

THE NAVY AND MARINE CORPS AVIATION SAFETY MAGAZINE

Approach

VOL. 67, NO. 1

Summer 2025



A FIELD GUIDE TO
AIRFIELD BIRDS
OF NORTH AMERICA

A SWISS CHEESE DIVERT
Navigating through risk management

.....✈
+ MORE

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The content in Approach Magazine is written 'by aviators for aviators' across the Navy and Marine Corps. Articles, columns and supporting information is often written in conversation style to facilitate discussions across ready rooms in support of risk management across the Department of the Navy.

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Stay Connected





Commander, Naval Safety Command

Fellow Aviators,
Let me start by congratulating our Grampaw Pettibone award recipients. Your writing efforts exemplify the accomplishments we seek across the aviation community. Bravo Zulu also to the recipients of the Admiral James H. Flatley Memorial Award for Naval Aviation Safety mishap prevention during flight operations.

This issue of *Approach* provides a snapshot of the challenges our aviators face when dealing with weather, unexpected operational deviations and complacency. I encourage you to read each article and take its lessons and best practices to the ready room to discuss and share with your fellow aviators; some fuel for AOMs.

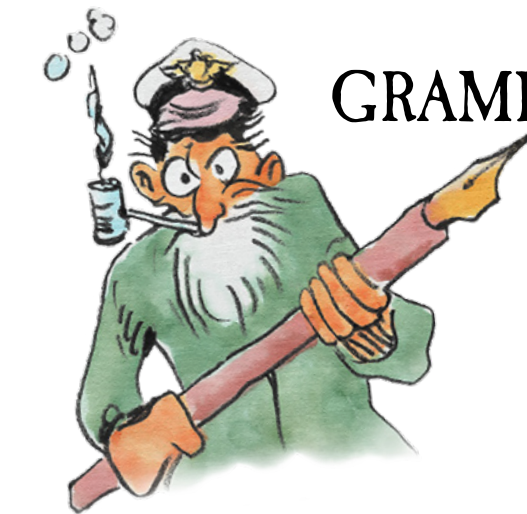
The recurring themes found within these pages deal with risk management, the importance of crew resource management and NATOPS. Complacency, making unfounded assumptions and the importance of pre-flight planning proved to be pivotal learning experiences across each type/model/series.

Naval aviation is a dangerous business and operational mishaps will occur which affect our readiness across the fleet. By fostering an operational approach to safety, Safety Command continues its focused efforts of preserving our forces and our assets, but we need your help and attention.

Directing and ensuring khaki leadership perform appropriate oversight and combat non-compliance across all operations ensures we keep all our players on the field and helps prevent the self-inflicted wounds taking our people out of the fight. Shared experiences on the flight line ensure sound decision-making practices, procedural compliance and encourage risk awareness in the hangar bay and on the flight deck.

Fly Navy!

Rear Admiral Dan "Dino" Martin, USN
CO, NAVAL SAFETY COMMAND



GRAMPAW PETTIBONE Award

Steeped in Naval tradition, the annual Grampaw Pettibone Awards recognize the organization and individual who contributed the most to overall aviation safety awareness through development and submission of publications and media resources. By retelling the stories of mishaps our Sailors and Marines encountered during their missions, we highlight the key details of each incident to help prevent similar events from happening to others in the future.



Individual Award: Cmdr. Robin Dirickson, Helicopter Sea Combat Squadron 14
Cmdr. Robin Dirickson exemplifies a deep understanding of the human element in naval aviation, combining compassion with strict compliance, lethality and mission focus. Her article, "When Tragedy Strikes," provided a detailed list of tools and processes available to commanders during their darkest days, offering recommendations to improve no-fail systems and processes across the Naval Aviation Enterprise, particularly in aviation safety and casualty response. Her unit commander emphasized the article's profound impact, noting its incorporation into the curriculum for Aviation Safety Officers and prospective commanding officers, equipping them with critical knowledge to face tragedy with greater preparedness.



Organization Award (written): Helicopter Training Squadron 18
The "Vigilant Eagles" of Helicopter Training Squadron 18 (HT-18) distinguished itself through several notable aviation safety initiatives. The Aviation Safety Officer established a forum for pilots to share experiences and engage in frank discussions about mishaps and lessons learned, emphasizing standardized instructor techniques and categorizing events for organized review. In addition, the safety department maintained a "pilot confessional" binder, cataloging lessons learned by flight category and providing instructor pilots with planning material drawn from previous events to help prevent or repeat mistakes. The squadron also identified the flight regimes presenting the greatest safety risks and developed a targeted briefing guide to address those specific maneuvers.



Grampaw Pettibone Award ALSAFE message



Admiral James A. Flatley Memorial Award ALSAFE message

NAVSAFECOM safety awards and criteria



Approach has been recognized
for its impact on the fleet.



These awards recognize excellence and professional merit demonstrated by individuals and communication teams throughout the Navy. Each award recipient has earned recognition by showing what "right looks like," helping our community collectively raise the bar. The work you're doing every day and the standard to which you're doing it continues to put the focus on leading the fight. Congratulations and keep up the great work.

RDML Ryan M. Perry, APR+M
Chief of Information
Navy Office of Information

Presented annually by the U.S. Navy in recognition of outstanding achievements in mishap prevention during flight operations. Awarded to one nuclear-powered aircraft carrier (CVN) and its associated carrier air wing (CVW) and one amphibious assault ship (LHA/LHD) and its associated Marine Expeditionary Unit (MEU).

**ADMIRAL JAMES H. FLATLEY
MEMORIAL AWARD FOR NAVALAVIATION SAFETY
USS ABRAHAM LINCOLN (CVN 72) & CVW-9
USS TRIPOLI (LHA 7) & 13TH MEU**

These teams were selected based on high-velocity outcomes and an exceptional safety program and record. The ships and embarked air wings set the highest standard of safety through operational readiness.



FAILURE IS IMMINENT, LAND IMMEDIATELY.

By Lt. Michaela Grobbelaar

HELICOPTER
MARITIME STRIKE
SQUADRON
(HSM) 70
SPARTANS

It was June 5, 2024 the morning of my first cross-country flight as helicopter aircraft commander (HAC). I was a mix of nerves and excitement as my crew and I briefed risk management, Naval Air Training and Operating Procedures (NATOPS) and the route we planned to take. This was our second day attempting to launch from Naval Air Station Jacksonville (KNIP), Florida, for the flight down to West Palm Beach (KPBI), Florida, with a follow-on leg to Site 1 at the Atlantic Underwater Testing and Evaluation Center for my first Helicopter Advanced Readiness Program as HAC. We were a flight of

one aircraft, as my playmate had managed to launch the day before and my crew was delayed for aircraft discrepancies.

As my crew finished its preflight of aircraft 706, I looked out over the St. John's River. The sun was out and the weather was perfect. There were no issues with my aircraft. None that were identifiable during a detailed preflight, in any case. My helo second pilot (H2P) and I filed our flight plan and walked to launch with our naval aircrewman tactical helicopter first class (AWR1) and two maintenance personnel. After an uneventful startup, we taxied for takeoff around 1000 local. We established ourselves at 4,000 feet per instrument flight rules flight plan and proceeded south, expecting to be safe on deck at KPBI roughly two hours later. None of us could have anticipated we would find ourselves on the ground much sooner than that.

Around 40 minutes into our flight, I was head down working the navigation for our route and communicating with approach, while my H2P was at controls. Suddenly, I heard him verbalize the caution for one of the degradations I hoped I would never encounter.

"#1 INPUT CHIP."

As I lifted my head to look at my screens, processing what I had just heard, my H2P was already verbalizing the critical memory items associated with the Main Transmission Malfunction Emergency Procedure.

"If failure is imminent, land immediately. If secondary indications are present, land as soon as possible."

I scanned my instruments, searching for secondaries or signs of imminent failure, as I assumed the controls from my H2P. For about 30 seconds, all other instruments appeared normal. As my H2P broke out his Pocket Checklist and read through the remainder of the procedure, it directed us to land as soon as practicable. At this point, the decision-making process drilled into every HAC kicked in and I began running through my options. I knew I was about 75 miles from KNIP and 100 miles from KPBI. I was already in contact with approach, so I requested range and bearing to the nearest airfield. Approach came back immediately, indicating the closest airfield was Ormond Beach Municipal Airport (KOMN), about 10 miles east of my current position.

At that moment, my entire crew noticed the acrid smell of hot metal fumes. My AWR1 was the first to state this realization. Almost simultaneously, we experienced the onset of abnormal vibrations quickly degrading the situation from uncomfortable to extreme, as I watched my No. 1 engine turbine generator temperature climb from the green into the yellow while I maintained level flight. I suddenly recognized this as a manifestation of increased power required for a fixed collective setting, a possible sign of imminent failure, per NATOPS. This entire series of events unfolded almost concurrently and within about 30 seconds of the first caution light illuminating.

As I mentally checked the boxes of possible imminent failure signs delineated in NATOPS (abnormal vibrations, fumes and increased power required for a fixed collective setting), it only took a few seconds for me to reach a decision. I scanned outside below the aircraft and identified what appeared to be a relatively flat farmer's field off our 11 o'clock low. I knew if my transmission failed at this altitude, my crew's likelihood of survival was virtually nonexistent. I didn't know how long my input module would last and I determined I wasn't going to find out.

I immediately initiated a rapid descent, which resulted in the vibrations only growing in intensity. As we continued working our way down toward the field, I tasked my crew with executing the immediate landing/ditching checklist and then locating the most suitable area in the field below us. Due to the fact we still had positive communication with approach, I made an emergency call over their frequency, alerting them to the reality I would not make it to KOMN and was executing an emergency landing in a field near my current position. As we decreased our altitude, we eventually lost the ability to reach approach, but could still hear them over their frequency calling other aircraft in the area to assist in locating our precise position.

As we came down over the field, I set up for a low-power, no-hover landing in an area clear of trees and shrubbery. The landing was fortunately uneventful and resulted in no additional damage to the aircraft. Once we were safely on the ground, I checked to make sure my crew and maintenance personnel on board were safe.

To avoid any additional damage to aircraft components, we expeditiously shut down and I tasked my H2P with sending our GPS coordinates back to the squadron duty officer (SDO) to assist in locating us while I made the phone call to base to break the news. Upon receiving the information, the entire squadron sprang into action. The SDO contacted first responders and within minutes, personnel arrived to provide us with assistance and supplies.

Over the next six hours while we waited in that field, I replayed the scenario in my head, turning the details over in my mind, contemplating the question many HACs have had to ask themselves:

Did I make the right call?

I made the decision in flight so quickly, almost automatically, I initially began to question myself once the situation had concluded. Looking back on it now, I have come to the realization the only reason I was able to make the decision as quickly as I did was due entirely to the training my HACs had instilled in me when I was an H2P. Over and over, I had been told you can never wait until you're in a situation such as an imminent transmission failure to determine what it would really take to get you to land an aircraft immediately. I had rehearsed many scenarios and how I would react to such situations since early on in my HAC training. Throughout these thought experiments, however, I honestly believed this was more of a hypothetical discussion. The likelihood of this happening to me seemed infinitesimally small. So when it came down to the decision, as I sat in that seat, mentally checking off the indications in front of me, I realized I had already identified the risks, assessed the hazards and made this decision months ago, before I ever knew I would find myself in this situation. If I had hesitated in my decision, there is a possibility this event may have ended very differently.

The importance of developing a resilient and repeatable process is emphasized, time and time again for a reason. When faced with a challenge, we will always default to our foundational training. I was fortunate enough to have exceptional teachers who played a pivotal role in shaping my process. ➔



By Navy Capt.
Jonathan D.
Erpenbach, M.D.

PHYSIOLOGICAL
EPISODES
ACTION
TEAM (PEAT)

O₂K
TO
BREATHE

Have you ever stopped to think about something you do around 6.5 million times per year? Unless you have a condition making breathing more difficult, we all just do it automatically and take it for granted. The exchange and transportation of oxygen from the outside environment to our cells is elemental to our survival. The pathway subsequently using oxygen for cellular energy, called aerobic metabolism, is the primary engine enabling the body to function. While the details of these cellular processes such as the Krebs Cycle and the Electron Transport Chain are not essential for aviators, understanding the basic principles of breathing dynamics, oxygen use and the effects of blood gas chemistry are critical for safety of flight.

For the purposes of this discussion at altitudes most relevant to naval aviation, the composition of air at sea level is about the same as it is at higher altitudes in the atmosphere. There is approximately 21% oxygen and 78% nitrogen with other gases such as carbon dioxide, argon, helium and neon making up the remaining 1%. As you ascend in the atmosphere, the total pressure for all gases combined decreases (figure 1). The pressure at sea level is 1013.25 millibars (or around 14.7 psi) while the atmospheric pressure is half of that at an altitude of around 18,000 feet.

If unfolded and laid flat, the total surface area of the human lungs available for gas exchange is around 70 square meters which is about the size of a tennis court. It's critical the amount of oxygen available to diffuse across the surface area is sufficient to meet the needs of your body. At sea level, there is a significant reserve capacity in the system to compensate if oxygen levels decrease. When the amount of oxygen in the breathing gas is unable to meet the body's demands, it is termed hypoxic hypoxia. To restore the balance if insufficient, either the percentage of oxygen, pressure of the gas or both can be increased to facilitate the exchange of oxygen across that large surface area. Pressurized cabins or On-Board Oxygen Generating Systems (OBOGS) facilitate this and ultimately help prevent hypoxic hypoxia.

GAS CONCENTRATION VS. PRESSURE

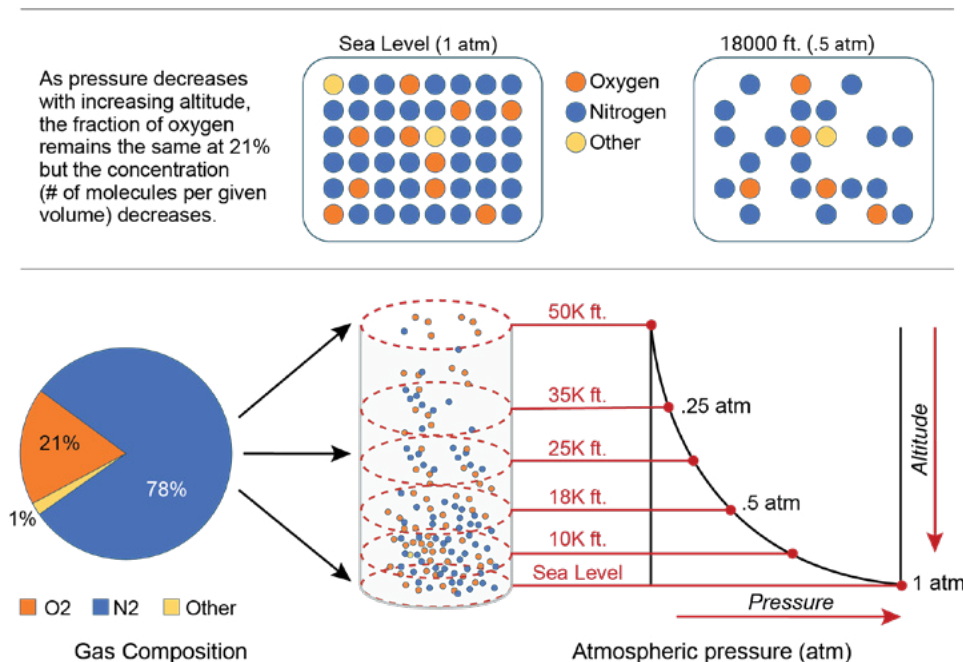


Figure 1. The total pressure for all gases combined decreases with increasing altitude.

The transportation of oxygen from the lungs is another essential link. Hemoglobin is the protein within blood preferentially binding oxygen in the lungs, carrying it to the cells and then releasing it for use. Hypemic hypoxia occurs when the oxygen-carrying capacity of the blood is insufficient. This can occur if you are anemic (not enough red blood cells), you lose blood volume (donating blood or hemorrhage) or in some diseases when hemoglobin does not work properly.

Another form of hypemic hypoxia can occur when there is too much carbon monoxide (CO). This colorless, odorless gas most frequently results from fossil fuel combustion and preferentially binds to the oxygen-carrying sites on hemoglobin inhibiting the transportation of oxygen. Symptoms of CO poisoning typically do not occur unless carboxyhemoglobin levels exceed 10%, an exceedingly rare occurrence in naval aviation. Scrubbers within the OBOGS are extremely effective at removing CO from the product gas before reaching the lungs. Interestingly, heavy smokers often have chronic carbon monoxide levels in the high single digits; their bodies partially adapting to this stress of permanently impaired oxygen transportation.

Stagnant hypoxia is a third form most frequently occurring in aviation during heavy G-loading. The normal dynamics of blood circulation are inhibited by G-forces, which if too extreme or not well compensated for through the anti-G straining maneuver and G-suit, can lead to a loss of consciousness.

The fourth form is histotoxic hypoxia which occurs when the cells are directly inhibited from using the oxygen they receive. Cyanide poisoning is a primary example, however, outside of burning material in mishaps this type of hypoxia is extremely rare in aviation.

Although we have covered the different forms of hypoxia when there is not enough oxygen available through different mechanisms, there can also be considerations when there is too much oxygen. Compared with nitrogen, oxygen is absorbed more rapidly through the lungs. When the air you breathe contains a high percentage of oxygen and is rapidly absorbed, it can cause absorption atelectasis (a-te-lec-ta-sis), where the alveolar sacs in your lungs start to collapse over time (figure 2). This creates a shunt where the blood continues to flow through the vessels around the collapsed alveolar sac but does not receive oxygen. G-forces

can exacerbate this effect as the bottom parts of the lung are compressed helping those alveolar sacs collapse. Recent changes to CNAF M-3710.7 incorporating strategic air breaks and the aircrew controlled breathing cycle help prevent or alleviate this occurrence. By fully expanding the lungs through deep breaths and introducing more nitrogen from the cabin air back into the alveolar sacs, atelectasis is prevented ensuring oxygenation of the blood moving through the lungs.

Another consideration is how the body reacts when oxygen levels in the air oscillate. Modern OBOGS use alternating sieve beds to enrich the amount of oxygen in the product gas flowing to the aviator. Under certain conditions, these systems can produce oscillations around the target oxygen percentage during normal operations. Compared with a steady state oxygen delivery concentration, one theory known as rapid oscillating hyperoxia concentrations (ROHC) proposes the body physiologically reacts differently to oscillating concentrations even though the average oxygen concentration remains the same. Several research studies performed by both Navy and Air Force, as well as academic partner institution labs, investigated this possibility over a three-year period.

In December 2023, a subject matter expert panel, including authors from the studies as well as Navy and Air Force aeromedical personnel, convened to review the research results. While minor physiological changes were observed during focused analysis of cardiopulmonary, blood or imaging components, there were no observed effects on adverse symptom presentation or cognitive performance. The panel unanimously concluded ROHC was not a primary cause of Physiological Events (PEs) in the aviation environment. The mixing effect of gases in the lungs during inhalation, as well as the overall dampening effect of the entire breathing system (air within the plenum, life support components such as tubing/mask and airways), significantly decreases the magnitude of any oxygen concentration fluctuations occurring at the OBOGS concentrator before reaching the lungs. Essentially, the body does not respond adversely in a meaningful way to these short-duration OBOGS oscillations.

Understanding the basic physiological principles, design and functioning of the life support system, along with solid emergency

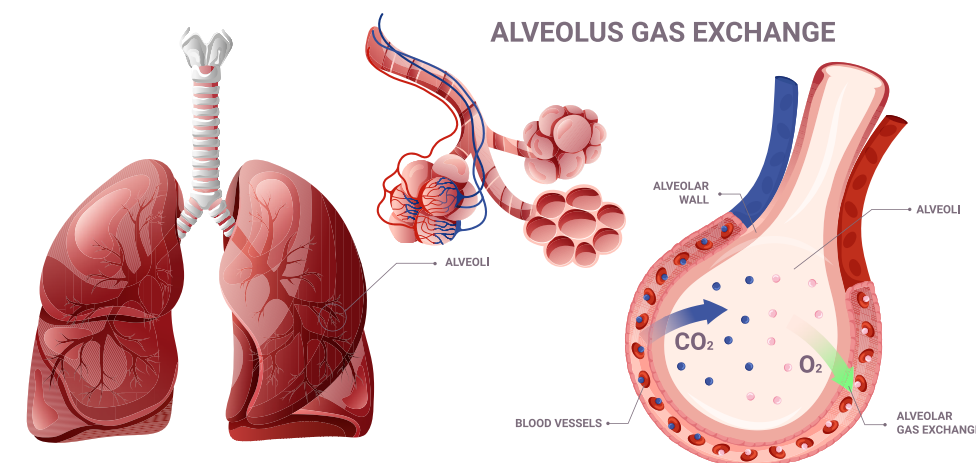


Figure 2. The time of useful consciousness at various operating altitudes following a rapid decompression.

TIMES OF USEFUL CONSCIOUSNESS (TUC) WITHOUT SUPPLEMENTAL OXYGEN		
ALTITUDE	TIME OF USEFUL CONSCIOUSNESS	FOLLOWING RAPID DECOMPRESSION
18,000	20-30 min	10-15 min
22,000	10 min	5-6 min
25,000	3-5 min	1.5-2.5 min
28,000	2.5-3 min	1-1.5 min
30,000	1-2 min	30 sec-1 min
35,000	30 sec-1 min	15-30 sec
40,000	15-20 sec	7-10 sec
43,000	9-12 sec	5 seconds or less
50,000	9-12 sec	5 seconds or less

Figure 3. The time of useful consciousness at various operating altitudes following a rapid decompression.



A U.S. naval aviator dons an oxygen mask in a T-45C Goshawk onboard Naval Air Facility El Centro, California, July 19, 2023. (U.S. Navy photo by Mass Communication Specialist 3rd Class Aleksandr Freutel)

(Continued on next page)

ADVERSE PHYSIOLOGICAL CONDITIONS						
COMMON SYMPTOMS	HYPOXIA	HYPOCAPNIA/HYPERVENTILATION	HYPERCAPNIA	FATIGUE	HYPOGLYCEMIA	DEHYDRATION
COGNITIVE IMPAIRMENT/DISORIENTATION	X	X	X	X	X	X
DIZZINESS	X	X	X	X	X	X
FATIGUE/SLEEP DEFICIT	X	X	X	X	X	X
HEADACHE	X	X	X	X	X	X
TINGLING/COLD EXTREMITIES	X	X	X	X	X	X
LIGHTHEADEDNESS	X	X		X	X	X
NAUSEA	X		X	X	X	X
VISUAL DISTURBANCES-HAZY/BLURRY/FUZZY/OTHER	X	X	X	X	X	
EUPHORIA	X					

Figure 4. Several conditions have overlapping symptoms with hypoxia.

procedures knowledge, are the foundation for safe operations. Appreciating the differences in time of useful consciousness (figure 3) at various operating altitudes should an unintended exposure occur is always important. As part of the quick look following a possible PE, OBOGS design knowledge sometimes helps drive the analysis for what is causing symptoms.

For instance, the sensor alerting aircrew to inadequate OBOGS performance is positioned immediately after the sieve beds, providing a reserve buffer of well-oxygenated air to the aviator before hypoxia could be a physiologically plausible cause of symptoms with a malfunctioning OBOGS.

The system is designed to alert aircrew to a failing component well before any adverse physiological effects could occur thus allowing time for emergency procedures. Subsequently, when an OBOGS caution occurs with a normally functioning cabin pressurization system and symptoms are reported almost immediately after, hypoxic

hypoxia due to inadequate levels of oxygen to the aircrew is a highly unlikely explanation for symptoms given the design.

This systems knowledge helps drive evaluation for other components or physiological occurrences that could be causal to the symptoms. Several causes have overlapping symptoms with hypoxia (figure 4). Depending on the event circumstances, this often makes determining a cause difficult based on symptom presentation alone. Systems knowledge and reliable technical information, such as from Slam Sticks and MU data, is foundational to determining the cause of any adverse symptoms when they occur.

The next time oxygen comes up as a topic, think back to the basic physiological principles relevant to the aviation environment. They drive the design and functioning of the life support systems as well as the emergency procedures keeping us safe.

And remember, it's OK to just breathe. ✈



U.S. Marine Corps KC-130J Hercules pilots assigned to Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), conduct a touch and takeoff exercise, Chocolate Mountain Aerial Gunnery Range, California, April 8, 2025. (U.S. Marine Corps photo by Lance Cpl. Fabian Ortiz)

SLAM STICK BZ

Top performing Navy and Marine Corps squadrons for Slam Stick matching from recent months. The ongoing use of Slam Sticks is key for enabling a healthy aircraft and aviator.

Bravo Zulu to the winners.

June: 1) TPS: 100%	Mar: 1) VAQ-131: 100%	Dec: 1) VFA-137: 97.48%
2) VAQ-142: 98.53%	2) NAMCE Lemoore: 100%	2) VFA-37: 97.67%
3) VFA-137: 95.5%	3) VFA-137: 97.67%	3) VAQ-134: 97.22%
May: 1) VAQ-209: 100%	Feb: 1) VAQ-131: 100%	Nov: 1) NAMCE Lemoore: 100%
2) VAQ-131: 98.75%	2) VAQ-137: 100%	2) VMFAT 323: 100%
3) VAQ-132: 98%	3) VFA-31: 97.90%	3) VFA-137: 99.22%
Apr: 1) VAQ-131: 100%	Jan: 1) VAQ-130: 96.30	
2) VAQ-132: 100%	2) VAQ-131: 95.65%	
3) VFA-31: 97.89%	3) VFA-11: 94.46%	



PACK A TOOTHBRUSH

By Lt. Dom Colao

HELICOPTER MARITIME STRIKE SQUADRON (HSM) 70 SPARTANS

The unexpected can strike at any moment. The true measure of a crew's skill, training and composure is often revealed when things go awry. On Dec. 4, 2024, the Spartan 700 crew experienced just such an event.

While flying a routine Ship/Air Ops grade sheet as part of the Helicopter 2nd Pilot's (H2P) syllabus progression, the crew found themselves in a critical situation; two miles astern of USS John Basilone (DDG 122) with an unexpected engine emergency.

At first glance, the weather was clear, the seas calm and everything appeared ordinary. But as every aviator knows, what seems calm can quickly turn turbulent. While awaiting setup for helicopter in-flight refueling and vertical replenishment training, Spartan 700 received a #1 Fuel Press Caution light.

After following emergency procedures, the helicopter aircraft commander (HAC) took control while the H2P dove into the pocket checklist (PCL) to address the situation. Within seconds, before the H2P could even reach the emergency procedure in the PCL, the No. 1 engine flamed out.

What followed was a tense few moments as the crew debated possible causes. As the engine reignited and flamed out twice more, uncertainty loomed. Concerned about potential fuel contamination and the possibility of the No. 2 engine failing as well, the crew identified the closest option for a safe landing: the ship.

In this critical moment, the crew's rigorous training took over. Helicopter pilots and crews are trained to handle emergencies, including executing single-engine landings to single-spot ships. The crew remained calm under pressure, adhering to their emergency protocols. The HAC immediately declared an emergency and directed the ship to all-ahead flank. Adjusting their approach, the HAC flew a single-engine profile, even though the ship had not yet accelerated to full speed.

Despite the tension, the crew's training gave them the confidence they needed. They

successfully brought the helicopter in for a controlled landing on the flight deck.

This incident is a prime example of how crew resource management and solid training can make all the difference. It wasn't just technical know-how that saved the day – it was their ability to think clearly, stay focused and perform under pressure. What could have been a frightening and chaotic situation ended in a safe, controlled landing, thanks to the crew's preparation and understanding of emergency protocols.

While this story highlights the importance of training, it also serves as a reminder about the unpredictable nature of aviation: always be prepared for the unexpected. Reflecting on the experience after safely touching down, the first thought collectively crossing their minds was, "I didn't pack a toothbrush!"

It's easy to take safety for granted when everything goes according to plan, but the real value of training becomes clear when things don't go as planned. It's crucial to stay prepared for the unforeseen regardless of experience. And on that note, the moral of this story is: When heading out to other ships, always remember to pack a toothbrush! ✈



An MH-60R Sea Hawk, attached to the "Spartans" of Helicopter Maritime Strike Squadron (HSM) 70 launches from USS Gerald R. Ford's (CVN 78) flight deck, May 7, 2023. (U.S. Navy photo by Mass Communication Specialist 2nd Class Nolan Pennington)

By Lt. Cmdr.
Ryan Schmidt

**STRIKE FIGHTER
SQUADRON
(VFA) 2
BOUNTY HUNTERS**

When handling emergencies, aviators are trained to refer to the pocket checklist (PCL). More than one emergency has been made worse because procedures weren't followed. It is also possible you will encounter an

emergency not covered by the PCL or Naval Air Training and Operating Procedures Standardization (NATOPS). NATOPS still has guidance for these scenarios, "Use common sense and sound judgment to determine the correct course of action."

Lt. Cmdr. DJ Hooper and I found ourselves in such a unique scenario while flying a night combat flight over Yemen. While receiving fuel from our tanker, something went drastically wrong with our aircraft. Our inter-communication system (ICS) started blasting a constant, loud high-pitched tone. All the displays in both cockpits alternated between flashing "STANDBY" and a degraded version of their normal display. In short, all our information sources were both useless and distracting.

I attempted to continue fueling as long as possible while reaching out over the radio to our flight lead but realized our radios were non-functional. I also could not safely concentrate on refueling so we broke away to deal with the issue. Fortunately, Hooper and I could still talk to each other using the ICS over the constant loud tone. With no displays, we guessed we had about 11,000 pounds of fuel out of a potential 16,500 pounds.

With no other way to communicate, we turned all our external lights to full bright. We then transitioned from behind the tanker to the right side of our flight lead. I assumed the unexpected breakaway with lights would cue our flight lead something was wrong. After we moved to the right side of our flight lead, they began to lead us away from the tanker, reinforcing in my mind they got the message. Once we were safely away from the tanker, I further assumed we would go with the normal procedure of making

the "bleeder the leader." This procedure states the aircraft with the problem should be the formation lead. This is to help them focus on troubleshooting and not flying formation. I moved up "acute" or forward of my lead's wing line and went wing's level. However, I did not conduct any light signals to convey the exchange of formation lead. Nonetheless, I decided to try to start troubleshooting.

Unfortunately, the PCL has no procedure specified for exactly this scenario. Instead, Hooper and I talked back and forth about what would be most logical. Consistent flashing "STANDBY" on the displays is associated with a "mission computer" failure, which does have a procedure. The consistent flashing was only one of our symptoms, but maybe the procedure would help, so we attempted to reset both mission computers.

No luck.

We then noticed our flight lead was not flying form on us but had flown on straight ahead without us. With no flight or navigation instruments and no way to talk to anyone, we could not afford to lose sight of them. Their aircraft was our only flight instrument. Pausing the troubleshooting, we focused on catching back up to their wing line. Clearly, we were failing at communicating.

We pulled forward of their wing line and put our arresting hook down, in accordance with NATOPS and standard operating procedures to indicate a need to land as soon as possible and take an arrested landing. I once again made the dangerous step of "assuming." Given we were still over land, I assumed the "land as soon as possible" signal would convey "take me to the land divert." Unfortunately, Hooper and I soon noticed we were being led back out over water, toward the aircraft carrier. In our current state, I assumed landing on the ship would be too dangerous. We had no way of entering Precision Landing Mode (PLM) for a shipboard landing. We had no primary flight instruments. We had no idea what our weight was. And we had no way to talk to anyone. Unfortunately, neither of us knew how to convey this to our flight lead. Without them, we had no way to navigate ourselves to the briefed divert. With our estimated fuel state, we knew we had time though, both to troubleshoot and attempt to communicate better.

Going back to troubleshooting, we tried to analyze the problem logically. Clearly something was electrically faulty. The radar is one of the largest electrical loads, so we turned it off. No change. We then turned off every other combat system with a switch in the cockpit. Still no change. The only option left was to turn off the aircraft's electricity entirely.

The F/A-18 is a fully fly-by wire aircraft with computers controlling both its flight control surfaces and engines. However, it does not need its two AC generators to stay in the air. Permanent magnet generators (PMG) installed on the engines provide power to flight control and engine computers. These PMGs will operate if an engine is turning. With the generators off, the jet would still fly. But that's about all it would be able to do. Every other system aside from the engines and flight controls would lose power. Since none of those systems were helping us at this point, Hooper and I decided a full electrical reset was worth the risk.

After turning both generators off, the cockpit became dark and quiet. We paused for a few seconds to allow the aircraft to fully reset itself. We then turned on the right generator. Systems associated with the right side of the electrical system turned on normally. However, the systems on the left generator's side did not turn on. In the F/A-18, there is an electrical tie connecting the left and right electrical systems when one generator is offline. This allows one generator to support the full load of the aircraft. However, the tie will open if there is an electrical fault exceeding its tolerances. This is to prevent a single fault from causing both generators to fail.

When we turned on the left generator, the symptoms resumed. We had isolated the fault. It would turn out later the faulty component was the communications system control. This component is mentioned nearly 20 times in the F/A-18EFG NATOPS. Each instance lists one of numerous systems it affects. However, it has no section dedicated solely to explaining what it does or what happens if it fails. We did not know this at the time but we did know the fault was on the left side. So we turned off both generators again and then turned on only the right generator while leaving the electrical tie open.



We now had a few working displays and no constant high-pitched tone in our ears. We also could tell our fuel state and presumably, would be able to enter PLM for shipboard landing. However, we still lacked any navigational capability and had only standby flight instruments. In addition, with the left generator off and the GEN TIE open, the PCL says data sent from the standby attitude to the heads up display may be corrupted. It turned out "corrupted" meant frozen.

We attempted to talk on our only operational radio. Unfortunately, it was stuck transmitting in its encrypted mode. The electrical resets

caused the radio to dump its crypto-logical keys. All our transmissions sounded like static. We tried turning the radio off and back on to no effect. The last option was the "GUARD TX" switch in the front cockpit. When set to either the PRI or AUX position, it will override the settings in the radio and cause it to transmit/receive on 243.0 MHz. Finally, this worked and we managed to get in touch with our wingman.

From that point on, troubleshooting and arranging a safe recovery became a lot easier. Through our wingman on guard we coordinated a recovery time back aboard the ship. We tested out configuring and entering PLM at altitude. We also discovered we could not dump fuel to adjust weight given our current electrical issues. This was another fact not stated in NATOPs. However, this did not end up being much of an issue. We increased speed to increase fuel burn and the delay to recovery was minimal. Because we had lacked navigational instruments, our wingman led us until I could see the visual landing aids on the ship. With the assistance of the air wing landing signals officer, we executed a safe, uneventful recovery.

Afterward, Hooper and I agreed it was one of our most uncomfortable experiences in an aircraft. While I am proud of our problem-solving efforts for an emergency with no written procedure, there are several things we could've done better.

One, we should have been more familiar with night visual communication procedures. The only NORDO (no radio) comm procedures we practice every day are lead changes for tanker flights. While it did not end up being a factor, if we had not solved our electrical problems, we would have needed to divert. None of us, our lead included, knew the night visual signal for that request.

Second, with only visual communications, I should have been more deliberate in communications. I also should not have assumed my lead got the messages I intended. We both were familiar with the use of a single flash of external lights for lead change. I should have used this signal and made sure he moved to fly formation off me before going heads down to troubleshoot. NATOPS states the general procedures for any emergency should follow the priorities of "Aviate, Analyze, Navigate, Communicate." Given our lead was our only operable "flight instrument," I should have prioritized "aviating," i.e., making sure he did not fly away without us, before "analyzing" or troubleshooting.

NATOPS does not have the exact script written to handle every scenario. However, its general guidance to "use common sense and sound judgment," and "Aviate, Analyze, Navigate, Communicate" will, when combined with a calm head, almost always lead to a safe recovery. ✈

F/A-18F Super Hornet from the "Fighting Redcocks" of Strike Fighter Squadron (VFA) 22 conducts flight operations in the Pacific Ocean, April 17, 2025. (U.S. Navy photo by Mass Communication Specialist 2nd Class Hannah Kantner)

By Lt. Cassia
Larson & Lt.
Cait Sylvester

**STRIKE FIGHTER
SQUADRON
(VFA) 103
JOLLY ROGERS**

The chosen location for Carrier Air Wing SEVEN's (CVW-7) Air-to-Surface Strike Fighter Advanced Readiness Program (SFARP), Marine Corps Air Station (MCAS) Beaufort, South Carolina, was forecasted

to have bright, sunny days and minimal weather conditions requiring pilots to fly primarily using flight instruments, rather than visual cues. Unfortunately for the strike fighter squadrons of CVW-7, they brought the dreary February Virginia weather with them to include chilly temperatures, drenching rains and — importantly — overcast ceilings.

At the brief time for a two-wave air-to-surface mission, Beaufort's forecast weather for flight time was undeniably under instrument meteorological conditions, declaring a minimum 500-foot ceiling during time of flight and up to an hour post landing; all aircrew in the event understood an approach would be required to land back at Beaufort at the conclusion of the mission. Beaufort had a Precision Approach Radar (PAR) to all runways with a decision height of 200 feet above runway threshold, so with the 500 foot forecasts above the required minimums, aircrew expected to be able to land without incident. The risk of a potential missed approach was mitigated by setting an appropriate joker/bingo fuel state to ensure each aircraft would have sufficient fuel to return to Beaufort, attempt two approaches and then, if required, divert to Naval Air Station Jacksonville, Florida, the chosen weather divert option due to its optimal visual meteorological conditions forecast during the flight time.

After the two divisions of F/A-18Es and Fs launched and completed their mission, the formations split up into singles for weather and approach considerations. The first division of the Strike Fighter Squadron (VFA) 83 began their recoveries at Beaufort, which entailed getting vectored around a wide box pattern at 3,000 feet. Before any of the first wave landings the second division of VFA-103 Victory (VY) jets completed their mission in the working area and proceeded to the airspace exit point. The range training officer for the working airspace was a helpful relay from the field, keeping the

division updated with current runway and airfield conditions so informed decisions could be made. The VY fighters decided the weather was proceeding as forecasted and their preflight fuel planning was sound for the required approaches, even with the wide traffic pattern and many jets in the sequence.

Meanwhile, as the Jolly Rogers executed their formation breakup in the working area, the VFA-83 division was in the ground control approach (GCA) box, receiving vectors to land. The first jet in the VFA-83 landed normally until the pilot attempted to taxi off the runway and momentarily lost braking action — necessitating the use of the F/A-18E emergency brake system. Without the assistance of anti-skid due to emergency brake selection, the aircraft brakes caught on the runway and resulted in a blown tire which created a foreign object debris (FOD) hazard on the active runway. Unwilling to accept the FOD risk to landing aircraft, Beaufort tower discontinued multiple aircraft approaches until the risk was addressed and the runway was clear. With only one aircraft landed, the VY division entered the landing GCA pattern as the Rams were being rerouted for their second approach.

VY 13, the third jet in the VFA-103 division piloted by the squadron safety officer with a "new guy" weapons systems officer (WSO) in the back seat, was sequenced into the GCA box behind VY 11 and VY 12. As the traffic pattern continued and jets were sent off approach frequency to individual GCA frequencies, the conditions degraded further. The active runway changed because of the FOD, sending jets on vectors even farther from the field to get the GCA box oriented in the correct direction and invalidating fuel planning assumptions.

Weather had also degraded due to a localized rain squall and despite Automatic Terminal Information Service calling the

ceilings set at 500 feet, aircraft in the GCA box ahead of VY 13 were discontinuing their approach at minimums due to not having the runway environment in sight. Two VFA-83 jets, now on a second missed approach, elected to execute emergency fuel divers to Jacksonville.

In aviation risk management (RM), we often talk about the "Swiss Cheese Model" — meaning there is rarely a single causal factor for a mishap, but rather, a series of minor incidents line up like holes on a stack of Swiss cheese slices and create the conditions for a mishap. At this point, VY 13 was starting to see the confluence of multiple hazards and the aircrew turned to the final approach bearing on their first PAR with some apprehension. Stiff crosswinds during final approach made it difficult for the jet to remain on course. The approach controller opted for large heading changes to quickly address any deviations from course, which made overshoots difficult to avoid. Ultimately, at 800 feet, the controller informed the aircrew of VY 13 they were not in a safe position to land due to course line deviations and they directed them to execute a go around. Still in the clouds without the runway environment in sight, VY 13 executed their missed approach instructions.

Now was the time for decision making: Should they attempt another approach or should they avoid the risk and go ahead and request to divert to Jacksonville? The aircrew assessed they had enough gas remaining to try the PAR one more time at Beaufort, but after that, a bingo fuel profile would be required with near-perfect

ATC Under Instruction

execution to make it to Jacksonville without violating standard operating procedures for minimum fuel on deck. In the downwind for their second and final approach at Beaufort, the VY 13 WSO provided the pilot the bingo information: direction to turn, airspeed required and the altitude needed to make it safely while burning the minimum amount of fuel. Ultimately, the second PAR at Beaufort ended as the first, with too many course deviations for the jet to land safely.

Executing missed approach for their second PAR with 3,800 pounds of fuel remaining onboard, the pilot of VY 13 immediately turned the jet toward Jacksonville and began to accelerate as required to climb up to flight level (FL) 430 for the emergency profile. The WSO declared an emergency to ensure priority handling from air traffic control (ATC). It required assertiveness from the aircrew to get what they needed; ATC attempted to issue heading vectors and level-off altitudes lower than the required cruise altitude of FL 430. The pilot remained persistent in flying the climb profile dictated by NATOPS (the Naval Air Training and Operating Procedures Standardization) and the WSO remained directive in telling ATC what they needed. Ultimately, ATC understood the situation. By the end of the

The Swiss Cheese Model is a risk management tool demonstrating layers of active failures and latent conditions. Each slice, or layer, of risk mitigation has holes, representing weaknesses or potential failures. When the holes in each layer align, a trajectory of failure can pass through all the defenses, leading to a possible accident. (U.S. Navy illustration by Ani Pendergast)

A SWISS CHEESE DIVERT

FOD on Runway

Overcast Ceilings

Stiff Crosswinds

Bingo Fuel



affair, the aircrew of VY 13 landed safely at Jacksonville, no worse for wear except for their lack of wallets and cellphones. They fueled the jet up and launched for an uneventful landing back at Beaufort.

Many lessons were learned from this experience.

First, the importance of appropriate pre-flight fuel planning. In this case, all members of the Victory flight had planned for what initially seemed like a conservative amount of fuel remaining at the end of their event, considering a successful approach and landing were all but certain based on the weather at the airfield. However, after the Swiss Cheese Model had its say — including a fouled runway, poor weather, stiff crosswinds and ACTs under instruction — the fuel planning was exactly appropriate to get the crew to their planned divert.

Second, the importance of in-flight decision making and continuous reassessment of the RM matrix. With all the factors at play, the crew made the correct decision to divert, rather than risking another potential failed approach which would have put them in true fuel extremis.

Third, the need to be assertive. Air traffic control is a third crewmember in the flight, and crew resource management (CRM) applies to interactions with them as well. If an aircraft is in extremis, the aircrew are the only ones who truly know what they are experiencing in the cockpit. It's important to communicate with ATC and be assertive.

Often, it's easy to overlook the basic components of RM and CRM, but on days like these, aviators discover why it's so essential to understand and execute them. ✈

SHOULD WE KEEP GOING?

By Lt. Cmdr.
Ryan Govoni

NAS FALLON SEARCH AND RESCUE LONGHORNS

"Keep your airspeed up," I warned. But it was too late. We were already too slow and too high with nowhere to go. The engine temperature rose from yellow to red and our rotor speed began to drop. In that moment I knew it was too late.

I took the flight controls and called to the crew, "We're going down, boys! We're going down!" The canyon was too tight to try and maneuver back the way we came, so I made a play for the middle, fighting to keep our rotor speed from slowing further. We hit the ground hard. The helicopter shook violently as the main rotor blades hit the sides of the narrow canyon walls and then exploded

into thousands of pieces. I cut power to the engines and managed to engage the rotor brake. The mangled rotor blades came to an abrupt halt.

"Should we keep going?" You ask yourself this question almost every day, maybe more than once. You may have asked it while passing a gas station on the highway when your tank is almost empty or after winning money at the blackjack table — or in my case, after spending several hours searching for a lost hiker at high altitude.

It is easy to become so focused on the reward you lose sight of the mounting risks. When you ask this important question, "Should we keep going?" what you are really asking is, "Does the benefit outweigh the cost?" The answer is different for everyone, but it depends on your risk management (RM) process and your discipline to stick to it.

The question was the last thought I had before the rotor speed of Longhorn 02 began to decay, leading to the mishap July 16, 2021. Playing back events of the day in my mind, my ability to deliberately and effectively answer that critical question rested on a breakdown of two critical crew resource management (CRM) skills: mission analysis throughout the day and my leadership role as the aircraft and mission commander.

The call came from the Air Force Rescue Coordination Center, requesting our assistance in a search effort for a middle-aged male last seen hiking up Boundary Peak in Nevada. Minutes after the notification, the ready room was buzzing with search and rescue (SAR) team members looking to help any way they could. It seemed the whole team was present except for one, my co-pilot. When I called him to ask his estimated time of arrival, I was surprised to hear he sounded like he had just woken up. I soon discovered he had flown the night before and was mistakenly scheduled for duty the next morning. By the time he arrived at the hangar for the SAR mission, he was operating with less than 12 hours of crew rest.

We arrived on station around 1230 and began searching for the lost hiker. With the little information we had, our initial thought was, "This guy could be anywhere ...", so we decided to initiate a contour search as close to Boundary Peak as possible, focusing on nearby hiking trails then expanding outward. On our climb to investigate the area, we conducted an altitude check and made note of our 13,000-foot density altitude Naval Air Training and Operating Procedures Standardization limit, setting a ceiling of 10,500 feet mean sea level for ourselves. We then searched up and down the steep, unforgiving terrain for the next two hours.

Once we hit our bingo, we flew to a nearby airfield in Bishop, California, where we shut down to receive fuel and plan our next sortie. I called my officer-in-charge and we spoke of the tough terrain and high-altitude conditions, weighing the options of continuing to search for the missing hiker. Ultimately, we agreed to devote another two hours of fuel to the search and set a bingo for Naval Air Station Fallon, Nevada. Next, I advised my crew of the new plan and updated our RM. The crew was tired and hungry, but all agreed with capping our search time and heading home afterward.

This was another "Should we keep going?" moment. Some members of my crew were showing obvious signs of fatigue. Navigating a search in the high mountainous terrain was difficult. Coupled with lack of food and water for several hours, our focus and attention were waning. Not to mention there was still no sign of the missing hiker. With the search area in question and no leads pointing us in any direction, the odds of finding the hiker were fading along with our outlook.

I neglected to use my time on deck at Bishop to conduct a more in-depth mission analysis of the next search phase. Instead of treating this phase as a new flight, I continued as if it were just an extension of the previous one, to which we had briefed hours before. An analysis of the next phase would have allowed a more honest discussion about our crew limitations and higher risk for complacency.

Additionally, it would have given me time to reassess my power requirements in the terminal area. I neglected to adjust for the rising air temperature and increased fuel weight compared to when we first arrived on station and I failed to recalculate the altitude cap in the new environment. Perhaps then, after better examination of my crew and the mission ahead, I could have made a more informed decision to knock off the mission and return to base or at least better mitigate the associated risks ahead of us.

Nevertheless, we took off from Bishop and headed back, determined to finally track down the missing hiker and rescue him. We crossed over to the eastern side of the range and began searching again, making our way north to Boundary Peak. With no luck, we turned our attention to the western side where the terrain was much harsher. Carved out by the prevailing westerly winds,

(Continued on next page)

U.S. Marines, Sailors and civilians disassemble a Navy MH-60S Knighthawk helicopter after a hard landing during a search-and-rescue operation on Mount Hogue, near Bishop, California, 120 miles north of Naval Air Station Fallon, Nevada, Sept. 4, 2021. (U.S. Marine Corps photo by Lance Cpl. Colton Brownlee)

the western side of the range was rocky and full of steep narrow canyons. The plan was to use the remaining on-station time to give the west side a thorough search before heading home. Starting from Boundary Peak, we flew a contour search in and out of terrain as our final attempt at finding him.

We eventually came to the mouth of a large canyon with what appeared to be a stream running down it. We thought it reasonable to assume a hiker would follow the running water down the canyon and he would be located at the lowest point of terrain after following the path of least resistance. We flew up the canyon to investigate and as we continued our climb, we reached a fork. The path to the right was steep and narrow, while the left fork was wider and curved around, disappearing behind the terrain.

The walls of the canyon had started to become level with the aircraft and I began to feel uneasy. I transitioned my scan from searching outside to back inside and forward. I remember thinking to myself, "This is probably a good place to turn around." Then I asked myself that critical question: "Should we keep going?" I paused for a few moments waiting for a response from my co-pilot as if he could read my thoughts, but we just continued flying higher, following the canyon left and up the fork.

I had become complacent flying up into that canyon. Instead of actively leading the flight and the mission, scanning my gauges, backing up the flying pilot, communicating my intentions and engaging my crew, my focus was outside looking for someone who could have been anywhere. Due to my complacency and lack of mission planning, I missed the warning signs telling me to turn around. I was not aware of how slow the aircraft had gotten, nor how high we had climbed. Even during my last opportunity to say something — my "Should we keep going?" moment — I did not

effectively take charge and make the decision to lead the aircraft back down the canyon to safety.

I now see this as a critical mission analysis and leadership failure. Despite conducting a proper risk management discussion and receiving assurances from my co-pilot that he was fine, I should have conducted a more in-depth analysis of the composition and effectiveness of my crew. I should have then exercised my responsibility as mission commander to make substitutions to enhance the mission's safety and CRM. Given the circumstances of scheduling and risks stemming from the potentially high level of mission difficulty, a different crew pairing would have been more optimal for the type of mission that day. Even though the numbers on the RM sheet added up to "Low Plus Risk," it was my job to scrutinize and recognize the limits of my crew and allocate the most suitable resources for the assigned mission.

That day, I gained a new perspective on what being an aircraft commander means. It is as if you are trying to coach a football game while also playing in it. There are so many things going on all at once, so many things to manage, yet you still have an active role to fulfill within the crew. Miraculously everyone walked away without a scratch that day, but this incident was completely preventable starting from the brief. I offer to you, before you find yourself asking, "Should I keep going?", know your limits through continuous mission analysis, have a stopping point, and know when to turn around and commit to it. ✈

Note: All four crewmembers survived the crash without injury and were safely recovered. The hiker was found safe and was rescued after four days of waiting under shade and near a water supply. The 15,200-pound MH-60S Knighthawk was fully recovered by the CH-53K King Stallion after careful planning and preparation.



A CH-53K King Stallion from the Marine Operational Test and Evaluation Squadron (VMX) 1 lowers a Navy MH-60S Knighthawk to the ground after recovery from the Mount Hogue mountain range. The two-day operation was the first official fleet mission for the CH-53K King Stallion at Naval Air Station Fallon, Nevada, Sept. 5, 2021. (U.S. Marine Corps photo by Lance Cpl. Colton Brownlee)

THE CONSTANT ROUTINE

A BATTLE AGAINST COMPLACENCY

By Lt. j.g. Troy Brennan

PATROL
SQUADRON
(VP) 10
RED LANCERS

As you become more senior in a squadron, your experience grows. Each flight presents different challenges to learn from and apply lessons learned. Knowledge gained during those challenges can be applied on future flights.

Although no flight is the same, many aspects of various flights can be similar. Your standard preflight leads to the same taxi clearance to the same runway line up for a takeoff ending with the same approach into your home field at the end of every flight. You might become so comfortable with this order you could almost fly that

home field approach by heart.

The routine aspect of these parts of the flight can lead to complacency and letting our guard down. We always prepare for the worst, especially in the critical phases of flight, but we must ensure we always stay engaged and ready for whatever comes our way. Sometimes the parts of the flight we think aren't dangerous prove otherwise.

At the beginning of April 2024, VP-10 landed in Misawa, Japan, for our spring deployment. Our tasking was to provide 24-hour surveillance of an assigned operational area as part of an anti-submarine warfare mission. To do this, we had to maintain a full flight schedule daily to ensure there were no gaps in coverage for the mission. This included the need to continuously launch planes while others were still flying on station or returning home. This cyclical motion placed pressure on executing ground ops quickly and efficiently so we would be able to relieve those aircrews on station. I joined Combat Air Crew Eight for a night flight a few days into this continuous tasking. While other crews had flown together on previous missions and had experience with the operational area and tempo, this was my first mission flight in VP-10. The night started as normal, beginning with a brief and discussion of risk management with the crew to cover any hazards we might face along the way. The weather was ideal, the mission route and tasking had been flown by other crews without issue. It seemed set to be a routine flight.

After the brief, the crew got their gear and headed to preflight the aircraft. Each crew member took charge of their roles and worked together to ensure the aircraft was safe and ready for the mission. With the P-8A being a three-pilot aircraft, we all worked together on the preflight. Once we finished, the Patrol Plane Pilot (2P) took the left seat as the pilot flying. The Patrol Plane Commander (PPC) assumed the pilot monitoring role. Before every takeoff, we brief the start, taxi and takeoff procedures. These briefs cover the flow of events from starting the engines, our expected taxi route, any potential malfunctions and our plan of execution should they happen through the initial stages of flight. These briefs ensure the flight deck is on the same page in the event something happens. The briefs were completed and there were no questions. Both pilots had flown at Misawa Air Base before and were familiar with the taxiways and the takeoff clearance we received. Final checks were made with the aircrew and we were all ready for engine starts.

The 2P and PPC took their seats as I closed the flight deck door and took the jump seat. The 2P signaled to the plane captain (PC) we were ready for starts. Our PC ensured chocks were removed and cleared us to pressurize. It was time to start our engines. The 2P signaled to the PC to start engine #2. After receiving the clearance to start, the 2P and PPC started the #2 engine off the auxiliary power unit. The crew did the same for engine #1. Another flight with routine engine starts — or so we thought

The 2P was ready to check the flight controls when he saw something strange: the PC signaling to the flight deck to cut engine #1. As briefed earlier, the 2P aborted the start per Naval Air Training and Operating Procedures Standardization guidelines. The PC then directed the 2P to cut engine #2. The 2P cut both engines and directed the PPC to take out the aborted start checklist. The flight deck completed the checklist.

Following two normal starts, the PC, with his diligent scan, caught a fuel leak from the #1 engine. The PC correctly directed the flight deck to cut the engines. Once given the signal, the 2P and PPC handled the situation exactly as they briefed it. The proper handling of the emergency led to a swift response from the VP-10 maintenance team who quickly controlled the leak, stopped the spread and prevented a larger mishap from occurring.

While this emergency may not have been as dramatic as shooting an approach to minimums with one engine on fire, as many pilots experience in a simulator for training, it underscored the importance of staying alert at all times while flying an aircraft. The starts checked normal. Everything looked normal ... until it wasn't. We typically train for an aborted start emergency to happen during a start, not when you have finished it. It is easy to expect nothing to go wrong when you are doing the same flights, on the same aircraft, where nothing has gone wrong before. The routine flow of events, especially on long deployments, can lead to complacency. If this team had let their guard down that day, we might not have had the response time we did and the situation could have escalated quickly. Combating complacency can be the difference in a few seconds between a properly handled emergency and a major mishap. ✈

By Lt. Sara R.
Wedemeyer

PATROL
SQUADRON
(VP) 46
GREY KNIGHTS

We've all been there. You're on final, the downwind or smoothly rotating away on takeoff and the sudden "THUD", "POP" or "POOF" of feathers ricochets off your windscreen. You've established aircraft control, noted no damage to the aircraft and comply with your local standard operating procedures; time to go home for a full stop. "BASH was low!" your crew exclaims. "It came out of nowhere!" Agreeing, you're already doing the mental gymnastics of how much paperwork you will need to do for your aviation safety officer once established in cruise.

What really is BASH? It stands for Bird/wildlife Aircraft Strike Hazard and is a preventive and program management entity with origins and execution in the U.S. Air Force. Notably, BASH itself is not the scale of how many birds are currently present in one area. So what is? Does it even exist?

Most aviators use the Aviation Hazard Advisory System (AHAS) during preflight to check what they believe is avian activity in the local airfield or route locations. Crews will then read the AHAS Risk (Low, Moderate, Severe) and conduct crew risk management (CRM) to determine if the risk can be mitigated. So then how is AHAS risk calculated?

AHAS risk is based on next generation radar (NEXRAD or WSR-88D), Next Generation Bird Avoidance Model (NEXBAM) and the Soaring Bird Forecast Model (SOAR). NEXRAD is a weather radar system with models to predict bird movement every six minutes. NEXBAM is a bird avoidance model showing hourly trends based on five years of NEXRAD data. Finally, SOAR is based on the latest local weather data and the known populations of five different soaring birds every 12 hours. If NEXRAD data is not available, NEXBAM will be used only in conjunction with SOAR as the driving model. Additionally, if SOAR data is missing and the NEXRAD risk is low, the AHAS risk will be based on NEXBAM.

Just as every aviator should be an amateur meteorologist, every aviator should be an amateur ornithologist — if not only to help decipher the acronym alphabet soup from the AHAS Risk explanation above. Understanding basic avian ecology can be an additional safety tool to help mitigate your risk of bird strikes.

Birds, from the class Aves, comprise over 11,000 individual species, totaling over 50 billion worldwide. This is an astronomical number compared to Flight Aware's average of 12,000-14,000 aircraft in the sky at one time. With the total percentage of flightless birds being .54%, we certainly share the skies with many lofty, feathered friends.

To start, let's break down the day and night cycle of birds. Almost all birds are diurnal, meaning most active during the day. Some birds, like the common nighthawk and the chimney swift, are only active during twilight hours, both dawn and dusk. Finally, nearly all members Strigiformes — owls, are nocturnal. Nocturnal animals are active during the night and rest during the day.

Most birds collect food by foraging. It is rare for a bird to forage alone. Groups of birds foraging together are called foraging guilds. This concentration of sometimes hundreds of avians is most active during the early morning and evening hours. This foraging tends to lull during the middle of the day when the sun is at its highest. This is in conjunction with the diurnal habits of most birds.

Airfields are prime foraging locations for both diurnal and nocturnal bird species because large areas of expansive, open vegetation are ideal for insectivores. Seabirds, such as gulls, will forage together on the ground after extensive rainfall on airfields as they have easy access to invertebrates that come to the surface. With large numbers of insects come members of the family Rodentia (rodents). Herons and raptors, although solitary hunters, will frequent airfields to eat rodents. But are these avians on your airfield every day throughout the year? Not always. That's where studying the concept of migration is essential.

Migratory animals travel from areas of low resources to areas of higher resources to best fit their ecological and productive needs. Most birds in the northern hemisphere move northward during the spring to take advantage of the new resources after a harsh and cold winter. Those birds will move south again once fall arrives. But the distance birds fly during migration isn't equal across the species board.



AN INTRODUCTION TO THE MOST UNPOPULAR AIRFIELD BIRDS

A FIELD GUIDE TO AIRFIELD BIRDS OF NORTH AMERICA

The Cornell Lab of Ornithology explains all birds are split into four types of migration based on distance traveled. Avians are split into permanent residents and short-, medium- and long-distance migrants. These distances range from changing sides of a mountain to traveling continents. Additionally, North America is split vertically into four major flyways for the medium and long-distance migrants. Think of these as the "avian superhighways" of the sky. This is where bird strikes can become the deadliest.

According to the Federal Aviation Administration's (FAA) published Wildlife Strikes to Civil Aircraft in the United States 1990-2023, both raptors and waterfowl, with the addition of pelicans, had the highest correlation of human fatalities after a bird strike. They additionally had the highest number of human injuries after a bird strike. High periods of bird movement correlate with high numbers of bird strikes.

Waterfowl, such as snow geese and Canada geese, migrate south deep into the United States in the winter to forage in spacious fields of alfalfa, wheat and clover crop. In addition to their normal diet of insects, these birds will eat germinating vegetation. While foraging in large guilds of several hundreds to thousands, some flocks will break off into smaller entities to "hop" fields to find more natural resources. Airfields are a perfect alternative to supplement avian hunger and are frequently visited by migratory birds.

Returning to our definition of AHAS Risk, NEXRAD, while primarily a Doppler weather radar, works by targeting and identifying migratory birds, bats and sometimes insects, populating meteorology screens as "clutter". There are 159 NEXRAD stations per the National Oceanic and Atmospheric Administration. Each station, varying in capacity, can collect clutters of birds up to 140-290 miles away. This data is not necessarily a real-time warning of individual birds at individual airfields, but a focus on flocks. Large flocks of birds may appear as curved crescents on NEXRAD screens and are like those of clouds. Operators are unable to tell species of bird from NEXRAD readings alone.

According to the FAA's published Wildlife Strikes to Civil Aircraft in the United States 1990-2023, 80% of the top 10 species of bird strikes are permanent residence and short-distance migrant bird species. The outlier species of birds are both from the swallow family; the barn swallow and cliff swallow, both of whom are long distance migrants. Swallows create cup-shaped nests high above the ground using grass and mud on both vertical and horizontal surfaces, as well as inverted corners. They habitually choose aircraft hangars due to high overhangs and protection from predators and natural elements. Therefore, swallows are a nuisance to many airports and airfields.

Swallows are also one of the many species protected by the Migratory Bird Treaty Act of 1918. This federal law prohibits (without a waiver) hunting, taking, capturing, killing or selling those species listed as migratory birds. This law does not differentiate between live or dead birds and includes bird parts such as feathers, eggs and nests. This law was updated in 2004 with the Migratory Bird Treaty Reform Act delineating this protection as only for native migratory bird species whose occurrence in the United States results from natural biological or ecological conditions. The top 10 species of birds most likely in bird strikes in 2023 are protected by the Migratory Bird Treaty Act (except one), despite in most areas being permanent residence or short-distance migrant species. This also includes the more deadly bird species upon bird strike, such raptors and geese.

The one unprotected outlier in the top 10 likely bird strikes is the European Starling, an invasive species to North America since the 1870s. European Starlings create massive flocks, also called murmurations, and are the most common at the end of the day to return to their nightly roosting sites. Murmurations have been recorded to range in size from a few hundred to millions of birds. Yes, you read that right, millions. The highest recorded murmuration of European Starlings was estimated to be over 6 million individual birds. In Europe, avian murmurations are relayed as Bird (Density) Notams (BIRDTAMs).

BIRDTAMs, while not an official International Civil Aviation Organization term, is used throughout Northern Europe and is recognized by the European Aeronautical Information System Database and as its own Aeronautical Fixed Telecommunication Network address. BIRDTAMs originated in the military services to provide information for bird strike risks. In conjunction with radar activity and predicted bird movement, BIRDTAMs are the only bird strike prediction service including real time, in-person human observation. Specific countries participating in the creation of BIRDTAMs and have airspace represented in prediction



Airfield bird watercolor illustrations by Anna Lopatina.

models include Belgium, the Netherlands, Germany, Denmark, Sweden and Poland.

Returning to our AHAS risk definition and re-visiting the SOAR Model, these models are based on the latest local weather data and the known populations of five different soaring birds over a 12 period. Not much is published online other than the above definition on how this model is calculated. So what can we as amateur ornithologists do to help mitigate risk on short notice?

A soaring bird is defined as an avian using the rising air currents to maintain flight; they rarely flap their wings. These avians use columns of heat from the ground, called thermals, to help generate lift. This list includes birds of prey, passerines (ravens), cranes, storks and seabirds. Note that many birds on this list are solitary or paired hunters, many only congregating during mating season. Seabirds are the exception and can be guild foragers. Thankfully, many of these birds range in size (wingspan) from two feet to eight feet. This makes them somewhat easier to recognize and “see and avoid” tactics can be established.

What is not established in the SOAR definition is what populations of which five soaring birds are reported. We can research what birds we are most likely to see and mitigate risks based on the current weather, our new bird knowledge and the time of day and month. Let’s use Naval Air Station (NAS) Whidbey Island, Washington, with conditions similar to a clear morning in April with little precipitation during the previous week as our example.

To begin, identify what free bird resources you have quickly at your disposal. Cornell Lab of Ornithology, Ebird, Audubon Societies

and ornithology nonprofits can publish checklists for local birders to enjoy. For Whidbey Island I can see from a published checklist my Soar Birds in April can include the Mew Gull, GWxWestern Gull (hybrid), Great Blue Heron, Osprey, Northern Harrier, Bald Eagle, Red-tailed Hawk, Great Horned Owl and the Raven. Additionally, all of our migratory waterfowl have returned home to Canada since it is springtime.

It is morning, so our local birds are out foraging. We can almost guarantee to have Gull activity near the water to find food due to the proximity of NAS Whidbey Island to the Pacific Ocean. The Gulls would be more concentrated near the water, as they cannot forage on the ground due to the lack of precipitation. The Great Horned Owl is nocturnal so we don’t expect to see it in the morning. Ravens tend to live in wooded areas, not open fields, so is another avian nonplayer. The base itself does not have superior wetlands near the runways so the Great Blue Heron may be an infrequent guest. This leaves our four birds of prey remaining; each with a history of bird strikes.

On taxi you could anticipate a single Northern Harrier or Red-tailed Hawk in the adjacent fields looking for rodents, both soaring low over the ground and blending in seamlessly to the background. Bald Eagles tend to only forage for carrion, the decaying flesh of dead animals and will soar to wait for primary hunters, such as the aforementioned Northern Harrier or Red-tail Hawk to complete a kill first before swooping in. Finally, like the Gulls, the solitary Osprey will only be found in vicinity of water. Ospreys soar between 30 to 130 feet over the water before diving in at 50-plus miles per hour to complete their aquatic kills.

In this example, and based on our AHAS risk definitions, the above bird activity would probably constitute AHAS risk: Low. There are no migratory birds reported, guilds are not appearing on NEXRAD and individual birds of prey dominate specific territories while soaring. What is not mentioned in the scenario are the permanent residence birds, individually they can easily travel to forage without being picked up on weather radar. If you are lucky, Tower may make a 99 call which states there are now birds in the vicinity. Try this example at your home airfield and explore different months and times of day. You may be surprised by what you learn about your local avian ecology. This begs the question, is your bird strike risk ever just Low? Never, I would argue. It only takes one bird to potentially down an aircraft.

The next time you “Clear Left, Right and Above” on taxi and takeoff, think additionally what you are also looking for on the airfield other than other humans, vehicles and aircraft. When landing on a new airfield, practice a chart study of the surrounding area. Are there surrounding low-lying fields? Is there an abundance of agriculture? What time of year is it? Am I about to enter a common migratory bird zone? What about a wildlife refuge or a nature preserve? Has someone passed a pilot report or is the Automatic Terminal Information Service (ATIS) blaring about birds? All these factors matter in your preflight and in-flight planning to best mitigate your bird strike risk. Additionally, ask if your airfield specifically uses a 3D avian radar. This is reliant technology and greatly increases the accuracy of bird reporting.

Use the AHAS risk definition to your advantage. Teach and brief your crews on what to look for using the AHAS website instead of requiring one-risk adjective on a single line in your Naval Air Training and Operating Procedures brief. BASH is only the name of the preventive program, and doesn’t explain the risk itself and should be addressed accordingly. I am not advocating for every aviator to take courses in ornithology at the graduate level, but do recommend each aviator has a fundamental knowledge of avian ecology to help mitigate operational risk. If this level of information helps crews create more informed decisions in their CRM process regarding reported AHAS risk and ATIS BASH reporting alone, then this bird-themed article is a success. After all, is not a bird in the hand worth two in the bush? ➤

A little owl, Athene Noctua stares at the camera during a banding event, on Chièvres Air Base, Belgium, June 5, 2025. (U.S. Army photo by Pierre-Etienne Courtejoie)

BAMBOO EAGLE EJECT

Electronic Warfare Officer Perspective

By Lt. Cmdr.
Lenue Gilchrist

**ELECTRONIC
ATTACK
SQUADRON
(VAQ) 209
STAR WARRIORS**

The morning of Feb. 12, 2025 began with a 0600 brief, as VAQ-135 and VAQ-209 began day three of Exercise Bamboo Eagle, a large-scale joint exercise operating hundreds of miles off the coast of Southern California. We briefed as a flight of three, focusing on transit, tanker plans, fuel ladders and safely flying in a crowded airspace. It was my first event of Bamboo Eagle after arriving days earlier from participating in three weeks of Red Flag at Nellis Air Force Base, Nevada.

Weather was marginal at Naval Air Station North Island (NASNI), California, calling ceilings between 1,300 and 1,500 feet, but nothing out of the ordinary for February weather in San Diego. Startup was routine but we had to swap into a spare aircraft after maintenance issues called for the first jet to be down. Jumping into the spare put us behind our planned takeoff time with the formation but we were still able to takeoff as a single about 10 minutes later.

We met up as a light division on the tanker and started the long transit out to the working area. During our first plug, we received a WXFR (wing transfer) advisory, a standard advisory in the H18 System Configuration Set (SCS) while tanking, but new to both of us due to it being our first time tanking in this SCS. With limited familiarity and the possibility of trapped fuel 500 miles offshore, we elected to Return to Base (RTB) solo.

The RTB started off uneventful. Beaver Control handed us off under instrument flight rules to Approach Control. Automatic Terminal Information Service (ATIS) for NASNI called broken clouds at 1,400 feet and Runway 29 active. We adjusted our weight for landing and requested Precision Approach Radar (PAR) into NASNI. Approach initially vectored us for a PAR but downgraded the approach to an Airport Surveillance Radar before final. We reached our minimum descent altitude of 540 feet and executed our missed approach instructions due to not breaking out of the clouds.

We discussed our options; based on our fuel and the low ceilings we had just encountered, we would try one more PAR at NASNI before asking to divert to San Diego International or Naval Air Facility (NAF) El Centro, where visual flight rule conditions were reported.

Approach put us on a PAR for our second attempt. They advised standing water on the runway and a 10-knot quartering tailwind on final. We broke out around 350 feet above ground level and touched down about 500 feet down the runway. Upon touchdown we felt little deceleration, by the time we did start to decelerate we were well above our standard board speeds and decided to go around and reassess the situation. We made this decision too late.

“TRON 63 going around,” was transmitted to tower, with a response from them seconds later, “Not enough runway!” My focus immediately turned to looking up and over my pilot’s head at the quickly approaching end of the runway with the San Diego Bay in clear sight at the end of it. Now in an unmistakably bad scenario, we had no choice but to pull the ejection handle as the jet sped toward the end of the runway and into the water, with no apparent indication the jet was lifting off the surface. “Eject! Eject! Eject!” was called over the Integrated Cockpit Sensing System.

Thanks to our Aviation Structural Mechanic, Safety Equipment and Aircrew Survival Equipmentmen, the ejection seat and all our survival gear worked exactly as it should have. We landed in the bay about 20 feet from each other. After making sure we were both physically ok, we started swimming to the nearest shore before being rescued by a local fishing charter within minutes of being in the water.

No single threat led us to the errors we made in this mishap, but failure to recognize and address them appropriately led to an undesired state we were unable to recover from.

This mishap was a sobering reminder even experienced crews are not immune to basic errors when multiple threats go unaddressed and critical decisions are delayed. The outcome was avoidable and the lessons clear: Never lose sight of the basics. ➤

BAMBOO EAGLE EJECT

Aviator Perspective

The morning of Feb. 12, 2525 started with my phone alarm going off at 0345. VAQ-135 was on detachment to Naval Air Station North Island (NASNI), California, participating in Exercise Bamboo Eagle — an Air Force exercise where joint air assets operate in the W-291 airspace 300-500 miles off the coast of San Diego, California. It was the third day of the exercise, executing flight operations out of NASNI.

Our brief started at 0600 as a flight of three, and we were focused heavily on the administrative aspects of getting to and from the area, our tanker game plan, fuel ladder and safely executing operations with more than 50 aircraft in the airspace. The weather was forecasted to be ceilings of 1,300-1,500 feet broken throughout the time of flight. The remainder of the brief and walking to our jet was unremarkable. My Electronic Warfare Officer (EWO) and I had to hustle into a spare jet after battling some maintenance issues during startup, however we managed to swap and get the aircraft started with all combat systems up in relatively little time. This allowed us to take off shortly behind the other two jets in our formation.

Initial rendezvous with the tanker was normal. While in the basket for our first plug, we received a wing transfer (WXFR) advisory — a new-to-us but expected advisory while tanking in an H18 System Configuration Set (SCS) Growler. The squadron had recently upgraded jets to the H18 SCS and we were still becoming familiar with the nuances of the upgrade. From a Crew Resource Management perspective, my EWO's squadron still flew an older software and this was our first time both tanking with the new SCS. The advisory's cause and remarks section in the Pilot Checklist includes warnings about fuel starvation and trapped fuel. Unfamiliar with the advisory and concerned about potential fuel transfer issues 300-500 miles from land, we elected to return to base early from the mission as a single.

Beaver Control issued us an instrument flight rules clearance to NASNI 50 miles from the airspace border. North Island's Automatic Terminal Information Service (ATIS) reported broken clouds at 1,400 feet and Runway 29 in use; we did not note the winds. With ceilings well above landing minimums, we dumped fuel to reduce gross weight in preparation for the shorter runway (7,501 feet compared to the 8,000 feet we were used to). Eventually Southern California Approach vectored us for a precision approach radar (PAR) to Runway 29, but to our surprise degraded us to an Airport Surveillance Radar approach on final. We arrived at the Minimum Descent Altitude of 540 feet MSL, or mean sea level, without breaking out of the clouds and executed missed approach instructions. Realizing the weather was worse than reported, we obtained ATIS for other local airfields and discussed executing a minimum fuel profile to Naval Air Facility (NAF) El Centro, approximately 79 nautical miles away with visual flight rule conditions reported. We also attempted to contact our maintenance base radio with no response.

With a viable divert plan in place, we requested another PAR to get below the clouds. On final, Approach relayed there was standing water at the runway intersection and I noticed my in-flight displays indicated a 10-knot quartering tailwind. We broke out around 300-350 feet above ground level and flew to a normal touchdown point about 500 feet down the runway. My usual habit is to apply brakes at 115 knots ground speed (KGS); however, aware of the shorter runway,

I applied brakes earlier — around 120 KGS — but perceived little deceleration. The brakes felt mushy to me and after an uncomfortably long pause, deceleration finally began, but by then we were well above expected board speeds.

In the F/A-18 community, we reference board speeds — aircraft ground speed versus runway remaining markers — to assess deceleration. Though not Naval Air Training and Operating Procedures Standardization (NATOPS) values, they closely align with NATOPS landing performance and are a routine part of every landing. For example, at the 5,000-foot marker, ground speed should be no more than 100 KGS; at 4,000 feet, 80 KGS; at 3,000, 60 KGS and so forth. Post-flight data showed we were well above those numbers.

By the time I initiated go-around procedures it was too late. My EWO transmitted, "TRON 63 going around" on Tower frequency with an immediate response of "not enough runway." As I processed that transmission, I locked eyes to the end of the runway and the bay beyond, praying the jet would fly. As the aircraft approached the end of the runway, I felt no indication it was going to fly and commanded ejection with an "Eject. Eject. Eject." call over the intercom system. Ejection, seat-man separation and survival gear worked as designed. My EWO and I landed in the bay roughly 10-20 feet apart. Our Automatic Sea Water Actuated Release System and life preserver units functioned properly. We both had flotation and quickly separated from our parachutes. After confirming each other's condition, we began swimming to shore. A local fishing charter picked us up and transferred us to an ambulance, which took us to a local hospital.

The narrative above represents the sequence of events as they occurred. What follows is a list of my analysis and, using the Threat Error Management Model (TEM), my reflection on the major errors contributing to the mishap, the order of their severity and the lessons learned from each.

While no single factor caused this mishap, several latent threats aligned to create the conditions for an undesired aircraft state. Using the TEM we learn about in training, there were many Swiss cheese holes aligned. First the day began with maintenance fallout forcing a last-minute aircraft swap. Second, we were flying an aircraft with recently upgraded software neither crew member had tanked with before. Third, we encountered an in-flight WXFR Advisory leading to an early return and deviation from the original flight plan. Fourth, the weather conditions turned out to be significantly worse than ATIS reported. On top of that, repeated attempts to contact base radio went unanswered due to poor signal performance, removing a key layer of communication during a dynamic and deteriorating situation. Each of these threats eroded the margin of safety and increased our reliance on timely decisions and effective crew coordination. ➔

By Lt. Gennaro Esposito

**ELECTRONIC
ATTACK
SQUADRON
(VAQ) 135
BLACK RAVENS**

THREAT & ERROR MANAGEMENT MODEL

Continued by Aviator Lt. Gennaro Esposito & Electronic Warfare Officer Lt. Cmdr. Lenué Gilchrist

THREATS

- Forecast Ceiling: 1,400 ft., 350 ft. actual
- KNZY Runway: 29 length: 7,501 feet
- Runway: Rain & standing water reported
- Tailwind: 10-knots
- Aircrew: VAQ-135 active-duty pilot & VAQ-209 reserve electronic warfare officer
- Different SCS: H18 SCS vs. H14* SCS

ERRORS

- Complacency
- Poor threat recognition
- Delayed decision to go around
- Decision to land on runway 29
- Poor task management
- Poor crew resource management (CRM)

ANALYSIS

POOR THREAT RECOGNITION

Gilchrist: The Swiss Cheese Model was in full effect. The threats: (1) late aircraft swap due to maintenance issues; (2) a jet with tanking software neither crew member had previously used; (3) different aircrew composition and squadron experience; (4) early RTB and deviation from the original flight plan; (5) weather was far worse than the ATIS reported; (6) attempts to reach base radio failed due to poor reception, cutting off a vital layer of communication when we needed it most. Each of these factors chipped away at our margin of safety, leaving little room for error and placing even greater importance on timely decisions and effective CRM.

COMPLACENCY

Gilchrist: Surrounded by pilots with 1,500+ Growler hours, I began to assume we all had everything under control, and shifted my focus to other aspects. That mindset led me to let my guard down during a critical phase of flight with an outstanding aviator who needed my backup in a key moment.

OVER RELIANCE ON FEELING

Esposito: Feelings in the aircraft can be deceptive. We're trained to crosscheck them against instrument scans and procedural cues. During rollout, when the jet didn't respond to braking the way I expected, I narrowed my focus in search of an explanation. Instead of "scoping out" to gain full situational awareness, I "scoped in" — fixating on the abnormal brake feel rather than referencing my instruments and the board speed cues which were telling me we were fast and still accelerating through the

problem. The aircraft wasn't responding the way I expected it to; I experienced a moment of sensory overload. I was waiting to feel the familiar acceleration and lift-off cues; but instead, the jet just continued to roll.

DELAYED GO AROUND DECISION

Gilchrist: The warning signs were present; the ground speed numbers were too high, the amount of runway left too short, yet we delayed our decision to go around. Had we initiated the go around properly we would have easily been able to divert to another airfield or come back around to take the arresting gear. Discussing go around procedures and our game plan more in-depth before our initial approach could have been all we needed to bring our focus back to the basics.

DECISION TO LAND ON RUNWAY 29

Esposito: With Runway 18/36 closed, Runway 29 was our only option at NASNI. However, that choice came with trade-offs: standing water, a 10-knot quartering tailwind and a shorter runway. We didn't fully appreciate the compounded effects of these factors.

If we were able to land with a headwind or zero wind, we had a chance of stopping the jet with the runway remaining. However, as you add the compound effects of a wet, short runway and tailwind environment, the ability to stop is practically non-existent.

Gilchrist: Standing water, a 10-knot tailwind and a shorter runway had a dramatic effect on landing performance, increasing landing distances substantially. At our aircraft weight, in these conditions, the book calculates we need 7,600 feet to land manually and 8,116 feet using precision landing mode (autopilot). In our case, the aircraft needed more runway than was available on Runway 29 (7,501 feet). Had we faced headwinds or dry conditions, stopping would have been feasible. But under these conditions, making a short-field arrestment or diverting were the only safe options. If we had calculated these numbers in the jet during the RTB or before the flight, these threats could have been mitigated. Our failure to properly recognize these combined threats led us to an undesirable aircraft state.

WET RUNWAY BRAKING TECHNIQUE

Esposito: NATOPS guidance is clear for wet runway braking technique: reduce gross weight, aim for a short and slow landing and apply brakes as soon as possible if

directional control allows. Instead, I relied on an old technique from my FRS days that had never failed me — waiting until 115 KGS to "test" the brakes before applying them. A 3-5 second delay in action cost us approximately 675-1,125 feet of runway. Once I did apply the brakes, the initial feel was unfamiliar and soft, which led to more confusion — Was this hydroplaning? Anti-skid system malfunction? My scan broke down as I mentally searched for explanations and by the time I recognized the aircraft was finally decelerating properly, we were already outside the bounds of acceptable board speed parameters.

POOR TASK MANAGEMENT

Gilchrist: "Aviate, Navigate, Communicate," is the mantra we have all been taught since day one of flight school. Upon landing, I was mistakenly focused on making the "Rollout," call to Tower, an unimportant task that could have and should have been dealt with after confirming good brakes and that the jet was going to come to a stop. Though making this call is usually a quick task, due to the radios not being channelized, it took about 15 seconds of critical time. Had I properly managed my tasks, I could have noticed we were not making our board speeds, indicating the need for a go around and decisively instructed my pilot to do so.

POOR CREW RESOURCE MANAGEMENT

Esposito: There was uncertainty between us afterward if the board speed callouts were made during the rollout, and if they were, whether they were clearly heard or registered by both of us. I didn't verbalize the aircraft's stopping performance was not meeting my expectations early enough, and if there were callouts being made, I failed to process or respond to them in time.

Gilchrist: While both of us were engaged throughout the approach and landing, our communication lacked the information and initiative the situation demanded. My board speed calls were late and possibly not registered due to the pilot's concerns with the aircraft's poor deceleration. "We're fast" or "no brakes" calls were possibly passed by my pilot but not registered by me due to task saturation and my poor task management.

CONCLUSION

Esposito: The tools were there; we didn't use them to their full potential. ➔

WEATHERING THE STORM

By Lt. Cmdr.
Braden Miller

**STRIKE FIGHTER
SQUADRON
(VFA) 195
DAMBUSTERS**

Unpredictable weather is a constant challenge, demanding vigilance and adaptability. This fact played out in real-time during a recent training mission involving Strike Fighter Squadron 195 (VFA-195) Super Hornets near Marine Corps Air Station (MCAS) Iwakuni, Japan.

The challenges faced by the aircrew underscores the critical role crew resource management (CRM) plays in ensuring safety when faced with unexpected conditions.

On April 10, 2025, two F/A-18 Super Hornets, call signs Chippy 51 and 52, launched as coordinated singles — flying separate missions but aware of each other's location — to conduct a simulated precision-guided munitions mission in airspace 35 nautical miles from MCAS Iwakuni. Concurrently, the squadron's commanding officer, Chippy 91, led a three-ship formation on a ferry flight from Naval Air Facility Atsugi, Japan, to also land at MCAS Iwakuni.

All aircraft departed under legal weather conditions, having established divert fields and a calculated bingo fuel, with each aircraft maintaining a comfortable fuel reserve above this minimum.

Fuel and divers are thoroughly briefed every flight, more so if weather becomes a factor. This is complicated by the relatively short (8,000 feet), single runway in service at MCAS Iwakuni, which requires a balance between landing light enough to not overwork the brakes, but with enough gas to make it to a suitable divert if required, the nearest being Tsuiki to the west and Nyutaburu to the southwest, 66 nautical miles and 130 nautical miles away, respectively.

About halfway through their mission, Chippy 51 observed towering cumulonimbus clouds building and rapidly approaching Iwakuni from the southwest. Recognizing the potential impact on their planned recovery, they proactively contacted the base for an updated weather briefing and submitted a Pilot Report (PIREP) detailing the deteriorating conditions. The squadron duty officer (SDO) confirmed their observations, noting a fast-moving line of thunderstorms just 15 nautical miles southwest of the airfield, potentially impacting their planned recovery time. The decision was made for Chippy 51 and 52 to hold, waiting out the storm's predicted passage in 20-30 minutes. This rapid, localized storm development highlighted the dynamic nature of weather and the challenges of predicting such isolated events.

Critically, recognizing Chippy 91 was also airborne, Chippy 51 immediately contacted them and Chippy 52 on the tactical frequency, sharing the recent weather update. At the same time, thanks to the PIREP Chippy 51 submitted to Iwakuni Approach

Control, Chippy 91, who had just checked on frequency, was told by the approach controller, "Tower recommends you do not attempt an approach at this time due to lightning strikes at the end of the runway." This proactive communication, a key tenet of CRM, enabled all flights to adjust their plans. Chippy 91, with sufficient fuel, slowed to max endurance airspeed and coordinated a holding pattern with air traffic control. Through collaborative discussion on the tactical frequency and with the SDO, the flight leads developed a coordinated divert plan, in case the need arose, and prioritized landing based on fuel states.

The SDO, using both satellite imagery and direct observation, provided continuous updates on the storm's progress, enabling informed decision-making by all aircrew, a crucial element of effective CRM. Had Chippy 51 not proactively sought the weather update, both they and Chippy 52 could have faced a dangerous approach through severe weather.

Once the SDO confirmed the storm's passage, the aircraft commenced their approaches to MCAS Iwakuni. However, the lingering rain created challenging landing conditions on the base's single 8,000 foot runway. The first two aircraft to land reported medium and then poor braking action — indicating noticeably and significantly reduced braking effectiveness, respectively. This crucial information, along with the understanding the initial rain after a dry spell can create a surprisingly slick surface due to accumulated

oil and tire residue, prompted the tower to direct the third aircraft to execute a go-around, allowing the runway additional drying time while increasing the separation between landing aircraft. After having a quick discussion over the tactical frequency on a proper wet runway landing technique, all aircraft recovered safely thanks in no small part to skilled airmanship and the F/A-18's anti-skid system.

While thorough pre-flight weather briefings are essential, this event highlights the inherent unpredictability of weather in naval aviation. More importantly, it demonstrates the vital importance of well-honed CRM skills, decisive action and proactive communication. Chippy 51's initiative in sharing the developing weather situation allowed sufficient time to develop and execute a safe recovery plan for all involved. This scenario reinforces a critical message: even with meticulous planning, unforeseen circumstances can and do arise. By fostering a strong culture of CRM and empowering aircrew to make proactive decisions, naval aviation enhances both safety and mission success.

Chippy Ho! ➤

The Airport Report

Naval airport operational environment report by Paul Widish, Naval Aviation Analyst

Naval aviation is in continuous operation ... are you managing your risk?

The insidiousness of foreign object damage (FOD) to our fleet's aircraft is akin to wartime sabotage. Our mission is briefed. The crew has manned up. Hundreds of investigatory maintenance tasks and safe-for-flight preparatory actions necessary to launch are now complete. As the pilot signals the plane captain to start engines and engages the igniter — WHAM! Smoke and sparks fly. Another FOD event has occurred.

Any new tools to help us fight the causes of FOD? Pavement research has provided naval aviation with a possible answer.

DEFINITION OF FOD

To address FOD-related challenges (figure 1), Naval Safety Command (NAVSAFECOM) conducted an enterprise-level risk assessment, analyzing more than a decade's worth of FOD data.

For this study, FOD was interpreted in each safety report as "... aircraft damage due to foreign objects or debris from another failed aircraft (or unmanned aerial vehicle) component or where power plant damage is due to an ingested object." This yielded 711 aircraft FOD events. The assessment excluded an additional 222 FOD events where they were determined to be solely caused by wildlife strikes, and included eight Class A and nine Class B mishaps (figure 2).

Since the fleet doesn't have any stand-alone Department of Defense or OPNAV FOD strategic program guidance, our local FOD programs are built from the cobbled-together FOD-event lessons learned and embedded in the guidance our primary naval aviation safety references: OPNAV M-3750.6, CNAF M-3710.7, CNAF 4790.2E and NAVAIR 00-80T-124. None of these risk controls adequately address the migratory FOD threats to the Naval Aviation Enterprise (NAE). This led NAVSAFECOM to leverage possible solutions developed by the Federal Aviation Administration (FAA), including reviewing Airport FOD Management Advisory Circular 150/5210-24A (2024).

INTERPRETING SAFETY DATA

In the FOD events in figure 2 look at the red circle for a moment. In this "unknown" category, only five of the reported 93 events occurred aboard ship. Now, contrast the remaining 88 "unknowns" with the certainty of every human action to prepare our aircraft and aircraft operational environments i.e., flight lines, hangars, engine high-power areas, etc. to be FOD-free and add in the reality all naval aircraft spend most of their time onboard these naval airports. It is not impossible to imagine 58 + 88 = 143 "naval airport FOD events" could be the right number, when aggravated by the migratory FOD hazard.

FROM THEORY TO PRACTICE

One of the top contributors to the migratory FOD problem on the flight line is vehicular traffic. The "why" answer is simple. In theory, all vehicular traffic, including security vehicles, aircraft rescue and firefighting vehicles, air operations vehicles, public works and supply department vehicles, etc., are not supposed to operate inside the perimeter fence line of any naval airport before every wheel has been thoroughly checked for embedded FOD because of the high propensity for dislodging while on the airport's controlled surfaces.

In practice, few vehicle operators stop their vehicles and perform thorough FOD inspections on their vehicles before driving through the airport's perimeter access points.

After reviewing the safety data to address airport FOD challenges, NAVSAFECOM determined that the portable FOD shakers recommended by the FAA are a passive solution to address the issue of human factor failure. Drivers do not always drive over the shakers or even check their vehicles before driving into aircraft operations areas. As a possible solution, NAVSAFECOM looked at the pavement design engineer's research performed by the FAA and Purdue University, called Partnership to Enhance General Aviation Safety, Accessibility and Sustainability (PEGASAS) Project #8.

PROBLEM SOLVED?

PEGASAS Project #8 was originally designed to provide mechanical feedback into flight controls for pilots taxiing across taxiways and runways to physically remind them to talk to Air Traffic Control to get permission before causing an incursion. Upon the NAVSAFECOM's inquiry into the practical use of this research for immovable vehicular FOD removal application, the FAA, Federal Highway Administration and Purdue University all agreed on the right cut and depth for aviation rumble strips (figure 3) that would provide more than enough mechanical energy to dislodge migratory FOD from vehicular tires. Cutting rumble strips into the pavement of critical access points into every naval airport is a plausible and immovable tool to help combat the migratory FOD, as every vehicle would drive over these rumble strips areas before driving inside the fence line.

INNOVATION REQUIRES COURAGE

The applied science of this pavement modification is not written anywhere in a Unified Facilities Criteria, but the airport safety research for it has already been paid for. If rumble strips are strategically installed at airfield access points at locations where pavement repairs are already approved, it will not cost much extra to provide our airport operational environment with another valuable tool against FOD caused by human failure. ✈



Figure 1. Do you see the bolt, nut and washer? How long have they been there? Long enough to rust! (Photo by Paul Widish)

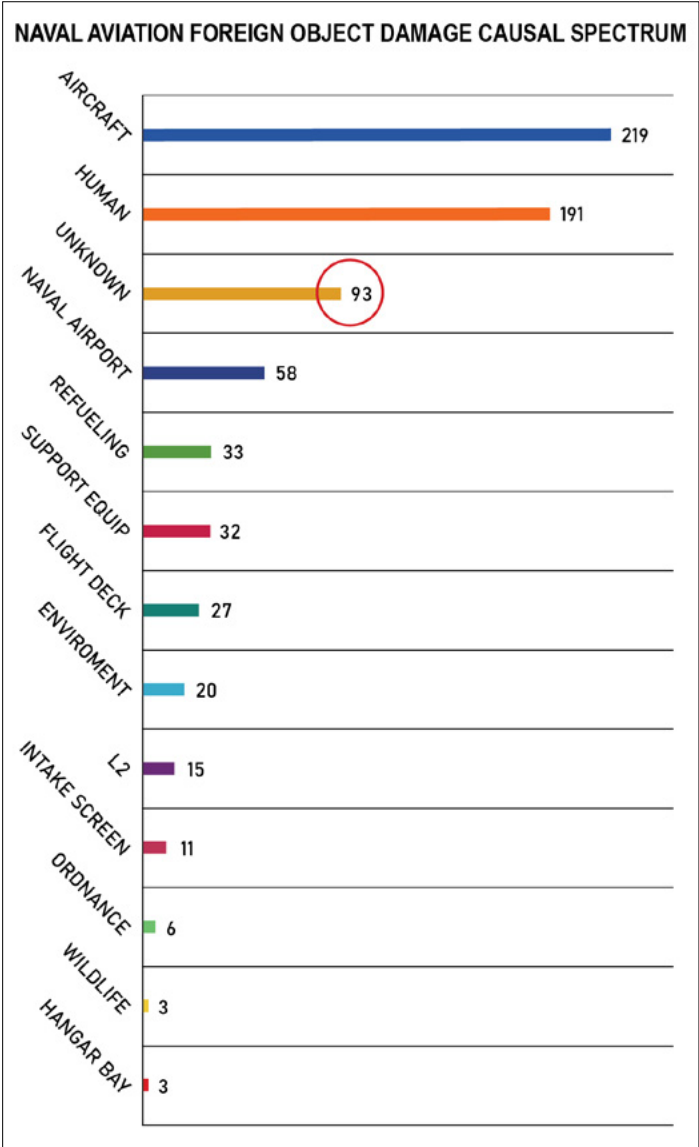


Figure 2. The naval aviation enterprise's FOD causal spectrum.



Figure 3. Short milled rumble strips adaptable to airport use. (Photo courtesy of the U.S. Department of Transportation Federal Highway Administration)

Naval Aviation FOD Grooved Pavement System - APR24, full study available in the Studies, White Papers, Articles section of the NAVSAFECOM CAC-enabled site (additional access required):



U.S. Marine Corps F-35B Lightning II pilot assigned to Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) taxis during an air-delivered ground refuelling exercise as part of Weapons and Tactics Instructor course 2-25 at Laguna Army Airfield, Arizona, April. 2, 2025. (U.S. Marine Corps photo by Lance Cpl. Adam Scalin)

AFCS DEGRADED

By Lt. Katie Maier

HELICOPTER
SEA COMBAT
SQUADRON
(HSC) 14
CHARGERS

It was a stormy day in the South China Sea, in the middle of another busy flight schedule for the HSC-14 "Chargers" while USS Abraham Lincoln (CVN 72) conducted training operations. Meteorology and Oceanography Command was forecasting a scattered layer at 1,000 feet, a broken layer at 5,000 feet and rain showers in the vicinity, a common forecast for the middle of U.S. 7th Fleet area of operations. I was scheduled to fly with my squadron's executive officer (XO) for a nearly three-hour flight providing primary Search and Rescue (SAR) coverage for fixed wing aircraft, as

well as surface search coordination, a mission in which we identify vessels operating near the carrier.

One of the primary missions of a carrier helicopter squadron is providing airborne SAR coverage for the fixed wing aircraft. If our aircraft goes down, all flight operations would pause. The first crew was delayed for troubleshooting, so the XO and I helped swap to the backup aircraft to cover fixed wing operations. Afterward, we met back in the squadron spaces to brief our crew. The weather was thoroughly briefed due to the likelihood of encountering rainstorms and degrading visibility that had occurred all week. After the brief, we were told our aircraft had inoperable windshield wipers, which was a repeat gripe for the aircraft and we started to prepare for the hot seat.

During the hot seat, troubleshooters attempted to fix the broken windshield wipers to no avail — the launch was going to start soon, so we needed to get off deck to prevent delaying the fixed wing cycle. The tower reported gusting winds greater than 35 knots over the deck. Rain spattered around us — the whole ship was surrounded by gloomy, dark weather. Due to the in-depth brief, the crew had a detailed plan in the event of entering instrument meteorological conditions (IMC) and felt comfortable with taking the aircraft. The XO and I confirmed we would immediately transition to an instrument scan with radar altimeter hold on after passing over the deck edge. The sequence of events occurred according to plan and we were soon flying steady at 200 feet, 80 knots indicated airspeed (KIAS). Visibility degraded to .25-.5 nautical miles (NM) with rare pockets of visual meteorological conditions (VMC) within the storm.

Approximately 45 minutes into the flight, I felt a kick in the flight controls and noticed extra slack in the controls. The "AFCS (Automatic Flight Control System) DEGRADED" caution appeared on the flight display, along with the failure of one of the Stability Augmentation Systems (SAS),

the trim system and the auto pilot functions. For our fixed wing readers, SAS adjusts controls to dampen the reaction to gusty winds and minimizes movement in the controls affecting the aircraft on any axis, which can cause pilot-induced oscillations and degrade flight performance. I executed the critical memory item for the emergency procedure and established a safe altitude and airspeed. The XO worked through the checklist while the crew chief in the back aided in the troubleshooting process.

At this point, we were 10 NM away from the carrier, in and out of clouds, rarely finding any pockets of VMC and trying to dodge around foreign warships and politically sensitive areas. We climbed to 500 feet above ground level (AGL) and remained 10 to 15 NM outside of the carrier to await the completion of the fixed wing cycle. The XO called the carrier for a squadron representative to inform them of our status and coordinate with the ship to give us a carrier-controlled approach (CCA) to Spot 9, located at the carrier stern.

Fixed wing traffic also had difficulties in this monsoon of a storm — the cycle was delayed due to rain showers and other surface traffic preventing the jets' lineup on final. The XO and I swapped controls every 15 minutes to reduce fatigue and backed each other up on all parameters including adjusting nose attitude for airspeed, keeping the ball centered and wings level and maintaining a level vertical speed indicator. This continued for an hour until departure was ready to conduct the CCA.

An MH-60R, attached to HSM-71, was also landing, but suggested our aircraft be given priority handling due to the nature of our emergency. Departure gave us vectors to final and we continued inbound within 10 NM of the carrier. After a couple minutes, another squadron representative notified us one channel of the CCA was inoperative, so the controller would not be able to provide any glideslope information and may not have reliable information within 2 NM of the ship. She suggested we continue with the surveillance approach, while using the Tactical Air Navigation beacon to back ourselves up, which we ultimately decided to do due to the IMC conditions and malfunctions degrading our visibility.

After we received positive radar contact and were given initial vectors, there was a pause in external communications and the XO noted we were moving further away from the ship instead of joining the final approach path. We switched radios and reestablished communication with departure after being hailed on guard, showing

the radios were in fact degraded as they had indications earlier during the hot seat. Paddles, who are a group of aviators helping fixed wing aircraft maintain proper glideslope on final, manned their stations for our recovery. The XO turned on the landing light in order to help Paddles visually acquire us. After reestablishing communications, we commenced the approach and drove in on the final bearing.

I felt confident in my approach because we had discussed XO taking all radio calls, navigating us around surface traffic and backing me up on all parameters while I flew. We discussed instead of a constant glideslope for the approach, I would descend straight to 200 feet AGL and drive in until I could make out the ship. At any time, if I needed a break after a vigorous scan, I would either change controls or hand off the collective to focus on the cyclic and pedals. We planned to do a change of scan once we got the ship in sight and transition into a landing glideslope to get to Spot 9. I passed control of the collective to XO since my deviations were starting to affect the approach. Listening to some confusing radio calls, I had started to climb and get slower since Paddles had said we were closing on the MH-60R.

After the collective was passed to XO, I was able to focus on staying at 90 KIAS with wings level. At 1.5 NM, XO saw the ship's wake, followed closely by the lineup lines. At 1 NM, she directed me to call visual on the ship. I took all controls back as previously briefed and flew the rest of the approach. I was initially high on the approach, climbing back up to around 250-300 feet, but quickly corrected after XO called out my altitude and started to descend slowly at 150-200 flight path marker.

The Landing Signalman directed us in and the XO was defensively postured to ensure we touched down safely. Winds were 35+ KIAS over the deck at the completion of the approach, so crossing the deck edge at 50 KIAS felt unusual to me and led to a slower than usual approach. After landing Spot 9, the XO verbalized that on shutdown, she would maintain cyclic control since there wasn't a functioning trim system. The shutdown was uneventful and we were towed off the spot soon after.

Overall, the crew used every aspect of risk management (RM) and crew resource management during the emergency procedure. Communication was superb between the pilots as we called out each other's deviations early and often so there were no excessive control inputs. Splitting up controls during an approach is not a common occurrence in the helicopter community during shipboard operations; usually that only occurs during degraded visual environment landings over land. However,

the pilots remained flexible and adapted to circumstances allowing proper flight parameters to be maintained. It goes to show proper briefing and a thorough discussion of RM helps you react quicker to emergency procedures by planning for the worst-case scenario and how your crew is going to handle it when it happens. ✈

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Article length should be 450-2500 words. Bravo Zulu inputs should be 90-150 words and include a photo.

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Front cover: Lt. Richard Bramble, assigned to the Golden Falcons of Helicopter Sea Combat Squadron (HSC) 12, disembarks from an MH-60S Seahawk on the flight deck of Nimitz-class aircraft carrier USS George Washington (CVN 73) while underway in the Pacific Ocean, Oct. 5, 2024. (U.S. Navy photo by Mass Communication Specialist 3rd Class August Clawson)

Back cover: An E-2D Hawkeye assigned to Airborne Command and Control Squadron (VAW) 125, Carrier Air Wing (CVW) 5, flies over Iwakuni, Japan during Marine Corps Air Station Iwakuni's 46th Friendship Day at MCAS Iwakuni, Japan, May 3, 2025. (U.S. Navy photo by Mass Communication Specialist 1st Class Ryre Arciaga)

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