Flightfax
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Environmental Training to Reduce the 4th Quarter Spike

As written about in previous issues of "Flightfax," over the previous five fiscal years Army Aviation has experienced roughly 40 percent of its Class A mishaps during the fourth quarter. The 4th quarter represents a complex convergence of numerous factors that, individually or aggregated, if not mitigated create an increased risk to operations. High operations tempo (OPTEMPO), changes in personnel and leadership with the summer manning cycle, and a significant change in the operational environment and weather all influence operations during this time period. The key to reducing risk during the fourth quarter is to ensure units adequately plan and train for the complexities with this timeframe. Developing effective environmental training plays a significant role in the unit training plan for building aircrew proficiency and reducing the "4th Quarter Spike."

Environmental Risk Factors

The environmental risk factors involved with mishaps during the 4th quarter usually involve power management; aircraft lift dynamics; "high-hot" operations; changes in weather patterns (thunderstorms); and operations in dust/degraded visual environments (DVE). This makes environmental training exceptionally important in reducing the risk to force (RTF) and risk to the mission (RTM). Training Circular (TC) 3-04.11, Commander's Aviation Training and Standardization Program, states in paragraph 6-57:

"In their SOP, aviation units will establish specific aircrew training requirements based on the environment or region required by the unit mission. Commanders will establish an academic and flight training program that develops and sustains ACM proficiency in the specific environment in which the unit operates. Commanders will establish training requirements for specific environments when required by the mission, as described in TC 3-04.4 and TC 3-04.5. If an approved TSP exists for the training, it will be utilized. Environmental academic/flight training is required for—

- Cold weather operations.
- Desert operations.
- Jungle operations.
- Mountain operations.
- Overwater operations."

So the requirement is codified to establish a program and to sustain unit aircrew members' (ACM) academic and flight training proficiency in the environments they operate.

Where is the Guide

There is no "one" guide that provides all the information for environmental training. The varied environments in which Army aviation operates runs from the frozen areas of the northern latitudes to deserts around the world. So the commander's team of instructor pilots (IP), aviation mission survival officers (AMSO), aviation safety officers (ASO), and enlisted flight instructors (FI) must collaborate to develop the academic and flight training programs that the unit will utilize to ensure aircrews establish and sustain proficiency operating in these environments.

There are numerous publications that provide detailed information on operating in different environments such as TC 3-04.4, Fundamentals of Flight or various training support packages (TSP) which provide a piece of the training puzzle, such as the Overwater TSP and the Terrain Flight TSP. Each of the different publications provides valuable information that should be incorporated into the training program.

Training Program Development

The environmental training program should be developed to comprehensively cover the topics that are relevant to the unit location and environment the aircrews habitually operate in, both at home station and during deployments. Some challenges develop when trying to design in-flight training for environmental conditions which may not be available at home station (mountain terrain, desert environment, high-hot, overwater). While the in-flight availability may not be there, the unit program should maximize simulator training to get as close to realistic conditions as possible. Even experienced personnel should be provided ample training opportunity to sustain proficiency and mentor unit members in the mission and the environments they

A UH-60 Black Hawk medevac helicopter, like the one used to evacuate Marine Cpl. Winder Perez. Performs a dust landing near Camp Dwyer, Afghanistan, April 5.

are expected to operate in.

The environmental training program should provide aviation personnel with a thorough academic foundation and a solid "hands-on" performance train-up. This training should give the commander and the standards team a valid assessment of how well the team is operating, their proficiency, the effectiveness of the training, and where more training is required. The program should be under constant review so that it may be adjusted to maximize the benefit of the training and reduce risk for aviation operations.

Capt. Sean McManus, Commander of A Co, 1-3rd Attack Reconnaissance Battalion, talks through lessons learned with his pilots after a full day of simulator training on Feb. 7, 2020. Photo by Maj. Robert Fellingham.

Executing the Training

A thorough records review should be accomplished for each aircrew member prior to the beginning of training. The records review allows instructors and senior unit members to design the appropriate start point for the training. For some, they are at a crawl stage, for some they are at a walk, and for others, they move into a run (e.g., crawl, walk, run methodology). Thoroughly assessing the unit and developing a progressive environmental training program based on individual aircrew member proficiency will set the training and the unit up for success.

Establishing regimented environmental situational training exercises (STX) to execute in the simulator should build upon classroom academics. These scenarios should allow the command an opportunity to validate the training and the proficiency of aviators in executing operations in tough environmental conditions. Putting the crews into tough, realistic situations and making them work through the tactical and environmental challenges will build proficiency not only for in-flight techniques but in thinking through problems and safely resolving them. Transitioning your training from individual skills to include collective, multi-aircraft and night exposure, as well, builds proficiency and resiliency. Just regurgitating the "book" answer doesn't check the block on proficiency.

Don't forget about NRCMs; they are just as important in the aircraft. How will you validate and establish their proficiency level? Since the simulator doesn't support the whole crew, incorporate flight hours into the program to run aircrew specific scenarios in the aircraft. Using a very proficient crew in the cockpit while evaluating the crewmember in the back executing tasks should allow your FIs to understand their proficiency level. Continue providing instructions and assistance on tactics and techniques they should utilize to become proficient.

Conclusion

While there are many factors that converge to influence the 4th Quarter Spike, addressing changes to the operational environment improves individual and collective unit proficiency through effective training and reduces one aspect of 4th quarter complexity. Developing an effective, incremental environmental training plan will build unit proficiency and can be part of how leaders account for assessing risk (the intangibles) while ensuring their aircrews are prepared for the challenges of the 4th quarter environment. Establishing, validating, and executing your environmental program ahead of time will not only remove the 4th Quarter Spike, but also reduce mishaps and preserve readiness in the long run. ■

Aviation Division
Directorate of Assessments and Prevention
United States Army Combat Readiness Center

Electronic Warfare Support to Aircraft Survivability

As the focus shifts from counterinsurgency (COIN) to multi-domain operations (MDO), aviators at all levels should begin to understand the importance of electronic warfare (EW) implementation, and the role provided by cyber electromagnetic activities (CEMA) personnel. Coalition forces' uncontested control of the electromagnetic spectrum (EMS) during COIN operations provided unimpeded freedom of maneuver in the use of communication and navigation systems. Given the emerging hybrid threat, we can expect that we will not enjoy such unimpeded freedoms on the next battlefield.

Our peer adversaries possess electromagnetic interference (jamming), spoofing (meaconing) capabilities, and methods to locate the source of emitters operating on the EMS. Our adversaries have invested heavily in cyber, EW, and information operations in the last 20 years; with such a low investment needed for a high payoff, the U.S. military has been slow to reap these benefits. So how do we educate, plan, and train aviators to win in such conditions, while integrating electromagnetic effects?

Rebuild

As the U.S. Army continues to invest in rebuilding its EW personnel and capabilities, much of the focus on the acquisition of newer technologies has been provided to the brigade combat team (BCT), leaving other units without the tools to readily integrate EW in operations at the brigade (BDE) level and below. Following the Cold War, the United States (U.S.) Army distanced itself from EW and only began limited reinvestment in this technology to combat the emerging threat of improvised explosive devices (IED) used by insurgents in the Middle East; this reignited the significance of maintaining control of the EMS and lead to a variety of efforts to equip U.S. forces with the most sophisticated technologies to compete against near-peer threats.

Combating these threats is not solely an equipping challenge; the restructuring of the forces as well as the creation of experimental cyber-EW units and tactical support detachments in Special Forces (SF) Groups help to emphasize the direct role of cyber-EW in combat operations. However, this emphasis is lost on non-BCT units, such as engineers and aviation units. Addressing that shortfall can be achieved via multi-function EW (MFEW) initiatives and development of unmanned aerial systems (UAS).

Modified table of organization and equipment (MTOE) changes have reduced EW personnel slots at the battalion and task-organized them into the BDE CEMA cell, leaving battalions without a subject matter expert (SME) and planner for EW. Typically this leaves commanders and operations officers who are motivated to conduct EW training without the resident expertise to conduct it correctly.

The 2nd Combat Aviation Brigade (CAB) CEMA team is currently working towards a solution to these problems, using a variety of resources in South Korea combined with creative solutions to complex problems. Our lines of effort include, but are not limited to education, planning, and training integration.

Education

Electronic Warfare personnel reside in the CEMA section at the brigade level; typically comprised of one 17A/B CEMA officer, two 17E EW noncommissioned officers (NCO), and two 170B EW technicians. Our efforts have been to integrate EW training to pilots during regularly scheduled pilot briefs by integrating our program with aviation mission survivability officers (AMSO) and standardization pilots at the battalion level. The main focus is an overall introduction to EW, followed by related topics, such as emission control (EMCON); EMS vulnerabilities; the importance of encryption; overview of global positioning system (GPS) and GPS jamming; and a North Korean threat overview.

While many are already familiar with an electronic attack (EA, or communication jamming), educating units on threat capabilities has been challenging given units access to secure internet protocol router (SIPR) and the current intelligence gaps on North Korean EW tactics, techniques, and capabilities.

Overcoming these challenges included focusing on other aspects of EW, specifically electronic protection (EP) and EW support (ES). This education has not only been directed at pilots, but also to junior enlisted Soldiers, junior NCOs, and senior leadership as well, in an attempt to provide a comprehensive familiarity to EW operations across the force. Many of these blocks of instruction are nothing new to the Army, but rather using historic doctrine and manuals to reemphasize the importance of lessons learned in the past.

Figure 1 from Field Manual (FM) 24-33, pre-Gulf War-era signals intelligence (SIGINT)/EW doctrine, depicts the execution of transmission intercepts by adversary communication intelligence (COMINT) analysts and the platform being targeted by EA, or prosecution via artillery or combat missions within 2-3 minutes; this was a tactic, technique, or procedure (TTP) so well executed by Russian SIGINT forces during the initial invasion of the Crimean Peninsula in February of 2014, that it completely restructured the way that Ukrainian forces have been fighting Russian separatists and SF.

These lessons extend to the aviation community when considering an aircraft's electromagnetic emissions and implementation of EMCON. Pair the aforementioned example with educating the aviation community in the basic utilization of tactical radio communications techniques; such as brevity codes, pro-words, the establishment of communication patterns (hourly checks), and minimizing the usable information transmitted.

Our EP plan must account for all reasonable measures to deny information to enemy intelligence analysts. FM 3-12, Cyberspace and Electronic Warfare Operations, defines EP as "actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy use of the EMS that degrade, neutralize, or destroy friendly combat capability", and even has "expendables such as flares" as a form of EA. In an effort to take advantage of their SME and enabling a top-down approach, we have focused on building relationships with the company, battalion, and brigade AMSOs. By seeing aspects of EW in all echelons of training, CEMA personnel can work with AMSOs at increasing EW knowledge and placing a heavy emphasis on aircraft survivability. Aviators understanding their own signature in the EMS as well as how to minimize threat detection during transmission decreases the chances of intercept while increasing survivability. There is no single method of absolute protection, but through a defense-in-depth model, aviation units can become more knowledgeable about what to look for and how to report anomalies.

Planning

Now we have a general understanding of what the enemy can do and how we can mitigate those effects. The next step is to implement these conditions in our training. Operations (S3) officers and commanders should use every means necessary

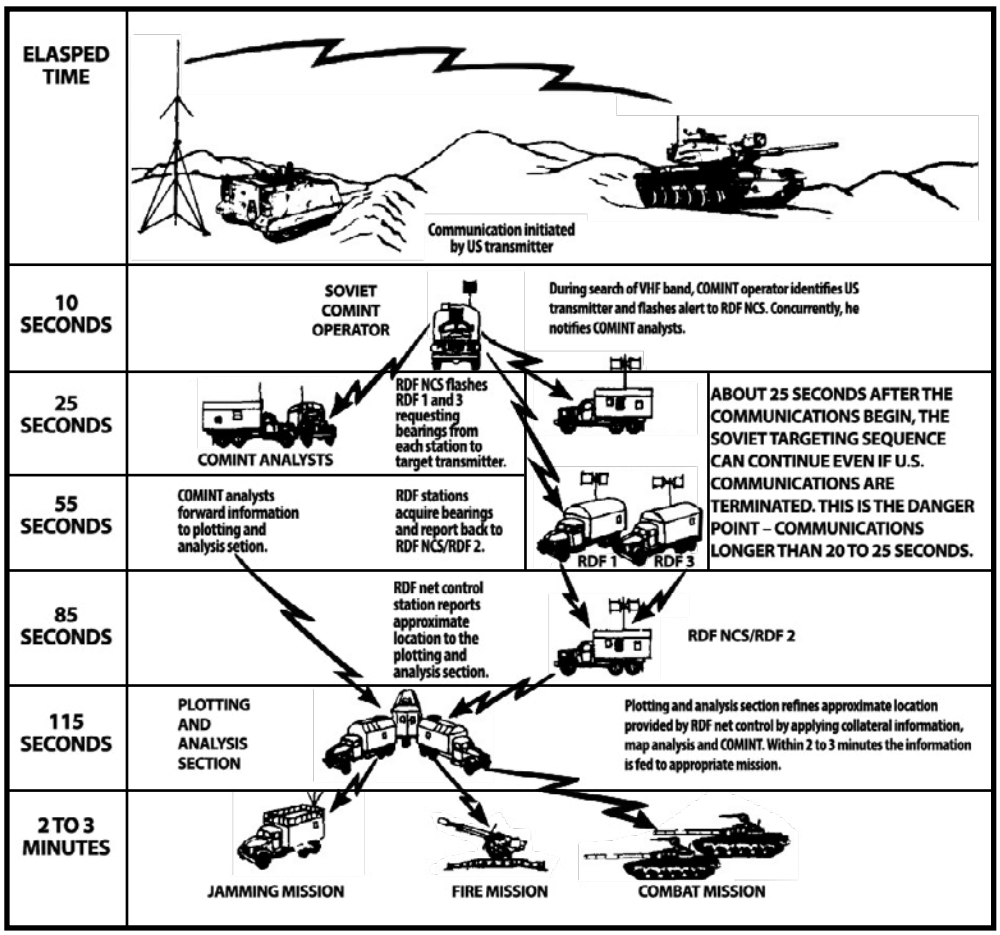

Figure 1. Pre-Gulf War-era signals intelligence

to make their training realistic; this includes interference of communication and GPS devices.

The integration of CEMA personnel early in the planning cycle can help with this problem set and provide advice and expertise on when and how to induce such effects in a training environment. Given the challenges of conducting real-life EW training, we are left to simulate as accurately as possible what that denied environment would look like. This gives the unit an opportunity to respond in a realistic way to a perceived threat (i.e., the presence of a GPS jammer on the battlefield and its impact on aviation operations.) We can work with the intelligence (S2) officer to ensure an accurate enemy situation is written into operations order (OPORD) so pilots can plan to react to such threats. Surface-to-air weapons may be located between the current position and objective and must be taken into account when planning routes. This creates obvious challenges since a simulated weapon system on the battlefield could potentially impact multiple adjacent units and higher echelons, thus requiring planning efforts across all parties involved, when simulating these types of threats.

Another consideration for planning is a suitable primary alternate contingency emergency (PACE) plan. If a pilot experiences interference on one frequency modulation (FM) channel, it is likely to be on the next. There must be a distinguishable difference in frequencies to allow communications between aircraft and higher headquarters during contested environments.

Training Integration

Training EW is based on solid integration of a program into the unit operations and training scheme. Without integrated EW education, detailed planning, and integration into operational training scenarios in simulators and aircraft, aviation commanders induce unnecessarily higher risks to the mission and force. Utilization of the Aviation Combined Arms Tactical Trainer (AVCATT) can be a risk mitigation method. This simulation training allows the pilot to identify interference, execute countermeasures, and continue the mission. This training reinforces explicit learning from a classroom with tacit or hands-on execution of effectively managing your aircraft flight through an EW environment. After action reviews (AAR) can be conducted to examine the interval of time between recognition and resolution while discussing the most successful methods to counter the EW threat. CEMA personnel must be integrated into the training program from the start to have a valid training program. A progressive training program could look like the following:

Crawl Phase: Incorporating analog navigation to simulate a GPS-denied environment. This includes the integration of EW training into our simulations by forcing the testing of PACE plans and being familiar with what actions to take in the event of a loss of communications. EW training could also take the form of "hot MIC-ing" a radio during a simulation to mimic interference, to force pilots to transition through their PACE plan.

Walk Phase: Forcing rotary wing assets to conduct survivability maneuvers in response to threats through the utilization of training aids and EW ranges.

Run Phase: A combination of these efforts including the use of analog navigation (to simulate a denied, degraded, disrupted space operational environment, or D3SOE), the loss of communications (to require the use of a PACE plan), followed by the aircraft getting targeted by enemy weapon systems requiring the implementation of survivability maneuvers.

Training Opportunities

Pilsung Range is an EW range in Korea that maintains a suite of EW training aids that emit threat signals to simulate enemy weapon systems. Pilsung is managed by the 7th Air Force and typically designed for fixed-wing aircraft but does training for rotary-wing as well. This gives aviation assets the opportunity to conduct live EW/EA training in the aircraft. Its distant location requires the implementation of a forward arming and refueling point (FARP) operations, providing the opportunity to train multiple capabilities simultaneously; this presents the opportunity to execute logistic and command and control operations in a contested environment as well. While there are many unidentified planning considerations since this training is not conducted on a regular basis, we encourage all units to explore how (or if) they can benefit from this training and build upon it so that it might become a more regular training event.

Another training opportunity that was previously discussed is the utilization of the AVCATT, which we

Figure 2. Joint Deployable Electronic Warfare (EW) Range Training

have exercised, to enable the pilot's familiarity and mastering of operating in a contested environment during MDO. Many of these training efforts remain in their infancy and have yet to reach the crawl phase, let alone more advanced stages of training.

In addition to Pilsung Range, we've also employed the Joint Deployable EW Range (JDEWR). Managed by Pacific Air Force (PACAF), this asset is capable of simulating surface-to-air missiles (SAM) and anti-aircraft artillery (AAA) emitters in locations that may have limited or no range instrumentation or on-site EW/EA training capabilities. This system was first deployed in 2006 and has since been utilized for numerous Air Force missions to simulate SAM, but recently has been utilized to simulate AAA as well.

Electronic warfare training is very challenging to execute outside of simulating the threat and its systems. The use of jammers to intentionally block, jam, or interfere with authorized radio communications is a violation of federal law in the United States. Units must design novel training approaches to fully integrate EW training into their programs and then execute the training. Aviation simulators provide high-level fidelity comparable to actual aircraft flight. So, the ability to design and plan simulator training scenarios to exercise crew knowledge of threat EW and the countermeasures they should utilize to thwart it is available. In certain locations, there are threat system simulators available to fly against, units who have the opportunity to fly and train against these simulators should make the effort and execute the training. These EW effects have to be simulated.

Conclusion

In an attempt to make our forces more lethal and capable of fighting our nation's next war and reduce the risk to mission and force, we should be seeking out ways to integrate EW training in any capacity possible, even if that means simply simulating it. Our next adversary, more than likely, will have EW forces trained and integrated into their operational plan to defeat our technologies. We have to battle-focus our aviation and supporting forces on integrating EW training, simulation, and its culmination in training exercises. The BDE and above training guidance should incorporate EW training.

Electronic warfare countermeasures require more than just a flick of a switch in the aircraft or a blurb in the operation's order. EW begins with the fundamental elements of communication and navigational methods. Ensuring radio operators are aware of the EMS when they are transmitting their messages, to incorporate brevity codes in order to avoid enemy collection and direction finding. This could also include advanced navigation measures; incorporating terrain association and the lack of reliance on GPS-aided devices (does your unit have maps?). Defeating the adversary's EW efforts requires foreknowledge and training by our forces prior to entering the fight. Take the time to make sure you have prepared and trained your units to survive and fight in the EW spectrum. ■

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The More You Know

After completing a successful mission, most individuals start preparing for the next task, training, or mission. Never reflecting on what went right or wrong, or areas that need improvement; evaluating every phase of the mission is critical to allow for smoother execution of future missions. Just as every mission needs a thorough briefing, every mission requires an after action review (AAR) to help develop a better product and implement more effective risk mitigation. Identifying gaps or flaws in your plan will reduce the possibility of accidents or incidents during the execution phase of your mission.

In accordance with (IAW) FM 6-0, Commander and Staff Organization and Operations, an after action review is a guided analysis of an organization's performance, conducted at appropriate times during and at the conclusion of a training event or operation with the objective of improving future performance. Well-rounded training includes candid assessments, AARs, and applied lessons learned to ensure improved readiness. Formal and informal AARs both review what was supposed to happen, what did happen, determine what was right or wrong with what happened, and determine how the task should be completed differently next time.

What happens if your unit is being deployed to the National Training Center (NTC) or Europe for a rotation? It would be smart to do some research and look at what other units may have experienced during their deployments. The Center for Army Lessons Learned (CALL) most likely has what you are looking for. Topics ranging from operations, missions, standard operating procedures (SOPs) and tactics, techniques & procedures (TTPs) can be found and requested from CALL. Using resources provided to you by CALL will allow you to work smarter and not harder and learn from someone else's mistakes.

The most critical part of an AAR is to take an honest look at the complete process, share lessons learned, and best practices allowing others to learn from your mistakes. Document your AAR for continuity in your unit. There are those who have and those who will conduct the same missions you have. So, why not avoid the missteps? ■

References:

Army Publishing Directorate (APD) https://armypubs.army.mil/

ATP 5-19 Risk Management

FM 6-0 Commander and Staff Organization and Operations

Center for Army Lessons Learned (CALL) https://call2.army.mil/aar/default.aspx

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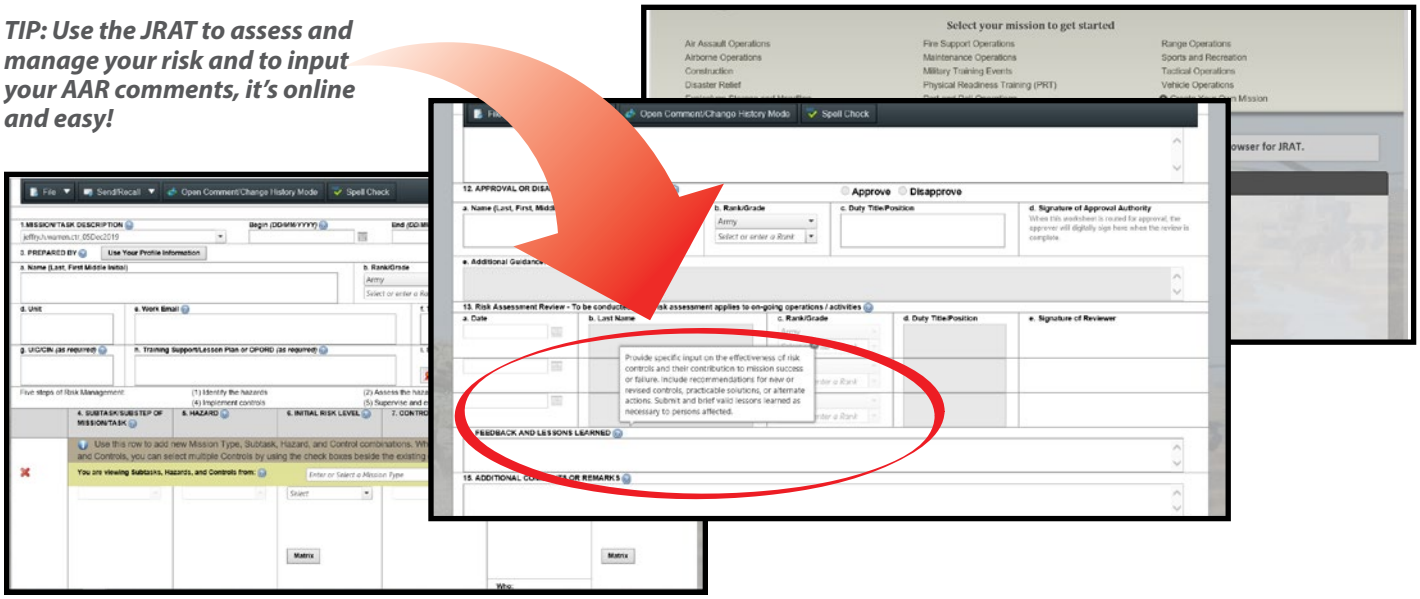
TIP: Use the JRAT to assess and manage your risk and to input your AAR comments, it's online and easy!



Mishap Review
UH-60A Improper Response to Emergency

While conducting a night vision goggle (NVG), multi-ship air taxi movement to a hot refuel site, the crew of a UH-60 noted a No. 2 engine oil pressure caution light. The pilot (PI) slowed the aircraft to approximately 26 knots resulting in the main rotor (MR) rotations per minute (RPM) drooping. As the rotor began to droop, the aircraft entered an uncontrolled descent. The instructor pilot (IP) took the controls and applied aft cyclic while increasing power. The aircraft went into a 20- degree nose-high attitude and further decayed the MR RPM. The aircraft impacted the ground tail first and skidded across the taxiway. The aircraft rolled three-quarters of a time after reaching the terrain on the other side of the taxiway. The aircraft was destroyed and the crew received serious injuries.

History

The mishap crew was conducting support of combat operations and was selected to provide very important person (VIP) mission support as a team of two aircraft. The crew began their mission day at 1130 beginning with a preflight aircraft inspection where it was noted the aircraft had a diagonal write-up of the No. 2 engine requiring priming prior to start. The diagonal was signed off with a "could not duplicate" annotation. Then, the mishap crew conducted the appropriate briefings and risk assessments for the support mission with a follow-on readiness level (RL) progression training flight under NVG to progress the PI from RL 3.

The aircraft departed and conducted the VIP mission with the mishap aircraft as Chalk 2. Following the completion of the VIP mission, the mishap aircraft began repositioning from a position on the southwest of the airfield to hot refuel. While air taxiing at 50 knots and 60 feet above ground level (AGL), the No. 2 engine oil pressure caution light and master caution illuminated. The PI on the controls announced the light and the IP instructed him to reduce airspeed while the IP attempted to shut down the No. 2 engine. The PI reduced airspeed and entered a descent. While shutting the engine down the IP noticed the descent, rotor droop, and took the controls. Trying to arrest the descent the IP pulled aft cyclic and increased collective pitch, which exacerbated the main rotor droop resulting in the aircraft contacting the ground with a 20-degree nose pitch up attitude and severed the tail wheel and tail cone. The aircraft skidded across a taxiway and entered terrain which hooked the right landing gear. The aircraft rolled 270 degrees right and ended on its side with a destroyed aircraft and serious injuries to all crewmembers.

Crew

The IP had 1,669 hours in MTDS and 1,753 hours total time. The PI had 220 hours in MTDS and 708 hours total time.

Commentary

The aircraft had an emergency occur which was not an immediate action emergency. The IP took immediate action to shut down an engine that was not required. The IP failed to take aircraft control and urgency of the emergency into consideration when assessing the situation. This led to abrupt action and the wrong emergency procedure being executed.

All actions are subordinate to aircraft control during an emergency in an aircraft. The ability to identify and assess the situation when an emergency occurs inflight is paramount to the safety of the crew, passengers, and aircraft. Commanders should take the time to validate their unit training instruction in the simulator and the aircraft. Working with the unit IPs and enlisted standardization instructors (SI), the programs should be designed to facilitate teaching the unit crewmembers to use individual competencies when emergencies occur and to think through the situation. No situation should be "procedural only" with no thought as to action, situation, or possible outcomes. Crewmembers execute what they are trained to do; take the time to train them to think. ■

Class A - C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 14 May 20
	Month	FY 19					FY 20			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	1	1	4	0		2	1	5	0
	November	0	0	3	0		1	1	1	2
	December	1	1	2	0		1	1	2	3
2nd Qtr	January	1	1	0	0		0	0	5	0
	February	2	0	0	0		1	0	5	0
	March	0	1	5	0		1	1	4	0
3rd Qtr	April	0	1	3	0		0	1	1	0
	May	2	2	6	1		0	0	1	0
	June	0	0	5	0					
4th Qtr	July	2	1	2	0					
	August	1	0	3	1					
	September	2	1	8	1					
	Total for Year	12	9	41	3	Year to Date	6	5	24	5
	Class A Flight Mishap rate per 100,000 Flight Hours									
	5 Yr Avg: 1.08		3 Yr Avg: 1.09		FY 19: 1.15		Current FY: 1.14			

UAS Class A – C Mishap Table									as of 14 May 20
	FY 19					FY 20			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	9	2	3	14	W/GE	3	1	2	6
MQ-5	1	0	0	1	Hunter	0	0	0	0
RQ-7	1	12	38	51	Shadow	0	6	12	18
RQ-11	0	0	0	0	Raven	0	0	0	0
RQ-20	0	0	1	1	Puma	0	0	1	1
SUAV	0	0	0	0	SUAV	0	0	0	0
UAS	11	14	42	67	UAS	3	7	15	25
Aerostat	1	1	1	3	Aerostat	2	0	0	2
Total for Year	12	15	43	70	Year to Date	5	7	15	27
UAS Flight Mishap rate per 100,000 Flight Hours									
MQ-1C Class A	5 Yr Avg: 9.56		3 Yr Avg: 9.87		FY 19: 8.77		Current FY: 5.53		
RQ-7B Class A-C	5 Yr Avg: 58.29		3 Yr Avg: 69.64		FY 19: 109.84		Current FY: 97.56		

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

USAAAVS
PRELIMINARY ARMY AIRCRAFT MISHAP DATA
FLIGHTFAX

VOL. 1, NO.4 29 June – 5 July 1973

When Silence Is Not So Golden

A UH-1H with a crew of five was cleared to land and the pilot initiated a descending right turn to base leg. At approximately 400 feet and 60 knots, a loud "screeching" noise was heard coming from the engine section. The aircraft yawed to the right 10 to 15 degrees and then streamlined. The pilot felt the control responses as normal but immediately, and without comment, turned the controls over to the aircraft commander (AC). The AC initiated a precautionary landing and advised the tower of his intentions. As the airspeed dissipated to approximately 40 to 45 knots on the approach, the aircraft began an accelerating right turn, and then started a flat spin to the right. Attempts to regain airspeed were futile, and the crew notified the tower they were going to crash.

The tower operator saw the aircraft hit the ground while in a right spin. It hit first on its left front side and rolled at least twice before coming to rest inverted. Four of the crewmembers received only minor injuries, but the fifth crewmember was killed. The aircraft was a total loss.

Established cause factors involved materiel failure and operation. Evidence indicated that the No. 1 hanger bearing failed in flight, resulting in separation of the tail rotor drive shaft at this location. The bearing showed visible evidence of excessive heat, the ball bearings were deformed and fused, the splined shaft and couplers were stripped, and circumferential marks were found on the forward shaft assembly and fire shield. There was no concrete evidence of maintenance or inspection error at the time of the investigation.

The mishap cause factor lay in the AC's failure to analyze the in-flight problem and his decision to make an immediate precautionary landing. It is reasonable to assume that had the pilot told the AC about the normal control responses, the AC would have examined his options a little closer and possibly have continued flight to the airfield where he could have made a running landing. Golden silence turned to brass when the pilot failed to speak, the AC made a bad decision, and the aircraft was allowed to enter a non-recoverable flight envelope. ■

Editor's note: Although all details of this mishap are not disclosed, a lack of communication between the pilot and the AC led to an incomplete analysis/ diagnoses of the emergency and an improper response.

Mishap Briefs #89

ROTARY WING

Utility
H-60
M Model

- While completing normal shutdown procedures, the aircraft lost alternating current (AC) power and shortly thereafter the auxiliary power unit (APU) failed. Following the aircraft shutdown, the crew observed smoke coming from the APU deck. There were no signs of fire or indication of a fire in the cockpit. On post-flight inspection, the crew opened the APU compartment and discovered the smoke was coming from the APU generator. Suspected seizure of the APU generator would have caused the loss of AC power followed by the APU overheating and its subsequent failure. (Class C)

UNMANNED

MQ-1
C- Model

- During mission operations, wind speeds changed to conditions which were more than the aircraft vehicles (AV) limitations. Winds out of AV limits were not forecast to be experienced in the operations area until after the mission was complete but during a weather update, the winds had already exceeded AV limitations while the mission was ongoing. Due to the unexpected high winds and there duration in the area exceeding the AV remaining fuel duration, the aircraft commander (AC), company commander and battle captain decided to return the AV to base and land. The aircraft made seven attempts to land with different operators but conducted wave-offs due to the inability to maintain runway alignment as the winds continued to blow the AV off the runway and over the dirt. On the eighth landing attempt, the AC made the decision to have the aircraft land in the dirt as the winds continued to increase in speed (winds were 140 at 27 knots gusting 34). The AV successfully landed in the dirt. During the landing rollout, the aircraft automatically attempted to correct to the runway centerline and the nose wheel impacted a runway light resulting in the nose landing gear shearing off the aircraft. The nose of the AV impacted the ground destroying the payload. Additional damage occurred to the synthetic aperture radar radome and diagonal tails due to flying debris when the nose impacted the ground. The AV came to rest within five feet of the runway with the right-wing was over the runway. (Class B)

RQ-7B
V2

- The AV flew for approximately one hour before abnormal engine parameters occurred that were indicative of a potential engine failure. The crew immediately began recovery procedures flying toward the launch and recovery site (LRS). While attempting to enter a takeoff and landing system (TALS) loiter, the AV was unable to maintain airspeed above the minimum required to acquire TALS track for landing. Following the second wave-off, while in the loiter holding, the AV engine failed while on its outbound heading. The AV operator released the onboard parachute immediately after confirming the engine had failed. The AV impacted the ground approximately one mile north of the runway. Local pre-accident plan procedures were executed and the aircraft was recovered without further incident. (Class C)

Flightfax

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EMERGENCY RESPONSE METHODOLOGY

Let's look at the emergency response methodology which is being integrated into our aircrew training manual (ATM). The purpose of this methodology is to establish a set of common operating procedures suitable to all rotary-wing airframes found within the Army aviation branch. This methodology adds to Army aviation ATM Task 1070 a simple method to manage crew emergency response and supports commonality among all airframes. Let's get a brief introduction to the methodology.

FADEC-F

What does FADEC-F mean? It has nothing to do with full authority digital engine control which is FADEC.

FADEC-F is a mnemonic which takes crewmembers through a sequence of steps in order to manage any emergency procedure. FADEC-F stands for:

F - Fly the aircraft.

A - Alert the crew to the problem.

D - Diagnose the emergency condition or system malfunction.

E - Execute the emergency procedure.

C - Communicate.

F - Fly the aircraft.

Once FADEC-F is incorporated into the ATM for each airframe, it will give aviators and nonrated crewmembers (NRCM) a sound methodology to assist them in successfully responding to any emergency procedure in a standardized method. The methodology is further incorporated into adjustments to Task 1070 Respond to Emergencies.

In the adjusted Task 1070, the common standards have the addition of actions broken down by rated and NRCM. This makes standardized actions clear and concise for crew actions and responsibilities. Certainly a revolution in standardization across all Army airframes, the methodology was built using statistical analysis of mishap data by the United States Army Combat Readiness Center (USACRC) and a working group made up of team members from the: Directorate of Evaluations and Standardization (DES), Directorate of Training and Doctrine (DOTD), United States Army Aeromedical Research Laboratory (USAARL), Aviation and Missile Command (AMCOM), Special Operations Aviation Regiment (SOAR), aircraft Program Management (PM) office, and USACRC aviation division.

While to some the FADEC-F method may seem like just a common-sense procedure, aircraft mishap data shows that it isn't. Army training systems are developed with standards and standardized procedures to take as much human error out of a task as possible. The integration and use of the emergency response methodology, FADEC-F, provides aircrews with a standardized method to effectively handle emergencies when they arise. It incorporates the total crew into managing the emergency and spells out actions for rated and NRCM which culminate in the response being handled correctly and all crewmembers being situationally aware of what is occurring during the emergency.

5 Questions

1. What does each letter of FADEC-F stand for?
2. What does FADEC-F methodology provide rated and NRCM during an emergency response?
3. Is FADEC-F a standardized procedure? Yes or No?
4. FADEC-F is only for the rated crewmembers. True or False?
5. Have you looked over your aircraft-specific ATM within the past 30 days? Yes/ No?

TASK 1070

Respond to Emergencies

CONDITIONS: In a rotary wing aircraft, you encounter a specific emergency, warning, caution, or advisory.

STANDARDS: Appropriate common standards and the following additions/modifications:

1. RCM.
   a. Conduct the Emergency Response Method (fly, alert, diagnose, execute, communicate-fly [FADEC-F]) upon recognition of an emergency.
   b. Identify the emergency condition or system malfunction.
   c. Conduct the emergency procedure.
   d. Select a suitable landing area, if required.
2. NRCM (if applicable).
   a. Assist in identifying the emergency condition or system malfunction.
   b. Assist in the conduct of the emergency response method.
   c. Assist in confirming the suitability of the landing area, if required.
   d. Prepare the aircraft and passengers for an emergency landing.
   e. Evacuate passengers to designated assembly area.

DESCRIPTION:

1. Crew actions. The urgency of certain emergencies requires immediate and instinctive action by the P*. The most important single consideration is helicopter control. All procedures are subordinate to this requirement.

a. The P* will accomplish steps that must be performed immediately and instinctively in an emergency situation to maintain helicopter control. Those steps that are underlined in the CL must be performed from memory.

b. When the crew identifies an emergency or system malfunction they will conduct the emergency response method below (FADEC-F):

(1) **F** – Fly the aircraft. The most important single consideration is aircraft control. Aircrew's should consider jettisoning external stores and external cargo (if required) to establish or maintain a safe flight profile. Disengaging from coupled flight may assist in maintaining the aircraft within operating limits. Aircrew's should place the aircraft in a single engine profile, or safest flight profile that the conditions permit, any time there are indications that could result in the eventual failure of one or both engines. The P* will adjust the flight controls as necessary to achieve the following:

- Safe rotor speed. N_R stabilized and within aircraft limits. When continued flight is in question, due to a loss of rotor RPM or reduction of available power (as a result of equipment malfunctions or environmental conditions), the immediate corrective action should be to adjust collective to maintain N_R within limits.
- Safe attitude. Level the wings on the attitude indicator or appropriate symbology.
- Safe altitude. If able, level off or climb (as necessary), unless descending as a result of the emergency.
- Safe speed. Achieve safe single engine airspeed if possible or achieve the best airspeed to maintain the minimum rate of descent or best autorotation airspeed for the situation.
- Safe heading. The aircraft should be oriented toward a landing area and away from danger.

(2) **A** – Alert the crew to the problem. While aircraft control is the primary concern, it is important to near simultaneously alert the crew to the emergency condition.

(3) **D** – Diagnose the emergency condition or system malfunction. Malfunction analysis should be conducted using the helicopter indications, the current CL, and input from both RCM and NRCM as applicable. The cockpit indications may be preceded or accompanied by unusual helicopter vibration, abnormal control actions, or a change in ambient helicopter noise.

(4) **E** – Execute the emergency procedure. Crews will accomplish underlined steps from memory, when time does not allow the use of the checklist, or it's use becomes a hazard to flight. All other steps will be accomplished utilizing the current helicopter CL.

(5) **C** – Communicate. The PIC will communicate a plan of action to the crew (e.g. landing plan). The crew will then communicate outside of the aircraft as necessary (e.g. MAYDAY call).

(6) **F** – Fly the aircraft. The P* will remain focused outside and continue to maintain control of the helicopter until the completion of the emergency or safe landing, shut down, and egress.

c. The P will perform as directed or briefed. If time permits, the P will verify all actions with the aircraft checklist as well as assist in executing the emergency response method (FADEC-F).

d. The NRCM will assist the crew in malfunction analysis by explicitly relaying indications of an emergency situation from their crew station. They will then assist as directed during the conduct of the rmergency response method. The NRCM will prepare passengers for an emergency landing. During the descent, the NRCM will assist in identifying a suitable landing area as applicable. After landing, the NRCM will assist in evacuating the passengers to the designated assemble area. After accounting for all crewmembers and passengers, the NRCM will assist the other crewmembers in any follow-on actions.

2. Procedures. Perform the Emergency Response Method (FADEC-F), conduct the appropriate emergency procedure IAW the appropriate operator's manual, and safely land the aircraft.

NIGHT OR NIGHT VISION GOGGLES CONSIDERATIONS: Take special precautions to identify the correct switches/levers when performing EPs at night or while wearing NVD.

TRAINING AND EVALUATION REQUIREMENTS:

1. Training will be conducted in the helicopter, TFPS, SFTS or FS, and academically.
2. Evaluation will be conducted in the helicopter, TFPS, SFTS or FS, and academically.
3. During the conduct of annual standardization evaluations, NVG evaluations, and PFE's a crewmember must respond to a minimum of three (3) emergency procedure scenarios in the helicopter, (or if authorized) TFPS, SFTS or FS. Emphasis should be placed on selecting critical emergencies that require immediate and instinctive action by the pilot such situations involving the loss of Nr, loss of engine(s), and fires.

REFERENCES: Appropriate common references, AR 95-1, aircraft current operator's manual and CL.

STACOM Message 20-01

Shared Rotary Wing Task 1070
Respond To Emergencies Implementation Guidance

This STACOM establishes implementation guidance for shared rotary wing task 1070, Respond To Emergencies, published in the 2020 Aircrew Training Modules (ATM). This implementation guidance is not applicable to the Fixed Wing and UAS communities.

TRAINING REQUIREMENTS: Unit Standardization personnel will self-start and initiate the training requirements listed in this STACOM for their units.

Academic training: Academic training will be led by unit standardization personnel utilizing the exportable training package for the implementation of task 1070. Trainers will familiarize themselves with the training material, to include the instructor notes, prior to administering. The exportable training package can be downloaded from the link below or by navigating to the DOTD Flight Training Branch page on AKO 2.

Emergency Response Method Training Package

Flight training: Task 1070 incorporates the Emergency Response Method (FADEC-F) which provides crewmembers a structure to systematically respond to emergencies. To meet the standards listed in task 1070, a crewmember must apply the emergency response method, not just recite an emergency procedure.

All ACM will receive a one hour flight, preferably in a SFTS, to practice the application of the Emergency Response Method and to demonstrate their ability to perform the new task 1070 to standard. The mode of flight is at the trainer's discretion. The SFTS enhances the ability to replicate emergency conditions and improves the quality of training. Training and evaluation may be completed in an aircraft for NRCM and RCM if there is no access to a NCM3 or SFTS.

Standardization personnel will select a minimum of three emergency scenarios to train and evaluate task 1070. The scenarios chosen should range from critical emergencies that require immediate and instinctive reaction from the pilot to maintain aircraft control to less urgent scenarios that involve more extensive diagnosis and use of the aircraft checklist.

DOCUMENTATION REQUIREMENTS: Successful completion of the academic and flight training will be recorded on the crewmember's DA Form 7122. Units will create the following custom CAFRS entry; "Task 1070 implementation complete." The grade, aircraft, and associated flight or simulator time will be annotated on the entry.

TIMELINE: All ACM will complete this implementation guidance by 31 OCT 2020. ACM who have not completed this implementation guidance will be designated RL3. All ACM integrated after 31 OCT 2020 will comply with this STACOM prior to being designated RL2. Commanders should consider crewing ACM who have implemented task 1070 together although it is not mandatory. The pilot in command will direct the conduct of the crew during an emergency if a crewmember has not implemented task 1070. This STACOM will remain in effect until it is rescinded.

The POC for this STACOM is the Directorate Standardization Officer, at 334-255-1582 DSN 558-1582 or email robert.s.slider.mil@mail.mil.

Standardization communications (STACOMs) are prepared by the Directorate of Evaluation and Standardization (DES), U.S. Army Aviation Center of Excellence, Fort Rucker, AL 36362-5208, DSN 558-2603/9098. Information published in STACOMs may precede formal staffing and distribution of Department of the Army official policy. Information is provided to commanders to enhance aviation operations and training support.

JAMIE R. LAVALLEY
LTC, AV
Director of Evaluation
and Standardization

What's the RUSH

If an aircraft emergency occurs in flight, know your actions:

- All actions are subordinate to aircraft control
- Take immediate action underlined steps (procedural)
- Use individual competencies to think through the emergency

Be trained and prepared, know your aircraft PPC data, and don't turn a "land as soon as practicable" into an aircraft mishap.

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