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CHILL OUT!

Operating in cold weather environments

ERGONOMICS EFFECTS ON UAS DEPLOYMENT

PE UPDATE

Aviation Safety

+ MORE

Engine Flame out

Faulty spray nozzle in wash rack lines up with fuel vent and leads to unexpected consequences

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LESSONS LEARNED



4. Ergonomics and the future of aviation

By Lt. Bartley O'Toole, VUP-19

8. Chill out! It's just snow

By AWSCS Aaron Hutchinson, NAVSAFECOM

10. Dome in the Funnel - Unlocked

By Lt. Mike Morales, HSM-75

11. Know Your Boldface

By Lt. Cmdr. Kelcey Crusier, VQ-4

12. Back to the Basics

By Lt. Cmdr. Colleen Johnson, VQ-1

14. Groove Awareness

By Lt. Keith Chaney, VT-10

16. 'Skip the 4 Wire, Bolter'

By Anonymous

18. Not Another Day in Paradise

By Lt. Spencer Vance, VQ-1

20. Save the Seals!

By Lt. Cmdr. John Isso and

Lt. Cmdr. Nick Jones, VT-86

22. Cold Weather Ops

By Lt. j.g. Kyle Seniff, VP-45

24. Wash Rack Geyser

By Lt. Catherine O'Donnell, HSM-75

26. Slow Down

By Lt. Cmdr. Adam Howe and

Lt. Cory Ayers, VP-4

28. PE Corner

By Lt. Cmdr. Philip DeNicola,

NAVSAFECOM

30. Bravo Zulus

8



10



12



16



18



22



28



30

BRAVO
ZULU

Aviation Boatswain's Mate (Equipment)
1st Class Aaron Wilson, assigned
to USS Gerald R. Ford's (CVN 78) air
department, stands watch as the
arresting gear officer as an F/A-18E
Super Hornet, attached to the "Golden
Warriors" of Strike Fighter Squadron
(VFA) 87, prepares to land on the flight
deck, April 19, 2022. (U.S. Navy photo
by Mass Communication Specialist 2nd
Class Zachary Melvin



ERGONOMICS AND THE FUTURE OF AVIATION



By Lt. Bartley O'Toole, VUP-19

When one thinks of ergonomics, often the first thoughts are of office settings, such as the height of a chair, how closely someone is sitting to the computer screen or the shape of the keyboard and mouse. These are all examples of classic ergonomic office concerns. Merriam-Webster defines ergonomics as “an applied science concerned with designing and arranging things people use so that the people and things interact most efficiently and safely.”

As naval aviators, individuals often disregard the importance of ergonomics in their workplace and think of ergonomics almost entirely as it relates to comfort on the ground. However, based on the definition above, ergonomics is actually rooted in the idea of efficiency through safety. For most individuals this idea applies to office settings; however, in aviation this concept is a crucial part of safe and successful mission

execution. The seven principles of display design address the manner of an aircraft's cockpit design and arrangement, as well as the information and its legibility as it relates to the safe operation of the aircraft (Tsang, Vidulich 2003).

The MQ-4C Triton is unique in that it is an unmanned aerial vehicle (UAV), and as such, it has the ergonomic needs of both an aircraft and an office setting. While not all seven principles of display design apply to MQ-4C operation, those that do play an important role in the development of future unmanned aerial systems.

The principle of information need rests on the idea that the amount of information given to pilots should be just enough to perform the operation or procedure safely (Tsang, Vidulich 2003).

Too little information leaves the pilot guessing, while too much information causes error through task saturation or information overload. Regarding the MQ-4C, the latter is normally the issue. This premise stems from the MQ-4C being built based on the RQ-4 Global Hawk, which is often referred to as a generation one, or early generation UAV. This means the aircraft has an inability to think for itself during an emergency. When the MQ-4C senses a malfunction, due to its inability to pinpoint the exact cause of the malfunction, the aircraft simply shows the fault code for each affected component. This often leads to what is known as a cascading fault, where one specific system failure will trip multiple – often 10 or more – fault codes, or master warning/master caution lights.



U.S. Navy photo by Mass Communication Specialist 2nd Class Nathan T. Beard

Example 1

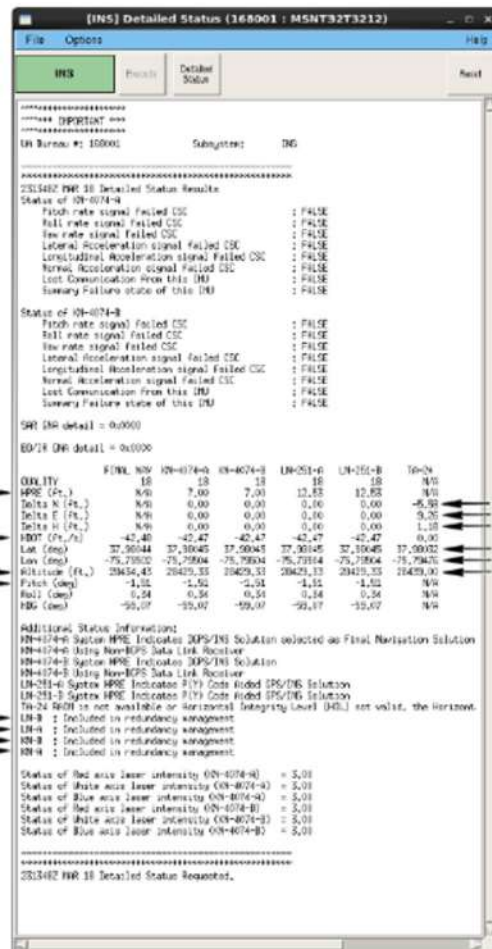
When this occurs, the pilot must cycle through each of the fault codes individually in an attempt to find and diagnose the source malfunction. This series of events can lead to an incorrect initial diagnosis of the malfunction or delayed procedure completion as many of the more serious malfunctions are illuminated in yellow, while some of the less serious malfunctions are often illuminated in red. See **Example 1**.

Active Fault Status (168001 : MSN1stFlight)					
File		Update		Last Update: 16 049 16:15:22	
				Message 3 of 3 Received	
Time of Update	Subsystem	V	Code	Severity	Message
16 049 16:15:22	RAD ALT		030	WARNING	Radio Altimeter Difference Fault
16 049 16:15:22	RAD ALT		031	WARNING	Radio Altimeter (Either) Failed due to Range/Rate, FTZ, or IBIT while on ...
16 049 16:15:22	RAD ALT		032	WARNING	Radio Altimeter Bias Fault when radio alt. A= radio alt. B > 10 ft, WOW "T...
16 049 16:15:22	ACTUATORS		004	CAUTION	Brake test failure on channel A. Surface not stowed or brake did not en...
16 049 16:15:22	ACTUATORS		007	CAUTION	Brake test failure on channel B. Surface not stowed or brake did not en...
16 049 16:15:22	ACTUATORS		010	CAUTION	Right inner ruddervator CSC failure on channel A.
16 049 16:15:22	ACTUATORS		011	CAUTION	Left inner ruddervator CSC failure on channel A.
16 049 16:15:22	ACTUATORS		012	CAUTION	Right outer ruddervator CSC failure on channel A.
16 049 16:15:22	ACTUATORS		013	CAUTION	Left outer ruddervator CSC failure on channel A.
16 049 16:15:22	ACTUATORS		020	CAUTION	Right inner aileron CSC failure on channel A.



The U.S. Navy is using UAVs in the maritime environment, and by studying the effect of ergonomics on UAS employment, we can ensure future generations of UAVs are better able to carry out crucial missions safely and effectively.

Example 2

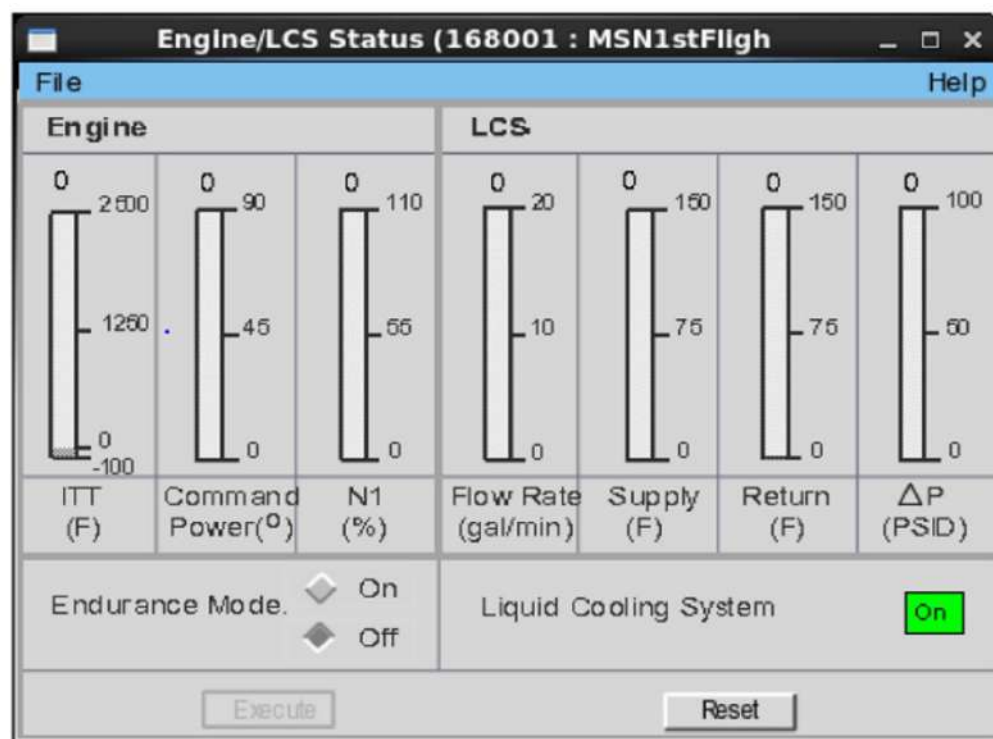


The principle of legibility is another concern on the MQ-4C. When a malfunction occurs, many checklists call for the pilot to check the associated detailed status. The pilot completes this by using a mouse to select the malfunctioning system and execute a detailed status pull. Once this is done, a new page appears on the screen with the textual data associated with that system. The data is written in computer code that the pilot must decipher. Furthermore, this tedious task may lead to a loss of situational awareness and can be a hindrance regarding crew resource management. See **Example 2**.

Display integration, proximity compatibility and pictorial realism are all issues associated with the MQ-4C, especially regarding the Engine/LCS (liquid cooling system) Status display. This display is a snapshot of how the engine is operating.

In most modern aircraft, the engine temperature gauge has associated colors depending on the temperature of the assessed component. The MQ-4C's inlet turbine temperature (ITT) status display is a tape-style depiction with no color association. Instead, it simply shows up as dark gray, regardless of the ITT's temperature. This makes it difficult for pilots to spot an impending engine malfunction or over-temperature. See **Example 3**.

Example 3



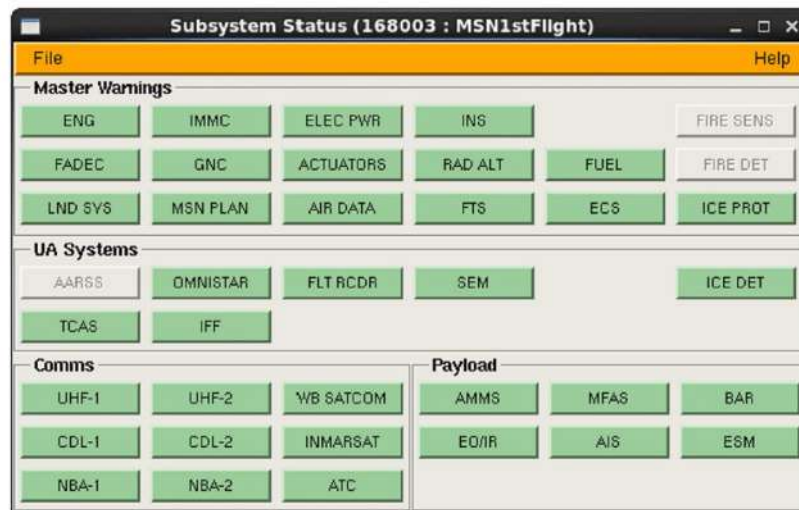
Regarding the principle of the moving part, the MQ-4C is unique. Traditional aircraft give you a constant representation of the aircraft's altitude, attitude and pitch. As the MQ-4C is unmanned, all display information is sent from the aircraft to displays via a wideband satellite communication link, which means there is a delay of one to five seconds between what the operator sees and what the aircraft is actually doing. This delay creates the illusion that the aircraft is "stepping" between altitudes, when the aircraft is actually in a constant climb or descent. This is especially troublesome when communicating with air traffic control (ATC) during takeoff, departure and arrival.

Predictive aiding is also a constant battle during MQ-4C operation. Since the UAV is operated using satellite communication, pilots must continually think how the aircraft will perform in case they "lose link," or the ability to command the UAV. When this happens, the UAV will fly a pre-loaded route to attempt to reach its landing field. However, this also means pilots can no longer see where the aircraft is on their maritime tactical displays (MTD).

The MTD displays the UAV's Contingency 1, or Lost Link route, but pilots must use time and distance calculations based on the true airspeed the aircraft was flying when the loss of link occurred. This can be very difficult, especially when attempting to communicate aircraft position while on an oceanic clearance outside ATC radar coverage. Once the aircraft is within UHF line of sight range, the pilots usually regain link with the aircraft, and the position will once again be displayed on the pilot's MTD. This usually occurs about 200 nautical miles, or 230.15 miles, from the destination airfield.

The last principle, the principle of discriminability, is also applicable to the MQ-4C. Much of the information required to safely operate the MQ-4C is not readily available to the pilots. For instance, if a master warning or master caution pertaining to the engine system annunciates, the pilot must click the ENG button on the subsystem status display, execute an ENG detailed status and then scroll through the material for the desired information. This can lead to incorrect malfunction diagnoses or delayed checklist completion. This also takes the pilots' focus away from the most important aspect of handling an emergency, which is to aviate. For

Example 4



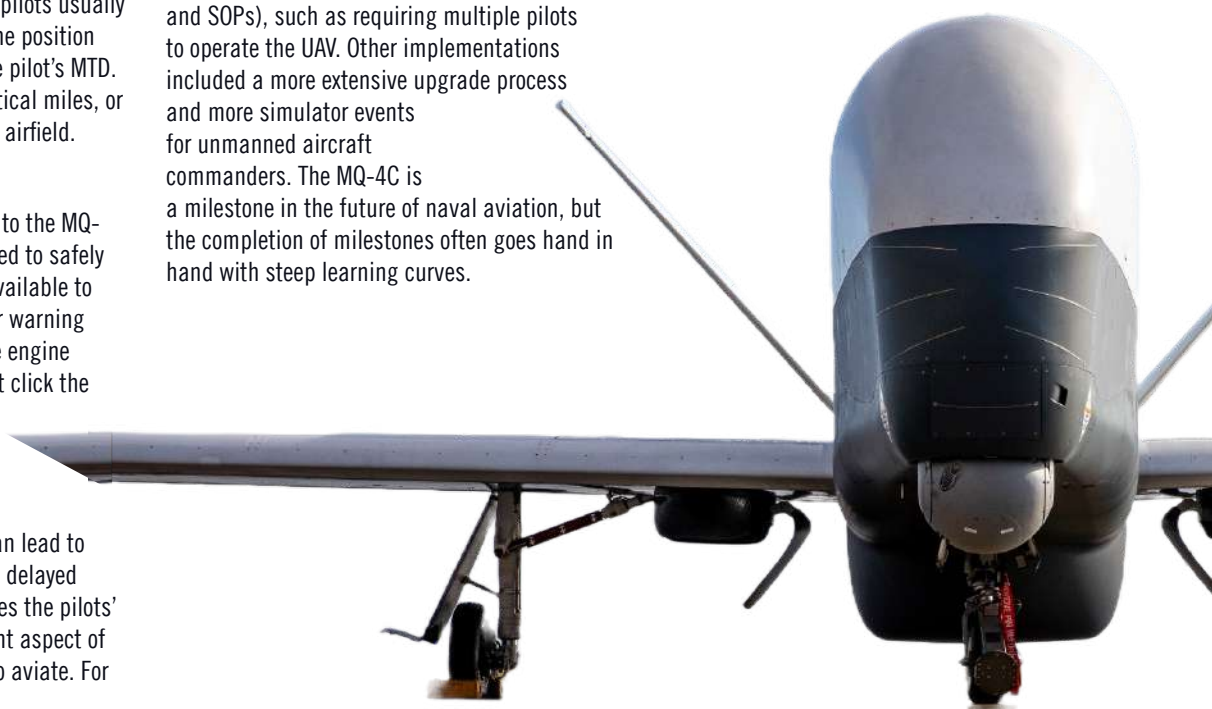
this reason, while the MQ-4C was designed as a single-piloted UAV, the current Naval Air Training and Operating Procedures Standardization (NATOPS) and standard operating procedure (SOP) guidance requires a minimum of two pilots to operate the UAV at all times, Example 4.

The examples illustrate the crucial role ergonomics play in safely and effectively operating UAVs. Although the MQ-4C Triton reveals multiple ergonomic flaws, the discovery of these drawbacks has led to implementing multiple mitigations to combat these shortcomings.

Some of the precautions are procedural (NATOPS and SOPs), such as requiring multiple pilots to operate the UAV. Other implementations included a more extensive upgrade process and more simulator events for unmanned aircraft commanders. The MQ-4C is a milestone in the future of naval aviation, but the completion of milestones often goes hand in hand with steep learning curves.

More often, the U.S. Navy is using UAVs in the maritime environment, and by studying the effect of ergonomics on UAS employment, we can ensure future generations of UAVs are better able to carry out crucial missions safely and effectively.

U.S. Photo by Mass Communication Specialist 2nd Class Nathan T. Beard



CHILL OUT!

IT'S JUST SNOW

While operating in the cold weather environment, maintenance support personnel, aircrew and aircraft will all face numerous hazards due to their direct exposure to the elements. If managed correctly, operations can be executed without significant impact on the mission while keeping maintenance support personnel and flight crews safe and aircraft fully mission capable. However, occasionally Mother Nature will prevent missions from launching, as NATOPS restrictions are in place for a reason. Proper identification of “no-go” criteria and adhering to policies in place for cold weather operations will further assist in preventing a mishap. How squadrons prepare to meet these challenges will ultimately determine their success or failure when tasked to meet mission requirements while balancing personnel safety.

Proper command preparation can begin with early identification of the intent to operate in a cold-weather environment. Too often, commands are reactive to tasking, placing them behind where they need to be to succeed and operate safely and effectively. Once the requirement to work in the cold weather environment is identified, initial or refresher training should be conducted to ensure all hands are familiar with applicable cold weather operations policies and practices that may be used. Conducting practical drills or scenario-based walk-throughs are great opportunities to validate training and help shift the mindset of how the command will operate.

**By Senior
Chief Naval
Aircrewman
(Helicopter)
Aaron
Hutchinson,
NAVSAFECOM**

Conducting an accurate inventory of gear and equipment is very important. Generally, the supply chain does not always allow commands to equip themselves promptly, so the sooner you know what you need to operate in cold weather, the better. This preparation can range from aircraft components to support de-ice, engine anti-ice and environmental control systems (ECS) to climate-appropriate clothing for aviators and maintenance personnel. Often, cold weather clothing is passed down and is not always

readily available. Identifying the serviceability of current gear and the requirement for new equipment will help ensure everyone can safely and effectively operate.

Additionally, wing-level financial support or augments can take the burden off the operational squadron having to prioritize funding to support these requirements at the sacrifice of other needs.

Environmental impacts on flight operations can cause a lot of known and unknown risks. Flight



U.S. Marine Corps photo by Capt. Katrina Herrera



U.S. Navy photo by Mass Communications Specialist 3rd Class Benjamin Ringers

crews must receive accurate weather briefs with updated forecasting information to mission plan appropriately. Establishing a “no-go” criteria that is reached before the NATOPS limitation will provide aircrew with a margin of safety when weather forecast change. In non-climate-controlled aircraft, aircrew are directly exposed to the elements. Even with the best cold weather gear, aircrew can reach the point of incapacitation, and often, because of perceived pressure, they may not speak up. If this point is reached, there should be no hesitation or fear of reprisal, as continuing could jeopardize the entire crew’s safety. Establishing a culture that allows for the ability to speak up without reservation is critical to the safety and success of the crew and mission.

When operating in a cold weather environment, the presence of icing and snow is pervasive. When these conditions present themselves, squadrons must be prepared to execute required maintenance to aircraft. This maintenance can include ensuring de-ice, anti-ice and ECS are operable, along with any other required aircraft systems. Additionally, before preflight, all ice and

Space permitting, aircraft should be stored in a hangar if possible to help preserve it; this will also lighten the workload on maintenance crews and reduce their exposure to the elements.

snow must be cleared off the aircraft fuselage and flight control surfaces. When clearing off ice and snow, there are specific requirements to be followed, which may vary by type/model/series. Also, slip hazards are extremely dangerous and very predominant in these conditions. Both flight crews and maintenance personnel should be highly cautious while walking on and around the aircraft. Ensure applicable fluids are serviced with cold weather additives if temperatures require. Lastly, if hangar space is available for use, aircraft should be stored in a hangar to help

preserve it; this will also lighten the workload on maintenance crews and reduce their exposure to the elements.

While squadron leadership owns much of the risk management process, it falls on all hands to support a climate of safety. Supervisors and fellow personnel need to be aware of the “cocoon effect,” a phenomena where people in extreme cold weather, bundled up in layers of clothing, begin to physically and mentally withdraw from the task at hand. This phenomena not only negatively affects the mission, but mental isolation, confusion and loss of coordination are often early indicators of hypothermia.

To remain operationally effective in cold weather environments, aircrew must protect themselves by proper planning and engaged leadership. By ensuring appropriate training is conducted, gear and equipment are available and serviceable, accurate mission planning is performed and engaged supervision is present during mission execution, units will significantly help mitigate the risks associated with operating in cold weather environments.

Dome in the Funnel ... Unlocked!

By Lt. Mike Morales, HSM-75

My L2 anti-submarine warfare (ASW) tactical evaluation (TACEVAL) was scheduled near San Clemente Island (SCI) against a MK-30 submarine training target. Assets included three MH-60Rs from two squadrons loaded with four MK-54 recoverable exercise torpedoes (REXTORPs), dipping sonars and sonobuoys.

Once up and ready, the section worked through troubleshooting and was off deck shortly but at different times. During the transit it became obvious that we would be first on range and the other two helicopters would follow staggered 15 and 45 minutes behind.

With a green range, the fight was on and the first two helicopters conducted passive-to-active ASW tactics. We successfully localized, tracked and identified the target in short order and immediately transitioned for attack. After our playmate's REXTORP drop, they expanded our passive sensors and repositioned to a dip for re-attack. With contact established by our playmate, we called for "Up Dome" and as the sonar broke the surface, error code 1174 (ESD sequence fail) appeared and the dome submerged light failed to extinguish.

After the helicopter aircraft commander (HAC) confirmed our dome was stopped just above the surface, we increased altitude to 100 feet to avoid damage during troubleshooting. With a hung dome, we aborted our attack run and told our playmate they were on their own for a while. We broke out our checklists, established a 1,100 pound bingo to SCI's airfield and started working the problem.

The communications from back to the front intensified, but it wasn't overwhelming. I followed the checklist up front and asked questions when necessary to ensure no steps were missed in the back. After 20 minutes



The sonar dipping transducer of an MH-60R Seahawk, attached to the "Saberhawks" of Helicopter Maritime Strike Squadron (HSM) 77, assigned to USS Shiloh (CG 67) is hoisted during an subsurface detection exercise evolution, June 23, 2021. (U.S. Navy Photo by Mass Communication Specialist 1st Class Rawad Madanat)

our aircrewman was able to get the dome into the aircraft, but was unable to lock the dome or get a seated light. We encountered persistent 114C (stress sensor fail), 126C (sonar cable tension too low) and 1367 (locking device fail) codes.

After going through the same checklists two more times, we agreed to terminate the training event and return to the airfield for troubleshooting on deck. Halfway through the 25-mile transit, our aircrewman got a "Slip" indication and noted the dome was starting to leave the funnel. The HAC quickly transitioned the aircraft to a hover and we went through the checklist again. Still unable to lock or seat the dome, we continued the transit to the airfield with our aircrewman keeping the dome in the funnel using the auxiliary hydraulic hand wheel.

Once safe on deck, cycling computer power, mission power and appropriate circuit breakers produced the same results. With crew day limits on the horizon, a technician was sent out to assist. The maintenance inspection revealed a broken locking harness, broken retention nut and a malfunctioning transducer. We removed the reeling machine front panel, placed the dome in the cabin and returned to North Island uneventfully.

While I didn't get to drop a REXTORP or complete my TACEVAL, I did gain invaluable experience fighting the aircraft and developing crew resource management. That day we left focused on an ASW mission, but it quickly transformed into a materiel preservation mission. Communicating clearly and keeping a level head helped us bring it home safely.

An MH-60R Sea Hawk from the "Blue Hawks" of Helicopter Maritime Strike Squadron (HSM) 78 takes off from the flight deck of USS Chafee (DDG 90) in preparation for Anti-Submarine Warfare training exercises, July 9, 2021. (U.S. Navy photo by Ens. Alexandra Parent)





KNOW YOUR BOLDFACE

By Lt. Cmdr.
Kelcey Crusier,
VQ-4

It was a standard VQ training (T) flight profile from our home station at Tinker Air Force Base, Oklahoma. The crew completed their preflight and commenced engine starts without incident.

Upon receiving clearance to taxi to the active runway and taxiing out of spot, the flight engineer (FE) noted erratic indications on the hydraulic quantity gauge. The gauge would increase or decrease rapidly without reason, occasionally circling around through electronic zero, which was obviously a problem. The aircraft commander (AC) sat in the left seat - an unusual location as the AC normally sits in the right seat, and the copilot (CP), who normally taxis from the left seat, chose to taxi back into spot to get some maintenance support.

Once the crew circled around to park, the AC noted over the internal communication system that he needed to maintain a right turn with the nosewheel steering to maintain centerline, something abnormal but completely controllable. Upon reaching the parking spot and after receiving direction from the plane captain to execute a left 90-degree turn to line up with the centerline of the spot, the AC put in a full left turn with the nosewheel steering

tiller and pulled all four engines to idle.

In anticipation of completing the 90-degree turn, the AC started to straighten out the nosewheel steering but was unable to do so. Looking down, the AC noted the nosewheel steering was stuck fully to the left and quickly applied brakes while simultaneously stating he could not stop the left turn and was getting on the brakes. The CP also applied brakes and quickly scanned the engine instruments, and verbalized the No. 4 engine was accelerating even though the throttles were at idle.

At this point, the aircraft was accelerating through the 90-degree point of the turn, and pointing directly toward a power island and another E-6B. It was now in an uncontrollable left turn on a busy and crowded parking ramp, being pushed by approximately 24,000 pounds of thrust without steering or brakes. The AC immediately called out for the

emergency engine shutdown checklist of the No. 4 engine. The CP and FE quickly executed their "bold-faced items," shutting down the engine and bringing the aircraft to a stop. At this point, the aircraft was a full 45 degrees off centerline, and stopped just short of the adjacent power island.

Maintenance later discovered the No. 4 engine throttle cable had snapped under tension, causing an internal lever for the main engine control to swing forward to nearly full open, demanding maximum thrust. Without that cable, the cockpit had no control of that engine. Fortunately, the ability to execute time-critical decision-making skills in a stressful environment allowed the crew to bring the aircraft to a stop without damage or injury to the aircraft or personnel. The crew's attention to detail, textbook procedural knowledge and excellent crew resource management saved the day, and this is a good example of why naval aviation emphasizes the importance of these skill sets.

BACK TO THE BASICS

By Lt. Cmdr. Colleen Johnson, VQ-1

The mission was to reposition an aircraft from Naval Air Station Whidbey Island, Washington, to Naval Support Activity (NSA) Souda Bay, Greece, a task we regularly undertake in VQ-1 to maintain our constant forward-deployed presence, 365 days a year. To successfully reposition an aircraft, meticulous planning and coordination is required between numerous entities. This was my first reposition flight as the electronic warfare aircraft commander in almost two years, as I was in a down status while pregnant and after giving birth to my son. Needless to say, I was slightly nervous I would miss something critical in the planning phase, but thankfully I had my crew to help me.

We spent a week researching the Foreign Clearance Guide, confirming our flight routes and clearances, PPRs, classified support, and room reservations.

Additionally, we had to take extra precaution to ensure we were in compliance with Department of Defense, U.S. Navy and theater commanders' COVID-19 protocols.

Our first leg of the trip went smoothly, and we arrived on time in Naval Air Station (NAS) Patuxent River, Maryland.

Our second leg of the trip was a transatlantic flight from NAS Patuxent River to NSA Souda Bay. Crossing the Atlantic Ocean is a major accomplishment for any aircraft, but especially for the EP-3E. Our max cruising altitude is 28,000 feet. However, that is only if we are lucky enough to have our pressurization system hold the cabin altitude below 10,000 feet at that altitude. Flying a lower profile compared to the airliners means we have to constantly hawk our fuel consumption, winds and distance to divert airfields as we cross the pond.

The night before this flight, a storm warning was issued for Tropical Storm Zeta, previously downgraded from a hurricane. We had planned to depart at 4 a.m. local time to arrive in Rota, Spain, at 6:30 p.m. local time. As we watched the storm progress the night before, we decided to postpone our takeoff time to 9 a.m. to avoid an

unnecessarily long preflight and extended crew day.

Our crew of 11 arrived at the airplane at 7 a.m. to begin preflight. Our flight station personally met with the weather forecaster to discuss the storm's path and a few concerning significant meteorological activities (SIGMETs) along our route for severe turbulence. Additionally, there were a few areas of moderate icing. Using our anti-icing systems in the EP-3E increases our fuel burn by about 500 pounds an hour. We delayed our takeoff by two additional hours to let the outer bands of Zeta pass north, and were now four hours into our crew day with a projected 9.5-hour flight to Rota.

We taxied to the active runway after our weather delay, and during taxi our internal communication system (ICS) began to malfunction. We were unable to talk to each other. We decided to taxi back to the transient line, shut down and call our aviation electronics technicians (ATs) out to troubleshoot.



U.S. Navy photo by Dan Rachal

In true EP-3E fashion, the ICS gremlin was no longer present as soon as the ATs arrived. We updated our weather brief and proceeded back to the active runway. As we approached the hold short, the ICS began to reset every two seconds. The gripe now affected our radios, which caused us to miss our takeoff clearance. Frustrated, we again taxied back to the line for additional troubleshooting. With the ATs back onboard, once again the malfunction could not be replicated. We were now approaching a five-hour preflight. Our standardization notes require us to complete a risk management assessment with the entire crew once we exceeded a five-hour preflight. We addressed the weather en route, general fatigue level, and potential ICS issues. The tropical storm was completely north of our flight path, and we altered a few of our points to avoid the SIGMET for severe turbulence. Everyone felt rested, and we made a plan to alternate the four pilots and two flight engineers to provide ample rest time for everyone.

At 1 p.m., six hours into our crew day, we

finally departed NAS Patuxent River to arrive in Rota at 3:30 a.m. Fortunately, the radios and ICS system only dropped a few times and then worked for the majority of our flight. However, it was only the beginning of a few minor malfunctions that would contribute to our overall fatigue.

Thirty minutes into flight, the pilot's navigational data and attitude information were lost; indicative of a RINU-1 failure. A RINU-1 failure is a relatively minor malfunction; however, it is required for flights outside of navigational aid (NAVAID) coverage. There are no terrestrial NAVAIDs for the majority of a transatlantic flight, so the RINU-1 was very important to us. Luckily, we were able to conduct an in-flight alignment, which fixed the issue.

Our next malfunction did not show until four and a half hours into the flight when we entered moderate icing. We used our propeller de-ice system and one of our propeller de-ice circuit breakers popped. Our Naval Air Training and Operating Procedures Standardization (NATOPS) tells us not to reset to avoid a possible brush block fire. Therefore, we had to navigate out of the icing with our brand new navigator using the high-frequency radios. This extra distance and icing increased our fuel consumption. As luck would have it, our tailwind component increased as we passed the Azores, allowing us to continue onto Rota without fuel concerns.

An hour and a half prior to Rota, my copilot (2P) got out of the seat to stretch and relax, as she was flying the approach and landing. While she was out of the seat, she reviewed the instrument landing system (ILS) and distance measuring equipment (DME) Z approach to runway 10 and wrote down the applicable NAVAIDs on a piece of paper. She got back into the seat and tuned the NAVAIDs. About 60 miles away, and still at flight level 200, I requested a descent for the approach but the controller told us to standby. During this time, my 2P briefed the approach, but was interrupted several times by radio calls from air traffic control for our descent and an arrival to fly for the ILS. I loaded the arrival points into our control display unit, and my 2P increased her descent to get us on a normal profile. Our flight engineer called the field in sight, but the location he pointed at did not match the information displayed on our NAVAIDs

and GPS.

The hair on the back of my neck began to stand up, and I got the uncomfortable feeling something was wrong. We were in an unusually high descent, it was pitch-dark and I felt behind the aircraft. I have always honored that gut feeling and used it as a trigger to conduct a sanity check. I verbalized my discomfort and went back to the basics. I checked the distance to the airport on our GPS, which did not align with the tactical air navigation (TACAN) DME. I looked at the approach plate and found the discrepancy.

We had tuned up the wrong NAVAID, and it was giving us a distance of 30 miles to the field when in reality we were 12 miles. I double-checked the localizer frequency and inbound course. As we continued to skyrocket down, we picked up the ILS glide path. I did some quick pilot math. Our distance multiplied by a 3-degree glideslope confirmed what we already knew and what was showing on our displays ... we were very high on the approach. My 2P verbalized that she wanted to be at 1,000 feet, 3 DME, and at the correct approach speed for landing or she would wave off and enter the visual flight rules pattern. With this control in place, I felt safe to continue. She was able to get the aircraft into that stable position and continued with landing.

After we completed the secure checklist, our flight station discussed what happened and how we got into that position. We identified fatigue as a major factor. At the time of the approach, we were almost 16 hours into our crew day and had dealt with a multitude of malfunctions. The next factor was our communication breakdown during the brief. It turned out that my 2P wrote the wrong TACAN frequency on her piece of paper and used it when she tuned the approach NAVAIDs. During her approach brief, she said NAVAIDs were set appropriately for the ILS Z. I was distracted by radio calls and did not verify the NAVAID setup, which is one of my specific duties as the copilot. This flight served as an important reminder to employ the basic skills we learned during flight school. Localizer, inbound course, DME, or LIDs. A simple LIDs check and performing copilot duties according to NATOPS would have kept us ahead of the aircraft.

GROOVE AWARENESS



By Lt. Keith Chaney, VT-10

U.S. Navy Photos by Lt. Cmdr. Michelle Tucker



As a newly qualified formation pilot in the T-6A, I was conducting my fifth formation event with a student naval flight officer. The plan was to conduct the event in the Wahoo airspace then land at Gulf Shores International Airport at Jack Edwards Field, Alabama (KJKA), for fuel.



I was in the wingman position as our section entered the KJKA area. Lead announced over common traffic advisory frequency that we intended to conduct a right-hand overhead break to runway 09 for a full-stop landing. At the time of that call, there was a civilian King Air at the hold short of runway 09 as well as a Cessna in the left-hand pattern for runway 09. Our flight conducted a normal three-second break to the right downwind and coordinated our full stop prior to the Cessna. We established 3,000 feet of aircraft separation for Jack Edwards' 100-foot wide runway, per the flight training instruction (FTI). As the section moved through the 90 and lead rolled out on final, the King Air took the runway unannounced and departed runway 09, causing an unexpected waveoff for the section.

At this time, the lead instructor pilot assumed the section had been dissolved due the "kiss off" passed prior to the break. I, as wing, assumed the section was still intact, as there was no coordination over TAC frequency to dissolve the section. Both aircraft



entered the right downwind, maintaining previously established FTI values for spacing.

The Cessna, still in the left-hand pattern, announced its intentions to perform a full-stop landing, making us No. 2 for the full stop. As lead rolled through the 90 position to final, I continued to maintain at least 3,000 feet of separation and moved flaps to the landing position in order increase separation and reduce roll out distance. As the lead T-6A crossed the threshold, our focus shifted to inside the aircraft, ensuring our checklist was complete and focusing on the landing. Little did we know the lead also elected to move flaps to the landing position. Upon touchdown, the lead expeditiously slowed down to make the first safe exit off runway 09 onto taxiway A2.

On a different day, this may not have been an issue; however, exiting on A2 this day took a little more braking action and did not qualify as a leisurely rollout for a T-6A. Unfortunately, the aforementioned Cessna had exited runway 09 at A2 and was blocking the lead's ability to clear the runway. As I touched down, I noticed an increased rate of closure occurring between the section aircraft. Power was at idle with flaps landing, and we were quickly decelerating through 85 knots, normal rotation speed. I elected to not attempt a wave off, as it was not a safe course of action. I applied normal braking at first with increasing pressure as we moved closer to the lead. As a result of my ground speed, flap configuration and steadily increasing braking pressure, both tires were blown in the process. When I was about 1,000 feet away from the lead, they were able to taxi off the

runway, allowing us to maintain centerline and roll to the next taxiway, A3. It was clear that at least one tire had blown, so I elected to shut down the aircraft on A3 for maintenance action.

Lessons learned

Establishing nose-to-tail separation at the 90 or when rolling final is good, but it should not give your brain the green light for the full stop. Since this incident, I have adopted a technique I call "groove awareness," and I try to make a final check in the groove to visually confirm I have appropriate separation before touching down. For instance, at KJKA, you should see the lead aircraft roughly halfway down the runway (taxiway A3) before continuing for a full stop, as it is about 6,962 feet long. Another important note is that FTI values are minimum values; 3,000 feet separation is not necessarily the goal to maintain, but a minimum value for safety of flight. Nothing says you can't land 4,000 feet in trail.

I believe this situation also gave me perspective on how to consider my wingman's position when I am leading a section. Verbose communications may be frowned upon in the fleet, but we're in an orange-and-white aircraft in Pensacola flying with fellow instructors from every type of background. Use your TAC frequency whenever required for safety of flight and never assume both instructor pilots are on the same page with non-briefed situations. As a final general statement for newly qualified formation instructors everywhere, keep a large safety window and fight the urge to operate the aircraft above your skill level. Your parade position for the overhead will come with time.



By Anonymous

Naval aviators take great pride in being the best. It takes training and skill to achieve that goal. In the Hawkeye community, we train extensively to propeller and engine emergencies because we know there are two types of aviators: those who have had an engine or prop emergency, and those who will. We train and brief so that we can handle any emergency and bring the plane and crew back safely, to the field or the carrier. We train so if an emergency happens, our aircraft systems knowledge allows us to quickly and smoothly feather the propeller and properly configure the aircraft for single-engine flight. This time though, we did it to ourselves. This time, the right conditions at the wrong time created a scenario where we lost a perfectly good engine for no good reason.

The aircraft my crew and I were getting into had just landed aboard the ship for a planned "hot pump and crew switch." I conducted a turnover with the previous flight's aircraft commander and was told the aircraft had zero discrepancies for their entire 3.5 hour flight. Thirty minutes later we launched from the carrier just after sunset for a single cycle. The weather was overcast from 2,500 feet up to around 6,000 feet with light to moderate icing. We climbed to our stationing altitude without any issues and proceeded on our airborne command and control mission. The mission went smoothly and before returning to the ship we rendezvoused with an F/A-18 tanker jet for two night aerial refueling proficiency plugs. Post-aerial refueling we checked in with Marshal, commenced and proceeded inbound on the Case III CV-1 approach.

During our descent, we noted the weather had deteriorated slightly, with the tops now around 8,000 feet and the bases around 2,000 feet. We also noted a slight increase in the icing conditions compared to our departure.

However, we were able to properly de-ice all accumulations on our aircraft once we leveled off below the clouds at 1,200 feet. At three-fourths of a mile, we called the ball, "603, Tracer ball, 4.9." Everything felt smooth until the very end when I added too much power and the ball began to rise in close, indicating I was high on glideslope. I made a play to stop the rising ball by bringing the power levers back. We touched down ... but we didn't stop. As paddles would later call the pass:

(TMP.DLIM) (HCDIC) TMPAR BIW - for the (OK) skip the 4 wire Bolter.

In other words, I got over powered at the ramp and touched down just before the 4 wire but the hook skipped it, resulting in us missing all available wires. I added power to go around and I felt a slight swerve in the aircraft as we went off the end of the carrier and back into the night. The slight swerve during the power addition and the fact the plane was not responding as it normally would, were our first indications that something was not right. Sixty feet off the deck and 120 feet above ground level (AGL), my co-pilot and I realized our rate of climb was slower than normal and I heard the words, "keep your climb in." Soon after I saw our engine RPM indications rapidly decreasing, an indication that the left engine was shutting down. Seconds later the left engine indicated 0% RPM with a fully feathered prop. I pitched for 135 knots, which is the E-2D's single engine best rate of climb airspeed and we continued to climb as we executed the boldface [emergency procedures] for Engine/Fire/Failure Shutdown in flight. We coordinated to continue our climb past the normal bolter/wave off pattern altitude of 1,200 feet up to the base of the cloud layer to get as much altitude below us as possible while still remaining clear of the clouds and icing. This put us at about 2,000 feet AGL. Unsure of why the engine had shut down, but also knowing that we had a fully feathered prop and a

controllable aircraft with a 6,000 foot layer of instrument meteorological conditions and moderate icing above us, we elected to remain at our current altitude and recover as soon as possible.

We communicated our situation and intentions through our squadron representative back to the ship as we were vectored around to final for another approach. We completed all the requisite checklist items and performed a controllability check of the aircraft before finally discussing our situation with paddles. For the second time that night we called the ball at three-fourths of a mile, “603, Tracer ball, 4.2, port engine out.” Fortunately, this time we caught a wire.

Once back safely in our squadron ready room, we took a thorough look at the maintenance data from our flight in an attempt to determine the cause of the engine shutdown. All engine recording and monitoring system data showed that the autofeather system on the left engine had activated when I advanced the power levers on the bolter. Maintenance performed a thorough inspection of the engine and completed a low power turn, noting no abnormalities.

The E-2D has built-in software on each motor that will initiate automatic feathering of the propeller if it does not sense 500 pounds of thrust coming from the respective engine when the power lever is above 63.8 degrees power lever angle. There is a warning associated with the system:

“With the [autofeather] system armed should the power levers be rapidly advanced from near flight idle to above the autofeather arm point before the propeller can generate 500 pounds of thrust all autofeather conditions will be met and feathering will be initiated. As the blade angle increases toward full feather RPM will decay and thrust will increase. When thrust is above 500 pounds the feather circuit will be de-energized. During this sequence engine RPM may significantly decay and engine flameout may occur.”

The autofeather system was inherently designed for safety of flight and does have a lot of positive attributes. In the case of an immediate engine failure at low altitudes, this system should feather the engine with no input from the pilot as long as the power levers are above 63.8 degrees power lever angle and the system is armed. However, the system is not without fault, as illustrated by this incident and others in recent years. The uncommanded autofeather has been ranked as a top safety concern from our community for several years by the System Safety Working Group. The group takes inputs from all of the squadrons in the community and prioritizes the top 10 E-2D systems which present a potential safety hazard.

Some unforgettable lessons were learned by a junior

“On one hand, I was flying at the ship, at night, and I got myself into a place where I needed every ounce of power my aircraft could give me.”

carrier aircraft plane commander that day. We have all been taught that NATOPS is written in blood, and that going against NATOPS is a cardinal sin of any naval aviator. But I also learned a lot about the NATOPS review process and while the book goes through systematic scrutiny, it is not without flaws. In this instance, I was in between a rock and a hard place. On one hand, I was flying at the ship, at night, and got myself into a place where I needed every ounce of power my aircraft could give me. But the book told me to be careful, because if I responded too fast to a screaming power call or a bolter, the engine would shut down. I could have flown better by not putting myself in a position where I needed to advance the power levers from flight idle to max. I could have made the power lever movement slower. However, as I thought through the incident I couldn't help but be frustrated that a power lever movement at a critical phase of flight would cause me to lose an otherwise good engine.

Since this incident occurred, my community has taken an in-depth look at this, and a multitude of other undesired autofeather scenarios, and decided that some significant changes in aircraft design and procedures to help prevent undesired autofeathers should be implemented. Hardware changes and procedures are being tested and some have already been implemented into the fleet to help reduce the potential for unsolicited autofeathers, including leaving the autofeather switch off for approaches and implementing logic changes to the autofeather system itself. Undesired autofeathers have been an issue in my community for years. But, instead of designing a better system, NATOPS procedures were devised to attempt to prevent undesired autofeathers from occurring. The NATOPS will never replace good judgement. In addition, it should never be written to compensate for a poor design.



U.S. Navy photos by Mass Communication Specialist 2nd Class Kelsey Trinh



U.S. Navy photos by Heather Judkins

NOT ANOTHER DAY IN PARADISE!



By Lt. Spencer Vance, VQ-1

It was a relatively calm, sunny day in the desert. We were about a third of the way through an already challenging four-month detachment, when the mighty EP-3E Aries decided to throw us another curve ball.

Let me set the stage for you. Combat Reconnaissance Crew One (CRC-1), detached from the Fleet Air Reconnaissance Squadron (VQ) 1 “World Watchers,” had already been put through the paces. We arrived to a broken plane, leading to our detachment’s first flight being a functional check flight. After a laser incident on the first mission flight, we started to get a taste of what the next few months had in store for us. A few flights later, a propeller malfunction led to a three-engine emergency landing. Two more emergency, no-flap landings later and we finally got to the main event.

Automatic terminal information service (ATIS) was calling winds 250 degrees at 7 knots, 27 degrees Celsius and 29.81 inches Mercury (inHg). The runway was 33R which

is 12,500 by 150 feet, with a 0.9% upslope. With 42,000 pounds of fuel onboard, our gross weight was just over 123,000 pounds. Our crew calculated a three-engine rate of climb of 490 feet per minute and a rotate speed of 123 knots of indicated air speed (KIAS). We had a smooth pre-flight, which set us up for an on-time takeoff. As the Electronic Warfare Aircraft Commander, I occupied the left seat while my co-pilot (2P) was in the right seat.

During takeoff, we called out 80 KIAS for a power and airspeed check to ensure we made forecasted power. We did not have a refusal speed, so the next call out was to rotate at 123 KIAS. Immediately after rotate, our flight engineer called out “power loss on three” followed by “number three auto-feathered!”

My training kicked in. I immediately noticed the loss of power; however, the yaw was less than I expected. I raised the right wing approximately five degrees and pitched up to continue climbing. I called for gear up.

Fortunately, there were no obstacles on our departure heading and a right turn took us immediately over the water.

As we continued to climb away, airspeed increased above 140 KIAS and I called for flaps to maneuver and then for the number three emergency shutdown handle. The flight engineer checked and then pulled out the e-handle, I voiced “HRD (fire bottle), not required, emergency shutdown checklist.”

The first two steps on the emergency shutdown checklist are emergency shutdown handle—pull and HRD (fire only) - discharged. As the second step states, we will only discharge the fire bottle if we have a fire warning or other indication telling us there is a fire associated with the engine malfunction. Step six of the checklist is “Alternate HRD (if fire persists) as required.”

It was at this step we received a fire warning in the flight station and my heart



rate continued to increase. It is extremely uncommon to have an engine fire warning indication after the engine is shut down. I called for the number three HRD bottle and sent the off-duty flight engineer and observer to look for any visible flames or fire indications. The observer saw a large white puff of what looked like smoke, but this was most likely the flame retardant agent from the HRD bottle. After we determined there was no persisting fire as our turbine inlet temperature was decreasing and there was no visible bubbling

paint, flames or smoke, we decided to not transfer and discharge the alternate HRD.

We continued our slow climb to 1,500 feet and proceeded to the first point on our flight plan. We declared an emergency with air traffic control (ATC) and asked for another right turn to remain near the airfield. They directed us to stay over water but cleared us within a working area just south of the field. There was approximately 2,000 pounds of fuel in tank five, which is the only tank from which we can dump fuel. As a flight station, we discussed if we were going to dump fuel and asked ATC if our current location would suffice. They denied the request and began coordinating a suitable location.

To land or not to land

Our maximum landing weight is 103,880 pounds. We can land above that weight – up to 114,000 pounds; any landing above 114,000 pounds requires an overweight landing inspection. As we discussed whether it was worth it to dump the 2,000 pounds of fuel and extend our time airborne, it was the first time where real life started to feel a little different from training.

After you have lost an engine during a simulator event, it's no sweat to say, "I'll just burn down to below 114,000 and then land," or something of the sort. However, when I was actually in a three-engine situation, with a fire indication, only one HRD bottle left in case the fire re-ignited and 23 other souls counting on me, being back on the ground sooner rather than later

sounded a lot more attractive.

We elected to forego dumping the fuel and to land as soon as we finished the necessary administration. We finished the climb checklist, descent/off station checklist, approach checklist and worked through the emergency landing brief. The ATIS information at the field remained the same so the next decision we had to make was which runway to land on. If the wind is blowing over the dead engine, it will be favorable for the reversal on the runway, but unfavorable for the approach and vice versa.

With wind remaining 250 degrees at 7 knots, landing on 33R would be unfavorable for the reversal and landing rollout. ATC would only give us a four-mile final to runway 15L because of a nearby airfield. We discussed switching to 15L; accepting a very slight tailwind but gaining the favorable rollout winds; however, we decided the extended final, upslope, and length of the runway made 33R the better option.

We conducted a visual approach to runway 33R backed up by the Instrument Landing System with approach speeds of 158 KIAS with flaps at approach, and 142 KIAS with land flaps selected. These speeds are significantly higher than our normal approach speeds as our weight was still approximately 120,000 pounds at this point. It took roughly 500 shaft horse power more per engine than normal to maintain these speeds at our weight. After

conducting an uneventful landing, we were greeted by the local fire department and crash crew and safely returned to the line.

All things considered, a lot of things went right for us that day. The auto feather system worked appropriately, significantly reducing any drag caused by the failed engine. The crew worked together extremely well, with information flowing from the back of the plane to the front seamlessly leading to prudent decision making. The countless repetitions we put in practicing these dynamic engine failure scenarios paid dividends in leading to safe and effective decision making, keeping 24 souls in the fight for another day.



The countless repetitions we put in practicing these dynamic engine failure scenarios paid dividends in leading to safe and effective decision making, keeping 24 souls in the fight for another day.

SAVE THE SEALS!



By Lt. Cmdr. John Izzo and Lt. Cmdr. Nick Jones, VT-86



Like many aircraft, the T-45C community is no stranger to hydraulic (HYD) failures and emergencies. Although the aircrew should always be on alert for problems in their jet, it is worth noting the increased risk of hydraulic emergencies brought on by cold winter weather – even in places like sunny Pensacola, Florida. Normal loads placed on cold-soaked aircraft and systems can overstress HYD pumps, lines and seals in ways both insidious and spectacular.

U.S. Navy photos by Mass Communication Specialist Seaman Hannah Kantner





U.S. Navy photo by Mass Communication Specialist 3rd Class Justin McTaggar

In order to help aircrew avoid inducing a hydraulic emergency, the Naval Air Training and Operating Procedures Standardization cold weather procedures chapter (section 19.2.3) states:

“At temperatures below minus 15 degrees Fahrenheit (minus 26 degrees Celsius), the flight controls should not be cycled for a minimum of five minutes after engine start to allow the hydraulic fluid to warm. The controls should then be cycled in small circular motions to slowly warm the actuators. This minimizes damage to actuator seals, thus preventing hydraulic leaks.”

Even if temperatures at the time of startup do not reach as low as minus 15 degrees Fahrenheit, extended periods



of on-deck times - over a weekend, for example, can lead to “cold-soaking” of the aircraft. The T-45C is a relatively simple aircraft to start; it is not unheard of for experienced aircrew to go from batteries on to completion of final checks in less than five minutes.

Given the expeditious startup sequence, it’s possible the aircraft systems may still be quite cold and stiff when the jet taxis out of the line, even with an engine operating around 842 degrees Fahrenheit (450 degrees Celsius). In fact, chilled fuel can serve as a heat sink as it travels from the tanks to the engine, further delaying components from warming to their optimal operating temperatures.

The danger here is that rubber seals and gaskets are stiffer and more prone to cracks, leaks and shrinkage when they are cold. Loading a HYD system full of such seals with the full 3,000 or even 5,000 pounds per square inch provided by the engine-driven pump is asking for a blowout. Despite the fact the Aviation Hydraulics Manual (NAVAIR 01-1A-17) states seals are designed to operate between minus 65 degrees Fahrenheit and plus 160 degrees Fahrenheit, every seasoned maintainer knows it’s best to avoid putting that demand on the system before it is ready.

Therefore, a little extra time taken before actuating flight controls will pay dividends in preventing seal failures and reduce the possibility of air entering the system, which could lead to fluctuations in HYD pressure on deck or in flight. Once aircrew have allowed a few minutes post-startup for the jet to warm up, it’s best to begin with small magnitude inputs, cycling the controls or even starting with trim to exercise the valves and seals while maintenance checks for any obvious leaks. After a few iterations, pilots can start to smoothly program full-deflection on the flight control surfaces, slowly “stirring the pot” to exercise the system fully.

Having taken the time to prepare and test the HYD system, aircrew can continue their mission, confident that the critical hydraulics they rely on will perform as expected, avoiding a hasty, self-induced return to base. Remember: If you felt chilly when you walked to the jet, it’s a safe bet that the aircraft is cold too. It’s well worth spending the time to warm up the aircraft so it will perform as needed, when needed.

COLD WEATHER OPS

While cold weather operations procedures for aircrew and maintenance are well documented in aircraft publications, a particular recurring situation exists among P-8A squadrons that is worth emphasizing due to the potential impact on flight safety. This situation is smoke and fumes in the aircraft due to de/anti-ice fluid ingestion into the bleed air system. This may manifest itself in any number of phases of flight including preflight ground operations, the takeoff roll and climb out.

Cold weather operations paragraph 17.5 in NATOPS provides guidance to safely operate aircraft in these weather conditions. One common evolution is applying de/anti-ice fluid to aircraft during pre-flight which removes ice and prevents further ice accumulation. Procedures warn aircrew that residual fluid may cause noxious fumes, odors, white smoke or any combination thereof to enter the aircraft through either the auxiliary power unit (APU) or engine

By Lt. j.g. Kyle J. Seniff, VP-45

bleed air systems. After de/anti-ice application and bleed air switches are positioned back on, fumes and/or smoke can be expected.

There is a documented dangerous scenario where aircrew believe the smoke or fumes have been purged out of the environmental control system after turning bleed air back on while on the ground. While the initial smoke or fumes may have dissipated, the de/anti-ice fluid that has been sprayed on the aircraft continues to drip into the bleed air and ram air inlets as time progresses. This may reintroduce smoke and fumes into the aircraft during takeoff and climb out.

From past hazard reports (HAZREPs), the white smoke can be very dense and completely fill the aircraft in seconds. However, it has been observed to dissipate in a few minutes. While

this is benign when the aircraft is on the ground and stationary, it can be intrusive and dangerous while taxiing, on the runway, or during climb out. To give context to the magnitude of smoke that can be introduced into the aircraft, a hazard aircrew described it as “thick enough that you could not see the hand in front of your face.” This has caused aircrew to abort missions, declare emergencies, and land overweight.

Smoke and fumes in the aircraft is a crew resource management (CRM)-intensive emergency that is only amplified when in a critical phase of flight like takeoff or climb out. The best way to deal with such a situation is to minimize the likelihood of it happening in the first place and to make sure it is thoroughly briefed beforehand. In addition to adhering to the procedures in paragraph 17.5, the following lessons learned can minimize the impact of smoke and fumes from de/anti-ice fluid ingestion:



Ensure de/anti-ice crews avoid spraying fluid into the auxiliary power unit (APU), engine and ram air inlets.

- Ensure de/anti-ice crews avoid spraying fluid into the APU, engine and ram air inlets.
- The smoke and fumes from de/anti-ice fluid are recognizable by a faint, sweet aroma and are not toxic in low doses and for short periods of time.
- Consider opening the forward and aft egress door before turning bleeds on after completing the de/anti-ice application to facilitate the dissipation of smoke or fumes. This should only be done before engine starts.
- Consider putting the aircraft into smoke removal mode if the smoke or fumes are overwhelming.
- It is recommended to operate bleed air for a couple minutes on the ground before takeoff, especially if a no engine bleed air takeoff is planned. This should allow time for any ingested fluid

to burn out of the mix manifold.

- Previous HAZREPs of reported smoke or fumes from de/anti-ice ingestion occurred after turning bleed air switches on.
- Ensure the crew is briefed to expect some sort of smoke or fumes after turning bleed air back on after de/anti-ice application and to not be alarmed as it should dissipate quickly.
- Ensure the potential for smoke and fumes in the flight deck during the takeoff roll or climb out is thoroughly briefed to include courses of action amongst the pilots.

A thorough brief of the scenario discussed in this article amongst aircrew, maintenance, and de-ice personnel will aid in preventing

CRM breakdown, unnecessary overweight landings, and mission aborts. The aircrew having knowledge of what is to be expected and why will turn a daunting scenario into an expected one that can be easily managed. Strict adherence to procedures along with effective communication to all personnel involved will allow us to get off deck safely and into the fight!

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P-8AA NATOPS Manual A1-P8AAA-NFM-000
15 November 2021 Chapter 17.5.8 De-icing/
Anti-icing HAZREPs:

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- 05-21 VP-9 P-8AA SFF in Flight Deck Shortly After Takeoff from APU ingestion of Anti-Ice Fluid; RMI Event ID #682540
- 03-20 VP-10 APU de-ice fluid ingestion SFF; RMI Event ID #110677634



US Navy photo by Mass Communication Specialist Seaman William Andrews

WASH RACK GEYSER FLAMES OUT ENGINE

By Lt. Catherine O'Donnell, HSM-75

YES, YOU READ
THAT CORRECTLY



U.S. Navy photo by Mass Communication Specialist 3rd Class Novalee Manzella

"We just flamed out the No. 2 engine," the helicopter aircraft commander (HAC) called just before takeoff.

As naval aviators, we pride ourselves on our systems knowledge. We do this because it may save our lives one day, especially if something unimaginable happens in a critical flight regime. Like most mishap stories, this story underscores the importance of systems knowledge and being ready for anything.

On Jan. 4, 2022, we completed a night training flight. After landing, we taxied to the wash rack with 1,000 pounds of fuel to rinse off salt water. The HAC advised to stop with the nose of the

aircraft slightly out of the water to avoid disorienting ourselves. Upon activating the sensor, fresh water engulfed the aircraft. Unbeknownst to myself and the crew, this placed the aircraft's fuel cell vent, which is on the underside of the aircraft, in the perfect position for a faulty water nozzle to spray pressurized water through the vent line and into the right fuel cell.

After about 20 seconds, I taxied out of the wash rack and requested an air transition. We completed the takeoff checklist, and as I started applying takeoff power, the HAC noticed fuel-reading fluctuations on the flight display. We observed the No. 2 fuel cell quantity indication fluctuating erratically from red

Prior to this incident, we assumed that debris or water could not “jet” itself into a fuel cell.



U.S. Navy photo by Mass Communication Specialist 3rd Class Jared Mancuso

“XXXX” to 2,100 pounds, down to zero pounds, and then red “XXXX,” all within what felt like three seconds. The HAC then called out the No. 2 engine failure. We informed ground one engine flamed out and requested to ground taxi to our line. As we taxied, I ran the checklists and started the auxiliary power unit (APU), not realizing in the stress of the moment that the APU draws fuel from the No. 2 fuel cell. Luckily, the APU started and remained on. Suspecting water intrusion, we decided not to attempt to re-start the No. 2 engine.

We taxied into the line with no further issues, but we were on guard for a possible No. 1 engine flameout. On post-flight inspection, maintenance drained fuel from both fuel cell low-point drains and found water contamination. Maintainers drained 12 gallons of water-contaminated fuel – seven gallons

in the right fuel cell and five in the left – before getting a clean fuel sample.

Prior to this incident, we assumed that debris or water could not “jet” itself into a fuel cell. However, after thorough investigation, collaboration and digging deep into the fuel system, we found this was likely the cause. A faulty spray nozzle in the wash rack created a high-pressure water spout that was later observed spraying about 50 feet into the air. As we taxied the aircraft into the wash rack, this faulty nozzle lined up perfectly with the fuel vent and sprayed water into the fuel cell. Luckily, the engine flameout occurred while we were on the ground. Had we taken off, who knows what would have happened. Moments like these remind me that emergencies can happen at any time, and that you must always stay ready – even after landing.

SLOW DOWN

By Lt. Cory Ayers and Lt. Cmdr. Adam Howe, VP-4

A P-8A Poseidon's standard complement of aircrew on a tactical mission is nine personnel: five officers and four aircrew. Often, the most challenging aspect of operating this aircraft is making sure all nine people have a common mental picture of where we are, what we are doing and what we are going to do next. Emergencies only exacerbate this crew resource management (CRM) challenge, and success depends on smooth, methodical execution. On the morning of Sept. 6, 2021, the importance of this shared mental model was highlighted in the early stages of a mission flight in 5th Fleet.

Preflight on the tarmac of Isa Air Base, Bahrain, went off without a hitch. We were fraggled for a typical mission profile through the Arabian Gulf

and beyond, a tasking that was familiar to our crew after several months on deployment. The assigned aircraft completed an engine wash evolution two days prior and was ready to go. With clearances obtained, active runway taken and takeoff thrust applied, Combat Aircrew Four took to the skies with myself at the helm as the patrol plane commander.

Seconds into the flight, I heard the words every P-8A pilot dreads hearing from their tactical coordinator (TACCO), the senior Naval Flight Officer on board. "Fumes in the tube" was the call heard on the intercom, meaning the aircrew in the back smelled an unusual aroma. This is never a good thing, but during a critical phase of flight like takeoff and climb out, it was all the more problematic.



U.S. Navy photos by Mass Communication Specialist 1st Class Juan Sebastian Sua

Before diving into what we did next, it is worth expounding a bit on how a P-8A crew handles a situation like this. Our Naval Air Training and Operating Procedures Standardization (NATOPS) program directs us to execute the smoke, fire and fumes (SFF) checklist. This entails the aircrew members outside the flight station to divide the aircraft into sections and attempt to identify the source of the fumes. The crew has three attempts, or passes, to find the source. Once complete, the crew reports their findings, or lack thereof, to the TACCO, who relays the information to the flight station, and they collaborate on a course of action. Absent finding a source, the NATOPS checklist directs the crew to secure "All Mission Equipment." A P-8A is fundamentally a 737, doing this essentially turns the plane into a civilian airliner, minus some seats and windows. Suffice it to say, CRM is critical to successfully executing this process.

At this point in our checklist, I had some decisions to make. It was clear we would need to establish ourselves into a hold; we were smack in the middle of the approach and departure corridor and needed to get to a safe spot. The question was: Who would do it? Do I delegate the SFF NATOPS procedure now in progress to the co-pilot, allowing me to get us established in a hold, or do I let the co-pilot get us established, and I run the checklist? Falling back on the priority scheme we know so well in aviation, I chose to take the "aviate, navigate" portion as the senior pilot and began to coordinate with Manama. I put the responsibility for SFF checklist execution on the co-pilot.

Moments later, my attention was drawn to the master caution light and alarm. In my peripheral I could see the dual bleed light was illuminated due to an incorrect bleed air switch position. How the switch got in that position is not the point of this story and was easily and quickly corrected. Rather, the master caution focused my attention back to the processes unfolding in the aircraft, and I was surprised to find how far things progressed.

In the few moments it took to get a hold set up with air traffic control, the remainder of the crew completed their three attempts to locate the source of the fumes, assessed that they could not find the source and were shutting down mission equipment. The co-pilot started the auxiliary power unit in response, thus revealing the erroneous position of



the bleed air switch. The checklist had progressed several more steps than anticipated while I was coordinating our hold. When I asked for an update, I could feel the nervous excitement in the crews' voices. I called for a temporary pause in checklist execution and finished getting the aircraft into the hold. Once established, we reengaged the SFF process together.

I was concerned the crew was rushing through a complex checklist; things were moving far faster than necessary. We had plenty of oxygen, no controllability issues, functional civilian navigation systems and no visible flames or smoke. Yet we were shutting down systems without the senior pilot's concurrence. Was this a procedural violation? Not at all. I deliberately delegated checklist execution to the co-pilot in order to focus on what I thought was most important. But was it necessary?

Being able to divide and conquer is simultaneously a P-8A aircrew's greatest strength and critical weakness. It is, in part, the reason our NATOPS does not always prescribe exactly who needs to perform an action or give concurrence. This puts the responsibility on individual crew members to employ good CRM at their discretion in order to get to the best outcome. Orbiting 7,000 feet over the Arabian Gulf that day, I did not get the sense that was happening, and the result was that I was out of the loop. We needed to slow down and get on the same page.

Ultimately, we elected to conduct an overweight but otherwise uneventful landing back at Isa. The source of the fumes was never determined with certainty, but most who were involved feel confident it was associated with soap residue from the engine wash. The real takeaway for us was not how we got into this scenario, but how a group of nine people could best use CRM to get out of it!

PE CORNER

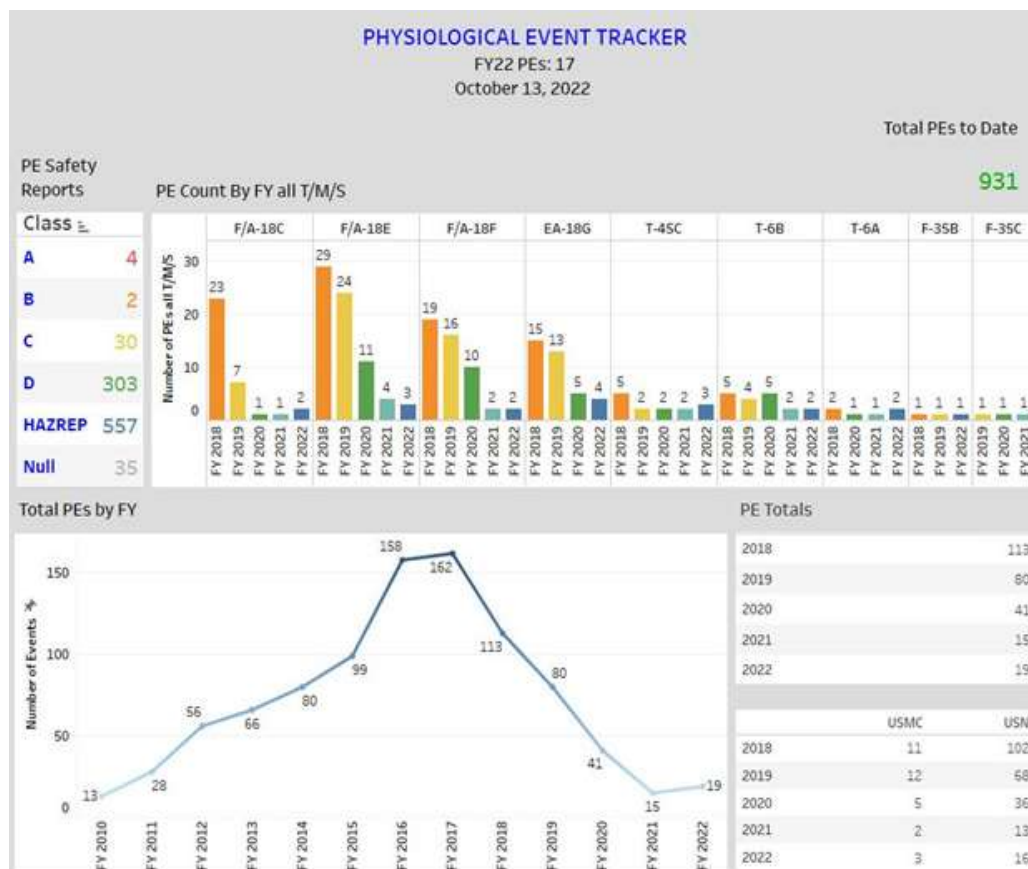
By Lt. Cmdr. Philip DeNicola, NAVSAFECOM

A Physiological Event (PE), which is a subset of a Physiological Episode (PHYSEP), occurs when aircrew experience adverse physiological symptoms during or after flight AND these symptoms are attributed to a known or suspected aircraft and/or aircrew systems malfunction. This multifarious phenomenon has been at the forefront of the minds of aircrew that fly tactical naval aircraft for the last several years. An increase in reported PEs in T-45 and F/A-18 aircraft in 2017 led to the establishment of the Physiological Event Action Team (PEAT) and Root Cause Corrective Analysis (RCCA) teams. Years of research, data collection and analysis have created new programs such as the Hornet Health and Reporting Tool (HhART), led to updated clinical practice guidelines and resulted in more streamlined reporting/investigative processes conducted by local Physiological Event Rapid Response Teams.

In September 2021, the Naval Safety Center, now Naval Safety Command (NAVSAFECOM), assumed the functions of the PEAT and the PE reporting process. The intent of this move was to provide clear policy and guidance while tracking outcomes for the fleet under OPNAVINST 3750.6 safety reporting guidelines. After the initial PEAT formation in 2017, PE Roadshows occurred regularly

to disseminate new information regarding PE rates, aircraft or aircrew systems updates, medical research and the inception of HhART. Aircrew may remember attending one of the many Roadshows put on by the Naval Safety Center and the PEAT before COVID. Although the Roadshows have not continued, there is value in ongoing regular communication to aircrew on PE-related information.

To keep the flow of information going, the PEAT is establishing a section in Approach magazine called the “PE Corner” to promulgate updates and to answer your questions regarding PEs. The intent is to provide aircrew with regular updates on the current state of PEs, rates, medical research and to update the fleet on any changes and or improvements that have been made or are in the process of being made to aircraft life support systems and aircrew systems. Lastly, this section will provide relevant information to operators of tactical naval aircraft. There are many questions still in the community including why changes to NATOPS procedures were made or what new aircraft life support equipment is in the pipeline. Please let us know. We want to hear from you and know what your questions are and what you would like to see. Contact us at PEAT@us.navy.mil.





A U.S. Navy F/A-18E Super Hornet assigned to Strike Fighter Squadron (VFA) 137, Naval Air Station Lemoore, California, lands on the runway at Tyndall Air Force Base, Florida, Nov. 8, 2021. (U.S. Air Force photo by Staff Sgt. Betty R. Chevalier)

WHAT IS A PHYSEP, PE?

Physiological Episode (PHYSEP)

Definition: A PHYSEP occurs when aircrew experience adverse physiological, psychological, pathological or physical problems that manifest during or after flight.

Includes: While not a comprehensive list, examples include airsickness, spatial disorientation, GLOC/ALOC/black-out/grey-out, manifest bowel or bladder dysfunction, autonomic response to physiological stress, hypo/hypercapnia (typically hyper/hypoventilation), hypoxia, etc. that are not due to a known or suspected aircraft and/or aircrew systems malfunction.

Excludes: Any symptoms due to a known or suspected aircraft and/or aircrew systems malfunction.

Physiological Event (PE)

Definition: A PE is a “subset” of PHYSEPs, and occurs when aircrew experience adverse physiological symptoms during or after flight AND these symptoms are attributed to a known or suspected aircraft and/or aircrew systems malfunction.

Includes: While not a comprehensive list, examples include hypo/hypercapnia (typically hyper/hypoventilation), hypoxia, pressure related illness, autonomic response to physiological stress, decompression illness, carbon monoxide poisoning and symptoms due to smoke/fumes in the cockpit due to a known or suspected aircraft and/or aircrew systems malfunction.

Excludes: Any symptoms that are not due to a known or suspected aircraft and/or aircrew systems malfunction.



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ARTICLE

BZ nomination article length: 90-150 words

PHOTOS

All photos must be good, clear quality and in high resolution (300 DPI) or larger than one megabyte per image.

When you email your BZ nomination, include the file and photo. Also, use the author's name as the filename. Example: AE3 Jane Navy.doc.

Above: A U.S. Marine Corps UH-1Y Venom assigned to Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) conducts battle drills during Weapons and Tactics Instructor (WTI) course 1-23 at K9 Village training complex, Yuma Proving Ground, Arizona, Oct. 8, 2022. (U.S. Marine Corps photo by Cpl. Camille Polette)

Maj. Brian Goss, VT-21



While flying from the back seat of a T-45C during a basic fighter maneuvers student training sortie, Maj. Brian Goss lost communications with his student when Goss' aircraft's oxygen warning light illuminated. He smoothly initiated an immediate descent and increased aircraft N2 in accordance with the Naval Training and Operating Procedures Standardization program. Goss then returned to base for an uneventful recovery. The post-flight inspection revealed a failed oxygen concentrator. Without Goss' timely execution of a new emergency procedure, the crew would likely have experienced hypoxia and further jeopardized themselves and their aircraft. Bravo Zulu to Maj. Brian Goss for executing textbook procedures, demonstrating expert decision-making and displaying superb airmanship, which resulted in the safe recovery of his aircraft!

Aviation Electrician's Mate 2nd Class Jacob Little, HSM-78



During a routine hot seat evolution at HSM-78, May 31, 2022, then-Aviation Electrician's Mate 3rd Class Jacob Little was acting as plane captain when he noticed a shiny fluid spraying onto the helicopter from above. The Columbus, Ohio native quickly recognized hydraulic fluid was leaking from the main rotor head. He communicated with the crew and gave the immediate shutdown signal. After the helicopter was shut down, squadron maintainers realized one of the main rotor head damper pistons had failed, causing a bleed-out of the hydraulic accumulator. The blade dampers serve to keep the rotor head in track and, without hydraulic pressure, may have resulted in unusual vibrations and possible ground resonance for the helicopter. Little's quick action saved Blue Hawk 715 and the three crewmembers onboard.

Lt. Cmdr. Ramy Ahmed, VT-21



While instructing from the back seat of a T-45C during an "Out of Control Flight" student training sortie, after momentarily taking control of the aircraft, Lt. Cmdr. Ramy Ahmed noticed abnormally stiff flight controls. Ahmed elected to forgo the sortie and recovered the aircraft via a straight-in approach. During post-flight inspection, maintainers found a broken viscous dampener in the aircraft's control system. Without Ahmed's recognition of the aircraft's abnormal control feel, recovery from a nose-low attitude would have been difficult and likely would have resulted in the aircraft descending through the floor of the Military Operating Area. Bravo Zulu to Lt. Cmdr. Ramy Ahmed for expertly recognizing an abnormal situation, demonstrating expert decision making and displaying superb airmanship that resulted in his aircraft's safe recovery!

Photographer: LT Benjamin Kosek

THE LEADING CAUSE OF
AVIATION GROUND
MISHAPS
OVER THE LAST DECADE
HAS BEEN THE FAILURE
TO FOLLOW
PROCEDURES.

Lives are at stake if
procedures are not followed!



