With life and death decisions being made from the information that we provide, we want to ensure that our training and qualifications are beyond reproach when it comes to retaining the trust of our supported commanders.

--SFC Christian Holderith, DES UAS Standardization Operator, may be contacted at (334) 255-3475, DSN 558.

WE NEED YOUR INPUT

Complete the online Flightfax Reader Survey

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UAS Accident Investigation Shortfalls CW3 Brett Horner

When I was a young enlisted man, my aircraft accident knowledge was pretty limited. I knew I would have to "pee and bleed" and I would have to go through something equivalent to a Law and Order interrogation to find out what happened, and how I was involved. During the course of my assignment at the U.S. Army Combat Readiness/Safety Center, I have learned more than I ever imagined. Let me share it with you.

My very short sided view of the process limited my full understanding of the importance and impact accident investigations have on our Soldiers, and the systems we operate. Everyone tends to balk at the thought of safety, and we have all heard stories of "Safety Nazis" within our organizations. What about the four-day weekend "safety talk?" You get all the right stuff for the weekend, right? Well, for me, I could pretty much recite this safety brief by about week two in the Army. Seeing members of my past units dive for cover as the safety officer entered the room was pretty hysterical as well. However, seeing safety from this level has taught me a tremendous amount about being a leader, but also the lack of humor behind the very topic of safety within our ranks. It can deter needless loss of life, equipment and improve operational effectiveness. It is a force multiplier and deserves a place of value within our organizations.

I have had the privilege of serving on Centralized Accident Investigations (CAI) and have reviewed countless Installation Accident Investigations (IAI) for unmanned aircraft (UA) mishaps. The same errors are continually identified during accident reviews. They include "our forms are horrible and ineffective. They don't even coincide with unmanned operations." Okay, fair enough. Our pleas have not fallen on deaf ears. The forms need some work, and I can assure you there are professionals working diligently to get these forms revised and have them relevant to unmanned operations. That being said, we (as a community) can get better by understanding the process, enforcing standards, and digging into the appropriate Army Regulations (AR) or Department of the Army Pamphlet (DA PAM) where the standards are located.

Devoting 10 hours a day, CAI's take anywhere from 12-15 days to complete from the time you hit the ground to the command out-brief. When the investigation is concluded, the board will be waiting on a few loose ends (Bio-chemical testing results and Corpus Christi Army Depot (C-CAD) results).

DA Form 2397U

Your best friends when it comes to the DA Form 2397U is DA PAM 385-40 and the **UAS Prep Guide** . Examples for completing this form are located in DA PAM 385-40 para 3-37, pg. 127. Not only does it give you an example, it will prohibit minor errors on the form when used, such as:

Block 11d (2)(4)(5)/e (2)(4)(7)c - Inputting the name, rank and position of personnel, when the form only requires the rank and position.

11f(1) Digital Source Collection installed – yes, and state what source was utilized (Ace Box II, GCS, etc.) Input the primary source from where you downloaded the digital data.

Block 12 – Summary should be a summary of the accident consistent with the findings and recommendations provided to the command. This is not the initial summary provided at the onset of the accident. Information will change as data is collected and analyzed.

Block 19(9) – Lab tests are required for ALL Class A, B and C mishaps. This block is rarely checked and test results are rarely sent with the final report. See AR 385-10 3-16 (3).

Findings and Recommendations – DA PAM 385-40, paragraph 3–5, table 3–1, and para 3–24 give the format for writing Findings and Recommendations.

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Accident Scene Photos

Photos are an important element of the investigation process. It assists the investigators with detailing crash data, aircraft attitude on impact, pre-crash and post crash fire data. the list goes on and on. It also tells the story to someone who wasn't involved in the accident or investigation. The standards for photos taken are contained in DA PAM 385-40, chap 2-5, (4)-(b), pg. 26, which states: All photographs used in the report must be numbered and captioned. Captions should explain in detail what the picture is supposed to show. Captions will include type equipment, date of the accident, and location of the accident.

Most files we received contain photos. However, there is no way for personnel auditing the file to be certain they pertain to the accident in review, unless they are properly marked.

Materiel Failures and Product Quality Deficiency Reports (PQDR)

Material failures can occur at any stage in the lifecycle of equipment. Sometimes these failures are caught before an accident occurs. For example, an engine with less than 50 hours of operation is discovered on a post flight inspection to have metal shavings in the engine oil fins. Do we just replace the engine, write in the log book, and call it good? I should hope not. We should be submitting the reports required (PQDR) to notify the proper channels of a defective part or component received. This is important because it could prevent mishaps from happening at other units operating the same platform. It's possible that parts were sent into the field with the same lot number and are failing at a high rate. Submission of PQDR's is equally as important when a part has failed and is the cause of the incident.

Sometimes, mishaps happen as a result of materiel failure. If you have an accident and the causal factor is determined (by the board) to be a material failure, this requires the submission of a PQDR, see DA PAM 750-8, chap. 10 and AR 702-7-1 for information on submitting this report.

DA PAM 750-8 states: *Anyone finding quality deficiencies in Government-owned materiel is required by this pamphlet, DA Pamphlet 738–751, and AR 702–7 (DLAD/DLAI 4455.24) to report the defects to the appropriate Military Service Screening Point for investigation and resolution. For situations where equipment becomes dangerous to people, Ground Precautionary Messages and Safety of Use Messages should be issued in accordance with AR 750–6. Submit an SF 368 via Electronic Deficiency Reporting System (https://aeps.ria.army.mil), mail, e-mail, or fax to the military service/agency screening point for that item (see table 10–1).*

To get a full understanding of the multi-use SF 368, refer to DA Pam 750-8, Chap 10, (1)-(9). Submission of this form is the responsibility of the unit maintenance NCOIC. A Field Service Representative (FSR) is not required to, nor is it their responsibility, to submit this form. If an accident has occurred, one of the board members will fill it out. However, they may require the assistance of the maintenance NCOIC to access all the data required to complete the form. PQDR is a means of identifying possible trends, as well as, recouping cost when parts fail.

Accident investigations are one of the many ways the Army is able to identify trends and disseminate findings and recommendations to the field. It saves lives, resources and prevents further accidents. The impact of an investigation will be determined by the care given to documenting the information, the enthusiasm put forth to obtain the causal factors and desire to prevent future accidents.

CW3 Brett Horner is a UAS Accident Advisor assigned to the Aviation Directorate, U.S. Army Combat Readiness/Safety Center, Fort Rucker, Ala.

Know your unmanned aircraft

The RQ-7B Shadow® 200 Unmanned Aircraft System (UAS) provides Maneuver Commanders a near real-time, highly accurate, sustainable capability for over-the-horizon Reconnaisance, Surveillance, Target Acquisition (RSTA).

Shadow® provides 12 hours of continuous operations on station within a 24-hour period, with surge to 18 hours and provides Electro-optical, Infra-red, Laser Pointer/Illuminator, and Laser Designation

Wing Span	Max Gross Weight	Range	Airspeed	Altitude	Endurance	Payloads	Launch/ Recovery
20.4 ft	460 lbs	125 km	65 kts loiter 110 kts dash 70 kts cruise	>15,000 ft msl	9 hrs @ 50 km	EO/IR, Laser Pointer, Laser Designator Communications Relay Package	100 m x 50 m Area

Manuever Commander's Tactical Unmanned Aircraft System

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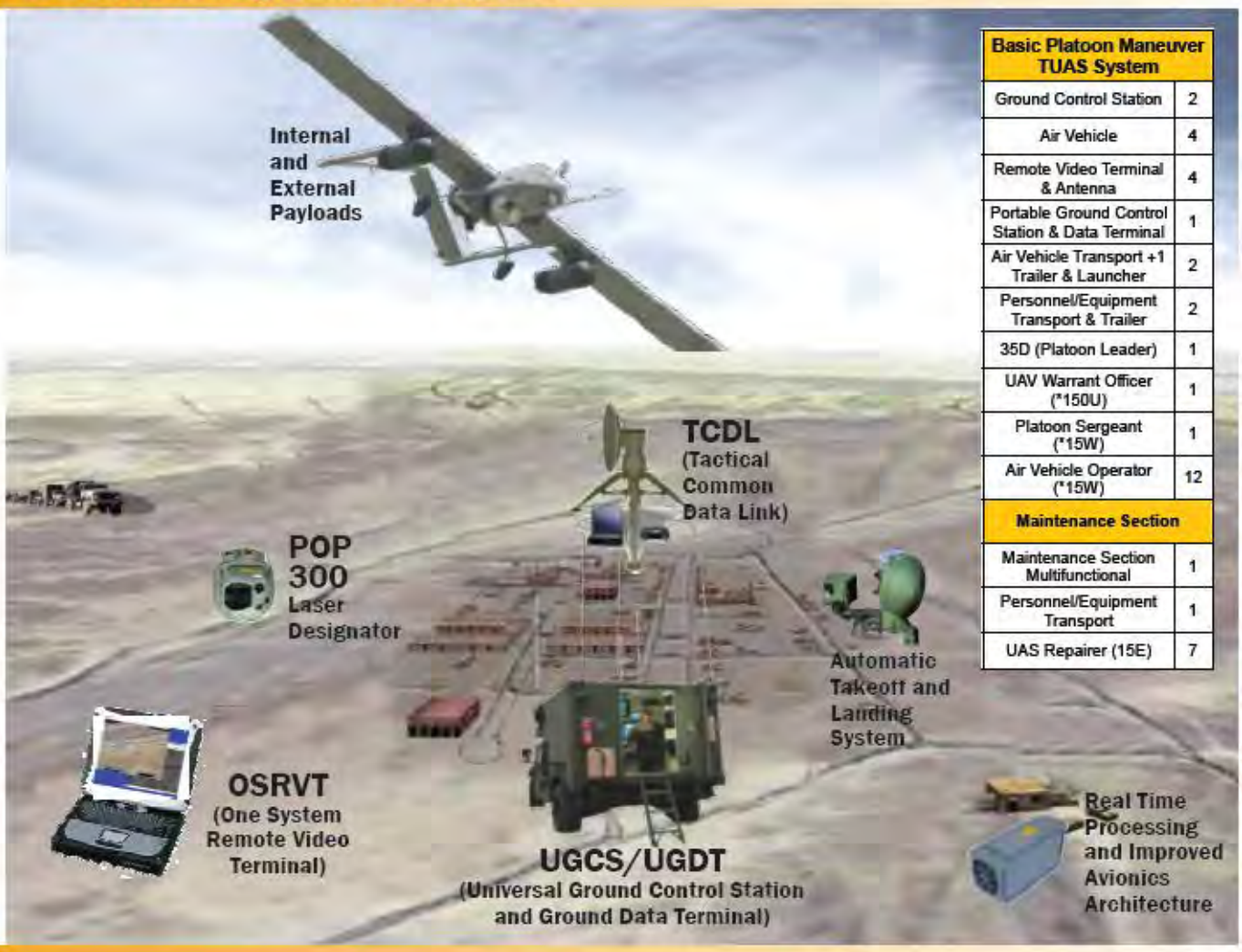
Shadow 200 System Description



Basic Platoon Maneuver TUAS System	
Ground Control Station	2
Air Vehicle	4
Remote Video Terminal & Antenna	4
Portable Ground Control Station & Data Terminal	1
Air Vehicle Transport +1 Trailer & Launcher	2
Personnel/Equipment Transport & Trailer	2
35D (Platoon Leader)	1
UAV Warrant Officer (*150U)	1
Platoon Sergeant (*15W)	1
Air Vehicle Operator (*15W)	12
Maintenance Section	
Maintenance Section Multifunctional	1
Personnel/Equipment Transport	1
UAS Repairer (15E)	7

System Characteristics

- Hydraulic launcher on standard HMMWV trailer
- One-man deployable in less than 10 minutes
- System transportable on six C-130 aircraft
- Early entry capability with three C-130 aircraft
- Tactical Automatic Landing System (TALS)
- Compatible with Army's Battle Command System

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 14 Jun 13
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	11	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	2	12	0		3	1	5	7
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0		0	0	4	0
	June	1	0	2	0		1		1	
4th Qtr	July	3	3	9	1					
	August	2	5	5	0					
	September	2	0	2	2					
	Total for Year	20	17	82	12	Year to Date	8	4	33	9

	UAS Class A – C Mishap Table								as of 14 Jun 13
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2	1	0	3
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	1	8	9
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	4	4
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat				
Total for Year	8	11	28	47	Year to Date	4	2	15	21

Human Factors in UAV Accidents

Patricia LeDuc, USAARL and Sharon Manning, USAABSO Aug 04 Flightfax

Editor's Note: The following article is an excerpt from the U.S. Army Medical Department Journal. The full report may be found online at http://www.usaarl.army.mil/TechReports/2004-11.PDF

The expanded use of unmanned aerial vehicles (UAVs) in Afghanistan and Iraq has brought them into the public spotlight. Advocates for UAVs cite a number of distinct advantages over manned aircraft. These advantages include:

- Reduced or eliminated human loss.
- Lowered initial system development costs.
- Lowered replacement costs.
- Lowered operator training investment.
- Expanded mission time.
- Reduced detection signature and vulnerability.
- The ability to operate in nuclear, biological, and chemical environments.
- Reduced peacetime support and maintenance costs.

The Army currently fields two major UAV systems: The RQ-7 Shadow and the RQ-5 Hunter. The Shadow is a small (9 feet in length), lightweight (330 pounds), short-range surveillance UAV used by ground commanders for day and night reconnaissance, surveillance, target acquisition, and battle damage assessment. Capable of operating at altitudes of 14,000 feet, the Shadow can carry instrument payloads of up to 60 pounds. The Hunter is a twin-engine, short-range, tactical UAV that provides capability for an increased payload (200 pounds) and endurance period (up to 12 hours). It weighs 1,600 pounds and has a 29-foot wingspan.

While UAVs offer multiple advantages, they do have some disadvantages. Many are low flying and have slow ground speeds, making them easy targets for enemy ground forces. Remotely piloted UAVs require a complex and highly reliable communication link to the control station, and operators must make decisions based on sometimes-limited sensor information accompanied by a built-in signal delay. Automating some functions within a UAV control system may overcome certain remote operation disadvantages, but removing the man from the cockpit reduces the ability to make rapid decisions with maximum situational awareness.

Naturally, the increase in UAV use has been accompanied by an increased frequency of accidents. As mechanical failures decrease with the maturation of UAV technology, human error will account for a higher percentage of accidents. Knowledge of the human-related causal factors in UAV accidents can be used to suggest improvements in areas such as current flight training methods, crew coordination measures, and operational standards. The predominant means of investigating the causal role of human error in all accidents is the analysis of post-accident data. From Fiscal Year 1995 to 2003, a total of 56 UAV accidents were recorded. The application of both the Human Factors Accident Classification System (HFACS) and the DA Pam 385-40 approach identified 18 accidents (32 percent) as involving human error. While no single factor was responsible for all UAV accidents, both methods of analysis identified individual unsafe acts or failures as the most common human-related causal factor category (present in 61 percent of the 18 human error-related accidents).

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Within the major HFACS category of "unsafe acts," four subcategories were identified: skill-based errors, decision errors, perceptual errors, and violations. The most common unsafe act was a decision error, present in 11 percent of all UAV accidents and 33 percent of all human error UAV accidents. Examples of decision errors include (a) when the external pilot hurried turns using steep angles of bank and prevented a proper climb rate, resulting in a crash; and (b) when the wrong response to an emergency situation was made by commanding idle power after the arresting hook caught on the arresting cable. The single accident categorized as "preconditions for unsafe acts" was further identified as a crew resource management issue.

Based on the DA Pam 385-40 classifications, the most represented Army failure was "individual failure" (20 percent). The second most prevalent failure category was "standards failure" (14 percent). When just the 18 accidents involving human error are considered, individual failure was present in 61 percent, and standards failure was present in 44 percent. "Leader failure," "training failure," and "support failure" were present in 33 percent, 22 percent, and 6 percent of the human error accidents, respectively.

Incidents of individual failure included (a) the operator misjudged wind conditions during landing; and (b) crewmembers overlooked an improperly set switch on the control box. Incidents of leader failure included (a) a crewmember who did not have a current certification of qualification was assigned as an instructor pilot; and (b) leadership failed to provide oversight of placing the UAV in a tent and having the tent properly secured. Incidents of training failure included (a) training was not provided to the UAV operator on effects of wind; and (b) training was not provided on single engine failure emergency procedures. There was only one incident of support failure, which involved a contractor that did not take appropriate maintenance actions even though information was available. Incidents of standards failure included (a) written checklist procedures for control transfers were not established in the technical manual; and (b) there was no written guidance on inspection and replacement criteria for the clutch assembly.

As seen in virtually all types of accidents, human error plays a significant role in UAV damage and loss. Post-accident data analysis can provide a starting point for the design, examination, and adoption of appropriate countermeasures. While no single human factor was responsible for all accidents, these findings suggest there is a need to further develop and refine UAV training and safety programs that target individual mistakes. In demonstrating that human error plays a significant role in UAV accidents—and by identifying the type and prevalence rate of these errors—this study shows the need for emphasis on developing and implementing countermeasures that target human decision making error.

—At the time of this writing, Dr. LeDuc was a Research Psychologist for USAARL's Aircrew Health and Performance Division, Fort Rucker, Ala. She is currently the Human Factors Director at the U.S. Army Combat Readiness/Safety Center. Ms. Manning was assigned as a Safety and Occupational Health Specialist at the U.S. Army Aviation Branch Safety Office, Fort Rucker, AL.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in May 2013.

Cargo helicopters

CH-47

-D series. Aircraft experienced failure of the right rear wheel during post-landing taxi to parking. (Class C)

Utility helicopters

UH-60

-L series. Aircraft experienced a #2 engine hot start. IVHMS data showed TGT greater than 950 degrees C in excess of 15 seconds, peaking at 996 degrees C. Engine replacement required. (Class C)

Fixed wing aircraft

C-12

-U series. On post-flight, damage to the #1 propeller blade of the #1 engine found following an IFR flight.

-V series. Aircraft was on downwind when it struck a bird resulting in damage to the left side of the tail stabilator.

"You cannot be disciplined in great things and undisciplined in small things"
GEN George S. Patton Jr., May 1941

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U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Online Report of Army Aircraft Mishaps

Aviation: All about the Culture

BG TIMOTHY J. EDENS and LTC CHRISTOPHER PRATHER

U.S. Army Combat Readiness/Safety Center

Fort Rucker, Ala.

Our Aviation warriors are continuing a phenomenal trend of safely operating through high operations tempo and declining budgets. While we have seen an overall decline in mishaps from fiscal 2012, we are experiencing ongoing trends in human error, a possible result of the rapid development of new technology that has fundamentally changed the nature of work within and on our aircraft. While these advances enhance our operational capability and help mitigate potential mishaps, they require a tight coupling between technical subsystems and our aircrews.

Accidents during the past year have shown that failure of either the technology or the human can often cause a failure of the entire system. Investigations have shown that determining the causes of system failure is extremely crucial to preventing future accidents.

Causation progresses through several stages, the first of which is a technical period where new mechanical systems, due to their rapid development, may malfunction and result in an accident. We're in the midst of a second stage, one of human error, where faults of the human operator – not catastrophic mechanical malfunctions – are surfacing as a source of mishaps and fatalities. This is not to say mechanical malfunctions don't happen; rather, it's the preponderance of human error-based causal factors that make it obvious we're in this stage.

Building a proactive safety culture is the single-best "cure" for this issue, and leaders should be working on four primary elements that can help their unit reach a mature safety culture.

Crewmembers

One of the major sources of problems in aviation stems from the history of flight and its consequences for the attitudes of those who fly. In American culture, pilots have generally been regarded as elite, capable and self-sufficient, not necessarily the type of individuals willing to admit to failure. Within this context, pilots are often reluctant to confess their mistakes; some leaders, themselves aviators, might not want to hear about errors and even regard those who make them as poor pilots.

An aviation unit with a truly proactive safety culture is very different. Errors are willingly and openly reported, with causes thoroughly investigated in an after-action review that's shared with the unit. When regulations and standing operating procedures are disregarded or checklists skipped, unit personnel work together to solve the problem.

In a proactive safety culture, aviators are constantly applying the risk management process to determine whether to continue the mission or turn back when problems that put mission or force at unacceptable risk arise. Instead of blindly following predetermined plans, pilots develop

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sophisticated, real-time decision-making processes based on proven risk mitigation strategies.

Cabin Crew

Non-rated crewmembers personify the safety culture in the way they convey their attitudes while securing the cabin area, conducting their duties, and caring for their passengers. Through their interactions with passengers and others, cabin crews are the public face of the aviation unit and its safety culture.

Non-rated crewmembers are actively involved in a proactive safety culture. They are the individuals who are most often convinced and, by extension, convincing when safety issues arise in flight. They are the over-the-shoulder voice of safety reason when working as an integrated team with their pilots.

Maintainers

Maintainers, especially when deployed, often work under continuous time pressure, nowhere more than in overnight repair operations. The consequences of failures by maintainers are often more devastating than those by pilots, as these failures are often impossible to "fly out."

Maintainer professionals, like all Army Aviators, are all too aware of just how dangerous aviation is and are rarely willing to take risks. Yet investigations reveal that errors still occur, especially unintentional omissions. Like pilots, maintainers have considerable autonomy, and this can easily create a culture in which trust and open sharing of information is not as common as leaders want in a well-developed safety culture.

Leaders

The final element of a proactive safety culture is leadership and management. Army Aviation is fortunate because, unlike much of commercial aviation, our leaders are pilots and have experience as non-rated crewmembers, maintainers, and in-flight operators. They've acquired the "gut" safety imperative that's given Army Aviation an amazing reputation over the years.

We can capitalize and enhance this positive difference if our leaders continue to ensure that safety culture is part and parcel of what the unit is, not just what it does. Safety isn't hard – it's about knowing what's right and doing what's right. That mantra applies to every Soldier in our Army, not just aviators.

Our pilots and crewmembers, however, often have the most to lose, so it's therefore imperative for them to keep safety at the forefront of each and every mission. An environment where leaders encourage their crews to learn form one another's mistakes, talk openly about safety issues and "live the talk" will go a long way toward maintaining Army Aviation's hard-earned safety reputation and saving lives.

Fly smart, and remember – Army Safe is Army Strong!

BG Edens is the Director of Army Safety and commanding general, U.S. Army Combat Readiness/Safety Center. LTC Prather is the Aviation Director, USACR/Safety Center. *This article first appeared in the June 30, 2013 issue of ARMY AVIATION - the official journal of the Army Aviation Association of America (AAAA).*

Conservative Approach

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FW SP

Every time an army aircraft crashes, the enemy scores a victory. It doesn't matter what caused the accident, whether it was in combat, or a routine training mission; whether it was pilot error or mechanical failure. The fact is, especially in the current fiscal climate, when we damage our equipment or hurt our soldiers, the enemy gains an advantage. Any real or perceived weakening of our force emboldens our current enemies, and encourages future enemies.

I recently read an OIL paper (Operations Insights and Lessons Learned) from one of the Staff Course students here at Fort Rucker. The concern was that when it comes to taking the most conservative approach to mission planning and execution, commanders and pilots alike are talking a good game, but essentially doing the exact opposite when it comes to decision making. They're flying in weather they shouldn't, and ignoring crew rest policies, etc. The viewpoint was that the current culture in Army aviation supports the aggressive aviator, and punishes the conservative one. There is tremendous pressure from commanders to get the mission done, even in garrison doing training flights. My question is: how many accidents will it take for people to learn why ***the most conservative response*** is in the army lexicon?

Of course there are times when you will have to accept the high risk missions. The level of acceptable risk is proportional to the priority of the mission. If you have a real world MEDEVAC mission, that's a huge priority. If you don't go, someone could die. On the other hand, if you are trying to get an APART done, RL progression or a routine training flight, there is no excuse for taking undue risk. The worst possible outcome of a canceled flight is the commander may have to grant an extension. The equipment is safe in the barn, everyone goes home that night but you have to bug the commander for a signature. The boss will get over that. If you damage or destroy an aircraft, the commander probably won't get over it, and it's likely you *won't* be going home that night. We all seem to know this, but when it comes to applying it to mission planning and execution, many seem to fall short.

I once told a platoon leader I was going to delay a training flight until the weather improved. I was with an RL3 aviator and our airfield had nothing but an NDB approach at the time, so my experience and 175-1 told me it was best to slow back a bit. I was taking the most conservative approach. What was his response? Without looking at my weather brief, he ran over to the window and said: "The weather doesn't look that bad to me!" I had to hold back what I really wanted to say, but I had to wonder what made a person of such little experience in aviation feel it was OK to say that to one of the most experienced aviators in the unit. I could sit and point fingers all day long, and blame any number of people, or blame the command climate, but the truth is, I was on the blame line myself. Our job as aviators is to mentor other aviators, especially the ones who make decisions for the rest of us. The culture that either encourages or discourages overly aggressive behavior has to start somewhere. We've tried the top down approach; maybe we need to start from the bottom up. We need to focus on mentorship for our aviators and future leaders,

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based on proven risk mitigation strategies. If we're not leading by example as the senior aviators, we're partly to blame for the toxic or dangerous culture that results.

We can all agree that Army aviation is no place for the timid. But it's no place for reckless cowboys either. Unfortunately, there are a small number of Army aviators that fall into the latter category. Commanders need to identify them, and try to correct the problem before their behavior starts to spread to other aviators. It's the brash and bold aviators that seem to have the most influence on the younger crowd. The less experienced aviators look at them with a great deal of awe and admiration. Some will begin to follow in the footsteps of these types very quickly if someone or something doesn't intervene. Sometimes being in the air and wishing they were on the ground a few times will do the trick. Maybe a failed check ride or a word from the commander will get them on track. Sometimes it takes a bit more drama.

The boldest of aviators become very meek and humble if they live long enough to meet the accident investigation team. There are two primary reasons for this. First, they are made suddenly and violently aware that they are not as good as they thought they were (assuming it was pilot error). Second, they realize that the United States Army is seriously considering bestowing on them the scarlet letter of a failed aviator. Unless you've been through it, you probably don't know the stress that comes from having that microscope focused on you, and no one but an aviator knows the shame that would come from having the wings torn off your chest. This shame, of course, pales in comparison to how they'd feel if they got one of their own injured or killed. Ask your spouse and kids sometime if they'd rather you were an old aviator or a bold aviator.

Army aviation is an inherently dangerous business, and accidents are going to happen; however, ignoring the most basic principles of aviation safety makes the problem far worse than it needs to be. If you're briefing a mission, brief the mission, don't just read the script and send the crew out the door. Mission briefers and approvers should be critical of all aspects of mission planning, weather, crew rest, crew mix, currency, etc. If someone is too tired to fly, it doesn't matter how many hours they had off before their duty day. In some states driving tired is considered a criminal offense, why do people think that it's OK to fly a mission tired? Legal weather is not necessarily smart weather. A pilot shouldn't be shamed into accepting a mission because a weather guesser thinks the weather will improve. How many IIMC accidents have we had in the Army? If you say you're going to make the most conservative response in your crew brief then come home with hail damage, you probably didn't. Taking the conservative approach does not mean the mission won't get done, it just means we'll have less accidents and fewer fatalities in the process.

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Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 15 Jul 13
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	12	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	3	11	0		3	1	5	7
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0		0	0	4	0
	June	1	0	2	0		1	0	3	0
4th Qtr	July	3	3	9	1		1	0	1	
	August	2	4	8	0					
	September	1	0	3	2					
	Total for Year	19	17	86	12	Year to Date	9	4	36	9

	UAS Class A – C Mishap Table								as of 15 Jul 13
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	2	1	0	3
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	1	9	10
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	5	5
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat		1	1	2
Total for Year	8	11	28	47	Year to Date	4	3	18	25

Mishap Review: AH-64D Day Reconnaissance

While conducting a multi-ship reconnaissance mission, the AH-64D, flying at 94 KTAS and approximately 2000 feet AGL, suffered a catastrophic in-flight failure resulting in destruction of the aircraft and two fatalities.

History of flight

The mission was a scheduled two-ship security/reconnaissance mission in day and night vision device conditions in a mountainous environment. The aircrew met the crew chief at the aircraft at 0400 hours and completed their pre-flight. At 0500 hours the crew received their mission brief to include S-2, weather brief, and TACOPS/S-3 brief. The initial mission set called for a base security flight with a follow-on area security/recon mission in support of friendly forces. Weather was few clouds at 9,000 feet with a broken ceiling at 19,000. Visibility was unrestricted. Winds were 280/03 knots. Temperature of +17C and PA approximately +5000 feet.

The flight departed at 0600L, completed the security sweep and shutdown at approximately 0700L to await the follow-on mission. No problems were noted with the aircraft and the aircrews updated their weather. After a short break the crews completed thru-flight inspections, cranked and departed home base at 0750L with the accident aircraft in the trail position. The team conducted recons of various checkpoints in support of ground forces for the next hour and ten minutes. At approximately 0900L, while Chalk 2 was providing high security over watch for the lead aircraft, radio contact was lost between the two aircraft. Shortly thereafter lead aircraft observed a fire on the ground. A subsequent search of the area revealed the crash site of the trail aircraft.

Crewmember experience

The PC, sitting in the rear seat, had more than 2,200 hours total flight time, with 1,900 in the AH-64 (950 as an IP/IE) and 600 hours NVD time. The PI, flying in the front seat, had 400 hours total time, 270 hours in the AH-64D and 120 hours NVD time.

Commentary

Investigation of the accident is ongoing. The accident board suspects a materiel failure in the main rotor system caused a loss of control and subsequent crash of the aircraft. The aircraft was destroyed and the two pilots were fatally injured. Tear down analysis of recovered aircraft components is being completed to determine the cause of the failure.

All information contained in this report is for accident prevention use only. Access the full preliminary report on the CRC RMIS under Preliminary CAI Reporting https://rmis.safety.army.mil/ AKO Password and RMIS Permission required.

Mishap Review: OH-58C Autorotation

During the conduct of a simulated engine failure (SEF), the aircraft struck the runway surface in a level attitude, breaking off both skid tubes and coming to rest on its left side.

History of flight

The mission was a scheduled Commander's Evaluation flight for a newly arrived aviator. The mission involved evaluation of 1000 series aircrew training manual (ATM) tasks. The flight had been scheduled and approved by the flight detachment commander.

The crew's duty began at 0900 hours. Academic training was conducted from 0930 -1030 followed by the aircraft preflight. No problems were noted with the aircraft. Weather was clear skies with 7 miles visibility. Winds were 250/10-20 knots and temperature of +40C.

The flight departed at 1340L with various hover drills, hovering autorotations, and OGE checks being accomplished. The crew then conducted simulated engine failure training. The first two iterations were terminated by power recovery IAW the ATM. The third SEF was initiated at 2500 feet AGL at 80 knots. The IP instructed the PI to conduct a 360 degree turn to plan a landing to the intersection of the two runways. The PI flew the maneuver as directed and rolled out at 500 feet AGL lined up with the runway. The IP instructed the PI to terminate with power at a 3 to 5 foot hover over the runway. During the aircraft's deceleration the low rotor RPM audio warning sounded. The IP took the controls, rolled the throttle to the full open position and applied power to arrest the descent but the aircraft struck the runway's surface and spun to a stop resting on its left side. There were no injuries.

Crewmember experience

The IP, sitting in the left seat, had more than 3,900 hours total flight time with 1,800 hours as an instructor pilot and over 1,200 hours in the OH-58A/C. He had recently completed his RL progression. The PI, flying in the right seat, had over 1,500 hours total time including 389 hours as a PIC. This was his first flight in an OH-58C since graduation from flight school seven years prior.

Commentary

The accident board determined the crew failed to confirm the throttle was full open and the N2 RPM was at 100% prior to 200ft AGL. As a result, when the PI began to apply aft cyclic and increase collective pitch to slow the rate of descent, the rotor RPM decayed and the aircraft struck the ground and was destroyed.

All information contained in this report is for accident prevention use only. Additional information may be found on the CRC RMIS at https://rmis.safety.army.mil/ AKO Password and RMIS Permission required.

Know your unmanned aircraft

The Hunter (MQ-5B) UAS is used in support of Army Aerial Exploitation Battalion for RSTA and is the Army's longest serving Corps/Division level UAS. The Hunter's imagery system allows data to be processed in a matter of seconds, providing virtual, real-time information of battlefield conditions/targets. Hunter's enhanced imaging system allows commanders to detect, identify, and track hostile activity/targets for external weapons systems or maneuvers and battle damage assessment; thereby enhancing the commander's ability to locate and identify friendly forces to avoid unnecessary loss of life and locate enemy targets.

Wing Span	Weight	Range	Airspeed	Service Ceiling	Endurance	Primary Payloads	Launch/ Recovery	Propulsion System	Center Wing Configuration
34.5 ft	1,950 lbs	>200 km	62 Kts cruise 110 Kts Dash	18,000 ft	25 hours with EO/IR	Max weight 275 lbs 770 EO/IR 80 lbs	Unimproved Runway 1,600 ft	Heavy Fuel	Wet Extended Center Wing

Visions of the Past, Bringing Lessons to the Future

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Hunter System MTOE Configuration

- Five (5) Air Vehicles
- Four (4) Quad Sensor Payloads
- Three (3) One System Ground Control Stations
- Two (2) Ground Data Terminals (Antenna)
- One (1) Launch Recovery Terminal (Antenna)
- One (1) Backup Generator Mounted on HMMWV
- One (1) World Wide Power Interface Unit Mounted on HMMWV
- Four (4) One System Remote Video Terminals
- Five (5) Mobile Power Units (Generators)
- One (1) 5-Ton POL Truck
- Two (2) 5-Ton Crane Trucks
- One (1) 5-Ton Flatbed Truck
- Two (2) 5 Ton Trailers
- One (1) HMMWV Personnel/Equipment Transport
- Two (2) HMMWV Cargo Trailers
- One (1) Mobile Maintenance Facility

Hunter Capabilities

- Supporting Theater Conflicts 1999 to present
- Extended Range/Endurance UAS
- Highly Redundant Mission/Propulsion Systems
- Integrated with One System GCS
- Outstanding Target Location Accuracy
- Versatile Payload Platform: 35 Demos
- Multiple Mission Configurations
- Stellar Overseas Performance
- Target Designation/Attack Capable
- Deployed to both theaters OIF/OEF
- C-17 & C-5 Transportable

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UAS Project Office
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The life you save may be just about anybody's 20 Jan 1982 Flightfax

Back in the days of the war in Korea, an aviation unit adopted as its slogan: "We fly when the ducks are grounded." Stout chaps, those. The kind who are always ready to tell you they can get any job done . . . no matter what.

On the other hand, who ever heard of an off-course, disoriented duck running head-on into a mountain during a monsoon? When a duck reaches the sensible conclusions that things are considerably more hairy than he can handle, he looks around for the nearest pond on which he can paddle around until it is safe take off again.

There is another tired old slogan you can see on people's desks: "The difficult we do immediately. The impossible takes a little longer." Considerably longer.

Few people ever undertake what is clearly impossible provided they stop to give it some hard-nosed, mature thought in advance. It may turn out, too, that a problem which looks impossible at first glance can be cracked if you think about it long enough. After all, Mount Everest finally was climbed. Men have walked on the moon.

That's the bright side. There's a dark one. For every glowing triumph there have been dismal failures because people undertook some task they either didn't understand, failed to prepare for, or weren't able to do in the first place.

As often as not it wasn't their fault. They were asked or ordered into waters so far over their heads they sank without a trace.

If it's worth doing . . .

. . . It's worth doing in bang-up style, right? Take the case of Army aviation missions. Anything – repeat, **anything** – can be fouled up by just one person doing the wrong things in the wrong place at the wrong time. It doesn't matter whether he is the top person on the totem pole or the guy at the bottom holding everybody else up. If he is unequal to his assigned task, fails to give it the attention and planning it demands, isn't properly briefed as to what the mission is all about, or allows haste and distraction to interfere with proper execution, the result is almost certain to be a can of worms which could best be given the code name Operation Total Loss.

But let's take it as a matter of faith that professional pride makes every aviator anxious to do his job well and also that everybody is responsible enough to want to see it through to a safe, successful conclusion. No argument, there. At the same time, let's face the fact that not every mission comes up smelling like roses. Things go wrong which, by rights, shouldn't. How come?

One easy answer given in Vietnam – but not always the correct one, by any means – was that in combat, aviators, like everyone else, sometimes were forced to undertake assignments with considerably less than the comfortable safety margins normal prudence called for. In the heat of battle, extraordinary risks had to be assumed. There were times when the gamble failed to pay off. It is also true that in 'Nam, as in every war, overaggressive commanders on occasion made sitting ducks out of aviators in their attempt to carry out missions of dubious value which probably shouldn't have been attempted in the first place.

This isn't the sort of thing which happened every day. It serves to demonstrate, however, that if

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there is a gap in communications or understanding anywhere along the line in mission conception or planning, the operation can be in deep trouble from the start.

That's one important side of mission planning. Another pitfall in the same area comes as a result of what expert marketing managers call "impulse buying" – the kind of shopping binge which can fill a grocery basket with unneeded items and shoot a month's budget to shreds in a matter of minutes. Impulse missions are a good deal worse. A typical one took place on a dark and stormy night when two aviators of limited experience were ordered on a medevac mission to pick up two injured Soldiers in the hills. You probably won't be surprised to learn that on the way back they flew into a hill and nobody aboard ever returned to base. The ironic fact was that one of the men they picked up had a broken arm and the other was suffering from a minor cut. Both could have waited until daylight – and survived.

Needless losses of this sort stand as tragic testimony to the fact **that a failed mission is worse than no mission at all.** Sometimes much, much worse.

How can you guarantee the success of any mission? You can't, of course. In any operation in which a number of fallible human beings are involved, so many things can go wrong nobody would want to bet there won't be some sort of monumental snarl before the day is out.

But, what the heck, just about everything involves an element of risk. People manage to break their necks just by taking a shower in their own bathroom.

Just the same, risks can be cut down to bare bone, and where Army aviation missions are concerned, the place to start the whittling process is at the command planning level. In fact, mission planning and supervision are essential parts of a sound management program. An aviation unit can no more do without these professional tools than Jack Nicklaus could his golf clubs.

What goes into sound planning will differ in detail and volume depending on the mission, but planning is planning. You cover all the bases.

Aside from the painstaking blueprinting for the mission's execution, there is the matter of analyzing the mission itself. Is it really necessary or even worthwhile? Have alternate courses of action been considered? Has everything that could be done to identify and evaluate the hazards involved been done? Has everything that can be done to reduce and control the risks been done? Does everyone have a thorough understanding of the mission and the risks involved?

If all systems are go at this point, the next hurdle comes with the business of carrying out the mission, which is a little like saying that once you have read the simple instructions all you have to do is fit the pieces together to build yourself a Rolls Royce in your basement.

The truth is that once the whistle blows, the risks start coming at an aviator like a gang of downfield tacklers zeroing in on a punt returner. If he doesn't handle the ball with professional slickness, he knows he will end up face down on the turf under a half ton or so of enemy linemen. If an aviator falls down on the job there's a good chance he may find himself under a couple of tons or so of thoroughly junked helicopter.

Sic 'em tiger

Everybody who has been in the Army long enough to draw his first paycheck knows that enthusiasm for flying is part of every successful aviator's makeup. He takes pride in his job and he wants to do it well. Nobody is going to argue with this healthy attitude.

Continued on next page

As long as it stays healthy, that is. It starts getting a little green around the gills when it is carried the one fatal step into overconfidence, to the point where a person's professional pride is transformed into his desire to demonstrate to anybody around – and sometimes himself – how good he really is.

Any aviator who manages to slide into this dangerous state is a large package of **real** bad medicine. Mishap prone? He's loaded for bear so far as mishaps are concerned, that's for sure, and unless he is disciplined or grounded, he will wind up a short but thrill-packed career.

There is something equally capable of gumming up the works of any mission and that's pressure, or stress, or tension or whatever you want to call it. Every worthwhile enterprise has some sort of goal, and a person working toward a goal with only a fixed (and not always as much as he wants) time to do it in is a person working under pressure.

If an aviator is carrying an overload of pressure, he is a good deal more likely to make a big mistake than the carefree soul who has nothing to do and all day long to do it in.

Heat of battle

A fair amount of enthusiasm, and the excitement which simulated combat or other types of missions induce, is not only unavoidable but is desirable. Even a simple undertaking such as a cross-country training flight is more likely to have a happier ending if it is approached by an aviator who has an enthusiastic rather than a ho-hum attitude. The point is to adjust the enthusiasm to the point where it constitutes a blessing rather than a burden.

Here's where a good management and supervisory program comes back into the picture. Planning a unit mission is management's job, but before the blades begin turning, the razor-sharp execution required to reach the assigned goals becomes management's principal concern.

Mission possible sense

Basically, it comes down to rigid insistence on strict by-the-book procedures plus constant supervision designed to spot and correct the aviator who is about to be swept off his feet by his own emotions the way Romeo was the first time he laid eyes on the fair Juliet.

At the heart of every worthwhile management program is the realization that the ultimate goal is the successful completion of missions. That's pretty much what military aviation is all about – whether it is the deadly business of combat, rescuing stranded people in flooded disaster areas, ferrying aircraft, or countless other tasks an Army aviator can expect to be called on to perform. Nobody knows what the call will be tomorrow, but it's good sense to be prepared for anything.

No easy task, that. Mission impossible, you might say. Not at all. Sure, you could worry yourself into premature old age by trying to put down in black and white everything the future holds, but the kind of horse sense most of us are born with keeps us from such idiocy. Instead, we prepare ourselves by learning well, and sticking by accepted, established procedures which have stood the test of time in and out of the heat of battle.

And that's what a mission-conscious management program's training is built around. Good training makes for good flying habits.

Lone eagle

Once the blades start going around, every Army aircrew is a team functioning on its own to a

Continued on next page

marked and critical extent. A coach can't take the field with his team. The best management and supervision in the world can go only so far. After that, the success of a mission depends on the self-discipline, skills, and judgment of the people in the aircraft.

Out in the field, pilots are likely to have a total leeway in the matter of exercising their judgment about whether to go or not to go and what to do or not do in a particular situation. If their training has been thorough and if they are safety-conscious and disciplined enough not to allow overconfidence, misplaced enthusiasm, tension, or simple fatigue to override their skills, they'll come through with flying colors. One lapse in any direction can set off a chain of events which will bring their well-planned mission to a dismal end.

Take the matter of fuel management. A simple matter, to be sure. Yet you might be surprised to know how may missions failed because the fuel tanks went dry at the worst time, the way a motorist who should know better always manages to run out of gas five miles from the nearest filling station.

Or the missions which come to grief simply because a weary crew, taking honest pride in a long day's work well done, failed to remember that no flight is at an end until the aircraft is safely on the ground and the engine is shut down. A person who is looking forward to an evening of rest and relaxation involving a thick steak and perhaps a few short beers is ripe for a last-moment letdown which will make his evening turn out a good deal differently from what he had hoped.

All in the family

Every Army aircraft mission involves the skilled services of a considerable number of people. The fact that most missions are successfully completed is testimony to the generally high level of management programs, supervision, unit training, and individual responsibility of crewmembers and maintenance personnel. That's just the way things should be.

The silver lining, you could say. Less shiny is the fact that missions sometimes do fail and the cause can be traced to an error somewhere along the line committed by men trained to know better. Commanders or subordinates, senior pilots or young aviators just out of flight school – statistics prove that nobody carries a gold-plated card guaranteeing he won't be the one who will bring the next mission to an untimely end.

It's something to think about. Think about it while you are planning your next mission.

Think Mission all the way.

It's almost a fulltime job. If you do it well, the life you save may be just about anybody's.

Discipline is the most important attribute of an Army aviator or crewmember. Learned discipline allows inexperienced aviators and crewmembers to overcome a deteriorating tactical situation or unexpected weather conditions. Unwavering discipline keeps a mid-level aviator from attempting maneuvers beyond his capabilities and from placing his crew in situations of unnecessary risk. Discipline enhanced by experience allows senior aviators and crew chiefs to make solid recommendations to air mission commanders and influence the actions of fellow crewmembers.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in June 2013.

Utility helicopters

UH-60

-L Series. Aircraft landed hard during air assault. Damage to the airframe and tail boom reported. (Class A)

-A Series. Damage to trailing edge of stabilator, searchlight assembly, and FLIR discovered on post-flight following dust landing training. (Class C)

-A Series. During NVG sling load training the HMMWV load separated during climbing left turn. Vehicle was destroyed. (Class C)

Observation helicopters

MH-6M

On an approach to a ridgeline aircraft landed hard. Damage to the tail boom and tail rotor reported. (Class C)

Unmanned Aircraft Systems

RQ-20A

UA initiated an uncontrolled descent after two minutes of flight at altitude. UA contacted the ground and was not recovered. (Class C)

NOT TOO LATE

Complete the online Flightfax Reader Survey

The online version of Flightfax is just over two years old. In an effort to keep current with the field, we need your feedback. Please take a few minutes and complete the Flightfax Reader Survey located at:

https://tools.safety.army.mil/Survey/TakeSurvey.aspx?SurveyID=8lKJ7p8
(You may have to copy and paste into your browser).

"How can we improve Flightfax or make it more relevant to your needs?" - is the information we're seeking.

If you can't do the online survey, feel free to respond with your input via email to the Aviation Directorate, U.S. Army Combat Readiness/Safety Center:

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Flightfax®

Online Report of Army Aircraft Mishaps

The Walk Around Inspection

What's the last thing you do before you climb into your aircraft? The tail boom check comes to mind for many aircrew personnel – novel thought but not my target.

"Engine start was attempted with one blade tie-down rope still attached to the blade. The blade rope caused visible damage to the tail rotor paddles, the tail rotor gear box cover, minor sheet metal damage to the tail pylon and minor damage to the red blade. Class C damage reported."

This reads like the 'selected aircraft mishap briefs' found on the back page of Flightfax. Why? Because that is exactly what it is – a description of a recently reported mishap. This is actually one example of several types of similar mishaps that get reported each year that fall into the "things I should have noticed" category. Actually, that's not an official category, but unsecured cowlings, covers, panels, tie-downs, etc. can and do pose hazards to aircraft operations.

The Class C list for this FY includes: left engine cowling opened in flight, engine exhaust cover flew into rotor system damaging blade, right hydraulic door opened in flight causing damage to four main rotor blades, No. 2 engine inlet plug installed during start causing overtemp and engine replacement, and the left-side hydraulic deck cover opened at a hover and contacted all four main rotor blades.

A look back at the last five years shows 29 Class C and 55 Class D/E reported mishaps. I stress the word reported because the unreported or no-damage numbers would push the count even higher. The cost associated with these incidents is nearly $3,000,000. The more common events include the AH-64 engine cowling opening in flight; the UH-60 APU compartment door left unsecured as well as the occasional nose compartment door opening and slamming into the windshield, the inlet covers not being removed or secured prior to engine start, the ever traditional drive shaft cover that's closed but not fastened as well as other unsecured panels, shrouds, doors, and covers still occur. No aircraft is immune. Although the mishaps listed the last few years have been Class C or less, Class A and B mishaps have occurred in the past, to include fatalities. Human error is often the cause factor but not every incident can be attributed to it. Material failure of fasteners and latches can and do occur. But the great majority can be placed squarely on the human element and are very preventable.

So, how do you reduce the numbers? The initial thought is that every pre-flight checklist refers to the "covers, locking devices, tie-downs, and grounding cables – removed and secured." The simple solution is to follow the checklist. That works well for most occasions, but the variances that can occur during the preflight process can cause mistakes. The urgency to launch can lead to splitting the duties to reduce time. Last second maintenance being accomplished as the crew readies to start can lead to missed checks and unsecured panels. Stand-by aircraft that are preflighted but not run-up often remain tied-down until needed. When a mission does surface, there is increased exposure to errors being committed as the crew plans and preps for a quick

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launch. The are numerous things that can disrupt the routine leading to missed checks.

Aviation is a system of checks, double checks, and more redundant checks to confirm the airworthiness of the aircraft. The final walk around is one of these. Depending on the airframe, it can be referred to in slightly different ways, both in the operator's manual and the ATM. "The PC will ensure a walk around inspection is completed prior to flight" or "the PC will perform a walk around inspection prior to aircraft start" are two examples.

As with many things - *how* the walk around is accomplished is left up to the PC. There is no set standard on *what* you look for on your personal inspection. From reviewing the mishap reports the obvious items include visually or physically checking the security of the cowlings, removal of blade and aircraft tie-downs, no covers or jettison pins remaining, and loose equipment/seat belts secured. Timing is everything so the least amount of time between conducting the inspection and climbing into your seat leaves the minimal amount of time for an outside influence to come in and change what you last observed on your aircraft. And it should be done prior to each start. Crews have been caught short by having outside agencies work on their aircraft while between missions, sometimes without their knowledge. The nose compartment was secure for the first flight but when they came back from lunch it was not secured properly when the radios were re-keyed. Pop goes a windshield on takeoff.

My walk around was always conducted as the last thing I did before climbing into the aircraft. It wasn't something I would delegate to another crew member. Typically, it was a time to mentally conduct one last overview of the mission, check your aircraft, and secure your body armor and survival vest. In addition to the items listed previously, I would also check the general condition in and around the parking spot. Checking for loose debris and hazards (i.e. dust) associated with departing the parking area as well as the anticipated effects of the rotor wash on nearby objects were more thoroughly accomplished from outside the cockpit. If I was not involved in the preflight I would expand my inspection to include physically checking the top and engine inlets. Those are my techniques. You have your own. I've observed PCs numerically count latches and panels as their technique to know that they checked them all.

One more thought. Most of the written guidance on walk-arounds refer to the PC conducting or ensuring the inspection is completed. Remember earlier in the article it stated that there have been fatalities associated with these type events? About fifteen years ago an aircraft was conducting an engine MOC for a fuel filter replacement. The engine was being run against the gust-lock. The aircraft chains and blade tie-downs were still in place. The gust-lock broke. Secured main rotor blades began to turn. The imbalance and vibrations caused by broken blades rotating resulted in two fatalities – the crew chief monitoring the MOC from the engine work platform and the PI in the pilot's seat. The aircraft was destroyed. Two lessons – if the aircraft is going to be started, complete the checks as if it is going to be flown and if you are the individual who is in charge of starting the aircraft whether for MOCs, engine flushes, or whatever reason – you are responsible for completing the checks.

When you are reviewing the contents of this article at your next safety meeting - and I know you will - ask the question "What is the last thing you do before you climb into your aircraft?" The walk around inspection should be somewhere in the mix.

Robert (Jon) Dickinson
Aviation Directorate, U.S. Army Combat Readiness/Safety Center

The Art of Interpretation

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We live in an age of documented change, or should I say, changing documents. Never before have I seen so many Army publication changes than in the past few years. The changes may be for safety, legal and/or procedural purposes intended to guide us in our everyday missions. With each newly changed document, we as an aviation community are charged with interpreting these changes.

In the distant past, interpreting publications was fairly easy – we relied on the "old guys'' to show us. Now that I'm the "old guy," I find myself looking at the written words and questioning the meaning of it all. So, how do we interpret all these changes? The obvious method would be to read it word for word – the literal meaning of the written word. I had an "old" IP once tell me "words mean things." But, unfortunately, due to the rapid fielding of many documents, wording and sustenance can be contrary to what think we know. Even though the words have individual meanings, I sometimes have difficulty putting them together into a meaningful whole. Of course, this was not the intention of the author(s). I know, because I have helped write numerous changes, only to see the draft document go through the staffing process and be published with errors and/or misunderstandings. In this case, we must know the intent of the document to better interpret it – but "words mean things." This catch-22 leads me to believe interpreting publications is a true art form, so we must be satisfied to only be *jacks of all and masters of none* when interpreting publications.

Let's first look at the realistic art of deciphering the publication by diagramming the sentences. See, 8th grade English may save your life. We must start by breaking down the sentence into its major parts: nouns, verbs, adverbs and adjectives. Then we look at its syntax, how the words and punctuation work together to give the sentence meaning – "sentences mean things." This form of interpretation will give us the literal meaning of the sentence, the connotation. Now that we know the meaning, we are able to put it into practice, right? Well hold on, what do we do about the document that leaves us asking "what was the purpose for putting *that* in there?" or "where is the common sense in *that*"? Ms. Smith, my 8th grade English teacher, said to understand a sentence, I need to know how to diagram it. Oh-no! Here is the catch 22 all over again. She was partially right: whether I diagram it or not, I must be able to put all the words and punctuation (right or wrong) into a meaningful whole. If I said "the nut is broken," did you picture a nut as in the food or a nut as in hardware that goes with a bolt? In order for you to know which one I'm talking about, I must give you more information to go on; this provides denotation – the meaning in the context. I do this by adding more and more sentences to create paragraphs that have meaning – "paragraphs mean things."

Using the connotation and the provided denotation, we can now begin to interpret these publications to achieve the intent for which they were written. Determining the intent is an art form in itself also. Luckily for us, many Army publications start with a purpose or intent paragraph. This provides the foundation and guidance for us to better understand the document.

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But this alone does not provide the full intent and its effect on our mission, so we must look at who wrote it and why. Each publication is constructed and maintained by a proponent. The proponent is staffed by Subject Matter Experts (SMEs); one of their many tasks is to write and update its publications. Believe me, this is a very time consuming job with an abundance of criticism. These SMEs use references and source documents to write their part of a change in a team effort to get their collective intent across. As we learn more about this proponent and its purpose, we are afforded a better understanding of their intent. The intent of the document is its heart and soul. It's worth more than the sum of its parts. We must be able to read between the lines and see the different shades of gray to fully understand the intent hidden in all the words, sentences and paragraphs. Therefore the question we must ask ourselves is "how does the publication's intent affect the commander's intent?" Remember, all the Army's publications are designed to guide, assist and regulate the commander in achieving the unit's mission—"publications mean things".

Interpreting publications is like looking at a painting. We must look past the colors, the brush strokes, the imperfections, and the abstract content to truly see the painter's intent. If we are able to do this when interpreting a publication, we will be able to see past the fog, confusion and errors to determine the writer's intent. If we truly see the publication for why it was written and not how it was written, we will surely meet the commander's intent and be successful in our missions. "There can be no sound interpretation without good faith and common sense." (Remarks on The Army Regulations and Executive Regulations in General by G. Leiber, JAG, 1898, p. 86)

Manned Aircraft Class A – C Mishap Table as of 28 Aug 13

	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	12	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	3	11	0		3	1	5	7
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0		0	0	4	0
	June	1	0	2	0		1	0	3	0
4th Qtr	July	3	3	10	1		0	2	4	0
	August	2	4	8	0				4	
	September	1	0	4	2					
	Total for Year	19	17	88	12	Year to Date	8	6	43	9

Mishap Review: UH-60 Ground Taxi

While ground taxiing to a refuel point at a civilian airfield, the UH-60A contacted an aircraft hangar resulting in significant aircraft damage and no injuries to the crew.

History of flight

The mission was a day single ship cross country return flight to home station following two days of internal training on the eastern side of the state. The original 0930L VFR departure was backed up to the afternoon due to weather. The crew planned an IFR flight to an intermediate airfield for refuel followed by a VFR leg to their home station. The mission was low risk. The weather was broken skies with visibility of 10 miles. Winds were 090 degrees at 08 knots; temperature -01C and PA of +2300 feet.

The aircraft departed on an IFR flight plan at 1515L en route to the refuel stop. Approximately one hour after take-off and 10 miles from their destination, the crew canceled IFR and proceeded VFR to the airfield. With the PI on the flight controls, the aircraft landed and ground taxied toward the fuel pump. Concurrently, the IP began the shutdown procedures, telling the PI they needed to be close to the refuel pump. There was no ground guide or marking for taxi and parking. Approaching the point, the CP in the left crew chief station called a blade clearance warning of five feet, followed by turn right - stop. Near simultaneously, the main rotor blade tips struck the hangar door and a heavy steel beam on the hangar corner. The aircraft rotated approximately 270 degrees to the left coming to rest with extensive damage to the aircraft, hangar, and other parked aircraft. An emergency shutdown was completed. There were no injuries to the crew.

Crewmember experience

The IP, sitting in the left seat, had more than 2,000 hours total flight time, with 1,900 in the UH-60 (1,300 as a IP/PC) and 600 hours NVG time. The PI, flying in the right seat, had 128 hours total time, 45 hours in the UH-60 and 19 hours NVG time. The IP qualified CP in the left crew chief seat had 1,500 hours with 280 NVG. The flight medic, sitting in the right crew chief seat, had over 500 hours with 150 NVG.

Commentary

The accident board determined the crew failed to maintain a path clear of obstacles allowing the main rotor blades to contact the hangar door. The pilot on the controls failed to estimate distance, closure, and control input; the IP failed to properly direct his attention outside the aircraft during a critical situation; and the co-pilot was not timely and assertive in his obstacle clearance advisories during a critical phase of flight.

All information contained in this report is for accident prevention use only. Access additional accident report information on the CRC RMIS https://rmis.safety.army.mil/ AKO Password and RMIS Permission required.

Know your unmanned aircraft

The MQ-1C Gray Eagle Unmanned Aircraft System (UAS) will provide combatant commanders a much improved real-time responsive capability to conduct long-dwell, wide area reconnaissance, surveillance, target acquisition (RSTA), communications relay, and attack missions (4 HELLFIRE II® missiles). Gray Eagle addresses an ever-increasing demand for greater range, altitude, endurance and payload flexibility.

The acquisition strategy has capitalized upon competitive forces, bringing cutting-edge improvements at the best cost and value that support the major thrusts of the Department of Defense UAS Roadmap, a host of other studies, and the imperatives of Army modernization and Army Aviation Transformation. This includes a heavy fuel engine, Tactical Common Data Link technology and network connectivity that reduces information cycle time and enhances overall battlespace awareness through liberal dissemination, teaming with manned platforms, and steps toward integration of UAS into national and international airspace.

A 3,600 pound gross take off weight, Fowler flaps which improve take-off and landing performance, Automatic Take-off and Landing (ATLS) and the flexibility to operate with or without Satellite Communications (SATCOM) data links are just some of the characteristics that make this system a combat multiplier.

Wing Span	Length	Power	Weight	Payload Capacity	Payloads	Altitude	Endurance	Maximum Air Speed
56 ft (17m)	28 ft (8.5m)	Thielert 160 HP (JP8)	3,600 lb	575 lb int 500 lb ext	EO/IR, SAR/ GMTI, and Communications Relay	25,000 ft	27 hours	150 Kts

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System Features

- Redundant Flight Controls and Avionics
- Dual Redundant ATLS
- System Operational Availability Over 80%
- Displacement/Emplacement in Less than Two (2) Hours
- Near All Weather Capability
- Common Ground Control Station

Mission Features

- Integrated in the Combat Aviation Brigade within each Division
- Immediately Responsive
- Persistent Surveillance
- Target Acquisition, Designation, Attack, and Battle Damage Assessment
- Reinforce Brigade Combat Team Capabilities
- Heavy Fuel Engine (JP8)
- Manned-Unmanned Teaming

Project Manager
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Why did they take these risks? Feb 2000 Flightfax

A recent accident illustrates how risk-taking behavior can lead to a tragic chain of events. The result was destroyed equipment, crew injuries, and death.

Poor judgment does not reserve itself to any category of aviator. Low-time and high-time pilots alike can make poor decisions. When a poor decision is made, it can be fatal, not only for the offender, but for the crew and passengers as well. The following account, which traces the mission and planning of an ill-fated flight, demonstrates the consequences, which arose from risk taking and violation of Army flight regulations.

A case in point

An instructor pilot with 3,900+ hours was preparing for an instrument refresher training flight just before Thanksgiving holidays. The weather had been poor for the previous three days and very few flights had launched. The pilot had approximately 450 hours and flew infrequently as a staff officer. Two crew chiefs were aboard the flight. The weather the day of the accident was poor in the morning, improved a little during the day, and then deteriorated again that evening. Ceilings were 200 feet overcast around 0900 with two statute miles visibility and a temperature/dew point spread of 13/13 degrees. Around 1300 the weather came up to 1,000-foot ceiling, overcast, 10 statute miles visibility and 17/14 temperature/dew point spread. By 1600 that day, when formal flight planning for the training mission began, conditions were still VFR.

Mission planning

The aircraft assigned did not have a glide-slope receiver and at 1630 the IP directed the crew chief to physically inspect the aircraft to verify whether or not the aircraft had a glide slope. After their review of the aircraft, it was determined that the aircraft was not glide-slope equipped.

At 1710 the IP called the flight service station (FSS) for weather and received a forecast for his destination airfield at 1800 of winds variable at three knots, two statute miles visibility, mist, overcast 600 feet, temperature 15, dew point 14 and a temporary condition from 1800-2400 hrs of 1/2 – statute mile visibility, fog, overcast at 200 feet.

Risk-taking behavior #1

Did not receive weather briefing from a military facility IAW AR 95-1 and local SOP.

He also received METAR (Aviation routine weather report) observations for his two en route destinations for training approaches. The first airport was 55 miles to the east and was reporting winds 000 at 00 knots, ¼-mile visibility, fog, temperature and a dew point of 14 at 1650.

The second airport was 27 miles west of the first airport and 33 miles east of the departure airport. The second airport's METAR report cited winds 000 at 00 knots, 10 statute miles visibility, broken 800 feet and overcast 1100 feet, temperature 15 and dew point 14.

Risk-taking behavior #2

Did not associate hazards of a minimal temperature and dew-point spread, temporary condition, deteriorating forecast conditions, and added hazards associated with night instrument flight.

At 1715 the IP filed his flight plan with FSS. Navigation equipment installed included a VOR and

Continued on next page

ADF. The planned approach at final destination had ceiling and visibility landing minima of 400-1/2. IAW AR 95-1 an alternate was required if ceiling and visibility were less than 800-1 ¼. The flight plan indicated 2 hours and 26 minutes of fuel on board.

Risk-taking behavior #3

No alternate airfield planned or filed in the flight plan, in contravention of AR 95-1.

Mission planning and training continued for the pilot using the general planning and FLIP until approximately 1800 hours, 15 minutes past the filed departure time. The IP turned in his DD 175, DD175-1 and risk assessment to operations. The mission briefer approved the mission, and the crew conducted their preflight inspection of the aircraft at approximately 1805.

Risk-taking behavior #4

The mission briefer failed to ensure forecast weather conditions met the requirements of AR 95-1 and the local SOP. Specifically, a non-military facility provided the weather forecast, and an alternate airfield was required but not designated.

The flight

The flight took off at 1832, using a standard instrument departure in route to the first airport, to conduct an instrument approach and a missed approach for training. At the second airport another training instrument approach and missed approach were to be conducted, followed by an instrument approach at their destination airport for termination of the flight.

The flight to the first airport was relatively uneventful. At 1906 the crew was conducting the VOR approach at the first airport. Radar showed the aircraft was on course and had no apparent difficulties executing the approach. The crew made the missed approach and continued to the second airport.

At the second airport, radar and ATC communications revealed the crew had some difficulty with identifying and intercepting the approach course. The approach clearance was cancelled, the aircraft was vectored to re-intercept the course, and the crew flew an ILS approach to the localizer minimums at 1929. Radar data again shows the aircraft on course throughout the approach. The crew executed the intended missed approach and was given vectors for the return leg to their destination airport.

While en route to their destination, the crew acknowledged having the current ATIS information – 100 feet vertical visibility, ¼-statute mile visibility, fog, temperature 13, and dew point 13. After being vectored onto the approach course, the crew executed an ILS approach to localizer minima, and then executed a missed approach at 1957 because they could not identify the runway environment. Radar data shows that the crew flew the approach course without significant deviation down to minimums. The crew requested vectors for a second ILS approach. At 2013 the tower radar identified the outer marker and the crew acknowledged the transmission as they began their second approach. This was the last transmission from the crew.

Radar data shows that the crew flew on course down to localizer minimums. Several hundred feet short of the runway the aircraft track began to veer left of course. The aircraft slowed to 60 knots and descended another 100 feet as it traveled 3/10 of a nautical mile past the runway approach end. At this point, radar identification was lost. From the last known radar position, the

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aircraft turned approximately 180 degrees and traveled the 3/10 nautical miles back towards the approach end of the runway. At 2017, 4 minutes and 20 seconds after crossing the outer marker, the aircraft impacted the ground. The aircraft was in a 30-degree nose-down level attitude.

The consequences

The resultant crash force was 57 G's. The IP and one crew chief were killed on impact. The pilot and other crew chief were ripped out of the aircraft as it disintegrated along the wreckage path. The expulsion of the pilot and crew chief dissipated resultant impact forces so that survival was possible. The pilot and surviving crew chief sustained serious life-threatening injuries. The aircraft was destroyed.

Conclusion

This accident was avoidable. Army flight operations are controlled and regulated for a reason. Major airlines and Part 135 operators use detailed operations manuals and procedures, just as we use SOP's and AR's, to reduce some decision making in the interest of safety and risk management. Major airline and military accident statistics strongly suggest that our operations are safer than general aviation, because the military and major airlines utilize more controls. If the SOP's and regulations are not enforced by supervisors and followed by our pilots, then we lose invaluable checks and balances to keep our operations safe.

UAS Class A – C Mishap Table as of 28 Aug 13

	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	4	1	0	5
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	2	10	12
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	6	6
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat	1	2	1	4
Total for Year	8	11	28	47	Year to Date	7	5	20	32

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in July 2013.

Cargo helicopters

CH-47

-D series. Engine exhaust cover was still in place during engine run-up for flight. Cover blew into the rotor system and contacted the aft 'green' blade. (Class C)

MH-47

-G series. PTIT exceedance (1.1K degrees C/12 sec>) during engine-shutdown. Engine replacement required. (Class C)

Utility helicopters

UH-60

-A series. Post flight inspection revealed damage to the stabilator. Aircraft had been performing autorotations during RL progression training. (Class C)

Observation helicopters

OH-58C

Aircraft experienced a torque exceedance (106%/1 sec) when crew initiated a vertical climb in dust conditions to avoid terrain. (Class C)

Fixed wing aircraft

UV-20A STOL

Aircraft contacted tree line during take-off sustaining damage. (Class B)

Unmanned Aircraft Systems

MQ-1C

UA experienced loss of fuel pressure and a FADEC degradation during flight. Crew initiated emergency procedures for return to base. Engine failed with system landing short of the runway. (Class A)

RQ-20A

Operator lost link with the system and initiated emergency procedures to re-establish. Attempts were unsuccessful and the UA crash-landed. (Class C)

RQ-7B

System experienced engine failure approximately 45 minutes into flight. Crew was able to control system for descent and deployment of recovery chute. Damaged system was recovered. (Class C)

Aerostats

-Aerostat reportedly became engulfed in a 'dust devil' as it was being launched. Tether broke in the erratic shifting of the balloon. FTS activated and balloon recovered with damage. (Class B)

- Aerostat was aloft when 'dust devils' were observed and tether was severed by winds. Balloon impacted the ground. (Class A)

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Number 29 September 2013

Flightfax®

Online Report of Army Aircraft Mishaps

Taxi Mishaps – Pay attention, They're Preventable

Want to know how to save nearly four million dollars a year in Army aviation? Stop taxiing into things, that's how. That sounds so basic you would think it is common sense. Unfortunately, it appears common sense is one of our least used senses in this area.

"Aircraft taxied down Mike taxiway, then turned left down Papa taxiway. Due to an aircraft being towed down Papa taxiway in their direction, the decision was made to turn left through an empty parking pad, then turn right and take Oscar taxiway to Lima to get around the towed aircraft. Aircraft made a wide right turn to a avoid a parked CH-47 on the right edge of Lima taxiway, then closed their gap on the front rotor system of the same CH-47 due to a HH-60 being parked at the hanger to their left. Light sets, ASE, and MILVANS were on Lima taxiway to the right side of the hanger forcing the aircraft farther to the right. Aircraft's four main rotor blades contacted a light set on the left side and an emergency engine shutdown was performed." Class C damage.

This crew took the long way around the barn to eventually get to the scene of the accident - and the point of this article – Army aircraft are having mishaps doing a task that should have no mishaps. To be fair, there were plenty of challenges on getting this aircraft to its parking pad but none of them rose to the level of taking a risk in striking an object and causing aircraft damage. In this taxi mishap review we'll look at what is happening, why it is happening, and what could or should be done to prevent it.

Since the beginning of FY 2008 there have been 31 reported Class A thru E taxi mishaps involving object strikes. There were seven class A, seven class B, 11 class C, four class D and two class E. No injuries were reported in these mishaps but the total cost exceeded $23 million. By type aircraft, there were 23 incidents involving UH-60s, four fixed wing aircraft, two CH-47s, one Mi-17 and one OH-58A. Two of the mishaps occurred while hovering (a UH-60 and a OH-58 contacted signs) while the rest were related to ground taxi.

Enough about the numbers – what did we hit? How about five parked aircraft, three running aircraft (two during lead swaps, one trying to park side-by-side as close as possible – you know how it gets at port ops), four hangars, six light poles, one vehicle antenna, two signs, six barrier walls, one fire extinguisher, two runway lights, and one UAV. No partridge in a pear tree.

So we know who hit what, how many times, and what it cost. Why? It is no surprise that they are all human error mishaps. The majority of the mishaps involve individual task errors associated with failure to accurately estimate/judge distances between objects (that means maintain clearance) and failure to scan.

The clinical definitions that would show up in a mishap report would read along the lines: *"Failure to accurately judge distance between objects, rate of closure with objects, or the amount of control input required to properly maneuver aircraft."* In regards to scanning errors: *"Failure to properly direct visual attention inside or outside the aircraft, (for example, too much or too little time on one object/area/activity); scan pattern not thorough or systematic; channelizing/fixating*

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attention, allowing attention to be drawn away from the scanning process so that visual information important to decision making and/or aircraft control is missed and/or not acted upon."

Examples of scan failures include crewmembers not monitoring the taxi due to working other tasks, distractions, inattention, or crewmembers intensely monitoring one area; i.e. the tail clearance, for hazards but not the main rotor, which ultimately strikes something.

Why did these task errors occur?

A great majority of the root causes of the errors are associated with overconfidence/complacency. *Overconfidence is a temporary state of mind that becomes a root cause when an accident is caused by a person's unwarranted reliance on their own ability to perform a task, the ability of someone else to perform a task, the performance capabilities of equipment or other materiel.*

Let's say a crew is taxiing out of parking. The pilot-in-command (PC), not on the controls and using good aircrew coordination, announces to the co-pilot that he/she will be inside programming the navigation system. The co-pilot acknowledges and confirms that he/she will pick up the PC's scan area. The PC exhibited confidence in the co-pilot's ability to continue to taxi in a safe manner while he/she completed the nav update. That the co-pilot then strikes the tail rotor of a parked aircraft while the PC's attention was directed to other areas, has now pushed the PC into the realm of being overconfident in co-pilot's abilities.

In the same vein the co-pilot was probably overconfident in his/her ability to maintain obstacle clearance. To be fair, there could be all sorts of contributing factors. Are the taxiways marked? Are they the appropriate width? Are there obstacles as described in this article's opening example? Is aircraft parking to standard? The list can go on, but critical is the need for the crew to take them into consideration. Would programming the navigation system have the same priority to this PC, if it was night, operating out of an unimproved aircraft parking area? Would or should his/her confidence level be the same in the co-pilot's ability to maintain clearances with one less set of eyes monitoring the activity? It is often these fuzzy areas that increase the risk in very subtle ways. Experience levels can lull you into complacency and overconfidence. Of those reporting crew experience, over half had cockpits with greater than 3000 hours.

So, how do you reduce the numbers?

Back to basics comes to mind. For the aircrews - don't take chances. If, in the course of cockpit communications, key phrases like "it'll be tight/close" or "I think we can make it," - things along that line, then it might be time for the discount double check. The 1000 hour crewchief on the right of your aircraft has a different experience base than the 50 hour door gunner on the left. That's some of the fuzzy math you have to use in making decisions. Has anyone ever really been trained in distance estimation and depth perception to the end of a rotating blade and light pole you're trying to slip past at an unfamiliar municipal airport?

For the safety officers – ensure your aircraft operating environments meet the standards. If they don't, then implement control measures to reduce the risks. Clear the overflow that inhibit clearances on taxiways or close them to aircraft operations. Keep the aircrews informed of the hazards and keep working to meet the standards. Don't have taxi lines? Give them something else to use – bean bags, chem lights, sandbags, painted rocks – whatever improves the crew's situational awareness.

For the leaders - I'm sure it wasn't foreign to your observations that a significant number of

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incidents involved UH-60s (23/31). To be sure, the Black Hawks are exposed to tighter quarters for pickups and drop-offs than the CH-47s. But they also have a smaller footprint to monitor. There probably isn't a single factor you can point at the UH-60 to explain the numbers. My past dealings with Chinook drivers have left me with the impression that they are very cognizant of the size of their rotor system and the effects of their rotor wash. There are always exceptions, but most take great care in how they operate on the ground. You will seldom see a CH-47 parked next to a Cessna 150 on the transient ramp. Significantly, their operators manual gives guidance on ground taxiing stating that when within 75 feet from an obstruction, on an unimproved/unfamiliar airfield, a blade watcher and taxi director shall be utilized. Could a control measure for UH-60s be implemented? Sure, maybe not in an operators manual, but a unit SOP stating clearance criteria could be established. A suggestion might be within 50 feet of the aircraft or maybe 20 feet of the rotor tip.

Would this type of recommendation deter the overconfident crew from 'cutting it close?' That's to be seen. But if the point is raised *"Sir, we have an obstacle within 50' of the aircraft and the SOP states we must deploy a ground guide,"* then at least the discussion is started, and sometimes, just a little discussion is all you need to prevent an accident.

Robert (Jon) Dickinson
Aviation Directorate, U.S. Army Combat Readiness/Safety Center

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Do you have an aviation related story, information brief, or lesson's learned type event you would like to share with the aviation community? Pass on your experience with an article in Flightfax.

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Automation in the Cockpit

CW5 James A. Strine
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
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Commander EFSB, DES SP/IE

These are exciting times in Army Aviation as we continue to field new, modernized aircraft across the fleet. Digital systems, glass cockpits, moving maps, auto-pilots and coupled flight; finally the automation to reduce pilot workload and human error! We embrace this technology and welcome its capabilities as we should, but with it comes new challenges as well.

In January, the Federal Aviation Administration issued a safety warning cautioning the commercial industry that flight data reviews show an "increase in manual handling errors" which the FAA blames on pilots' regular reliance on auto-flight systems. Bill Waldock, a safety science professor at Embry-Riddle Aeronautical University, stated, "Automation has reduced certain types of human errors, but in a way it's introduced new ones. You're trusting automation to fly the airplane, and, in a lot of respects, that makes you not pay attention to the plane…"

Recently, the crash of Asiana Flight 214 may prove to be a result of this very phenomenon. Although the cause of this crash is still speculation, the National Transportation Safety Board did release information indicating that while the plane's auto-throttle was set for 157, it was only armed, ready for activation. Perhaps for our fixed wing community that's enough said; a direct line correlation can be drawn and the lesson learned. For our rotary wing community the correlation is not as direct for obvious reasons. Nonetheless, there are scenarios from which similar errors or a computer malfunction could prove just as dangerous; let's examine two.

When we transition to these sophisticated, modernized aircraft, it's imperative we learn to use the systems as they are designed. So, using an ILS approach as an example, time and time again we go through the process. Arm the ILS (in whatever method you're aircraft uses), wait for capture of the localizer – got it – okay, wait for capture of the glide slope – got it – we're done and the computer performs a picture perfect approach, success! The fallacy here, of course, is in the statement "I'm done," yet I'm sure this is going on in many pilots' minds at this point. I'm sure because during check rides when I fail the auto-pilot or simply decouple the aircraft, forcing the pilot to fly the approach, so many spend the next several minutes scanning the glass seeking relevant information for which they haven't developed an habitual cross check required to manually fly the approach. Is that not an increase in manual handling errors?

What about IIMC? In my travels around Army Aviation I've asked hundreds of aviators about this task. Most answer "Transition to the instruments after stating they're IMC and verifying the other pilot is as well, immediately initiate a climb, attitude, heading, torque, airspeed, then comply with the SOP." While there are things to discuss in what's been said already, that's not the intent of this article so I'll drive on. As an ongoing personal experiment over the past 14 years, I continue the IIMC discussion by asking the pilots to visualize going IIMC; place themselves in the cockpit mentally then tell me what altitude and airspeed they were at when they entered IMC. More than 90 percent answer an altitude between 2,000 and 3,000 feet, some answer 1,500 feet, and a handful have stated a much lower altitude described by AGL. Everyone who answers 1,500 feet or

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above states his airspeed is either 90 or 100 KIAS. While such a description is not impossible, especially in low contrast environments, another scenario exists, one which has killed too many crews. Un-forecast weather is encountered; the visibility reduces so we slow down. As the clouds get closer, we descend. Soon we are off our course line dodging the weather, turning this way and that as determined by the direction we can see the furthest. Then it happens, everything goes white.

Not long ago that would lead to a discussion of just what their answer truly means to immediately initiate a climb. Now I'm hearing new ideas from those who are flying automated systems. Overwhelmingly the response is "I'll hit the go-around button," but is that really the right choice? Using the CH-47F as an example, it is likely that since you are no longer on your planned course line and speed, then you are no longer in coupled flight, either. This means that when you hit the go-around button you get cues, the aircraft does nothing automatically, you're "armed." Okay, you're sharp, next you reach down and couple the aircraft. Several issues now confront you. If you were turning when you encountered IMC then when you pressed go-around the computer captured current heading and not the heading you rolled out on by leveling your attitude. Simultaneously the aircraft will begin to attain a 500'/minute rate of climb, certainly not enough for this circumstance. Now you must reach to the CDU, bring up the Flight Director page and increase your vertical speed. Bear in mind that precious seconds are ticking away while all this button pushing is going on, seconds which could critically affect the outcome of this event. Finally, as soon as the aircraft attains a climb rate of 200'/minute it begins to achieve an airspeed of 80 KCAS. If your speed at IMC entry was something less than that, the aircraft will pitch down to achieve the new airspeed; probably not the response you're ready for just yet at low altitudes unable to see terrain and obstacles. The possibility of automation confusion taking hold at this point increases significantly.

One last quote to conclude - Hans Weber, president of aviation consulting firm TECOP International, stated, "One of the consequences of highly automated airplanes and younger pilots, who grew up very computer literate, is that they tend to focus exclusively on the computer, punching buttons and trying to get the airplane to do the right thing, rather than focusing on the fundamental requirement of the pilot…" Don't let yourself get caught in this trap. Constantly prepare, train realistically, maintain technical and tactical expertise and prepare for contingencies. Commanders and trainers, look at your areas of operation and your METL. Develop standard procedures to preclude and/or overcome contingencies which can be reasonably expected to occur, and if it's necessary implement seasonal procedures as well. When you train, make it realistic and address automation confusion and computer failures. Take advantage of these exciting times, don't become a statistic of automation.

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Just another day of the Marne Express

Sgt. Anthony Davis, Hunter Army Airfield

Our day began with mission plans and a manifest review, the flight route was briefed and crew actions before and after flight were discussed. With that done, we agreed to meet back at the aircraft after dinner to prepare for the mission from BIAP, Baghdad, Iraq. When we were ready for take-off, the auxiliary power unit gave a thunderous roar and the UH-60 came to life. I climbed through my gunner's window as I had so many times with no real concern for the crew mix of experience in the area of operations.

We received clearance to depart the taxiway and transition via what we called Mike, a direct path to Forward Operating Base Liberty. Upon landing at Liberty, I exited the aircraft and went to pick up passengers from pick-up zone control. With PAX in tow, we boarded the aircraft. As we prepared for take-off, I heard the co-pilot, who doesn't get much flight time because of his staff duties, say „I have the controls" and the instructor pilot said „You have the controls" and we took off in a direction which was not familiar to me.

I didn't think much of it at the time when I heard the instructor pilot say "Hey, sir, I think we just flew through a restricted operations zone" and the co-pilot said, "Oh, well, no big deal." Seconds later the aircraft shook violently and began to vibrate. We also heard traffic over Baghdad radio about a PTDS (Persistent Threat Detection System) that had been cut loose, so I began to scan higher than normal. When I realized what happened, I informed the cockpit that we had cut the tether line for the JLENS (Joint Land Attack Cruise Missile Defense Elevated Netted Sensor) balloon.

It turns out that the co-pilot had turned down the radios and was unaware the balloon's tether had been cut. We requested permission to return to the parking area and began the shut down process. Upon exiting the aircraft, I felt the co-pilot acted as if nothing had happened and wasn't acknowledging just how close we came to a serious aircraft accident. I was relieved no one had been injured. With my flight gear still on, I inspected the rotor system and blade and saw the damage to one of the rotor blade tip caps, a tear one half the length of the cap.

When the safety officer arrived, we were told the PTDS had been severed from its tether and we had to provide blood and urine samples as part of the accident investigation. It turned into a long night and I was administratively grounded as I waited for the accident report findings.

The investigation concluded the lack of crew cohesion was the main reason for the crew coordination break down. Other factors included the lack of flight time in the AO for the staff officer and that both pilots failed to respond to the violation of flying through the ROZ. It was a series of crew coordination breakdowns that caused the problem and the destruction of a UH-60L tip cap and over $1M damage to the PTDS.

Know your unmanned aircraft

Puma is a hand launched Small Unmanned Aircraft System designed to directly support organic reconnaissance requirements of battalion and below maneuver elements. The system is man-portable and is operated by 2 trained operators. The Puma provides the ability to automatically track moving targets and to operate in a "follow-me" mode relative to the operator, thus allowing for mobile operations. The sensor is fully gimbaled and simultaneously provides EO, IR, and illuminator capabilities. Puma can operate in a wide range of environments, including rain and salt water conditions.

The Puma All Environment Capable Variant (AECV) **is designed for land based and maritime operations. It is capable of landing in fresh or salt water and on land and provides the operator with the flexibility to tailor missions to the specific needs of forward deployed tactical units. The Puma AECV is designed for use in rugged and austere environments, providing a highly reliable, man portable reconnaissance system requiring no auxiliary equipment for launch or recovery operations. The electrically powered system operates autonomously and carries a fully gimbaled sensor system incorporating electro-optical and infrared sensors and an IR Illuminator in one modular, gimbaled payload allowing the operator to keep "eyes on target".**

Wing Span	Air Vehicle Weight	Range	Airspeed	Operational Altitude	Max Altitude	Endurance	Payload	GCS/RVT	System Design	Data Link	Flight Modes
9.2 ft	13 lbs	15 km (LOS)	23-52 mph	500 ft AGL	10,500 ft MSL	120 Min	Gimbaled EO (2592x1944), IR (640x480) and Laser Illuminator (25 ft spot at 500ft AGL) and IR camera plus an IR illuminator	Handheld (GCS & RVT are inter-changeable) Combined Weight- 9 lbs (13.9 lbs w/mission planning/ RSTA Laptop)	Modular, Kevlar composite, direct-drive electric motor, Li-Ion rechargeable batteries	Digital Data Link (DDL) using IP based protocol with 95 selectable channels-of which 16 may be used in an ops area-locked to specific air vehicle	Manual, Autono-mous, Follow-Me

Small Unmanned Aircraft Systems
SUAS
Soldiers' Eyes

Continued from previous page

The system provides day/night reconnaissance and surveillance capabilities to maneuver battalions, significantly enhancing force protection.

Project Manager
UAS Project Office
(SFAE-AV-UAS)
Redstone Arsenal, Alabama 35898

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 26 Sep 13
	Month	FY 12					FY 13			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	2	2	6	1		1	0	7	0
	November	0	1	13	0		0	1	3	0
	December	2	2	6	4		2	1	0	0
2nd Qtr	January	2	0	12	0		0	0	5	0
	February	2	1	6	0		0	0	2	0
	March	1	3	11	0		2	1	5	6
3rd Qtr	April	2	1	6	4		1	1	6	2
	May	1	0	4	0		0	0	4	0
	June	1	0	2	0		1	1	3	0
4th Qtr	July	3	3	10	1		0	0	5	0
	August	2	4	8	0		1	1	6	
	September	1	0	4	2			1		
	Total for Year	19	17	88	12	Year to Date	8	7	46	8

UAS Class A – C Mishap Table									as of 26 Sep 13
	FY 12 UAS Mishaps					FY 13 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1		6	W/GE	5	1	0	6
MQ-5	1		3	4	Hunter	2	0	3	5
RQ-7		5	20	25	Shadow	0	3	10	13
RQ-11					Raven				
RQ-20			4	4	Puma	0	0	6	6
YMQ-18									
SUAV			1	1	SUAV				
Aerostat	2	5		7	Aerostat	1	2	1	4
Total for Year	8	11	28	47	Year to Date	8	6	20	34

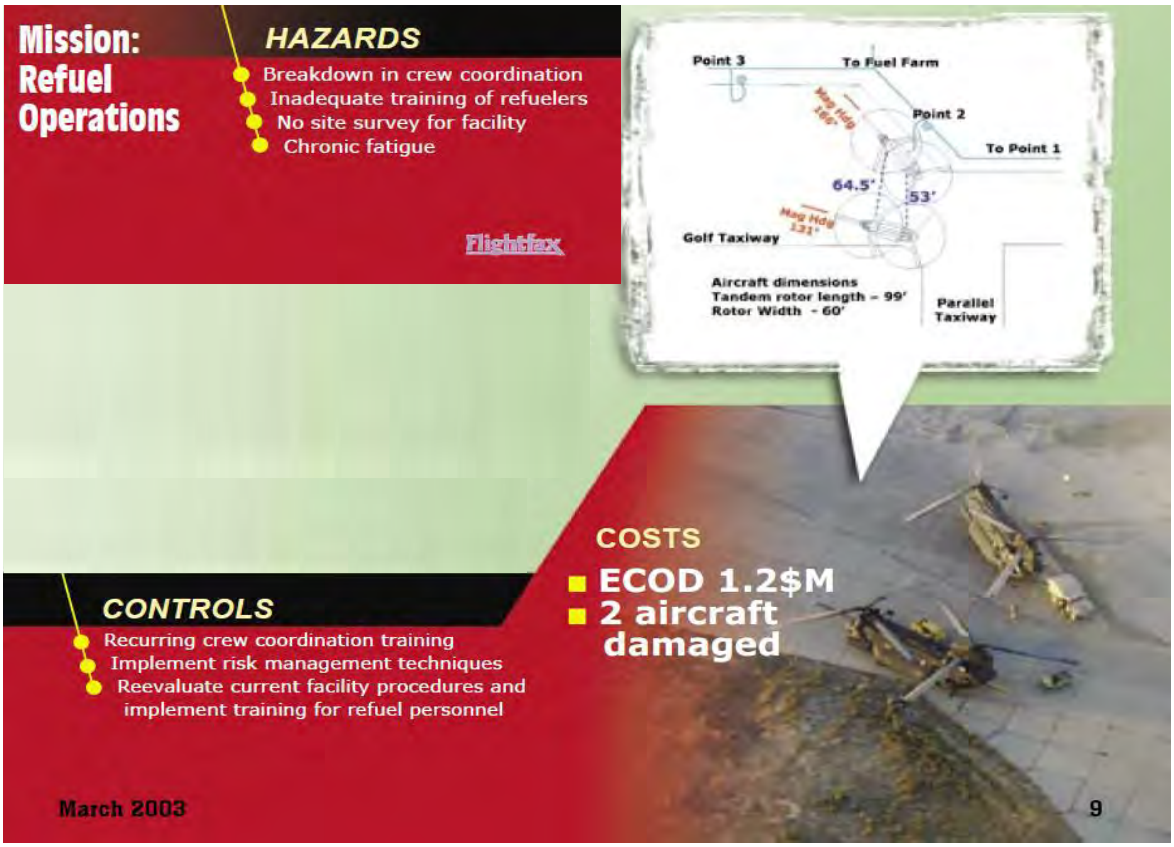
The Danger of the Assumption March 2003 Flightfax

An accident investigated by the U.S. Army Safety Center highlights the consequences of making assumptions about airfield operations and about crew coordination. The following example shows how easily things can go wrong and end up in disaster.

Background

The accident in question involved two MH-47E aircraft at the airfield hot refuel facility. The facility, a four-point forward area refueling equipment system fed by a series of fuel bladders, had been moved to its current location in September 2002 from another location on the airfield. The personnel who initially set up the facility had rotated back to their home stations. The units currently at the airfield assumed that because this was the airfield refuel facility, it had been properly laid out and surveys done to identify the hazards. They also assumed that the personnel running the refuel facility had been properly trained and had procedures for sequencing aircraft through the facility. The reality was quite different.

While the distance between the refueling points was adequate, not having a site survey for the hazards at the location resulted in no one being responsible for the refuel operation. More to the point, no one was aware that there wasn't enough lateral clearance for an H-47 to ground taxi to Points Three or Four if another H-47 was occupying Point Two.



Aircraft receive refueling instructions from ground control personnel who, in turn, receive

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instructions from refueling personnel over handheld radios. Because there weren't any written procedures on sequencing aircraft into the facility, the soldier on the radio determined which point he wanted the aircraft to occupy. In addition, because there were no ground markings at the refuel points showing where an aircraft should stop, over time the refueling point could migrate several feet from its optimum location.

In the diagram on the previous page, the aircraft at Point Two was actively engaged in hot refuel operations when the second aircraft called ground control for refuel instructions. After calling the refuel facility over the radio, ground control cleared the second H-47 to Point Three. The pilot in command (PC) of the aircraft at Point Two then requested that the aircraft be cleared to Point Four so that when finished, he could depart without interfering with the second aircraft. This change was approved and the second aircraft attempted to ground taxi to Point Four.

The PC in the right seat cleared the aircraft on his side, as did crewmembers along the right side of the aircraft. The result was that the aft rotor system of the taxiing aircraft collided with the forward and aft rotor systems of the aircraft at Point Two. Nine rotor blades and three rotor heads were damaged. Both aircraft were shut down without additional damage. Fortunately, there were no injuries.

While the board determined that the pilots and crew are ultimately responsible for obstacle avoidance, the board also determined that support failures existed that directly contributed to this accident. In addition, the Soldiers operating the refuel facility were from three different CONUS installations. While they had a strong background in bulk refuel, there was no SOP and the Soldiers had only minimal training on aircraft refueling operations. Also, they were not familiar with the use of the fire extinguishers present.

Lessons learned

Rotational units deployed to an airfield are essentially tenant organizations, and that includes some inherent responsibilities. When a headquarters establishes or takes over an airfield, people need only look at their home station airfield to see what basic functions and requirements must be accomplished at their deployment airfield. One of these critical functions is airfield operations, and two key positions—the airfield manager and airfield aviation safety officer (ASO)—must be filled. It is critical that personnel in these positions be deployed early in the airflow to ensure the smooth and safe operation of the airfield.

There was no airfield ASO at the time of the accident. During a joint operation, each service must clearly understand the responsibilities of the other services. All aviation organizations must be involved in the airfield operating board and in the monthly safety and standards councils. Procedures covering all aviation-related operations must be established, published, and widely disseminated.

Crew coordination must be done to standard and all crewmembers are responsible for aircraft clearance. If a crewmember sees a dangerous situation developing, that crewmember must speak up immediately and not assume that the pilots are aware of the situation.

Finally, unit ASOs need to periodically get out and "walk the ground" both at their home station and when deployed. Getting out of the aircraft and periodically meeting those personnel who support your operations is the best way to stay abreast of any changes that may be occurring in your AO. It's also a good way to identify hazards that may exist but have been previously missed. Take nothing for granted, assume nothing, and take immediate action to correct deficiencies.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in August 2013.

Utility helicopters

UH-60

-M Series. Aircraft was taxiing on the ramp when the main rotor blades contacted a concrete T wall barrier. (Class A)

-M Series. Aircraft made inadvertent ground contact during a pinnacle landing resulting in damage to the airframe. (Class C)

UH-72A

-At a hover the left-side hydraulic deck cover opened and contacted all four main rotor blades. (Class C)

Attack helicopters

AH-64D

-Tail wheel strut and stabilator damaged during approach to mountainous terrain. (Class C)

Cargo helicopters

CH-47

-D series. Soldier was struck by a pallet blown by rotor wash during a sling-load operation. (Class B)

Observation helicopters

OH-58D

-Aircraft experienced NP/NR exceedance (124%/123%) during FADEC manual throttle training. (Class C)

MH-6M

-Aircraft contacted the ground with the tail rotor during formation landing and sustained damage to the tailboom. (Class C)

Unmanned Aircraft Systems

MQ-1B

-UA crashed following loss of link. System recovered as a total loss. (Class A)

RQ-7B

-UA made ground contact approximately one-half mile from the launch site. (Class B)

"Scan, scan, scan; there's always something you missed."

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

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Online Newsletter of Army Aircraft Mishaps

0.72

Why make this number so big? There are two reasons. One – although it's a big number in physical appearance, it's not a big number when you're talking Class A accident rates for flight mishaps. The 0.72 represents the rate of Class A flight mishaps per 100,000 hours of flying (fixed and rotary wing). It is the second lowest on record and one of only four rates that have fallen below the 1.0 mark in the last 40 plus years (see chart page 6).

It's a good news story. FY2013 reflects one of the safest years on record for Army aviation. An overview of the preliminary data found in the next couple of pages will show that 2013 had only half the mishaps of those reported in 2012. Can the genesis of this year's safety success be traced back to the basics of leadership engagement and adherence to standards and discipline? Hard to say - but the improvement displayed this year over past years does reflect the efforts and dedication of all the individuals involved in the safety efforts of our aviation community.

But with the good comes the challenge. In safety, the numbers and rates can never be low enough so you are always striving to improve the record. In effect, you're setting the bar higher by trying to go lower. Continuing to scrutinize your risk management processes, keeping your leaders actively engaged, and executing tasks/missions to the established standards will go a long way in minimizing the risk that leads to accidents. It's a team sport with individual effort. The more individuals are putting forth the effort, the stronger the team.

In addition to the fiscal year review found in this month's newsletter, DES discusses the Army standardization policy, and the Blast From the Past reminds us of the true cost of the accident numbers.

Earlier it was mentioned there were two reasons the number at the top was so large. One was the good news story. The second is it takes up enough space that you don't feel you must expound on limited value information to try and fill white space - like many of us used to do on our unit training calendars...come on, be honest!

Aviation Directorate, U.S. Army Combat Readiness/Safety Center

Preliminary Report on FY13 Aircraft Accidents

In the **manned aircraft** category, Army Aviation experienced 61 Class A-C aircraft accidents in FY13. This is a decrease from the 124 Class A-C aircraft accidents in FY12, including a decrease in Class A mishaps.

	2012	**2013**
CLASS A	19	**8**
CLASS B	17	**7**
CLASS C	88	**46**
TOTAL	124	**61**
FATALITIES	12	**8**

CLASS A and B Summary: There were 15 Class A and B mishaps, 4 of which occurred at night. Human error was the cause factor in 13 (87%) of the 15 mishaps. Materiel failure or suspected materiel failure was contributing in 2 (13%) of the 15 mishaps.

The flight category Class A mishap rate (RW+FW) for FY13 was 0.72 (0.72 class A flight mishaps per 100,000 hours of flight time). For FY 12, the rate was 1.53.

Operational Assessment Concerns:

Human Error: Dust landings were contributing factors in one Class A, one Class B, and two Class C aircraft mishaps. One NVG Class A (five fatalities) occurred due to spatial disorientation with low illumination and lack of terrain contrast as contributing factors. Power management contributed to one Class A, one Class B, and one Class C incident. Additional Class A mishaps included two UH-60 ground taxi mishaps and one blade strike during a NVG slope landing.

Materiel Failures: Materiel failures included one engine failure and one catastrophic main rotor system failure.

2013 Breakdown by aircraft type:

	Class A	Class B	Class C
UH/MH-60	5	3	16
AH-64	1	0	4
CH/MH-47	1	2	8
OH-58D	1	1	5
LUH-72	0	0	3
TH-67/OH-58C	0	1	1
AH/MH-6	0	0	3
Mi-8/17	0	0	0
C-12/UC-35/C-26/UV-20	0	0	6
EO-5C	0	0	0

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Synopsis of selected FY13 accidents (* denotes night mission)

Manned Class A

- CH-47D: Chalk 2 trail aircraft contacted a tower on the crew's 3rd landing attempt in dust conditions. The forward main rotor blades struck a mounted MK19 40mm launcher system resulting in ignition of some of the cartridges.

-UH-60A: Aircraft taxied into hangar, entered an uncommanded left yaw and became partially airborne and struck the hangar a second time.

* UH-60M: Aircraft was on approach to a dirt/gravel road adjacent to a man-made pinnacle in the training area when the main rotor blades contacted the upslope of the pinnacle. Crew maneuvered the aircraft forward and set down on the road for shutdown.

* UH-60L: While on a NVG multi-ship training mission under low illumination/low contrast conditions, the crew lost spatial awareness and placed the aircraft in an unrecoverable attitude. The aircraft impacted the ground inverted, fatally injuring the five crewmembers.

- OH-58D: While conducting day multi-ship training, the aircraft experienced an engine control unit failure in flight. Aircraft impacted the ground resulting in one fatal injury. Aircraft was destroyed.

- AH-64D: Aircraft crashed following a catastrophic failure of the main rotor system. Two fatalities.

- UH-60L: During conduct of an air assault mission, the main rotor drooped. Aircraft landed hard. Class A damage reported.

-UH-60M: Aircraft was taxiing when the main rotor blades contacted a concrete barrier wall. Damage reported as Class A.

In the **unmanned aircraft systems**, there were 36 Class A–C incidents with 8 Class A's, 8 Class B's, and 20 Class C's. The Class A's included two Aerostat balloons, five MQ-1s, and one MQ-5B. The RQ-7Bs comprised 14 of the 28 Class B and C mishaps with cause factors relating to engine failures, landing problems, and lost link.

Synopsis of selected accidents (FY13):

UAS Class A

- MQ-1C: Engine failed following indications of overtemp and FADEC failure. UA impacted just off the runway.

- MQ-1C: Engine failed during manual transfer of fuel.

- MQ-5B: Engine experienced rpm fluctuations then failed.

- MQ-5B: During take-off, UA was damaged when it veered off the runway into a concrete drainage ditch.

- MQ-1C: Engine failed due to loss of fuel pressure.

- Aerostat: Tether was severed due to winds during lowering.

- MQ-1B: Operators experienced loss of link with the system during flight.

- MQ-1C: Vehicle experienced low manifold pressure followed by engine failure.

Shared Goal: Standardization and Safety

DAC Charles W. Lent
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, AL
H-60 SP/IE, Literature Review

Army standardization policy is the management principle which fosters the development and sustainment of a high state of proficiency and readiness among Soldiers and units throughout an organization. The commanding general, U.S. Army Aviation Center of Excellence, is responsible for standardization within the Army aviation branch and is the proponent agency for the U.S. Army Aviation Standardization Program. The process is aimed at reducing the number of Army aviation accidents while recognizing that sound standardization practices also support a proactive safety program.

USAACE develops and establishes policies to ensure units are efficient and effective in their warfighting mission. At every Army level, personnel charged with the management of standardization and safety programs share a common goal – preventing accidents. Standardization serves to develop and ensure compliance with approved procedures while the safety program educates Soldiers through accident awareness and reporting. They go hand in hand: the development of standardized procedures assists the development of safe procedures.

Standardization and safety are closely related and must work together to ensure future accidents are prevented to the maximum extent possible.

The first objective of Army standardization policy **is improvement and sustainment of proficiency and readiness among Soldiers and units throughout the Army**. This is accomplished by universal applications and approved practices and procedures. The Army Aviation Standardization Program, AR 95-1, defines the responsibilities of the aviation branch chief to review changes to AR-95 series publications and designates the Department of the Army to develop, staff and coordinate changes to aviation training and standardization literature.

The aviation branch chief has delegated these responsibilities to the Directorate of Evaluation and Standardization to ensure Army aviation training and technical publications are standardized, accurate and not duplicated. Examples of standardized publications which DES continuously monitors and reviews are Army aircraft operator's manuals and checklists. These technical manuals are essential to the safe and efficient methods of operating Army aircraft and related systems and, when followed, provide guidance to Army aviators to help reduce the number of accidents.

The second objective of Army standardization policy **is r*eduction of the adverse effects of personnel turbulence following reassignments.*** This is accomplished at USAACE through a joint effort by DES and Directorate of Doctrine and Training (DODT) to produce doctrinal training materials which govern management of the Aircrew Training Program (ATP) and

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aircraft Aircrew Training Manuals (ATM), allowing units in the field to manage and execute a standardized ATP. This program gives commanders a clear direction on assignment, integration and training task requirements for personnel. An example would be an ATM task which has specific conditions, a recommended description, and standards that must be met for task accomplishment.

The third objective of Army standardization policy is ***elimination of local modification of approved standardized practices and procedures.*** The standardization program is approved by senior leaders who ensure information and procedures are standardized and not distorted or changed throughout the aviation branch. The Aviation Branch Chief utilizes DES as a field operating agency to assess units in the field to ensure compliance with the approved ATP and Army aviation standardization policy. IAW AR 95-1, this is accomplished in conjunction with inspections by Aviation Resource Management Survey teams every 12-24 months or at the direction of the Aviation Branch Chief. Over the past 12 years, this has generally been a combat aviation brigade-centric assessment/assistance for deployed units and as a requested tool by CAB commanders to fight complacency during a deployment.

Although priorities and emphasis on skill sets change due to Army requirements, adherence to approved practices and procedures is a critical element in a unit's ability to prevent accidents.

The Army aviation standardization program has proven effective in maintaining a high state of readiness and proficiency for the aviation branch; Army aviation branch standardization and Army safety both share accident prevention as a common goal.

Remember: the development of efficient and effective procedures always lead to safe procedures and effective standardization is a proactive safety program.

DAC Charles W. Lent may be contacted at (334) 255-9098, DSN 558.

WE STILL WANT YOUR INPUT

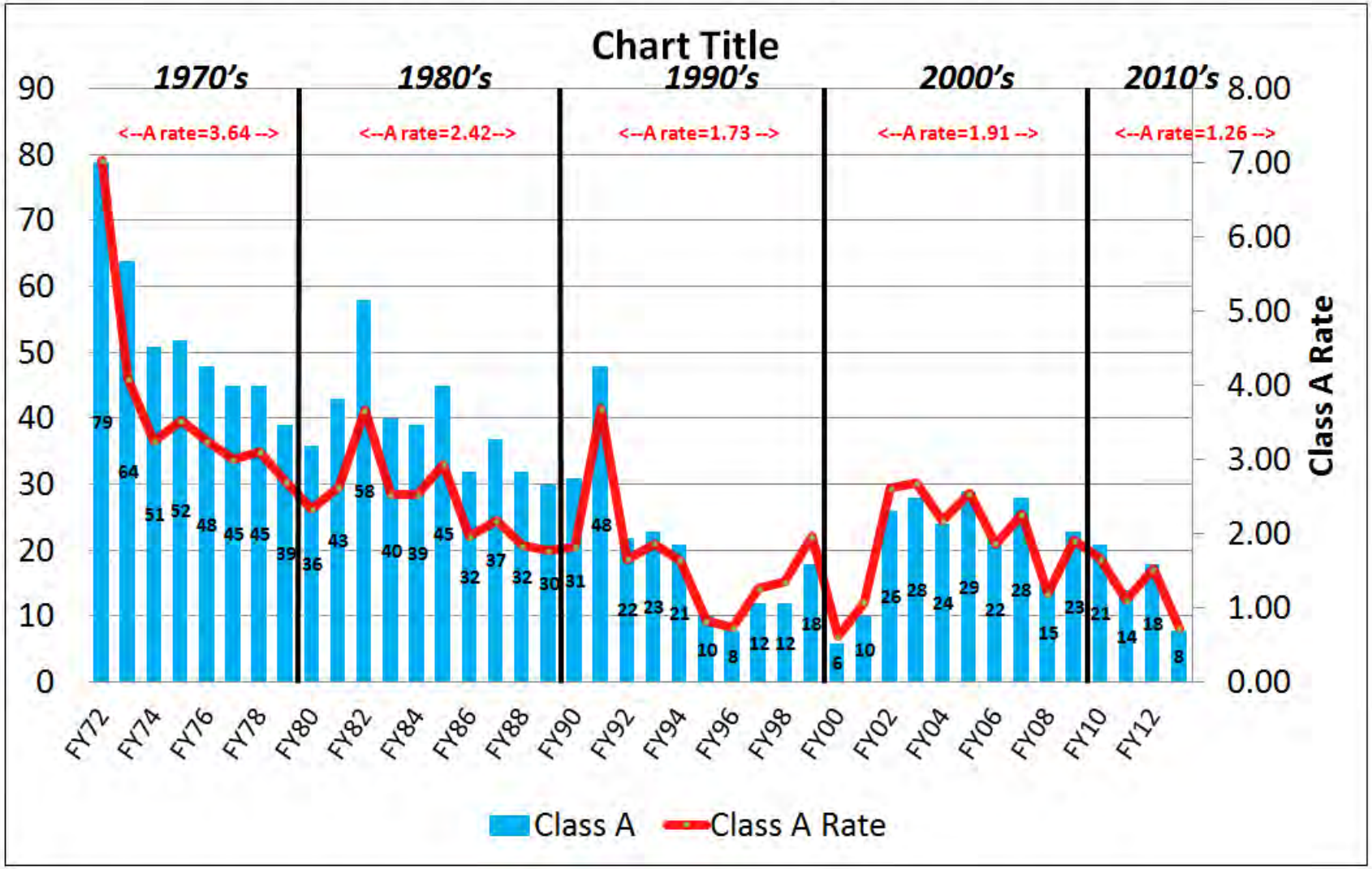
Do you have an aviation related story, information brief, or lesson's learned type event you would like to share with the aviation community? Pass on your experience with an article in Flightfax.

Send them via email to the Aviation Directorate, U.S. Army Combat Readiness/Safety Center:

usarmy.rucker.hqda-secarmy.mbx.safe-flightfax@mail.mil

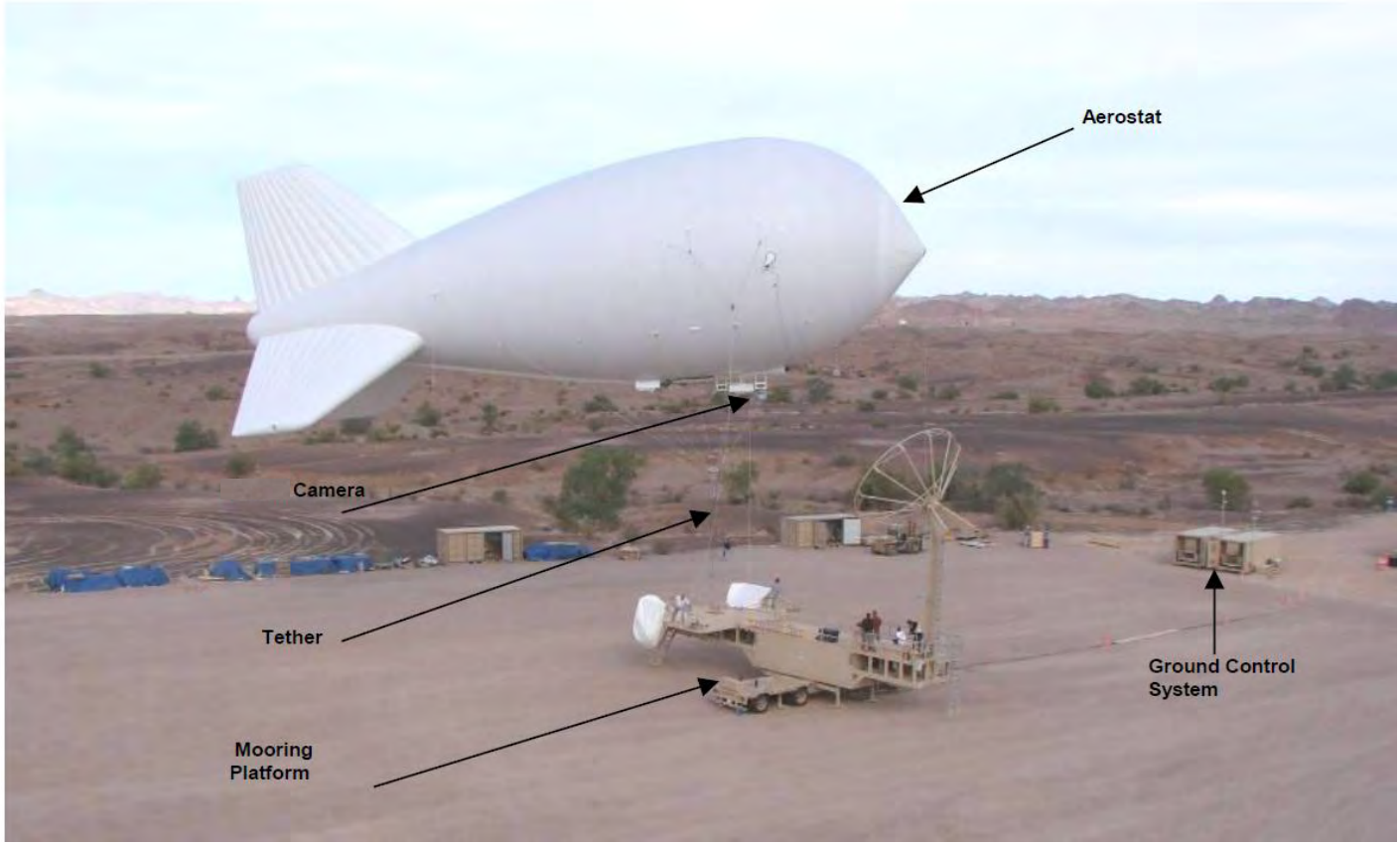
We can also be reached by phone – (334) 255-3530, DSN 558

42 Year Trend (FY1972-FY2013)
Manned Aviation (FW + RW) Class A Flight Accidents and Rate



Rate Per 100,000 Hours
Data as of October 2013

Know your unmanned aircraft



Persistent Threat Detection System (PTDS)

A highly persistent and flexible multi-sensor information collection platform that is integrated with other aerial and unattended ground sensor systems to provide all-weather detection, surveillance, monitoring, and targeting capability of moving vehicle and dismount targets. Integrated into aerial information collection, base defense, and aerial layer network transport architectures to support needs for persistent surveillance, information collection, and communications extension at key operating locations.

Characteristics:

- **Length = 117 ft**
- **Diameter (max) = 52 ft**
- **Helium volume = ~74,000 cubic feet**
- **Extended payload mounting locations**
- **Capable of reaching 9,000 ft AGL**
- **Durable & repairable hull**

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 29 Oct 13
	Month	FY 13					FY 14			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	1	0	7	0			1	3	
	November	0	1	3	0					
	December	2	1	0	0					
2nd Qtr	January	0	0	5	0					
	February	0	0	2	0					
	March	2	1	5	6					
3rd Qtr	April	1	1	6	2					
	May	0	0	4	0					
	June	1	1	3	0					
4th Qtr	July	0	0	5	0					
	August	1	1	6	0					
	September	0	1	0	0					
	Total for Year	8	7	46	8	Year to Date	0	1	3	0

	UAS Class A – C Mishap Table								as of 29 Oct 13
	FY 13 UAS Mishaps					FY 14 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1	0	6	W/GE	1			1
MQ-5	2	0	3	5	Hunter				
RQ-7	0	4	10	14	Shadow		1	1	2
RQ-11					Raven				
RQ-20	0	0	6	6	Puma				
YMQ-18									
SUAV					SUAV				
Aerostat	1	3	1	5	Aerostat	1			1
Total for Year	8	8	20	36	Year to Date	2	1	1	4

They're not just numbers

12 Aug 81 Flightfax

When people talk aviation safety, they almost always include numbers in their discussion. Mishap rates, numbers of destroyed aircraft, and percentages of crew error are some of the more popular figures used in aviation safety discussions and articles. While the use of these numbers is essential in conducting trend analyses and various statistical studies, their full meaning often seems to get lost in the process.

A good example of numbers that really mean something are this year's number of fatalities and dollar losses as a result of Class A aircraft mishaps. As of 12 August 1981, 22 aircrew members have died in 39 Class A aircraft mishaps. These are not just numbers out of the Safety Center computer; they are dead people – dead irreplaceable crewmembers. Their loss affected not only the manning level of their units, the overall readiness of the Army, and the number of replacement aircrew members required from the training command next year, but also the morale of their unit and the lives of their families. They were 22 valuable soldiers. And the truly sad fact is that most of these people contributed to their own deaths through crew error…in most cases those flying the aircraft or supervising the flight violated established procedures.

While these 22 dead crewmembers are a tragic loss to the Army, the loss in combat readiness does not stop there. The 39 Class A aircraft mishaps this fiscal year have cost the Army close to $25 million…enough to put 16 new Cobras on the flight line.

As you walk out to your aircraft on your next flight, think about the fact that as an Army aviator, you are the basic element in the command line of aircraft mishap prevention. Your total dedication to strict air discipline with respect to regulations and rules will do more than any other known remedy to prevent Army aircraft mishaps.

Note: FY1981 ended with a total of 43 Class A mishaps and 27 Army fatalities.

Addendum for FY 13

The numbers for this year (FY2013) currently stand at 8 Class A mishaps resulting in 8 fatalities. Cost estimates to the Army of over $35 million.

Selected Aircraft Mishap Briefs

Information based on preliminary reports of aircraft mishaps reported in September 2013.

Utility helicopters

UH-60

-M Series. Aircraft was Chalk 2 in a flight of two landing at an HLZ when the aircraft touched down on an upslope. All four main rotor blades made contact with the slope. (Class B)

Unmanned Aircraft Systems

MQ-1C

UA was approximately 2.5 hours into the flight when the vehicle experienced low manifold pressure and indications of an engine failure. During attempt to return to base the aircraft lost altitude and contacted a ridge. Vehicle recovered but reported as a total loss. (Class A)

Due to the reduction in Class A – C Aviation mishaps reported to the U.S. Army Combat Readiness/Safety Center, we have been experiencing difficulties in filling the back page

KEEP UP THE GOOD WORK

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Flightfax®

Online newsletter of Army aircraft mishap prevention information

I am honored to make my first entry into Flightfax as I assume the role of Aviation Director, leading the Aviation Directorate in the CRC. I recently left command of 2-3 GSAB in 3CAB at Hunter Army Airfield and hope to continue the great legacy of this directorate in helping our great aviators reduce the accident rates within Army Aviation.

Last month, we celebrated the close of FY13 and the exceptionally low aviation accident rates for the year. This was the culmination of hundreds of thousands of flight hours with pilots in command and air mission commanders making smart decisions on each and every flight they led. Be proud of last year's accomplishments, but the new fiscal year is here, along with several recent incidents showing that aviation is still a dangerous business. Maintaining our historic low accident rates will require every aircrew member to continue to make informed and alert decisions during every phase of their flight while managing their risks down to the lowest levels.

As you read through this edition of Flightfax, think about the risks that the aircrews identified and the controls that they placed upon their mission in the pre-mission process and compare them to the risks they encountered during mission execution. Leaders within Army Aviation are inherently good at the RM process and can identify the individual hazards associated with each mission effectively. However, in my experience, we are less effective during mission execution in identifying compounding hazards, by either not recognizing their risk levels or under-assessing the cumulative effect of these hazards. LCDR Henry's excellent article in this edition highlights his team's Crew Resource Management (CRM) and flight discipline successes that resulted in a successful rescue. It is clear in the article that the crew struggled to accurately judge their risk levels with all the compounding factors required of them in order to complete their assigned mission. What would you have done in these circumstances?

Until next month, fly safe and manage your risk levels!

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Where the Road Ends, Communication Should Begin

LCDR Brian Henry, USCG, Group/Air Station North Bend

On 5 July 2010, I was the PIC during an aircraft mishap that underscored the dangers and leadership challenges of flying in the Coast Guard. I firmly believe that I should share some of my own shortcomings in Crew Resource Management (CRM) and Operational Risk Management (ORM) to help keep you, my fellow flyers, from getting into a similar situation. I will discuss how deficiencies in communication, risk management, flight discipline, leadership, and situational awareness all contributed to a situation in which the crew and the helicopter could have been lost.

The evening of 5 July featured a perfect, fog-free sunset on the Oregon coast. I was standing duty at Air Facility Newport and settling in on my first helping of Espresso Madness ice cream when the SAR phone rang. The call for three juveniles stranded on a rock near Road's End State Park 20 NM to the north. I knew where Road's End Park was, realized that we were running out of daylight, and did not request additional information. In an effort to get these hoists done before sunset, we pushed ahead toward a launch as this appeared to be a detail we could clear up during the 10 minute transit and took off for Road's End.

Once we arrived on scene, our rescue swimmer reported four small specks on a vertical surface that we collectively determined to be people in the faint ambient light. There were two individuals on a western reach of what appeared to be about a 150 foot vertical surface approximately 75 feet above a sandy beach and two more east of the others about 60 feet above the beach. We made multiple recon passes to survey the scene, but did not report the on-scene conditions or the actual nature of the rescue to our Operations Center (OPCEN) in North Bend, Oregon.

External communication with parties outside the aircraft has a key role in facilitating other key components to CRM such as situational awareness. Unfortunately, a hazardous attitude of "I have to get these kids off the cliff, and I can't waste time and fuel to talk on the radio any longer" prevailed. The OPCEN and operations officer were left to assume the case was a simple case of survivors stranded by the tide on a rock and not a night vertical surface rescue we never train for.

After being told that the rescue party was not able to reach the children from the top or bottom of the cliff, we planned to rescue each survivor from a position 200+ feet above the beach to maintain clearance from the upper ridge of the vertical surface, 25 feet of clearance from a group of dead trees to the west of the survivors, and 25 feet of clearance from a 400-foot headland up and to the east of the survivors to minimize downwash and blowing dirt. As a crew, we agreed the mission was extremely high risk, but that there was high gain. I had never performed a night vertical surface hoist, but had excellent NVG conditions and felt that I could maintain a steady platform for my flight mechanic to hoist 120 feet above the clinging survivors.

Inadequate external communications were again a problem in that we never conveyed to local responders the potential negative impact of downwash and blowing debris on the survivors, nor the fact that none of us had conducted a rescue of this nature at night. Instead, I assumed that by asking the ground rescuers multiple times if our services would be required, they would infer that we were worried about the high risk of a helicopter rescue.

We battled as a crew to fight through darkness, downdrafts, and blowing debris to take two of the four children off the cliff and deposit them on the beach below utilizing our rescue swimmer to make contact with each child and apply a quick strop. Both hoists of the rescue swimmer and survivor resulted in violent swings away from the cliff with subsequent swings and brutal contact with the cliff face. As I maneuvered the aircraft aft and away from the cliff, dust clouds billowed up

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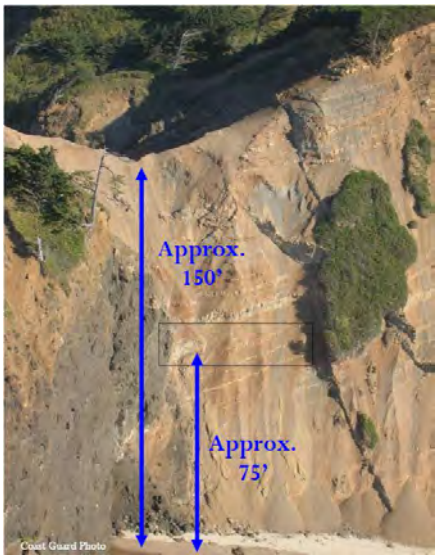
forward of the aircraft and obscured my 40-degree NVG field of view making it difficult to maintain hover references. The rescue swimmer was brought aboard the aircraft and he announced that he didn't think that there was any way to recover either the third or fourth survivors without knocking someone off the cliff. Low on fuel, we departed scene and again questioned the local responders to see if there was any other way to get to the survivors off the cliff or if the pair could make it through the night on the cliff. They replied that a helicopter rescue would be required.

The incident scene. The rectangular box indicates the area in which the victims were trapped.



We recovered at Newport, refueled, and I spoke briefly to my operations officer, who did not know that the case involved a night vertical surface rescue. I told him that the previous two hoists were the hardest I'd ever done and we were "in the red" for risk. What I didn't tell him was that I didn't want to continue with the mission. He suggested I increase my hover altitude to minimize the circulating dust that obscured visibility. I told him that an increase in hover altitude would make it more difficult for the flight mechanic to see the rescue swimmer and precisely place him on the cliff face. Without hearing from me that I didn't feel the mission could continue safely, the operations officer endorsed continuing the mission.

During the refueling evolution, we didn't take any time to debrief what had happened because we each perceived the need to get back out to Road's End as quickly as possible. No one felt good about continuing the mission, but no one spoke up. During the first rescue, the rescue swimmer had to physically grip the child as the child began to let go and both he and the survivor were dragged 10 feet up the cliff. After attaching to the survivor with the rescue strop, the hoist cable unknowingly wrapped around his leg, and he was pulled up the cliff with the survivor in an inverted position before snapping upright. We did not discuss this while on deck. It was clearly an internal communication breakdown in CRM.

This situation also illustrates the flight discipline and leadership tenets of CRM. Flight discipline and leadership require that crewmembers employ an aircraft within common sense guidelines in the presence of temptation to do otherwise. I equate common sense guidelines with knowing and respecting the limits of your crew and yourself. I was leading my crew beyond prudent limits because of our emotional commitment to saving the lives of children, but I didn't have the objectivity and presence of mind to say that we shouldn't finish the mission.

We departed Newport for Road's End and I established a hover in the same place that we had prior to conducting the first two hoists. I noticed that the wind direction appeared to have shifted easterly and that blowing debris was not moving aft of the aircraft. As soon as the flight mechanic

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reported the rescue swimmer had positive contact, dust began to completely obscure my view with the NVGs. I lost all visual cues, and told the flight mechanic to "get the swimmer up now!" An experienced pilot once told me that 80% torque and nose on the horizon during inadvertent IMC saved his bacon, and for some reason it was as if he was sitting next to me telling me just that. It felt like 10 or more seconds that I wasn't able to see the cliff or the rapidly rising headland 25 feet to my right. My copilot couldn't see the dead trees to his left, but I remember him once again blocking any left movement of the cyclic.

We emerged from the dust cloud with the headland inside of a rotor disk distance to my right and well-forward of our original position. The rescue swimmer had rocketed off the crest of the cliff and had come nearly eye-level with my copilot on a forward swing. The hoist cable then wrapped around the nose wheel with the rescue swimmer dangling helplessly below the aircraft. We managed to make a slow climbing left turn away from the headland to the right. Offshore rocks and crashing waves briefly got my attention through the chin bubble as I turned my attention from the instruments to attempt to acquire visual references under the NVGs. The flight mechanic came over the ICS and exclaimed that the "hoist cable was wrapped around the nose wheel, and that the swimmer would most likely need to be sheared off." I checked the RADALT, noted that we were climbing through 450' AWL, and shouted, "don't shear the swimmer!"

To compound the confusion and chaos, my copilot and I could not pick up any visual cues through the windscreen due to the lack of a visible horizon over the Pacific combined with excessive glare in the cockpit due to reflected cabin light off the dusty windscreen. Almost immediately after telling the flight mechanic not to shear, the rescue swimmer came over his handheld radio and excitedly asked, "Why are we so high?" He was seeing the lights of EMS below the cliff getting smaller and smaller and made several previous radio calls that were unintelligible due to static and rotor noise. I noticed my airspeed indicator was now fluttering between 10 and 20 knots and immediately realized I needed to increase airspeed and get down low over the surface in case the hoist cable parted and allowed the rescue swimmer to fall. We initiated a descent and the copilot came on the collective to help me arrest the aircraft's descent at 26' AWL. We air taxied at 50' AWL to the approach end of the runway at Pacific City, lowered down to a 10' hover, and the rescue swimmer released from the hoist hook and ran out of the rotor arc.

Situational awareness during this final stage of the flight saved our crew, but was also our downfall in making a poor decision to return to base after we had landed safely at Pacific City. Anyone who has been in a very tense scenario in the aircraft knows just how the chaos of the unexpected can wreak havoc with decision making and communication in an unusual situation. Crew communications were accurate, bold, and concise amidst distractions and hindrances to communication after the brown out. However, a crew must maintain situational awareness even after the aircraft has landed. We, as a crew, simply let our guard down and stopped assessing risk after the events that had transpired. We overlooked the possibility of aircraft damage and erroneously elected to fly the 30 NM back to Newport.

I challenge you to reexamine missions, such as night vertical surface rescues, that are so hazardous that we do not train for them. I also urge you to consider how you would foster Crew Resource Management and Operational Risk Management in a similar situation. How can you strengthen communication within your crew, with your command, and with other first responders during a case? When faced with tragic circumstances, such as children in peril, do you allow your emotions to cloud your professional judgment?

Important STACOM Information

DAC Charles W. Lent
Directorate of Evaluation and Standardization
U.S. Army Aviation Center of Excellence
Fort Rucker, Ala

The Directorate of Evaluation and Standardization (DES) publishes standardization communications (STACOMs) in order to clarify standardization policy in accordance with AR 95-1. STACOMs may precede formal staffing and distribution of Department of the Army official policy. On a recurring basis, DES will review a listing of active STACOMS and publish it on the Army Knowledge Online (AKO) portal and in FlightFax.

Active STACOMS are available on the DES main page: https://www.us.army.mil/suite/page/337793 or DES homepage on AKO-S (SIPR) at http://www.us.army.smil.mil/suite/page/9746 A website link can be saved in your browser's favorites or bookmarks for direct access. Once logged into AKO and displaying the new DES homepage you can click "Add to Favorites" at the top right edge of the page.

In an effort to ensure the field has the most current information, a review of all active STACOMS was recently conducted. Previously published STACOMS not listed in the table below have been and rescinded and are located in the "rescinded" folder on the AKO portal for historical purposes.

For questions or more information contact DAC Charles W. Lent at (334) 255-9098 or e-mail charles.w.lent.civ@mail.mil.

STACOM #	Date Published	Title
09-01	Apr 09	H60 ATP Guidance
09-03	Aug 09	CH47F ATP Guidance
10-01	Jan 10	LUH PPC and ATM Tasks
10-07	Aug 10	H-60M Series Transition
10-10	Sep 10	Clarification of FM 3-04.11
11-02	Aug 11	SUAS Master Trainer
12-01	Apr 12	UH72 SI FI Qualification Requirements
12-03	Dec 12	AH-64E Series Transition
13-01	Jan 13	CBRN Requirement
13-02	Mar 13	CH47 F Qualification Guidance
13-03	Apr 13	C-12 Torque Limitations
13-04	May 13	TC 3-04.21 (TC 1-272) FAD Clarification
13-05	Jul 13	OH-58D FADEC Training Guidance

Mishap Review: Multi-ship AASLT

While conducting a Day, multi-ship, air assault landing to an unimproved HLZ, the CH-47D encountered brown-out conditions. The aircraft touched down with a right roll resulting in the main rotor blades striking the ground. The aircraft came to rest on its right side with major damage and only minor injuries to the crew and passengers.

History of flight

The mission was a five ship (3 x UH; 2 x CH) trigger based air assault to action a preplanned objective. Crews reported for duty at 0200L completing pre-flights and aircraft prep. The air mission brief was conducted at 0300L followed by individual crew briefs. The mission risk was moderate with the task force commander as the final mission approval authority. The weather forecast was for clear conditions and unlimited visibility. Winds were 070/08; temp +37 and MSL landing altitude of 5100 feet.

The flight departed at 0450L en route to a staging area ten minutes away with the accident aircraft in the trail position. Upon arrival at the staging area the flight shut down, conducted an update brief, and remained on stand-by for the on-call mission. At 0800L the flight departed the staging area for the ten minute flight to the objective. Upon arrival, the two CH-47's held vicinity of the RP awaiting call-in to their designated LZ. At 0820L the two Ch-47Ds departed the RP for their LZ in a staggered right formation, 5 – 10 rotor disk separation with the accident aircraft in trail. The lead Chinook landed with moderate dust. The accident aircraft (trail) during approach entered the dust cloud created by the lead aircraft and continued in a landing profile. At approximately 5 to 10 feet the pilot on the controls lost visual contact with the ground. The aircraft touched down with a right roll followed by the main rotor blades contacting the ground. The aircraft came to rest on its right side with extensive damage and only minor injuries to the crew and passengers.

Crewmember experience

The PC, sitting in the left seat, had 630 hours total flight time, 550 in theCH-47D with 104 hours as a PC. The PI had nearly 2300 hours total time with 875 in the CH-47D and nearly 1000 hours PC time. The unit was in the process of RIP/TOA with the PC assigned to the departing unit and the PI assigned to the incoming unit.

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Commentary

The accident investigation determined that the crew failed to execute a go-around when visual contact with the intended landing area was lost. Additionally, the pilot not on the controls (PC) directed his attention inside the cockpit during a critical phase of landing. Also, during the landing sequence, the passengers removed their restraints prior to the completion of the landing without direction from a member of the crew. As a result, they suffered minor injuries when they were tossed about in the cargo area during the crash sequence. No passenger brief or static-load training had been completed.

Manned Aircraft Class A – C Mishap Table as of 25 Nov 13

	Month	FY 13					FY 14			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	1	0	7	0			1	3	
	November	0	1	5	0		3		3	
	December	2	1	0	0					
2nd Qtr	January	0	0	6	0					
	February	0	0	2	0					
	March	2	1	5	6					
3rd Qtr	April	1	1	6	2					
	May	0	0	5	0					
	June	1	1	3	0					
4th Qtr	July	0	0	6	0					
	August	1	1	7	0					
	September	0	1	0	0					
	Total for Year	8	7	52	8	Year to Date	3	1	6	0

Mishap Review: MEDEVAC Chase

While conducting an NVG landing to an unimproved HLZ under zero illumination conditions, the HH-60L encountered brown-out conditions. While attempting a go-around, the aircraft drifted and impacted rising terrain coming to rest on its right side. A post crash fire destroyed the aircraft and two crewmembers sustained moderate injuries.

History of flight

The mission was a two-ship on-call support for MEDEVAC. The crews began their duty day at 0900L with pre-flights and aircraft run-ups. Weather, threat and ops briefs were completed with a moderate risk designated for the mission and approved by the task force commander. The weather was few clouds at 15,000 feet; visibility 6 miles with haze; winds 360/25 knots. Temperature was +22C and PA of +8200 feet. The illumination for the flight was 0%.

At 2030 the crew was notified of a potential MEDEVAC request at a remote site a significant distance from home base. The flight departed at 2100L with the accident aircraft performing duties as chase (Chalk 2). The flight arrived at a standby location at approximately 2230 to wait to be called forward.

Approximately an hour later the flight departed for the pickup site with 20 minutes en route and arrived just after midnight. The lead aircraft landed and began loading patients. The AMC in Chalk 1 determined Chalk 2 would also need to land at the site. Chalk 2 conducted a low approach and then set up to land to the right side of lead. During the VMC approach, at approximately a 10 foot hover, the aircraft became engulfed in a dust cloud. Decreasing rotor RPM was encountered when a go-around was attempted. With loss of visual references, the aircraft drifted forward, up, and to the right followed by the main rotor striking rising terrain. The aircraft crashed and came to rest on its right side. The crew was able to exit the aircraft before a post-crash fire developed and engulfed the airframe. The two pilots sustained minor injuries and the two crewmembers received moderate injuries.

Crewmember experience

The PC, sitting in the right seat, had more than 680 hours total flight time, with 600 in the UH-60 and 120 hours NVG time. The PI, flying in the left seat, had 270 hours total time, 190 hours in the UH-60 and 33 hours NVG time. The CE in the right crew chief seat had 1500 hours with 440 NVG. The MO, sitting in the left crew seat, had 44 total hours with 11 NVG.

Commentary

The accident board determined the PC on the flight controls, after loss of visual references, failed to correct for drift or adjust heading to avoid known obstacles. It was also noted the pilots were not utilizing the HUD, which might have assisted in maintaining orientation.

The top five 24 Mar 1982 Flightfax

In fiscal year 81, a total of 353 Class A, B, and C flight-related mishaps were recorded. An in-depth analysis was performed on 106 of these mishaps. The 106 mishaps analyzed accounted for 96 percent of the total number of flight-related fatalities last year, 94 percent of the destroyed aircraft, and 83 percent of the total dollar losses. This analysis identified the five top aviation mishap cause factors for FY 81 . The top five cause factors ranked in terms of frequency of occurrence, severity of injury, and dollar losses were:

1. Faulty judgment
2. Inexperience
3. Overconfidence in others
4. Improper motivation
5. Overconfidence in self

Faulty judgment

Most of the cases of faulty judgment involved violations of flight discipline at NOE or low-level attitudes. Generally, the violations were committed by properly trained and prepared aviators who disregarded or ignored regulations and directives. A typical example involved an OH-58A

IP who gave a pilot a forced landing while hovering over an unsuitable landing area ... a course of action he knew to be improper. The helicopter skids sank in the soft terrain and the aircraft came to rest on its side.

Inexperience

The mishaps involving inexperience were the result of errors committed by aircrew members whose skills in flying or maintaining the aircraft were not at the level required to do the job. In one case, an OH-58 pilot just out of flight school was assigned an NOE flight. He placed the aircraft in a steep left turn to evade a simulated engagement by an aggressor tank, and his main rotor blades hit a sand dune. The severity of the flight maneuver was not warranted by the existing conditions.

Overconfidence In others

Mishaps involving overconfidence in others were the result of tasks critical to flight safety not being accomplished due to a belief that another had performed or would perform the tasks. In some of the cases, IPs delayed taking corrective action for too long because they believed the pilot would correct his own mistakes. Following is a classic example. After a tachometer generator failure, a UH-1 IP took the controls from the rated student pilot and auto rotated into water with the engine still running. When the emergency occurred, the pilot was flying under the hood and the IP was looking outside the aircraft. When the pilot said something about an engine failure, the IP had such confidence in the pilot that he assumed the pilot had confirmed an engine failure, and he did not check his gas producer to determine the extent of the emergency.

Improper motivation

Mishaps involving improper motivation were caused by errors made due to an excessive desire on the part of the pilot to impress someone, to complete a mission, or simply to relieve boredom. In one case, a UH-1 H pilot, while awaiting IFR clearance, decided to perform a hydraulic check at

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operating rpm rather than at engine idle as required by the operators manual. He just got tired of sitting and waiting and decided to do "something." As a result, when the pilot put movement into the cyclic as required by the hydraulic check, the aircraft rolled over.

Overconfidence In self

A large number of mishaps were caused by aviators performing a prohibited or unauthorized action and violating established procedures. These aviators committed these acts with full confidence that they could handle any problem resulting from their undisciplined behavior. An OH-58 pilot had just completed a day tactical mission and was flying toward a landing point. Visibility was unlimited. The pilot had crossed a valley and was passing over higher terrain. Flying about 35 feet above the ground, the pilot saw some wires in front of him. He banked steeply to the left, but the aircraft hit three of the wires and crashed. The pilot had not done a hazards recon of the route he was flying. He knew he should not have been as low as he was, but he was confident in his ability to avoid hazards during periods of clear weather and unlimited visibility.

Crew error

In fiscal 81, Army aircraft mishaps killed 29 aircrew members and passengers, injured another 111 , destroyed 37 aircraft, and cost the Army almost $40 million. Through the first 5 months of this fiscal year, 18 flight-related Class A mishaps had been recorded. While investigations of all 18 mishaps are not complete at this writing, crew error has been identified as a definite factor in 11 of the 18. These 11 crew error mishaps resulted in 11 fatalities, 10 destroyed aircraft, and the loss of $9,309,629 in property damage and injury costs.

• During preflight, a pilot did not insure the engine cowling of his UH-1 was secure. The cowling came off during flight and hit the tail rotor. The pilot entered autorotation and hit the ground with enough force to destroy the aircraft. Result: a $619,000 loss.

• A PIC allowed his OH-58 to start across an active runway because he misinterpreted tower instructions to hold short of the runway. The copilot performed a quick stop maneuver to try to stop short of the runway. The main rotor struck and severed the tail boom, and the helicopter landed hard. Result: $143,782 in damages.

• An OV-1 pilot exceeded ATM bank standards while trying to avoid further penetration of restricted airspace he had entered. He put the aircraft in a bank of approximately 90 degrees and allowed the Mohawk to assume a nose-low attitude. Result: 2 fatalities and a $2,892,634 loss.

• The pilot of an OH-58 did not adequately secure his flight jacket. The jacket blew out of the helicopter and hit the tail rotor, causing the loss of both tail rotor blades and gearbox. The pilot autorotated into trees. Result: $143,782 in damages.

• An AH-1 S pilot's night vision goggles failed while the aircraft was flying at 100 knots and 100 feet above trees. The crew did not adequately coordinate exchange of control from pilot to copilot, and the Cobra crashed into trees and burned. Result: a $1,598,131 loss.

• When a UH-1H vibrated excessively during flight, the pilot began looking for a landing spot. He used too much airspeed during the approach and overshot the intended landing point. The Huey descended into trees, landed hard, and was destroyed. Result: a $618,055 loss.

• During takeoff, the pilots of two OH-58s allowed their helicopters to drift into each other. Result: 4 fatalities and $345,680 in damages.

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• A Cobra pilot was taking off from a tactical field location and allowed his helicopter to drift backward into trees. Result: $650,000 in damages.

• A UH-1H pilot allowed his helicopter to roll on its right side (dynamic rollover) during takeoff from a field site. Result: $618,055 in damages.

• The pilot of an OH-6 flew his aircraft into wires. Result: 1 fatality and $140,450 in damages.

• When the pilot of a UH-1 tried to hover between parked aircraft on the ramp, his main rotor blade hit the tied down rotor blade of a parked aircraft. Result: $200,000 in damages.

The situation is not improving. As this issue goes to press, three more Class A mishaps have been recorded. Preliminary information indicates that crew error may be a factor in all of these. There's nothing new nor unique about the cause of these crew error mishaps. They happened because commanders, supervisors, SIPs, IPs, PICs, and aviators allowed old "repeat" causes to creep back-unrecognized- into the aviation system. There's also nothing new nor unique about what's needed as a cure for the crew error problem. It's the elimination of substandard performance in every phase of operation by commanders, supervisors, SIPs, IPs, PICs, and aviators.

And the time to begin is now.

UAS Class A – C Mishap Table as of 25 Nov 13

	FY 13 UAS Mishaps					FY 14 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1	0	6	W/GE	1			1
MQ-5	2	0	3	5	Hunter	1			1
RQ-7	0	4	10	14	Shadow		4	1	5
RQ-11					Raven				
RQ-20	0	0	6	6	Puma				
YMQ-18									
SUAV					SUAV				
Aerostat	1	3	1	5	Aerostat	1			1
Total for Year	8	8	20	36	Year to Date	3	4	1	8

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Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in October 2013.

Observation helicopters

OH-58D

-Aircraft main rotor blade made contact with the tail boom during termination phase of a demonstrated autorotation. Damage reported to MRB and T/R drive shaft, coupling, and cover.(Class C)

Utility helicopters

UH-60-

-M Series. Aircraft landed hard on approach to an unimproved LZ in dust conditions and sustained airframe damage to the undercarriage, reportedly from obstacles on the LZ. (Class B)

-M Series. Three of four anti-flap MR brackets apparently separated in flight and the 4th was still present but cracked. Damage was also identified to the 'red' and 'blue' blade of the main rotor system and is presumed to have been due to contact with the flaps as they separated. (Class C)

Unmanned Aircraft Systems

MQ-1C

Controller lost link with the system as it was descending to land on the runway and it crashed resulting in Class A damage. (Class A)

RQ-7B

-Contract crew experienced Ignition and GEN FAIL displays as system was on climb-out to mission altitude. Crew was able to glide the system to a recoverable location and initiated FTS but the system contacted the ground prior to full chute-deployment. (Class B)

-System generated an un-commanded RPM spike and upward pitch during landing under the TALS, after which engine-failure was reported. System descended to ground impact on the runway. (Class C)

Learn from the mistakes of others -
You won't live long enough to make them all yourself.

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

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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Online newsletter of Army aircraft mishap prevention information

In this month's issue of Flightfax, we are focusing on individual and aircrew situational awareness and how our ability to process information influences our performance and risk management decision making abilities.

From a senior leader's perspective, both Pilot In Command and Air Mission Commander are the leaders within the flight that are responsible for establishing and maintaining the positive working environment that encourages open and free exchange of information. You are responsible for setting the tone within the cockpit. Once you have established this open exchange of information, where even the newest PI or most junior CE feels comfortable participating in the crew, then you, as a PC, will be provided the right information necessary for you to build the right mental models for a successful mission. The excellent article "Situational Awareness and Decision Making" by Craig Geis details how our past experiences shape our situational awareness and why complacency is more of a danger to experienced aviators.

Situational awareness is expanded into a crew attribute in CW4 Fenner's article "Don't Be Afraid to Speak Up." The entire aircrew, not just the PC or AMC, is responsible for successful mission execution and each crew member has a role to play. When each crew member is afforded the right voice within the cockpit, the PC will be provided the right information at the right time to make the best decisions. Clear information flow directly influences situational awareness and good situational awareness enhances information flow. It is up to the leaders within the aircraft, supported by a good cockpit team, to achieve this state.

On behalf of the Combat Readiness Center Aviation Team, thank you for your dedication to this Nation and your Selfless Service during this time of conflict. My additional appreciation and well wishes to the Soldiers deployed and their Families. May all be blessed and have a Merry Christmas / Happy Holidays!!

LTC Mike Higginbotham
Aviation Director, Future Operations
U.S. Army Combat Readiness / Safety Center
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Situational Awareness and Decision Making by Craig Geis

This is the fourth in a series of articles presented by Mr. Geis designed to help you better understand the science of human factors, which simply stated, is the study of the human capabilities and limitations that give rise to human performance errors. The three previous articles are found in the Sept 12, Jan 13, and Mar 13 issues of Flightfax.

In order to better understand situational awareness, we need to further explore the interaction of the previously discussed human factor concepts in the previous three articles.

Situational awareness involves being aware of what is happening around you in order to understand how information, events, and your own actions will impact your decisions, both immediately, and in the near future.

A common view of situational awareness involves ***perceiving, understanding, and thinking ahead*** to come up with an anticipated result.

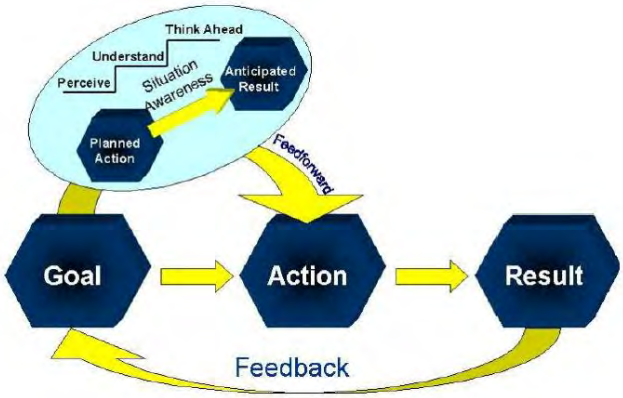

Figure 1: Situational Awareness Model
Reference: Sky Library - European Organization for the Safety of Air Navigation

The model in Figure 1 is simple, but the concept of situational awareness is not. In reality, our ability to perceive, understand, and think ahead requires us to examine a multitude of human factor issues.

Perception & Information Processing

Our level of situational awareness is ultimately determined by our ability to effectively process information. In order to be processed, the incoming information must first be perceived. To prevent overload, the brain selects only a small portion of the information detected by the peripheral nervous system to process consciously. Figure 2 illustrates that effective information processing is a function of our current physiological state which ultimately determines what information is available to process.

Individual stress levels determine the nervous systems level of arousal, which determines what we are able to attend to. We may be scanning our environment for threats, but if we do not attend to a stimulus, we do not perceive it at the conscious level. In this instance, our level of situational awareness is zero. A lack of situational awareness is often seen as complacency. Physiologically we perceive the information but are not consciously aware of it, so there is no understanding.

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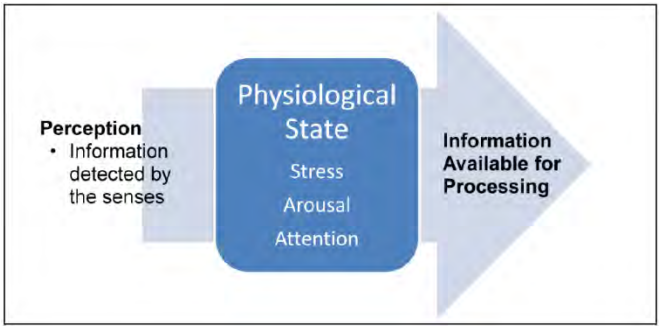

Figure 2

Complacency

We have all seen complacency in ourselves. Complacency, in simple language, is ***a lack of situational awareness or concern for a problem, accompanied by a feeling of pleasure and security in the task we are doing.***

While complacency may be about a feeling of self-satisfaction, contentment, and sometimes smugness about what we are doing, we need to be aware that complacency starts unconsciously - *by not effectively processing the information detected by the peripheral nervous system.*

The root cause factors listed below are most often seen in accident reports as complacency error. The seven factors are:

1. Habit Patterns - Automatic actions requiring little or no conscious thought, and no conscious monitoring.
2. Normalcy - Things appear normal because of the highly repetitive nature of the task, and the high probability of success.
3. Simplicity - The result of learning a task so well that no thought or concern is put forward to complete it.
4. Familiarity - The result of continued exposure to the same task. Familiarity is also the result of experience.
5. Assumption - If something has always worked in the past, we believe it will work again.
6. Expectations - Low expectation of encountering a problem often comes from success in prior experiences.
7. Constant Success/Lack of Negative Consequences – A lack of negative consequences leads to learning that has a high probability of repeating itself.

Constant exposure to any or all of these seven principles wires the nervous system to unconsciously choose courses of action. Choosing a course of action without thoroughly understanding the potential implications means we have a reduced level of situational awareness.

Understanding this helps explain why it is often the ***more experienced*** pilots that are ***more susceptible to complacency;*** they just don't perceive the threat. Less experienced individuals are more susceptible to skill-based error. I have developed a simple assessment tool that can assist you in determining the level of risk/probability of complacency vs. skill-based error. It will allow you to assess the type of error an individual may make by looking at the basic components that lead to complacency and skill-based error. This tool is available for download at

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www.cti-home.com under the Articles tab in the Heliprops folder.

Understanding: Comprehending the Situation

The initial development of situation awareness comes from our understanding the meaning of the perceived information. This is accomplished by comparing incoming stimulus with information stored in our memory. We also make our initial risk assessment at this stage.

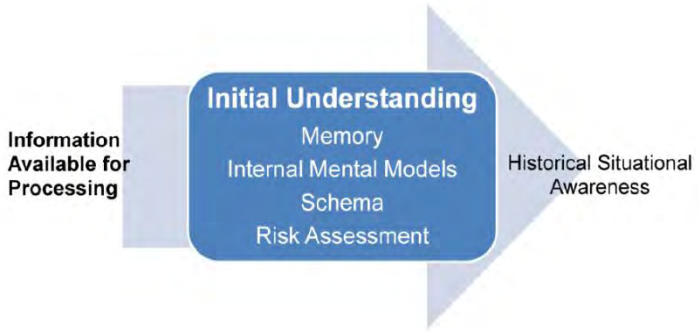

Figure 3: Understanding & Internal Models

The information stored in our memory is called a ***mental model*** or ***schema***. Think of them as a mental structure or composite of memories that we use to organize and simplify our knowledge of the world around us. We have schemas about ourselves, other people, our company, our equipment, the weather and, in fact, almost everything. They are so basic to our understanding of behavior that we are rarely aware of their impact on our decisions***. Most of our daily decisions are performed unconsciously based on mental models.***

Schemas (mental models) also affect what we notice, how we interpret things, how we make decisions, and how we act. Remember, the seven root causes of complacency, each one acts as a filter, accentuating and downplaying various elements. We use them to classify things, such as when we 'pigeon-hole' people. Schemas also help us forecast or predict what will happen. Schemas help us 'fill in the gaps.' When we classify something we have observed, the mental model will tell us much about its meaning, hence enabling a threat assessment and other predictions.

These permanently stored models are developed throughout life, and are acquired through experience and training. They are composed from bits and pieces (thin slices) of information gathered and stored in our memory. We sometimes call them experiences, biases, prejudices, attitudes, etc. If a schema is incomplete or wrong for the current situation, it can act as an information filter, and we will perceive only selected parts of the information. When schemas are complete, we can use them to make general predictions about a particular situation. Think of it as *a static assessment in historical time.*

While helpful, static mental models may replace carefully considered analysis as a means of conserving time and energy, and play a major role in applying knowledge, and in making decisions. Mental models become deeply ingrained blueprints of thought and action. This knowledge is fundamental to understanding how we view situations through our own filters, and how we ultimately make decisions. Our mental models help shape our behavior and define our approach to solving problems. Internal models are good for general predictions, but what about operating in a real-time environment? Remember that '*lazy piece of meat'* between our ears,

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mentioned in the first article? Many accidents occur when a crewmember distorts current information to fit their own internal model. The brain likes this simple way of conserving energy for 'more important tasks.'

Understanding: Comprehending the Situation

At any given time, our personal level of situational awareness is the degree of accuracy by which our perception of our current environment mirrors reality. In most accident investigations, we find that reality should have reflected more than the individual's internal model. Situational models help us to create a clearer perception of the situation, and a more accurate assessment of risk.

Figure 4: Understanding & Situational Models

We develop a situational model by gathering real-time, current information, (which may or may not agree with our internal mental model), and creating a new situational model. This new situational model is seen as our level of situational awareness.

Thinking Ahead

Conscious behavior comes from our ability to use the information available to think ahead. Our new situation model may or may not change our behavior. If the new cues we receive are strong enough, and we are willing to modify our solid internal models, it probably will change our behavior.

Individual vs. Crew Situational Awareness

Every individual will perceive a situation differently, based upon their internal mental models and their interpretation of new information. If we are alone, our decisions are based on our own perceptions. When we operate in a multi-crew/team environment, effective crew situational awareness depends on crewmembers developing accurate expectations for team performance by drawing on a common knowledge base. Even as a single pilot we need to gather information for outside sources to make decisions.

Each crew member will have their own mental model *but* ***to act as a crew, we need to develop a <u>Shared Mental Model</u>.***

A *shared mental model* allows team members to effectively:

- Anticipate the needs of the crew
- Adapt to the changing demands of the task

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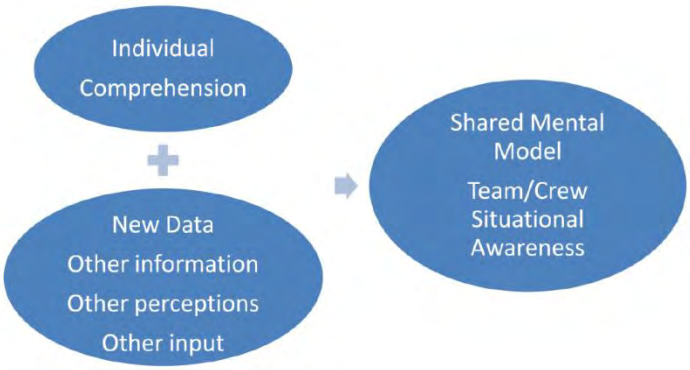

Figure 5: Crew/Team situational Awareness

To ensure a Shared Mental Model of the situation**, crew members must share their knowledge relative to**:

- The task
- Team goals and objectives
- Team member roles and responsibilities
- Information regarding threats/hazards that each person perceives

To provide a solid base for building crew situational awareness, crew members need to have information that will help them develop relevant expectations about the entire crew task.

Key Points to Remember:

1. Situational awareness is the process of keeping track of what's going on around you in a complex, dynamic environment.
2. We develop situational awareness from experience, training, practicing our job skills, and the use of good crew resource management skills.
3. We must first perceive a stimulus before we can understand its meaning.
4. Complacency generally occurs from a faulty perception of the situation.
5. You can assess the risk of skill error and complacency error by using the Complacency Error vs. Skill-Based Error Risk Assessment Tool.
6. An accurate comprehension of the meaning of a situation comes from both internal and situational mental models.
7. Internal mental models are developed throughout our lives, and are used to filter information quickly and make decisions.
8. Situational mental models represent a real-time assessment of a current situation. The brain compares them to permanently stored internal models and they are adjusted accordingly.
9. Team situational awareness depends on the sharing of information among team members and developing a shared mental model.
10. To develop a shared mental model, teams need to share information on the task, goals & objectives, roles & responsibilities, and information regarding threats.
11. Complacency affects the most experienced person the most.
12. Less experienced people are less complacent, but more prone to skill errors.

Additional references and articles are available at www.CTI-home.com, email cegeis@aol.com

Don't Be Afraid to Speak Up

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UH-60 SP/IE

As we close the chapter on over a decade of combat operations in two different combat zones, our future as a force will be intertwined with the motto' "doing more with less." So, as a community, we will be required to focus our attention on maximizing all available training opportunities. Gone will be the days of 700 flight hours in a calendar year. The impact of simple preventable mistakes will be exponentially more costly in this new budget constrained environment.

With that being said, aircrew coordination training will become even more vital to our mission as a force.

We all remember our first RL progression after graduating from flight school: there we sat, nervously trying to be perfect in every action and in every word. We looked at that instructor pilot with perhaps a sense of awe or wonder. Or perhaps you were a junior pilot flying with a well experienced pilot in command, that person being someone you might want to emulate someday.

So this bodes the question: are you being enough of an active crewmember? Only we can answer this if we are being honest with ourselves. The Alaska Airlines Flight 60 crash on April 5, 1976, reminds us that even if you are acting as only a copilot, you still must be a vigil crewmember.

Here's what happened: The Boeing 727 overran the runway after landing at excessive speed. The captain failed to initiate a go-around, even though the copilot expressed multiple times that they weren't "going to make it." This occurred while the aircraft was committed to a full stop landing following an excessively long and fast touchdown from an unstabilized approach. So, expressing your opinion as a crewmember not on the controls that the aircraft does not have enough runway left to land on, during the crash, is obliviously too late.

Being an involved and active crewmember, ready to maneuver the aircraft out of a dangerous situation, may be the difference between life and death.

If we look at the four principles of aircrew coordination in Chapter 6 of the respected Aircrew Training Manual, we can understand what is expected of us. When we **'Communicate Effectively and Timely,'** it enables the efficient flow and exchange of important mission information. This creates a fluid atmosphere of cooperation between all crew members and allows each one to feel they have a "vested" interest in the safe operation of the aircraft.

Sustain a climate of ready and prompt assistance. Each crewmember must be willing to practice advocacy and assertiveness should the situation demand a different course of action, as time permits. Crewmembers must feel free to voice any concerns they may be feeling in certain situations. We all have different comfort levels in regards to certain environments.

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A 100 hour NVG PI does not have the same comfort level of a 1,500 hour NVG PC in a zero illumination, desert environment. When assistance is offered, it should not be treated as an opinion of one's abilities. It should be treated as a genuine outreach to provide assistance.

TC 3-04.93, Aeromedical Training for Flight Personnel, cites examples of stress responses. The Perceptual Tunneling phenomenon, under cognitive responses, is one that, as aviators, we all have experienced at one time or another whether it was during flight school or your last Annual Proficiency and Readiness Test.

The conundrum is being able to recognize in yourself perceptual tunneling and to request assistance if needed. The simplest act of merely "Passing Off" the flight controls to the other pilot in the aircraft has thwarted many a potential aircraft mishap. Also, it's important that a pilot in command or instructor pilot should be able to recognize when a less experienced pilot is experiencing task overload.

Provide Situational Aircraft Control, Obstacle Avoidance, and Mission Advisories. Nothing could be more paramount to this Aircrew Coordination Principle than **Situational Awareness**. Crew members must feel free to express their concerns or offer information pertinent to the safe conduct of the aircraft. As the saying goes, "The only stupid question is the one that is not asked." Our occupation is a very dangerous one, filled with many strong willed personalities. But as a community, we have got to learn to put our ego's in check from time to time, and place the safety of the crew above all else.

In summary, it takes all crewmembers, acting in unison, for the safe operation of today's Army aircraft. As aircraft technology continues to increase and pilot workload grows along with it, there will be an ever greater need for practicing good aircrew coordination. As history has proven, there is a thin line between overconfidence and complacency. It takes a pilot lashed with intrepidity to identify and correct any pitfalls to the adherence of good aircrew coordination.

Situational Awareness: Don't Let it bite you!

Mishap Review: NVS Training Flight

While stable at a five-foot hover during night NVS training, the AH-64D experienced an un-commanded cyclic displacement to the left, rolling the aircraft approximately 60° causing an impact with the ground. The impact resulted in catastrophic damage to the aircraft, with no significant injuries to the crew.

History of flight

The crew began their duty day with a show time of 1700L for an NVS training flight. They participated in a mission brief and assessed the flight as low risk. At 1845, the crew proceeded to the aircraft to conduct the pre-flight and aircraft run-up. The weather was clear skies with 10 miles visibility, winds 340/09 knots. Temperature was +10C and PA of +100 feet.

At approximately 1940L, the crew departed home station to a designated training area to conduct terrain flight tasks. At the completion of the terrain flight training, the crew proceeded to the stage-field to perform slope landings, arriving at approximately 2030L. Upon completion of a slope landing, while at a five-foot hover with the PI on the controls, the aircraft entered an uncommanded roll to the right and twice to the left. The IP took the controls and stabilized the aircraft. The aircraft then began an uncommanded rolling motion to the left and right, followed by a cyclic displacement to the left, resulting in the main rotor blades making contact with the ground. The aircraft subsequently crashed and sustained extensive damage, the crew was not significantly injured.

Crewmember experience

The IP, in the back seat, had nearly 3,000 hours total flight time, with 2,800 in the AH-64, 1,200 hours as an IP and 800 hours NVS time. The PI, in the front seat, had 142 hours total time, 62 hours in the AH-64D and 12 hours NVS time.

Commentary

The crew that had flown the aircraft the day prior, reported uncommanded left cyclic-input as well, while operating on the ground. Maintenance personnel conducted the appropriate maintenance for the anomaly, and released the aircraft for flight. The aircraft had flown one flight period prior to the mishap flight, with no anomalies noted. Investigation determined that contaminants in the hydraulic system caused malfunction. These contaminants created a binding event with the mechanical spool valve and the Stability Augmentation System (SAS) Actuator Sleeve. As a result, the lateral servo actuator back drove the flight controls, through the mechanical linkage connected to the servo.

Leadership challenges during cold-weather operations

Sept 93 Flightfax

The principles of leadership are unaffected by the weather, but challenges for leaders can be profound during cold weather. To accomplish the mission, leaders must also contend with the stress of the environment. When addressing cold-weather operations, we most often address the threat of frostbite, chilblain, trench foot, dehydration, hypothermia, and so forth. However, the stress of cold can also adversely affect attitudes and morale, and leaders must recognize and cope with these effects if they are to maintain their unit's effectiveness.

Many soldiers come from regions where winters are not severe, and few have experience in working or living outdoors during cold weather. Initially, these soldiers may lack confidence in their ability to cope with and survive in cold weather.

The cold can seem inescapable. Even when soldiers are able to stay warm, the effects of the cold are felt in the need to wear awkward cold-weather clothing, confinement to small shelters, and problems with equipment. These effects can lead to anger, frustration, and depression, which can be intensified by fatigue, periods of isolation, and shortened daylight hours.

When conditions are extremely cold and soldiers have been out for a long time, the need to stay warm tends to become the individual's most important concern. Hurrying to finish the mission and get into a warmer environment can lead crews to take shortcuts, which often leads to accidents.

Leaders are responsible for prevention of cold injuries among their crews. Susceptibility to cold injury varies considerably. The sidebar shows some of the risk factors that can make individuals more susceptible to cold-weather injuries.

Although it's usually the newly-assigned individuals with little or no cold-weather training or experience who sustain cold injuries, leaders cannot fail to monitor the individuals with considerable cold-weather experience. They can become too desensitized to the threat of cold injuries. Leaders must be alert to this kind of carelessness too. Crews need to be taught that when it is cold, tasks may be more difficult but not impossible.

Leaders can build this confidence in their crews by having them practice tasks and survival skills in the cold and by conducting cold-weather training exercises. Viewing the cold as a challenge to be overcome is the key to the positive attitude required to successfully complete the mission.

-Adapted from Su*staining Health* a *Performance In the Cold:* A *Pocket Guide* to *Environmental Medicine Aspects* of *Cold Weather Operations*, U.S. Army Research Institute of Environmental Medicine

Individual cold-injury risk factors

- *Inadequate training*
- *Prior cold Injury*
- *Inadequate clothing and equipment*
- *Illness, Injury, wounds*
- *Fatigue*
- *Dehydration* (*Poor Intake of fluids or excessive caffeine Intake)*
- *Alcohol*
- *Poor nutrition*
- *Low body fat*

Class A – C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 12 Dec 13
	Month	FY 13					FY 14			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	1	0	7	0			1	3	
	November	0	1	5	0		3		7	
	December	2	1	0	0				2	
2nd Qtr	January	0	0	6	0					
	February	0	0	2	0					
	March	2	1	5	6					
3rd Qtr	April	1	1	6	2					
	May	0	0	5	0					
	June	1	1	3	0					
4th Qtr	July	0	0	6	0					
	August	1	1	9	0					
	September	0	1	0	0					
	Total for Year	8	7	54	8	Year to Date	3	1	12	0

UAS Class A – C Mishap Table									as of 12 Dec 13
	FY 13 UAS Mishaps					FY 14 UAS Mishaps			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	5	1	0	6	W/GE	1			1
MQ-5	2	0	3	5	Hunter	1			1
RQ-7	0	4	10	14	Shadow		5	1	6
RQ-11					Raven				
RQ-20	0	0	6	6	Puma				
YMQ-18									
SUAV					SUAV				
Aerostat	1	3	1	5	Aerostat	1			1
Total for Year	8	8	20	36	Year to Date	3	5	1	9

It's coming ...

Whether you're prepared or not, the snow and ice of winter are just a few short weeks away. Sept 1992 Flightfax

Operating aircraft in cold weather conditions or an arctic environment presents no unusual problems *if you're prepared.* If crews are aware of the changes that take place and conditions that may exist because of lower temperatures and freezing moisture, risk can be minimized and missions safely accomplished.

Preflight

Pilots must be more thorough in the preflight check when temperatures have been at or below O°C (32°F). Water and snow may have entered many parts of the aircraft during operations or in periods when the aircraft was parked unsheltered. This moisture often remains to form ice that will immobilize moving parts, damage structure by expansion, or occasionally foul electric circuitry.

Covers afford protection against freezing rain, sleet, and snow when installed on a dry aircraft before precipitation begins. Since it is not practical to completely cover an unsheltered aircraft, parts not protected by covers, parts adjacent to cover overlap, and joints require closer attention, especially after periods of blowing snow or freezing rain.

Crews should remove accumulations of snow and ice before flight. Failure to do so can result in hazardous flight because of aerodynamic and center of gravity disturbances, as well as the introduction of snow, water, and ice into internal moving parts and electrical systems. Particular attention is required for the main and tail rotor systems and their exposed control linkages.

Flight

Hovering helicopters produce the greatest amount of rotor wash, creating the potential for rotor-induced whiteout when operating over snow-covered terrain. The hazard is not as serious for aircraft with wheels as it is for skid-mounted aircraft. Aircraft with wheels can be ground taxied safely to the takeoff point with only minimum blade pitch, thus reducing rotorwash. Takeoffs pose a hazard in snow-covered terrain because of the lack of visual cues for peripheral vision and landing can present a significant hazard unless aircrews follow proper landing procedures. Selecting an improper landing technique can also result in whiteout. FM 1-202: Environmental Flight recommends specific techniques pilots should use when taking off from and landing on snow-covered areas.

Maintenance

The increased requirement for aircraft maintenance stems directly from low temperatures. Operation at temperatures below -50°F should not be attempted except in emergencies, unless the aircraft with the appropriate winterization kit and auxiliary systems has proven reliable at lower temperatures. The following special precautions and equipment are necessary to ensure efficient operation of the aircraft:

- Reciprocating engines should not be started at temperatures of 10°F and below without the

Continued on next page

 continued from previous page

use of an electrical power unit for assistance in starting. A source of external heat for application against the engine accessory case, carburetor induction system, oil pump, and battery will ensure easier starting.

- The standard portable combustion type heater that includes a blower and flexible hoses for application of heat to localized areas may be used for preheating aircraft components and systems before starting. In addition to preheating engines for starting, these units may also be employed to heat specific portions of the aircraft so that maintenance personnel can work without gloves. (Don't forget that touching cold metal with bare hands in below-freezing temperatures can tear the skin right off your hands.)

- For aircraft with internal combustion heaters, the heaters should be turned on to warm the aircraft for at least 20 minutes before operating hydraulic systems. Otherwise, damage to the system is more likely.

- Some system gauges/indicators are unreliable until the system reaches operating temperature.

-When temperatures remain below freezing, aircraft batteries not in use should be removed and stored in a warm place.

-When transferred from a warm to a cold environment, some aircraft engines, transmissions, and hydraulic and landing gear systems may require a different kind of lubricating oil or hydraulic fluid.

-Thickening of oils at low temperatures presents problems in operation and starting. Installing standard winterization equipment that includes baffles on oil coolers and engine cowl baffles can aid in maintaining proper temperatures. Oil dilution units may also be installed, although it is normally satisfactory to drain the oil from engines at the end of the day's operations and to heat it before replacing it in the engine.

- Aircraft with air-charged components such as accumulators and cargo hooks should be charged with nitrogen because air condenses and contracts in colder temperatures. Low pressure and moisture in the system may prevent the system from functioning properly.

-Operation of aircraft in temperatures below -35°F results in a marked increase in metal fatigue. All metals become increasingly brittle as temperatures decrease. This will be evidenced by an increase in the number of skin cracks and popped rivets in stress areas. Careful attention must be devoted to these areas during all stages of maintenance operations.

Fortunately, most units are not subjected to a severe cold-weather environment the entire year. But many units do encounter some snow and ice conditions during winter months. And a lack of recent flight experience in snow and ice conditions-skill decay-leads to accidents. Field manuals and operators and maintenance manuals for your aircraft contain suggested techniques and procedures for flight and maintenance operations in the cold environment.

You can't control or eliminate all risks associated with cold-weather operations, but you can learn to manage them. Prepare now by brushing up on techniques and procedures you'll be using in the months ahead. Even in those areas where summer lingers, watch out: it's coming - old man winter will soon be here. Don't let him catch you unprepared.

Selected Aircraft Mishap Briefs

Information based on Preliminary reports of aircraft mishaps reported in November 2013.

Attack helicopters

AH-64

-D Series. Crew was conducting aircraft qualification training, when crew reported uncommanded cyclic input. Aircraft contacted the ground. (Class A)

-D Series. Aircraft crashed just after take-off from the airfield and came to rest on its left side. One crewmember suffered abrasions in the impact. (Class A)

-E Series. Crew was participating in night operations when they detected smoke odor in the cockpit. While conducting emergency landing, the crew experienced electric power outage in the cockpit and subsequently impacted the ground. Crew was able to egress. (Class A)

-E Series. Crew was conducting a #1 Engine Max Power Check, with #2 Engine power lever reduced, when the #1 engine sustained a high-side event. Suspect #1 engine damage requiring replacement. (Class C)

-D Series. Crew experienced NR exceedance and engine-out warning during RL progression training (DECU lock-out procedure/task). Crew conducted single-engine landing to the runway. MDR read-out confirmed NR over speed. (Class C)

Cargo helicopters

MH-47

Right side M134 Mini-gun malfunctioned. Two crewmembers manning the weapon received minor shrapnel wounds to the lower extremities. (Class C)

Utility helicopters

UH-60

-M Series. Crew was initiating a two-wheel landing during NVG training when the underside of the fuselage made contact with the ground. (Class C)

-A Series. Post-MTF Flight inspection revealed a transmission overtorque condition. MTF comprised engine power checks. (Class C)

Observation helicopters

MH-6M

Aircraft MRS made contact with the cupola during familiarization training. Damage reported all MRB and cupola antenna. (Class C)

Unmanned Aircraft Systems

MQ-5B

System had reached 250' AGL following launch when it initiated an un-commanded descent and impacted the runway. (Class A)

RQ-7B

-Crew experienced engine failure during flight, under the TALS, at approx. 600' AGL, and deployed the recovery chute. System crashed on impact, sustaining significant damage. (Class C)

-Crew experienced RPM fluctuations while system was in flight, following by full engine failure at 300' AGL. FTS was activated but system landed with damage. (Class C)

U.S. ARMY COMBAT READINESS/SAFETY CENTER

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

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