THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE
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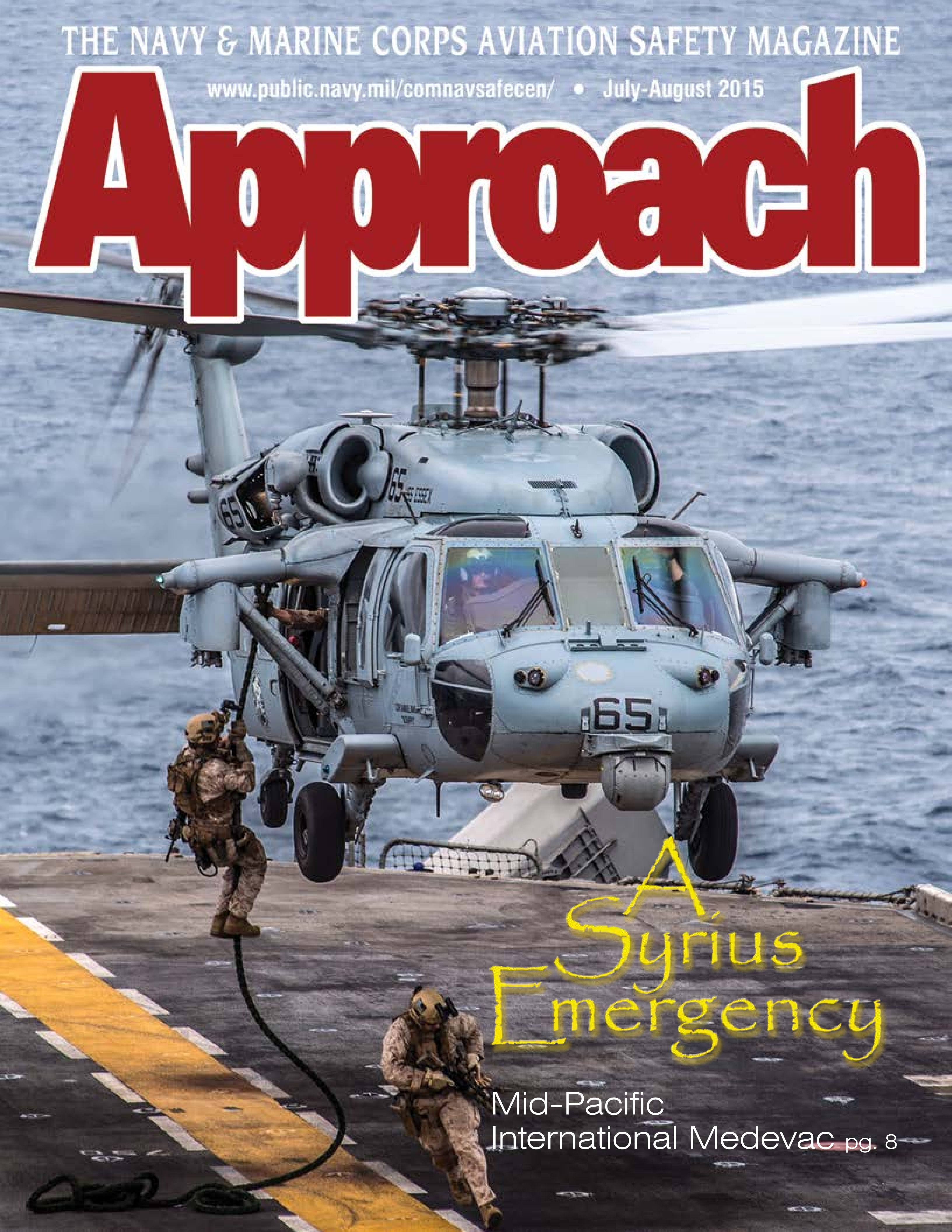
Approach



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Mid-Pacific International Medevac pg. 8

The Navy & Marine Corps Aviation Safety Magazine

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Mishaps cost time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous; the time to learn to do a job right is before combat starts.

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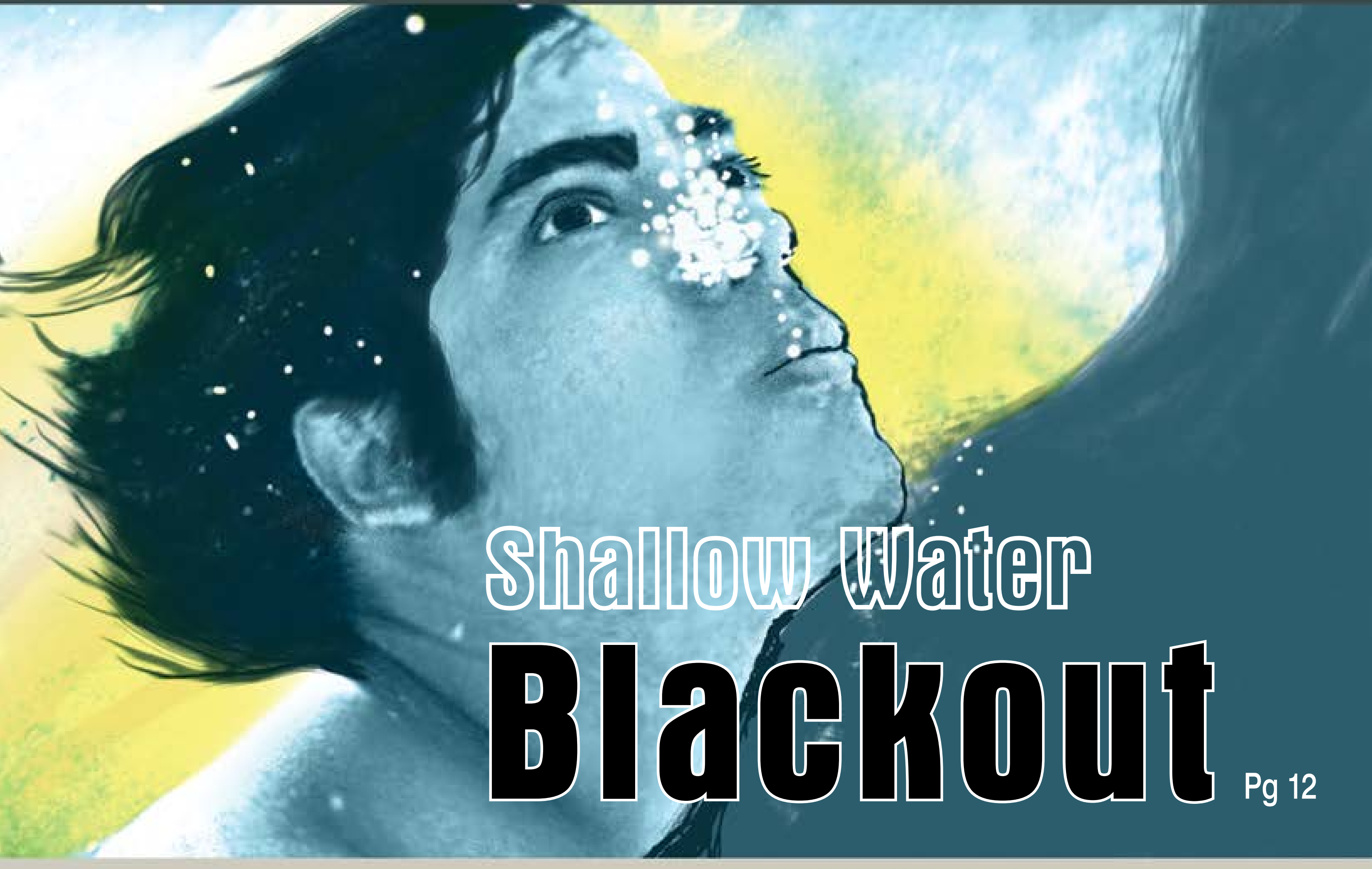

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Briefing Between the Lines

BY LT JACOB KYZER

If hindsight is 20/20, I would surmise that the visual acuity achieved following the completion of my flight brief was in the neighborhood of 20/400. Unfortunately, the corrective lenses that were my brief left both aircrews feeling much clearer and more comfortable than our experience, knowledge or proficiency would dictate. We were flying blind, but no one would realize this until we were able to sink comfortably into our Monday morning quarterback armchair and actually examine the break down between the plan and execution. Needless to say, there was much left to be desired.

For this particular flight, our mission was to link up with the CAST/HRST master schoolhouse to obtain numerous qualifications for their students going through the syllabus. As was usual for these types of flights, the coordination and mission specifics were left to the co-pilots, in this case I, another JO and a point of contact provided through operations. With less than six months into our fleet tour, we were experienced enough to know that no special operations plan ever survives first contact with the HRST master or the "good idea fairy."

Our initial plan was to draw as much information as we could from our point of contact, utilize that information to formulate our plan and brief, then any gaps would be filled in with our anticipated most likely course of action. This would cover us for the aircrew side of the house, and any discrepancies could later be

Members of Explosive Ordnance Disposal Mobile Detachment Eleven (EOD Mob. Det.11) and the “Black Knights” with Helicopter Anti-Submarine Squadron Four (HS-4) practice special purpose insertion extraction system rigging while participating in helicopter rope suspension training. (U.S. Navy photo by Photographer’s Mate Airman Daniel Johnson) *Editor’s Note: This photo is for illustrative purposes only and does not depict the actual day of events.*

identified and dealt with during our round table HRST Brief, with all parties involved.

From square one, this was shaping up to be a challenging flight. The information obtained from our POC gave us the following game plan: the HRST/CAST master students would arrive at the hangar two hours early to brief, and upon completion, walk onto the flight line to begin rigging both aircraft for the evolutions. Both aircraft were to be loaded for combat rubber raiding craft (CRRC) deployments: one aircraft would have a CRRC strapped to the underbelly via the cargo net restraint (known as a K-duck deployment); the other would have a rolled up CRRC in the cabin (known as a rolled duck). Both aircraft would transit to an area located south of Coronado Bridge, deploy their respective CRRCs and then CAST five students each from a 10 foot, 10 knot creep. The helicopters would then depart, return, and recover the students via the 20 foot special operations ladder or rescue hoist. In the case of aircraft, the intent was to have two students rig the CRRC for a cargo net recovery and then transport the CRRC and students to Turner Field located at the nearby naval amphibious base for offload. After offload, the aircraft would be configured for three evolutions of wet SPIE rig extraction, which would require the aircraft to CAST five students into a body of water, and then extract them from the water with a 120-foot SPIE rope over to Turner Field.

From the purview of my armchair, this is the point where planning and preparation began to deteriorate. The initial questions that arose from our conversation with the POC were threefold: what the heck is a rolled duck deployment, what the heck is a cargo net recovery of a CRRCand how the heck are we going to knock out all these requirements in a three-hour evolution? Eager to learn, we immediately set off into the pubs to find the answers to the first and second questions. With the help of a three-step procedure from NTRP and the knowledge of our local special weapons and tactics instructor (SWTI) pilot, we were able to determine what common sense had already suggested to us. A Rolled Duck was a deflated, folded CRRC that would be rolled out of the left cabin door from a 10 foot, 10 knot creep; easy enough. For the K-Duck, the SEAWOLF supplied a full set of procedures, complete with crew assignments, actions, and ICS calls.

Reading through the procedures, the evolution seemed easy enough. The aircraft would be positioned above the CRRC in a coupled hover. Once stable, the cargo net would be secured around the CRRC. While two team members work on securing the CRRC, the three others would be hoisted into the helicopter. With the CRRC ready for recovery, the crew chief would connect a 60 foot pendant rope to the cargo hook, lower it through the aircraft's hell hole, and the pilot would then position the aircraft over the CRRC for hookup. Once the personnel in the water attached the pendant, they would be hoisted into the aircraft. The aircraft would then lift the CRRC out of the water, and transport it to Turner Field.

Helicopters fly over the Coronado Bay Bridge during a practice flight. Student pilots are required to obtain numerous qualifications before being considered fully qualified. (U.S. Navy photo by Mass Communication Specialist 2nd Class James R. Stanley Jr)

Since the consensus was that this procedure was foreign to all members of the crew, we briefed our helicopter aircraft commanders (HACs) and the aircrewman on the procedures. All parties felt that we would be able to accomplish the tasking. To make sure all members of both crews were on the same page, we also included the step by step cargo net recovery procedures as a slide in our flight brief. During the brief, I made a point to note these procedures, but only opted to have everyone read over their responsibilities. I also delivered a minimal summary of how I envisioned the recovery evolution taking place, and was met with not questions or amplifying remarks from any members of the crew.

SINCE THERE WERE MEMBERS of the crew who were unfamiliar with Turner Field (myself included), I also included an overhead satellite image of the helo pad, so everyone was oriented to our drop off location, and potential obstacles in the area (mainly a few palm trees and a chain link fence on approach). The information I presented was gleaned almost in full from the satellite imagery. With all questions answered, we then shifted to the HRST/cast master's briefing. We were able to iron out some details with a few minor changes, but nothing that we felt was unmanageable. Toward the end of the brief, my HAC commented that no one here had done a cargo net recovery, but noted that the procedures seemed simple enough. The HRST/Cast Master mentioned that he had numerous challenges in the past with this type of recovery due to the rotor wash pushing the CRRC through the water, as well as difficulties positioning the CRRC while it was attached to the pendant and simultaneously hoisting personnel. Though we noted these comments, at no point did this spur any further discussion on how we planned to approach and execute the CRRC recovery.

The rigging and aircraft start was met with minor hitches but eventually we were able to depart from Naval Air Station North Island and transit quickly over to the operating area. We immediately went into our K-Duck and cast evolution, inserting the CRRC and five personnel from our low creep. Once all personnel and equipment were inserted in the water, we established an overhead orbit to allow time for the personnel to rig the cargo net around the CRRC. With the go-ahead given from the safety boat personnel we established ourselves in a 70 foot hover into the wind. The procedures called for engaging hover mode at this time, but unfortunately, when I called for it, the aircraft would not establish a coupled hover. We troubleshot for a few seconds before the HAC opted to engage the BARALT hold and let me hold the hover. We were so focused on the personnel and boat in the water, that at no time did anyone suggest we troubleshoot further prior to proceeding. I would spend the rest of this evolution task saturated and focused on which severely degraded my SA. Strike one. Now hovering over our personnel, we hoisted the first three swimmers into the aircraft. Once this was complete, our crew chief lowered the pendant through the hell hole and it was time to position the aircraft for the CRRC recovery. This is where the fun really began.

Not wanting to overshoot the CRRC, I slowly worked to position the aircraft overhead with the two personnel standing onboard waiting to receive the pendant. Shockingly, the boat did exactly what the HRST master and Seawolf Manual said it would: it got blown away by the rotor downwash. I steadily worked toward the boat, and it steadily worked away. This went on for a good 30 seconds before our crew chief finally called me out, telling me that if I didn't get more airspeed we would never get over the CRRC. Thank goodness for that call, otherwise I would have eventually blown the CRRC enough to beach it on the nearby strand. In hindsight that probably would have been the quicker and safer method of CRRC recovery.

Determined to make sure I got the aircraft over the CRRC without pushing it on the next attempt, I flew over boat at 15 knots. The crew chief then notified me that I had almost yanked one of the hook-up men off the CRRC as he grabbed the pendant attached to our rapidly overshooting helicopter. the third attempt was the charm, as we found a happy medium speed of approximately 10 knots, which allowed us to safely position the aircraft and get the cargo net hooked up. During an after action review, it was noted thatthe aircraft should drag the sling/pendant over the CRRC at 10 knots. Though we read through these procedures prior to the flight, this number was apparently never internalized during study or the brief. Ultimately, this could have led to the injury of the hook up men trying to connect the boat. Strike two.

With the CRRC now attached to the aircraft's cargo hook, it was time to hoist the two hook-up personnel out of the water. In the mass brief, the HRST master told us that the best way he had seen to position the aircraft was to put the CRRC in front of the aircraft, or out to the 9-10 o'clock position so the boat would be visible, but out of the way of the hoist. Our first challenge was that we were looking into the sunset and could not see the personnel. Eventually, we found one out at our 3 o'clock position. Between listening to North Island tower, the HRST Teams safety boat frequency, my HAC, and both aircrewman on ICS, I was completely overloaded on comms. Couple that with holding a hover and the completely new and less than fluid evolution I found myself completely task saturated. At this point, I started receiving positioning calls from literally every member of the crew, and many of them were conflicting: Crew Chief, "Left five!", second Aircrewman "Right ten!". Maintaining what little compo-

Basic crewman training (BCT) students perform a "dump boat" exercise with the combat rubber raiding craft at Naval Amphibious Base, Coronado. BCT is the first phase of the special warfare combatant-craft crewman training pipeline. (U.S. Navy photo by Mass Communication Specialist 2nd Class Dominique M. Lasco)

Naval Air Crewman (Helicopter) 2nd Class Danielle Moder, assigned to the Eightballers of Helicopter Sea Combat Squadron (HSC) 8, conducts lookout procedures during a familiarization flight, which incorporates search and rescue training, search patterns, and instrument training for pilots and air crewmen. (U.S. Navy photo by Mass Communication Specialist 1st Class Shannon E. Renfroe)

sure I had left, I told them I was getting conflicting calls. We were able to position ourselves to make the recovery of the swimmer we had in sight, but there was still mass confusion as to where the second swimmer was, and a log jam of position calls being made. At this point, the HAC attempted to take control by angrily stating that we did not have the swimmer in sight and that we needed better calls from the back. The second aircrewman then notified us that he had the swimmer in sight off the nose and that he needed the nose to come left. Voice activated at this point, I immediately complied and was through approximately 45 degrees of pedal turn to the left when my HAC's shouting voice emerged over the ICS unleashing a profanity laced barrage of commands and critiques that I will simply sum up as "Stop! That will turn us out of the winds. Position the CRRC on the left, and then we will move forward and hoist the swimmer on the right." Unfortunately, instead of taking a time out and calmly telling that to everyone, the HAC managed to take an extremely volatile situation and escalate it further. The recovery portion of this evolution to this day represents worst CRM breakdown that I have seen in my aviation career. After the flight, the Crew Chief mentioned during debrief that the plan he had discussed with the second aircrewman was that he would make all the calls relating to the CRRC, and that the second aircrewman would make all calls relating to the hoisting. At no point were the pilots notified of this plan. This contributed directly to the conflicting calls that were made to the flying pilot. Also, the Seawolf procedure states, "The aircraft should be positioned quickly to recover remaining swimmers to prevent the CRRC from being blown off position". It does not say how or where to position the aircraft in relation to the CRRC, and we never discussed how we would do it in the brief. This again could have easily led to injury to personnel, damage to the aircraft, or even a mishap. Big strike three.

With all personnel recovered and the CRRC hooked up, it was time to extract the boat from the water and transport it to Turner Field. At this point, the evolution transitioned from Cast and Recovery, to Vertical Replenishment (VERTREP) procedures and techniques. Per our SOP, the requirement for the first pick of the day is to note the height at which the load cleared the deck (in this case the water). This altitude is then used to establish the desired crossing altitude for dropping of the load. Unfortunately, neither pilot noted when the CRRC left the water. No problem though, I knew from the pubs that the pendant was 60 feet long and that our standard was to clear the highest obstacle by 20 feet. Happy to find a math problem I could complete in my head, I verbalized the pendant and crossing height to the crew and stated that I would level off at 80 feet AGL for the drop. No dissention was noted from any member of the crew, and the HAC even stated that sounded right. I rolled on final for my approach at the briefed 80 feet and as I approached the water's edge, and the start of the landing pad, I received a very pointed "Up!" call from the Crew Chief. Not wanting to yank in a ton of power with the boat attached to the aircraft, I made a small collective input to increase our altitude. That input was immediately met with a second and much more urgent "UP!" call from the Crew Chief. Again I made a second collective increase and felt an aft cyclic input from my HAC. The Crew Chief then called the load clear, and we placed it in the grass field adjacent to the helo pad. At this point, I had no idea how close we had come to a very bad situation. Being the 21st Century, I was able to get video footage of the drop evolution at Turner Field from the vantage point of the helo pad. I was shocked to note that as we made our final approach, the CRRC completely disappeared below the fence line. I was also able to note that the CRRC was not riding flat (as I had pictured it in my head). The CRRC was almost standing straight up and down in the cargo net, easily adding 10 feet to the length. Couple that with the fact that the helo pad at Turner field is approximately 20 feet above the waterline, and it does not take rocket science to figure out why the aircraft was in such a bad position. What happened that day ended up being the best case scenario. The worst case scenario would have been snagging the CRRC and cargo net in the fence, at minimum damaging equipment and facilities, and at the max resulting in a mishap. With this information in mind, the appropriate altitude calculation would have gone something like this: 70 feet for when the CRRC cleared the water, 20 feet for the elevation at Turner Field, and 20 feet for the desired obstacle clearance for a 110 foot approach altitude. That thirty foot discrepancy was the result of not following our VERTREP procedures, and an insufficient brief and in flight recon of the drop area. Strikes 4 and 5. For you baseball fans out there, we should have been out a long time ago.

THE FLIGHT CONTINUED ON, and ultimately terminated in the middle of the Special Patrol Insertion/Extraction evolution (which was not a cake walk in and of itself) due to weather. We returned home and took to debriefing, going over all the points I have presented here. As I took time to reflect on the flight in the days and weeks after, I could not help being upset at myself for the mistakes that I made. All of them seemed so careless, obvious, and simple to fix if we as a crew had briefed more efficiently, and then just slowed down and communicated better in flight. Though nothing catastrophic occurred, the opportunities for damage to equipment, injury to personnel, and even a mishap were abundantly present. The biggest problems I saw were that there were numerous deviations from procedures and flying without a plan. No mission is ever perfect, but if you have solid procedures and a solid plan, you have the base foundation to fall back on when the impending meltdown occurs. My challenge to you is to identify what is important when you brief a mission. Don't just check the boxes that comprise a standard whiteboard brief. Know when something is foreign, be willing to admit that it is foreign, and then be willing to break out the paper and crayons to draw out a step by step picture of what you expect to happen. If you are the person listening, do not be afraid to tell the drawer that their crayon picture is confusing or does not make sense, because as you can see from above, the aircraft is not the place to hash it out.

LT KYZER FLIES WITH HSC-8.

ORM corner
Operational Risk Management

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Mid-Pacific International Medevac

BY LT JUSTIN LANGAN, HSL-49

On every Helicopter Aircraft Commander Board, the question inevitably comes up, “When can you deviate from (insert publication here)”? Just months after qualifying, I found myself answering this after knowingly violating two major rules on a medevac flight during RIMPAC 2014. First, I conducted a night NVD landing on a vessel authorized for daytime-only operations. And second, I embarked a medical attendant suspected of not having approved water survival or egress training to assist with the night overwater medevac. Why did I break the rules and take those risks? Well, let me paint the picture to explain.

Our SH-60B detachment was operating on USS *Gary* (FFG 51) during Group Sail transiting from San Diego to Hawaii to participate in the 2014 Rim of the Pacific (RIMPAC) multi-national exercise. We had completed the basic phase of Initial Ship Aviation Team Training (ISATT) just three days prior, and were the only ones in the group of five US and foreign ships whose helicopter detachment had completed the required initial training. As such, we were the only detachment that could accept operational tasking.

After a full day underway, I had recently just hit the rack when at around 0100 my curtains opened and a voice said, “Langan, Langan! Your alert crew has a possible medevac!” My co-pilot, racked out above me in our stateroom, jumped to his feet and started getting dressed. Still in a haze, I climbed out of my rack and stumbled around the room for a few seconds before getting my bearings. Soon I was dressed and headed to Combat Information Center (CIC).

My mind raced back to many of the questions and scenarios that I had prepared for on my HAC board, just two months prior. Is our aircraft ready? What’s the patient’s condition? Where are we picking him up from? Where are we taking him? What’s the distance?

Quickly we started piecing together the details. We were to pick up a Norwegian Sailor from his vessel, Fridtjof Nansen, and transport him plus their English-speaking doctor to a big deck Amphib for emergency surgery. The information said the patient was suffering from a ruptured appendix, that he was in critical condition, and that he was to be transferred to USS *Peleliu* (LHA 5).

As we readied for the mission, it crossed my mind that I’d be undertaking a lot of firsts: first time performing a non-ambulatory medevac, first time flying any medevac as the HAC, first time operating on a foreign ship at night, and my first time landing on an LHA. I was excited yet also nervous. It was quickly obvious that we had two big obstacles to this mission: landing aboard the Fridtjof Nansen and whether or not to transfer their doctor along with the patient.

The first obstacle was the Fridtjof Nansen’s certifications. According to the HOSTAC (Helicopter

Operations from Ships other than Aircraft Carriers), the Fridtjof Nansen was certified for VMC day/night landings of the NH-90 helicopter only. Our SH-60B was only certified for vertrep (Vertical Replenishment) and HIFR (Helicopter In-Flight Refueling) on the Norwegian ship. I had never even heard of the NH-90 and did not know if it was comparable in size or weight to the Sikorsky H-60. As part of the planned RIMPAC exercises, we had received authorization to conduct daytime landings aboard the Fridtjof Nansen, so we knew someone had determined that their flight deck could handle the SH-60B but that did not mean a nighttime landing would be easy. We planned to use NVDs, but were unsure whether their lighting would be compatible. The HOSTAC said they would have a stabilized horizon bar, but would it be like the horizon reference system (HRS) bar we are used to, and would it be NVD compatible? Would their deck lighting be NVD compatible? How would we shoot our approach, since they did not have a TACAN?

Because I was a junior HAC, certainly without much medevac experience, I had limited resources to guide my decision process on whether or not to try for an unauthorized nighttime landing. Sure, my detachment's OIC and *Gary's* CO wanted this medevac to happen, but I was in the hot seat; it was my decision to make. And yet even as a junior HAC, I knew the answer to my dilemma was ORM. I needed to apply the steps and abide by the principles to do what I could to minimize the risk to the lowest level.

Having authorization that the SH-60B could land on the Fridtjof Nansen helped mitigate that the ship wasn't certified for the SH-60B. But what controls could I put in place to minimize the risks associated with landing there? A good thorough NATOPS brief was a great start. We briefed that we would don NVDs and perform a Self-Contained Approach to the ship using the SH-60B's APS-124 radar. We would execute strict radar altimeter adherence and follow NATOPS procedures for night overwater descent. We would use FLIR to help with alignment if needed. We would have the co-pilot back the pilot up on instruments, being especially ready to call for the wave-off if necessary. We would also take the transition to landing much slower than usual in order to allow our aircrewman to clear the tail and get a better feel for our position over the flight deck.

Our other concern was whether or not to transfer their doctor along with the patient. The patient would need to be transported via litter, and we knew he was in critical condition. We knew a recent interim change to OPNAVINST 3710.7U says "a qualified medical attendant who is current in approved water survival training, and has been properly briefed on emergency egress procedures for that aircraft, may be transferred at night with approval from the ship's Commanding Officer." But what about a medical attendant without water survival training? We had to assume the Norwegian doctor lacked any US Navy approved water survival training. The same section of 3710.7U does allow certain commanders to waive the restriction that prohibits nighttime ship launches/recoveries with passengers, but only in cases of operational necessity. And as far as I knew, we certainly hadn't crossed

A Sailor launches an MH-60 Sea Hawk helicopter assigned to the Blackjacks of Helicopter Sea Combat Squadron(HSC) 21 from the flight deck of the amphibious assault ship USS *Peleliu* (LHA 5). (U.S. Navy photo by Mass Communication Specialist Seaman Amanda Chavez) into the realm of operational necessity for this medevac. Of course there is always the "military exigency may require on-site deviations" caveat, but I did not want to willingly violate the rules just because I could.

So should I take the doctor? My instinct told me yes due to the nature of the emergency and condition of the patient, and both my OIC and the CO of the Gary agreed. I still needed to minimize as much risk as possible through ORM. The biggest control we could think of was to give the doctor a thorough passenger brief, emphasizing egress procedures. We also knew that the takeoff from the Fridtjof Nansen would, in theory, be safer than the initial landing. And we assessed that the landing on the Peleliu would be pretty straightforward, even if I'd never been to an Amphib before. I knew the procedures from the LHA/LHD NATOPS Manual and we knew we could ask for a precision approach as needed. Besides, landing on the Peleliu's giant flight deck would be the safest type of landing we could do with the doctor onboard. The last control we discussed was that the forecasted weather would allow us to maintain altitudes that would keep us in communications and navigation ranges with the various ships during our 120nm transit from the Fridtjof Nansen to the *Peleliu*.

Having the doctor on board the helicopter would be of tremendous benefit to our aircrewman, in case the patient's condition worsened. We also knew that the *Peleliu* might need the doctor's language skills to communicate with the patient. I assessed that the risk to the doctor was something I could not completely eliminate, but the benefit of transferring him with the patient outweighed that risk.

Not wanting to delay our initial launch, we agreed in the brief that we'd attempt the landing on the Norwegian vessel and that we would indeed pick up the doctor with the patient. Our detachment's maintenance team readied the aircraft, we preflighted, and launched uneventfully. The landing on the Fridtjof Nansen was smoother than I anticipated, the patient was loaded and the doctor was briefed, and the 120nm transit to the *Peleliu* was as quick as we could make it. The patient needed morphine during the flight, which the doctor was able to administer. Finally, the landing aboard *Peleliu* was without incident and their medical team took charge immediately. Later we learned the patient underwent successful surgery onboard the *Peleliu* and was recovering well.

The amphibious assault ship USS *Peleliu* (LHA 5) conducts an exercise in the U.S. 7th Fleet area of responsibility. (U.S. Navy Photo by Mass Communication Specialist 1st Class Joshua Hammond)

While most Aircraft Commanders would have made the same decisions I made that night, it was my first time really straying into the gray area between the black-and-white rules and regulations we abide by. Weighing the risks versus the benefits and using ORM was invaluable in helping me make those decisions. Being a helicopter pilot in the Navy is an inherently dangerous job, but with the right thought process and controls set in place, we minimized the risks in order to increase our chances of having a successful mission and ultimately saved a Sailor's life.

LT LANGAN FLIES WITH HSL-49.

Taxi Into Danger

BY LTJG DANIEL HUNZIKER

Immediately after checking in to my first operational E-2 squadron, I was initiated into one of the time-honored traditions in the Hawkeye community: high-power turns. Because the high-power area at our home field is not co-located on our ramp, it requires a NATOPS-qualified pilot to taxi the plane to it and back. This duty usually falls to the junior pilots and is a main reason they are welcomed into the fold.

That winter day was my first solo high-power after having done the requisite ride-a-longs with another junior pilot. I'd had my initial NATOPS check a month prior, so I was at the peak of my NATOPS knowledge. However, I'd spent the last year as a replacement pilot, flying only in the left seat. This left me with an admittedly rusty comm/radio skillset.

After a trip through Maintenance Control for a brief, I grabbed my helmet and gloves and jumped into the already turning airplane. I gave the cockpit and instruments a quick once-over. The maintainer and I exchanged places, and the plane was mine. I tuned up ground and called for taxi. The taxi from the line to the high power area is short: two quick turns, cross Runway 10/28, and then another hundred feet.

The response I got was, "Taxi via taxiway Charlie, Charlie one, Echo, hold short of runway 28 at Charlie one." It didn't register that the last part of the transmission might have been cut off.

I responded, "Roger, Charlie, Charlie one, Echo." This was my big mistake. Pilots are required to read back either the hold-short instructions or clearance across runways, and I failed to do either. Equally culpable was the ground controller, who is supposed to repeat instructions if they weren't received.

I thought I had been cleared across the runway; the maintainer and I looked left and right to ensure that it was clear. I said, "Cleared across, cleared left and right, an E-2 just left the runway and there is a COD overhead." My due diligence done, we proceeded across the runway to the high-power area. After I reached the other side, ground called me back, clearly distressed and telling me that I hadn't been cleared across.

The rest of the event proceeded without incident. Upon reaching the ready room, I called the tower chief to debrief. I learned that at the time of my incursion, a C-2 had been cleared for takeoff, though that pilot had not initiated the takeoff roll. The tower controller immediately cancelled the takeoff clearance, and the C-2 complied. The ground controller was an inexperienced trainee, which contributed to the communications issues.

This incident seems benign, but it could have been catastrophic, thanks to inexperience and complacency. High-powers are common for each of the many Hawkeye squadrons on the flight line, so the read back of "Charlie, Charlie one, Echo" was a common radio call. That doesn't excuse the fact that the requirements for both the pilot and the ground controller to read back specific clearances weren't adhered to.

LTJG HUNZIKER FLIES WITH VAW-125.

Shallow Water Blackout

BY EVELYN ODANGO, NAVAL SAFETY CENTER

Shallow Water Blackout (SWB) results from hyperventilating or taking a series of short breaths before going underwater. It is the leading cause of drownings for experienced swimmers. Most people can hold their breath approximately one minute, but usually not much longer without training or special preparation. SWB can affect anyone, even physically fit swimmers. Some survive because of quick rescue efforts; others succumb.

The Danger Zone

By hyperventilating before going underwater, the swimmer decreases or eliminates the amount of carbon dioxide (CO2) in the blood stream. Carbon dioxide supplies the body's primary urge to inhale while breathing. Taking a series of breaths expels the carbon dioxide, causing the CO2 level to drop below normal. This allows the swimmer to stay underwater longer before feeling a need to breathe.

During the breath-hold, it takes a significant amount of time for the CO2 to return to the normal level then to rise to the point where it stimulates breathing. While underwater, the levels of CO2 and oxygen (O2) increase. This build-up triggers the need to breathe and the diver heads to the surface. The CO2 decreases and the O2 level in the blood runs low enough (a condition called hypoxia), causing the diver to lose consciousness.

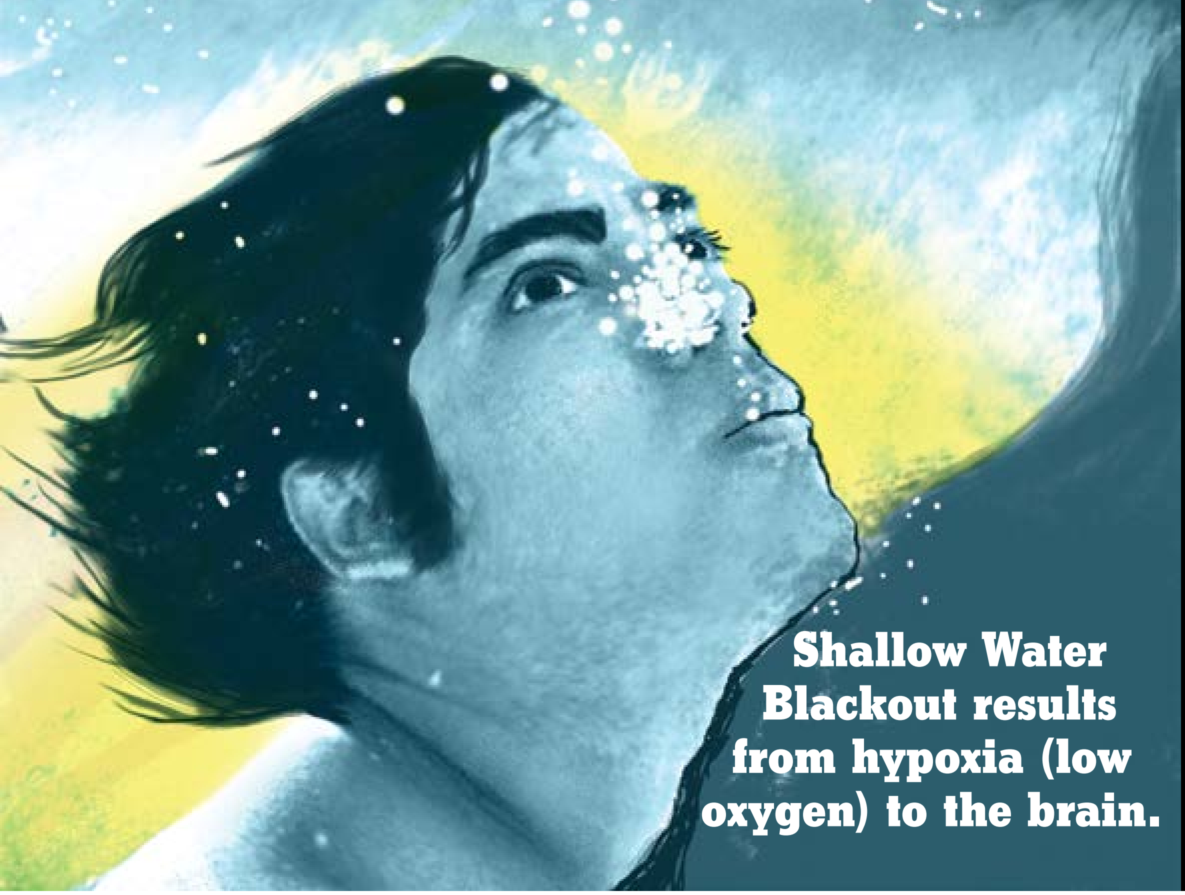
Breath-hold Diving and Consequences

Articles and reports on SWB-related deaths pervade safe-community websites and the news media, where survivors tell their stories so others may live. Warning signs are going up in major cities' recreation centers and pool houses. Reuter's news agency reports that New York City and Santa Barbara have already banned breath-holding in public schools.

Extended breath-holding after hyperventilation is not a safe procedure, and the Navy community is not immune to the danger of this phenomenon. The U.S. Navy Diving Manual states that hyperventilation is a common cause of breath-holding accidents in swimming pools. Although hard to track, SWB-related deaths have been documented for decades.

In October 1998, an article in the Navy & Marine Corps Medical News reported about the drowning of three Sailors who succumbed to SWB during training. According to the report, one of the victims was a chief petty officer who was a skilled swimmer. He died alone in the base pool.

In 2013, the U.S. Air Force Safety Investigation Board polled more than 3,300 airmen who regularly swam as part of their workout routine; of that number, 86 percent were not aware of SWB. During the same



WHO IS AT RISK:

- Free-Divers
- Special Forces Combat Divers
- Special Operation Divers
- Snorklers
- Competitive Swimmers
- Spear-fishing Divers
- Marine Raiders

WHERE CAN IT OCCUR:

- Pool
- Lake
- River
- Ocean

SWB can occur in any body of water, regardless of depth.

year, the Pacific Air Forces (PACAF) safety investigation of an airman's drowning in an underwater training led to changes in the service's high-risk activities program. Personal risk management, such as having a swim buddy, has become a major component of this program.

Recently, the U.S. Navy Diving Manual has also been updated. The revisions from November 2014 effect changes in mishap and near-mishap reporting, planning and ORM, breath-hold diving, and calculation of SCUBA air supply. The Navy Diving Manual prohibits the technique. Commanders and safety leaders urge instructors, swimmers, divers, and lifeguards to maintain constant awareness.

Chief Hospital Corpsman (DSW) Dean Del Favero, a diving specialist formerly with the Naval Safety Center, emphasized an important safety reminder in an issue of the diving newsletter, Diving Safety Lines.

"Refresh your knowledge on breath-hold diving," he said. In an e-mail, Del Favero added that "breath-hold diving is rarely performed in Navy diving, so it is a rare occurrence for our community."

It is, however, practiced quite often in special operations training. The diving manual also specifically states that "breath-hold diving shall be confined to tactical and work situations that cannot be effectively accomplished by the use of underwater breathing apparatus ..." The manual further states that "hyperventilation shall not be practiced because of the high possibility of causing unconsciousness underwater."

Call for Awareness

SWB can affect anyone at any time. Victims typically have no prior medical problems, are physically fit, and give no warning. In recent years, a series of SWB-related drownings involved victims between the ages of 15 and 26. They had all been holding their breath underwater.

An organization called Shallow Water Blackout Prevention has started a movement to increase awareness and promote prevention after the death of Gene "Whitner" Milner, who died at the age of 25 in his family's swimming pool. Milner was performing hypoxic training to increase his dive time for spear fishing. After his death in 2011, his family founded the organization to prevent senseless deaths caused by SWB.

Similarly, retired surgeon Dr. Ernest Campbell, who is also an avid diver, hosts a website that offers information about diving and undersea medicine for the non-medical divers and swimmers. According to the website, shallow-water blackout was a hot research topic for diving physicians in the 1960s, when they worked out the basic physiology of this phenomenon. They also studied the case

DROWNING STATISTICS

Naval Safety Center Data, FY08-15
(Oct. 1, 2007 - June 8, 2015)

MARINE CORPS FATALITIES

FY	Off Duty	On Duty
2008	1	0
2009	6	0
2010	4	2
2011	3	0
2012	4	0
2013	1	0
2014	2	1
2015	0	0
Total	21	3

NAVY FATALITIES

FY	Off Duty	On Duty
2008	7	1
2009	5	3
2010	2	1
2011	4	1
2012	4	1
2013	5	5
2014	5	0
2015	0	2
Total	32	14

Until the two recent events, NSC data shows no SWB-related death while on-duty since 2001.

PREVENTION STRATEGIES

- Do not practice prolonged breath-holding. Institute and enforce a ban on any prolonged, repeated, and competitive breath-holding activities.
- Inform parents and swimmers why breath-holding activities are not allowed.
- Never hyperventilate.
- Underwater breath-holding should never be encouraged, but if practiced the rule of thumb for safety is: One Breath-hold, One Time, One Lap, ONLY.
- Never swim alone.
- Repetitive breath-holding increases risk of SWB. If breath-holding underwater, a buddy must be next to you tapping you on your shoulder so you can signal that you are OK. Your buddy's total focus needs to be you and your safety. The buddy should never breath-hold with you. Do not rely on lifeguards. SWB is difficult to detect above water.
- Understand that any strenuous exercise performed underwater drastically decreases the amount of time a swimmer can stay submerged.
- Never hesitate; if a swimmer is sitting motionless on the bottom of the pool pull them out immediately.
- Train lifeguards on the dangers of hyperventilation and shallow water blackout.

Sources:
Pacific Air Forces Safety
West Bend Mutual Insurance Company/Culture of Safety

histories of SWB victims, identifying several factors that can contribute to this condition. These include hyperventilation, exercise, a competitive personality, a focused mind-set, and youth.

The website (www.scuba-doc.com) further explains that "medical researchers feel that many pool deaths, classified as drownings, are really the result of shallow water blackout. Most victims are male adolescents and young adults attempting competitive endurance breath-holding, frequently on a dare. Drowning victims, especially children, have been resuscitated from long periods of immersion in cold water 30 minutes or more. The same is not true for victims blacking out in warm-water swimming pools. Warm water hastens death by allowing tissues, especially brain tissues, to continue metabolizing rapidly; without oxygen, irreversible cell damage occurs in minutes."

It takes a concerted effort between command leaders, safety supervisors, trainers, swimmers, and divers to mitigate the hazards of underwater activities. Stay proactive and generative by sharing lessons learned, improving high-risk activity programs, maintaining awareness, and making decisions at the right level.

Sources for this article include the Pacific Air Forces Safety, Bureau of Medicine, West Bend Mutual Insurance Company, and the U.S. Navy Diving Manual.

MS. ODANGO IS THE EDITOR OF SEA COMPASS AND DECISIONS MAGAZINES PUBLISHED BY THE NAVAL SAFETY CENTER.

ONLINE RESOURCES

U.S. Navy Diving Manual (SS521-AG-PRO-010)
http://www.supsalv.org/00c3_publications.asp

Shallow Water Blackout Prevention
http://shallowwaterblackoutprevention.org

Sea & Shore Articles Online
http://www.public.navy.mil/comnavsafecen/pages/media/mag_index.aspx

PITCHLOCK & Cheese Holes

BY LT MIKE ANGELI

After you've logged a few thousand hours, it becomes all too easy to relax on practicing the basics that were so ruthlessly imparted us back in early flight training. Honestly, who thinks that they will one day find themselves on short final with an engine out, and that the infamous "bus full of nuns" will appear right in front of you?

Landing a Coast Guard C-130H just outside of Sacramento, California on a cool and blustery winter's day, I was unexpectedly provided one of these harsh reminders.

With the busy summer months behind us and a lull in recent search-and-rescue cases at Coast Guard Air Station Sacramento, I was eager to fly something other than the standard training sortie. This particular day's urgent tasking was to fly cross-country to the Coast Guard's aviation logistics center in Elizabeth City, North Carolina, to pick up a critical part for an Alaska-based H-60 helicopter that was down hard.

As a freshly minted First Pilot at the time, it would be my first cross-country flight to the East Coast in the mighty C-130. Originally from North Carolina, I was excited at the prospect of some sweet tea and BBQ with friends that evening – until I read the Dash-1 weather brief. Moderate to severe turbulence was forecast at all altitudes across the Sierra Nevada mountain range and on into eastern Nevada, stretching from the Canadian border down into Mexico. We were also looking at a strong low-pressure system approaching the East Coast, bringing gusts upwards of 35 knots, poor visibility and low ceilings at our destination. However, I felt reassured by the fact that my aircraft commander was one of the high-time flyers in the fleet and had logged considerable time flying in the extremes of Alaska at a previous unit.

We took off and climbed out. With a slicked-out aircraft and a full load of fuel, we quickly reached our cruise ceiling of 25,000 feet, putting us just on top of most of the clouds and turbulence. It wasn't until we crossed into western Utah that we spotted (or, rather, heard) the first sign of trouble.

An hour and half into the flight, we noticed a strange sound between the propellers, as if they were suddenly out of sync. After a quick discussion with the flight engineer, we decided that it was a problem with the propeller synchrophaser. We elected to simply switch the selected master engine. After moving the master select switch, we were shocked to see the RPM for the No. 1 propeller shoot up to and hold at 106.5 percent, with a subsequent change in sound and surprising yaw of the aircraft. A quick scan by the aircraft's loadmaster showed that hydraulic fluid from the propeller was streaming down the engine cowling at an alarming rate. We were surprised that we hadn't seen the prop's low-oil light illuminate. A slight change in throttle position and true air speed quickly revealed that the No. 1 propeller was pitch-locked.

We completed the emergency procedures (EPs) and establishing the RPM in the normal, pitch-locked operating range. We were flying on three and a half good engines. An immediate landing wasn't feasible, so we turned 180 degrees, quickly converting what had been a 100-knot tailwind into a direct headwind, for the two-hour flight back to Sacramento. Wary of the 10,000-to-12,000-foot mountains between us and home plate, we limped along at a disappointing 155 knots while discussing drift-down speeds and altitudes and three-engine cruise ceilings.

The return trip was less than pleasant, because the weather we had skirted above on the outbound leg had now grown in size and intensity. We were in the thick of the turbulence and icing. We finally cleared the weather west of Lake Tahoe, entered the terminal environment and began our descent into McClellan Airfield. Descending into denser air and needing to reduce our airspeed, we knew it was finally time to try to feather our pitch-locked propeller. The prop low-oil light still wasn't on, so we convinced ourselves that there was almost certainly enough hydraulic fluid remaining in the system for the propeller to safely feather (days later, maintainers would discover that the wiring to the sensor hadn't been connected during the aircraft's last depot-level maintenance).

Despite countless callouts by our aircraft and from the fire trucks on the ground, the oblivious pilot taxied past the clearly visible emergency equipment and took the runway with our aircraft on a three-quarter-mile final.

I grabbed the No. 1 condition lever and firmly moved it to the feather position. Time stood still while we anxiously waited for the propeller to feather. Just as we began to give up hope and prepared to execute the "prop fails to feather" checklist, the RPM began to decay and the propeller brake finally engaged. With the No. 1 engine secured, we could focus on landing.

A stark resemblance to its glory days as McClellan Air Force Base, the now-uncontrolled, 10,599-foot runway is home to a varied assortment of aircraft, ranging from OV-10s to DC-10 tankers, along with countless other general aviation and corporate aircraft. Having declared an emergency with NorCal Approach Control and requested crash crews be awaiting our arrival, we were cleared by ATC to switch to the airport's common traffic-advisory frequency.

We began our final approach to Runway 34. The airfield's three aircraft rescue and firefighting (ARFF) crash crew rigs awaited our arrival at the approach end of the runway. Making what most pilots would consider to be an excessive number of CTAF position reports, we turned onto final. Much to our surprise, at only five miles out from the runway, we noticed a single-engine private aircraft taxing quickly towards the approach end of Runway 34. Despite countless callouts by our aircraft and from the fire trucks on the ground, the oblivious pilot taxied past the clearly visible emergency equipment and took the runway with our aircraft on a three-quarter-mile final. We immediately executed an engine-out go-around and offset from the departing traffic. The civilian pilot taxied, took off and departed the airspace without a call-out on CTAF.

Our fun meters were officially pegged. We were relieved that our second approach proved less eventful then the first, and we made a safe, three-engine full stop.

The subsequent investigation revealed that the other pilot technically hadn't broken any regulations, since he had been at an uncontrolled airport in Class E airspace. In our case, even though no rules were broken, the holes in the Swiss cheese nearly lined up that day.

LT ANGELI IS CURRENTLY THE ASSISTANT SUPPLY OFFICER FOR AIR STATION KODIAK.

What Five Aviators Missed

LT SHAWN GORDON

The first time signing for a plane as a Patrol Plane Commander (PPC) is akin to taking the family car out for the first time after getting your driver's license. Sure, you have met all the requirements and filled out the forms. However, your performance during that first time behind the wheel can set the expectations for a long time to follow. Once you pull out of the driveway, everything that happens rests solely on your shoulders. If you come back with a traffic ticket, your confidence (and that of your parents) can vanish into thin air. On my first time "behind the wheel," I had a close brush with disaster.

My first flight as PPC was a typical P-3C Intelligence, Surveillance, and Reconnaissance (ISR) mission over the Horn of Africa. I'd completed three similar flights in the week prior acting as a Patrol Plane Pilot (PPP, or 2P), a role that I'd been performing for more than a year during my upgrading syllabus.

These three flights reinforced three major points about flying in this area. First, the airspace around our base of operations is dangerous. Local controllers are difficult to understand and frequently use non-standard terminology. A lack of functioning ATC radar only exacerbates this situation.

Second, all U.S. air operations at the field are given a "slot time" for takeoffs and landings. This process helps de-conflict arriving and departing aircraft and reduces the load on the controllers.

Third, on our prior deployment, slot times might as

A U.S. Navy P-3C Orion assigned to the "Gray Knights" of Patrol Squadron Forty Six (VP-46) taxis down the runway in preparation for take-off. (U.S. Navy photo by Photographer's Mate Airman Chris Otsen) well have been set in stone. Pilots in our squadron had passed down that any attempted departure outside of five minutes from our slot time could result in significant delays, as a new slot time would have to be coordinated before we could take off.

The plane that I was assigned had a known gripe affecting engine starts: a bleed-air valve on the auxiliary power unit (APU) worked only intermittently. If the valve malfunctions, we aren't able to start engines without the help of a huffer (ground support equipment, or GSE), which produces the necessary air flow for engine starts. After talking with my senior flight engineer, we agreed to try to start the engine on our own rather than deal with the added complexity of using the huffer. After an uneventful preflight, we briefed the crew and began the before-start checklist 20 minutes prior to our assigned slot time.

We finished the checklist and tried to start the No. 2 engine. The auxiliary power unit (APU) bleed-air valve failed, so I signaled to the lineman to connect the huffer. As the maintainers hustled to get the GSE into position and attached to the aircraft, I watched the clock tick closer and closer to our slot time. I didn't want my first flight as a PPC to be late. Once we had

The controller didn't understand the request and replied with something unintelligible.

the huffer attached and operating, starts went without incident. We prepared to reverse out of our parking spot, although the self-induced pressure to take off on time weighed heavily on my mind.

The variable-pitch propellers on the P-3 allow us to back the aircraft into and out of spots. The last time I'd backed an aircraft had been a year earlier during our last deployment, where we had to back into our spot after a flight. In our current location, we had to back out before we could start to taxi.

As part of the NATOPS backing procedure, the flaps are retracted to the up position. My PPP for the day had never operated out of the airfield or backed the aircraft, so I had him start in the copilot seat and put myself in the pilot seat. With less than ten minutes remaining before our slot time, we briefed the procedures in the flight station, configured the aircraft, backed out of our spot and began our taxi.

We began the takeoff checklist as we taxied to the active runway. As we neared the end of our taxi, a C-17 in front of us called ground and stated they needed 5-10 minutes to troubleshoot a malfunction. The copilot held the checklist and placed it between the power levers, a technique used to ensure we don't forget to complete the remaining items prior to takeoff. Already behind schedule, we discussed the possibility of turning the plane around and using a different taxiway to reach the active runway. We called the U.S. ground controller and requested just that. After a slight delay, we were given clearance to turn around, taxi and hold short of the active while switching to the local controller in the tower.

I should have taken a deep breath and reevaluated my situation. Other than the broken C-17, I was the only pilot who had to take off at the moment. We knew that communications with tower were going to be difficult, especially with an inexperienced copilot manning the radios. Between the delay with starting engines and the extended taxi, we were at our slot time. I had the copilot call tower and request our takeoff clearance.

The tower controller cleared us onto the runway, and we proceeded to back-taxi to take advantage of the full length of the runway. I called for the rest of the takeoff checklist as we trundled to the end of the runway. We reached two of the final checklist items: Identification, Friend or Foe (IFF) and the traffic collision avoidance system (TCAS).

The copilot held the checklist and requested our departure clearance and squawk code from tower. The controller didn't understand the request and replied with something unintelligible. As I completed a 180-degree turn to line up on the runway, the copilot tried multiple times to get the information we needed from tower. After numerous failed attempts to communicate with tower, I had the copilot place a generic IFF code into the system and request permission to takeoff from tower.

We were cleared to takeoff immediately. I scanned my instruments and asked the flight station if they were ready to proceed. They said they were, so I called for takeoff power and began our roll. At rotate speed, I pulled back the yoke to the proper nose attitude.

The plane lifted off the deck, but as we climbed, I felt the aircraft sink slightly. I assumed that I had over-rotated the aircraft a bit and released some yoke pressure to compensate. We had a positive rate of climb. I called for gear retraction. I scanned the rest of the flight station instruments to detect any other problems. WI saw made the blood drain from my face.

The flap handle and flap position indicator were both in the up position. I had just taken off with the flaps in the wrong position. The other flight station personnel noticed it at the same instant. I immediately called for an intermediate flap position as we accelerated and climbed.

The subsequent climb-out was silent except for the necessary radio calls and required checklist. Everyone was shocked, angry and remorseful.

U.S. Navy Chief Warrant Officer 3rd Daniel Haller, assigned to Patrol Squadron (VP) 16 performs a preflight inspection in the flight station of a P-3C Orion. (U.S. Navy photo by Mass Communication Specialist 2nd Class Gulianna Mandigo)

Once safely airborne and out of the terminal area, we began to discuss what had just happened. In addition to the three personnel in the seat, the junior flight engineer and an off-duty pilot had also been in the flight station during the takeoff. How had five sets of eyes and ears not picked up on the fact that the flaps weren't configured correctly? How did we miss such an essential portion of a checklist we have all read and executed hundreds of times? How did I not ensure the plane was in a safe configuration?

We concluded that in the confusion of trying to secure a departure clearance and squawk while positioning the aircraft for takeoff, we had forgotten to complete the last three items on the takeoff checklist after IFF/TCAS, including checking the flap position. Ordinarily they would already be in the takeoff position, but since we had to back out of our parking spot, they were fully retracted. Those distractions, combined with my press to take off on time, had placed my crew and aircraft in a dangerous position. I had failed in my role as the PPC to ensure that both my crew and aircraft were safe while under my command.

I was devastated – my first time in command of a P-3 had been tainted in a matter of minutes. My tactical crew, not knowing the situation in the flight station, cracked a joke over the intercom, but neither the pilots nor the FEs were in a joking mood.

We landed. The detachment OIC was waiting in maintenance control and asked about my first flight. Rather than have him hear about the mistake from someone else, I described what happened. I'd had numerous training flights with him as an instructor, and he was understandably disappointed to hear about the mistake. We included the rest of the flight station in the conversation as they returned from their post-flight duties. After the initial debrief, we discussed lessons learned and the way ahead.

As we reviewed the environmental conditions during takeoff and compared them with the NATOPS performance charts, we realized just how precarious our flaps-up takeoff had been. We calculated that we had been within 32 knots of our zero-thrust stall buffet speed (compared with the usual buffer of 44 knots with the flaps at the takeoff position). Even worse, if we'd lost an engine during takeoff or initial climb-out, our buffer above stall speed would have dropped to just three knots (rather than the 14 knots we would have with the airplane in its proper configuration).

We have added controls to ensure this event doesn't occur again.

LT GORDON FLIES WITH VP-47.

Understanding Aircraft Tire Heating

BY PHIL MCCOLLUM

Aircraft tire heating can significantly affect tire performance and have safety implications as well, especially for hot-weather operations. There are three primary causes.

First, deformation (known as "deflection") of the tire carcass while rolling generates significant heat, because the tire sidewalls flex, and the rubber compresses and expands.

Second, heat transfer from a high-temperature source (such as hot wheels and brakes).

Third, friction with the ground (from rolling resistance and braking maneuvers) heats up the rubber where the tire touches; some of this heat transfers to the interior of the tire. Braking produces the most friction. Ground friction when the aircraft is rolling is much lower and therefore a minor contributor.

Hot-weather operations magnify these causes by raising the starting temperatures of the tire and pavement and also reducing the ability of the tires to dissipate the generated heat.

Of these three causes, deflection of the tire while rolling is probably the least recognized and of the most concern. Just as bending a paperclip back and forth generates heat, the repeated flexing of the tire sidewall heats up the rubber. Aircraft tires, unlike automotive tires, are designed to operate with large deflections for relatively short durations during taxi, takeoff, and landing, with cooling periods in between. Deflection occurs primarily in the tire sidewall; this design feature helps the tire absorb bumps and handle turns. The amount of heat generated by tire deflection depends on ground speed during operations, distance traveled, and load and tire pressure (which influence the magnitude of the deflection).

Heat transfer from the wheels and brakes depends on the temperature and proximity of the heat source, and the exposure time. High-speed, maximum braking produces the most heat. Light braking, low-speed, and short duration braking events produce less.

Heating affects tire structural integrity in a couple of ways. The most obvious is that higher temperatures increase tire pressure. More significantly, the internal heat causes the nylon cord layers to lose strength and the tread to lose adhesion. Aircraft tire structural strength is substantially reduced by 250°F, generally considered the upper limit for safe tire operation. The failure mode is that the nylon layers begin to separate until the tire is no longer able to withstand the pressure, resulting in an explosive release of tire pressure in unpredictable directions.

Factors Affecting Tire Temperature

Several factors affect tire temperature during operations. Ambient temperature, the operating weight of the aircraft, and the aircraft speed on the taxiways and runways all affect how quickly heat generates and dissipates.

Heavy-weight operations cause larger tire deflections and require more brake energy to stop the aircraft. Consequently, heavy weights result in more tire heating due to tire flexing and hot brakes than light weights.

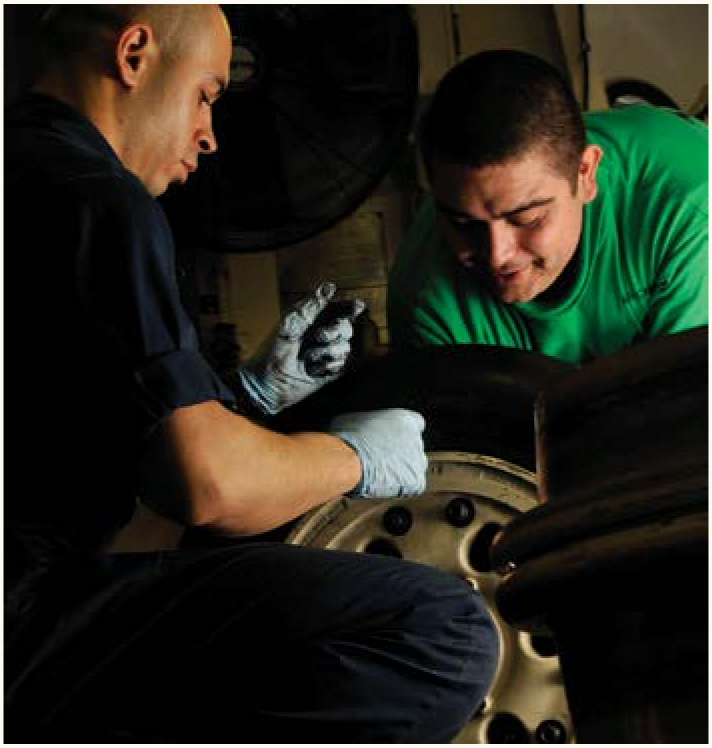
Environmental factors can raise or lower tire temperatures. High ambient temperatures raise the starting temperature of the tire and reduce the heat energy it can absorb. The problem is compounded since structural weakening of the tire starts more rapidly, which in turn allows increased deflection for a given load, which in turn raises the tire's heat. High ambient temperatures reduce convective cooling, since the temperature differential between the air and tire is smaller. Cold environments are favorable.

Altitude is also a factor. At high altitudes, ambient temperatures are usually lower, which helps, but the lower air density at altitude means less cooling via convection. Winds help cool the tire by allowing airflow to dissipate heat.

Using the brakes repeatedly in close succession, before the tires can cool down, can rapidly elevate tire temperatures. Rubber is a good insulator and resists heat transfer (that's why wetsuits are made from rubber). However, once heated due to normal operations, the internal tire temperature tends to remain elevated until gradual cooling occurs. Taxiing when your tires are hot further raises the tire temperature.

Initial tire temperature affects how hot the tires can get from operations. Prior to takeoff, tires are close to ambient temperature, unless tire temperatures are elevated from taxi out to the runway, a recent landing, or other ground operations. Tires are typically cooled by the in-flight operational environment to temperatures below the runway ambient temperature at landing, but they can rapidly heat up due to high-speed deflection cycles, braking action, and proximity to the high-temperature wheels and brakes.

Other factors can contribute to tire-temperature problems, such as under-inflated tires and using retreads. Under-inflated tires increase tire deflection. However, operations below the rated tire pressure allow more tire contact area with the runway (improving braking and load distribution) and thus may be desirable as long as



U.S. Navy Aviation Structural Mechanic 2nd Class Christian Samaras, left, and Aviation Structural Mechanic Airman Alfonso Cabral, both assigned to the aircraft intermediate maintenance department aboard Nimitz-class aircraft carrier USS Carl Vinson (CVN 70), perform maintenance on the tire of an F/A-18 C Hornet. (U.S. Navy photo by Mass Communication Specialist Seaman George M. Bell)

U.S. Navy Aviation Machinist's Mate 2nd Class Catherine Clements inspects a tire before installing it onto an F/A-18C Hornet assigned to the Golden Dragons of Strike Fighter Squadron (VFA) 192 aboard the Nimitz-class aircraft carrier USS John C. Stennis (CVN 74). (U.S. Navy photo by Mass Communication Specialist 3rd Class Benjamin Crossley)

the impact on deflection is considered. Retread tires are quite common and are more at risk of tire-heating problems than original tread tires. Retreads may have extra rubber on the carcass, which causes more rapid heat buildup when the tire flexes under load. To help eliminate problems due to retreads, the tire retread process provides an opportunity to conduct non-destructive tire inspections to detect any internal tire heat damage caused by prior operations.

Potential Damage

Tire failure can occur while the aircraft is taxiing, after the aircraft comes to a stop, or even after takeoff with the gear retracted. It takes about 15 minutes for tires to reach peak temperature, so the time of failure can be some time after a pilot uses the brakes. The damage due to explosive release of tire pressure can vary widely, depending on the location of the tire failure relative to surrounding structural components.

Aircraft system designers consider the potential for tire failure. They separate critical systems and judiciously place items in the wheelwell to help reduce the damage if a tire fails. Nevertheless, debris can strike vulnerable areas, such as hydraulic lines or fuel lines; release of these fluids near an ignition source (such as hot brakes) can result in fire.

The speed of the aircraft imparts kinetic energy to the tires. At higher speeds, tire debris have a larger damage radius. Tire explosions after the aircraft comes to a stop could potentially be fatal to maintenance or ground personnel who approach the tire area before temperatures have decreased. Even if a tire explosion caused little damage, it could create an operational nuisance by blocking an active runway and spreading debris over the runway that could damage other aircraft.

Examples from Operations

Recent operational reports illustrate that aircraft tire-heating problems represent a real concern. One example involves a business jet. It taxied normally out to the runway. The pilot noticed a slight operational problem during takeoff and returned for maintenance. Shortly thereafter, on the second takeoff roll, the tires overheated. Fortunately, damage was limited to the tires.

In another example, a transport aircraft pilot conducted a series of high-speed taxi runs in close succession, with only light braking. Ambient temperature was above 100°F, raising the initial tire temperature and reducing air cooling, but brake temperatures remained within the normal zone. However, heat transfer from the brakes combined with the high ambient temperature and the heat generated by the high-speed taxi events caused the tires to reach a critical temperature. Tire explosions fractured hydraulic lines and the ensuing fire caused extensive damage to the landing gear and wheelwell.

wheel to a critical level, resulting in the explosive failure of the wheel/tire. A melted fuse-plug results in a deflated tire. Thermal fuse-plug melting temperature can be reached during landing and rejected takeoff braking events. Ground taxi with light braking does not appreciably heat up the wheels or brakes, and the thermal fuse-plugs do not reach the critical temperature during routine ground taxi operations. Thus the thermal fuse-plugs offer no protection for ground operations where high internal tire temperatures are caused by excessive taxiing.

Landing with elevated brake temperatures is another scenario where the thermal fuse-plug melting temperature can be reached. Since it is operationally undesirable to melt fuse-plugs and have deflated and potentially damaged tires after landing, operational procedures may require checking the landing touchdown speed versus the maximum allowable brake application speed that is predicted to result in melted fuse-plugs.

... the most effective risk mitigation is to be aware of how multiple operations in close succession, long-distance or high-speed taxiing, hot-weather operations, and heavy aircraft can affect tire heating.

Aircraft Systems

Aircraft systems don't monitor internal tire temperatures on a real-time basis. The brake temperature monitoring system (BTMS) temperature, available in most heavy aircraft but not typically available in fighters, does not represent tire heating. It does indicate the influence of brake temperature on tire temperature. The BTMS temperature sensor is remotely located away from the brake to help protect the sensor from the extremely high brake temperatures. BTMS does not measure the actual brake temperature, and it can take up to fifteen minutes for the temperature sensor to reach a peak value. Aircrews must recognize this delay and the delayed impact on tire heating, especially if extensive ground taxi is required after a high-energy braking event.

Aircraft wheels are often designed with thermal fuse-plugs that melt when the internal wheel temperature at the fuse-plug reaches a pre-determined design value. The fuse-plugs are a safety device designed to release pressure before brake heat reduces the strength of the

Pilots can delay braking to stay below the critical brake application speed.

Risk Mitigation

Risk mitigation for tire failures begins with routine maintenance. Checking tire pressure and inspecting tires before dispatch is an effective means to prevent tire problems during normal operations.

From an aircrew perspective, the most effective risk mitigation is to be aware of how multiple operations in close succession, long-distance or high-speed taxiing, hot-weather operations, and heavy aircraft can affect tire heating. Monitor operations to avoid problems.

Aircrews should also be aware that ground taxi after a landing or rejected takeoff provides an opportunity for further increase in wheel temperature that could allow the wheel to reach the thermal fuse-plug melting temperature during taxi.

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An Expensive Chain of Events

BY MAJOR DANICA MOTTOLA

What was supposed to be a benign cross-country, ferrying an aircraft from MCAS New River to MCAS Yuma, turned into an expensive and time-consuming lesson for both the pilots and maintainers of HMLA-269.

The flight consisted of one AH-1W Cobra and two UH-1Y Hueys. The planned route of flight was from New River to Pensacola on a Friday, through Austin and El Paso over the weekend, and arriving in Yuma on Monday. We departed mid-morning and arrived at the first scheduled fuel stop in Columbia, South Carolina.

From Columbia to Albany, Georgia, we started to see evidence of the predicted thunderstorms. In Albany, we refueled and checked the weather forecast for the rest of the flight to Pensacola. Getting into Pensacola seemed untenable and we didn't want to risk inadvertent IMC at the end of a long crew day. We decided to stay in Albany.

This decision turned out to be fortuitous. While securing the aircraft for the night, a crew chief discovered two holes in the front right portion of the nose next to the battery compartment and just above the lower blade fold restraining pin. The airframes quality assurance representative (QAR) also found a crack on the underside of the panel, about 8 inches long. According to the pilots, no one had heard or seen anything hit the nose during the flight or refueling in Colombia.

Unable to come up with any other reasonable explanation, the crew agreed that it must have happened prior to leaving New River. We made the requisite calls back to the squadron. The bird was down until the H-1 Fleet Support Team (FST) could be reached for a depot-level assessment.

The aircrew's frustration and disappointment was nothing compared to the amount of churn back home. A number of squadron personnel were recalled over a three-day weekend to launch a replacement aircraft and begin the recovery effort. Between WTI support and the 60-day deployment window, the squadron was already on a constrained timeline and struggling with the availability of qualified personnel. To minimize the impact on operations, concurrent plans were made to either obtain depot-level maintenance off-site or to truck the Huey the 550 miles home. A planner and estimator (P&E) team was flown down to Albany; these artisans were able to make the repair on-site. A recovery crew then drove out to fly the aircraft home.

The damage was initially assessed by the aircrew and in the ASO's hazrep to have happened when blade-fold gear hit the nose of the aircraft. However, a command investigation was inconclusive. Regardless of the source for the damage, what we do know is troubling. At best, the damage had been missed by two daily and turnaround (D&T) inspections and two preflights within the 24 hours prior to launch. At worst, a squadron maintainer had failed to report damage to the aircraft – an extreme violation.

The damage done turned out to be minor, coming in well below the mishap threshold. The $10K bill to the squadron for travel and lodging could have been worse if not for the hard work put into an expedient recovery. But given the current fiscal landscape, that $10K could certainly have been better spent on actual training.

U.S. Navy Aviation Boatswain's Mate (Handling) 3rd Class Jarrett Keller of Morenci, Mich. directs an AH-1W Super Cobra off of the flight deck aboard USS Bataan (LHD 5). (U.S. Navy photo by Mass Communication Specialist 3rd Class Mark Hays)

The intangible costs are where the true expense lies. The loss of that Huey from the flight line for two weeks contributed to a loss in assigned support to the fleet, scheduled training events, and more than 25 flight hours, all at a time when the squadron could least afford to lose it.

MAJ MOTTOLA FLIES WITH HMLA-269.

Just a Quick Sea Story

BY LT KYLE MEEHAN

I was standing on the flight deck, getting ready for another "routine" flight into Iraq. Our crew was scheduled to hot-switch into our aircraft (an E-2C Hawkeye). Because of previous gripes about prop pump lights in the wires, my copilot and I had discussed shutting down the left engine to verify servicing levels.

When a pump light illuminates in the Hawkeye, it means that one of the flow switches on the prop pump has either failed or not received enough flow. If the prop is not properly serviced, the pump lights may illuminate. The failure of one of the pumps might prevent the prop from feathering in the case of an emergency. If the prop fails-to-feather, the airplane will not have as much climb-away performance. Worst case, it won't climb at all.

Our flight deck chief (FDC) wanted to come into the airplane and talk to us. He said that there was a hydraulic leak in the right wing root that required some troubleshooting. I realized that this process was going to cut into the typical hour that we have during a hot switch. The maintainers had us spread the wings and cycle the flight controls several times, which took up a lot of the time before our launch.

By the time our maintenance personnel told us the airplane was up and we had refueled, we had just 15 minutes until launch, and we still needed to start the right engine. My copilot and I agreed that we had run out of time to check the servicing on the left engine. We proceeded with the launch.

The flight seemed standard: we were going to the same area and altitude we had been working the past several days. When our 4-hour mission was complete, we started our transit home and began talking to the ship.

As we descended toward our marshal altitude, I saw the master caution flicker for a second, too fast for me to to identify the caution light that caused it. A minute later, the master caution was came on, caused by illumination of the left pump light. I added power, and the pump light went out as we continued our descent to our marshal altitude. Adding power increases blade angle and moves the prop closer to feather, which should make it possible for the aircraft to climb in the event that the prop fails-to-feather.

I told the copilot to ask marshal to bring us down first, and they gave us vectors toward the ship. Another minute passed, and the pump light came back on, forcing me to bring the power up a further.

CATCC told us to descend to 4,000 feet. I quickly realized that we were both too high and too fast with the current power setting and were probably going to have to get vectors away from the boat before starting the approach. I thought I could pull back the power on the good engine and leave the power up on the engine with the pump light. However, when I did, the light came back on, so I matched the power levers and slightly increased power. With the power levers matched, the power required to keep the pump light out was steadily rising. We kept descending. Finally, we were told to hold at 3,500 feet.

I had to maintain almost maximum power on the engine to keep the pump light out. I considered shutting down the engine. Fingers crossed, I made one decision to pull the power back to see if the light would illuminate, which of course it did.

We were left with one choice: I advanced the power back to max and told the crew I was going to shut down the engine. My copilot and I concurred on the correct condition lever and shut the engine down. I ran through the remainder of the boldface items, and the plane slowed to a more normal airspeed on the one good engine.

We headed out on a downwind at 3,000 feet before proceeding inbound toward the ship. We ensured that done is to have maintenance check the servicing on the prop. The servicing takes about 20 minutes, but it could have changed the outcome. As with all carrier operations, there is a perceived pressure to launch on time. You don't want to miss a launch, because that delays your mission if not canceling it completely.

I shouldn't have shut down the engine at such a high speed, and certainly not at 3,000 feet. We could have easily traded the airspeed for altitude, which would have benefited us in several ways. First, the increased altitude (ideally a minimum of 6,000 feet) would have given us more time to run through emergency procedures in case of the dreaded fail-to-feather scenario. Climbing to

An E-2C Hawkeye assigned to the Screwtops of Airborne Early Warning Squadron (VAW) 123 lands on the flight deck of the aircraft carrier USS Harry S. Truman (CVN 75). (U.S. Navy photo by Mass Communication Specialist 3rd Class Karl Anderson)

the prop had feathered, finished the non-memory items and checked controllability. We were about 9 miles behind the ship as I cleaned back up from the controllability check and proceeded inbound. We configured at 5 miles and, amazingly, the airplane felt a lot like the simulator, based upon the power settings we saw and how the controls felt inside the ball call. The fear of boltering lingered in the back of my mind until I felt the hook grab the wire. When the airplane stopped in the wires, a wave of relief washed over our entire crew.

When I got back to the ready room, I had some time to reflect about a few mistakes that I made and what I could do better next time. The first thing I could have

6,000 feet in the Hawkeye would have given us time to run through the fail-to-feather procedure and still have time to bail out if it didn't work. Second, we should have brought the airspeed down to around 150 KIAS, a much more reasonable shutdown airspeed, which would reduce the airplane's tendency to swerve. Had this been a compound failure, we would have been presented with even more problems.

Regardless of the emergency, you almost always have more time than you think you do to make good decisions. The decision that you make on the ground can have far-reaching consequences long into a flight.

LT MEEHAN FLIES WITH VAW-116.

A Syrius Emergency

CDR BRENNAN SWEENEY

If you had told me a year ago that my first combat mission as a squadron XO was going to be over Syria, I would've called you a liar. If you had added that the flight would include a 750-mile, single-engine transit over hostile territory, failing electrical systems and capped off with a no-HUD approach, I might have passed on the command bonus!

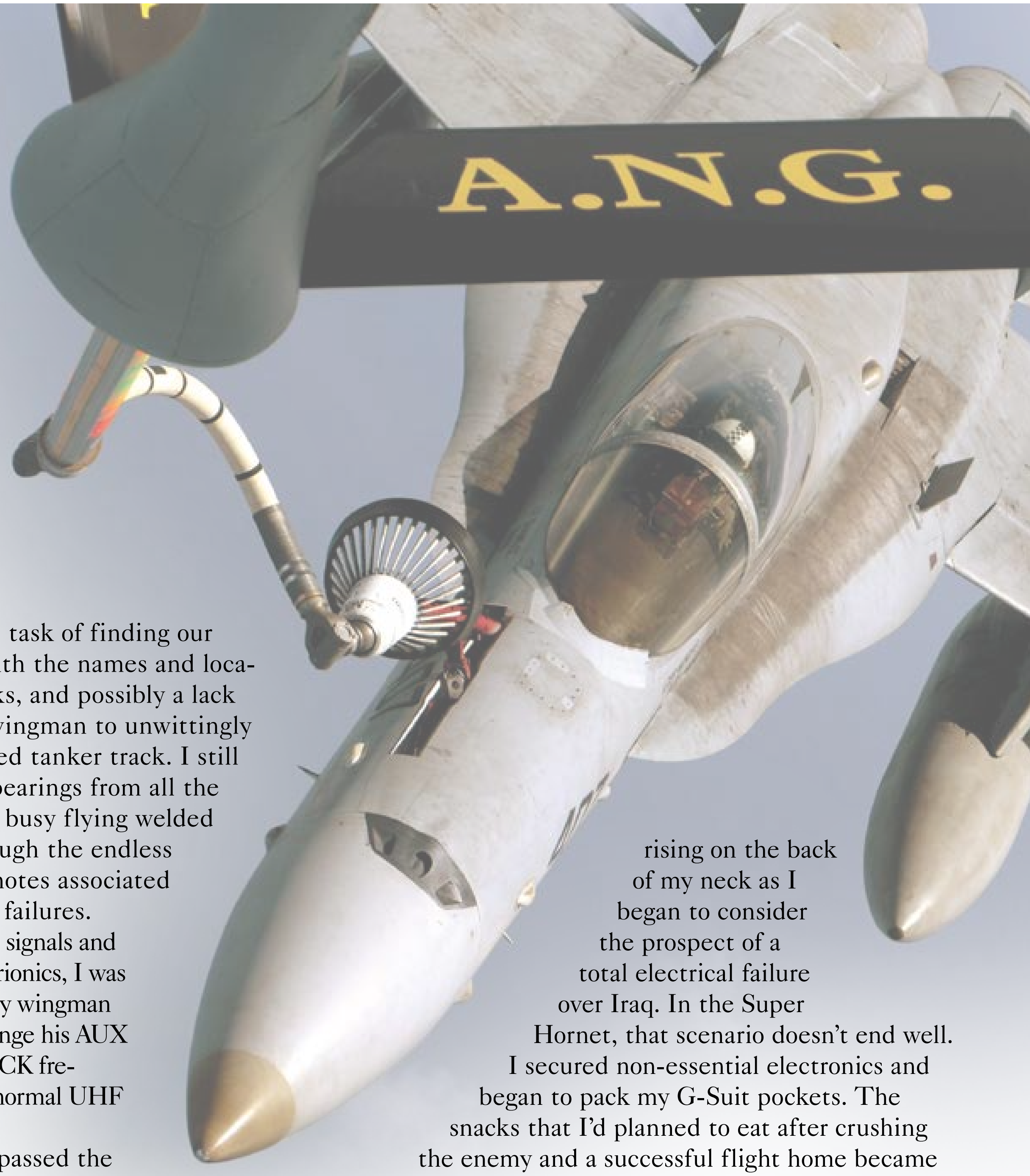
It was the first combat mission of the deployment, and it started out optimistically enough, with good weather forecast and a high likelihood of employing weapons on day two of Carrier Air Wing Seventeen's efforts to degrade and ultimately destroy ISIS. After transiting 750 miles from USS Carl Vinson (CVN 70) and tanking once on the dreaded KC-135 Iron Maiden, we had completed our first on-station window or "vul."

While en route to our second tanker, still over Syria, my heart dropped a little when I heard the distinctive master-caution tone and saw a steady right AMAD pressure caution. In the F/A-18E Super Hornet, this caution indicates a loss of oil pressure in the right airframe mounted accessory drive (AMAD). In accordance with the pocket checklist (PCL) and after a short discussion with my experienced wingman, I secured the right engine. I didn't plan to land any time soon and would rather not be on fire.

With one generator secured, the other should be able to carry the robust electrical load of the Super Hornet, even with all combat systems operating. I was disappointed and a bit surprised when, shortly after securing the right engine, my displays flashed, followed by loss of the right DDI, HUD and various other systems. The GEN TIE caution that was now illuminated pointed at a fault in the electrical circuitry. My electrical system showed just under 28 volts. I assumed that the voltage was actually 28 volts and that the gauge was just slightly off.

I diagnosed the loss of displays as being a mission-computer failure. To add insult to injury, my auxiliary radio was stuck in HAVEQUICK. The time sync had been lost, resulting in loss of communication with my wingman, who was still communicating with our JTAC on the PRI radio. I used my primary radio to communicate the emergency and my intentions to our assigned Battle Management Agency (BMA). I pumped my aircraft to signal my wingman to join and passed him the electrical HEFEO signal. After my wingman acknowledged the signal, I gave him the hand signal for "fuel," passed the lead and we proceeded to the tanker for some much-needed gas.

The next problem wouldn't come from a complex set of failures or compound emergencies: it was



the seemingly mundane task of finding our tanker. Unfamiliarity with the names and locations of the tanker tracks, and possibly a lack of preparation, led my wingman to unwittingly fly right past our assigned tanker track. I still hadn't gotten back my bearings from all the electrical failures; I was busy flying welded wing while reading through the endless warning, cautions, and notes associated with my aircraft system failures.

Through various hand signals and Team America-esque histrionics, I was able to communicate to my wingman that I required him to change his AUX radio from our HAVEQUICK frequency to our squadron's normal UHF inter-flight frequency.

On realizing he had passed the assigned tanker track, my wingman correctly assessed that we were in a tough situation where the only thing to do was to track towards our emergency divert in friendly (or less hostile) territory and have the tanker join on us. We calculated that with a top-off from the tanker, we would have just enough fuel to complete the remaining transit back to the ship. Significantly lower tanking altitudes and airspeeds would be required, due to the single-engine performance of the aircraft carrying a full combat loadout.

As the tanker was running us down, I noted the battery voltage had dropped to 25V. The hairs began rising on the back of my neck as I began to consider the prospect of a total electrical failure over Iraq. In the Super Hornet, that scenario doesn't end well. I secured non-essential electronics and began to pack my G-Suit pockets. The snacks that I'd planned to eat after crushing the enemy and a successful flight home became potential survival items. I took a moment to check my pistol and magazines.

By the time we joined on the tanker, I was below the single-engine bingo fuel required to get to the primary divert in Kuwait. My only options were to get gas or divert to the unsecured Baghdad International Airport, a very undesirable option that CAG had briefed in no uncertain terms as a "last resort." Emergency extension of the in-flight refueling probe (IFR) created additional drag, presenting the next problem to solve. I asked the tanker to descend to 20,000 feet and slow to 225 knots. This allowed me to contact the basket and start receiving fuel.

We were now stuck above a newly developing 19,000-foot layer of clouds that limited the acceptable airspace in which to air-to-air refuel. My aircraft's system failures meant that I had no awareness of how much fuel was in my external centerline tank. I elected to fill my internals only to make it easier to recover back aboard the aircraft carrier.

As my fuel tanks filled and gross weight increased, I struggled to remain in the basket and soon became detached, despite my former-LSO wingman's timely "power" call, a helpful first for me in a big-wing tanking situation. A further descent through the cloud tops at 19,000 feet quickly became unavoidable. The tanker pilot helpfully complied with all requests, dragging the section to the coast and even offering more gas overhead the carrier.

The squadron spent countless hours going over the dynamic tactical situations that we thought may arise, but as always, the administrative portion of the flight dictates success or failure.

The weather began to deteriorate because storms were building up in the Arabian Gulf. The tanker pilot was able to use his weather radar to guide the formation and maintain VFR, although I did have to dump 2,000-3,000 pounds of fuel to get the climb performance I needed to get over the cloud tops.

With approximately 200nm to the boat and dinner, we did one last top-off before detached the tanker. My battery voltage was indicating 21 volts, a similar trend as my own energy level after the eventful flight, and I still had to do a no-HUD landing on the carrier. The weather had deteriorated overhead mom, so I planned for the CV-1 approach. I restarted my right engine at approximately 40nm and was delighted to see my battery voltage jump back to 28V and all my displays and systems come back online.

My positive feeling was short-lived, however. Soon after the restart, the right AMAD caution reappeared. I again secured the right generator, resulting in the subsequent familiar loss of displays, systems and GEN TIE caution. I was worried that I might have to secure the engine again if any further issues developed, so I extended the IFR as not to be reliant on the EMERG EXTEND functionality later.

With no operational navigation aids other than ICLS, I relied on my wingman to lead me down on the CV-1 approach. No doubt tired from the experience himself, he didn't fly his best approach. I was detached from the formation when I was visual the carrier at 5nm and 2000 feet, a truly odd sight picture. With the ship in sight, good ICLS indications, and more than a little help from Paddles, I made the first pass count and taxied out of the landing area with a bone-dry right AMAD, 22V on the battery, and a renewed appreciation for my no-HUD brethren.

I sat down to review NATOPS with some smart junior officers. It was clear that, other than the AMAD failure, the only problem was that the left generator couldn't hold the full electrical load of the LOT 30 Super Hornet. If I'd realized this fact earlier and secured more electrical systems prior to shutting down the right engine, it might have prevented the electrical fault and loss of systems. However, it wasn't called for in the PCL. I also learned that the battery gauge does not necessarily indicate the electrical power in the aircraft if one generator is secured. In my situation, it was simply showing the voltage over the maintenance bus and, as the right generator was no longer powering the battery charger, it was normal to see a decreasing voltage over time.

There's almost no end to the amount of preparation necessary to succeed in the most challenging new environments, such as an unfamiliar AOR for the first day of combat. The squadron spent countless hours going over the dynamic tactical situations that we thought may arise, but as always, the administrative portion of the flight dictates success or failure.

When things get tough, you'll save yourself a lot of pain by reverting to the old mantra of "aviate, navigate, communicate." Over-flying a prescribed tanker track and not getting to an "on and on" start is not particularly helpful when everybody's "bucket" is already overflowing.

Combat is no joke. Don't wait until you feel like you're a moment or two away from ejecting over hostile territory to mentally prepare yourself for the worst.

CDR SWEENEY FLIES WITH VFA-81.

Iwo Jima
and the Carrier Air Wing Five Experience

BY LT ROBERT THOMPSON, VAW-115

On February 21, 1945, the escort carrier USS Bismarck Sea (CVE-95) was assigned to the Seventh Fleet. The carrier was supporting the Saratoga (CV-3) strike group, providing aerial combat and bombing support during the invasion of Iwo Jima. That evening, two Japanese kamikaze aircraft attacked the carrier.

The USS *Bismarck Sea* (CVE-95) participates in the battle for Iwo Jima. It received two direct hits then exploded and sank on the on February 21, 1945.

The first struck the starboard side. From directly above, the second struck an elevator shaft and destroyed the ship's internal firefighting equipment. The resulting fire was uncontrollable. Shortly after sunset, Captain J. L. Pratt ordered the crew to abandon ship. Of the 923 men on board, 118 were killed during the attack or drowned during the night, awaiting rescue. Ninety-nine Sailors were injured. One of the survivors was my grand-father: LTJG Lewis W. Thompson, a bomber pilot assigned to VC-86 flying the F4F Wildcat. VC-86 was the only squadron stationed aboard USS Bismarck Sea.

The last known position of the carrier was 22 nautical miles to the north east of Iwo Jima, presently known as Iwo To. It was the eleventh and final Navy carrier sunk during World War II

Fast forward 70 years. A light division of three E-2C Hawkeye 2000s from VAW-115 approach the island of Iwo

To, where my grandfather flew so many years ago. We're on a four-day Field Carrier Landing Practice (FCLP) detachment. The arrival and departure into Iwo To each year takes all Carrier Air Wing 5 (CVW-5) aircraft directly over the last known position of USS Bismarck Sea.

As we approach the 22 DME mark and look out the window, I feel a chill. Beneath us, in several thousand feet of water, lays my grandfather's ship. Right here, in these waters, he and hundreds of others struggled to survive through the night. The waters were cold and rough in February, and Japanese aircraft strafed the survivors immediately following the sinking. Directly off our nose, surrounded by the clear blue waters and white puffy clouds of the Pacific, the island of Iwo To comes into view.

From directly overhead, you can see remnants of the two WWII airfields. As we approach for the break, we pass nearly level with the top of Mount Suribachi, providing a clear view of the Japanese flag that flies today. Just past the volcano is the infamous invasion beach, where thousands of Marines died during the initial invasion. To

An aerial view of the island of Iwo To, formerly known as Iwo Jima, is shown from the air in 2008. (Photo by David Guttenfelder courtesy of the Associated Press)

our left is "Shipwreck Beach," where a conglomeration of old American ships were filled with concrete and sunk after the war in a failed attempt to create a safe harbor. At the far end of the runway, two rusted anti-aircraft artillery (AAA) guns still stand, pointing skyward at our aircraft as we break over them. These guns might have fired upon my grandfather during the 36-day aerial assault that preceded the invasion.

Iwo To became the FCLP home for CVW-5 in 1989. Each Spring, the seven tailhook squadrons assigned to CVW-5 depart Naval Air Facility (NAF) Atsugi for the 649-mile trip due south towards Air Station Iwo To, run by the Japanese Maritime Self Defense Force (JMSDF). Air controllers embarked aboard USS George Washington (CVN-73) join the air wing to provide control of aircraft in the Case III night pattern.

This form of training is unique to Iwo To and CVW-5, allowing pilots to practice their night landings using the full Case III bolter/waveoff pattern used at sea. The Chief of Naval Operations, once every two years, must waive weather and divert requirements to conduct training on the island. When aircraft depart each day for FCLP training, they do not carry enough fuel on board to allow for a return trip to the nearest divert, NAF Atsugi. Because of this, the single runway on Iwo To was built with four arresting gear to be used in emergencies. Three additional sets of arresting gear were built into the taxiways that parallel the runway.

Iwo To is a small tropical island rising directly out of the depths of the Izu Bonin Trench to several hundred feet above sea level. Weather can change quickly from clear and a million to heavy rain and low ceilings. Each year, aviators find themselves in an FCLP pattern that was clear on one pass and socked in with no visual cues to the island on the next. With only a TACAN and a portable "Bullseye" to use as navigation sources, these arresting gear, coupled with verbal assistance from Paddles, can quickly become a pilots only option.

In addition to training for CVW-5's yearly Pacific patrol, a trip to Iwo To provides aircrew and maintenance personnel a rare look at an island that has seen very little change in the past 69 years. As you step out of your aircraft and begin the walk to the barracks, you find yourself in awe at the sight of Mount Suribachi. After dropping off your gear and changing into clothes better suited for the 95-degree tropical heat, you can visit "Invasion Beach" and enjoy the sunset. Historians, witnesses, and the troops themselves have written about the invasion and the difficulty American troops had when trying to capture the island. Today, you can walk to the water's edge, turn around and then try to climb back up the 15-foot wall of coarse black volcanic sand. With each step, the sand beneath you collapses and you find yourself unable to maintain your footing, sliding back down to the bottom. As you pause and look up, you might think that this wall would have offered great protection to the invading forces as they stepped off their landing craft. But then you look left at Suribachi, towering overhead, and you are awestruck by the clear line of sight the Japanese forces had on the invading force. On the beach, you can still find rusted rifle shell casings, pieces of shrapnel, and remnants of landing craft. A Japanese machine gun stands in a pillbox, almost 70 years after the original battle.

Every year, CVW-5 aviators and maintainers explore the countless caves and remnants of the battle. Many of these sites are rarely visited; many others have only recently been discovered. It is hard to avoid the spiders,

An E-2C Hawkeye assigned to Carrier Airborne Early Warning Squadron One One Five (VAW-115) performs a fly-over. (U.S. Navy photo by Mass Communication Specialist Seaman Stephen W. Rowe)

cockroaches and scorpions at the mouth of each cave, but the history lesson within more than makes up for the unpleasant entrance. Most of the sites have been undisturbed since Japanese forces abandoned them after the battle. Clothing, cooking utensils, shoes, medical supplies, spent and unspent ammunition, communication equipment, lighting, and many other artifacts still lay untouched within the caves.

While exploring General Tadamichi Kuribayashi's headquarters cave, one can find many bottles of high quality Scotch. As a tribute, Japanese and Americans alike have left several bottles throughout the years for the general, a well-known fan of the whiskey. In addition to the caves, the island is littered with remnants of U.S. and Japanese aircraft from countless crashes, anti-aircraft artillery guns, unexploded bombs, memorials, and even an abandoned American tank with spent shell casings still inside.

The United States returned control of the island to Japan in 1968. Today it is manned year round by the JMSDF, who maintain a small contingent of search and rescue helicopters and a small detachment of P-3's that use the island as a base for Pacific patrols.

The battle for Iwo Jima claimed more than 6,800 American lives and resulted in more than 26,000 American casualties. More than 20,000 Japanese soldiers were killed in what was highly regarded as a futile attempt to defend the island. At the conclusion of the battle, only 216 Japanese survived and were taken prisoner. Many of the Americans and Japanese alike were buried in mass graves throughout the island, some of which are being excavated today. The Japanese treat the entire island as sacred ground.

Throughout the island, Japanese and American visitors have erected memorials to mark gravesites and honor those who fell. Each morning, prior to the commencement of flight ops, many of us rode bikes around the island, looking for a new shrine, artifact, or cave. On almost all of these bike rides, a member of the JMSDF out for a morning jog would flag us down and, in broken English, thank us for the friendship that Japan and America share today. Often they would direct us to another battle remnant which wasn't marked on the map we had gotten from our Morale, Welfare and Recreation (MWR) staff. This modern-day friendship is a highlight of a Forward Deployed Naval Forces (FDNF) tour.

As a third-generation naval aviator, I grew up listening to stories of my grandfather's WWII experiences in the western Pacific and my father's stories of WESTPAC cruises: the Cubi Point Officers Club, Russian TU-95 Bear intercepts, and his embellished stories of flying the F-14 Tomcat. The stories left me yearning from my own WESTPAC cruise experience. To be selected for CVW-5 for your first aviation assignment, you must finish at the top of your carrier qualification class at the Fleet Replacement Squadron (FRS) and have the luck of a rare spot being available. Some of your final positioning might be skill, but most is pure luck (and in the Hawkeye community, the occasional "hand of god" from the instructor in your right seat to keep you off the ace).

When I found myself in that position three years ago, I campaigned hard for the chance to join the VAW-115 Liberty Bells and CVW-5. I am beyond grateful for the opportunities during my junior-officer tour.

LT THOMPSON FLIES WITH VAW-115

Combat is no joke.

Don't wait until you feel like you're a moment or two away from ejecting over hostile territory to mentally prepare yourself for the worst.

— CDR Brennan Sweeney