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THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

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Approach

The True Meaning of PROFICIENCY

The Navy & Marine Corps Aviation Safety Magazine

July-August 2012 Volume 57, No.4

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

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Photo by Staff Sgt. Joshua Strang, USAF.

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The Least Dangerous

BY LT. DAVE NEW

When you hear a story about someone's most frightening moment in an aircraft, it usually begins with a tale of the darkest night you ever saw, or some harrowing situation the crew was placed in due to operational demands. It's almost always something dramatic and daring. In my case, it came during one of the most common evolutions you could imagine. In fact, during our crew brief, we considered this the least dangerous part of the flight.

We briefed for a TacForm event to help prepare the copilot, who was a pilot qualified in model (PQM) going on H2P, for his upcoming Helicopter Advanced Readiness Program (HARP) school. After running through all of our maneuvers and getting plenty of practice, we dissolved our flight and went our separate ways. We thought the hard part was over. We completed an area familiarization before heading home to practice pattern work. My PQM's NATOPS check was planned for the following week, and he needed warm-up maneuvers.

The pattern work started as it almost always does, a little bit rusty on the steep approaches and max-gross-weight takeoffs, all the things that normally concern a pilot approaching a checkride. I took the controls to give myself a lap in the pattern and practice a boost-off

approach. I gave my standard brief that I always give before doing any boost off. We discussed the profile of the approach and landing. I made a point to specify that if we got hung-up or unstable in the descent-to-a-landing, we would come back to a 20-foot hover and stabilize. I also briefed that upon landing, the pilot not at the controls would make sure the collective was placed full down. I even pointed out that boost off is something we tend to have more difficulty with because of a lack of practice.

I took my lap in the pattern and then turned it over to my copilot. After admitting it had been awhile since he had landed boost off, he decided to practice. He took the helicopter around the pattern, and our approach to a hover went smoothly. Winds were calm, so we remained on runway heading. Once stabilized, he smoothly began a descent. The aircraft got slightly hung up just below 10 feet, not an uncommon phenomenon. I quickly recognized the situation. He did just as we briefed and returned to a stabilized 20-foot hover while acknowledging the problem.

The second attempt also began smoothly until touchdown. As the wheels made contact with the deck, the helicopter pitched nose-up. Rather than having my hand ready to push the collective full down as I had briefed, it was hovering over the collective. I waited for him to completely touch down before I added my input. As a result, I was not prepared for what happened next. Instead of continuing down to the deck as I expected, he inputted a large collective movement and rocked the aircraft forward. This action induced an extreme nose-down situation very close to the ground.

I immediately took the controls and returned to a 20-foot hover. I restored hydraulic boost to the aircraft and landed as gently as possible. I set the parking brake while our aircrewman inspected the helicopter.

The radar antenna sits directly underneath the cockpit and is easily damaged during a hard landing. To my surprise, the radar antenna was fine; however, we had struck the forward ESM antennas, which sit more than a foot higher than the radar antenna. We returned to our flightline, where we discovered our damaged Datalink antenna.

While it may not have been my initial thought, we were actually fortunate. A drastic pitch at such a low altitude could have been catastrophic, much more than one bent antenna and a few superficial scratches. The damage was well below the mishap threshold, so we walked away with nothing worse than some wounded pride and a few lessons learned the hard way.

OUR FIRST MISTAKE had been in our brief prior to the boost-off approach. I mentioned returning to a 20-foot hover should the descent to a landing not be smooth. I never emphasized the importance of ensuring smooth inputs when close to the ground, or continuing through the landing if the wheels were on deck and the movement was not excessive. Be thorough when briefing a maneuver. In our case, we failed to address the safety concerns of boost off once the wheels are on deck or in a poor landing.

The second and most important mistake was something we all are guilty of sooner or later: complacency. We discuss complacency in almost every brief. We put up posters around our squadron about just how dangerous it is. I know I used to look at those posters and think that complacency wasn't an issue for me. I briefed our maneuvers before I did them, and I guarded the controls during critical phases of flight.

Had my defensive posturing been more aggressive, I could have made sure the collective went full down as we had briefed. This failure was the hardest lesson to swallow from this flight. It wasn't the mission, the weather or the aircraft. The field was well lit, the winds were calm, there was no one pushing us to get the mission done. Just us, with all the time we needed, practicing one of the most common emergency-procedure evolutions you could imagine.

Lt. New flies with HSL-51.

The True Meaning of Proficiency

BY LCDR. PAT SMITH

I had been on an extended break from the Navy reserves to train with a new airline. When I got back to Navy flying, I flew two long, round-trip C-130T missions to Hawaii in three months, but I had not participated in a pilot-training event in more than seven months. My first pilot trainer in a long time was a basic event where we would do engine-out landings and takeoffs.

All I thought was, "How hard could this be? I've been flying the C-130 for four years. It's like riding a bike. No big deal."

After more than 13 years of flying in the multi-engine community, little that happens on pilot trainers surprises me, but I never let down my guard. We warmed up with landing-pattern work and got ready for the engine-out takeoffs and landings.

As the other pilot pulled back the No. 4 engine, I put in the control inputs and maintained centerline. We started to evaluate what happened to the engine. I directed them to shut it down (simulated) and

complete the immediate-action items. However, as we continued straight ahead, the plane wouldn't climb. Did you ever have that moment in a T-34 in primary flight training? Yep! I forgot to raise the gear and the flaps. When this situation happened 13 years ago, I vowed to always recognize why a perfectly good airplane stopped climbing on a VFR day. Not this time though. The other pilot asked me if I wanted to bring up the gear.

Proficiency

What does it mean to you? Our annual flight-time requirement as naval aviators is 100 hours as per OPNAV 3710. As I've come to realize, though, 100 hours can be obtained several different ways: 100 hours from 50 sorties is a lot different than 100 hours from 10 sorties. In the C-130 community, the majority of our flights are cross-country or extended overwater missions. I can get my annual minimums with just 10 takeoffs and landings. But, am I truly proficient with my emergency procedures and flying the plane in unusual configurations? If I'm flying straight and level for hours at a time, my answer is "no."

Repetitions

We've all played sports. Perhaps we have even coached. One principle of sports is you must practice with copious amounts of repetitions to truly master a skill. If you want a good jump shot, you must take the shot hundreds of times to improve muscle memory. Is flying any different? Absolutely not. With budgetary cuts, part-time civilian flying, and all the other pressures of life, our reps can decrease. When reps decrease, proficiency decreases. I asked myself what I would have done if the emergency situation I discussed earlier had actually occurred when I felt, "less than proficient." Would I have handled it properly? Would I have remembered the gear and flaps because that time it was for real? Tough to say. If I had done a pilot trainer in the past month, then yes, I'm confident I would have remembered.

We all have our own ways of remaining proficient: chair flying, juggling and saying EPs, pilot trainers and simulators. Are you going over in your mind what can happen right after liftoff in the most critical phases of flight? Reaction time is minimal. If you've been out of flying too long, chances are you might forget what can happen right after takeoff. Other important aspects of handling emergencies can also become foggy.

There is no substitute for the real thing. Whether it's a training flight or a simulator, it's important that we recognize when proficiency is slipping and be assertive about ways to combat complacency. Chair flying is good, but simulating and flying is better. With budgetary cuts and skyrocketing fuel costs, it may be necessary to get in the simulator because flight trainers just aren't an option. There's no shame in requesting a trip to the box after an extended absence. Take advantage of the assets we have to train for the unthinkable. You never know when you may need that muscle memory to be as sharp as ever.

LCdr. Smith flies with VR-55.

A Collective Error

BY LCDR. MATTHEW VENTIMIGLIA

Although we had been flying in Operation Enduring Freedom (OEF) for only a few weeks on this deployment, the air wing had been here less than a year earlier. So for many, Groundhog Day quickly set in.

We were scheduled for a trap-cat-trap (TCT). Until our approach, everything went as briefed. The pilot was a carrier aircraft plane commander (CAPC) qualified senior JO; I was the copilot and assigned CAPC for the flight; the combat information center officer (CICO) and assigned mission commander was a senior JO; the air control officer (ACO) was newly qualified and our junior NFO; and the radar operator (RO) was a lieutenant commander, also mission-commander qualified.

Descending through 5,000 feet on our night, Case III CV approach, I reset the radalt to 1,000 feet. While passing 1,600 feet for 1,200 feet, at about eight DME on radar vectors, approach control requested an update on our fuel state. I looked at my radio select panel to make sure that I would transmit on the correct radio, peered at the fuel gauges and responded to approach.

As I unkeyed the radio, the pilot cried, "Oh sh*!"

I felt the pilot aggressively pull up. I immediately checked the altimeter as it went through 800 feet, bottoming out at about 700 feet. We quickly climbed to 1,200 feet. When the pilot caught the deviation, our VSI was about 2,000 fpm down, and our radalt annunciator was flashing in the pilot and copilot primary flight display (PFD) (the current software does not have an associated tone). Although our CIC crew had situational awareness (SA) to our altitude deviation, they hadn't yet said anything to the cockpit.

Besides the paramount concern of being 15 seconds from controlled flight into terrain (CFIT), the most disconcerting issue for me was that I had proven to myself, once again, that my weakest moments in an airplane are with other aircraft commanders, not junior pilots. I did not keep my priorities of aviate, navigate and communicate in order. When the pilot's scan broke down, I was not there to back him up. I put all five of us at undue risk. I had failed in the basic job of aircraft commander.

The RO first noticed our altitude deviation, but his initial ICS call did not reach the cockpit. He did not have us selected to receive ICS. As soon as the vertical speed indicator (VSI) was arrested, the CIC crew called to see if we were OK. We took a step back after realizing the severity of our collective error, recaged our crew-resource-management (CRM) contracts, and completed the TCT.

Although backup techniques may vary depending on whom you fly with, the same level of backup should be provided each flight, side-to-side and front-to-back. There is no substitute for a strong instrument scan. Although our squadron has been flying glass cockpit for almost a year, with the PFD dimmed, it does not provide the same peripheral scan cues as steam gauges.

I'd had less sleep than normal the night before, but thought I would be OK; I'd be in the right seat with another CAPC in the left. Obviously, I wasn't OK. Even if not at the controls, never lose sight of aviate, navigate and communicate. Concerning the RO's first ICS call not reaching the cockpit, CIC safety-of-flight back-up is the top priority. Eliminate internal communication delays during critical phases of flight. These takeaways are obvious, and they all came together to put our aircrew in a hazardous situation.

LCdr. Ventimiglia flies with the Sun Kings of VAW-116.

Author's note: The E-2C community is in the process of installing an upgraded radalt that includes a tone.

NAMI:

AN AVIATOR TO FLIGHT SURGEON PERSPECTIVE

BY LCDR. CHARLES JOHNSON, MC(FS)

I began my Navy career as an aviator in 1997 and earned my wings in 1999. As an aviator, I've gained a keen awareness of how most aviators feel about the Naval Aerospace Medical Institute (NAMI). Getting past NAMI is one of the biggest hurdles to jump before realizing their dream of becoming a naval aviator.

After 10 years in aviation, I had the opportunity to return to school to complete a medical degree. Transitioning from a naval aviator to a naval flight surgeon has been an eye-opening experience. It has changed the way I view the goals and importance of NAMI.

NAMI was established in 1965 to train medical professionals as aviation-medicine providers and to conduct aerospace research. In 1970, the Naval Aerospace Medical Research Laboratory (NAMRL) took oversight of the research component of military medicine. This allowed NAMI experts to focus on training, with the added responsibility of providing medical clearances for aviation candidates. All aviation personnel must pass through the halls of NAMI in Pensacola, Fla., to receive medical clearance to fly.

As an aviation candidate, I viewed flight surgeons as malicious, ruthless, and unsympathetic physicians whose sole purpose was to medically disqualify (or "down") an otherwise healthy aviation applicant. My medical screening began as I nervously sat in an auditorium surrounded by dozens of other aviation candidates. The NAMI clearance process was a traumatic, agonizing, multi-day event that I remember as if it were yesterday. All I wanted to do was fly, and I was terrified that NAMI physicians would find some loophole to disqualify me from the program.

As I look back, I recollect several startling moments during this phase of my aviation career. On the second day of processing, we candidates were handed our medical records. The documents were in official government folders with individualized notes stuck to the front of each record. My folder had "HIV" written on it in large, bold, black letters. I felt like my stomach was in my throat. I immediately thought this meant that the numerous tubes of blood they extracted from my arm had tested positive for HIV. I would be disqualified, processed out of the aviation program and the Navy, and die shortly thereafter. I was terrified — but I was also an ensign who was too humble to clarify my suspicions. To my relief, it turned out they wrote HIV on several folders to alert the medical staff that certain

candidates still needed an HIV lab test to complete medical processing.

A second upsetting experience occurred during the ophthalmology clearance process. Candidates were being disqualified for excessive near- and far-sightedness, and for defective depth perception or color vision. They also checked for vision-improvement procedures, such as LASIK eye surgery and photorefractive keratectomy (PRK). Aviators were not eligible to receive PRK or LASIK waivers back then. These surgeries meant you were packing your bags to go home or transferred to another job designator. I remember one candidate had to be physically removed from the ophthalmology department because he became so irate about being disqualified for his history of PRK. I later learned that he knew PRK was disqualifying, so he chose not to disclose this information in his original application. He had hoped the ophthalmologist would not notice.

Virtually every Navy and Marine Corps aviator has heard of the infamous slang term, "NAMI whammy." An aviation candidate is considered to have been hit with the NAMI whammy when their medical qualification is either delayed by what they view as medical bureaucracy, or by being deemed "not physically qualified," known as NPQ, without the possibility of a waiver. In my quest to become a naval aviator, I started the NAMI processing system with a large group of candidates and ended with a select few. Candidates slowly disappeared one by one, being disqualified in the selection process. That is what the NAMI whammy meant to me: hard-working folks just disappearing for reasons unknownto me, never to be seen or heard of again.

I NOW FULLY UNDERSTAND THE REASONS, and I've come to appreciate that NAMI performs a vital role in naval aviation. I believe that the aviator's perception of the NAMI process is in stark contrast to reality.

NAMI employs experts from many aviation medicine backgrounds to perform comprehensive medical clearances for all aviation candidates. NAMI trains aeromedical personnel for operational assignments. NAMI is the entity charged with training all Navy flight surgeons, aerospace residency-trained physicians, aerospace physiologists, aviation experimental psychologists, aviation optometrists and aerospace medicine technicians. Our Navy has the most intensive, rigorous six-month educational flight-surgeon-training course in the world. It's internationally recognized curriculum provides training for flight surgeons from Brazil, Canada, Finland, Germany, Italy, Netherlands and Norway.

An aviation medical clearance is a standard of criteria that makes sure aircrew are medically safe for flight training and aviation careers. Aerospace experts in multiple disciplines such as flight surgery, neurology, mental health, ear/nose/throat (ENT), and ophthalmology/optometry, along with their support personnel, both qualify and disqualify flight candidates. Some people have conditions that are deemed too high-risk to allow them to work in certain aviation professions. Fortunately, some conditions can be waived, and these candidates are allowed to continue in the program.

Ophthalmology provides a great example of how candidates can benefit from waivers. While the eye exam is one of the most dreaded portions of the NAMI physical-qualification process, it is also one of the most revolutionary areas of aerospace medicine. In 2000, the Navy's ophthalmology experts played an instrumental role in getting authorization to grant a PRK waiver. Over the past several years, this waiver paved the way for the development and authorization of a LASIK waiver. Because PRK and LASIK can improve a person's vision to within the required standards, these waivers changed the lives of countless pilots that previously would have been disqualified. Similar advancements in aerospace medicine allow NAMI providers to make aviation careers available to many more candidates.

Becoming a naval aviator is a long and challenging, but rewarding process. Transitioning from a naval aviator to a flight surgeon has opened my eyes to the risks associated with all aviation-related professions. It has given me an in-depth understanding of the importance of making sure candidates are medically qualified to safely pursue an aviation career. I take pride in knowing that it is my responsibility to medically protect aviation personnel. Their lives depend on it.

LCDR. JOHNSON IS A FLIGHT SURGEON WITH TH NAVAL AEROSPACE MEDICAL INSTITUTE.

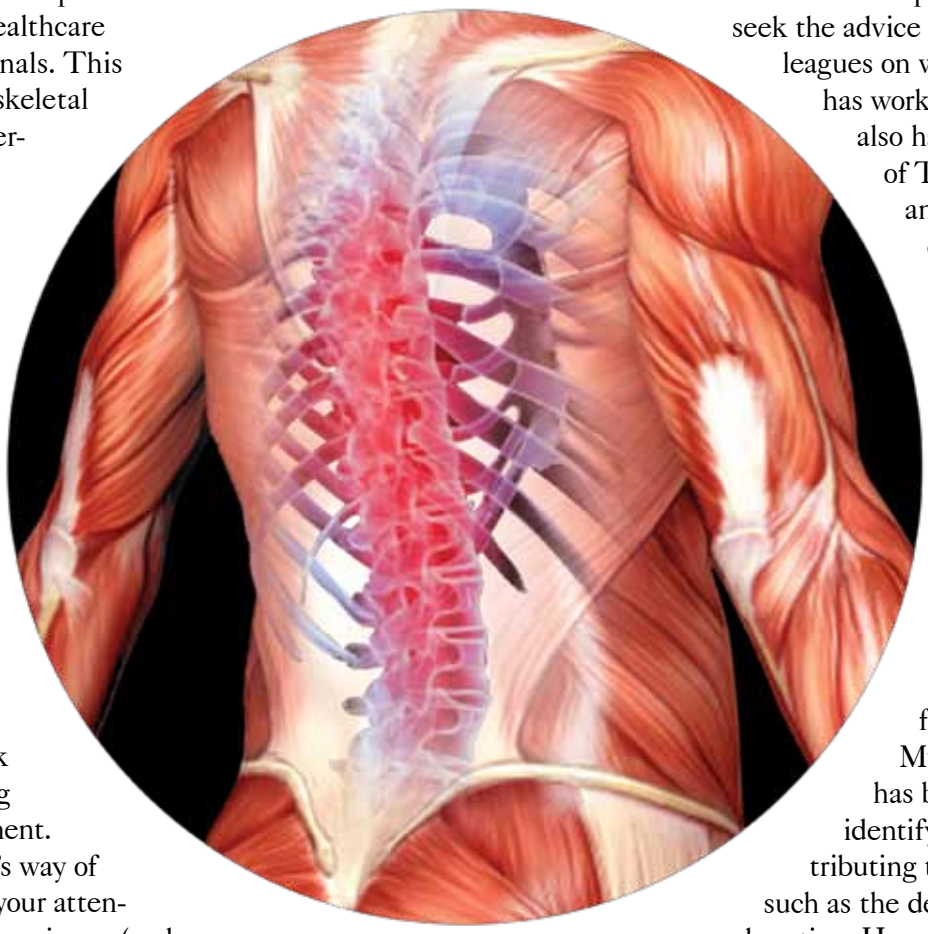
Back Pain in the Asterisk!

What is the single largest cause of lost work days and lost income? If you answered low back pain (LBP), you're right.

BY LCDR. THOMAS E. SATHER, MSC, CASP AND GREG LILLIE, DC, MS

Low back pain is also one of the most common complaints heard by our healthcare professionals. This musculoskeletal disorder affects 80 percent of us, and frequently in our prime working years.

The human back is versatile and complicated. It has 24 moveable vertebrae that end at the sacrum and pelvis, which supports them. It is responsible for the contradictory tasks of protecting the sensitive spinal cord, acting as a shock absorber, and enabling flexibility and movement.



Pain is your body's way of saying, "Hey, I need your attention." If unheeded, experience (and military conditioning and mindset) has taught us that the body will (eventually) heal itself and the aggravation will go away. However, what happens when that doesn't happen? We usually seek the advice of friends or colleagues on what to do or what has worked for them. We also have the influence of TV advertisements and internet to self-diagnose and treat our ills. However, self-diagnosing and treatment is often inaccurate, usually inadequate and at worst dangerous.

Research has shown that neck and low-back disorders are common in the flying community. Much time and money has been dedicated to identifying factors contributing to these conditions, such as the design of cockpits and seating. However, little change has been made in overall design in the last 30 years. Backache is so common that most sufferers

accept it as an occupational nuisance and rarely seek medical advice from their flight surgeon. But they should seek advice. Aviators must understand how important it is to take care of their back.

In naval aviation, LBP — especially in the rotary-wing community — is a well-known problem. Between 60 to 80 percent of the rotary-wing pilots, aircrew and frequent flyers suffer from chronic LBP. Studies have shown that while LBP is very common in aviators, only a small percentage of them will see their flight doc because they're afraid of being "downed."

Causes of Back Pain

LBP can be triggered by some combination of overuse, muscle strain, and injury to the muscles, ligaments and discs that support the spinal cord. One single event may not cause your pain. You may have been improperly doing many activities for a long time, and then suddenly, one simple movement such as reaching for milk in the refrigerator or bending from your waist to pick up a coin leads to injury and pain. Many people with chronic back pain have arthritis that caused extra wear and tear on the spine. This condition may a result of heavy use from work or sports (it's not the age, it's the mileage), past injuries and fractures ("war wounds") or past surgeries.

Other possible causes of chronic low back pain are curvatures of the spine, medical problems, and a decrease in strength and stability of the low back and midsection. A pain disorder called piriformis syndrome involves a narrow muscle in the buttocks that pinches the sciatic nerve.

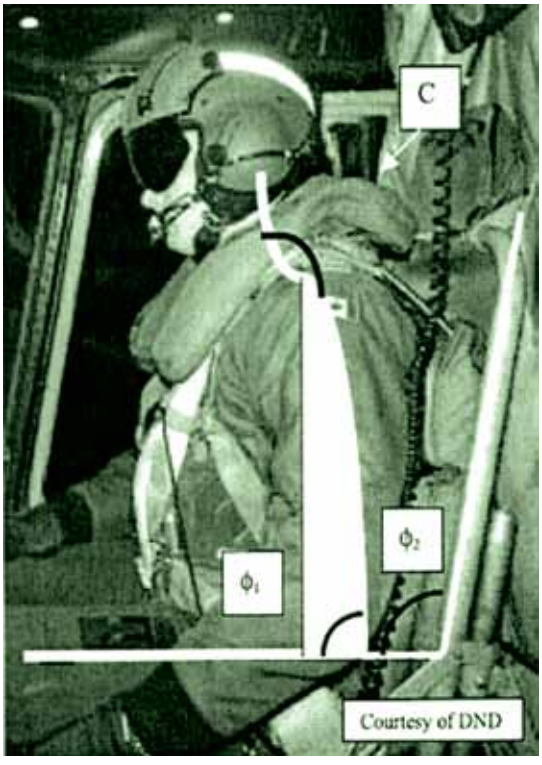
Problems specific to aviation

Most low back pain is mechanical and caused by strain or fatigue as the back provides structure and flexibility. Long hours in the cockpit (most of the time in a less-than-optimal posture), ineffective seat padding and lumbar support, the use of night-vision goggles (NVGs), and constant vibrations in rotary-wing aircraft are possible contributors to back pain.

Pain may appear during or immediately after the flight. It could be transient and last for less than 24 hours. The pain could be moderate in intensity, dull, localized in the lumbar area and buttocks and without irradiation. Other symptoms can occur more frequently and have greater intensity, persisting for more than 48 hours. Paresthesias (strange sensations like numbness, tingling, pins-and-needles or creepy-crawly) can affect the lower extremities if nerves are compressed or irritated.

Two main facts are directly responsible (yet beyond our immediate control) for back pain in helicopter crewmembers. One is the poor posture that results from how controls are arranged. The other is the exposure to vibrations.

It will help to understand a little about dynamic and static movement and posture. Positioning of the joints of the spine is controlled by muscle balance. Poor posture will take joints out of good alignment and alter muscle balance. A good example is that of a helicopter pilot. The typical "helo hunch" (namely slouching) causes anterior movement of the head, rounding of the shoulders, and jutting of the chin.

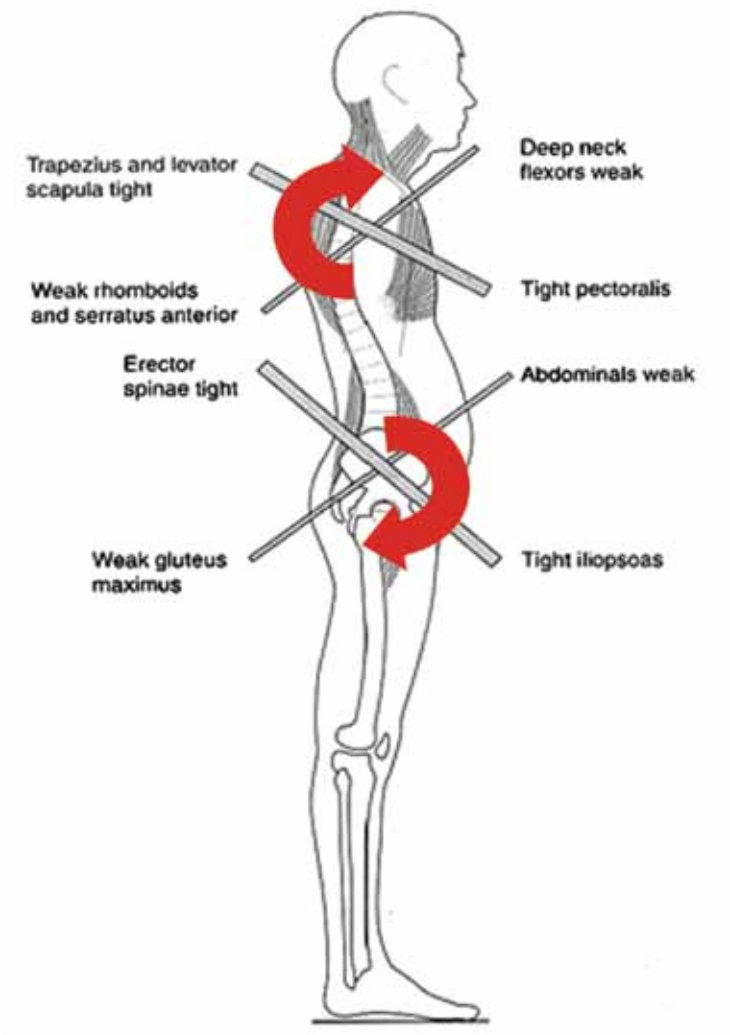


This posture stresses the cervical spine, shoulder joints and ribs, and loads the lumbar spine. Long hours spent being sedentary will contribute to these negative factors. Over time, soft tissue changes occur. Agonist and antagonist properties will change. Some muscle groups will shorten and become tight. Others will weaken from exhaustion or neurologic inhibition. Eventually, good posture is sacrificed and aberrant movement patterns will become the norm. The end result is joint wear and tear, disc degeneration, an increased likelihood of muscle spasms, and experiencing referred pain syndromes or sciatica.

When viewed from the side, the lumbar and cervical spines should have gentle curves forward. This is termed "neutral." Biomechanically, it is the strongest and most stable postural attitude possible. Several muscles, often referred to as the "core," work in concert with each other to support and stabilize the lumbar spine. Just as complex, the cervical and thoracic spines have several layers of muscles which not only support the spine but help control movements of the head and shoulders.

Think of the spine as if it were the mast on a sailboat. The guy wires on the mast must all have the correct tension on them for the mast to be stable. If the guy wires on the bow of the boat are loose, the mast becomes less stable and prone to damage. The core muscles are the body's guy wires. Generally, when seated in a flexed posture, the muscular system undergoes a series of physiologic changes, resulting in a complex sequence of events, which ultimately leads to overly tight and weak muscles. This compensatory pattern is the root cause of soft-tissue and joint distress with accompanying pain and irritation.

The seats and controls in most helicopters force the pilot to assume an asymmetrical posture for extended periods of time. The right hand operates the cyclic-pitch control, situated between the legs. The left hand operates the collective pitch lever on the left side of the seat. While the pilot keeps his hands on the controls, his body will be bending to the left. A good view outside the helo requires the forward flexion of the trunk, which means the back will not be firmly held against the seat back. This constantly maintained asymmetrical position does not permit relaxation of the spinal musculature. It can lead to spasm of the paraspinal musculature, including the hip flexors, which becomes fatigued. This results in a straightening of the normal lumbar lordosis (inward curvature of a portion of the lumbar and cervical vertebral column). Although poor posture alone can cause pain, it is important to consider that this postural condition may be aggravated over the long term by exposure to vibrations. The combination of these factors may act



synergistically to cause pathological changes in the spinal system.

Aircraft vibrations are transmitted to the pilot through an undampened seat, which amplifies them. Vibrations can contribute to microtraumas of the intervertebral disks. Physiological effects of vibrations are caused by the deformation and displacement of organs or tissues. The tolerance of a standing or sitting subject is at a minimum between four and eight Hz. Unfortunately, the majority of vibrations in flight occur at these frequencies. The body's natural reaction is to mobilize its resources to the vibration area. Inflammation occurs. Chronic inflammation can lead to anatomical changes and tissue remodeling; this means even your bones change shape.

Diagnosis and Treatment

Treatment of these conditions can be a challenge. The demand on physicians to come up with an exact diagnosis has led to excessive diagnostic testing, and in many cases, over-aggressive treatment. Technologic advancements in imaging studies, such as magnetic resonance imaging (MRI) and computerized tomography (CT), have helped assess the severity and nature of injuries. They can rule out "red flag" pathologies or show when surgical intervention is needed. However, these advancements have not been without their problems. Research supports significant false positive rates for some types of imaging studies. Chasing the structural cause of back and neck pain has not only led to the inappropriate use of imaging studies but may have contributed to the labeling of patients as being damaged. This results in interference with reaching full recovery.

There is no single, simple solution to individual conditions. Assessment of posture, followed by specific exercises can reeducate muscles and improve movement patterns. Chiropractic and osteopathic physicians, physical therapists, exercise physiologists and other movement specialists can give recommendations and prescriptions for change.

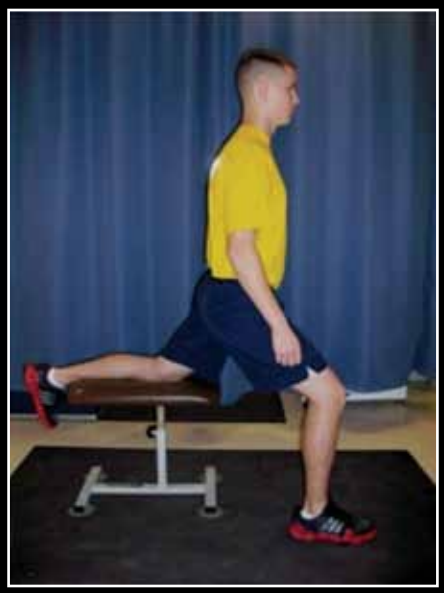
If general exercise programs offset the negative effects of poor environmental adaptation, we probably would not be writing this article. Active duty military members, as well as many of their civilian counterparts, undergo rigorous physical training. Naval Operational Fitness and Fueling System (NOFFS), and various "boot camps" found at many fitness centers and gyms, and intense commercial fitness programs do a great job with strength and conditioning, but flexibility is equally important.

LCDR. SATHER IS THE ASSISTANT DIRECTOR OF TRAINING, MSC AND HM TRAINING PROGRAMS, NMOTC COMMAND HIGH RISK TRAINING SAFETY OFFICER AT NAVAL AEROSPACE MEDICAL INSTITUTE. DR. LILLIE IS A CHIROPRACTIC PHYSICIAN AT NBHC NATTC

Let's get you started on a workout program

ILIOPSOAS/PSOAS STRETCH

Head over shoulders, shoulders over the hips, knee over the ankle. Hold for 20-30 seconds. Change sides, repeat 3-5 times.



We have published only the first part of this article in this issue. The full article, including several exercises and stretches to help your back, is on our website's aeromedical page. Go to: http://www.public.navy.mil/navsafecen/Pages/aviation/aeromedical/Aeromedical.aspx.

Excerpts from Recent HAZREPS:

FA-18. No adverse or unusual symptoms were present during flight. Pilot experienced symptoms 30 to 40 minutes post flight. Pilot diagnosed by flight surgeon with Type II decompression sickness and sent to chamber for several rounds of treatment.

FA-18. As pilot climbed through 30,000 feet, ECS and OBOGS surged. Pilot reported a rapid change in cabin pressure based on his ears popping. Emergency procedures followed and 30 minutes after landing the flight surgeon determined he had Type II DCS and he was medevac'd to a chamber ashore. Pilot med-down for 14 days.

FA-18. A loose nut on the cabin air pressure safety valve caused pressurization problems. Once on deck the aircrew were thought to have had hypoxia, but actually had decompression sickness.

DECOMPRESSION SICKNESS: What You Need to Know

BY LCDR. LISA FINLAYSON AND MS. MONA SANIEI

In aviation, decompression sickness (DCS) is a series of symptoms that are due to exposure to decreased altitude, which cause the inert gases in your body to bubble out of solution and into the tissues. There are two types of DCS, type I and type II.

Type I

Musculoskeletal DCS (bends) occurs mostly in the major joints (shoulder, elbow, knee, and ankle). Common symptoms include localized deep pain and dull aches. The pain can occur at altitude, during descent or hours after being on the ground. The bends must be evaluated even if symptoms disappear upon grounding.

Skin DCS (skin bends or creeps) mainly affects the skin and causes itching. Other symptoms include the feeling of insects crawling over one's body. Severe skin bends include: cutis marmorata, marbled skin and scar-like lesions.

Lymphatic DCS involves swelling and the above skin symptoms.

Type II

Brain DCS symptoms include: confusion, memory loss, headache, changes in vision, fatigue, seizures, dizziness, vertigo, unconsciousness, nausea and vomiting.

Spinal cord and peripheral nervous system DCS result in tingling, numbness, burning, stinging, muscle weakness, twitching, pain and other unusual sensations.

Inner ear DCS affects the inner ear with symptoms of vertigo.

Pulmonary DCS (chokes) is associated with a deep burning sensation inside the chest, painful breathing, shortness of breath and dry cough.

Susceptibility to DCS mainly occurs at cabin altitudes above 18,000 feet and with increased duration at altitude. It also occurs with increased age, previous injury of a joint or limb, excessive body fat, SCUBA diving before flight, increased rate of ascent, repetitive exposure, low ambient temperature and increased physical activity during flight. Dehydration due to any cause, such as excessive heat exposure and alcohol consumption, also increases the onset of DCS.

Preventive measures should be taken to avoid DCS. These include prebreathing 100-percent oxygen, hydration, shortened exposure time, and reducing exercise level while in flight.

LCDR. FINLAYSON IS THE AVIATION PHYSIOLOGIST WITH THE NAVAL SAFETY CENTER AND MS. MONA SANIEI IS WITH OLD DOMINION UNIVERSITY.

Resources

- OpNavInst 3710.7U discusses hyperbaric exposure in section 8.3.2.13, which states in part, "Under normal circumstances, flight personnel shall not fly or participate in low-pressure chamber flights within 24 hours following scuba diving."
- U.S. Navy Dive Manual
- FAA guidance can be found at: http://www.faa.gov/pilots/safety/pilotsafetybrochures/media/dcs.pdf
- Hyperbaric chamber information can be found at: http://www.hyperbaricinformation.com/HBO-articles/decompression-illness/aviat-space-environ-med-2000-71-115-8-Krause-Effects-of-SL-o.pdf
- Contact your local Aviation Survival Training Center (ASTC) or Aeromedical Safety Officer (AMSO) for additional information.

What Should You Do If You Suspect Decompression Sickness?

OpNavInst 3710.7U (section 8.2.4.6) provides actions to take when an occupant of any aircraft is observed or suspected to be suffering from the effects of DCS: 1) 100-percent oxygen or available aircraft oxygen will be started. 2) The pilot shall immediately descend to the lowest possible altitude, and land at the nearest civilian or military installation suitable for safe landing and obtain qualified medical assistance. 3) Consideration shall be given to whether the installation is in proximity to a medical recompression chamber. 4) Upon landing, contact your flight surgeon and debrief your symptoms and flight profiles to both the flight surgeon and hyperbaric-chamber personnel. 5) Submit a physiological episode hazrep.

Squadrons Need a Plan

Commander, Naval Air Forces has addressed the DCS situation for FA-18 and EA-18 squadrons in a recent message (dtg 290617ZMAY12) on physiological-episode reporting guidance. Included in this message is the directive, "Squadrons shall incorporate decompression-sickness (DCS) details into their premishap plan and duty binders. At a minimum, include location of the two closest hyperbaric chambers with POC information for 24/7 assistance and a transportation plan for the aircrew to get to the chamber, whether they are on or off base when it is determined that chamber assistance is needed." Preferred transportation for DCS is by ground and, most often, directly to the chamber. Realizing that ambulances routinely transport to the nearest medical facility, this can result in delays beginning recompression treatment. Unless the aircrewman is actively in need of CPR, it is often best to take them directly to the hyperbaric chamber. Flight surgeons can contact the NMOTC Det NOMI hyperbaric chamber hotline (answered 24/7) at (850) 449-4629, or their local hyperbaric chambers for assistance with evaluation, diagnosis or transportation issues. If a helicopter is used, do not exceed 1,000 feet.

Local Hyperbaric-Chamber Information

The hotlines for local hyperbaric chamber information are provided by the Diver Alert Network (DAN) at: (919) 684-9111 or (800) 446-2671.

ORM corner

Please send your questions, comments or recommendations to:
Cdr. Richard Couture, Code 16
Naval Safety Center
375 A St., Norfolk, VA 23411-4399
(757) 444-3520, ext. 7212 (DSN-564)
E-mail: richard.g.couture@navy.mil

Coyote Ugly

BY LT. MATT HOBERT

I was flying a T-6B night visual navigation flight with an experienced student at the tail end of his syllabus. We had completed our nav route and were headed into Pensacola International Airport for a few touch-and-goes before returning to North Whiting Field.

I flew a visual straight-in to runway 17 for my proficiency and did a touch-and-go. I passed the controls to my student, and he flew several uneventful touch-and-goes. We descended off the 180 for our next approach. My student rolled out on final, touched down softly and added power. Just as we prepared to rotate, I felt what I thought was our plane going over an uneven section of pavement, followed by my student saying, "Oh #$%^." I quickly asked what was wrong, as the aircraft lifted.

My student replied, "Sir, I think we hit a cat."

I took controls and asked him what in the world he was talking about.

He said, "It was either a small dog, a cat or something. We hit it with the right wheel."

I maintained control of the aircraft and climbed to the downwind. I told tower that we may have hit some kind of small animal. Neither of us had felt any drift toward the right tire or unusual handling on the deck before getting airborne. Both gear indicated three down and locked. The inboard gear doors position was also good.

I kept the gear down, broke out the PCL, and flipped to the closest procedure I could find to cover what we had experienced. I referred to the tire-failure-during-takeoff procedures, which state to abort if a decision is made to stop. We obviously had gotten past that point. The next step states that should the takeoff be continued, the gear and flaps should be kept at their current position. My student had raised the flaps, so that part of the non-memory item checklist already had been messed up. Unfortunately, he had not told me that we had hit an animal until after raising the flaps. I kept the flaps in the up position and the gear down after taking the controls.

I switched to base frequency to let the flight duty officer know what was going on, asking him to back me up with NATOPS procedures. I stayed below my maximum gear-extended speed and coordinated for a straight-in back to homefield. After switching-up tower, I coordinated for a low approach by the wheels-watch cart at the approach end. I wanted him to get a visual inspection of my tire and landing gear. The wheels watch reported no abnormalities with my gear or tire. The note in the failed-tire procedure calls for a landing on the good tire side of the runway to help maintain directional control.

Just to be on the safe side, I also decided to do a no-flap landing. I rolled out on final, landed on the good tire side of the runway and had no problems on rollout.

When I went inside, my flight duty officer said we had hit a coyote. Nothing more than a small bit of hair was discovered on the inboard gear door.

LT. HOBERT FLIES WITH VT-6.

BRAVO Zulu

While preflighting the transition section on Crusader 06, AWS3 Brandon Coan recognized that the guide pins for the tail-rotor pulley assembly were not fully seated in the pinholes. He promptly brought this discrepancy to the attention of the aircraft commander and maintenance control.

A quality-assurance representative determined this was a downing discrepancy and corrective action was performed. Misaligned tail-rotor cables could have resulted in a loss of tail-rotor control during flight.

Captain Quincy Newman, USMC, a flight instructor with VT-6 at NAS Whiting Field, Fla., was the runway duty officer at Brewton, Ala. While monitoring a congested landing pattern, Capt. Newman observed two T-6B Texans on a collision course, one at low key and the other at the opposite 180-degree position. Neither pilot made an identifying radio call to the other air traffic.

Captain Newman immediately directed the T-6B at the 180 position to wave off. He provided traffic position information to the T-6B at low key. Captain Newman's quick recognition of an unsafe situation and subsequent corrective action prevented a potential midair collision.

Lieutenant Caleb McDonald, a flight instructor with VT-27 at NAS Corpus Christi, Texas, and 2ndLt. Madison Stumpp, USMC, a flight student, were conducting a T-34C, day, instrument-training flight.

After a practice instrument approach at NAS Corpus Christi, Lt. McDonald and 2ndLt. Stumpp were flying the missed-approach procedure when the engine chip-fault and master-caution warning lights illuminated. This indicates a possible contamination of the aircraft's oil system. Immediately, the engine performance began to degrade. Realizing the aircraft had only minutes of useful power left, Lt. McDonald turned the plane back to the airfield as 2ndLt. Stumpp reviewed the NATOPS checklists aloud.

The crew declared an emergency with Corpus approach control and intercepted the emergency-landing pattern. As they made the turn to final, the aircraft continued to lose power. Lt. McDonald raised the flaps to maintain profile. He held 600 foot-pounds indicated torque to keep the proper rate of descent to touchdown and landing. Lieutenant McDonald's and 2ndLt. Stumpp's quick assessment of the situation, situational awareness and application of emergency procedures averted a mishap.

Left to right: Lt. Caleb Mcdonald, 2ndLt. Madison Stumpp.

Lieutenant Richard Bowers, a flight instructor with VT-31 at NAS Corpus Christi, Texas, and Lt. Christopher McKay, USCG, a flight student, were flying a T-44, day, instrument-training flight.

They were at 21,000 feet, in the vicinity of Houston, when the right engine suddenly lost power. Quickly diagnosing the failure, the crew completed the Emergency Engine Shutdown checklist. After declaring an emergency with air-traffic control, they began a descent into the Houston area, while reviewing suitable landing fields. As Lt. Bowers flew the aircraft, Lt. McKay coordinated a precision approach into Ellington Field. The crew made a single-engine approach and landing.

Postflight maintenance inspection determined that the engine-driven fuel pump had sheared, resulting in fuel starvation to the engine.

Lt. Richard Bowers.

Meet the Crash Crew

BY LT. MCCLAIN ISOM, USCG

After completing the contact phase in primary, I was, like all other student naval aviators (SNA), anxious to strap into the orange T-34C Turbomentor for my initial solo flight. The challenging practice precautionary-emergency landings, simulated power losses, and endless touch-and-goes leading to this flight bolstered my confidence to tackle any emergency.

I received my aircraft assignment (Blackbird 493), signed the A-sheet, and walked out to the north ramp of NAS Whiting Field to preflight. The aircraft looked good; it was time to have fun. I checked that the fuel caps were secured after getting airborne, I retracted the landing gear and turned for my departure heading.

I was established on course rules bound for Area 1. Pensacola Departure said my Mode C transponder was not received, and I was a negative radar contact. I recycled the function selector and pushed IDENT to check that the squawk code was correctly entered. The reply lamp indicated good interrogations, but no joy. Fortunately,

I had just departed Class C airspace and canceled the pending radar advisories. I assumed that the transponder was my glitch for the solo.

Still needing to complete my touch-and-goes, I got established for my three-mile initial into Navy Outlining Airfield (NOLF) Barin. After determining the duty runway, I advised the runway duty officer (RDO) of the failed transponder and asked if I should discontinue my solo. He advised that I should continue for the initial while he contacted NAS Whiting.

I got approved for break entry. I checked the airspeed and extended the gear, beginning the landing checklist. My instrument panel glared back at me with the red, unsafe-wheel light and three-up-and-locked indications. I took a rapid second look and realized the original indications were correct. I waved off. I told the RDO that I was peeling away from the pattern because of the gear failure and planned to troubleshoot at 3,500 feet.

A concerned instructor, in the only other aircraft in the pattern, advised me of the likelihood that the L/G power circuit breaker was popped. Sure enough, he was right. I reset the breaker and the gear immediately extended with three-down-and-locked indications. The other aircraft quickly joined me to complete an airborne gear inspection. He said that the gear appeared to be fully extended with positive downlocks in place. What a relief.

I still needed to complete the hop. With the suggestion of the RDO, I descended to pattern altitude and completed my four required touch-and-goes.

Calling No. 1 upwind, I departed NOLF Barin, checked my airspeed and retracted the gear. My relief of returning back on course rules for home-field recovery was despairingly shattered with a new problem: a right inboard gear-door-indicator light. I told Barin RDO of my new situation and heard the previous helpful instructor volunteer to assist. The instructor asked for my current position and advised me to overfly the coastline at 4,500 feet at 150 knots. The situation was further compounded when the left inboard gear-door indicator illuminated during the increase of airspeed. I decreased my airspeed back to 120 knots and the left light extinguished.

I began a shallow angle-of-bank turn around Point Clear. The instructor formed-up in parade position as Dash 2 to inspect the underside of my fuselage. As anticipated, the right inboard gear door was deflected outward with the landing gear partially exposed. I now had another gear emergency.

Following the direction of the instructor, we turned for a TACAN straight-in approach at NAS Whiting Field. He made all the UHF calls to Pensacola Approach and North Tower, maintaining two-way comms between both aircraft on VHF. Also, the instructor assumed the assigned squawk code for both of us because my transponder was still inop. Because we were already airspeed restricted, he recommended we try to lower the gear and check for proper extension. The airborne inspection indicated good extension with positive downlocks in place again.

As we approached Whiting Field, I turned for a right downwind and got established for landing. I quickly completed my landing checklist one more time, made my 180 call to North Tower and landed with no other complications. Taxiing off the active, I was met by flanking crash-crew vehicles with foam nozzles aimed at my direction. I taxied back to the ramp area and performed the engine-shutdown checklist. Mission complete.

LT. ISOM FLIES WITH VT-2.

Mishap-Free Milestones

HSM-75	130,000 Hours	22 Years
HS-10	350,000 Hours	52 Years
VFA-115	80,000 Hours	17 Years, 8 Months

Didja Hear?

BY JOHN M. SCANLAN

I got up on the morning of Tuesday, August 12, 1986, and tried to shake out the cobwebs. I opened my front door and picked up The Honolulu Advertiser. I then quickly shut the door because I was only wearing my tighty–whities and didn't want to freak out the neighbors.

I shuffled to the kitchen and tossed the paper onto the counter. Then I fixed my usual bowl of cereal. While pouring milk on my Cheerios, I glanced at the Advertiser to check the front page headlines.

"F-4 Phantom Disappears — Search Is on for Two Aboard"

"Oh $&!*," I mumbled. I quickly set down the milk, put on my glasses and leaned over the front page.

"A Marine search-and-rescue helicopter and a Coast Guard C-130 last night were looking for two Marines whose F-4 Phantom aircraft was declared missing at 9:10 p.m. by authorities at the Kaneohe Marine Corps Air Station."

At the time, I was stationed at Kaneohe Bay, Hawaii. I was a first lieutenant radar-intercept officer (RIO) with VMFA-212, flying in the F-4S. Initially,

I breathed a sigh of relief knowing that we hadn't been flying any sorties last night. I returned to the Advertiser.

"The jet was reported to be approximately 70 miles north of the Kaneohe Bay base when radar contact and communications were lost, according to a spokesman at the base last night."

I knew what that meant. Whichever F-4 squadron it was (VMFA-232 or VMFA-235), they were doing night, all-weather intercepts, and the missing F-4S was on the north station. Every squadron flew night intercepts the same way, with the southern station being only 40 miles north of Kaneohe. Such a set-up allowed for a 30-mile start to each intercept. I continued reading.

"The jet and two crewmen are from Marine Fighter Attack Squadron 235, Marine Aircraft Group 24, 1st Marine Amphibious Brigade based here."

"Uh oh," I thought. VMFA-235 shared a hangar with VMFA-212, so there was no doubt in my mind that I would know the missing pilot and RIO. I read the story's last paragraph.

"They were on a routine training flight, the spokesman said. The names of the missing men were being withheld pending notification of next of kin."

IN MY SHORT AVIATION CAREER, how many times had I heard that first line? For every accident, it seemed like they were always on "a routine training flight." Did such a thing really exist? Concerning the names, they would be rippling through the hangar by the time I arrived at work.

I returned to my soggy Cheerios and finished breakfast. Then the morning continued just like any other morning: pack a lunch, pack a gym bag, and don a stinky flight suit that needed washing. My drive over the Pali Highway from Honolulu to Kaneohe was somber and pensive.

Immediately upon arriving into the 212 ready room, I got bombarded with the question, "Didja hear?"

I bit my lip because no good news ever follows that question. I saved their breath, replying, "Yeah … I saw it in this morning's paper."

For a brief moment, the ready-room cowboys almost looked dejected because they didn't get to actually tell me about it.

However, that was followed by, "Didja hear who it was?"

"No," I replied. "The paper didn't list the names."

In a manner that was almost a little too eager, they told me who was in the missing F-4, not by their names, but by their call signs. Doing so seemed to make it even more of a tragedy. Mere human beings weren't lost last night, by God, they were aviators.

I winced. The missing RIO was a first lieutenant, just like me. I knew him. He had gone through the training pipeline right behind me. The Marine Corps was scheduled to soon replace the archaic F-4 with the ultramodern F-18, and we had been some of the last RIOs trained.

I went to my desk and sat down. I took the phone off the hook, rocked back in my chair and stared at the ceiling. I never understood how that could happen, where a jet just disappears. Most likely, the pilot got disoriented and flew into the water. But, then again, how does that happen? How does a pilot get so disoriented at night that he flies into the water?

Plus, how can a brand new, first lieutenant RIO sit idly in the backseat and let it happen? Was his situational awareness that bad? Or, because he was a new RIO, was he simply hesitant to say anything? I wondered how many young naval flight officers (NFOs) had been killed, while saying to themselves, "I won't say anything, the pilot knows what he's doing."

That day, I was scheduled to fly an intercept hop with a pilot whose callsign was Tube, against some A-4s. Upon completing each run, while returning back to the north station, Tube waggled the wings of our F-4. We were scanning the surface of the water, hoping to see a parachute, or a raft, or something, indeed anything. Our impromptu search was to no avail.

Fast-forward almost a decade.I got up on the morning of Friday, March 8, 1996. It was just like any other deployed morning. As I tried to shake off the cold from living in a tent at northern Italy's Aviano Air Base, my tentmate came in from an all-night flight. The first words out of his mouth were, "Didja hear?"

I bit my lip. Having just arisen, I simply asked, "Hear what?"

"533 lost a jet last night back in Beaufort."

My shoulders drooped. I didn't bother to ask him what happened. I figured that I'd find out soon enough by reading this morning's message board. Besides, I didn't really want to know.

I donned a stinky flight suit that needed washing and shuffled down to the mess tent for breakfast. The milk that I poured on my Cheerios had soured.

One evening, a week later, I was relaxing in the ready-room tent after supper. In the background, the latest episode of Cheers was on the television, courtesy of a VHS tape from someone's wife. On the tiny table in front of me was The Charleston Post and Courier

I couldn't help but recall Tube and I looking and looking and looking.

from Saturday, March 9, also from someone's care package. I glanced down to check the front-page headlines: "Marines Search for Crew of F/A-18"

I sat erect on the couch, adjusted my glasses and leaned over the tiny table. Knowing it was old news, I still wanted to read the article.

"The Marine Corps and Coast Guard on Friday continued searching for two crew members of an F/A-18 jet fighter, based at Beaufort that disappeared from radar screens while over the Atlantic Ocean Thursday night."

By this time, message traffic about the accident had already told me everything I wanted to know. However, I was still curious as to what The Post and Courier had told the public. I continued reading.

"Marine spokesman Chief Warrant Officer Tim Bennett identified the men, but their names had been withheld Thursday pending notification of their families."

Just like 10 years before, I winced. But this time I already knew the names. "Dang," I mumbled. "I knew both those guys." That classic line appeared again, "Their names had been withheld Thursday pending notification of their families."

What about the other classic line? Were they on a "routine training flight?" I got that question answered in the very next paragraph.

"The two-seater, all-weather plane is one of the Marines' most modern jets. The crew was practicing what the Marines call field-carrier landings, a procedure where the crew simulates landing the plane at night on an aircraft carrier. Lights on the air-station runway simulate the carrier."

I shook my head at the irony. Here we were, 10 years later, and even all the whiz-bang stuff in the F/A-18D couldn't prevent aviators from being lost. It all still comes down to the human beings in the cockpit.

"They were being tracked by air traffic control radar, both at the [Beaufort] air station and at Savannah," Bennett said, "when the plane disappeared from the scopes at about 7:30 p.m."

That was so eerily similar to the VMFA-235 F-4 in Hawaii.

The Coast Guard had picked up a possible distress signal late Friday morning, but when a helicopter arrived, there was no wreckage or life raft and the signal had stopped.

I couldn't help but recall Tube and I looking and looking and looking.

I returned The Post and Courier to the tiny table and then slouched back down upon the couch. The more things change, the more they stay the same.

MR. SCANLAN IS A RETIRED LTCOL., USMC, AND A GRAD ATE OF THE UNITED STATES NAVAL ACADEMY. HE CURRENTLY IS A WRITER, RESIDING ON HILTON HEAD ISLAND, S.C.

RUNWAY-INCURSION Awareness

BY COL. R. E. "BUCK" JOSLIN, USMC, (RET.)

Requesting taxi instructions, clarifying a taxi clearance, or informing ATC when and if you cannot comply with a taxi clearance are the first steps toward mitigating runway-incursion hazards, whether operating at a military airport, civil airport, or joint-use airport in the United States or abroad.

Here are several excerpts from runway incursions involving military aircraft, as recorded by the Federal Aviation Administration (FAA) Runway Safety Office.

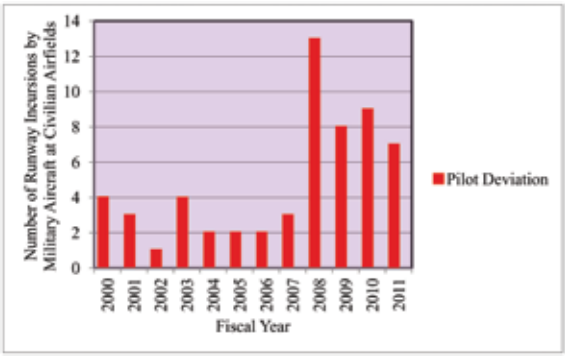
—An H-60 helicopter was issued taxi instructions to runway 6 at the approach end. Subsequently, the H-60 entered runway 6 without clearance, which conflicted with a commercial jet on two-mile final on the same runway. The jet aircraft was issued a go-around to avoid the loss of separation.

—A flight of three H-60 military helicopters were issued runway 13L at taxiway delta for departure. The first H-60 turned on delta and crossed the holdshort lines for runway 13L without clearance. This action conflicted with a Mooney M-20P on less-than-a-mile final on the same runway. The M-20P was issued a go-around at one-quarter mile final.

—A C-130 was issued taxi instructions to runway 35R. The C-130 crossed runway 35R at taxiway golf without authorization and conflicted with a British Aerospace B-461 (BA-46) cleared for takeoff full length on the same runway. Local control saw the C-130 approaching runway 35R and cancelled the BA-46s takeoff clearance before the pilot began the takeoff roll.

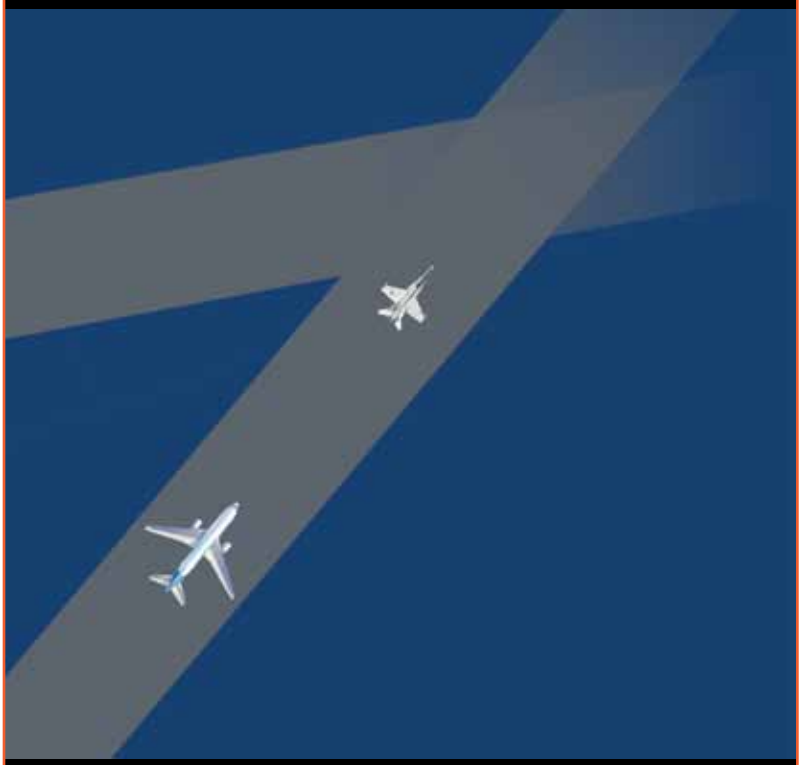
—A Dassault FA-20 military jet requested taxi from the west run-up to the FBO. The FA-20 was instructed to hold short of runway 18 at taxiway juliet. The FA-20 was then instructed to cross runway 18 on juliet and to hold short of runway 14 at kilo. The FA-20 pilot read back instructions correctly, then crossed runway 18 on Juliet. This action conflicted with a Cessna C-152 less-than-a-mile final on the same runway. The C-152 was issued a go-around at one-half mile final.

Reducing runway incursions has been a top objective for the FAA for more than a decade. It is listed as one of aviation's most critical challenges in the 2011 FAA NextGen Implementation Plan, as well as the 2011 National Transportation Safety Board (NTSB) Most Wanted List of Transportation Safety Improvements. The most common causal factors of runway incursions include: complex airport configuration, low-visibility conditions, cockpit-management issues and non-tower airport operations.



FAA data for pilot-deviation-type runway incursions by military aircraft at civilian airfields for FY00 to FY11

A recent runway-incursion incident between a military aircraft and an airliner involved three of the four most common causal factors. A tactical jet (Surf 14) was cleared to land on runway 4R. The airport layout had intersecting runways and multiple high-speed taxiways, all illuminated for night operations (casual factors: complex airport configuration and low-visibility conditions).



After landing on runway 4R, Surf 14 was instructed to vacate the active runway at taxiway kilo and hold short of runway 8L. Surf 14 taxied past taxiway kilo and remained on the active runway 4R while stopped at the land-and-holdshort (LAHSO) lights just before the intersection of runway 8L. A commercial air carrier (HAL 9) was cleared to land on runway 4R, which was still occupied by Surf 14.

After landing, HAL 9 saw the tactical jet on the runway and braked heavily, stopping less than 200 feet from Surf 14. Surf 14 told ATC that his canopy had fogged (causal factor: cockpit-management issues), which may have compromised the pilot's ability to interpret the aircraft's position at this complex airport filled with a wide variety of surface night lighting.

In this case, the difference between the event being an incursion instead of collision was less than 200 feet of horizontal separation. This incident could have been averted with better communication. Although this runway incursion was in part due to an ATC operational error, the consequences directly affect aircraft operators. The responsibility for avoiding runway incursions rests with all participants.

COL. JOSLIN IS A FORMER MILITARY TEST PILOT AND WAS THE 1989 *APPROACH* MAGAZINE CONTRIBUTOR OF THE YEAR. HE NOW SERVES AS THE CHIEF SCIENTIFIC AND TECHNICAL ADVISOR FOR FLIGHT DECK TECHNOLOGY INTEGRATION FOR THE FEDERAL AVIATION ADMINISTRATION.

A 2009 analysis by Mr. Ed Hobbs of the Naval Safety Center concluded that Naval Aviation incursion reporting has increased over time in conjunction with increased overall reporting due to improved reporting systems, increased command emphasis on reporting and expansion of the reporting base (in this case, the addition of field air-traffic controllers). When adjusted for the volume of sorties, the data definitely showed that incursions are statistically more frequent on Wednesdays while statistically less frequent on weekends and in the summer. Not surprisingly, and in keeping with the emphasis of this article, the analysis also found that the vast majority have human error as a primary causal factor.—Data Management Department, Naval Safety Center

I witnessed an airplane crash while flying a mission in our HH-60T.

Maximum Effort

BY LCDR. CHRISTOPHER WRIGHT, USCG

It was a warm, dark August night as we completed the last evolution of our airborne-use-of-force (AUF) gun-pattern flight in W-104A, 15 minutes north of Provincetown, MA. Because of a grounded HU-25 at Nantucket Municipal Airport, we also had flown several no-notice logistics runs to Nantucket to transport parts and personnel.

Our HH-60T was getting low on fuel, so we plotted a course directly to Air Station Cape Cod. While returning to base, we flew three to four miles west of Provincetown Airport. Around 10:45 p.m., we noted a traffic-collision-avoidance-system (TCAS) target off our 9- to 11-o'clock position, with no reported altitude. Our pilot at the controls (PAC) in the right seat had seen the airplane take off. Because I had a better vantage point as the safety pilot in the left seat, I immediately picked up the scan. I was wearing night-vision goggles. As the single-engine Piper got airborne it made a climbing left turn and then hit the trees.

I told the crew what I saw. I thought, "This couldn't have happened. Who witnesses an airplane crash as they fly by an airport?"

As I took the controls and made a beeline for the airport, we saw a lot of fire and smoke around the crash site. When we got on-scene, we confirmed the plane had crashed about 300 yards from the runway. We began searching for survivors and relayed information to Sector Boston to help them coordinate local authorities.

Because of the remote location of the crash site and the intense fire, we decided the safest course of action would be to land on the runway. We'd then have one of the aerial gunners/flight mechanics (AG/FM) take the cabin fire extinguisher, flashlight and hand-held radio to the crash site to search for survivors. As our AG/FM reached the tree line, several police and EMS responders arrived.

We got airborne to maintain communications and to provide guidance and lighting to the search party. We also wanted to alert the first responders if the fire began to cut off their ingress/egress route.

The search team surveyed the smoke-filled crash site. They found a young woman who, upon impact, had been ejected through the aircraft's windscreen. Because she was extremely close to the fire, the FM discharged

the fire extinguisher to free an area from flames. He then assessed her injuries, which included deep lacerations, third-degree burns, severe shock and possible internal damage.

We landed at the approach end of runway 7, adjacent to the crash site, trying to conserve fuel. The other AG/FM on the aircraft readied the cabin and ensured all weapons were downloaded and secured from the hoisting/cabin area. The rescue litter was assembled, and the AG/FM removed items from the cabin to expedite transport of the survivor using the litter. The survivor was transferred to a backboard. The AG/FM on the ground told the helo crew that an extraction and medevac was recommended by the EMS because of the critical nature of the patient and their inability to extract the patient via ground. We looked at medevac options. Because we were low on fuel, we told the FM that we would need to coordinate a regional med flight pick-up following our extraction of the patient using a trail line litter delivery/recovery.

THE MED FLIGHT WAS coordinated. We had the FM locate and mark a viable landing zone (LZ) with chemlights for the litter recovery. The FM quickly located an LZ and briefed the ground responders on what to do. Once the patient was in the LZ, the FM had the EMS personnel cover the patient with their jackets to prevent further injury from debris during the hover.

We monitored our fuel burn to determine an accurate bingo because we had low fuel lights in the hover. The onboard FM located the LZ and conned the aircraft over the hoisting area. With the help of the ground party, we quickly executed a litter delivery through a forested LZ from a high hover at 85-feet AGL.

Meanwhile, we coordinated the patient drop-off location with med flight and provided the patient status to EMS helo personnel. We decided that once the patient was onboard the aircraft, the trail line would be discarded. We would immediately make a smooth, coordinated approach to the runway to conserve fuel.

Once the survivor was onboard, the FM monitored her condition. We ground taxied to the ramp to the awaiting EMS helo. The survivor was transferred to med flight, and they departed to a Boston hospital. We found a clear location and shut down with about 200 pounds of fuel.

The Piper aircraft crashed in a wooded area.

The first responders said that the second Piper occupant had died from the crash. We were told that because of the remoteness of the crash site that if we had not seen, reported, and responded to the crash, both victims would have gone unnoticed until the fire extinguished.

We had several takeaways from this rescue.

You never know what you might stumble across or be called to do during any flight. We never thought we'd witness a plane crash and be the prime unit to respond. We had no rescue swimmer and no EMT/AMS. We

Only one person survived the crash.

were configured for an AUF mission (shoulder-fire weapons, a mounted area fire weapon, and spent shell casings in the cabin). Our fuel was already low.

The FARs and our CG Air Operations Manual (COMDTINST 3710.1) require fuel reserves at your intended destination, and in our case this would have been 20 minutes. However, this airfield didn't have any jet fuel available, so we couldn't get a SAR asset back to home.

The 3710 states, "… in the operational environment, mission demands may require on-scene deviation from prescribed instructions or procedures when, in the judgment of the PIC, such deviation is necessary for safety or the saving of life. Such deviation must not be taken lightly and must be tempered by maturity and complete understanding of the aircraft, mission, and crew." The instruction adds, "… the probability of saving human life warrants a maximum effort. When no suitable alternatives exist and the mission has a reasonable chance of success, the risk of damage to or abuse of the aircraft is acceptable, even though such damage or abuse may render the aircraft unrecoverable."

This discussion boils down to time critical risk management: the constant assessment of mission urgency and the benefits to be gained versus the risks involved, while keeping the safety of the aircrew and aircraft as a primary consideration.

Because of the rapid nature of this situation, the keys to our success were the excellent CRM and ORM efforts of the entire crew. Success depended on our ability to quickly determine the best course of action.

Trust your crews, your experience and your training. Without the help and experience of this entire crew, we would not have been successful in saving a life.

LCDR. WRIGHT FLIES WITH CGAS CAPE COD, MA.

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. Tony Anglero, Naval Safety Center
(757) 444-3520, Ext.7231 (DSN 564)
antonio.anglero@navy.mil

Every Flight is Unique

BY LT. BRENT ROBINSON

We enjoyed another Groundhog Day on USS Carl Vinson (CVN-70), as we approached the midpoint of deployment. We'd had several weeks of repetitive flight schedules supporting Operation Enduring Freedom (OEF).

While I surfed the internet in a feeble attempt to stay in touch with the real world (and by surfing, I mean waiting 10 minutes to load one page), our SDO received word that one of our OEF birds was coming back early with a maintenance problem. Fuel was trapped in the wing's external tank. Fortunately, for our SDO, the operations officer heard the call and came running. The Hornet NATOPS was broken out to estimate usable-fuel-remaining and the asymmetry limitations for a carrier landing. Five minutes of calculations and discussions determined there would only be 2,500 to 3,000 pounds of usable fuel "on the ball" to trap a FA-18C at max-landing weight of 34,000 pounds. The 34,000 pounds max-trap weight required the asymmetry to remain below 14,500 foot-pounds. With our standard OEF weapon configuration, that meant maximum fuel in the external wing tank was 1,700 pounds. Anything over that amount in the external wing tank would reduce max trap to 33,000 pounds and useable fuel on the ball to less than 2,000 pounds.

As is often the case with earth-shattering emergencies that seem to occur hourly on the boat, this one

quickly resolved itself. A few minutes after we made our calculations, the squadron was informed that with the aircraft below 10,000 feet, fuel was transferring. The section's troubleshooting had worked. With crisis number 205 of WestPac 2012 averted, I was back to surfing the internet.

The next day I received the operations department hook-up; I was scheduled for the daytime, good deal, JO-roommate OEF hop. Adding to the good deal was the weather portion of our mass brief in which Afghanistan was described as a "boring weather day," with a high-pressure system saddled over the country. Our jets had performed exceptionally well, and the previous day's events were nowhere near the front of my mind as I launched. Our transit up the boulevard included getting gas. We then provided ground forces with an armed show of force in our newly painted CAG bird. We proudly displayed the camouflaged "Super Bee" at 500-feet AGL and 600 knots to the quivering insurgents below.

Everything was going smoothly, so I decided to yo-yo to our second tanker, leaving my wingman overhead to provide the maximum amount of coverage for troops on the ground. During the short transit, I noticed about 100 pounds of gas remaining in my right wing's external tank. I didn't think much of it because it was almost negligible. After 25 minutes and another tanking evolution, I was back overhead talking to the joint terminal air controller (JTAC).

Our second tasking had us supporting separate JTACs southwest of Kandahar. Roughly halfway through the scheduled support window, I verified my external fuel was transferring and didn't notice anything out of the ordinary. About 10 minutes before checking off-station, I noticed 200 pounds remaining in the right wing tank — it should have been empty. Again, since this was a relatively small amount, I was not overly concerned. With minimal tasking from the JTAC, I decided to troubleshoot and try to transfer fuel. I cycled

the bleed-air system and placed the tank-pressurization switches to override, but the 200 pounds of external fuel remained.

I then recalled the previous days' fuel-transfer events. I was in a different jet, but thought perhaps maintenance had swapped the external tanks during their troubleshooting procedures that evening.

I had two reasonable options. The first was to fill-up on the next tanker and monitor the fuel transfer, risking excessive fuel being trapped in the tank. The second was to inhibit fuel from entering the right external during the next tanking and risk heading back to the ship with 2,500 pounds less fuel than planned for the transit.

Because more than 90 percent of the fuel had transferred out of the external tank twice already in the flight, I decided to go with the former. I would rather have gas and not use it than not have gas and need it. I remembered the magic number of 1,700 pounds from the day before as the maximum fuel in the wing's external tank, with our OEF loadout, to maintain a max trap of 34,000 pounds. I decided to take fuel, but only until the wing's external tank reached that level. That amount still provided plenty of gas for my return to the ship, so we got our gas and pressed south toward mom.

ON THE TRANSIT HOME through Pakistan, I monitored the fuel transfer while enjoying my "freshly made" Italian hoagie graciously provided by the ship.

As you might expect, the external tank stopped transferring fuel with about 1,500 pounds remaining in the tank. I was concerned but also hopeful that once I reached a lower altitude, the warmer/thicker air might help alleviate the problem as it had on the day before. Yet again, I was not so fortunate.

Once clear of Pakistan airspace, we started our decent to 5,000 feet. Passing 10,000 feet, I began the troubleshooting steps from the PCL, including placing external fuel-tank-transfer switches to override, cycling the bleed-air systems, extending the refueling probe and cycling the landing gear. One step said to apply positive and negative G's. After a few quick throws of the stick, my observant wingman saw fuel streaming from the wing external tank. I smelled fuel in the cockpit. The troubleshooting had made the situation worse, as I was left with an additional 200 pounds of fuel in the bad external tank. With that, I finally gave up my hopes for the perfect JO section break at sunset.

I kicked my wingman off and went to the bullpen. I continued speaking to DCAG and the squadron CATCC representative. We coordinated for a straight-in approach and started those fuel calculations again. Doing circles at 1,500 feet aft of the ship, I tried one last barrage of futile troubleshooting steps. Our calculations confirmed that my max usable fuel for the trap would be about 2,700 pounds, with just under 1,700 pounds trapped in the tank. I received a Charlie call from the Boss, and proceeded in for an uneventful OK 3-wire.

I learned several lessons. Here's what went well:

Communication is key. I had a great relay back to mom at an extended range using Link16. This provided plenty of time for the rep to validate all numbers and coordinate with all the key players aboard ship.

Learn from others and participate in ready-room discussions. My involvement in the previous day's events gave me a solid starting point for dealing with my emergency.

Compartmentalize. A sense of urgency is healthy with a low-fuel state, but allowing that stress to cause a bolter or unsafe pass would have only made the situation worse. The confirmation from DCAG regarding the steps we had taken and our fuel calculations made me comfortable, making it easier to fly a nice pass.

Here's what hadn't gone so well:

Communication is key. I should have reviewed my aircraft status with paddles before calling the ball. After landing, I learned they were unaware of the exact nature of my emergency. Paddles are a critical link in the safety chain and should be provided details of the emergency whenever possible.

I could have cleared off my wingman earlier versus trying to make the picturesque break. This would have provided me more time and space to troubleshoot.

After three deployments in three years in support of Operations Enduring Freedom and New Dawn, I've significantly increased my comfort level executing long and dynamic combat flights. However, this experience was a fantastic reminder that every flight is unique, and all too often the greatest challenges present themselves in the fundamental administrative phases of flight.

LT. ROBINSON FLIES WITH VFA-113.

BY LCDR. PASCAL HOLMES

We expected another standard day in the Indian Ocean. We were scheduled to fly a triple cycle up the boulevard into Afghanistan, tank twice and provide electronic-warfare support. We'd then RTB for the always pleasant, good-deal night trap.

The weather briefer said to expect a clear boulevard, but to plan on deep layers of clouds with possible icing after crossing into Afghanistan.

"Great," I thought, "this is all I need." I was already coming back to a requalifying night trap because I hadn't flown one in almost two weeks. By the way, along with the forecasted icing in the aerial-refueling (A/R) tracks, the cherry on top was scoring two Iron Maiden tankers for my three-cycle good deal.

The trip up the boulevard was deceptively nice. As we entered Afghanistan, ECMO 1 and I realized we'd have to put on our "big boy" pants and rendezvous with our tanker in IMC. Any Prowler aviator can understand what it's like when I say joining on a tanker in complete IMC is more nerve racking than trapping on the boat at night, in a storm, with a pitching deck.

Spotting the dark shadow in the clouds, I crept up onto the tanker only to see that the basket was covered with ice. The boom was doing massive circles from all the turbulence in the clouds. "This is going to be fun," I thought.

I finally got into the basket after five minutes of maneuvers and colorful language. I relaxed and asked my ECMO 1, "Well, it can't get any worse than this, right?"

My out gas was just as adventurous. As we watched the sun go down over Afghanistan, I joined on the KC-135. Visibility was good, but we had massive turbulence. I was more relaxed than with the last A/R rendezvous. But, as I joined on the port side, I saw something I never will forget: the boom and Iron Maiden basket were dancing to a song that I only wish I could hear. I had never seen such a sight.

"So, let me get this straight," I told my ECMO 1, "we are clear of clouds, its night, and the basket is moving so fast I can't keep it in my windscreen."

There was no way we could refuel with this turbulence. We asked for a drag back down the boulevard where the weather was much better, and (we hoped) far less turbulent. As expected, it was.

Coming back down the boulevard, our crew discussed our strategy for marshaling and approach. Then we heard louder-than-normal thumps of the bleed air being pushed into the drop tanks as they emptied the final pound of fuel through to the wings. We had read in the ADB before man-up that the crew on the previous flight had reported they couldn't fuel up the drops on their first and second A/R the night before. Maintenance control told us that the discrepancy had been a problem with a two-stage regulator valve, and that it had been fixed and op-checked good. We had no problem with that tonight, as we had transferred and refueled twice into the drops. The only abnormality was the louder-than-normal bleed-air thump in the drops as they emptied. We took note to report this to maintenance when we landed.

Upon arrival, we took vectors to final immediately after descending off the beach road. The deck was open and waiting to recover early for the last cycle of the

Spotting the dark shadow in the clouds, I crept up onto the tanker only to see that the basket was covered with ice.

night. Realizing that I had 4,000 pounds plus of fuel still in the wings, I turned on the wing dumps to get down to max-trap weight.

On final approach at 1,200 feet, I noticed the wings had not emptied as much as I expected after five minutes of straight and level dumping. I needed to be empty in the wings to be legal to trap, but now, here I was with 4,000 pounds still in the wings at six miles. Fortunately, we were told not to expect an approach this pass, and to expect a four-mile hook to downwind. This gave us time to troubleshoot the status of our wing dumps. ECMO 1 read through the initial wing-transfer procedures in the pocket checklist (PCL), as I rogered CATCC's vector to downwind.

Marshal asked if we could accept a 10-mile final, and I rogered, thinking that would give us more than enough time to get rid of the 3,000 pounds in the wings. As we turned downwind, we noticed the rate of fuel dumping had slowed and then stopped. After recycling the switches, I extended the speed brakes and flew at mil power to keep the throttles up and accelerate the dumps from the wings. Looking out, we realized that not only did this action not help, the wing dumps actually had reduced to a trickle and eventually stopped.

At eight miles, we were transferring gas only from the main bags, and had 2,800 pounds of trapped fuel in the wings. Turning onto final at 10 miles, we completed the first four steps in the PCL for wing fuel transfer failure, which required checking all switch positions. We confirmed their positions.

I told approach control that we needed a vector to the overhead. ECMO 1 coordinated with the rep, who told us to immediately take fuel from the recovery tanker, and to fill the main bags. This would allow us more time to troubleshoot.

Coming off the FA-18F, we started the checklist for wing-tank transfer failure. We completed every step up

to and including varying G loading. Realizing this had no effect on the wing transfer, we coordinated with the rep to finish the remaining steps. This would lead us to securing our generators, and should allow the fuel to gravity-feed from the wings to the main bags. The hazard in doing this is that we would be forced to fly overhead in darkness, and be not only NORDO outside the aircraft, but also on ICS.

We were in the process of securing the generators when CATCC told us to get gas. As CATCC gave us vectors to tank, ECMO 1 started to secure the generators. I stopped her and said we just got signals to tank. We immediately turned on the generator we had just turned off, and I settled in for my fourth tank of the night. Topping-off as directed by CATCC, we realized that we could not continue with the generators-off procedure because we had no room to gravity-feed fuel from the wings once we secured them. I decided to take advantage of the extra gas and try a second G-varying profile to see if that would jar anything loose. After two minutes of negative and positive G loading in the dark airspace overhead mom, we looked intently at the fuel totalizer for any change — no joy.

AFTER RECYCLING THE WING DUMP switches a few more times, just to make sure we hadn't fixed the problem, we noticed no effect. However, we had made 2,000 pounds of room in the main bag to try the gravity-feed portion of the PCL procedures. After carefully coordinating with the rep to make sure everyone was on the same sheet of music, we waited for the recently launched turning-tanker spare to trail us by two miles. Then we went midnight by turning off our generators. Once he was in place, we turned the generators off and went completely dark in the cockpit. As ECMO 1 held a flashlight on my pitot-static instruments, she yelled out the minutes left of our five minute lights-out party.

After five minutes, we turned the generators back on and waited for all the instruments and fuel totalizer to settle, only to realize that we still had 2,800 pounds in the wings — no change from before. The main bag was down to 6,200 pounds. After a fifth and final tanking, we were signaled to divert. We finally put our good deal, three-cycle OEF flight to a stop.

Twenty minutes into our divert, we noticed that the fuel in the wing tanks had started to transfer at a good rate. The main bag indicated 6,900 pounds for the entire divert while the wings slowly burned down to 1,800 pounds from the 2,800 pounds when we first departed overhead mom.

We realized after we landed that if only we had a few more hours of deck time, we could have transferred the rest of the fuel in the wings and returned to mom. The next day at Masirah, we got up early to run the engines at 80 percent for almost 40 minutes. At first it seemed as if the wings would not transfer, but after five minutes and 1,000 pounds burned in the mains, the wings started to burn more rapidly. After burning the wings down to 800 pounds, we shut down the engines thinking we could burn the rest on our 30 minute flight back to mom. After topping off the main bag, we briefed, manned-up and launched. We met up with an alert tanker halfway to mom, who topped us off again before landing.

It is often stated in this magazine, there is no such thing as a good deal. The truth is you should always expect the unexpected when you least expect it. Our 8.3-hour flight, five tankers and a divert were due to a simple fuel-relay box that had failed.

LCDR. HOLMES FLIES WITH VAQ-131.

Left to right: LCdr. Pascal Holmes (pilot), LCdr. Heather O'Donnell (ECMO 1), Lt. Patrick Bell (ECMO 2).

The Second and Most Important Mistake Was Something We All Are Guilty of Sooner or Later:

COMPLACENCY

— Lt. Dave New, HSL 51