THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

www.public.navy.mil/navsafecen/ • January - February 2014

Approach

The Navy & Marine Corps Aviation Safety Magazine

January-February 2014 Volume 59, No. 1

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.

Approach (ISSN 1094-0405) is published bimonthly by Commander, Naval Safety Center, 375 A Street Norfolk, VA 23511-4399, and is an authorized publication for members of the Department of Defense. Contents are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the U.S. Navy. Photos and artwork are representative and do not necessarily show the people or equipment discussed. We reserve the right to edit all manuscripts. Reference to commercial products does not imply Navy endorsement. Unless otherwise stated, material in this magazine may be reprinted without permission; please credit the magazine and author. *Approach* is available for sale by the Superintendent of Documents, P.O. Box 979050, St Louis, MO 63197-9000, or online at: bookstore.gpo.gov. Telephone credit card orders can be made 8 a.m. to 4 p.m. Eastern time at (866) 512-1800.Periodicals postage paid at Norfolk, Va., and additional mailing offices.

Postmaster: Send address changes to *Approach*, Code 71B,
Naval Safety Center, 375 A Street
Norfolk, VA 23511-4399
Send articles and letters to the address above, or via e-mail to the editor, jack.stewart@navy.mil.

CON

Features

Departments

NTENTS

January-February Thanks

Thanks for helping with this issue…
LCDR Pete McMorrow, VFA-27
Capt Julia Weber, USMC, HMLA-269
LT Ean Hobbs, HSM-40
LCDR Timothy Hurley, VFA-137
LCDR Steve Reis, HSL-49
LCDR Drew Beard, VRC-40
LCDR Trevor Hermann, VRC-30
John Minners, CNATRA
Capt Seth Grant, USMC, VMM-266(REIN)
LTJG Zachary McCune, CGAS Barbers Point

Front cover: Marines assigned to 24th MEU prepare to board an MV-22 Osprey helicopter aboard USS *Gunston Hall* (LSD 44). Photo by MC3 Lauren G. Randall.
Back cover: Photo composite by Allan Amen.

Go To:

School of Aviation Safety, Quarterly Newsletter
https://www.netc.navy.mil/nascweb/sas/newsletters.htm

www.facebook.com/NavalSafetyCenter

www.twitter.com/NSC_Updates
Get Twitter Video Updates at: www.twitter.com/NSC_Vid_Updates

WATCH OUR VIDEOS at:
www.youtube.com/navalsafetycenter

Visit Approach online

Naval Safety Center Resources for Mishap Prevention

Naval Safety Center Aviation Safety Programs
http://www.public.navy.mil/navsafecen/Pages/aviation/Aviation.aspx

Director, Aviation Safety Programs
CAPT Chris Saindon, christopher.saindon@navy.mil
(757) 444-3520 Ext. 7225 (DSN 564)

Deputy Director, Aviation Safety Programs
Kimball Thompson, edward.thompson@navy.mil
(757) 444-3520 Ext. 7226 (DSN 564)

Aircraft Operations Division
CDR Albon Head, albon.head@navy.mil
(757) 444-3520 Ext. 7203 (DSN 564)

Culture Workshops
http://www.public.navy.mil/navsafecen/Pages/aviation/culture/AviationCultureWorkshop.aspx
CDR Rich Couture, richard.g.couture@navy.mil
(757) 444-3520 Ext. 7212 (DSN 564)

Crew Resource Management (CRM)
LT Kirstin Carlson, kirstin.carlson@navy.mil
(757) 444-3520 Ext. 7270 (DSN 564)

Web Enabled Safety System (WESS)
http://www.public.navy.mil/navsafecen/Pages/wess/WESS.aspx
Help desk (757) 444-3520 Ext. 7048 (DSN 564)
NRFK_SAFE_WESShelp@navy.mil

Operational Risk Management (ORM)
http://www.public.navy.mil/navsafecen/Pages/orm/ORM.aspx
CDR Rich Couture, richard.g.couture@navy.mil
(757) 444-3520 Ext. 7212 (DSN 564)

Aviation Maintenance
http://www.public.navy.mil/navsafecen/Pages/aviation/maintenance/aviation_maintenance.aspx
LCDR Richard Thousand, richard.a.thousand@navy.mil
(757)444-3520 Ext. 7265 (DSN 564)

Aircraft Mishap Investigations
http://www.public.navy.mil/navsafecen/Pages/aviation/investigations/investigations.aspx
CDR Fred Lentz, frederick.c.lentz@navy.mil
(757) 444-3520 Ext. 7236 (DSN 564)

Airfield Operations/Bird Animal Strike Hazard (BASH)
http://www.public.navy.mil/navsafecen/Pages/aviation/AirfieldOperations.aspx
LCDR Tracy Mackey, tracy.mackey@navy.mil
(757) 444-3520 Ext. 7281 (DSN 564)

Aeromedical
http://www.public.navy.mil/navsafecen/Pages/aviation/aeromedical/Aeromedical.aspx
CAPT Robert Frick, robert.frick@navy.mil
(757) 444-3520 Ext. 7228 (DSN 564)

Aviation Safety Surveys
http://www.public.navy.mil/navsafecen/Pages/aviation/maintenance/aviationmaintenancesurvey.aspx
Maj Dave King, USMC, david.a.king1@navy.mil
(757) 444-3520 Ext. 7223

Aviation Data
http://www.public.navy.mil/navsafecen/Pages/statistics/aviation/av_stats_main.aspx
Customer support
(757) 444-3520 Ext. 7860 (DSN 564)

Statistics
http://www.public.navy.mil/navsafecen/Pages/statistics/statistics.aspx
Customer support
(757) 444-3520 Ext. 7860 (DSN 564)

Additional Resources

School of Aviation Safety
https://www.netc.navy.mil/nascweb/sas/index.htm
newsletter: https://www.netc.navy.mil/nascweb/sas/newsletters.htm

Command Safety Assessments
www.safetyclimatesurveys.org
Dr. Bob Figlock, (831) 641-9700/(888) 603-3170
surveys@advancedsurveydesign.com

Naval Aviation Safety Programs (OPNAVINST 3750.6R)
http://www.public.navy.mil/navsafecen/Pages/aviation/3750_Guidance.aspx

Little Did We Know

BY LT ANDREW HORVATH

It was early spring at VQ-1's detachment site in EUCOM. A glance at the news gave the impression that things were heating up in the region. My crew recently had changed detachment sites from Southwest Asia (SWA) to our current location, and we were excited about our tasking in the new AOR.

We did however, have several flights that kept us from using the term "routine." The all-too-common chips light had cost us two separate three-engine landings in SWA. In addition, a bleed-air-related power loss had caused another long-transit, three-engine landing. All this happened in just three months.

We had a full crew on board our EP-3E that day and a nearly full fuel load. I want to point out that the EP-3E uses the P-3C NATOPS and a shorter supplement tailored to the EP-3E. The flight characteristics and operating procedures are largely the same.

Preflight went as scheduled, and we were on track to be on-station at our fragged time. With my junior copilot (3P) making the takeoff, we took the active, set power, rolled and rotated. My 3P called for maneuver flaps at 160 knots. Moving the handle, I noticed the flaps indicator was tracking normally to the selected position. As the indicator arrow settled over MANEUVER, the FLAP ASYM light illuminated.

The FLAP ASYM light is brought on by an asymmetrical condition. It triggers the flap asymmetry system which, in theory, mitigates any damage and prevents further degradation of controllability. When that light came on, hydraulic power to the flap drive motor was shut off, preventing us from moving the flaps. The flap brake, located at the end of the flap torque tube spanning the length of the flap well, locked and prevented air loading from moving the flaps.

Knowing that our actions depended on my interpretations of the flight characteristics, I immediately took the controls as we passed through 500 feet AGL. I noticed that slightly more than normal right rudder was required to center the slip indicator that the aircraft tended to roll right. I determined that the FLAP ASYM light was accompanied by a change in flight characteristics. NATOPS then directed us to execute split-flap procedures, prompting the question, "Is the aircraft controllable in its present state?" Determining that the aircraft was indeed controllable, we opened NATOPS for reference. I sent my senior copilot (2P) to visually assess the flaps through the windows of the port and starboard overwing exit hatches.

Shortly after confirming our execution of NATOPS procedures, my 2P returned to the flight station. The

flaps on the P-3 are marked (per NATOPS) with lines corresponding to degrees of deflection, so that anyone inside of the aircraft can roughly estimate the position of the Fowler-type flaps. What my 2P told me matched what I expected him to see based on the airplane's flight characteristics. The port flap was at 10-degrees deflection (exactly maneuver position), while the starboard flap had traveled further up to eight degrees: a split-flap condition. I posted observers at the overwing hatches to watch the flaps for further movement.

AFTER STABILIZING THE AIRCRAFT, taking care of checklists, and stopping below an IMC layer at roughly 4,000 feet, we headed to a known functional-check-flight (FCF) VFR flying area. We dumped fuel, a standard procedure to lighten the aircraft which results in decreased approach airspeeds, shorter ground rolls, and less wear and tear on our aging airframe. OPNAVINST 3710.7 prescribes a minimum altitude of 6,000 feet for dumping, but a time-critical ORM analysis dictated that we not fly through IMC in our current condition. EP-3 crews usually find that after dumping they are still heavier than our heavyweight landing speeds prescribed by NATOPS. All landings below 103,880 pounds are normal and unrestricted, landings above 103,880 pounds and below 114,000 pounds necessitate documentation in the ADB. After 10 such landings an inspection is required. Above 114,000 pounds should only be done in an emergency, as it risks scrapping one of the few EP-3s in the fleet and requires an inspection each time.

Any number of things can result from landing overweight: fuel leaks, landing-gear structural cracks, or blown tires. These discrepancies can down the aircraft at single-aircraft detachment sites for days and even weeks, costing the squadron numerous missions. EP-3E crews usually burn down to 114,000 or 103,880 pounds depending on the malfunction for this very reason. The only time to land above those weights, as discussed in our wardroom, is if remaining in the air puts the crew in greater danger than landing.

The concept of a no-flap landing in the P-3 may lead one to conclude that we did not need to perform that type of landing with our flaps around MANEUVER. But, with the flaps "at any position above the APPROACH position," you have to make a no-flap landing. NATOPS continues, "No-flap landings are not recommended at gross weights exceeding 103,880 pounds." This recommendation highlights the criticality of no-flap landings in the P-3 series. Speeds are high, ground-roll distances are long, and the impact on the airframe from the nonstandard AOA-style touchdown is harsh. But, "not recommended" does not fit into the classic verbiage from OPNAVINST 3710: we're still used to seeing "may, should and shall." Quite suddenly, our tactical evaluator, a NFO currently assigned as the starboard observer, called me over ICS. He reported that the starboard flap was slowly moving upwards. In what cases would a crew land no-flap above 103,880 pounds in a P-3? I believe that we had found one example that morning.

Flying any longer was accepting unnecessary risk. The airfield was located on a peninsular cliff, where winds can be unforgiving, especially on short final. I was unwilling to attempt a landing with one flap completely up while another was stuck at MANEUVER if I didn't need to. My flight station and I thought that we could put the ailing airframe on the deck at its current gross weight. My crew and I began preparations to land at just below 114,000 pounds.

A controllability check was the next item of business. Because we did have some flap deflection, I knew it was highly unlikely for us to hit any type of buffet. Also, the effects of the asymmetrical-flap position would be attenuated as the aircraft slowed. We decelerated slowly toward our no-flap landing speed and made several control inputs; the controllability check was uneventful.

Since we had decided to land, any delays at this point were unfavorable. Our emergency-landing brief was completed as we turned toward home.

With our anticipated landing weight at 111,500 pounds, we declared an emergency with control and notified them of our intentions. I told my 2P to call out the slightest deviations from prebriefed parameters. We concurred on the necessity of being on terra firma without undue delay, but I was not going to land if we weren't adhering to all prebriefed parameters. We needed to get this right. I confirmed our ground roll of 5,900 feet; with a 10,982-foot runway, we needed to touch down in the first third. We would take a wide downwind with long final. The VSI at touchdown needed to be less than 500 fpm. To achieve this, it was crucial to have a flatter than normal final and be solidly stabilized and trimmed at my landing speed. It was game time.

The mainmounts touched concrete at the 9 board, and we were at taxi speed after a 6,000-foot roll.

Little did we know this was the start of a two-week mystery that had our maintainers at a troubleshooting impasse. My flight station crew was reluctant to load up 19 other people and attempt flight with no known cause of the flap asymmetry.

Maintenance put the aircraft back together, and I signed for it two days later. On takeoff roll, eight knots before rotate, the FLAP ASYM light struck again. I immediately took the controls and executed a high-speed, four-engine abort.

Our detachment maintainers exhausted their troubleshooting; they could not get it to replicate on the ground at zero knots. The aircraft was released safe-for-flight. Trying my hardest to not insult our maintenance professionals, who do a fantastic job maintaining an aircraft that was first flown in 1959, I voiced my suspicion that we would be in the same position again if we went flying. I insisted that we load up with minimum crew and minimum fuel for an inflight evaluation. My decision to do so was ultimately supported by maintenance, our detachment officer-in-charge and skipper.

Stepping to the bird for our evaluation, my flight-station crew discussed a made-to-order FCF deck. We'd take the active, set takeoff power, and cycle the flaps under the air load of the props. If no problems were noted, we'd fly to the FCF area, pushing the flaps to each airspeed limitation at least two times, and cycle them up and down. We didn't get that far.

The FLAP ASYM light illuminated with takeoff power set in the brakes with no-flap position change. What happened next makes me even more sure of our decision to not try a mission flight. We taxied back to the line and fuel-chopped engines Nos. 1, 3, and 4 for an external power shutdown. With the parking brake set, the aircraft began to creep forward. Our No. 1 hydraulic system then read zero gallons, and both of the system pumps gave us low-pressure advisory lights. I guarded the emergency-brake handle, ready to use it if necessary, and pulled No. 2 into reverse to slow our forward advance. My FE quickly fuel-chopped the No. 2 engine, and the aircraft came to a stop on the flat tarmac.

The lineman chocked the plane; we completed the secure checklist and stuck our heads out the side of the plane. It looked like a slasher horror movie scene behind No. 2. The swivel joint on the brake system had burst, releasing almost all of the 16.2 gallons of hydraulic fluid in a matter of seconds. We were without brakes or nosewheel steering, a situation that, coupled with a FLAP ASYM in flight, could have been catastrophic on the runway.

Two weeks later, after several maintenance turns, in-flight evaluations, and FLAP ASYM lights (which resulted in high-speed aborts and normal approach-flap landings), the problem was solved. We had lost several missions, but everyone came away unscathed.

Since my time in VP-30 until now, I've heard different mantras regarding the condition of the aging P-3. One is that the P-3 is old and that we must accept problems with the aircraft and deal with them. I believe this is a dangerous and illogical approach. My guidance, the one that I believe saved us from even more trouble, is that because the P-3 is old the likelihood of compound malfunctions is even greater. It is for that reason I believe aircrews should not accept degradation as just part of doing business in this plane.

LT HORVATH FLIES WITH VQ-1.

Between a Rock *and* No Place At All

BY VFA-27 READY ROOM

The words of the squadron's training officer echoed in my head as our KC-135 tanker executed its fifth missed approach into the Wake Island airfield. I landed my FA-18E in weather below approach minimums only about 15 minutes before reaching min fuel, happy to be on the ground.

The sequence of events that had put all the squadron's aircraft and three Air Force tankers, carrying 30 of our maintainers, in this situation stretched back over 2,000 miles across the Pacific Ocean.

The conversation had started in Honolulu as about half of the squadron pilots piled into the crew van headed to Hickam. "Weather Channel is calling rain with thunderstorms. Not sure what the ceilings are, but the weather doesn't look good," our training officer announced.

It was a beautiful day in Honolulu. After a month in the states transitioning into new Super Hornets, we were getting ready to start the second leg of our three-leg trip across the Pacific, back to our home field of NAF Atsugi, Japan. It was 0630 and we were headed to meet with the Air Force's delivery control officer (DCO) to brief our flight leg from Honolulu to Wake Island. A canceled mission would have meant another 24 hours in Hawaii. Most of us probably could have found a way to live with that.

The DCO brief went as planned, and little was said about the weather. The Dash 1 weather brief reported scattered clouds at 4,500 feet and some light winds — a typical day in Hawaii. It seemed the Weather Channel was wrong. There was some discussion after the brief about the forecast's accuracy. However, in the end, we collectively decided the forecast provided by the Hickam weather service was most likely more accurate than the Weather Channel.

The squadron had traveled through Wake Island almost a month earlier, and we were familiar with the airfield and the surrounding atoll. The atoll is actually composed of three small islands surrounding a lagoon. The runway and tarmac take up a large portion of the southern island. A VORTAC is the only navigational aid. There is no ground-controlled-approach capability, and the airfield has a single radio frequency to talk to base operations. The runway and taxiways are well maintained, and only a few obstacles are higher than 50 feet around the atoll.

going to get canceled today.”

We launched out of Honolulu International in three cells about 30 minutes apart: total of 13 FA-18E Super Hornets, two KC-10 tankers, and one KC-135 tanker. It was just over a four-hour trip, with four planned aerial refuelings.

The first cell of five Super Hornets and one KC-10 made radio contact with Wake Island's base operations 180 miles out. We got a different weather report than expected. Ceilings were overcast at 100 feet and visibility was less than a mile with heavy rain. The lowest approach minimums are 360 feet and 1 mile visibility for the TACAN approach. The weather was relayed back to each of the cells via their respective tankers over HF radio.

At this point the only cell that had a divert option was the third one, consisting of three Super Hornets and one KC-135. They had the fuel to get to Midway, essentially an emergency divert 450 miles north of the route, halfway between Hawaii and Wake Island. The lead Hornet pilot, our squadron's XO, suggested that the cell divert. However, the KC-135 was directed via HF by mission control at Scott AFB, Mo., to continue to Wake Island. The tanker crew stated this was merely a passing thunderstorm cell and would clear out by our arrival.

WHEN THE FIRST CELL ARRIVED in Wake Island, the weather had improved to a ceiling of about 700 feet and visibility out to a couple of miles. This was enough for the five Super Hornets to make their approach using the TACAN and land. As the KC-10 made its approach to the airfield, it received a wind-shear warning and discontinued its approach. Switching to the opposite runway, the KC-10 made its approach and landed.

While this KC-10 had been making its first approach, the second cell of five Super Hornets and a KC-10 had arrived overhead. Wake Island base ops directed the second cell to hold at the approach fix at 14,000 feet until the first KC-10 had landed. While the second cell held, the weather continued to degrade and the rain intensified. Once the first KC-10 was on deck, the first of the five Super Hornets in the second cell began the approach. Each pilot in the second cell reached minimums in and out of the weather, barely breaking out the field in time to make a play for the runway. The second cell's KC-10 could not break out the airfield and executed a missed approach.

The third and final cell arrived overhead at Wake Island. The three Super Hornets flew their approaches, followed by the KC-135. The first of the three fighters had been forced to fly a missed approach because of the intense downpour. The second two, using their radars to build a map of the runway, executed approaches to the runway and landed on their first attempts. The lead Super Hornet landed on the second approach, breaking out the runway at the last moment.

It was a relief to have all of the squadron's airplanes on deck. However, we still had 30 squadron maintenance personnel and three pilots riding in the two tankers that were airborne. They had less than 45 minutes of fuel remaining, no divert options, and the weather was not improving.

Looking for a solution to this problem, we tried to get the KC-10 that was on deck back airborne. We hoped they could refuel the second KC-10 tanker, which was now at a low-fuel state and still making approaches to the airfield. The KC-135, however, did not have the capability to refuel airborne. As the scramble to get the first KC-10 refueled on deck began, the second KC-10 was able to land, having made a play for the runway after breaking out the field at the last moment. "Making a play for the runway" is not the preferred technique for landing a 200-foot, 250,000-pound airplane.

Without a viable divert – the nearest one being more than 1,000 miles away - the Air Force requires aircraft to have enough fuel to hold for 60 minutes. At this point, the KC-135 had been holding and attempting approaches for 30 minutes. We then began to see if one of our department heads, a former CAG paddles, could help with a paddles-contact approach to talk the KC-135 in from the end of the runway. The Wake Island base operations personnel went on a search for a portable radio for that purpose. We discussed how to convince the KC-135 aircrew to trust a guy at the end of the runway to guide them to land, and a Navy guy at that. The situation was getting desperate.

After more missed approaches and several last-ditch ideas tossed around on the ground, the sounds of the KC-135 engines were heard. The aircraft rolling out on the runway with less than 20 minutes of fuel remaining signaled the end of the ordeal, to the cheers and relieved applause from all of us watching at base operations.

With everyone in the squadron on deck, we tried to figure out how the weather reports from Hickam had been so wrong. One of the Wake Island base operations personnel told us the weather had been this way for at least two days. This info had been submitted into the weather system. However, what reached the aircrew in our morning brief via the DCO had been considerably different: scattered clouds at 4,500 feet with unlimited visibility.

Most of the aircraft were forced to go below the approach minimums to make their landing; nearly all of the Super Hornets used their radars to find the runway. We call it a Hornet 1 approach. In the event any of the Super Hornet pilots had to eject or any of the tankers had to ditch, the nearest SAR effort was in Honolulu. Wake Island does not have a single rescue boat, much less helicopters.

Looking back at the events of the morning, we clearly placed far too much faith in the weather forecast given in the brief and ignored the contradicting information we had seen on The Weather Channel before leaving the hotel. The weather brief from Hickam AFB did not match the weather reports from Wake Island. Given the lack of options once arriving at Wake Island, we should have certainly asked the obvious questions, rather than let ourselves be painted into a corner. While we had the means to get better weather updates via our tanker's HF radio, we did not until it was too late. Even when accurate weather information was passed, it was assumed by many it was just a normal tropical island with a passing afternoon thunderstorm.

No Fast Hands

BY CAPT JASON CULLEN, USMC

We practice emergency procedures (EPs) in the simulator, and sometimes we even know when they'll be inserted into the scenario. Afterward, we usually discuss how relatively routine emergencies can become a big deal under complicating circumstances, such as flying at night or over water. What happened to us on a nice night in August was exactly what we had discussed following one of our EP practice sessions: a heavy aircraft, flying as wingman, using night vision goggles and over water.

The night had started out well. We briefed a night, terrain-navigation flight followed by section confined area landings (CALs). We reviewed the weight and power numbers and had a nice power margin in our UH-1Y Yankee. There was a short delay on launch as we waited for the AH-1W Cobra crew to troubleshoot a faulty starter in their aircraft. While they worked on the Cobra, we took the Yankee out for a few laps in the local pattern.

After taxiing back to the line, we assumed the wingman position with the Cobra as the lead. We followed them out for power checks on the midfield taxiway. Everything checked out, and we even had a little more power during our hover checks than we had calculated. With a warm and fuzzy feeling about our aircraft's performance margin, the lead aircraft called for a present-position takeoff, and we departed the airfield.

Our route took us over the New River to North East Creek Bridge, which is a VFR course-rules reporting point. Passing the bridge at 1,000 feet MSL, the aircraft commander passed controls to me in the left seat. I began to slide our Yankee out to the cruise position on the left side of lead's aircraft. Just as we stabilized in position, I heard the unmistakable sound of a turbine engine increasing speed. This drew my attention inside the cockpit just as the aircraft computer figured out what was going on.

A LITANY OF CAUTION ALERTS began to pop up on the video display, and the aural alerting system began barking "Rotor rpm" in my ears. It took me a moment to sort through all the information and figure out what was going on. In the Yankee, the initial indications of overspeeds, underspeeds and engine flameouts are remarkably similar (the one exception is main rotor speed or Nr). These three situations look similar because of the digital electronic control unit (DECU), whose main function is torque-matching between the two engines. Under normal conditions, the DECU matches the torque loads on the two engines. When there is a mismatch in power output between the two engines (overspeed, underspeed, or engine flameout), the DECU system signals the engine still under DECU control to increase or decrease power in an effort to maintain a constant supply of power to the transmission and main rotor.

Because these issues look so similar on the engine-performance gauges, the best indicator to use when deciphering between them is Nr. In an overspeed situation, which is what we had, the overspeeding engine redlines and the controlled engine reduces power, causing the performance gauges to look like the controlled engine has dropped to idle (easily mistaken for an underspeed situation on the controlled engine).

Identifying abnormal Nr (high or low) is the best way to differentiate between overspeed and underspeed. In an overspeed situation, Nr will be high, but during an underspeed it will remain constant or begin to droop (depending on single-engine power available). Because of this, we are taught to always reference Nr before taking immediate-action steps, because we could possibly shut down a good engine if we execute the wrong EP.

In our cockpit that night, crew resource management (CRM) instantly kicked in. We task-shed external communication responsibilities to lead (who declared an emergency with ATC and got us an immediate clearance to land) and began to diagnose the issue. We completed our immediate-action steps and got the overspeeding engine rolled back to idle. We were relieved to see the DECU work as advertised, with the good engine assuming the torque load.

We had tried to use the overspeeding engine in manual fuel-control mode, but it would not stabilize. We decided to keep it at idle instead of flying all the way back to the field with overspeeding Nr. Once we knew we could maintain stable, powered flight, we began to figure out our landing plan. Although we took off with sufficient power to land dual-engine, we had more than 2,000 pounds of fuel remaining, which put us nearly 700 pounds over our single-engine hover weight. I reminded the aircraft commander of this, and we agreed that a slide-on landing would be the safest profile.

We set up the helicopter for a long, shallow straight-in approach and touched down on the runway at just under 30 knots groundspeed. Other than some sparks flying from the skid shoes during the slide, the landing was uneventful.

Adhering to our training saved us a lot of heartache that night. I distinctly remember hearing the voice of Col. Spencer (one of our civilian simulator instructors, and a former AH-1W pilot and HMLA squadron and MAG commanding officer) in my head calmly telling me to look at Nr before I did anything else. Had I not first pulled that crucial bit of information, we may have wasted precious time fighting a nonexistent EP, instead of quickly resolving our issue and getting the helicopter back on deck.

CAPT CULLEN FLIES WITH HMLA-269.

A Simple, Day Fam

BY LTJG MICHAEL WATSON

Having recently earned my wings at Whiting Field, I was ready for the real thing: transitioning to a new aircraft and flying in the Jacksonville area. The weather around Naval Station Mayport was clear with light winds. This would be a perfect spring day for an initial fam flight for a MH-60R Cat I fleet replacement pilot.

My instructor was a fleet-experienced MH-60R pilot who recently had checked into the command from one of the local fleet squadrons. The two aircrewmen in the cabin were senior AWRs. Everything was set up to be a great learning experience for me and a basic, day fam for everyone else.

During our NATOPS brief, we had discussed operational risk management (ORM), especially because of the large volume of air traffic in the local area. It seems that everyone was taking advantage of the good weather. All our crewmembers needed to maintain a solid, proactive scan throughout the flight.

After reading the book, our crew met in the hangar to wait for a hot-seat. After launching, we left the local pattern for an area fam of Jacksonville. We then stopped at Cecil Field to briefly conduct pattern-work before returning to Mayport to pick up the next student.

We entered Mayport course rules from the west and requested a full-stop landing on runway 23, intending to air-taxi to taxiway C for the fuel pits. I was flying from the right seat and landed on runway 23 at taxiway B. I requested to air-taxi to the fuel pits. Tower cleared me direct to taxiway C from present position. Not fully understanding what ATC wanted me to do (which was fly point-to-point), I picked up into a hover, pedal-turned onto taxiway B and then proceeded to air-taxi toward taxiway G (a taxiway that runs parallel to the runway).

For those of you not familiar with the Mayport airfield layout, taxiway B connects the runway to the parallel taxiway and taxiway C connects the parallel taxiway to the line area. Spaced along taxiway G are 13 designated helicopter-landing spots. Our direction of air-taxi was going to take us past helo spot 12 en route to taxiway C.

While air-taxiing across the B and G intersection, I silently scanned left and right while remaining on the go. About 10 feet out into taxiway G, I felt the HAC pull the cyclic into his lap. The aircraft immediately pitched up, and we started moving backwards. I scanned the radalt and noticed we had climbed to 40 feet, and then I quickly looked outside the aircraft. All I could see was the radome of another MH-60R heading inbound along taxiway G. No more than 20 feet separated us. I heard over the radio an advisory call from ATC, telling the inbound aircraft to hold position. The other aircraft proceeded to land full-stop in an adjacent spot.

After holding the hover for what felt like an eternity, we finally crossed taxiway G, made our full stop at taxiway C, and continued our taxi on the ground. We were bewildered at how this dangerous situation developed so quickly. None of us had seen the other aircraft, nor had we heard ATC's clearance for them to land. We completed the hot seat and the HAC went back out into the pattern with the next FRP.

The aircrewmen and I talked with the aviation safety officer about what had happened. We later learned that tower had instructed the other aircraft to land on the helo spot 12, while we were taxiing over it.

Something had clearly gone wrong or had not been communicated; however, tower isn't the only source of situational awareness (SA). That comes from your senses and is strengthened and amplified by good internal crew resource management (CRM).

During the simple air-taxi to the fuel pits, I had not heard ATC's instructions to the other aircraft. I was focused on debriefing the flight with the HAC. I had been in the habit of only holding short when instructed while taxiing. From now on, I will be taking the extra two or three seconds to come to a stop before vocally clearing myself left and right; I'll use the other set of eyes in the cockpit to increase my SA. Waiting to discuss the flight until safe in the chocks will spare some distraction among the crew. I had wanted to learn something on my first flight — mission accomplished.

LTJG WATSON FLIES WITH HSM-40.

ORM corner

Please send your questions, comments or recommendations to:
CDR Rich Couture, Code 15
Naval Safety Center
375 A St., Norfolk, VA 23411-4399
(757) 444-3520, ext. 7212 (DSN-564)
E-mail: richard.g.couture@navy.mil

True Confessions

BY LT ANTHONY MORANA

Our detachment was in its seventh week of a southern Pacific deployment in support of Operation Martillo. We were flying Counter Transnational Organized Crime (formerly Counter Drug) operations, attempting to reduce the flow of drugs into the United States. We had a slow start to the deployment with several boardings but no interdictions or disruptions.

One night started out like more of the same: providing eyes in the sky and radar coverage of the operating area. About an hour before our land time, we received a call from control notifying us that a suspect vessel was spotted in the vicinity. Game on.

We gave chase and located the vessel. After identifying it, and with the help of a P-3, we tracked them while our ship was in hot pursuit. The vessel was skirting Panamanian territorial waters. After an hour into the chase, we were given permission from the Panamanian government to enter their national airspace and territorial waters. You could feel the adrenaline pumping through the crew.

To let the vessel know we were there, we descended from 2,000 to 500 feet AGL and flashed our searchlight on them. We maneuvered to maintain forward-looking-infrared-radar (FLIR) imagery in case the vessel started dumping bales of drugs.

The moon had just set, so the illumination was dropping; haze further degraded visibility. Meanwhile, our ship was putting the boarding team's rigid hull inflatable boat (RHIB) in the water. We tried to buy some time and keep the suspects from heading straight for a nearby cove that had many islands around it. As we illuminated the vessel, it made erratic maneuvers in an effort to avoid the light.

Despite our efforts, they made it to the cove, and we lost sight of them on FLIR. We tried to find them on radar, FLIR, and visually to no avail. The boarding team was now loaded in the RHIB and waiting for guidance. After what seemed like an eternity of searching the cove and islands, we relocated the vessel. The crew had shut off the motors and were pushing the vessel into a small rock enclosure on the island, trying to mask their position. We maneuvered the helicopter into a 100-foot coupled hover and put our searchlight on them to give the boarding team the location.

Realizing they had been discovered, the suspects frantically began to pull start their engines as our RHIB rapidly closed their position. The vessel got one engine started just as our boarding team arrived on scene. Our team started to chase them. We transitioned from our 100-foot hover to forward flight and climbed to 200 feet. The suspects began to dump bales of drugs overboard.

Our crew of three split up our responsibilities. I kept the search light fixed on the suspects, my copilot flew and maintained standoff, and our aircrewman in the back operated the FLIR. After getting the smugglers on video jettisoning their drugs, the aircrewman got out of his seat and went to the cabin door in his gunner's belt to drop chem lights on the jettisoned bails, marking the location of the contraband to be recovered later.

With our aircrewman at the door, we were down a crewmember to provide backup on altitude integrity. The pilot-at-the-controls became focused on a predominantly outside scan. As the nonflying pilot, I was scanning outside to maintain visual on the vessel with the search light. I also looked inside to check instru-

ments and maintain FLIR image. I noticed our altitude rapidly decreasing. Our radar-altimeter altitude hold had disengaged without us noticing. With no reference to the horizon due to a pitch black night, we had entered a nose-low descent approaching 1,500 fpm.

At 150 feet, I called out, "Altitude!" and took the controls. We immediately completed our unusual-attitude-recovery procedures, stopping the rate of descent at 50 feet, breaking our briefed SOP hard deck of 100 feet.

Altitude hold is a great tool, but an instrument scan is imperative when there is no reference to the horizon. With an over-reliance on the altitude-hold function, the crew became absorbed on maintaining position on the contact. We wanted to make sure we had video evidence and remained clear of the terrain. But, with the non-NVG compatible search light on, it made the conditions even more difficult to pick out the terrain on NVGs. When we first maneuvered near the cove, the crew was very good at communicating the location of obstacles in reference to the aircraft, but as soon as the chase began, each crewmember became focused on their specific tasks.

As the crew transitioned from a coupled hover from 100 feet to 200 feet, we did not readjust our altitude-warning system, leaving it at 90 feet instead of being adjusted to 180 feet as required by our SOP. The missed step eliminated a crucial risk-management control, allowing an increased rate of descent to develop before we caught the unusual attitude and high rate of descent. Fortunately, we caught it when we did. With our altitude-warning system set at 90 feet, the 1,500 fpm rate of descent would have given us only four seconds to impact.

We had had an opportunity earlier when we fueled to embark a USCG controller, but after a quick discussion on the ship, we decided not to take him. If embarked on the helo, the controller could have maintained a hand-held search light on the contact, provided position reports, and dropped chem lights, which would have spread out the workload for the crew. The additional manpower would have allowed the aircrewman to maintain his position at his console, keeping FLIR and backing the pilots up on altitude. Given the opportunity again, I would have taken the controller with me.

With the adrenaline rushing and the work load continuing to increase, a few basic steps were missed, resulting in our crew breaking our hard deck. I always brief my crew to aviate, navigate, and communicate — in that order. We lost sight of our priorities and nearly lost the aircraft and our lives. That simple process was broken in the heat of the mission. Those who stick to the basics will have the highest success rate and return home safely.

LT MORANA FLIES WITH HSL-49.

CONTACTS
Naval Aviation Schools Command
Crew Resource Management
181 Chambers Ave., Suite C
Pensacola FL 32508-5221
(850) 452-2088/5567 (DSN 922) • Fax (850)452-2639
https://www.netc.navy.mil/nascweb/crm/crm.htm

LT Kirsten Carlson, Naval Safety Center
(757) 444-3520, Ext.7270 (DSN 564)
kirsten.carlson@navy.mil

Tower, We're Going To **Need a Tow**

BY LT ANDREW WING

Slowing below 60 knots, we lost directional control and began a slow drift to the right of centerline. The pilot spooled the thrust reversers to max, and the aircraft finally slowed to below 10 knots just before the right main and nose gear rolled into the grass. Fortunately, the dirt was hard and the ground crew had an easy time towing us loose. With no damage done, we took a breath and started to replay how we'd gotten there.

We had been on a two-jet, weekend cross-country trip to Las Vegas, and it was time to go home. We took off second, and everything was going smoothly as we climbed toward FL390. Passing FL310, we heard knocking from underneath the aircraft. The rattle intensified, and the pilot noticed a decrease in main hyd pressure.

The hyd gauge appeared to be in free fall, dropping with every clunk below my seat. My pilot executed nonboldface steps reflexively and secured the hydraulic-pump switch, setting it to off. This would ensure that the pump did not try to pump more fluid out of the line, should there be a leak. The knocking continued, and we watched the main hyd guage drop to zero. After it reached zero, there was silence.

The Saberhawk has independent accumulators for the auxiliary (a backup system to provide normal braking with a hydraulic pump failure), emergency brake, and thrust-reverser (TR) systems. We looked through and discussed the Hydraulic Power System Failure EP, and then the pilot discussed what we could expect to see from gear down to full stop. He recently had handled a similar situation, so we figured we had it in the bag. As the mission commander (MC) with rela-

tively few hours and no actual emergency-procedure experience in the aircraft, I was allowing myself to feel too secure.

While still in contact with the other jet, we had discussed the EP, asked them to coordinate with our destination, and discussed another anomaly of the T-39 that would come into play once we touched down. The T-39 has an aural-warning tone that goes off with weight-on-wheels when the main hyd pressure is below 2,000 psi. Think of it as a “You might lose brake pressure” alarm. We discussed silencing the horn with the jet ahead of us. A couple of different circuit breakers were recommended, neither of which is discussed in the pocket checklist (PCL) or in NATOPS.

By short final we had briefed, rehearsed, and initiated the before-landing steps of the checklist. We still felt good, but our procedures started to break down during this critical phase of flight. We delayed the activation of the auxiliary hyd system, deciding to hold it until just before touchdown to preserve pressure. Because of this unfinished step, the pilot never pumped the brakes before touchdown, as is standard after confirming the gear position, flaps and landing lights.

As we approached the ramp, all eyes were outside, and the aux switch was forgotten. After touchdown, the pilot simultaneously deployed the TRs and applied pressure to the brakes. The TRs deployed, but the brake pedals went straight to the floor. The pilot then activated the AUX system. As planned, after hearing the hydraulic warning tone on landing, I pulled the LDG Gear POS circuit breaker (CB), which silenced the horn. With the pedals on the floor, we had no brakes. We later learned that with the CB out, we had no nosewheel steering (NWS). Sensing something wrong, I pushed the CB back in, but we were eating up runway.

Theoretically, to restore the system, the pilot would have had to release the pedals, get them to return to the up position, pump them and then apply. He would likely also have had to re-activate the NWS button to gain steering. Given the panic we were all feeling, that would have been next to impossible. However, the TRs have sufficient force to slow the aircraft to a stop. Once we came to a complete stop, we noticed that the aux gauge was still pegged at max pressure. Was that a product of the pedals being on the floor, or a malfunction? There had been a brake gripe on the jet, but gripes on the T-39 are often transient and hard to duplicate.

Maintenance discovered that our original problem was a roller in the gear door that allowed it to sag into the wind stream. Sensing the open door, the hyd system activated to close it before it sagged again. This produced a shotgunning effect that bled the pressure out. There was nothing wrong with the hyd pump or lines. Our maintainers suspect that had we reactivated the pump after lowering the gear, we could have restored the full main system. However, the PCL conditions are written in such a way that aircrew must suspect a leak. There is no discussion of anything besides securing the system.

In regards to the hydraulic warning tone that captured too much of our attention, the PCL does contain a Hydraulic Failure Audible Warning On Taxi procedure directly after the Wheelbrake Failure EP. It advises aircrew to activate the aux system and stop the aircraft. I believe that the hydraulic EP should reference both of these pages. Of note, it never mentions getting cute with circuit breakers. Could a second reference have kept me honest?

The real problems started when we tried to outsmart NATOPS and prioritize comfort over procedures. Had we activated the aux system on schedule, the pressure should have been there. Had we accepted the tone during rollout, we likely would have had full steering capability. Ironically, by trying to make our landing better, we actually made it worse.

LT WING FLIES WITH VT-86.

CRM Discussion for LT Wing's Article

The T-39 presents a unique CRM challenge. The students tend to excel only at practiced and briefed procedures. It's difficult to prepare them for anything nonstandard. Mission commanders enter the squadron proficient in fleet aircraft and must be reacquainted with a semi-familiar aircraft. They are responsible for the conduct of the mission but are not used to the nuances of older technology, and they lack the corporate knowledge of the contract pilots. The contract pilots are former fleet aviators who are experienced in fleet procedures but who rely on corporate knowledge to control and troubleshoot aging aircraft. For these reasons, it can be difficult to decide who has the better situational awareness (SA) required to handle a specific situation.

Because of the experience levels of the contract pilots, it is easy to defer responsibility, making them the functional leader of any given flight. The reality of the situation, however, is that the MC will be held accountable for any mishap.

The Upside

During an emergency or troubleshooting situation, the pilot is often able to mitigate any problems before they affect the conduct of flight. The MC can adjust the flight profile to "think outside the box," and keep the student's SA high enough to save the X. The student can hold on, execute the appropriate checklists on time to stay ahead of the jet, and maintain enough of a leadership role to gain experience dealing with the problem.

It doesn't always happen this way. It is often briefed that during an actual emergency situation, the student will relinquish the communication role to the mission commander, while the pilot handles the boldface and puts the jet where it needs to go.

The Downside

On occasion, especially with minor system failures, the pilot communicates with no one, or just with company aircraft over VHF. The MC lacks the institutional knowledge to contribute, and the student freezes.

Correcting CRM

NATOPS and pocket-checklist (PCL) knowledge is paramount for a good mission commander. Procedures for MCs who are inexperienced with emergencies are in place, but extra study is required. Students must be as conversant as possible, and attention to briefed emergencies is important. Assertiveness and inquiry by the student and MC should be applied whenever there is doubt about troubleshooting or the correct course of action. Also, MCs should never support a course of action that modifies PCL or NATOPS procedures. Despite what may have worked in the past, mission commanders will be judged based on apparent malfunctions and the application of codified procedures.

The Ideal

Good CRM is all about a mutually beneficial relationship. As briefed, the pilot executes the boldface, the student executes checklists, and the MC maintains overall SA and comms. With this role, overall SA really means an understanding of what needs to happen, how and when. Whenever there is a change to the plan introduced by weather, systems or EPs, the T-39 crew should pause to discuss the situation. All options should be discussed, and the best one chosen, time permitting. The student needs to be kept in the loop as much as possible to enhance training, including making standard radio calls if able.

Summary

There is nothing cosmic discussed above. The message is a reminder that assertiveness and engagement by the mission commander and student will maintain the correct balance in the cockpit. Experienced MCs have no problem with this, but a below average day can change the dynamic enough to allow a mistake. A passive, "We've got this, he's got this" attitude can have poor consequences. —LT Andrew Wing, VT-86.

A Split Second

BY LT ROSS ADAMS

I was the C-2 squadron duty officer the day before the mishap. The senior pilot scheduled to fly with me stopped by the desk around 1430 to discuss the "double shuttle" we'd be flying via Cecil field in Jacksonville, Fla. We were scheduled for a 0530 brief. He reminded me to do as much preflight planning as possible that afternoon and to get home when I got off duty (about 1600). We also discussed the importance of a good night's rest. He said we would delay our arrival until 0515 because we expected a long day.

We arrived early and briefed. As our squadron ASO, he emphasized the length of the day in the ORM part of the brief. He also reminded us how performance deteriorates after so many hours without sleep. We manned-up, launched from our base in Norfolk, Va., and headed to Florida.

I flew the first leg from the left seat. We stopped for fuel and passenger pickup at Cecil and swapped seats. The senior pilot was in the left seat for the flight to the ship so he could trap. It was a normal Case I boat day, with fleet replacement squadron (FRS) carrier quals (CQs) being conducted. We got aboard, dropped our load, quick-turned and launched back to Cecil. After landing, we shut down and had time for the crew to grab a quick lunch. We reviewed the brief, again deliberately addressing fatigue. While we all felt good, the onset of fatigue began to take hold; we were more than 10 hours into our crew day at this point.

I was in the left seat as we launched from Cecil back to the ship. This leg was a reasonably short transit, around 100 miles. We arrived on time and held overhead until we got the "charlie" from the Air Boss. We performed the break, ran our landing checklist and rolled out for my first pass. My start wasn't too bad, but I noticed that as I tried to energize the ball, it was more reactive than expected. As I then tried to chip it down, it all came off at once. I remarked that I was less precise that day than I had been recently flying the ball at the ship.

I made a couple lineup corrections during the pass and got underpowered through the burble, then overcorrected it with a stark power on correction. We flattened out late and boltered. Paddles came up on the radio and said "hook skip" as we were on the go, then came up a little later to tell me, "That bolter counts." He apparently thought we were one of the CQ CODs. Boss directed us to take it to four miles, so we turned downwind at four and set up for our next pass. I was slightly frustrated at that last pass, but immediately put it behind me. It had been my first bolter in the COD, but I figured it had to eventually happen.

I had a decent start on the next pass, but the precision of my ball-flying mimicked the first pass. This pass would read remarkably similar. As I went low in close and added power, I realized it was too much and eased back on power to correct. Not wanting to go to idle to avoid being too aggressive, I chose not to act on my momentary concern that we might bolter again. After I partially pulled back power, my pilot pulled the levers back to idle. This was a last-second move after we had crossed steel.

We touched down on centerline with some nose-right fuselage misalignment, missing the 3-wire

(the 4-wire was stripped) by just a few feet. I felt us tracking to the right and put in a full boot of left rudder to correct. Then, and I'll never forget this, I felt the left rudder push back at me. We had arrested our left to right drift, but I felt we were still right of centerline, tracking parallel to it. When I felt the left rudder coming back at me, I hesitated for just a split second, not knowing who or what the input was from. I thought the copilot was intentionally putting in right rudder. I still felt we needed left rudder, but in that moment of uncertainty, I allowed my pressure on the left pedal to decrease long enough that we no longer had the needed left rudder input. We tracked parallel to but right of centerline. We also added power to go flying again because of the bolter, which would require right rudder because of the p-factor of the propellers.

Later, I thought about why the copilot might have put in right rudder. Had we trapped, right rudder would have been needed on rollout with the power addition from idle to max. Also, if he hadn't seen that we were right of centerline, but felt the swerve left that we felt when I put in full left rudder after touchdown, he may have wanted to put in right. Whatever the case, just before we went flying again, I felt a little bump, like running over a squirrel in your car. From my peripheral vision, I had been aware of something parked near the landing area on the right side near the forward end of the ship. When I felt the bump, I thought, "Oh God, we just hit something."

As soon as we were airborne, my pilot instinct maintained level wings as we flew away. I knew something was wrong with the airplane and voiced my concern to my copilot. He was not aware that anything was wrong. I said that I didn't know, but something didn't feel right on the controls.

As I looked down and realized I was holding significant left aileron to maintain a wings-level attitude, the Hawkeye pilot on deck called, "On the go. You just hit cat 2."

My copilot initially thought he was referring to the shuttle on cat 3, but then the Hawkeye clarified, "On the go. You just hit the E-2 on cat 2." My copilot looked out the window and saw that we were missing our starboard wingtip.

I had a moment of terror as I realized this collision could have killed us and everyone aboard. The moment vanished as quickly as it arrived as I noted 130 knots accelerating and climbing off the end of the ship. We were flying, and that was the only thing that mattered. We quickly discussed with the ship about where to go and decided to divert to NAS Mayport.

We had raised the gear, but then I suggested it might be better to leave them down. We didn't know what damage was done to the inner workings of the wing. I didn't want to risk that the hydraulics were damaged or that debris from the missing section of our plane could be mangled into our gear or flaps. Our XO was on deck in a different COD, and he reported to us that we had lost our wingtip and a six-foot section of our right aileron.

We had plenty of gas for a short, dirty bingo, so we returned to our original configuration of gear down and headed for Mayport. After consulting NATOPS, our plan was best considering any unknown damage. We discussed keeping our airspeed low (but with a generous margin above what we had determined to be our minimum controllable airspeed) to minimize air pressure on fragile and possibly damaged flight-control surfaces. We already knew the plane was controllable at landing speeds because we had flown it off the deck. When at altitude, we had swapped seats so my copilot, as the plane commander, could fly the field arrestment. We conducted a controllability check per NATOPS. Another COD from the FRS (VAW-120), chased us down and gave us a visual inspection. They remained on our wing.

It was almost an hour bingo at our slow airspeed, which gave us plenty of time to prepare for our field arrestment. We went through everything in NATOPS and considered any other factors we could think of. We also reviewed our approach and landing checks multiple times. We thoroughly briefed crew resource management (CRM) during the terminal phase, including what we would do for a missed wire. My copilot trimmed the aircraft hands off, using about two-thirds of available aileron trim. He made an uneventful field arrestment at Mayport. With two good engines we taxied clear, shut down, took care of our seven passengers, and breathed a sigh of relief.

Nobody wants to be the centerpiece of a mishap, and especially a Class A. While this event will remain at the forefront of my memory, our squadron and the C-2 and E-2 communities gleaned valuable lessons. I think back to numerous CRM discussions and reflect on where I think our communication and assertiveness broke down. In my training, I've studied examples of drawn-out scenarios in the cockpit, but I contend that in this case the momentary hesitation and uncertainty regarding rudder input highlights the most critical form of assertion. As the junior pilot in the crew, I questioned my input at this critical juncture during flight. It is my belief that as long as there are two sets of controls in a cockpit, no matter what the platform, there will always be a gray area that can exist with regards to control inputs. Communication must accompany any control input and needs to be simultaneous to alleviate any confusion. The pilot at the controls should have confidence in his or her abilities.

In retrospect, things could have been a lot worse. We didn't lose anyone and no one was hurt. Damage to the aircraft was repaired. Our squadron has focused on CRM and highlighted several takeaways that became clear, both from the SIR endorsements and from the paddles community. These items are now standard in our brief and chalk talks.

The C-2 is notorious for directional-control issues and has the least amount of wingtip clearance (tied with our E-2 brethren). Paddles can only control so much. While they will preach to be on centerline, they're waving the hook point crossing the stern and can only see lineup until touchdown and possibly the first moments after touchdown on a bolter. Focus from the right seat should shift to lineup for the last brief moments before touchdown until the aircraft is either airborne or fully arrested in the wires.

I've reviewed my pass many times in my head and also in discussions with colleagues and friends. While the pass wasn't great, I've been assured it also wasn't dangerous. Our mistake was made just before touchdown and exacerbated through our inputs on deck. As carrier aviators we are trained to "fly the ball" and be as precise as we can behind the ship. However, your inputs while in close proximity to personnel and other aircraft are just as, if not more, important.

LT ADAMS FLIES WITH VRC-40.

A Rotorcraft Tale: Toll of a Tailwind

BY JACK CRESS

Loss of control (LOC) is the common element of several civil and USN/USMC rotorcraft accidents over the last few years — each involving situations where the power required to fly exceeded the engines' power available, or "oomph," to do it. There were well-trained, experienced and qualified crews at the controls in each instance — all aware of the effects of higher temps and thinner air on power margins. Entry into unsustainable flight regimes were encountered with each event ending in significant airframe damage and some loss of life.

The laws of aerodynamics are what they are, and keeping an eye on the OAT/FAT, the pressure altitude, the torque gauge, and the trusty NATOPS pocket checklist has traditionally been the key to success in coping with each scenario. Today, with multi-sensored instrumentation and performance-paged multi-function displays (MFDs), keeping the bird airborne and at full flying potential is surer and safer than ever. But, stuff does happen.

One time-honored ingredient is factored in your favor on every landing aboard ship, and in virtually every touchdown to a controlled strip on terra firma. It's a factor you know you need working for you, and one you'll consider in every maneuver you make. Yet, aside from some super-sophisticated systems, it is often an essential element only available via "eyeball" cue, and at times it'll put you behind the power curve without a clue. It may not have been the culprit in each of the cases we'll discuss, but there are clear grounds to suspect that it could have been. Got it figured yet?

Consider a civil registered, single-rotored, electronic news-gathering (ENG) chopper, down close to the surface in an urban area. They have a few places for a safe touchdown in the event of "stuff." The bird isn't heavy and the air isn't hot, but its mission has it hovering on a blustery day, in the sights (camera) of another ENG bird nearby. The camera records a low, slow and troubled transition from a hover to forward flight, apparently in an attempt to make an emergency landing. That transition winds up in another hover, in which yaw control is lost. The pilot has apparently encountered some form of loss of tail rotor effectiveness/authority (LTE/LTA). During the attempt to recover, the bird continues it wobbling ways, eventually striking a building and shredding itself. Somehow, all aboard are spared. Post-crash analysis indicates no problems with the engine, rotors or control linkages.

In another mishap involving a close kin to a USN workhorse of several decades, a civil aircraft had made several landings at high altitudes, under hot, remote conditions through the afternoon and into the early evening. As is often the case at such sites, near-vicinity metro data was hard to come by. However, the pilots had completed preflight-performance calculations, which indicated liftoff from the frequented, high helo site was within the aircraft's hover-out-of-ground-effect (HOGE) capability. With the helo pad on uneven terrain, it was clear they'd fly out of ground effect during departure — before they got much help from effective translational lift (ETL). However, with early evening temps and cooling, their earlier experience with the site, and their calculated safety margin, they expected a safe departure. Though all systems were go, it didn't work out that way. While inaccurate reporting of aircraft weight was a complicating factor, analysis by the aircraft manufacturer pinpointed another, and possibly pivotal factor.

There's at least one element potentially common to all these mishaps. During transition to forward flight, today's prop-rotor center of gravity (CG) shifts and cross-coupling challenges are not encountered by traditional rotorcraft. When the aircraft is morphing from the rotor-to-wing mode, the wing becomes the sole source of lift as the nacelles transition to the airplane configuration.

With the wind on the nose at 15 knots and gusting to 27, and groundspeed barely over (no wind) translational lift, the flow over the wing — the sum of wind and ground speed — could be near 50 knots. Not only is the wing producing several hundred to a few thousand pounds of lift at that point, but the prop-rotors' induced power (the power required to overcome induced drag) has the total power required on a slide down the "back side" of the power-required curve (Fig 1). At this point, climb capability is rising rapidly, and the challenges of CG shift and thrust-pitch cross-coupling are diminishing. However, a quick 180-degree heading change, tail to the wind, will spoil wing lift and put the rotors back below ETL. With nacelle transition underway, the nose will pitch down, as the required power rises rapidly. An uncontrolled descent quickly

Fig 1. Typical Rotorcraft Power Curve

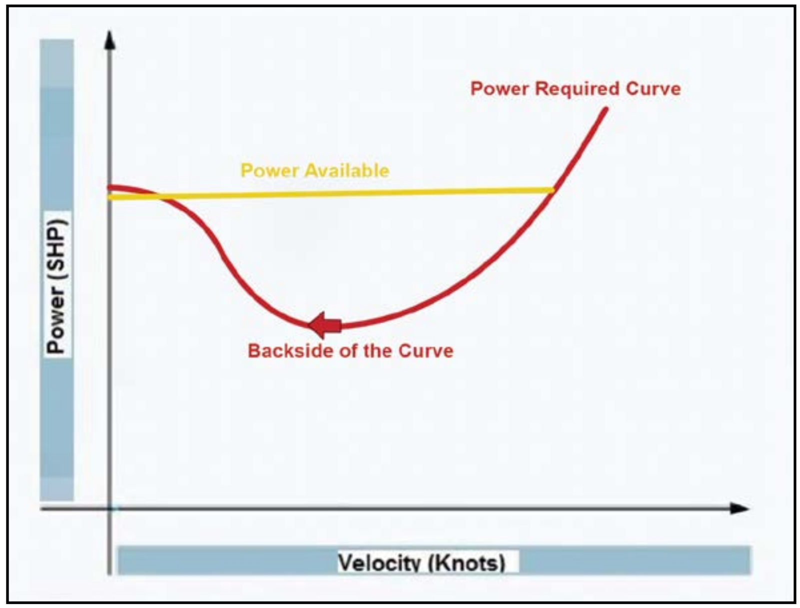
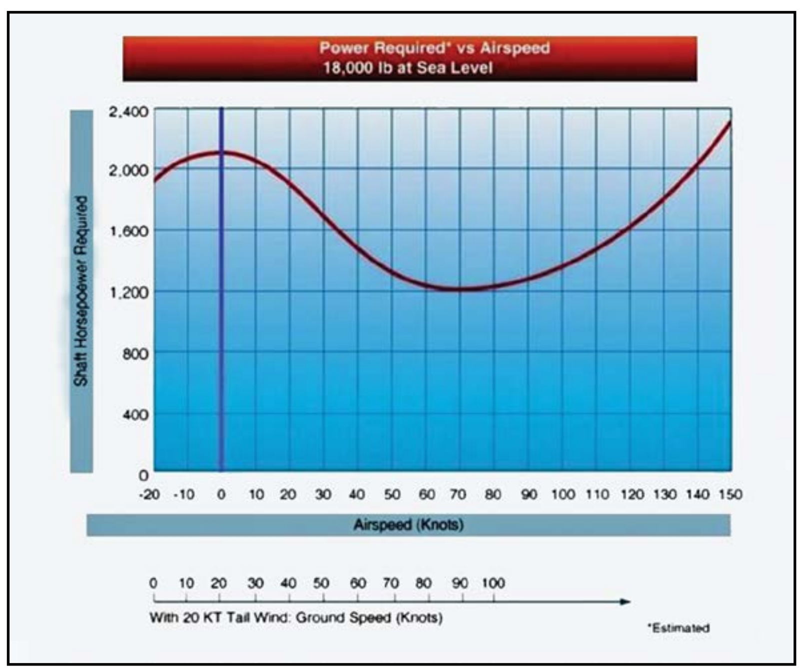


Fig 2. Tailwind Effect on Power Required Curve

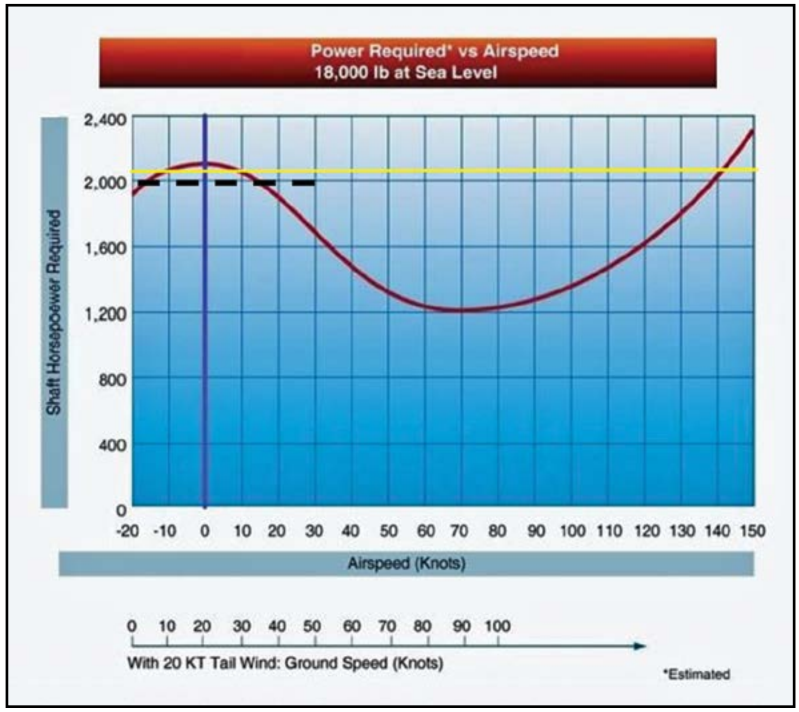


develops, and at IGE (in ground effect) levels over flat terrain, an impact is virtually assured. If not earlier, by now you know that pivotal factor — the potential common element of each of these mishaps was wind direction.

In the first instance (ENG helo), winds in the vicinity were reported at 14 gusting to 20 knots. The "footage" from the observing ENG helo camera appears to show strong gusts in the direction of flight. A helo under otherwise demanding conditions will "back up" over the high point of the power required curve (Fig 2) while attempting to slow to a "stop" over the ground, in a tailwind. If the available power was marginal to begin with, a rotor "droop," and potential LTE/LTA are likely, as the attempt is made to decelerate to zero ground speed, with tail-to-the-wind. Similarly, a successful (marginal) hover in a tailwind might very well result in the same droop-LTE/LTA as the aircraft flies "up" the power required curve (Fig 2), when accelerating "with the wind" from the downwind hover into forward (ground speed) flight.

You'll remember that the USN workhorse mishap occurred in a dry, high, remote area, with no metro nearby. While the pilots knew the OAT and the pressure altitude at the pad, their (higher-hotter) calculations were based on a no-wind condition. They had no cues by which to make a good guess at the winds, but the ground crew had tried to assist with ribbons tied in the lower branches of nearby trees, and guessing the winds on the tail were zero to six knots. The hover power-check went as previous, and the departure over treed, down-sloping terrain was to be a repetition of the earlier, warmer ones that day. The post-mishap analysis by the manufacturer determined that a five-knot tailwind would have caused a 3.4 percent overestimate of the (constant-power) thrust capability in a no-wind condition. The difference in ground-effect benefit from the point of the hover check (solidly IGE) to the point of the first tree strike (marginally IGE) was another thrust decrement (constant power) of 13.4 percent. The power required to produce hovering thrust was at least 200 horsepower higher just before the first tree impact than it was where the power check was conducted seconds before. In this example, and using Fig. 3,

Fig 3. Tailwind Effect on Power Required Curve (modified).



power required is shown by the red curve, and power available by the yellow line. Power-wise, a 13-knot tailwind feels like 12 knots on the nose (see dashed black line). But with the headwind, power required decreases with forward stick/ground speed, while it increases with forward movement, if the wind is actually on the tail. The aircraft "sees" excess power (climb) with forward stick/groundspeed, but with the tailwind there is a power deficit (descent) with forward stick/forward movement. What are the implications during a marginal-power approach to a hover with a tailwind?

There is more to be known about each of these accounts, but in each case the point should be clear: If you haven't found yourself launching or landing in the unknown outback, with a limit-pushing load, you likely will someday. If so, take a good look at the lay of the land, and consider that the air may be moving. If on your nose, it's a "breeze," but on your tail, there will be a toll.

MR CRESS IS A PHORMER PHROG PHLYER.

BRAVO Zulu

VT-3

LT PATRICK CADORET, a flight instructor with VT-3 at NAS Whiting Field, Fla., was on a day, contact training flight in a T-6B. While returning to Whiting Field at 4,500 feet and 240 knots, his aircraft had a sudden power loss with associated aural warning tone and red warning light.

He took control of the aircraft and turned toward nearby Navy Outlying Field Evergreen. Executing the NATOPS Precautionary Emergency Landing procedure, he began a climb to a safe glide altitude to the field. During the climb, the engine instruments momentarily returned to normal, but within seconds showed high engine temperature and decaying power. He set the power lever to idle to reduce the temperature. Unable to restore engine performance, LT Cadoret communicated his situation and intentions to the runway duty officer at Evergreen. Without usable thrust, he followed a forced-landing profile and intercepted a straight-in approach to an off-duty runway and landed.

The time from initial indication of the power loss until on deck was just over two minutes.

VT-7

LT ROBERT DENEAU, a flight instructor with VT-7 at NAS Meridian, Miss., was on a night, familiarization training flight in a T-45C. He and his student returned to NAS Meridian to find a saturated field-carrier-landing pattern. After completing their first touch-and-go, the crew made a crosswind turn to establish their jet in the traffic pattern downwind.

LT Deneau noticed the pilot in the aircraft following them had started his crosswind turn early and had effectively cut in front of him. The other aircraft was piloted by a student solo, who had evidently lost track of LT Deneau's jet in the busy, night pattern. Further compounding the problem, the air traffic controller confused the aircrafts' call signs.

LT Deneau told the solo pilot that he was turning in front of his interval. Still unable to see LT Deneau's plane, the solo pilot leveled his wings, which put the two aircraft on a collision course. LT Deneau directed the solo pilot clear and maneuvered his aircraft to prevent a mid-air collision.

VMM-266

Kraken 21 Marine aircrew from left to right: Capt David Berger, Capt Christopher Ludlum, Cpl Brian Douglas, Cpl Patrick Barrett and Cpl Wade Oglesby.

THE CREW OF KRAKEN 21, the lead aircraft of a CH-53E section, departed USS *San Antonio* (LPD 17) to conduct crew-served weapons training as they crossed the Atlantic Ocean. As the section neared the working area, Capt Dave Berger, the section lead, noticed a low oil-pressure caution light on his aircraft's main gear box (MGB). This indication could mean imminent failure of the CH-53E MGB. They were more than 20 miles from the nearest ship and thousands of miles from the nearest land.

Capt Berger took the controls and turned toward USS *San Antonio.* He directed his copilot, Capt Christopher Ludlum, to coordinate with the Dash-2 aircraft and alert the ship that they were inbound with an emergency that required an immediate landing. Capt Berger and his crew assessed the situation, noting a decrease in MGB oil pressure and an increase in temperature, as they approached the ship.

The aircrew, Corporals Patrick Barrett, Wade Oglesby and Brian Douglas, investigated and noticed oil leaking from the MGB. The crew decided to continue for a landing at the LPD, while simultaneously preparing for a ditch in case the gearbox failed before they arrived.

Once checked in with tower, they received a ready deck and landed on spot six. On shutdown, the MGB lost all pressure and smoke could be seen coming from the MGB compartment. Postflight inspection revealed inflight failure of the MGB tail-rotor takeoff seal and a loss of all MGB oil.

FIGHTING GRIFFINS
VMM 266

USCG Air Station Barbers Point

AMT2 Will Werner, a flight mechanic with USCG Air Station Barbers Point, was conducting maintenance ground runs on an H-65. He had completed a series of maintenance checks and was almost done with the job. During engine shutdown, he noticed smoke and flames coming from the main-gearbox cowling. He notified the pilot who quickly shut down all systems.

Knowing that there isn't an installed firefighting capability in the main-gearbox area, AMT2 Werner retrieved the portable fire extinguisher from the aircraft's cabin. He went to the cowling area and discharged the extinguisher directly onto the fire. His immediate action prevented further damage to the airframe.

Mishap-Free Milestones

HSC-2	65,000 hours	11.5 years
VP-9	200,000 hours	35 years
HMLAT-303	231,700 hours	31 years, 8 months
VR-64	25,000 hours	9.5 years

Canyon in the Sky

BY GARY M. WATTS

My Navy "Wings of Gold" finally looked like they were in the bag — a sure thing. Only a major accident or a significant brain dump on my part would prevent me from being awarded the cherished symbol of naval aviation.

That's the way it looked to me in the spring of 1968, in Kingsville, Texas. I had completed advanced carrier qualification and the instrument-training syllabus, so I was fully qualified for instrument flight. All that was left before I was finished with the Naval Aviation Schools Command was a couple of low-level navigation hops and several introductory tactics flights.

That morning in the VT-23 briefing room, three of us met and briefed for the basic tactics flight. The purpose of the flight was to introduce one-on-one maneuvering. Neither the instructor, who was a former attack pilot, nor we two students knew anything about dogfighting. Themaneuvers outlined in the syllabus were a mystery to all three of us. The true purpose of the flight, I suspect, was to evaluate our natural ability to fly fighters in the air-combat-maneuvering (ACM) arena. Basically, the instructor would be the referee and the two students would be like two kids thrown into a boxing ring and told to "have at it."

The instructor for this educational event was a commander, the executive officer of the squadron. The other student was Ltjg. Garry "Wags" Weigand.

Wags and I had entered the Navy and Aviation Officer Candidate School (AOCS) at Pensacola, Fla., within one week of each other. After AOCS, we were commissioned ensigns and had enough testosterone between us to fuel the Oakland Raiders for a season. Wags and I have had a long, close friendship, but we were also very competitive about who was the best fighter pilot.

Back to my story. The instructor finished the brief and the three of us suited up, signed for our aircraft, and headed toward the line of Cougars on the ramp.

We marshaled together near the end of the runway, checked in on tactical frequency, then switched to the tower for takeoff. Because there were a lot of clouds in the area, and we would be in and out of IFR conditions on departure, we took a one-minute takeoff interval with plans to rendezvous when we found a clear area.

I was No. 3 to roll. The other two planes in the flight had disappeared into the clouds by the time I added power for takeoff. I stayed glued to the instruments until I popped out of the clouds.

"Oh, my God!" I exclaimed.

I was astounded by what I saw. It was like being inside a huge canyon; the clouds formed vertical walls, rising into space. The canyon walls glowed with an eerie luminescence. I spotted Garry's plane, a mere speck, about five miles ahead. I felt like we were two flies buzzing around inside the Superdome.

We eventually joined up and flew the entire hop inside the cathedral-like walls of clouds; it was an out-of-body experience. I remember kicking Garry's butt in the one-on-one engagements, but he'd probably disagree. The results of the dogfights have been eclipsed in my memory by the surreal beauty of the "canyon in the sky."

When we reached bingo fuel state, we knocked off our engagement, joined up and headed back to NAS Kingsville. I was busy flying tight formation in the No. 3 position as we skimmed along the tops of a low cloud layer; I wasn't really aware of where we were. Suddenly, the XO gave us the kiss-off signal, broke left and disappeared into the clouds.

What the hell?

Looking down, all I saw were clouds.

Wags looked at me, shrugged, blew me a kiss and broke hard left, disappearing immediately into the cloud deck.

I looked down again — nothing but clouds. I looked at my fuel gauge and saw 500 pounds. Holy crap! I had just been hung out to dry!

I looked back down at the cloud layer I was skimming over. Nope. I wasn't going down into that goo to find a runway. I hoped I'd find it before I flamed out in about 15 minutes, maybe.

I popped up to a more comfortable altitude, slowed down and switched the radio over to approach-control frequency. I told approach I was at minimum fuel and requested immediate vectors to a GCA approach. I was hoping they wouldn't think that I was some idiot student who got lost and waited till he was out of gas to admit it.

Approach came through like a superhero in tights, cleared out the pattern, and had me on the runway with a couple hundred pounds of fuel to spare.

Our debrief was something else. The XO didn't even mention our one-on-one engagements — the entire reason for the flight. He also never said a word about why he left us on our own, with low fuel, under VFR rules in IFR conditions, or how he was able to land after dropping us off.

He did criticize Garry for landing after flying the VFR pattern below a very low ceiling, without the tower ever seeing him or clearing him to land. He criticized my "random radar" GCA saying that I was "a little rough on the glide-slope control."

We were just happy to be alive and glad that we didn't get downs for the flight. If Garry and I had known then what we know now, we'd have gone to the squadron CO with the story and asked for a pilot disposition board for the instructor. But, what did we know? We were just lowly students. Why would proven warriors, salty naval aviators listen to us? Perhaps experienced aviators routinely did that sort of thing. Whose story would they believe? I've always wondered why I was never questioned about asking for low-fuel priority, or why Wags was never ques-

VT-23 AF-9J "Cougar"

“Graduation” hop pilots: Standing: Unidentified instructor. Kneeling: Lt(jg)s Garry Weigand, John Bodanski, Jim Stillinger, Gary Watts.

tioned about landing without a clearance. Garry explains the reason he didn’t get landing clearance was because he was so low he didn’t want to look down to switch to tower frequency. Apparently, the XO had left us on tactical frequency while leading us into the break.

Since then, just about every time Wags and I get together, over cocktails or beer, or to play golf, we’ll remember that awesome canyon in the sky and the instructor that almost got us killed.

After discussing this incident many times over the aforementioned beverages, and under the policy of in vino veritas, the most likely motivation we could come up with for the instructor’s actions that day in Kingsville was pure cowardice. We deduced that he’d navigated to the field using TACAN, while looking through breaks in the overcast. The field had been marginal VFR when our flight departed, and there had been variable, medium-to-heavy cloud cover over the surrounding area. We surmised that the visibility and ceiling had lowered rapidly while we were returning to base, and as we entered the break the field had gone IFR. But, the tower hadn’t officially, for some reason, changed the status of the field.

The XO, we think, saw the runway through a small break in the overcast and had to make an instantaneous decision. He had two choices. First, continue VFR into the break, hope he can land before he has to declare a low-fuel emergency, and leave his two students to their own fates. Second, take charge, declare an emergency and get his flight to approach control as soon as possible.

He chose the former, sacrificing his students on the altar of his own survival.

One positive outcome of this adventure is that it made better instructors and flight leaders out of Wags and me. We always tried to be more aware of and more considerate of our students and wingmen. Another positive for us is that it caused us to develop a continuous awareness of our fuel state during a dogfight.

In any case, the experience gives weight to a quote from Nietzsche in “The Twilight of the Idols:” “Out of life’s school of war: What does not destroy me, makes me stronger.”

MR WATTS IS A RETIRED NAVAL AVIATOR.

AEROMEDICAL

Wristwatch to the Rescue

BY LT MATT CURRID

It was another standard day for our C-2A detachment, which meant a three-hour flight from Bahrain to USS *John C. Stennis* (CVN 74) using the same route and same time. We had the standard load of military personnel and high-priority parts for the carrier strike group.

We climbed out of Bahrain International airport on an IFR clearance to 11,000 feet and awaited further clearance to FL210. We executed the Climb/Cruise checklist, which includes a visual check of the cabin-altitude gauge to ensure the cabin is pressurizing. The C-2A begins to pressurize at 4,000 feet. The cabin is maintained at 4,000 feet until about 22,000 feet. Above that altitude a pressure differential of 6.5 psi is maintained. Maintaining pressurization for this aging aircraft is often a challenge, but our maintenance team has done a good job keeping the system working throughout our deployment. We expected a 4,000-foot cabin altitude all day.

We leveled off at 11,000 feet and began our daily transit. After about 10 minutes, we climbed to our requested final altitude of FL210. We took note of the cabin altitude, which indicated 4,000 feet. The crew chief completed his walk-around check that included a visual inspection of the cabin, ramp seals, outflow valves that maintain the pressurization schedule, various electrical equipment and the hydraulic reservoirs. All systems were normal.

We had been at FL210 for 30 minutes when I noticed the pilot's apparent inability to maintain altitude.

The Greyhound has hydraulically-actuated flight controls that require constant pilot input to maintain flight parameters. It has an autopilot that is rarely used because it's unreliable and hard to maintain. As pilots, we had become accustomed to flying without it, and as a result, we've excelled at trimming the aircraft and allowing it to "fly itself" at altitude. Our pilot at the controls, a senior aircraft commander, was no exception to this rule. Much like the flight plan and pressurization schedule, I had come to expect no deviation from the norm.

We had been at FL210 for 30 minutes when I noticed the pilot's apparent inability to maintain altitude. The aircraft was oscillating and deviating from altitude as much as +/-100 feet. I looked over at him and began to poke a little fun. I asked if there was something wrong with him and pointed out that his airwork was awful. I remember laughing about it, and his response was noticeably confused. I could see he was putting considerably more effort into flying the aircraft than normal.

About the same time, the crew chief mentioned that he felt a little dizzy. I immediately looked at the cabin-pressure gauge and noted that it still read 4,000 feet. I looked for any indications of smoke or fumes that might be causing his impairment.

The pilot looked at me and exclaimed, "Matt, I think I'm hypoxic."

OUR CREW CHIEF IMMEDIATELY looked at his wristwatch, equipped with a barometric altimeter, and saw that it indicated over 18,000 feet. He passed this information to us. We reached for our oxygen masks and put them against our faces. It wasn't until I began to intake 100 percent oxygen that I realized the extent of my hypoxia. What seemed like good vision just seconds ago was obviously a near grayed-out condition. With my oxygen mask on, I took the controls from the pilot so he could don his mask. After instructing the crew chief and second crewman to get on the walk-around bottles (a portable O2 bottle in the cabin for emergency use), I dropped the passenger oxygen masks and made the announcement for our passengers to use them.

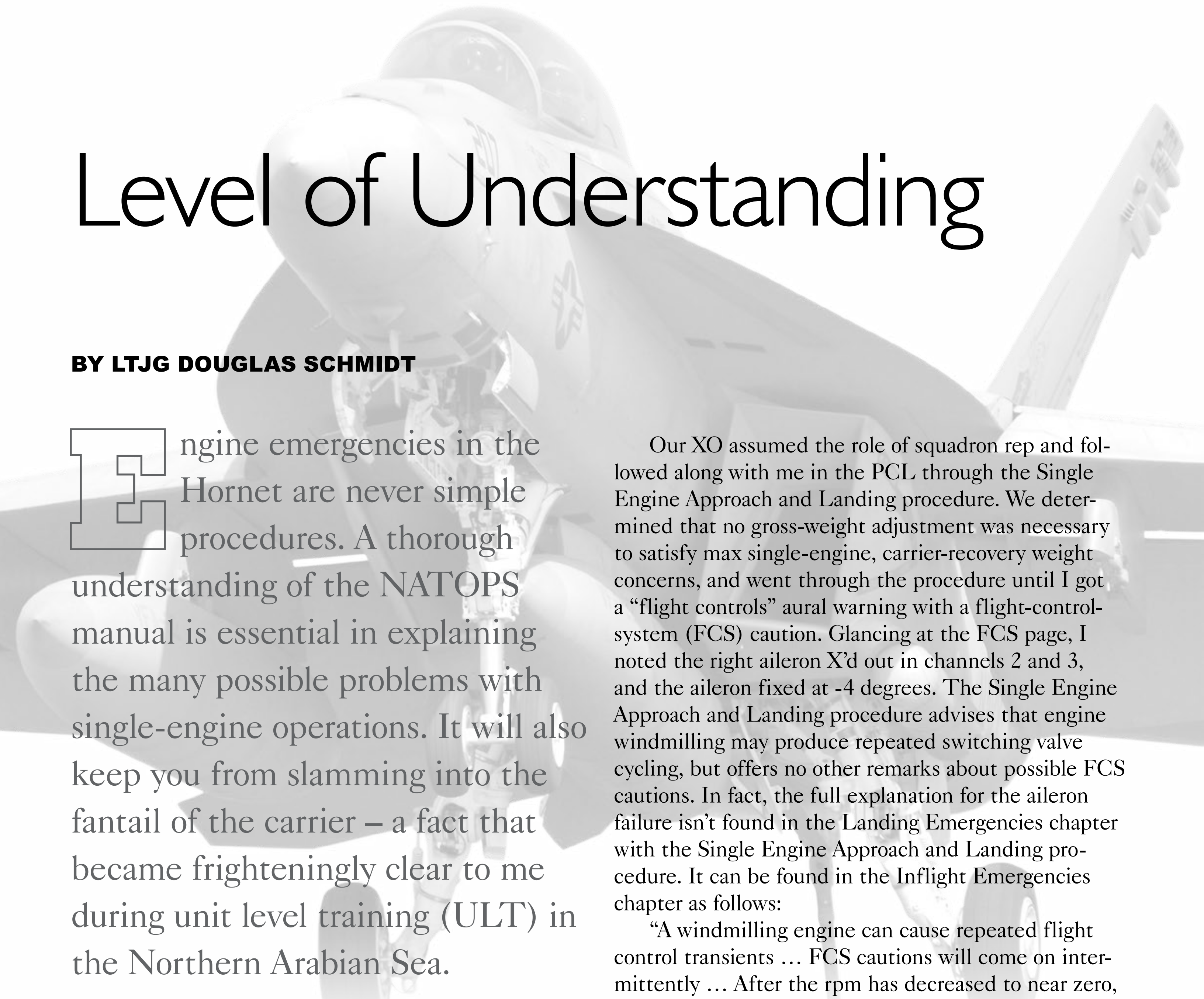
Using our NATOPS pocket checklists, we completed the depressurization emergency procedure that essentially instructs the pilot to apply oxygen and descend to below 10,000 feet.

Airborne troubleshooting revealed a stuck cabin-altitude gauge and a partially stuck open outflow valve. These factors prevented the aircraft from maintaining the prescribed pressurization schedule. After getting the outflow valve to close enough to maintain a cabin altitude less than 10,000 feet, the flight was completed by transiting at 15,000 feet. Once aboard the carrier, our maintainers fixed the problem, and we safely returned to Bahrain.

We all go through training in the hypobaric chamber. We are exposed to the effects of hypoxia so we can recognize the symptoms and effects. In a controlled environment, the stage is set, and we are expecting to be deprived of oxygen. We are hyperaware of the affects and the surroundings. However, during our flight, we were not expecting to be deprived of oxygen. We had no unusual indications of our cabin altitude and no reason to suspect anything different.

In the plane, unlike the chamber, you don't get games to play or someone on the speaker telling you to observe your physiological changes. You aren't staring at your nail beds for color or pinching your skin for elasticity. Instead, you sit still and concentrate on completing your mission. The only indication of hypoxia may be an exaggerated laugh and a look of confusion. Had we been on autopilot, it would've taken us even longer to realize what was happening. These events have proven catastrophic in the past, and it was a lesson for our crew that it can happen to anyone.

LT CURRID FLIES WITH VRC-30.



Level of Understanding

BY LTJG DOUGLAS SCHMIDT

Engine emergencies in the Hornet are never simple procedures. A thorough understanding of the NATOPS manual is essential in explaining the many possible problems with single-engine operations. It will also keep you from slamming into the fantail of the carrier – a fact that became frighteningly clear to me during unit level training (ULT) in the Northern Arabian Sea.

I was scheduled for my seventh sortie with VFA-97. I had arrived on the boat eight days earlier on a COD to check in to the squadron. The sortie was a strike-fighter weapons and tactics (SFWT) Level II Red Air event.

The event proceeded uneventfully until the final Red Air presentation. While kill-removing myself from the presentation, I got an "engine left" aural warning with an L OIL PR caution. After following the boldface and retarding the left engine to idle, I observed my left engine oil pressure at zero psi. After consulting the pocket checklist (PCL), and with the caution remaining after 15 seconds, I shut down the left motor. With no other indications of engine trouble, I terminated myself from the event and began my RTB, informing strike of my situation.

Our XO assumed the role of squadron rep and followed along with me in the PCL through the Single Engine Approach and Landing procedure. We determined that no gross-weight adjustment was necessary to satisfy max single-engine, carrier-recovery weight concerns, and went through the procedure until I got a "flight controls" aural warning with a flight-control-system (FCS) caution. Glancing at the FCS page, I noted the right aileron X'd out in channels 2 and 3, and the aileron fixed at -4 degrees. The Single Engine Approach and Landing procedure advises that engine windmilling may produce repeated switching valve cycling, but offers no other remarks about possible FCS cautions. In fact, the full explanation for the aileron failure isn't found in the Landing Emergencies chapter with the Single Engine Approach and Landing procedure. It can be found in the Inflight Emergencies chapter as follows:

"A windmilling engine can cause repeated flight control transients … FCS cautions will come on intermittently … After the rpm has decreased to near zero, the transients will cease, the FCS cautions will go off, and FCS operation will be normal. To prevent repeated switching valve cycling, avoid stabilized flight where engine windmilling rpm produces hydraulic pressure fluctuations between 800 to 1,600 psi."

Observing the HYD 1 pressure stable at zero psi, I performed an FCS reset and the aileron resumed normal operation. After analyzing postflight maintenance data, it was discovered that the aileron Xs appeared in conjunction with a BLIN 66 (Aileron Switching Valve or Wingfold Swivel Valve Failure) in channels 2 and 3. Although a postflight analysis explains what most likely caused the aileron failure, such a clear explanation airborne would not have been possible

without an extensive understanding of NATOPS. The greatest learning point, however, was yet to come.

Executing a half-flap, straight-in approach, I flew the jet to an on-and-on start. Having decided earlier that adjusting gross weight for landing was not necessary, I called the ball with a fuel state that corresponded to just over 30,000-pounds gross weight. When the aircraft began to settle slightly in-the-middle, I anticipated a full settle and set mil power. Paddles gave the first of three "power" calls, with increasing voice inflection. I watched as the ball increasingly sank below the datums. Being initially fearful of the asymmetric thrust caused by setting full afterburner, I slowly realized that the back of the boat was rapidly becoming a much greater hazard.

Before I could reactively set full afterburner, the aircraft caught the No. 2 wire. If I had reacted any more slowly to the settle, mil power might have been insufficient to keep the hook point above the ramp. A quick reference to the Recommended Maximum Single Engine Recovery Weight figure in NATOPS indicates that the max recommended weight for my approach, given the temperature that day, was exactly 30,000 pounds. Although this weight should ensure no more than 50-foot altitude loss with a mil power, single-engine waveoff from on-speed/on-glideslope, it assumes a proper rate of descent while on-glideslope.

Alarmingly, with my momentary delay in recognizing the increasing rate of decent in-the-middle, setting mil power for the final four seconds of my approach was only sufficient to stabilize the aircraft below glideslope. While NATOPS states that a max-power waveoff will minimize altitude loss, the "technique is not recommended due to increased pilot workload attendant with higher asymmetric thrust."

The lessons learned includes the explanation for the aileron failure and the importance of abiding by recommended maximum single-engine-recovery weights. The most important lesson, however, comes from the level of understanding required to explain what was happening and why. This experience demonstrates why it is invaluable to read emergency procedures in-depth to gain a greater understanding of what could happen before it happens.

LTJG SCHMIDT FLIES WITH VFA-97.

I always brief my crew to aviate, navigate, and communicate — in that order. We lost sight of our priorities and nearly lost the aircraft and our lives. That simple process was broken in the heat of the mission. Those who stick to the basics will have the highest success rate and return home safely.

— LT Anthony Morana, HSL-49