THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE
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Approach

Cold-Weather SURVIVAL
Are You Ready?

The Navy & Marine Corps Aviation Safety Magazine

September-October 2013 Volume 58, No. 5

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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CON

Features

Focus on Cold-Water Survival

Could you survive in cold weather after a crash or ditch? Does your squadron have the survival gear that will give you the best opportunity to survive until the SAR pickup?

Flight ops in winter conditions are fast approaching, and many squadrons will be operating over water that requires additional survival gear if you ditch or bailout. We offer a couple of articles to raise the awareness of cold-weather operations and to get you prepared for any situation.

Departments

N T E N T S

Photo by MCS2 Brooks B. Patton Jr. Modified.

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September-October Thanks

Thanks for helping with this issue…

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Lt. Chris Conway, VP-4
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John Minners, CNATRA

Mishap-Free Milestones

HSM-72	200,000 Hours	28 Years
HSC-3	250,000 Hours	46 Years

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Front cover: An FA-18C Hornet from VFA-83 flies a combat mission in the 5th Fleet area of responsibility as part of Operation Enduring Freedom. Photo by Lt. Greg Linderman.

Back cover: Photo composite by Allan Amen.

SURVIVING IN THE COLD

BY MS. KELSEY LEO

It is time to brief and go fly. The water temperature is 50 F, but the outside air seems too warm to gear up in your anti-exposure suit. What is the appropriate gear?

Time to ask yourself some questions. Will you be ready for the worst? What would you do if you had to eject or ditch, and wait in the water for SAR to find you? What if you had to wait for longer than expected because of rough seas? What if you were flying in the mountains and crashed as a storm approached? Even if SAR had located the site, would you be prepared to make it through the storm, maybe even the night, waiting for the rescue?

The threat is real; we've had mishaps in 2010 and 2011 which resulted in mild and severe hypothermia.

Changes in the weather must be considered on every flight. Whether off the coast of Jacksonville, Virginia Beach, Southern California or the Pacific Northwest, cold water presents a threat. Regardless of how prepared you are, a mishap can require you to leave your aircraft.

Although cold-water injuries can occur even when wearing anti-exposure suits, the threat quickly becomes much worse if not wearing the gear. Rescue times range from only a minute to hours later; however, aircrew rescued after only a few minutes while properly dressed in anti-exposure gear have suffered mild hypothermia. Land survival can also be a challenge in the higher latitudes or in mountainous terrain (stateside and in theater). The multi-layered, cold-weather flight clothing and specialized survival gear is your first line of protection in these cases.

Cold Weather

The environment changes with each season and you need to adjust to the conditions. It is necessary to be prepared when thinking of the environment outside the aircraft and be ready for the worst-case scenario. Cold temperatures can also affect the aircraft. Don't rush through the aircraft preflight inspection. Icing can occur before takeoff as well as while airborne. Extreme cold can cause malfunctions on the aircraft, such as failure of an O-ring seal.

Preflight your cold-weather clothing, flight equipment, and survival gear to allow for maximum survival if something goes wrong. For anti-exposure suits, leaking neck and wrist seals, and cuts in the fabric all reduce protection from the cold. Loss of finger dexterity and injuries can play a role in reaching for and using other signaling devices. Helmets lost when exiting the aircraft leave aircrew without reflective tape for location by SAR at night.

Colder weather brings the threat of hypothermia. This condition occurs when heat loss exceeds the heat production of the body, and is measured by core body temperature. Risk of cold-weather injuries increase when blood flow is too slow, you haven't eaten enough, you're dehydrated or exhausted, you get wet or touch a metal surface, or when insufficient oxygen is available, as in high altitudes. The chart on the next page provides data on water and wind chill factors.

Cold Injuries

Recognizing the signs and symptoms of cold-weather injuries is essential to providing prompt treatment. Hypothermia symptoms include intense shivering, lethargy, clumsiness, confusion, irritability, unreactive pupils

COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS AN EQUIVALENT TEMPERATURE

ESTIMATED WIND SPEED (IN MPH)	ACTUAL THERMOMETER READING (F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT TEMPERATURE (F.)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70		
15	36	22	9	-5	-18	-32	-45	-58	-72			
20	32	18	4	-10	-25	-39	-53	-67				
25	30	16	0	-15	-29	-44	-59					
30	28	13	-2	-18	-33	-48	-63					
35	27	11	-4	-20	-35	-51	-67					
40	26	10	-6	-21	-37	-53	-69					
WIND SPEEDS GREATER THAN 40 MPH HAVE LITTLE ADDED EFFECT.	LITTLE DANGER (FOR PROPERLY CLOTHED PERSON) MAXIMUM DANGER OF FALSE SENSE OF SECURITY.				INCREASING DANGER: DANGER FROM FREEZING OF EXPOSED FLESH.			GREAT DANGER				

SOURCE: NAVMED BULLETIN 5052-29

Taken from the NWP 3-22.5-SAR-TAC.

and central-nervous-system dysfunction that causes the individual to no longer feel cold. Treatment for hypothermia should start immediately with drying and insulation, intake of warm fluids (sometimes with an IV) and active rewarming.

The best way to deal with hypothermia is to avoid it. Brief the weather conditions in the areas you'll be flying and discuss the worst-case scenarios for a mishap over land or water. Preflight and wear your cold-weather flight clothing. Check your survival gear, along with the gear on the aircraft. Know what you have available for shelter and heat. Keep gloves and socks as dry as possible. Carry enough food and fluids to help sustain metabolic heat production. Pay close attention to body parts getting cold or numb and immediately begin warming them. Monitor your workload and modify your clothing layers to avoid sweating. Avoid moisture and wind. Keep a positive attitude.

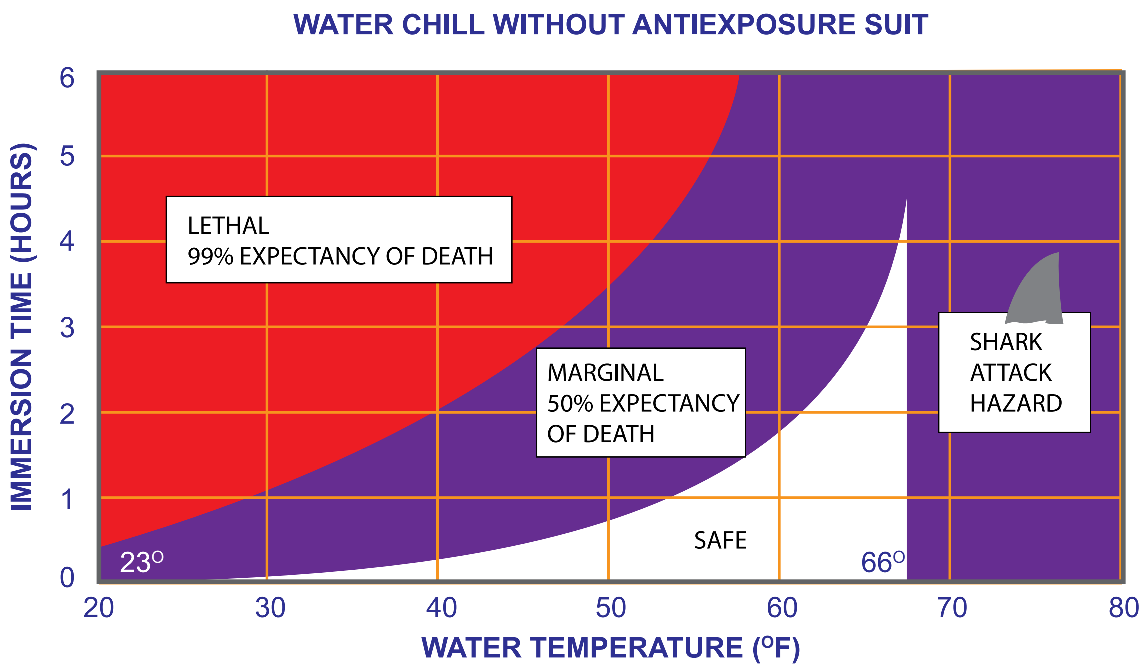
OPNAVINST 3710.7U, Chapter 8, requires the CO or OinC to determine when anti-exposure suits must be worn by flight personnel. It is strongly recommended that these suits be used when the water temperature is 50 F or below, or when the outside air temperature is below 32 F (corrected for wind-chill). For example, waiting in 61 F water for an extended period of time, without anti-exposure gear, can still cause a rapid decrease in core body temperature. This survival situation leads to severe hypothermia, while immersion in 50 to 60 F water for as little as two hours can result in unconsciousness.

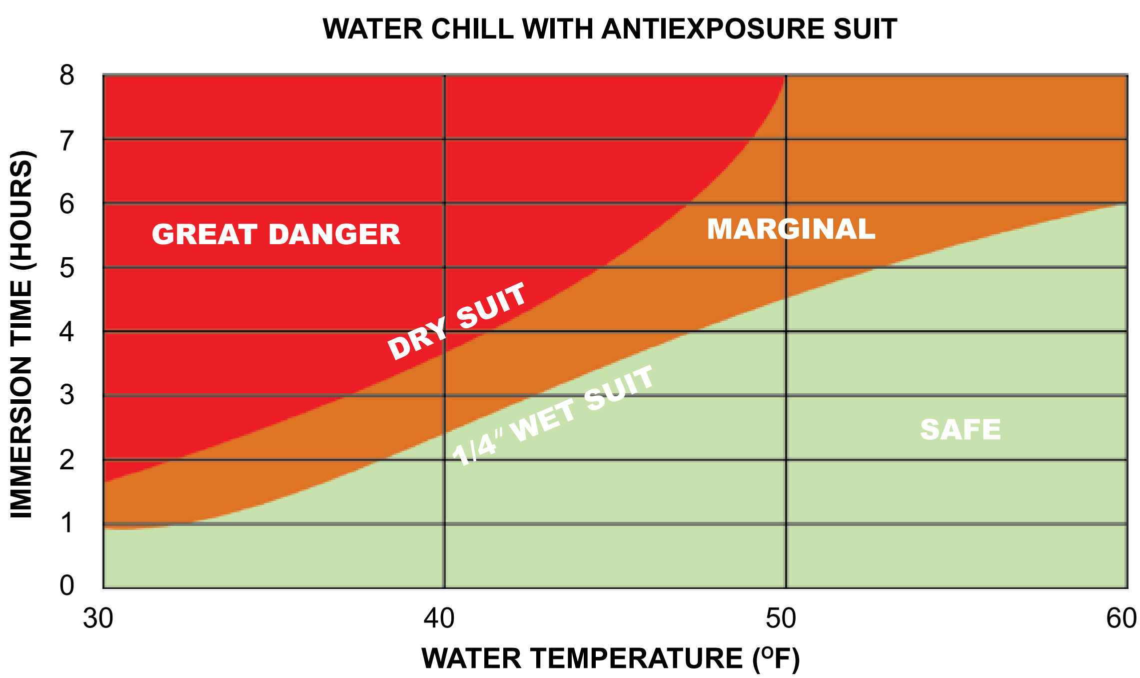
The following charts compare the difference in wearing and not wearing an anti-exposure suit. Taken from NWP 3-22.5-SAR-TAC.

Editor's note—Refer to the Cold-Water Survival and the Cold-Weather Flying and Survival Information Packets on the Aeromedical page of the Naval Safety Center website for more information.

The seasons are changing and cold weather is coming. Now is the time to prepare for cold-weather survival situations. Get the right gear, wear the right clothing, and train for land and water survival.

MS. LEO IS A GRADUATE INTERN WITH OLD DOMINION UNIVERSITY.





Are You Ready for Cold Weather/Water Survival?

BY LTJG. CHRISTOPHER MURR , MSC

It's a brisk spring morning in early March at NAS Patuxent River, MD. The forecast weather is low 40s with water temps struggling to rise above 39 F. While most folks on base will cozy up with a cup of coffee, a brave few have volunteered for acold water/weather survival and recovery exercise.

Why subject local test pilots and Aviation Survival Training Center (ASTC) instructors to such an uncomfortable (some say sadistic) exercise? Very simply, to train like we fight. This exercise helped to identify and understand the operational limitations of our survival techniques, aviation life support systems (ALSS), and search and rescue (SAR) procedures in a realistic water-survival environment during winter weather.

Exercise Procedures

Four aircrewmen, representing different Navy aircraft platforms, were asked to ingest a Telemetric Core Body Thermometer (fig. 1). This device provides real-time core body temperature (Tc) readings. Each was then outfitted with their respective anti-exposure suits and survival vests. After entering the icy Patuxent River, the aircrew performed basic, survival swim skills before boarding a life raft. All participants were asked to locate and operate their survival-vest items as they anxiously waited for station SAR to arrive.

VitalSense monitor, core temperature sensor, and dermal temperature patches.

The Exercise

Once waterside, a multi-person life raft (MPLR) was staged and safety boats transported the aircrew about 100 yards from the raft. Each aircrewmen, with safety swimmers nearby, entered the water and inflated their life preservers. The aircrewmen then did the following tasks:

- Survival swim (100 yards)
- HELP huddle (immersed, 15 minutes)
- Board MPLR
- Dexterity exercises (locate, operate, and stow) with the whistle
- Signaling mirror
- MK 124 day/night flare (mock fire)
- MK 79 pencil flare (mock fire)
- Sea dye marker
- Flashlight
- SDU-39 strobe light
- PRC-90/149 survival radios

The exercise transitioned to the extraction phase following a radio call to SAR. However, before SAR could arrive overhead, the surrounding airspace became restricted due to high priority flight-test operations within the NAS Patuxent River airspace. This unplanned delay served as an important reminder that immediate recovery by SAR is not the norm. About one hour after the initial radio call, and following some minor complaints from the survivors, SAR returned and initiated the extraction. SAR swimmers deployed and performed recoveries using basket, rescue strop, and direct deployment with rescue strop. After all aircrew were recovered, the training evolution was complete.

Results

The exercise produced some important data and key learning points. The first issue concerned "thermal burden," which is any demand that makes it harder to regulate temperature and keep the body warm or cool. It is one of the most salient concerns for aircrew faced with wearing an anti-exposure suit. Many aircrew forgo the use of the thermal liner, especially when the weather conditions during preflight are moderate or warm. There is an important tradeoff between the additional thermal burden and discomfort of the anti-exposure suit and liner ensemble (inducing hyperthermia) and the important protection they provide during a cold-water-survival scenario (protecting against hypothermia).

Heat-related performance changes include shortened simple reaction time, G tolerance decrease, increased error rate, narrowed attention with neglect of secondary tasks ("tunneling"), and diminished capacity for learning and/or response to unusual events. All study participants experienced an increase in temperature above the Tc of 98.6 F while fully dressed in the survival gear while waiting for the water scenario to begin. From donning the suits until water entry (about 1.5 hours), the Tc for all participants rose to at least 100.0 F. Heat exhaustion symptoms include dizziness, fatigue and malaise, headache, nausea, visual disturbances and weakness. This is significant because these types of anti-exposure suits are designed for constant wear and may inadvertently invoke performance decrements caused by excessive thermal burden. Dehydration should be mitigated by aggressive hydration before flying.

Cold-related performance changes include discomfort, loss of manual dexterity, shivering, impaired performance of mental or manual tasks, and local tissue damage. Hypothermic conditions exist when core temperature drops to 95.0 F. Upon water entry, each participant had a steady decrease in core temperature. The lowest Tc recorded was 96.9 F for the aircrew wearing the rotary-aircraft ensemble without the thermal liner.

Although many factors can play into maintaining Tc, such as body-fat composition and suit type, aircrew experienced a Tc one to two degrees lower than those with insulating layers after water entry. Not surprisingly, this training demonstrated that anti-exposure suits will raise the core body temperature to hyperthermic levels. It may also contribute to aircrew discomfort and degraded performance with longer wear times. More importantly, this training showed that not using a thermal liner will greatly decrease the survivor's functional exposure time in cold water. This tradeoff is one aircrew must consider when preflight planning for an overwater flight.

Survival Swim Challenge

Although survival breaststroke is the preferred survival swim stroke due to sustaining visibility (without an inflated LPU), three of the four volunteers (with inflated LPUs) naturally deferred to some form of elementary backstroke. The backstroke may have been a response to the innate supine and prone buoyancy from the Viking and Imperial suits, and the fear of submerging their head. Conversely, the TACAIR rep (who used the survival breast stroke) said, "I definitely preferred breast stroke due to the improved visibility." The use of the HAU-12 gloves actually aided his ability to use the survival breast stroke by increasing hand surface area.

Dexterity Challenges

The overall dexterity decrements were subjectively measured. Here are some of the comments:

Viking suit – "Difficult to locate and remove survival items in the vest pouches." "Difficult to work the zipper, but could operate the PRC-90 radio while gloved." "Recommend pulling all items out of the pouches to have easier access. Pouches with multiple items are packed too tightly to access when wet." "The gloves were good while in the water, but continued to retain water once in the raft. I removed them and my hands warmed up."

Imperial immersion suit – Nothing of significance to report.

Rotary crewmember – "My hands were completely useless and could not grip any of the pockets to open them and pull out survival items."

TACAIR crewmember – "The inflatable exposure gloves were invaluable. Compared to another survivor who did not don the gloves, I suffered only mild loss of feeling in my hands during the water immersion period. Once I removed the HAU-12s and the flight gloves to operate the vest gear, I lost feeling in my hand quickly. I redonned the inflatable gloves and the feeling gradually returned."

Mobility challenges

None of the participants noted any real difficulty boarding the life raft because of the anti-exposure suits. However, many found it difficult to swim with the limited range of motion the suits afforded.

Fatigue

Only the individual without a thermal liner mentioned fatigue, and that was a concern about swimming against the rotor wash.

Equipment Failure and Success

The Imperial immersion suit is predominantly carried on P-3s and C-130s. In the event of an imminent ditch, the member dons it under their survival vest or when in the raft. The main failures encountered with the suit were the waterproof seams around the hands and the air vents located on each foot.

The HAU-12 is a unique piece of ALSS that was unrecognizable to all participants. Although many of squadrons elect to not pack these in the seat pan kit, it is one of two gloves required as an anti-exposure item per NAVAIR 13-1-6.7-2, and should be stowed in the pockets of either CWU-62 or -86. The TACAIR volunteer used these gloves upon water entry and during the HELP huddle portion of the event. They also performed well during the swim and equipment operation portion.

SAR Concerns

Both SAR swimmers lost dexterity after entering the water while wearing the Sea Soft Hunter Wetsuit gloves and the Kevlar reinforced neoprene gloves. Also, the SAR swimmers sais that it was difficult to differentiate between the red rescue strop and two red anti-exposure suits while trying to secure the individuals.

The swimmers noted that some survivors were very hesitant to reenter the water and all needed major assistance when swimming against the rotor wash.

If preparation means safely breaking out of our training comfort zone, then we should do it. Information gleaned from this exercise will benefit aircrew, maintenance and recovery personnel as we approach the colder months and fly over colder waters.

LTJG. MURR IS WITH THE AVIATION SURVIVAL TRAINING CENTER.

Editor's note — This study was authorized by the Naval Air Warfare Center Aircraft Division's Institutional Review Board.

The Fast and the Furious: OCEANA DRIFT

BY LTJG. BILLY VEY

Vin Diesel has done it, Paul Walker has done it, and now the Super Hornet has done it!

It was supposed to be an uneventful flight: a good deal, all JO, 1 v 1, morning basic-fighter-maneuvering (BFM) flight. The weather at the field was overcast at 2,000 feet, with unlimited visibility and no precipitation. The launch and transit to Phelps MOA in Dare County, N.C., were uneventful, but most of the working area was socked-in up to 16,000 feet.

Lacking the required weather to complete our primary mission, we split the section to conduct our alternate mission: a 1 v 0 advanced-handling-characteristics flight. About 30 minutes into this training, we heard the master caution, "Deedle, deedle," with a corresponding "Engine right, engine right."

We ceased maneuvering the jet and saw a "R ENG" (right engine) caution on our displays. My pilot did the immediate-action item of "Throttle affected engine – IDLE," as I broke out the pocket checklist (PCL) to back him up and step us through the rest of the emergency procedure. The engine-status page indicated we had a "THRUST" advisory, as well as both channels A and B of the FADEC lined out for the right engine. We noted that with the "THRUST" advisory, our engine thrust would be limited to between 40- and 90-percent power available with significantly slower engine transients. The emergency procedure said to use the throttles as required and to land as soon as practical.

We also had an MSP code for a "R VEN A8 HYDROMECHANICAL FAIL," which was consistent with our observation that the right nozzle was stuck at nine percent. We decided to keep the right throttle at idle for the rest of the flight, confident in the Super Hornet's single-engine performance.

On the transit home we radioed base and told them our situation. We told the SDO that we had decided to stay at idle and that we were coming back for a half-flap, precautionary straight-in approach. We talked to approach and requested vectors to the initial for a visual straight-in to runway 23L, which is the longer of the two parallel runways.

We lowered our landing gear at seven miles, noting that our approach speed would be roughly 10 knots faster because we were making a half-flap approach. At

The decision to turn the aircraft onto the taxiway at high speed put the aircraft and us at increased risk.

3.5 miles, we informed tower that our gear was down-and-locked.

Tower responded, “Roger gear. Can you accept a side-step to 23R?”

We responded that we could and were cleared to land on 23R. We repositioned our approach to 23R, unaware that we would be the first aircraft to use it for the day.

Touching down at the lens at 143 knots – the proper speed based on our weight and configuration — my pilot reported, “Good brakes.”

It was apparent that it had rained while we were away; the runway was wet with patches of standing water. Passing the 4-board at 90 knots, a little faster than the recommended 80 knots, we decided to keep the aircraft on deck versus executing a go-around. Approaching the 3-board we felt more comfortable as we slowed through 65 knots. As we passed the 2-board at 45 knots, we felt the antiskid system engage as we hit a patch of standing water just before the long-field arresting gear.

We were going nearly 40 knots as we crossed the arresting cable, and remained at that speed as we passed the 1-board. The antiskid engaged two more times on the wet runway. Quickly approaching the end of the runway at about 30 knots, my pilot elected to guide the jet onto the taxiway instead of plowing straight ahead into the grass and mud. Once we started the turn, it became clear to us that taxi-speed limitations are in place for a good reason. The jet began to fishtail to the right as both of our mainmounts and nosewheel lost traction and hydroplaned.

After about 90 degrees of drifting, one of our wheels finally caught traction. The tail stopped sliding right and whipped back in the opposite direction. The plane came to rest after rotating another 270-degrees clockwise. The position of the jet looked as if we were holding short at 5L. One maintainer said the right main come off the ground as the plane came to a stop. We requested a tow back to our line, not knowing the condition or direction of the nosewheel. An inspection showed that the tires and landing gear were intact and undamaged.

We could have talked about a few items as a crew prior to becoming reactive.

With plenty of gas available, we could have told tower that we preferred the long runway for the extra 4,000 feet of concrete. We could have accepted vectors to downwind.

As a two-seat crew, we didn’t use tactical crew coordination (TCC) to discuss our go-around options in case we didn’t slow down as expected. This should have been important to us since our nozzle was failed closed at nine degrees and would not open up when we brought the throttles to idle. This added thrust significantly increased the distance it took the jet to slow, but we didn’t discuss it immediately before landing.

We referenced board speeds but did not take into account that those numbers are only a valid technique for a dry runway.

Despite limited thrust from the right engine, advancing both throttles into maximum afterburner passing the 4-board at 90 knots should have been sufficient to get us airborne.

We could have taken the long-field arresting gear after feeling the antiskid engage the first time. Granted, it would have required us to immediately drop the hook.

Rather than trying to execute a 90-degree turn onto the taxiway at 30 knots, we could have continued straight off the departure end and slowed down using the grass and mud.

The decision to turn the aircraft onto the taxiway at high speed put the aircraft and us at increased risk. We could have blown a tire, collapsed one of the mainmounts, or even departed the runway at an angle that most likely would have rolled the aircraft.

LTJG. VEY FLIES WITH VFA-213.

Brain-Stem Power

BY LT. GRAHAM CLEVELAND

When a squadron detaches to NAS Fallon, the aircrew should expect a few things: long days of studying, planning, briefing, flying and debriefing, followed by well-deserved time at the Oasis O Club. For a majority of CVW-17, the NAS Fallon unit-level training (ULT) Det matched those expectations. However, with the uncertainty of sequestration, an unfortunate few of us were being fire-hosed with strike-fighter weapons and training (SFWT) syllabus flights, thereby missing out on the bonding experience occurring within the Oasis.

Of all the SFWT Level III syllabus flights, urban close-air support (CAS) seemed to provide a break from the extensive briefing and debriefing of most of the other air-to-air and air-to-surface flights. Having flown similar flights in combat during OEF, I thought this flight should have been a breeze.

We took off as a section, but shortly after takeoff my wingman had a knob come off his up-front control. With FOD in the cockpit, he had to turn around and land. I was now alone and unafraid, making the flight seem even easier with just my aircraft to worry about. I checked in with Cyclops, our simulated joint terminal-air controller (JTAC), and that's when things started to go awry.

I was told to hold at 14,000 feet and began to receive a talk-on to a vehicle in the open. This should have been child's play, but already it was requiring 100 percent of my focus to operate the FLIR. Despite having numerous autopilot modes, I started to deviate in altitude roughly plus-or-minus 3,000 feet. It's good that I was the only aircraft in the area. There are also restricted areas that border the town of Fallon, and I unknowingly crossed the boundary into Bravo-16, not realizing it until getting a call from approach.

I got extremely angry at myself for my inability to perform basic air work, but I attributed it to fatigue. I continued the search for the large vehicle in a wide open space. This simple task should have taken one minute, but it took 10. My frustration was building. Like most naval aviators, I am a Type A personality, and I expected much more from myself. I still assumed my poor performance was simply because I was tired.

I found the vehicle and tracked it for about one mile. However, giving descriptive updates to the joint tactical air controller (JTAC) on the ground was out of the question. I could not figure out cardinal directions to save my life. This was yet another of many indications that something was not right. After a mile of tracking, I lost the vehicle again. Despite being given grid coordinates of where to find it, I couldn't reacquire.

Because of time limitations and obvious frustration from Cyclops, I was given an attack scenario with an immediate time-on-target. I copied down the 9-Line and frantically tried to put the target coordinates into my system, setting up for a simulated joint-direct-attack-munition (JDAM) delivery. Again, this should have taken less than a minute, but I struggled for several minutes. I could barely concentrate on the cockpit displays, much less pay attention to airspeed and altitude. I cycled through just about every display in the aircraft to validate my JDAM delivery, and then pressed the pickle for one simulated bomb away. It wasn't until after the flight that I was told I was not even supposed to be employing a simulated JDAM, but had been instructed to drop a simulated laser-guided bomb. I was completely into the drool cup by this point, having lost nearly all cognitive ability.

I CONTINUED TO DRIFT in the air for a few more minutes. I gave random radio calls, trying to piece together what I was told by the JTAC and replying with an assort-

Photo by Cdr. Erik Etz. Modified.

Now, with the oxygen off, I started to feel extremely light-headed, almost euphoric, and for the first time began to attribute my symptoms to hypoxia.

ment of different call-signs. I still did not recognize something was wrong, telling myself that it was simply fatigue. I finally decided the helmet fire was burning too bright and it was time for me to leave. I checked out with the JTAC using the not-quite Topgun recommended check-out communication of, "I'm done. I'm going to go home."

I contacted approach and told them I was going to land. It was not until I was descending out of the initial that I finally realized that something was physiologically wrong with me, and it wasn't just fatigue. However, I still didn't recognize that this might be an oxygen issue. The realization came when I noticed I wasn't paying attention to my descent as I came down through 1,000 feet. I was casually daydreaming and looking out of the canopy, as my aircraft continued to drop into a 3- to 4-degree, nose-low descent.

I mustered enough energy and focus to get my eyes on the instruments, but barely. I broke early on my interval and dirtied-up at the appropriate airspeed, failing to make an abeam call until prompted by tower. I double, triple and quadruple checked my landing-gear status and then came off the 180. When I was about at the 90, I finally recognized the danger I was in and became scared. I still could not figure out why I was having trouble, but all I knew was that it was extremely difficult to maintain any focus on the runway.

I touched down and had an immediate sinking feeling that I hadn't put the gear down, which I then remembered checking multiple times. On rollout I was aware of a VFC-12 Hornet that had been about 3,000 feet in front of me at touchdown. I hadn't seen it, and therefore had no idea how much separation remained as I moved down the runway.

I got off the runway as soon as I could and finally took my mask off. Without making any radio calls to

... the fact that I even attempted to attribute my poor flying to fatigue means I should have backed out of this flight before it began.

ground or base, or doing any post-landing checks, I found my way back to the VFA-113 line. Now, with the oxygen off, I started to feel extremely light-headed, almost euphoric, and for the first time began to attribute my symptoms to hypoxia.

I tried to call base to communicate my condition, but all I could get out was, "Base 300, need medical."

This call was enough for the JO at the desk to call an ambulance, which promptly met me in the line. Still loopy for another 30 minutes, I was put on pure oxygen, and then the gravity of the entire situation really set in.

I sat down that night and reviewed the flight. I knew I had done a number of things wrong, but most of them could be attributed to understanding the limitations of someone experiencing hypoxia. The first point to consider is that this event was very insidious. I experienced no rapid onset of symptoms, which made recognition of my slowly-deteriorating condition extremely difficult.

I failed to properly execute NATOPS immediate-action procedures. At a minimum, I should have pulled the green ring and immediately landed. From reduced-oxygen breathing device (ROBD) training, I knew my symptoms were a loss of focus, feeling hazy and eventually euphoric, but by the time the euphoria kicked-in, it was too late. In terms of limitations, the fact that I even attempted to attribute my poor flying to fatigue means I should have backed out of this flight before it began.

We brief ORM every flight, and even though the natural instinct of Type-A aviators is to "tough it out," the right action is to admit when the hazard of fatigue presents an unacceptable risk. We may all have off-days from time to time, but there is a point when I should have realized that I couldn't perform anywhere near the minimum level required to fly the mission. Whether I was attributing the underperformance to fatigue or hypoxia, I should have called a knock-it-off much sooner than I did and made sure that I would live to fight another day.

I also gained an increased respect for the importance of CRM, even in a single-seat cockpit. While my wingman had to return to base, an exchange of dialogue should have cued him to my condition. I still had radio contact with the JTAC on the ground, and I should have let him know what was going on in my cockpit.

In the end, I used brain-stem power to land on a long and wide runway. As tailhook naval aviators, we do not always have that option. I suspect the results would have been drastically different if we had been at sea. By using the ROBD training and understanding each of our own hypoxia symptoms, personal capabilities and limitations, we all have the tools to mitigate the failure of an oxygen-generating system, an emergency that has become a prevalent hazard within the aging fleet of the FA-18C community.

LT. CLEVELAND FLIES WITH VFA-113.

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Photo by PHA Benjamin Dennis. Modified.

Do You Hear That?

BY LT. EVAN COLEMAN

The night began as any other good-deal night flight in the central Arabian Gulf. The September temperature was hot and the moon set early in the afternoon, which didn't increase our hope for decent night illumination. The crew was very seasoned; I had the fewest EA-6B Prowler flight hours at 884. This was my first flight in the ECMO 1 crew position after returning from a four-day port call to NSA Bahrain. I was excited to get back in the front seat.

Shortly after leveling off at Angels 13.5, we heard abnormal humming. It was subtle at first, but soon progressed in intensity. I thought it sounded remarkably similar to a hydraulic pump about to fail. I scanned the hydraulic gauges, but they were perfectly "in band" and showed no indication of failure. The pilot noticed a direct relationship between throttle position and noise intensity. To isolate the source, he moved each

As soon as he isolated the source, the pilot saw the rpm drop 7 to 10 percent, and the fuel-flow meter repeatedly bounce off the high and low gauge limits.

throttle independently. The right throttle produced a very distinct, audible change to the abnormality.

As soon as he isolated the source, the pilot saw the rpm drop 7 to 10 percent, and the fuel-flow meter repeatedly bounce off the high and low gauge limits. I noticed the oil-pressure gauge for the right engine drop out of limits and then return to normal. The right engine's abnormal noise also sharply increased, followed by a loud explosion, engine chugs and subsequent vibrations.

The pilot immediately brought the right throttle to idle and reported, "I am shutting down the right *[engine]*."

It surprised me how rapidly everything progressed. It took less than 30 seconds from the first detection of any abnormality until we were flying with a single engine.

As the right engine spooled down, we all knew what had happened. The 4.5 engine-bearing failure has been briefed time and time again throughout the Prowler community in various hazreps and mishaps. In the history of the Prowler, this failure has caused 14 unrecoverable engine shutdowns, four of which progressed into Class A mishaps. Even as a Cat 1 FRS student, the severity of this exact scenario was covered in various simulators and chalk talks. In the worst case of an uncontained engine-bearing failure, engine debris severs hydraulic and fuel lines, the fire warning lights illuminate, and the next step is automatic: "Eject. Eject. Eject." The simulator freezes and you hear, "Congratulations, you ejected successfully. Turn all your switches off and come upstairs for debrief."

The vibrations slowly subsided as the right engine finally stabilized at its windmilling rpm. The humming sound was masked by a metallic grinding sound. The left engine was normal. The situation was not digressing further, so I loosened my grip on the seat cushion.

As the aircraft commander, the pilot was ultimately responsible for safety of flight. He turned the aircraft back toward the carrier and wrestled with the asymmetric thrust. The rest of the crew took a supporting role, backing him up on basic aviation and navigation priorities. I communicated our intentions to the controlling agencies and initiated the process toward recovery. ECMO 3 initiated the "single engine failure" checklist until I could catch up and take control of running it and the "single engine landing" checklist myself. ECMO 3 also calculated our single-engine, bingo-fuel state, just in case we needed it. ECMO 2 had sole custody of button 18, where he coordinated with the Prowler representative our requirements and intentions.

FLYING IN THE ARABIAN GULF WE ASSUME "virtual blue water" operations. There are viable diverts available, however, they are only used in extremis and with chain-of-command direction. After a discussion between our Prowler rep and the chain of command, the decision was to land aboard the carrier. ECMO 3 and the Prowler rep calculated our maximum landing weight at 44,000 pounds for a single-engine, wave-off rate of climb of about 550 ft/min. Our fuel state had to be less than 6,600 pounds, which essentially gave us two to three looks at the ball before we had to think about receiving organic gas from the recovery tanker, or pointing our nose toward a foreign country on a bingo profile.

The particular failure we experienced was on the right engine. Within the single-engine-landing checklist, one of the critical steps is to inhibit the stall-warning horn and disregard angle of attack (AoA). In a Prowler, the AoA probe is located outside the right engine cowling. The disruption of airflow from a windmilling or seized engine causes turbulent airflow around this probe, creating unreliable AoA indications. Slowing to on-speed on final approach, I noticed the AoA indexers were rapidly flashing through the different fast, slow, and on-speed indications. The AoA gauge was cycling from 0 to 30 units. We had absolutely no cockpit indication of our AoA, instead we had to use our calculated on-speed of 134 knots as an estimation. Had the stall-warning horn been on, we would have received numerous false indications of a stall because the AoA needle passed 21 units in the gear-and-flaps-down (dirty) configuration.

At night from three-quarters to one-half miles from touchdown, the pilot transitioned from an inside-outside scan to an outside scan, referencing "meatball" and "lineup" almost exclusively. The AoA is normally the third item the pilot scans, but he didn't have an accurate indication to reference. Therefore, it was my contract to bias inside the cockpit on the airspeed indicator and VSI, while he focused primarily outside for glideslope and lineup corrections. It was critical that we didn't get slow or develop an excessive sink rate with a single engine.

"Bolter. Bolter. Hook skip. Bolter." We rotated to 10-degrees nose up. My outside horizon reference vanished as the carrier disappeared behind us.

After the bolter, the VSI was initially 600 feet/min positive. However, it quickly dropped off to 200 to 300 feet/min, which was about half the performance we calculated. The barometric altimeter and radalt initially read about 50 feet and climbed slowly. At 400 feet, the positive climb stagnated completely, so the pilot had to lower the nose to keep the airspeed from falling below 134 knots, our calculated on-speed. Lowering the nose caused us to descend slightly before we built enough airspeed to reset the 10-degrees, nose-up attitude. We finally reached 1,200 feet at 7.5 miles ahead of the carrier before we were comfortable to turn downwind.

Our next approach was a rails pass for the OK 2-wire. I don't think I could have shaken the pilot's hand any harder.

In the temperate environment of Whidbey Island, we train to single-engine approaches where the Prowler behaves very predictably in the cool air near sea level. The hot temperatures of the Arabian Gulf presented a stark difference. We had shockingly little room to modulate power in response to glideslope deviations. The pilot's minimum power setting was never below 92-percent rpm and the left throttle hit the military power stops four percent higher at 96-percent rpm. We could not afford to be anywhere other than "on and on" with a stable energy state; the environmentals simply did not allow anything less.

In a four-seat aircraft, we had the luxury of redistributing important duties to keep any one crew member from being overwhelmed. Without crew resource management (CRM) this luxury can quickly become a curse as miscommunications and incorrect assumptions are made. For us on this night CRM worked perfectly, which made a difficult emergency manageable.

THE FIRST LESSON LEARNED reinforces that carrier aviation can be unforgiving if you fail to rise to the occasion. You never know which night is going to be your night in the barrel. You cannot get lulled into a sense of complacency; your life depends on your mental and physical preparation. You can experience an emergency two days after a port call just as you can at the end of a 45-plus-day flying period.

The second lesson learned is that I have never thought about a single-engine approach to the carrier, especially compounded with unreliable AoA. During NATOPS simulator flights as a cat 1 student, these emergencies are always diverted to a runway, but the assumption is that you are in a carrier-qualification (CQ) environment off the coast of Virginia or California. In a combat zone, diverting may not be the first option. You have to be ready to execute your chain-of-command's orders. Thinking about a single-engine approach for the first time, behind the boat at night, is not a comfortable place to be.

My last lesson learned goes back to the brief. When I brief emergencies and get to the en route portion, I always say, "After we are up, clean and isolated, we will handle any emergency as en route. After the bold face, we will come up with a game plan and take it to the logical conclusion." This is a very generic statement with one critical assumption: En route means you have altitude and airspeed which increase time available to make appropriate decisions.

Our emergency demonstrated a situation you might find yourself in, even at high altitude, where you don't have the luxury of time to fully analyze everything. This emergency doesn't even have an immediate-action item to accomplish, yet, had the pilot's reaction been any slower, the result could have been drastically different. You have to approach every flight as if everybody and everything is trying to kill you.

LT. COLEMAN FLIES WITH VAQ-140.

ORM corner

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Watch Your Nose

BY LT. BRIAN HANSON

It was the third day of air-to-air SFARP (strike fighter advanced readiness program) in Key West, Fla., and we were heading out to fly a point-defense mission as a 2-ship. As I walked to the jet on that beautiful morning, I never would have imagined that a timely call from my lead and "Betty" would save my life.

I had flown both of the days prior and felt confident in max-performing the jet in the air-to-air arena. My lead took extra time in the brief to cover the training rules and the specific ORM associated with section-engaged maneuvering. We both walked to the jet feeling prepared and ready to execute the mission. As it was a morning flight, the sun was low in the sky. Because of the humidity, the horizon was slightly obscured with haze, making it difficult to discern the sky-to-ocean interface. My lead noted weather conditions and commented over the radio on the blending of the blue-sky background and the calm blue ocean.

Once all of the tac admin was completed, we set up in the area and headed down range. As the mission began, we completed our first engagement and established ourselves over the notional downed aircrew.

Lead picked up an indication of a threat at our 6 o'clock, so I pitched in and picked up a tally of a single F-5 Tiger. At the merge, I cut across the F-5's tail and eventually made a second left-to-left merge. At that next merge, I reversed my turn and increased my pitch nose-high and so did the bandit. During the fight with the F-5, I lost sight of my lead, who pitched in from the north. Lead asked for a status call. I provided situational awareness (SA) that I was high, and he then killed the bandit. I then regained sight of my lead coming into the fight — this is where things started to go wrong.

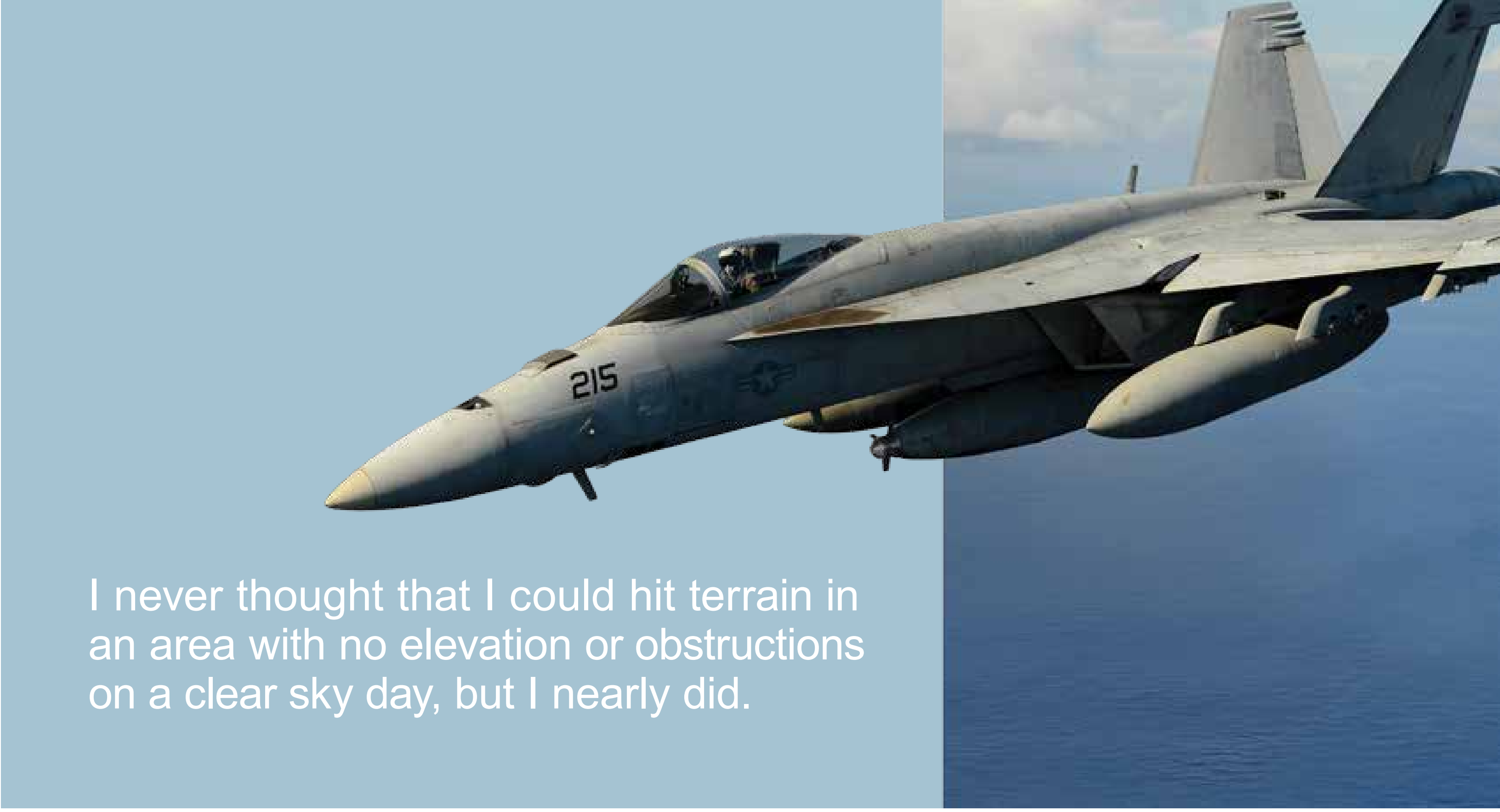
I heard the Fox call from lead. I was at 11,000 feet AGL, 30 degrees nose-high attitude, and in a slight right hand turn. I allowed my nose to fall toward the horizon as the engagement was being terminated. I picked up sight of my lead and tried to keep sight over my left shoulder as my nose continued to descend towards 35-degrees nose low. I unknowingly rolled the aircraft inverted to keep sight.

As I continued to look over my shoulder to keep sight of my lead, I was still unaware of my increasing nose-low attitude. Completely inverted, I was surrounded with the light blue sky along with the light blue water. When I came back into the cockpit and looked at my HUD, I immediately became disoriented.

As I saw the 55-degree nose low, pitch ladder in the HUD it took me a while to assess what I was looking at. I needed to get back to the horizon. I rolled the aircraft and pulled in the wrong direction to 85-degrees nose low.

My lead immediately recognized the severity of the situation and called, "Watch your nose, watch your nose!" over the radio in a tone that I never will forget.

This call snapped my brain into focus as I recognized the pitch ladder pointing me in the right direction. I began an unloaded roll to put my aircraft right side up. Nearly simultaneously, the voice warning system (commonly referred to as "Betty") told me, "Pull up…pull up!" The vertical recovery trajectory arrow displayed in the HUD.



I never thought that I could hit terrain in an area with no elevation or obstructions on a clear sky day, but I nearly did.

Once wings level, I started a max performance, 7.5G pull toward the horizon with the aircraft at 465 knots, 80-degrees nose low, and 4,800 feet AGL. Those next six seconds felt like 20 minutes as I had my right hand on the stick planted in my lap, throttles at idle, left hand resting on the G-limit override switch (a.k.a. "paddle switch"), and my pinkie finger near the ejection handle. While the jet was recovering, all I could do was watch the water get closer and closer. The velocity vector finally swept above the horizon, and my heart started to beat again as I bottomed out at 1,000 feet AGL. I began a slow climb, lead knocked off the fight, and we headed for home field.

After reviewing my tapes the data showed the magnitude of the event. My assessment of where the lapse in SA began was during the initiation of the first overbank and pull toward the horizon, as I gained visual of my lead and tried to maintain sight. The visual perception of lead, a blue sky/blue ocean environment, hazy horizon, and the effects of my head constantly looking over my left shoulder impeded my ability to feel the nose falling, and to know which way was up. Because I had little perception of what was occurring with my aircraft, looking back in the cockpit to see the nose-low indications added to my disorientation. The timely and emphatic call by my lead, pitch ladder in the HUD, and TAWS (terrain awareness warning system) got my head back into the game. During my recovery I did not experience any grey out, and was able to accurately assess events. If I had delayed the recovery any longer or been in afterburner past the terminate call (my throttles were mid-range prior to rolling wings level), I wouldn't have recovered.

This event was the first time I truly scared myself in the Hornet. I never thought that I could hit terrain in an area with no elevation or obstructions on a clear sky day, but I nearly did. We talk and brief extensively about CFIT during low levels, and cover unusual attitudes during our yearly instrument checks. But, we expect an event similar to this to happen in bad weather or at night, and this is clearly not always the case.

We check the weather every flight, and if the sky is clear and the visibility is unrestricted, the discussion stops there. Many of us would not anticipate how disorienting a hazy/blended horizon over water can be on a hot and humid, but otherwise good weather day. Combine these conditions with dynamic airspeeds and attitudes, and a momentary lapse in SA, and an unforgiving situation can quickly develop.

I encourage every naval aviator to think of this example when conducting aggressive maneuvering when hot and humid conditions rear their ugly head as "clear and a million."

LT. HANSON FLIES WITH VFA-34.

Invisible Hazard to Flight

BY LCDR. TRAVIS LIKES

I was scheduled as the aircraft commander for a good-deal, day training event with a full crew. Our aircraft had recently been modified with a new configuration. The back of the aircraft had some problems on preflight, but we felt comfortable taking it flying. We planned to continue troubleshooting in the air.

We departed our home base, Tinker AFB, Okla., and started our trek down to our local working area of W-602 in the Gulf of Mexico. Unfortunately, mission tasking required us to change operating areas en route. This shift led to a bit of scrambling as we coordinated with Houston Center to short-notice activate an alternate warning area. After a brief delay, we were approved to operate in W-228C, which was close by.

We visually checked the new area and did a surface sweep with our weather radar. We extended our long, trailing-wire antenna, which hangs down several thousand feet while in level flight. The autopilot was engaged, and our traffic-collision-avoidance system (TCAS) was functioning. We were in contact with Houston Center, who would divert IFR traffic around our area. This sounded like the perfect opportunity to do a little training with the junior 3P.

We were deep in discussion about my doe-eyed 3P's NATOPS study habits when we were queried by Houston Center.

"SHADO 20, Houston Center, how far do those wires hang below your aircraft?"

I love playing airplane trivia as much as the next guy, and I just assumed the Houston Center controller wanted a neat factoid to impress the rest of his Houston Center friends. I replied and asked him why he needed to know. He said a Dash 8 aircraft on a VFR flight plan was a few thousand below our altitude at 11 o clock, and they were headed straight for us. Naturally, thoughts of what a trailing-wire antenna attached to a 70-pound drogue could do to an aircraft with about 500 knots of closure quickly flashed through my head. I am not a physics major, but I knew the end result would not be good.

Houston tried several times to hail the Dash 8 on center frequency with no result. We asked Houston for an avoidance maneuver, as we placed our TCAS in "below" mode. We also increased our VFR scan in that quadrant of the sky.

Houston called, "Turn right."

WE TURNED JUST IN TIME to spot the Dash 8 aircraft pass below us going nose to tail and pointed behind us — exactly where the wire was hanging. TCAS confirmed his altitude was 4,500 feet below ours.

Do you know that feeling of dread that you get when something happens that is really not good? I had that feeling a few times as a kid. Once was when my best friend and I were having a rock fight, and we used his parent's car as a shield to block the incoming rounds. A broken window was the result. I will always remember that feeling of dread as we walked in to tell his dad what had happened. As I watched the Dash 8 pass below us, I had that same feeling. Only this time I was sure that an aircraft and its aircrew would be lost instead of a car window.

The aircraft passed without hitting the wire. We asked Houston as to the origin of the small aircraft that was flying alone and seemingly unafraid through a Warning Area in the middle of the Gulf of Mexico. They replied that they were a Department of Homeland Security (DHS) aircraft on a VFR due-regard flight plan.

We wrapped up our flight, headed home and filled out an ASAP report. The following day, I sent out an email to other pilots in my squadron detailing what had happened. I asked them what I could have done better to avoid this situation and a lot of good discussion came out of it. I found out that this same scenario had played out several other times in the previous few months. Several great recommendations came out of this discussion, such as making UHF/VHF guard calls and operating the TCAS in below mode when the wires are hanging below the aircraft (it is normally left in above/below mode).

I contacted the folks at DHS and discussed our shared airspace in the Gulf. We both have a good reason to be there, and we often operate in close vicinity. However, they were unaware of any hazards associated with being close to our aircraft.

The big lesson that I learned is that even in the most routine of good-deal, day VMC flights, you need to be on your guard. Most E-6 pilots go into a flight thinking that the challenging parts are going to be either a difficult approach and landing, or air refueling. More often than not it is during the eight hours of "airborne alert" drone time with the autopilot engaged and our minds on cruise control that problems tend to rear their ugly heads.

My guard was down on this flight. We were sitting in our pressurized cabin with the autopilot on, a book open, and a cup of coffee in one hand, conducting training on aircraft limits. We were in radar control in an aircraft with TCAS on a VMC day where we could see forever. I never thought another aircraft would be out there, and if it was, that I could see and avoid it in plenty of time. That was certainly not the case.

LCDR.LIKES FLIES WITH VQ-4.

Photo by MCS2 Brooks B. Patton Jr. Modified.

"Wave off" Means "Wave off"

BY LTJG. GARTH WILLARD

Nobody wants to be told to wave off when the landing environment is in sight, especially when you're in position to make a beautiful touchdown that you know would make the saltiest of pilots envious.

Then you hear the dreaded words, "Wave off, wave off."

You think, "How could this be happening? Why is this happening? I just want to land!"

On a sunny December day, my crew heard those words during a landing aboard our control unit off the coast of Mayport, Fla., while participating in our predeployment workups.

After a week conducting surface-based missions, it was time to move into the antisubmarine portion of the training. On this flight, I was sitting left seat as airborne tactical officer (ATO). I felt confident in my ASW skills after recently completing the two-week Helicopter Advance Readiness Program (HARP) syllabus at the Atlantic Undersea Test and Evaluation Center (AUTEC). Not long after takeoff, we received tasking from a P-3 to investigate a possible "sniff" on one of the submarines.

We bustered to the reported threat location, quickly knocking out our sonobuoy-launch checklist. We then deployed our first pattern of buoys to localize the suspected sub. Shortly after the buoys were in, our enlisted sensor operator reported possible contact on the threat.

I quickly set up additional sonobuoy-launch points in our NAV system to track the contact.

During any sonobuoy launch, aircrews are trained to do three things. Monitor for an AWAY light on the armament control indicator panel (ACIP). Listen for the pneumatic sound of air pushing the buoy out the launcher. And look for the buoy to deploy its parachute. The right sound of air flow in the launcher means the buoy won't get stuck or hung up. The sight of a parachute means that the buoy will glide to the water intact and will function.

As we reached our first launch point, I looked down at the ACIP and saw an AWAY light on the SONO LAUNCH pushbutton, heard the good sound of air flow, then glanced in the side-view mirror as the buoy left the launcher.

I reported, "Good spit, good chute," to the crew, letting them know the launch was successful.

We flew to the next launch point, and I again reported, "Good spit, good chute."

As we arrived at the third launch point, I saw another AWAY light on the ACIP, but this time I heard a muffled "thump." I quickly looked in my side-view mirror and saw the buoy hanging out of the launcher.

"We've got a hung buoy," I reported.

A hung sonobuoy is not uncommon in the SH-60B, but it is still considered an emergency because the chute could open and get tangled in one of the rotor systems. I pulled out the pocket checklist and began the NATOPS hung-sonobuoy procedures.

As we headed back to the ship, we tried to manually relaunch the buoy from the tube in accordance with the NATOPS checklist. Our attempts were unsuccessful. We told the ship of our condition and requested a green deck for landing. My HAC flew the approach as I reviewed and completed the Return to Force and Landing checklists.

We flew a normal approach to the deck and positioned the helicopter over the rapid-securing device (RSD) for a free-deck landing. Conditions over the deck were far from challenging, as there was little pitch and roll, and the winds were calm. We considered this a normal landing with the minor added risk of the buoy potentially becoming dislodged. We figured the chance of a dislodged buoy was remote because it had remained jammed in the launcher while we were in forward flight.

As we prepared to land, we were all taken by surprise when we heard the landing safety officer (LSO) call out, "Five zero one, wave off, wave off!"

WE TRIED TO REMAIN CALM as we racked our brains as to why we were getting waved off when we were feet, maybe inches, from landing. Was the ship turning? No, it didn't look like it. Were the winds out of limits? No, they were calm. Was the deck fouled? It didn't appear to be. As we pulled power to execute our waveoff, we asked the LSO what was going on. He replied that the hung sonobuoy had just fallen directly into the jaws of the RSD.

> I quickly looked in my side-view mirror and saw the buoy hanging out of the launcher.

After our waveoff, the LSO directed maintenance personnel to the flight deck to remove the buoy, inspect the RSD for damage and conduct a FOD walkdown. Once the LSO operationally checked the RSD, we were cleared to land and made a free-deck landing.

In the landing environment, everyone in the aircraft is concentrating on putting the aircraft on the flight deck. The LSO is responsible for making sure the landing environment is safe for the aircraft to land. In this case, our LSO did an excellent job of paying attention to the total picture. He had made sure the aircraft, flight deck, and landing environment were 100 percent safe for us to land. Had he not noticed the buoy in the trap and responded so quickly to call a waveoff, it could have damaged the aircraft and the ship when he tried to close the RSD beams to secure us to the deck.

LTJG. WILLARD FLIES WITH HSL-48.

Too Many MAFs

BY CW02 JORDAN WIERMAA

I was scheduled for my Cat 1, night instrument flight in the SH-60B on a Monday. The sky was clear, with no haze, but low illumination. I briefed with my instructor pilot and two experienced aircrew instructors. During the NATOPS brief, we discussed the duties and procedures for the flying and nonflying crewmembers during an emergency. The pilot at the controls (PAC) would execute memory items requiring flight-control input, while the pilot not at the controls (PNAC) would do the memory items not requiring flight-control input. I would inform the crewman of the situation and ask for their assistance as needed.

Following our brief, the helicopter aircraft commander (HAC) and I reviewed the aircraft-discrepancy book for Airwolf 412. Multiple maintenance-action forms (MAFs) had been signed off for the automatic-flight-control system (AFCS) from the past few flights. The maintenance actions included replacing the AFCS computer and the control panel.

Following our stop in maintenance, we grabbed our gear and headed out to preflight while there was still sunlight. The preflight went without incident, and we agreed on a time to walk out to the aircraft. An hour later, we started up and I called Mayport ground to put our clearance on request. I filed a departure from NS Mayport to the GCA pattern at NAS Jacksonville.

By the time we started to taxi, the sunlight was nearly gone. The HAC noticed the lower, center-console-panel backlighting was inoperative. Although a minor inconvenience, we still had lip lights, flashlights and the utility lights.

Mayport tower cleared us to fly runway heading and climb to 3,000 feet. As I took off and flew upwind from runway 5, the master caution light came on, along with an AFCS-degraded caution light. The SH-60B has three mode-failure display buttons, each containing four different failure lights for the AFCS. This time one of the cubes had all four lights illuminated.

I continued to fly our heading and climb, while the HAC referenced the checklist and reset the AFCS. The caution light cleared, and we pressed on.

Tower handed us off to Jacksonville Approach, and they told us to turn to 180. While flying our new heading, I was passing 2,900 feet when approach called, "Airwolf 412, expedite your climb to 3,000 please."

I kept silent for a second to scan my altimeter, and then confirmed I was level at 3,000 feet. The approach controller told us his display indicated 2,400 feet. The HAC then came on the radio and assured him we were at 3,000. The controller replied that he now had us at 3,800, and to turn off Mode C and turn to 270 to continue with our flight plan.

We updated our crewmen on the aircraft's two minor issues. Because we still could complete the event with the current aircraft configuration, we decided to press on.

During this discussion, our crewman claimed he felt a "kick" in the aircraft and asked if we had yanked back on the cyclic. Both of us assured him that we hadn't, and the HAC told him to let us know if he felt anything else. About 30 seconds later, the master caution came on again, and the aircraft began an immediate descending right turn. I worked to level the aircraft and stop the descent, while the HAC investigated the problem.

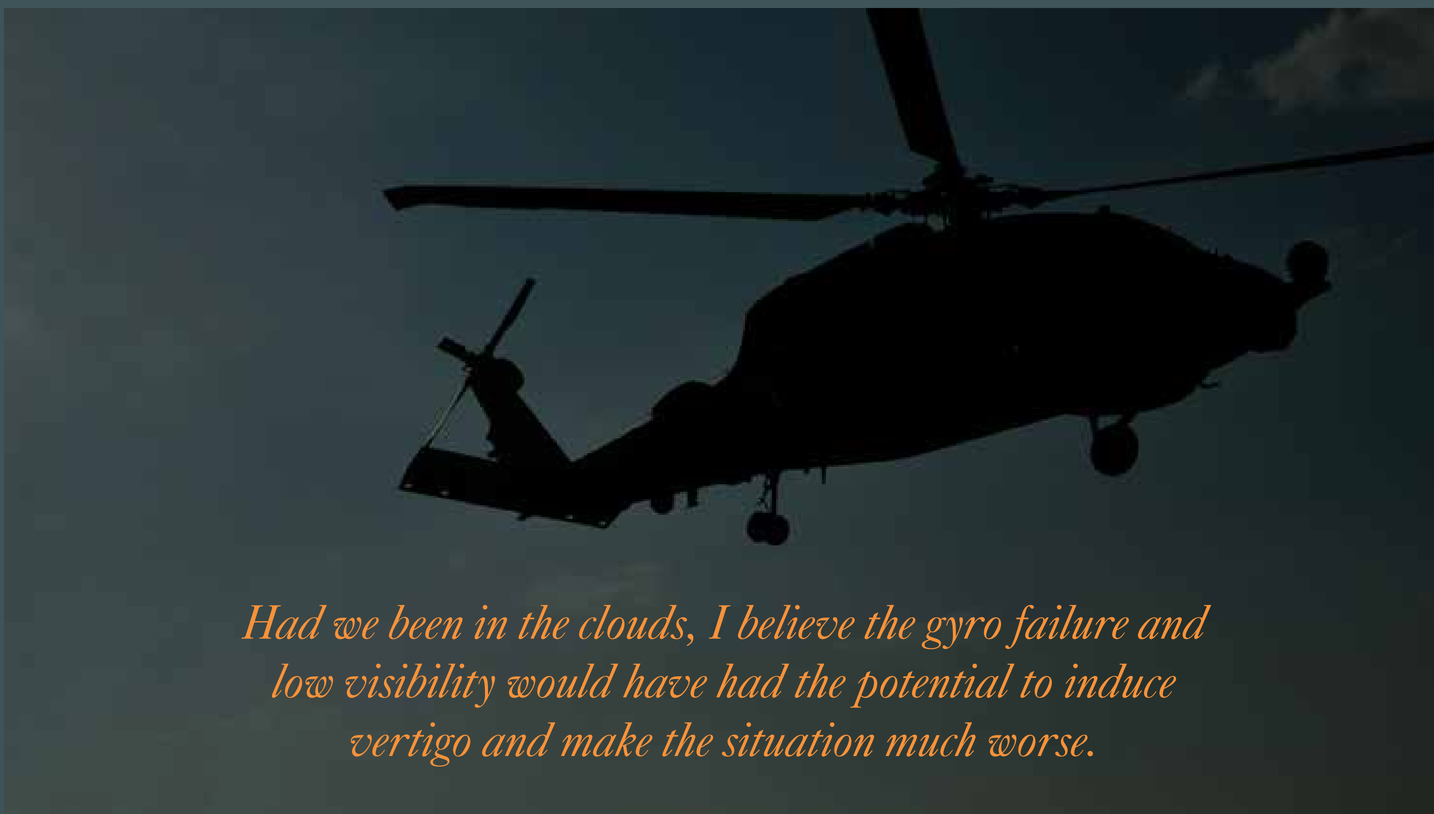
The aircraft now had another AFCS-degraded caution light, with all three failure display cubes illuminated. With this being our third issue of the night, the

HAC instituted the "three strikes and you're out" rule and cancelled IFR. He told approach we were experiencing AFCS issues and asked for a vector back to Mayport. Approach told me to make a 180-degree turn to the right.

When I rolled wings-level, my instrument scan told me that my attitude indicator was wrong because we were still turning. I used a partial-panel scan to stop the turn and asked the HAC if his attitude indicator had us wings level. He confirmed it did, and I told him mine was malfunctioning. He took the controls and my gyro, then tumbled back and forth between 20- and 30-degrees nose up and down with a fail flag.

The HAC then instructed me to review the AFCS-Degraded checklist. When I flipped the pocket checklist to the procedure the master caution light came on again. I looked at the caution panel and realized we now had a No. 1 engine chip light. The HAC then told approach we were declaring an emergency because of multiple-system degradations. I scanned the engine instruments to confirm we didn't have any secondary indications of an engine failure.

Jacksonville Approach cleared the traffic in the area and gave us immediate handling back to Mayport. Tower had the fire trucks standing by on the taxiway for us as a precaution, and we landed without further incident.



Our emergencies hadn't put us into any imminent danger. The cultural lighting below us had been enough to keep track with the ground, but the PAC had been forced to maintain an instrument scan because of the AFCS malfunction and the lack of a visible horizon. Had we been in the clouds, I believe the gyro failure and low visibility would have had the potential to induce vertigo and make the situation much worse.

After our stop in maintenance control, we debriefed as a crew. We went over the chain of events and talked about how we all remained calm and professional while using good CRM. The PAC maintained control of the aircraft, and the PNAC referenced the checklist. The entire crew communicated throughout the flight, and our crewmen's assertiveness gave them the ability to speak up when they felt something was wrong with the aircraft. The instrument-tailored NATOPS brief set the standard for the flight.

CWO2 WIERMAA FLIES WITH HSM-40.

Bravo Zulu

VT-86

First Lieutenant Matthew Babcock, USMC, a flight student with VT-86 at NAS Pensacola, Fla., was standing watch as the squadron duty officer. A severe thunderstorm threatened the airfield, driving high winds across the flightline.

While checking the security of the squadron's aircraft, 1stLt. Babcock saw the rudder of a parked T-39G Sabreliner flapping in the wind. He recognized the aircraft's gustlock, a mechanism designed to protect the flight controls against damaging winds, was disengaged. Knowing the unrestrained deflection could damage the rudder, he immediately notified maintenance personnel. A mechanic was quickly dispatched to engage the lock.

VT-2

Lieutenant Junior Grade Rachel Post, USCG, a flight student with VT-2 at NAS Whiting Field, Fla., was on a T-6B, aerobatics, solo training flight. On returning to Whiting Field, Ltjg. Post began a course-rules recovery.

Established on a heading to the field entry-control point, she noticed coaltitude, converging aircraft on her traffic advisory system (TAS). Unknown to her, the conflicting traffic was another T-6B aircraft headed to the same entry point for a Whiting Field recovery.

Monitoring the saturated radio, Ltjg. Post heard the air traffic controller switch the other aircraft to tower frequency. She realized the controller was unaware of the developing conflict. As the aircraft closed on each other, air traffic control directed her to follow the merging traffic. When Ltjg. Post reported that the other aircraft was not in sight, she was issued a heading turning her directly into the traffic's flight path.

Recognizing the need for evasive action, she pulled up as the TAS alerted to hazardous traffic. Looking forward between her wing and prop arc, she caught sight of the other aircraft as it passed just beneath her plane. Although the climb deviated from course-rules procedures and the instructions from air traffic control, it prevented a midair collision.

A post-incident investigation led to a revision in the Whiting Field recovery procedures. This flight was Ltjg. Post's second solo flight.

VP-4

During VP-4's deployment, combat aircrew 12 was transiting home following an operational mission. Approaching the field at night in low visibility, the crew was given instructions to descend and proceed to a point southwest of the field. Ltjg. Chandler Hasemeyer, the crew's tactical navigator-communicator immediately verified the point and recognized that the terrain elevation was above the crew's assigned altitude. He promptly directed the crew's pilots to make a climbing right turn to the north. Ltjg. Hasemeyer's call out of the rapidly approaching terrain prevented a potential controlled flight into terrain (CFIT).

Sgt. Brian Beasley

HMHT-302

Nearing the end of a CH-53E replacement aircrew (RAC) training flight, the helicopter aircraft commander (HAC), Capt. John Ballenger, USMC, requested a climb-out for the 1,000 foot autorotation pattern. Climbing through 300 feet, the aircrew heard a loud sucking noise, followed by a loud bang, and felt a slight yawing of the airframe. The No. 2 engine overheat caution light came on, followed closely by the No. 2 engine fuel-bypass lights, a corresponding decrease in torque, and a rapid rise in engine temperature.

Capt. Ballenger quickly diagnosed a compressor stall, which would likely result in an engine fire. If the No. 2 engine speed-control lever is at or below MIN GOV and the Ng is below 75 percent, hot exhaust may blow back into the engine compartment, creating a fire hazard. While the HAC was executing the immediate action steps of slowing the aircraft below 85 knots, the crew chief instructor, Sgt. Brian Beasley, USMC, aware that the nonflying pilot was a student, positioned himself in the cockpit and assisted in the shutdown of the No. 2 engine. On downwind, the HAC requested a full stop in lieu of the practice autorotation. Sergeant Beasley continued with his crew chief responsibilities and also provided leadership to the crew chiefs under instruction (CCUIs). Once he positioned the CCUIs in the observation windows, Sgt. Beasley assisted the HAC by monitoring other engine instruments and calling out airspeeds and altitudes for landing.

Postflight inspection revealed that the emergency was caused by internal failure of the engine.

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