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Approach

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RADM Brian C. Prindle, Commander, Naval Safety Center
Col. Mark Erb, USMC, Deputy Commander
CMDCM (AW/SW) Dominick Torchia, Command Master Chief
John Mahoney, Head, Communications and Marketing
Naval Safety Center (757) 444-3520 (DSN 564) Dial the following extensions any time during the greeting
Publications Fax (757) 444-6791

Approach Staff

Jack Stewart	Editor and Distribution
jack.stewart@navy.mil	Ext. 7257
Allan Amen	Art Director
allan.amen@navy.mil	Ext. 7248

Aviation Safety Programs Directorate

Capt. Mike Zamesnik	Director
Michael.Zamesnik@navy.mil	Ext. 7225
Kimball Thompson	Deputy Director
edward.thompson@navy.mil	Ext. 7226
Cdr. Monte Yarger	Aircraft Operations Division
monte.yarger@navy.mil	Ext. 7203
Maj. Anthony Frost	Aircraft Maintenance and Material Division
anthony.frost@navy.mil	Ext. 7223
Cdr. Frederick Lentz	Aircraft Mishap Investigation Division
frederick.c.lentz@navy.mil	Ext. 7236
Capt. Nick Davenport	Aeromedical Division
nicholas.davenport@navy.mil	Ext. 7228
Cdr Duke Dietz	Safety Culture and Risk Management Division
duke.dietz@navy.mil	Ext. 7212

Analysts

Cdr. Monte Yarger	NATOPS/WESS Program Manager
monte.yarger@navy.mil	Ext. 7203
Leslee McPherson	Asst Div Head, WESS, ATC, NEXTGEN, MISREC
leslee.mcpherson@navy.mil	Ext. 7245
LCdr. Ian Mackinnon	C-9/40, C-130, P-3, E-6B, P-8, C-12/20/26/35/37, T-6, T-44
ian.mackinnon@navy.mil	Ext. 7272
Capt. Ed “Nasty” Nastase, USMC	AV-8B, F-35, NVD, JSSC
edward.n.nastase@navy.mil	Ext. 7216
Lt. Brian “Band Camp” Abbott	E-2, C-2, UAS, MFOQA
brian.j.abbott@navy.mil	Ext. 7274
LCdr. Jason “Chum” Gardner	EA-6B, T-2, T-34, T-39, T-45, FA-18E-G
jason.d.gardner@navy.mil	Ext. 7224
Maj. Ryan “Timmeh” Harrington, USMC	FA-18A-D, F-16, F-5, T-38, ARSAG
ryan.e.harrington@navy.mil	Ext. 7217
LtCol. Michael Cunningham, USMC	Marine Liaison, H-1, H-57, NVD
Ext. 7209	
Capt. Chris Smith, USMC	CH-46E, CH-53, MV-22
christopher.j.smith@navy.mil	Ext. 7206
Lt. Ryan Jackson	H-60
ryan.p.jackson@navy.mil	Ext. 7102
LCdr. Matt Meyers	H-60, MH-53E
matthew.meyers@navy.mil	Ext. 7263
Lt. Vern Jensen	Facilities Branch, Fuels, CFR/ARFF, BASH
vern.a.jensen@navy.mil	Ext. 7281
ABCM (AW/SW) Lance Hands	ALRE/Air Terminal
lance.hands@navy.mil	Ext. 7279
ABECS Hubert Chambers	ALRE/Air Terminal
Hubert.chambers@navy.mil	Ext. 7208
ACCS(AW/SW) Joseph Corcoran	ATC
joseph.m.corcoran@navy.mil	Ext. 7282
All Analysts	All
safe-code11@navy.mil	Ext. 7811

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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Naval Aviation—100 Years

The Centennial of Naval Aviation is celebrated in 2011, and *Approach* magazine is presenting articles to commemorate our legacy.

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Departments

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Thanks for helping with this issue …

LtCol. Bill Moryto, MAG-49
LCdr. Meghan Angermann, CTW-1
LCdr. Steve Shauberger, VAQ-131
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Ltjg. Ross Thomas, HSL-37
Capt. Blake Stoffel, USMC, VMFA-323
LCdr. Dave Wilson, HSL-49

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I am excited with the challenge and opportunity to be your advocate for Naval Aviation safety! My team of dedicated Safety Experts, partnering with you, will make a big difference for the Naval Aviation Team. Our goal is to eliminate all preventable mishaps. Although a challenging "stretch" goal, we should fully expect to prevent all mishaps we have the ability to anticipate, and the required risk management tools to manage or avoid.

First and foremost, Navy and Marine Corps aviation success is driven by the quality of our people. Challenging and taking care of each other is fundamental to everything we do, on and off duty. When we evaluate and discuss mishaps, more often than not a common thread is human-factor involvement. Because of this, our Sailors and Marines deserve the best possible training so they will possess the technical skill and confidence to effectively employ all our weapon systems. Equally important is to ensure effective training on risk management so that we can operate safely despite the hazards in our work environment. This is especially important when we are "time critical" and must decide quickly the best course of action to prevent an on or off duty mishap. You have to live risk management every day to be able to instinctively employ it when time is short!

As we celebrate the Centennial of Naval Aviation and take time to remember our legacy, we also look forward with great excitement at a rapidly evolving air warfare environment. The contrast between the early pioneers first launching and recovering aircraft from ships at sea, with today's aviators testing unmanned systems that will soon demonstrate an unmanned tactical aircraft capability, is indeed amazing. Our challenge is to rapidly understand the differences a wide range of unmanned systems will bring to our flight decks, runways and battle space so we stay ahead of the "safety power curve" as our operating practices and TTPs rapidly evolve.

As Commander of the Naval Safety Center, I am driven to support you by my experiences over the last 32 years. They have made it very clear we must constantly recommit ourselves to improving upon our vibrant safety culture, one that places tremendous value on sharing experiences to ensure we all quickly learn how to prevent the next mishap. Like many of you, I have seen far too many shipmates lost to preventable mishaps, on and off duty, and the impact of their loss on our Navy and Marine Corps, and personal families.

I will be hitting the road to provide you the opportunity to tell me personally how the Naval Safety Center can better serve you. The Fleet will continue to have a very loud voice at the Naval Safety Center to ensure we are working on your most important concerns. I look forward to congratulating the commands who are on the leading edge of superb safety performance, and sharing their keys to success in future Approach editions.

We exist to serve you!

RADM Brian "BC" Prindle
Commander, Naval Safety Center

Our website is: http://www.public.navy.mil/navsafecen/

Postwar Growth and Arresting Developments

BY PETER MERSKY

The armistice of November 11, 1918, finally brought peace to the world after four years of bloody war. U.S. Naval Aviation had grown from 48 officers, 279 enlisted men and 54 aircraft (including five Marine Corps officers and 18 enlisted) to 6,716 officers and 30,693 enlisted men in Navy units, and 282 officers and 2,180 enlisted in Marine Corps units. Some 18,000 officers and men had been sent overseas during the conflict. A total of 2,107 aircraft equipped both services.

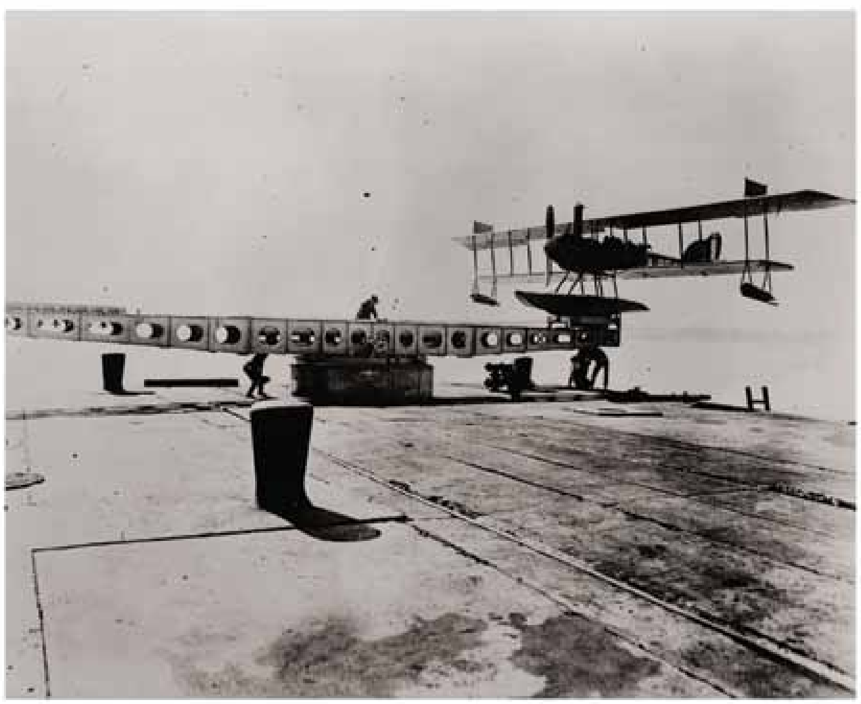
Those people who remained in the Navy and Marine Corps found themselves on the ground floor of a rapidly rising elevator that included stops on every floor of the new endeavor called Naval Aviation. Records and equipment — endurance, altitude, speed, radio, navigation (like the gyro compass) — came fast in the five years following the war.

On March 9, 1919, LCdr. E.O. McDonnell launched in his Sopwith Camel from a turret platform aboard the USS *Texas* (BB 35) while at anchor off Guantanamo Bay, Cuba. Trials with these precarious arrangements used veteran European fighters from France and England. Along with Camels and 1 ½ Strutters (a two-place Sopwith design from the early war timeframe), French Hanriots and Nieuport 28s perched atop gun mounts of several heavy ships. By 1921, however, with the anticipated arrival of the USS *Langley* (CV 1), this form of launching was dispensed with.

On October 26, 1921, LCdr. H.C. Richardson used a compressed air, turntable catapult design to launch his Curtiss N-9 trainer from pier-side at the Philadelphia Navy Yard. From the look of it, the sharp punch of the design must have provided a really rough ride.

Ensign F.W. Dalrymple and CMM (Chief Machinist Mate) Frederick H. Harris, flying from NAS Miami on January 23, 1919, stayed aloft in their Curtiss HS-2L for 9 hours and 21 minutes. That same month, parachutes were issued to Marine crews in Haiti, the Dominican Republic, Guam and Quantico. In July 1922, eight doctors reported for flight training at Pensacola.

One of the most significant events of the period was the planned flight of three big Curtiss NC flying boats from New York to Europe. On May 8, 1919, the "Nancies" left NAS Rockaway and headed east. Beset with problems, only one, the NC-4, actually flew as planned to Lisbon, Portugal, landing in the harbor on May 27, having made the first transatlantic flight. The crews and their feat received national coverage but were largely forgotten until eight years later after Charles Lindbergh's spectacular solo



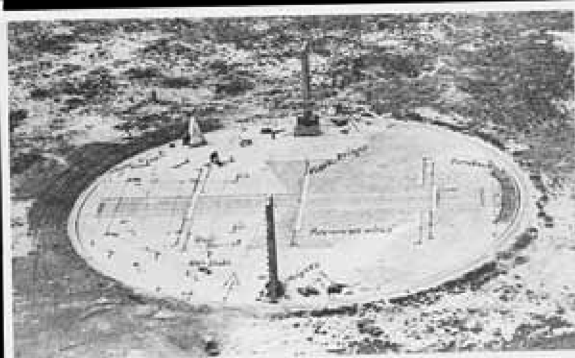
A Curtiss N-9H on the turntable catapult at the Philadelphia Navy Yard, October 1921.

flight across the Atlantic. Someone finally recalled that the Navy had done *some*thing like it a few years earlier.

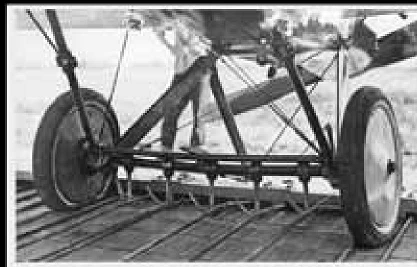
You can see the NC-4, restored and imposing as it greets visitors to our own wonderful National Museum of Naval Aviation at Pensacola, Fla. Next time you're down there, make it a point to see it.

On March 17, 1920, flight training was separated into heavier-than-air and lighter-than-air pipelines, with the period of training reduced from nine months to six months, all to alleviate a pilot shortage.

This Aeromarine makes an arrested landing in the maze of wires on the Norfolk installation in 1921.



The unique turntable installation at Norfolk showing the so-called fiddle-bridges-and-wire-arrangement.



A closeup of the spreader-bar hooks of an Aeromarine's main gear.

One solution to nose-overs was this cage-like affair mounted under the nose of this Douglas DT aboard *Langley* in March 1924. The DT was the first military aircraft from Douglas. It evolved from a single- to a three-seater and served as a wheeled-gear torpedo bomber or float-equipped scout.

A Sopwith Camel on its turret aboard USS *Texas*. The Camel shot down more enemy aircraft than any other Allied fighter of WWI, however, it was dangerous to fly, especially for neophytes. It was, thus, an odd choice for such obviously hazardous flying as from a ship's turret platform.

In 1919, authorization for the first American aircraft carrier, to be named USS *Langley*, gave focus to an ongoing series of activities, including development and testing of catapult and arresting-gear designs.

When the *Langley* was commissioned in March 1922, it quickly became a test bed for not only aircraft, but for the various systems that would eventually combine to create the aircraft carrier that we know so well today. The ship, a converted collier — when most fleet vessels were powered by coal and needed replenishment of that ancient fuel — was narrow of beam, and offered a correspondingly narrow flight deck, 534 feet long and only 64 feet wide. (Alignment was everything!) Its funnels had to be angled out during flight operations so as not to intrude on the meager deck space. However, it served long and well until World War II.

On February 27, 1942, after being struck by Japanese bombers, *Langley* had to be sunk by its accompanying destroyers with torpedoes and gunfire. By that time, its deck had been truncated and the old ship was no longer an operational carrier, but rather a transport, hauling badly needed Army P-40s to Java in the Netherlands East Indies.

The *Langley* included nearly everything we now take for granted in a modern carrier: aircraft, flight deck, catapult and arresting gear. The last item was, admittedly, a very clumsy, primitive arrangement that often resulted in bothersome tipovers and damaged props and wings. Almost from the beginning, refining the arresting-gear system became a priority.

A new design raised the cable over the flight deck with the help of vertically placed wooden boards, nicknamed "fiddle bridges" because of their resemblance to similar devices on violins. In August 1921, an unusual layout was constructed in Norfolk consisting of a turntable and these raised cables. Lt. Mel Pride [Alfred Melville Pride, 1897-1988] was in charge of the project. The new design would be installed in *Langley* after testing ashore.

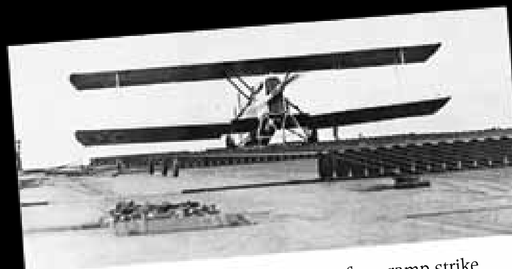
One of the aircraft often used for testing early developments was the Aeromarine, a late World War I design barely able to attain 73 mph with its 100 hp Curtiss OXX engine. With the turntable pointed into the wind, the 24-year-old lieutenant. Pride taxied his Aeromarine toward the turntable, aiming for the wires, barely making 15 mph. Judging his position, he gunned the engine, becoming airborne for a few seconds before retarding the throttle and settling down into the wires with the control wheel buried in his lap. The aircraft's main gear screeched across the platform as the hooks mounted on the spreader bars scraped into the fore-and-aft wires. The tailhook then picked up the cross-mounted wires on the fiddle bridges.

Although the test was successful, everyone knew more was needed. Pride remembered the arrangement Eugene Ely had used in 1911, 10 years before when he flew aboard the USS *Pennsylvania* (ACR 4). He had used cross-deck mounted wires weighed down by sand bags.

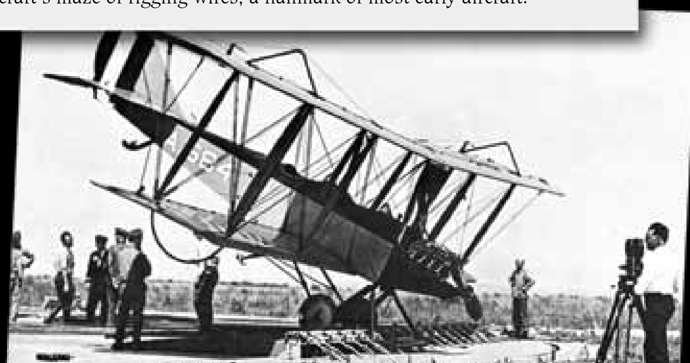
During a 1976 interview, now-Admiral Pride commented on the development of the arresting gear.

"I felt Ely's concept was essentially sound. We had to modernize the concept, of course. To me, that meant estimating the kinetic energy of a landing airplane and converting this into potential energy via a system which could be closely predicted to absorb it. This indicated the early weight system. By using appropriate weights and hoist heights, a plane could be landed, engage a cross wire, and run out properly without going too far or being halted too abruptly."[1]

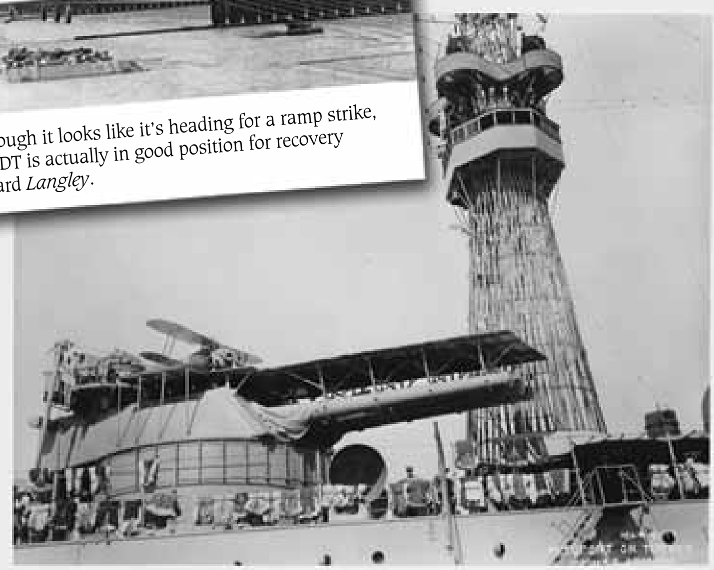
An Aeromarine possibly heading for the turntable installation at Norfolk. The hooks on the main gear spreader bars show up well as does the aircraft's maze of rigging wires, a hallmark of most early aircraft.



Although it looks like it's heading for a ramp strike, this DT is actually in good position for recovery aboard *Langley*.



An Aeromarine come to grief in the land installation. Nose-overs were not unusual. Note the fuselage-mounted hook, a precursor of our familiar modern tailhook.



A Nieuport 28 sits on the forward gun turret of the USS *Arizona* (BB 39). The Navy obtained 20 of these frail French WWI fighters from the Army in 1919 and fitted them with flotation bags for use aboard ships. Note the "basket weave" main mast, replaced in 1929-1931. Although not used in combat by the French, the N. 28 scored the first U.S. kills flown by American aviators from American squadrons.

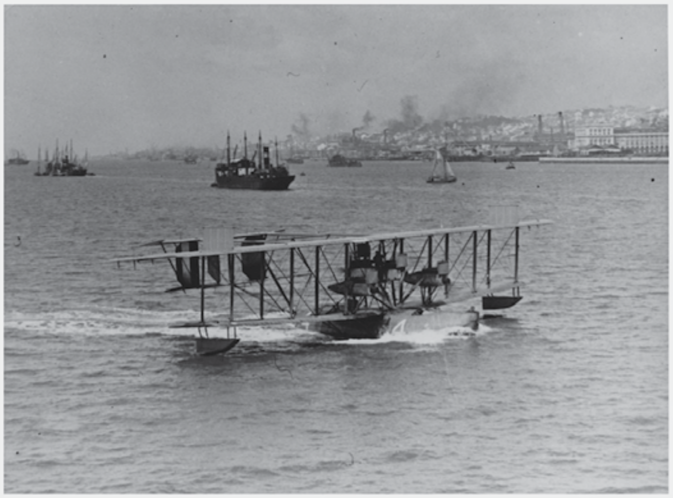
(Pretty fancy thinkin' fer an aviator!)

Even with this important conceptualization, there continued to be problems, especially with keeping the longitudinal wires and axle-mounted hooks. Noseovers and overstressing the gear still were common. Admiral Pride continued:

"The trick was to land without bouncing, if possible, and to be going straight up the deck. Then you had to haul back on the flippers [early nickname for the elevators—author] as soon as flying speed was lost.

The line of effort of the hook passed above the center of gravity of the airplane thus providing a righting or nose-up moment that was sometimes insufficient to overcome the noseover moment.

Those in … authority were almost obsessed with the need for fore and aft wires. The consensus was that without them … aircraft would



The NC-4 sets down in the Tague River off Lisbon at the end of its record-breaking flight, May 1919. The engine placement shows off well, with two single outboard tractor engines and a dual arrangement in the center with a tractor and a pusher arrangement.

The earliest time period that the Naval Safety Center possesses mishap statistics is the early 1920's. The equivalent of a class A mishap was an event where at least one aircraft was destroyed.The following displays the number of destroyed aircraft events and the rate per 100,000 flight hours in the first three years that were recorded:

Year	Hours	Events	Rate
1923	52,586	74	140.72
1924	58,907	103	174.85
1925	63,791	64	100.33

surely go over the side."[2]

The fore-and-aft lines were eventually done away with, leaving the cross-deck pendants so familiar today. Tailhook designs were constantly being refined and the cables strengthened along with a myriad other improvements, all pointing toward a viable recovery system, whose basics we still use today.

On October 17, 1922, a Vought VE-7 made the first launch from an American carrier by an American Navy aircraft, flown by Lt. Virgil C. Griffin, this while the *Langley* was at anchor in the York River in Virginia. A week later, on October 26, LCdr. Godfrey DeC. Chevalier (Naval Aviator No. 7) flying an Aeromarine 39B made the first landing on a U.S. carrier while underway, with *Langley* now off Cape Henry. This event heralded the thousands of such recoveries in the years to come. Not just in the U.S. Navy, but for many other navies across the globe.

Endnotes:

[1] *Naval Aviation News*, August 1976. "Turntable and Traps," Cdr. Rosario Rausa, USNR

[2] Ibid

The author would especially like to thank Capt. R. "Zip" Rausa, USNR (Ret), for his help with historical research, Joe Gordon and Laura Waayers of the Naval History and Heritage Command, and Nicholas Thrasher of the Naval Aviation Museum Foundation for their help with photo research.

MR. MERSKY WAS THE ASSISTANT EDITOR THEN EDITOR OF APPROACH FROM 1984 TO 2000. A RETIRED NAVAL RESERVE COMMANDER, HE HAS WRITTEN EXTENSIVELY ON NAVAL AVIATION AND WAS THE 1999 RECIPIENT OF THE NAVAL AVIATION MUSEUM FOUNDATION'S ADMIRAL ARTHUR W. RADFORD AWARD FOR EXCELLENCE IN WRITING ON THE SUBJECT, AND THE TAILHOOK ASSOCIATION'S 2003 CONTRIBUTOR OF THE YEAR.

The narrowness of the *Langley's* flight deck is obvious. Note the two stacks slightly aft of mid-ship.

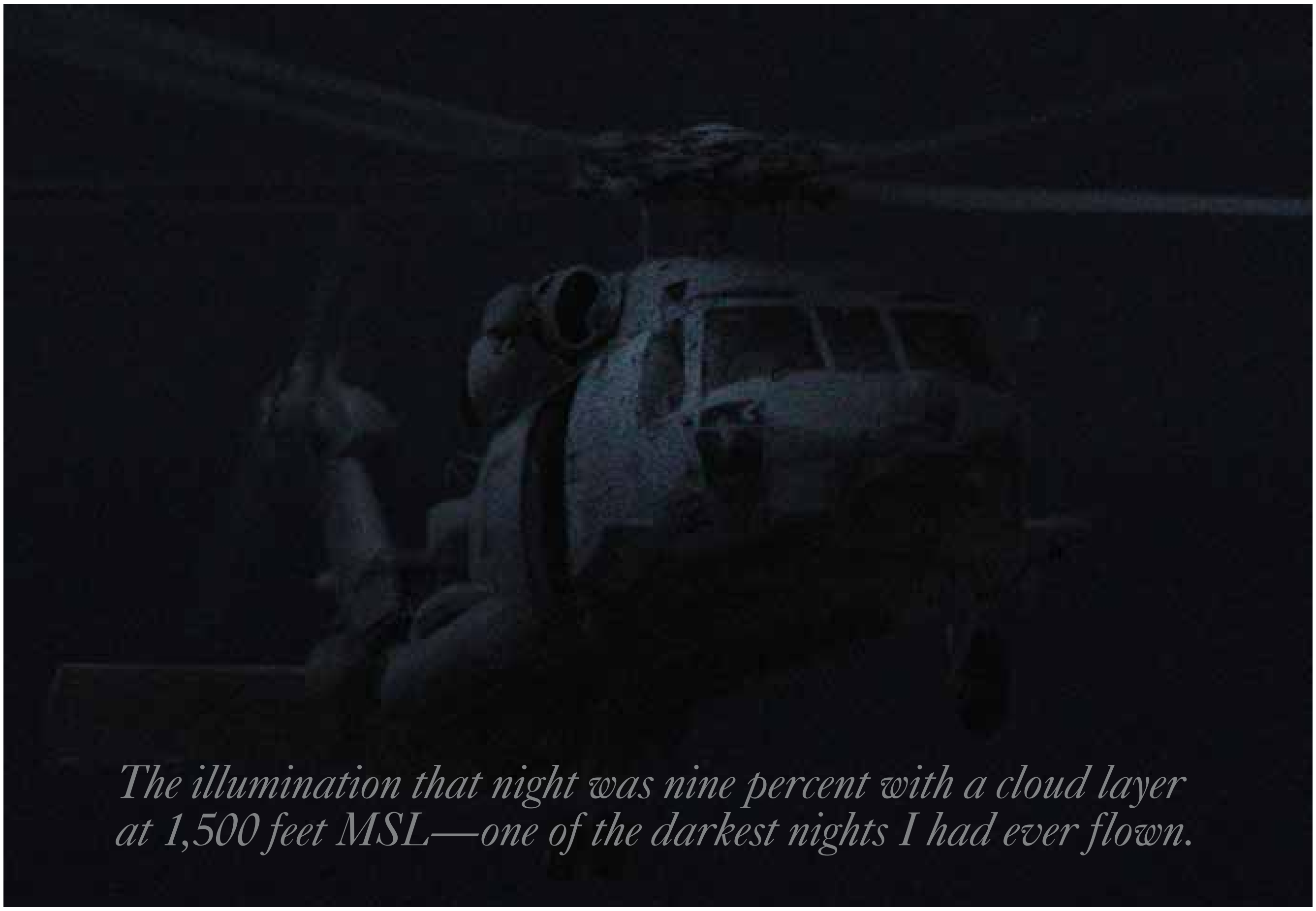
My First Sea Story

BY LTJG PATRICK MAGNO

As aviators, we often practice basic familiarization maneuvers and procedures to train our muscles and brain to act instinctively. As a young pilot, qualified in model (PQM) and not yet having made helicopter second pilot (H2P), I've found that a large amount of experience gained in the rotary-wing community is through sea stories told by senior helicopter aircraft commanders (HACs), and by simply experiencing things firsthand. Little did I know that I would experience my own sea story so early in my career.

We had just completed our week-one workups (WOWU) and were flying our last anti-submarine warfare (ASW) mission of a MidPac exercise known as KOA KAI. One of the events scheduled during our flight was an opposed replenishment-at-sea (RAS) mission. We launched off USS *Port Royal* (CG 73) about an hour and a half before sunset in EasyRider 53. This was my first time underway, and I relied heavily on my HAC to keep the flight flowing smoothly. After takeoff, we made the "Ops normal" call to the landing safety officer (LSO), with just over three hours of fuel onboard.

Two hours into the flight, we decided to put on our night-vision goggles (NVGs). According to the exercise schedule, the event would be completed around 1915,



The illumination that night was nine percent with a cloud layer at 1,500 feet MSL—one of the darkest nights I had ever flown.

and the ship would set flight quarters at 1930 for a 2000 recovery. We noticed our ship started their approach for the opposed RAS about 30 minutes late and commented, "They better finish up quickly." This comment would come back to haunt us later.

Ten minutes before setting flight quarters, my HAC called our antisubmarine/antisurface warfare tactical air controller (ASTAC) and asked when they would be setting flight quarters. The ASTAC responded, "We are still in the middle of the RAS, request you land somewhere else to get gas, so they can complete it."

Immediately, the "They better finish up quickly" comment came back to haunt us. We set max endurance airspeed and realized this last flight of the underway period would not be routine.

WE ONLY HAD ABOUT AN HOUR left of fuel until we reached our standard-operating-procedures (SOPs) limit that states we must be on deck with no less than 600 pounds. My HAC promptly relayed this information to the ship. He also told the ASTAC the aircraft was limited on flight hours because of required maintenance and could not support the request.

The ASTAC gave our crew this most unfortunate response: "The TAO said we are going to complete the RAS and need you to land somewhere else."

My HAC immediately responded, "I need to speak to Air Boss, now!"

After what seemed like forever, the Air Boss came on the radio, and the HAC relayed the situation. Several options were discussed. We could have the ship perform an emergency breakaway, land during the RAS after the aft-fueling station was disconnected, wait until the entire RAS was complete, or finally, divert for gas to another ship in the exercise. The breakaway was denied by the ship's captain, because he said they only needed to fuel for 30 more minutes. We also decided against our landing during the RAS, because the ship couldn't adjust course for winds and secure the ships lighting for NVG operations. It was a very dark night with a cloud layer.

We had the gas to wait the additional 30 minutes, but this did not leave us with much room for error, and, as my HAC pointed out, ships always underestimate how long things will take. We decided that less risk would be involved if we landed on another platform, hot pumped, and remained on deck until our ship was ready to set flight quarters. As this discussion took place, the Air Boss had gone out over chat to all the ships in the exercise to find a ready deck. USS *Russell* (DDG 59) agreed to support us. Within five minutes we learned *Russell* was setting flight quarters, and we were told to contact them as soon as possible. We quickly changed over our radios and established communication with them. We made an initial steer to north, and the ship was less than eight miles away.

The illumination that night was nine percent with a cloud layer at 1,500 feet MSL—one of the darkest nights I had ever flown. We had 1,300 pounds of fuel remaining, heading toward our divert ship at maximum-range airspeed. USS *Russell* is a flight I, guided-missile destroyer. In LAMPS this means no hangar, a three-degree sloping flight deck, an angled-approach profile and no trap to land in. Our crew had never landed on a flight I DDG, and the aircrewman and I had never landed on a destroyer. Also, flight I DDGs do not routinely conduct flight operations, so we were expecting an inexperienced flight-deck crew.

To add another element into the equation, the ship requested we do six landings after the approach to get the ship's flight-deck crew their flight-deck pay for the month. My HAC discussed this with Air Boss, and we agreed to do the additional landings only if they would accept yo-yo landings with no additional approaches. We received the numbers, executed the mission-change and the before-landing checklists and reconfigured for a clear-deck landing. We discussed time critical risk management (TCRM) items for our current situation.

As we spotted the destroyer, some of our fears of inexperience were realized when we noticed that none of their lights were NVG compatible. We made a few orbits while assisting the ship in reconfiguring for night-vision operations, and after some trial and error, the appropriate lighting configuration was set. To add to the inexperience, at about one mile, we realized it was an offset approach and quickly adjusted. Once over the deck, my HAC asked our aircrewman to clear the tail from any obstruction and verify it was over the deck. The aircrewman rogered, and all of a sudden, we were on deck.

We had some miscommunication in the cockpit when the flying pilot thought this was a confirmation that his tail was clear and the main wheels were in the circle. However, tower called and told us to lift immediately because our tail wheel was too close to the deck edge. We repositioned farther forward on the flight deck. We continued with the additional landings, and then secured with chocks and chains. While sitting on deck spinning, we experienced max rolls for a flight I DDG. The rolls were unnerving because the numbers passed did not reflect this condition.

We had about 900 pounds of fuel before we started hot pumping. We were told USS *Port Royal* still had another 30 minutes left to complete their RAS. As the scenario calmed down, we realized that if we had tried to push things and had not diverted, we could have run out of fuel while waiting for the RAS mission to end. Thirty minutes later, the RAS was complete and flight quarters had been set. We passed this information to tower, and were given a green deck to pick up and depart. After a long night, we were on our way home.

A HAC must expect the unexpected and be mentally prepared to react and adapt to an ever-changing environment. The ability to analyze each situation and mentally play the what-if game is just as important to a HAC as practicing basic familiarization skills and procedures. I had a steep learning curve that night. I learned an important lesson, and got material for my first sea story. This night will forever be in my back pocket for later on when I am the aircraft commander.

LTJG. MAGNO FLIES WITH HSL-37.

Straight Outta Compton

BY LT CHRIS SALOMON

As a new helicopter aircraft commander, I was eager to assume the responsibility of taking an aircraft and crew on a weekend cross-country. I was given the chance when I volunteered to fly to the Compton/Woodley airport, which is near Los Angeles, to provide a static display for the airport's aviation career fair and air show.

I coordinated with the air show point of contact to get details for the event, including where they intended to park our 20,000 pound SH-60B and a sister squadron's MH-60R amongst their modest collection of light civil aircraft. They had decided to park us away from the other aircraft to make sure we had plenty of space. Someone would direct us to our parking spot. Sounds good, right?

As we approached the airport, we transmitted the standard calls for operating at a non-tower controlled airfield. He announced our intention to land on the common traffic advisory frequency (CTAF). Our intent was to fly a normal approach to the midfield numbers, find our plane director and ground taxi to our parking spot. On our approach, we made an "on final" call and were directed by someone monitoring the frequency to proceed to land at the numbers, which were about 1,500 feet past the approach end. As we arrived at the landing spot, we found the area covered in orange cones. We called that we couldn't land at the spot as directed and were told to air-taxi back to the front of the runway for landing.

NATOPS states, "It is important to consider the effects of rotor downwash and the ground vortex on personnel and other aircraft, particularly much lighter civil aircraft."

As we pulled power to arrest our rate of descent to abort the landing, I observed that our rotor downwash had blown freshly cut infield grass over numerous civil aircraft parked on the runway, as well as the crowd that was gathered to see our arrival. As we pedal-turned back toward the approach end of the runway, I pulled in more power to get away from the ground and to stop blowing the grass. We then set up for a landing at the approach end of the runway, away from the other aircraft.

... coming closer to the ground, the aircraft's rotor downwash started to kick up more debris, making it difficult to see anything but the ground immediately around the aircraft.

We reached the approach end of the runway, but the taxiway adjacent to the runway didn't seem wide enough to allow our aircraft to taxi on the ground. As before, coming closer to the ground, the aircraft's rotor downwash started to kick up more debris, making it difficult to see anything but the ground immediately around the aircraft.

We couldn't taxi to the line if we had landed on the runway, so we decided the ramp was the best place to land. I pedal-turned and slid the aircraft toward the ramp to set down. Immediately after transitioning to the hard surface of the ramp, the amount of the debris significantly decreased. As I set the aircraft down, our aircrewman noticed that a previously unobserved small plane, about 50 yards away, was not secured to the ground. It was turning in its

spot, causing its wingtip to hit a nearby building. The aircraft was constructed of light materials with fabric-covered wings. Our crew hadn't noticed it because of the airborne debris.

After a heated, one-sided conversation from the plane's owner, I was assured by the air show's organizers that the damage was minor and could be fixed quickly. The plane was up flying a few days later, and the plane owner's business wasn't significantly interrupted. We had avoided some bad PR, so the consequences of our loss of situational awareness were minimized.

I learned several valuable lessons. First, because we normally operate at military fields specifically designed for large aircraft, it is easy to underestimate the power of our rotor downwash. NATOPS gives very clear guidance on what to expect when operating around light civilian aircraft. Also, we would have avoided the incident altogether had we not misjudged our inability to ground taxi versus air taxi on to the ramp. When operating at an uncontrolled field, as the pilot in command, it is your responsibility to maneuver your aircraft to make sure the safety of everything else at that airfield; be careful whom you let impact your decision making.

I should have flown a "recce" pass, which would have allowed us to identify the best course of action for landing and to make sure we were aware of all of the aircraft parked at the airfield.

LT SALOMON FLIES WITH HSL-49.

A Deeper Threat

BY CAPT JOHN BOUCEK, USMC

While preparing for a reconnaissance mission over San Clemente Island, I reviewed the mission's sequence of events. As is my habit before every hop, I mentally rehearsed the admin, tac-admin, mission objectives and emergency procedures. However, nothing could have prepared me for the type of exposure my body was about to experience.

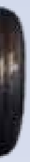
The sortie was scheduled to be a standard day, Case 1 launch, tank, check in for tasking, execute reconnaissance, and come back for the good-deal trap at sunset. I had 170 hours in the Hornet, very few of which had been flown from the carrier. Much of my attention was still focused on the basic admin and tac-admin procedures around the ship. My experience level played a key role in my ability to focus on the most rudimentary skill sets required in the carrier environment.

I saluted, grabbed the canopy handle, leaned forward in the seat, and took cat 1 for a ride. While outbound from the ship, I immediately noticed an abnormal flow of air from the environmental control system (ECS). Once established in a climb, I switched the ECS to manual, with no change in the system. I turned the temperature-control knob, but it had no influence on the flow of cockpit air. The air flow remained comfortable; however, it was colder than usual.

After the rendezvous on the tanker, I had difficulty hearing other aircraft transmissions as the ECS airflow intensified and got progressively louder. Twenty minutes into the flight, I set all the radios to max volume. This selection made it hard to distinguish which radio had received a transmission without looking at the upfront control (UFC).

I told lead of my difficulties with the ECS and the effect it had on the radios. We kept troubleshooting and decided to press on with the mission. When we reached our area of operation, the airflow volume continued to increase while the temperature plummeted. The cold became an annoyance, but not severe enough to jeopardize the mission. Lead and I maintained an ongoing dialogue. Throughout the flight, I manipulated the ECS controls to every possible configuration—to no avail.

My next indication of the rapidly deteriorating conditions was the seemingly locked defog handle. The increased cold airflow froze the handle so that I needed two hands to operate it. I slammed the defog handle



Who among us would choose to call base and tell them we are not going to complete the mission because we are cold?

forward to keep the airflow off my hands as much as possible. The redirected airflow allowed my hands to maintain sufficient tactile function and dexterity to operate switches.

About one hour after launch, as we neared the end of the mission, I tried to write some notes on my kneeboard. I couldn't get my pen to write, so I pulled out the pen I keep in my sleeve—it didn't work either. I opened my bag to find my water bottle had crystallized with ice on top. The conditions in my cockpit had deteriorated at such a rate that I needed to speak up before being boxed into a corner.

WHEN WE FINISHED OUR MISSION, we checked out with the E-2 overhead San Clemente, and I joined up with my flight lead. Fifteen minutes later, I began to lose feeling in my hands and fingers. The information passed to my brain grew increasingly vague. I had to consciously watch my hand push each button or switch to confirm that I had actually pushed it. I trimmed the jet with my palm because of the lack of finger dexterity. My jaw stiffened, as well—speaking required more effort. The flight rapidly evolved into intense discomfort.

I checked in with marshal, and told my lead that I needed straight-and-level time. I removed my gloves and mask, and breathed into my hands.

We called the squadron rep on the auxiliary radio to include him in our decision matrix. The rep quickly determined that NATOPS did not have a course-of-action for ECS stuck in full cold. In lieu of an appropriate procedure, he referenced "Cockpit Temperature High." We decided to descend and move the cabin-press switch to the RAM/DUMP position to dump the cabin pressurization and raise the temperature. The decision to dump the cabin pressure successfully halted the decrease in temperature, and while it remained cold, it prevented further degradation.

Lead wrote down my marshaling instructions and read them back to me. I carved my push time, holding radial and DME into my kneeboard. I noticed my mind internalizing and losing focus while I worked my timing problem in marshal. The sun quickly escaped the horizon, barely leaving behind a sliver of ambient light. My teeth chattered as I assessed whether I could fly the approach without an unnecessary elevation of risk. I could have easily diverted to North Island if I had not been comfortable with my physical state. Having breathed into my palms to warm them and at a lower altitude, I began to regain sensation in my hands. I now felt comfortable making the approach.

We told the squadron rep that we could recover on a standard CV 1 approach. We coordinated with marshal to have lead fly a loose formation off me to monitor my progress. He supervised my holding, made sure I leveled off at the proper altitudes, and turned to the correct headings. If any problems arose, I could have easily found him off my left wing and diverted to North Island. I pushed out of the marshal stack first and returned for an uneventful trap.

I parked the jet and opened the canopy to a welcome rush of warm ocean air. Every display in the jet immediately fogged up. I climbed out and noticed that I couldn't feel the ladder under my feet. I had not realized that my feet had become completely numb. During the next two hours, the sensation in my hands and feet gradually returned. I successfully walked away from my first winter in the Hornet.

The maintenance analysis showed that the cabin-air-flow-temperature sensor had failed. Also, the seal within the cabin-add-heat valve had a leak which resulted in a "full cold" condition. The system-flow-modulating-pressure-regulating valve (SMRF) received inaccurate information from the failed sensor, which resulted in strong airflow regardless of the settings on the ECS panel. Maintenance removed and replaced the faulty sensor and the cabin-add-heat valve. The aircraft returned to service.

There were several important takeaways from this flight. First, there was a lack of established NATOPS procedures to help guide me through this situation. My slow recognition of the deteriorating conditions could have resulted in a divert to North Island or more drastic measures. Currently, there is not a checklist in the Hornet NATOPS that addresses ECS full cold. However, steps can be taken to help you in the same situation. Descending and switching the cabin-pressurization switch to RAM/DUMP earlier might have alleviated the drastic decrease in temperature. I thought about requesting a Mode 1 approach, but the ship's system was not working that day. As a last resort, you could shut off your engine bleeds, but you must keep in mind the critical systems you will lose (such as OBOGS, cabin pressurization, anti-G and external fuel transfer). Cockpit temp high is a good reference point for the other systems you can manipulate.

Second, our continuous crew coordination was vital to making the proper decisions and keeping the right people informed throughout this emergency. CRM and ORM allowed the team to make an educated decision to bring me aboard, and was vital in risk mitigation.

Last, and most significantly, I learned an important lesson about hubris. In hindsight, my focus on the mission, rush of adrenaline, and increased blood flow all contributed to heating my body. I did not know that the cockpit would cool at such an exponential rate. My focus on the mission allowed me to ignore external environmental factors while I was "in the zone." Only after everything settled down, and I had a minute to relax, did I recognize the severity of the situation. Like most Hornet emergencies, the proficiency and experience of the pilot dictates how the emergency concludes. However, this emergency affected the pilot on a more personal level, because it challenged both the pilot and his ego. Type A personalities don't exude submission. Who among us would choose to call base and tell them we are not going to complete the mission because we are cold?

This question points to a potentially deeper threat to our community: pride. If we find ourselves considering what our peers may think, we are wrong. We usually have black and white answers in NATOPS that tell us what to do and when to do it. In this case, there is nothing in NATOPS that addresses ECS full cold. Understanding your systems and a deeper knowledge of NATOPS will greatly increase your success rate in handling situations. We often take a jet flying with degraded systems. However, we remain confident it will get us to and from our area of operation without significant complications. We rarely consider the degraded pilot.

The above scenario demonstrated that an aircraft can fly flawlessly, however the pilot can potentially become the weakest link.

CAPT BOUCEK FLIES VMFA-323.

Decision Making
Assertiveness
Mission Analysis
Communication
Leadership
Adaptability/Flexibility
Situational Awareness

Point Of No Return

BY LT JUSTIN L. REDDICK

It was a good night for a combat flight in Operation Enduring Freedom (OEF), and I was scheduled to fly a close-air-support (CAS) mission.

To prepare for my brief, I harkened back to a discussion our ready room had had a few weeks earlier concerning land-as-soon-as-practical versus land-as-soon-as-possible emergencies, with emphasis on the worst-case scenario of a single-engine emergency. The ready room took into account the time-distance problem, winds at altitude, the effects of drag on a single-engine aircraft, and, finally, the time involved for a flight-deck pull-forward.

Once we crunched the numbers, we agreed on a turn-around point that allowed a single-cycle recovery on the boat. If you were any further north of this point, the best option would be to press in-country toward the primary divert of Kandahar. Little did I know I was about to put this NATOPS “science project” to the test.

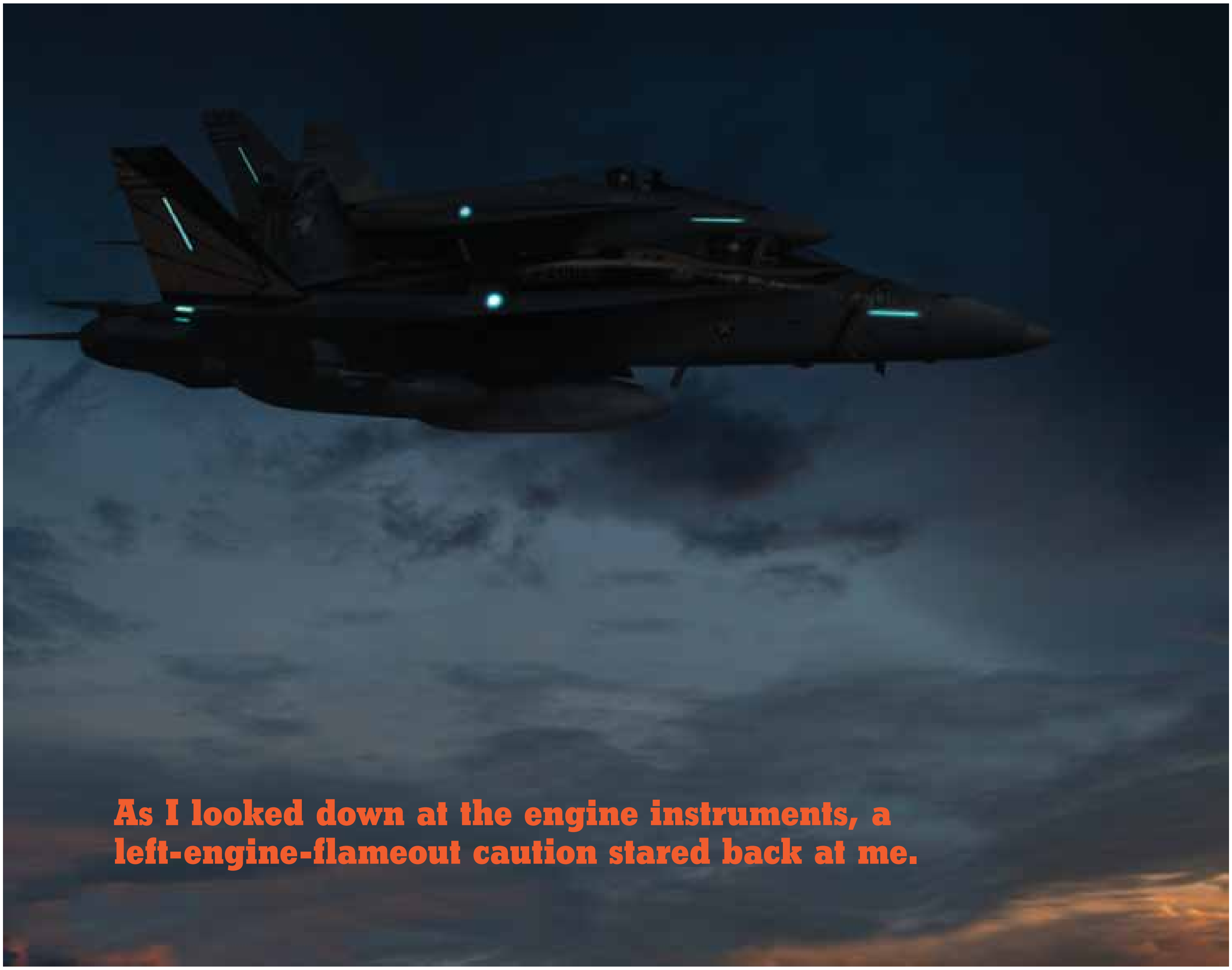
During my brief, I discussed a game plan for dealing with land-as-soon-as-possible emergencies. The rest of my brief was focused on the mission and supporting the troops on the ground. Soon, my wingman and I were airborne and in-country on the boulevard. Everything was going as advertised until I heard the sound that no Hornet pilot ever wants to hear: The sound of Betty’s voice announcing an engine problem.

After the initial “engine left” alert, I looked down to discover a left engine, oil-pressure caution, accompanied by significant fluctuations in the oil pressure. After executing the NATOPS boldface pro-

CRM 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



As I looked down at the engine instruments, a left-engine-flameout caution stared back at me.

cedure of throttling the engine to idle, I keyed the mic and told my wingman about the caution. No more than 10 seconds passed before I felt the aircraft surge. As I looked down at the engine instruments, a left-engine-flameout caution stared back at me.

My immediate thought was, "Where am I on the boulevard?" Looking down at the HSI, I realized I was approaching the point of no return.

From our ready-room discussion I knew the best option was to make a U-turn and head back toward the boat. As I did so, my next thought was to get my wingman in the loop and have him break out the PCL. With regard to safety of flight on the boulevard, I made a quick call on boulevard common to broadcast my intentions. Fortunately, the winds at altitude on the boulevard were about 30 knots, a sharp contrast to the 80-knots-plus winds we had seen during the last few days.

I got established southbound and realized it would be nearly impossible to maintain altitude on a single engine with a combat loadout. My wingman began to read the procedures for flameout, single-engine approach and landing. I throttled off the left engine and placed the right engine at mil power. Still unable to maintain altitude, I started a slow 100 to 200 fpm rate of descent to maintain 250 knots.

I AGAIN MADE A CALL on boulevard common, announcing I would not be operating at the published boulevard altitudes. Seeing how difficult it was to maintain altitude, and knowing that I wanted more options with respect to fuel and time, I told my wingman to start reading the procedures for selective jettison. I had to get rid of my ordnance.

... I told my wingman to start reading the procedures for selective jettison. I had to get rid of my ordnance.

After hearing my calls on common, several other aircrew offered assistance. A KC-10 offered to stay with us and provide fuel options in case of divert. A section of Hornets from our sister squadron offered to help on their return to the boat. Using my newly acquired CRM options, I cleared my wingman off frequency, had him contact the Hawkeye, and relay details of my emergency to the boat. These details included my desire to recover early, to have alert tankers ready, and, finally, to request a pull forward.

As my wingman started coordinating, I filled in the other section of Hornets on my emergency. I told them that I had cautions normally associated with single-engine operation, and also a FLAPS OFF caution with channels 1 and 4 of the left LEF X'd out on the FCS page. We quickly discussed divert options should the single-engine approach not go as planned. We then double-checked all the NATOPS steps that I had completed.

We now were feet-wet again, and I had lost about 5,000 feet of altitude. As I pointed toward mom, I prepared to jettison my ordnance in the carrier-operations-area (CVOA) box, and I caught my last glimpse of the sun as it disappeared below the horizon. I was headed for a night trap.

I was now within comm range of the boat and switched the section over to the squadron-rep frequency. The skipper came up on the other end, and I filled him in on the emergency, the NATOPS steps taken, and my current fuel state and burn rate. I finally expressed my intentions to jettison my ordnance in the CVOA box. He rogered up all the steps and then backed me up as I prepared to jettison.

A crucial step in the CRM process was the final step of the select-jettison procedure. To make sure that I did not accidentally push the EMERG JETT button, the skipper directed me to grab the parking-brake handle with my left hand and use my left thumb to press the SEL JETT button. After my wingman and I checked one last time for any surface contacts below us, I jettisoned the bombs.

With an increased max-trap weight and aircraft maneuverability, I could focus entirely upon the single-engine approach. Feeling more confident about a single-engine recovery, and with two sweet tankers airborne, I had my wingman tell the KC-10 that we would work organic-tanking options if needed. The KC-10 departed shortly thereafter. I cleared off my wingman and worked directly with the rep to get the jet on deck. The next alligator closest to the canoe was the configuration change with the FLAPS OFF caution.

Stepping through the NATOPS procedures with the rep, we agreed the best course-of-action would be to start a descent to 10,000 feet, and then do a controllability check. Once slowed and configured, we checked for any associated BLINs or FCS cautions. Satisfied with the check, I pressed the FCS reset button, and the FLAPS OFF caution and Xs cleared.

Ready to come aboard, I talked through my landing checklist with the rep, confirming we had double-checked everything. Paddles came up on frequency to talk me through the single-engine approach. As I made my way down and got established on final bearing, I took a moment for one final cockpit sweep. I adjusted my aileron and rudder trim to account for single-engine operation and found that line-up would be extra challenging because of the asymmetric thrust. Paddles did a great job helping me with the lineup and power calls. Once I had the ramp made, they gave me a smooth talkdown into the wires.

More than anything, this emergency was an exercise in CRM. The communication portion of CRM is usually the portion that is first to deteriorate. Everyone, including my wingman, the other Hornet crews, and squadron rep worked well together. The KC-10 crew also provided options that factored in to the decision-making process. Finally, the flow of information ensured that NATOPS procedures were followed; this allowed for a single-engine approach and landing aboard the boat. Had our ready room not had this discussion and worked out the point-of-no-return numbers, this situation could have gone poorly. Preflight planning and preparation will always set you up for success.

LT REDDICK FLIES WITH VFA-151.

Seat Secrets for Hover Lovers

BY LTCOL JACK CRESS, USMC (RET)

At this year's NHA gathering in San Diego, a Sierra helo seat display attracted attention, and brought questions from across the HSC, HSM and HSL communities. With a background in helicopter seating, the author hopes to provide several seat-safety insights in response to common questions.—Editor.

Helo seats don't offer a face curtain or a transparency penetrator — not that you'd want to take a ride through the rotor. But the energy-attenuating, "crashworthy" seat in your Romeo or Sierra shares a lot of physics with its fast-mover counterpart, and the bottom line mission is the same: to let you walk away from a flying machine that isn't anymore.

On the surface, flying might seem like a simple job: You strap in, and if the bird stops flying, you try to get it to a good spot, and land softly enough so that the pax, you and the rest of the crew will get out — fit to fly again on a better day. But if you've seen a mishap, you know it may not be all that easy. Some of you may have taken a course on the elements of crash survivability. If so, you remember that handy CREEP acronym:

C: Container
R: Restraint
E: Environment
E: Energy attenuation
P: Post-crash factors

Many design disciplines are involved in providing you a container (think fuselage) robust enough to weather an unpleasant impact without damaging you. NavAir and Sikorsky have done a good job of that, so let's just take the protective container as a given for this discussion, and move on to the R.

The first thing that comes to mind is the harness that holds you in the seat. We've made periodic mods to improve items such as buckles and adjusters. Cockpit air bags aside, "it don't get no better" than the harnesses you have. This includes the MA-16 inertia reel, with the traditional and the newer tri-axial sensor-locking mechanisms built into it. It's always best to manually lock it when things are turning to worms. If you are tight in black straps (sunlight has not weakened and bleached them), you can bank on your harness system doing you right. The robustness of the seat and its floor-interface hardware is also part of the restraint equation, which your airframer and seat designer have also well addressed.

Now, about that first E in CREEP. It relates to environment, which in this case, refers to the "stuff to run into" when you thrash in a crash. That, too, is a topic for another day, except to remind folks like SENSOs that the console is stuff that they don't want to slam into. Those checklist items (harness locked, seat up, seat back) definitely will enhance your chances of avoiding an environmental violation.

What about that second E, energy attenuation? Because most unplanned chopper landings involve a significant vertical-velocity component, let's stick to energy management in that axis. What's working for you? Well, the first line of defense, if this let-down is to terminate on terra firma, is the landing gear. Depending on which bird you're flying, the gear could absorb as much as 30 feet per second (fps) of descent rate before belly contact. Depending on your T/M/S, you can expect to tell the "there I was" story afterwards, with impact velocities of 50 fps or more. In this terra-firma scenario, your body is protected from the deceleration which will bring the fuselage – and you – to zero on the VSI. Like a car's front end, the bird's belly will provide some of that helpful crush zone, but the seat's energy attenuators (EAs) become primary in saving you from the instantaneous decel.

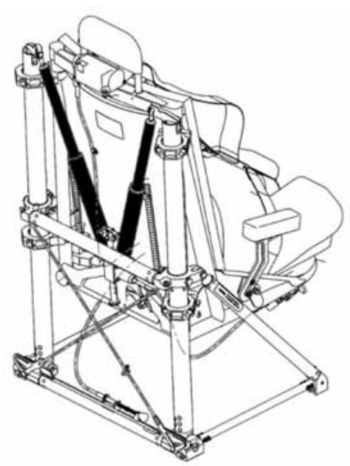


Fig. 1: SH-60B/F and MH-60R seat

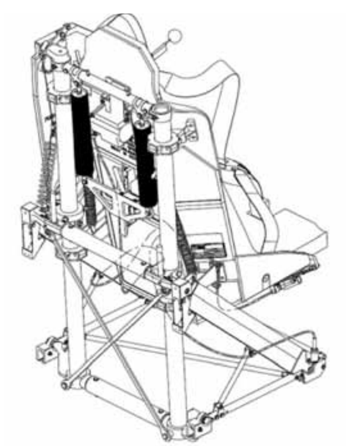


Fig. 2: HH-60H and (1st gen) MH-60S seat

How does this work? Are those cylinder-like EAs that you see on the back of a Bravo, Fox, Hotel, Romeo or older Sierra seats (see Figs.1 and 2) like a car's shock absorbers?

Not really. Most shock absorbers (like in a car) use some kind of a fluid (in a damper) to lessen the shock. However, all current energy-attenuating helicopter seat EAs, even those black cylindrical ones, attenuate the energy the body experiences by permanently deforming metal in one way or another. The ones of the B, F, H, R and Block 1 S seats are called inversion tube EAs (see Fig. 3), while the newer Sierra seats use wire-bender EAs (Fig. 4).

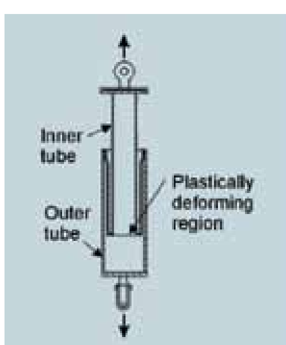


Fig. 3: Inversion tube energy attenuator

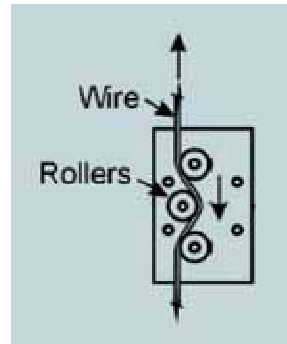


Fig. 4: "Wire Bender" Energy Attenuator

That may be cool, but we haven't quite described the seat's butt-saving system. What energy are we talking about? We could get fancy with equations and all, but no need, if you'll accept the following: Energy has the same units as work (inch-pounds or foot-pounds). So, the seat is designed to manage the crash energy transmitted to you by controlling the force (pounds) on the seat bottom, right there, beneath yours. If this is done right, the abrupt and very high G deceleration of the aircraft's impact is moderated by controlling loading (pounds) and stroking (vertical seat movement in inches or feet), so that you're subject to a lower G level over a longer period of time.

How does the seat know when to stroke? Another way of asking the question is, "How many G's can a crew member take (we're talking vertical G's) with a reasonable probability of avoiding spinal injury? In a milspec EA seat, that number is 14.5 G's. When the seat is G'd to that level, the EAs then allow the seat bucket to stroke. That combination of high load (pounds) multiplied by stroking distance (inches or feet) determines the crash energy attenuated by the seat: This is the energy you absorb at the highest G level which is unlikely to hurt you. Just to be clear, if you didn't have an EA (crashworthy) seat, your body (spine) would be subjected to a briefer period (milliseconds) of high, injurious Gs. With an EA seat, your spine gets a tolerable G level over a longer period (think stroke).

Where did that 14.5 G number come from? How do we know just how much vertical G your spinal column can take before you can expect serious injury? It's not the G load that causes the injury, but rather the resulting vertebral load (pounds) to your spine. It was only 40 years ago that pioneering seat designers established (via tests on animals and human cadavers) 14.5 G's as the level above which a typical military aviator would expect an unacceptably high probability for significant spinal injury. Getting a bit more into these weeds, let's look further into what this means.

For ease of calculation, let's assume you're a female aviator on the lightest end of the weight scale (5th percentile female, by weight), so that with your gear, you weigh 125 pounds. About 80 percent of that weight (head, arms, torso and thighs) acts on the seat (60 percent of the total weight carried by the spine into the pelvis). At 14.5 vertical G's, the seat bottom supports 1,450 pounds. Similarly, suppose you are a male on the other end of the weight scale (95th percentile male), and weigh 250 pounds with your gear on. Eighty percent of that is 200 pounds, so that at 14.5 G's (a crash event), your seat bottom is supporting 2,900 pounds.

How does the seat know if you're military? The seat obviously doesn't know if you're a military aviator, but it is designed for an occupant expected to be in better (musculoskeletal) condition than an average civilian counterpart, whose seats are set to stroke at 12.5 Gs. Are all military spines created equal? Predictably, the answer is no.

Not surprisingly, tests show that bigger people have stronger spines. A 5th percentile female (104 pounds) might experience injury at a spinal load of about 1,100 pounds. A fit, 95th percentile male (224 pounds) might not see similar vertebral injury until approaching a spinal load of about 2,100 pounds. From this, you can see the value of a device that would permit the seat occupant to set his/her (with gear) weight into the energy-attenuating system. The probability of spinal injury is minimized if the occupant properly inputs his/her equipped (gear included) weight, where such a hardware mechanism is provided. EAs which include this feature are called variable-load energy attenuators (VLEA), and Sierra seats (subsequent to Block 1) have VLEA. It is important that you set your equipped weight on the VLEA. Failure to do so would likely compound the impact injury. A too-high setting could cause spinal overload during stroke, and a too-low setting has the potential for causing injurious sudden stoppage at the end of the stroke.

What about those butt-kicking cushions in energy-attenuating seats? Would you be surprised to learn that they are necessarily designed to be uncomfortable? This is because seat designers would rather be flying than designing, so this is their payback…If you've sat in one for a few hours, you're inclined to accept this as a plausible explanation, but you know it ain't so. The cushions have to be stiff underneath the butt bones (ischial tuberoscities (IT)), so that dynamic overshoot (G-increasing relative motion) doesn't occur during impact. Of course, when you're well into an extended-range mission, with that brick-butt feeling, along with those creepy-crawlies that just won't go away, no matter how you wiggle or squirm, your miserable rump is interfering with mission focus. When this happens, your dynamic-overshoot concerns are low on your priority list. Understood.

However, sometimes stuff does happen, and when it does, NAMI (Naval Aeropace Medical Institute) and NavAir 4.6 want to maximize your chances of turning a sinking sensation and sudden stop into a "Top Gun" style "there I was" story at the club, rather than a sick-bay stay, or worse. Tests have shown that cushy-cushions can reduce energy attenuation by as much as 25 percent, so avoiding unapproved/unqualified and add-on cushions is a decision which could bring life-long kudos.

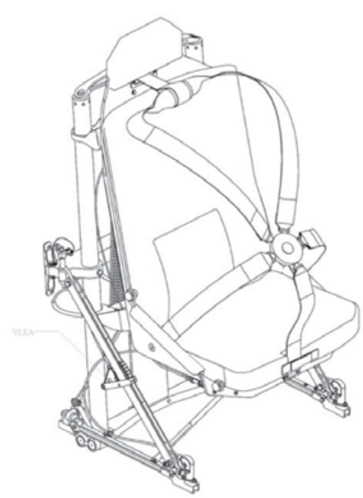


Fig. 5: Right-front view of the MH-60S seat

Sierra drivers with the latest-and-greatest seats (2nd generation, see Fig. 5) have pneumatic cells in the back cushion and bottom seat-pan cushion. While some variants may soon remove the inflatable bottom cushion, these seats are designed to permit easy and independent pressure adjustments in the lumbar and thigh support areas. The IT bones are still (necessarily) on stiff stuff.

The current configurations (BAE PNs 112450-1 (back); 112440-1 (bottom)) are easily adjusted to lower inflation levels by quick depressions of the button on the starboard side of each cushion. They're refilled by unloading the inflated areas (lean forward (lumbar); elevate thighs (bottom), while depressing the button(s) for a few seconds. (See Figs. 6 and 7).

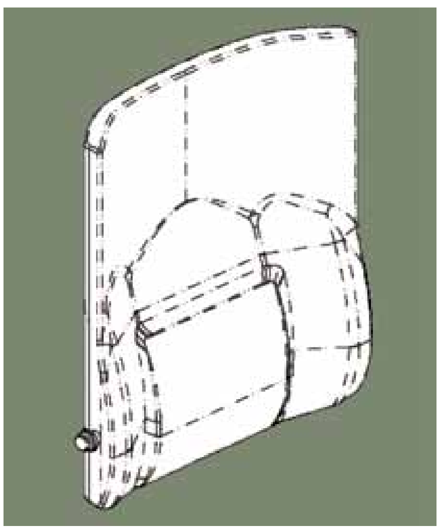


Fig. 6: Current MH-60S seat back cushion

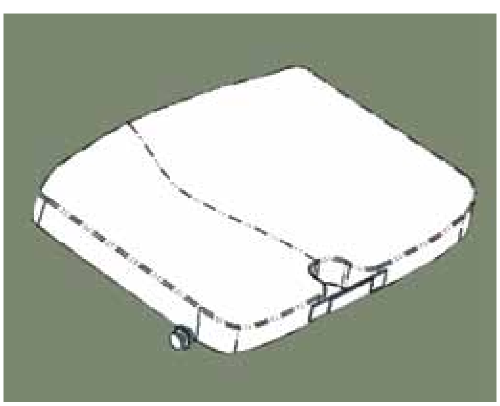


Fig. 7: Current MH-60S seat bottom cushion

NHA attendees expressed concerns with pneumatic-cell durability, which can be lessened by keeping boots off the cells and cushion edges tucked into the back corner of the seat bucket. Cushion manufacturing incorporates a lot of labor and high-tech materials, and new ones will definitely dent the budget. To counter upkeep costs, the manufacturer can "spare" the bottom cushion inflatable cells, and possibly the back cushion cell (BAE PNs 112444-1 and 112453-1, respectively), provided an approved set of install instructions are given. While a new NESE (non-ejection, seat, endurance) bottom cushion is under eval for the Romeo seats, it and predecessors incorporate non-inflatable technology.

WE DIDN'T TALK ABOUT the post-crash factors part of CREEP, but your NATOPS manual has that well covered. Other cool configuration changes are under consideration, such as the Sierra seat tilt shown at NHA.

Thus, here ends the secrets list.

Here's a review of things to remember about the seat gear you've currently got:

* For hardware of their respective types, the Romeo and Sierra seats provide superior protection.

* While crashworthy cushions are tough on the rump, new configurations are improving endurance, and NavAir is continuing enhancement efforts.

* The higher you adjust your seat, the more protection (stroke potential) you get.

* If your seat is VLEA-configured, setting it to your equipped weight is an essential pre-fly item.

Sharing these seat secrets won't bring fair winds or following seas, but they're guaranteed to reduce injuries and save lives over the long haul – scuttlebutt worth passin' along.

LTCOL CRESS IS A PHORMER PHROG PHLYER AND SCHOOL OF AVIATION SAFETY HELO AERO INSTRUCTOR

VP-16

AWF2 (NAC/AW) RYAN BENDER was the instructor flight engineer during a familiarization flight. After a simulated ground engine-fire scenario, the student team was prepared to restart the No. 2 engine. Despite poor visibility because of the setting sun, Petty Officer Bender spotted a large amount of propeller fluid on the engine and the deck. He immediately stopped the student from restarting the engine. He alerted the instructor pilot and crew.

The propeller had a catastrophic internal failure, which created a large hole in the propeller dome.

Bravo Zulu

TW-4

LT. JEFFREY GARDNER, A FLIGHT INSTRUCTOR with Training Air Wing Four at NAS Corpus Christi, Texas, was on a day, contact-training flight in a T-44C. While practicing pattern work at Cabaniss Field, Lt. Gardner's student, an instructor-pilot-under training, advanced the power levers to the takeoff position during a touch-and-go landing. As the aircraft accelerated, the plane swerved to the left. Lt. Gardner assumed control of the aircraft and scanned the engine instruments. He saw indications of a left engine power loss.

Realizing he couldn't stop in the runway remaining, he continued the takeoff and tried to maintain runway centerline with full rudder deflection. The propeller's autofeather system failed to activate, causing a dangerous left yaw. With the plane continuing to veer from centerline, and with the end of the runway rapidly approaching, Lt. Gardner reduced power on the operating engine to stop the yaw. He rotated at takeoff speed and, once airborne, reapplied maximum takeoff power to establish a climb. Passing through 100 feet, he executed an emergency shutdown of the malfunctioning engine. The crew declared an emergency, climbed to pattern altitude and made a single-engine landing.

Maintenance later determined that the compressor progressive bleed-air valve had failed, causing the power loss. A faulty switch had prevented the autofeather system from operating.

VT-7

COMMANDER STEVE DELANTY, an instructor pilot, and Ltjg. Bradley Holeski, a student naval aviator, with VT-7 at NAS Meridian, Miss., were returning home from a detachment at NS Mayport, Fla. Ltjg. Holeski had just completed his initial carrier qualification in the T-45C Goshawk.

The weather was CAVU, and the flight left Mayport on an IFR clearance. Commander Delanty was at the controls in the front seat. They were cleared to FL280, and Cdr. Delanty climbed at military rated thrust.

Approaching FL280, power was reduced to an appropriate cruise setting. They heard a loud thump. The exhaust-gas temperature (EGT)/rpm warning light illuminated in the cockpit, as well as an engine-control amplifier (ECA) caution light. The crew noticed the EGT rapidly rising with a sudden decay in rpm. Ltjg. Holeski pulled out the NATOPS pocket checklist to assist on the emergency procedures for a compressor stall. While reducing power, they declared an emergency and coordinated with ATC to turn back toward Jacksonville.

They had to shut down the engine and perform an immediate airstart. The engine started quickly, but its performance was severely degraded. It produced much less thrust than normal with the throttle set at 75-percent rpm. The aircrew decided to make a precautionary approach and emergency landing at Cecil Field, which was 35 miles away. Ltjg. Holeski performed his copilot duties by closely watching the engine indications and providing navigation and communication information. Commander Delanty flew the approach and landed.

Postflight inspection found a low-pressure compressor blade had failed, taking out most of the compressor section of the engine.

VT-2

LCDR. NICOLAS BERGAMOTTO, FRENCH NAVY, a flight instructor with VT-2 at NAS Whiting Field, Fla., was on a T-34C day, contact training flight. After completing an aerobatics maneuver, LCdr. Bergamotto noted a flashing master-caution light. He also saw a chip annunciator light, which warns of engine-oil contamination and possible engine failure.

He assumed control of the aircraft from his student and saw the oil temperature increase from 60 to 90 degrees Celsius. LCdr. Bergamotto did the immediate-action items in NATOPS and entered the emergency-landing pattern at Navy Outlying Field Silverhill. While flying the profile, he suspected erroneous engine-power indications and increased power to slow their rate of descent. When the aircraft did not respond, he further increased power to regain the proper approach profile. Before touchdown, he noted an oil temperature of 100 degrees. He landed, taxied clear of the active runway and shut down the engine.

The maintainers found metal particles in the engine oil and evidence of oil over-temperature.

HT-18

CDR. MICHAEL GIRON, A RESERVE flight instructor with HT-18 at NAS Whiting Field, Fla., was flying a TH-57C night familiarization training flight. While practicing autorotations at South Whiting Field, his student inadvertently secured the twist grip while turning toward the runway, shutting off fuel to the engine. Cdr. Giron heard the low rotor revolutions-per-minute warning horn, and he initially thought the collective control might be blocked by a stray piece of gear.

While quickly checking the controls, the student said, "Sir, I think I secured the engine."

Cdr. Giron then heard and saw the engine-out warnings and assumed control of the helicopter. As they stepped through the emergency procedures, he recognized there wasn't enough time for the engine to restart and produce effective power. He immediately decided to commit to a full autorotative landing. The aircraft lightly touched down on the runway and slid about 20 feet with no damage.

BravoZulu

HMH-772

THE CH-53E CREW OF HUSTLER 04 from HMH-772, MAG-49, 4th MAW, provided para-ops support for MARSOC over Hurlburt Field, Fla. While at 2,500 feet, Maj. Robert Laatch (HAC/PNAC) used the FLIR (pointed aft) to see that the third jumper's chute hadn't deployed. The static line had become entangled around the Marine's ankle, and he was being dragged behind the Super Stallion at 100 knots.

Major Dennis Hahn (H2P/PAC) maintained a steady flight profile over the drop zone (DZ). The crew chief and jumpmaster assessed the jumper's condition, but they couldn't tell if he was conscious. Any injury to the jumper's leg, ankle or hip could inhibit a landing if he were cut away to parachute to the ground (assuming he was conscious).

The jumpmaster decided the best option was to land the Marine on the ground at Hurlburt Field. This recommendation presented two risks. One, further injuring his leg by applying excessive G force. Two, creating slack or "unloading" the static line, which could release the jumper from an altitude too low to allow the parachute to open.

The HAC briefed the individual crew duties. He intended to fly the approach similar to carrying an external load, and then lower the jumper to the deck. The crew chief took a laying position on the ramp to observe the entangled jumper. Major Laatch (now PAC) descended to a hover over the DZ. During the approach, Maj. Hahn briefed the ground element over the radio on the aircrew's plan and completed the landing checklist. Corporal Ian Canich (AO) prepared the cabin and the remaining pax for landing. Sargeant Jones provided a running narrative on the hung jumper to the cockpit throughout the approach. Once in a hover, the jumper was lowered to the deck by Maj. Laatch, assisted by Sgt. Jones. Once the line was cut away, the aircraft slid forward and landed, which allowed Sgt. Chad Jones and the jumpmaster to debark and assess the jumper's condition.

They found that the static line was wrapped once around the ankle, similar to the rope-climbing technique. The jumper wasn't injured.

This event resulted in a NATOPS change due to a typo in the CH-53E NATOPS manual leading to a discrepancy with the ANTTP (TACMAN). HMH-772 ASO coordinated with the PMA-206 engineers and HX-21 to determine the appropriate airspeed envelope for PARAOPS, before submitting the NATOPS change. The change will be incorporated into the next revision of the TACMAN.

HSL-43

THE CREW OF BATTLECAT 27 was on a counter-piracy mission in the Gulf of Aden when they detected a burning odor aboard their SH-60B. AWR3 Kevin MacDonald quickly determined that the smoke and fumes were coming from the aft transition section. Lt. Joseph Landi immediately turned toward their ship, which was 50 miles away. He closed at best speed and called for emergency flight quarters. The crew completed the NATOPS emergency procedure, with Ltjg. Joel Snedeker securing circuit breakers to isolate the problem. The ship also closed at max speed and recovered the aircraft 16 minutes after the initial emergency call.

Postflight inspection revealed that the clamp that feeds engine bleed air to the environmental-control system had broken. This failure allowed hot bleed air to melt components in the surrounding compartments, which produced the smoke and fumes.

The crew's timely actions prevented this emergency from getting out of control.

Left to right: AWR3 Kevin MacDonald, Lt. Joseph Landi, and Ltjg. Joel Snedeker.

Left to right; Maj. Dennis Hahn, Sgt. Chad Jones, Cpl. Ian Canich
Maj. Robert Laatch not pictured.

I Was a
Hawkeye Test Dummy

I felt stupid, like a real dummy for flying the aircraft to Fallon...

BY CDR. MIKE FITZPATRICK

Ever seen those crash test dummies in automobile safety testing? Well, that's how I felt after a cross-country flight from NBVC Point Mugu, Calif., to NAS Fallon, Nev., for our air wing Fallon weapons detachment. I felt like a real dummy. Fortunately for the crew and me, no crash occurred.

A few weeks earlier, while flying Sun King 602 during CompTUEx, I'd noticed what seemed like excessive aircraft vibrations during a day, Case I departure from the ship. It's not unusual for the aircraft to vibrate a bit more during the climb, as the power setting is relatively high until we reach our established station altitude. Once established at altitude and on-station, the vibrations ceased. However, the vibes returned a couple hours later during our return, which was unusual. We asked one of our squadron playmates, who had just launched, to join-up and look us over. They saw nothing out of the ordinary. The shipboard arrested landing was uneventful.

Once we were back on deck, maintenance looked over the airframe. Everything looked OK, so they checked the propeller balance. Both props checked good and were within limits, but the starboard engine isolation mounts needed replacement. After replacing the isolation mounts, Sun King 602 flew again but came back with the same issue. We launched a chase plane to fly with 602 to help identify the source of the mysterious vibrations, but no joy.

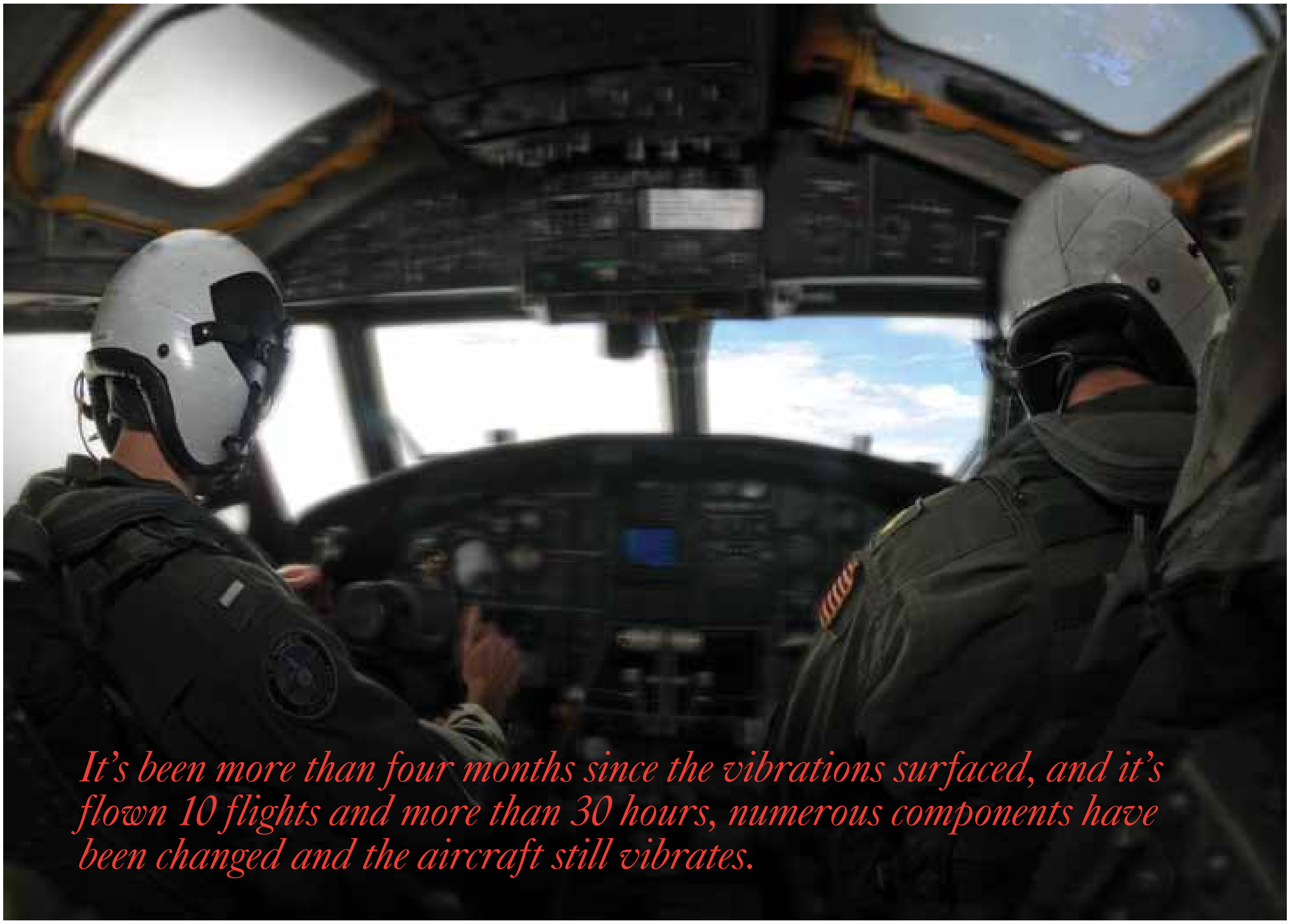
We replaced both motors. Our airframe mechs went through the entire aircraft tightening bolts and nuts, repairing minor discrepancies, changing actuators and so on. This process continued for the next couple of weeks, but there was no smoking gun, and the vibration still existed.

Two days before we were scheduled to depart for Fallon, one of our mechs noticed the rotodome appeared to wobble a bit more than usual when pushed upward. Engineers were called in and reported that the bearing supporting the dome was probably going bad. Voila!

We were in a tough situation: two days before Fallon, and we had an aircraft that needed a new dome bearing, which required I-level repair. We had a few options. The first option was to have a planning and estimator (P and E) team come to Mugu and replace the bearing. This option quickly became a nonstarter because Mugu did not have the required facilities or support equipment (SE) gear to remove, store and then reinstall the dome and bearing.

The next option was to send the aircraft to Fleet Readiness Center (FRC), NAS North Island, to change out the bearing. Unfortunately, the parts weren't available at NASNI, and even if they were, there wasn't enough hangar space available. In the end, the engineers said the aircraft was safe to fly "as is."

I took 602 to Fallon, if for nothing else, as a spare parts locker. Before heading to Fallon, NavAir developed a test plan they wanted us to perform to isolate all other possibilities and to confirm the bad dome bearing was causing the vibrations. The test plan called for us to fly different airspeeds, various power settings, angles-of-attack, and altitude changes, with a squadron chase Hummer following us. I really wanted to nail the culprit



It's been more than four months since the vibrations surfaced, and it's flown 10 flights and more than 30 hours, numerous components have been changed and the aircraft still vibrates.

down and find the source of the vibes, so I put myself on the flight schedule as the only NFO in the back—minimum crew.

DURING THE FLIGHT, I WALKED around the inside of the aircraft trying to isolate the location and source of the vibrations. The vibes seemed to concentrate in the forward equipment compartment, right below the pylon and dome. This confirmed what we had suspected, that the bad dome bearing was the source. During the two hour flight, we found the vibes to be the worst so far. In my 2,000-plus hours in the Hawkeye, I'd never experienced anything like it. I was uncomfortable.

Once we were on deck in Fallon, I immediately downed the aircraft. Postflight examination revealed that the lateral dome movements were even more severe that when we'd left Point Mugu, at about one inch laterally. We reported the events up through the chain. They responded by requesting us to fly the aircraft on a "one time flight" to North Island for repair, but I refused. It was only after sending a four-second video clip of the dome movement on deck that they reconsidered and decided to send a P and E team, equipment and parts to make the repair in Fallon. While we waited for the repairs to be completed, I half-seriously joked over a beverage at the club that I didn't want to be the skipper that caused the next Roswell incident, with Fallon locals reporting that they'd seen a flying saucer overhead after the dome departed the aircraft. I felt stupid, like a real dummy for flying the aircraft to Fallon in the first place. After all, we're a VAW, not a VX squadron.

After the dome pylon and bearing were replaced, I flew Sun King 602 back to Mugu. Although not as severe, the vibration was still there. As of this writing, 602 is at FRC, North Island. It's been more than four months since the vibrations surfaced, and it's flown 10 flights and more than 30 hours, numerous components have been changed and the aircraft still vibrates.

CDR. FITZPATRICK FLIES WITH VAW-116.

Same Ol' Emergency

BY LTJG. PATRICK BELL

Every time we prepare for a flight, we give as thorough a brief as possible without being so meticulous that we lose focus. Factors affecting our flight such as weather, fuel, closest divert airfield, time of day or night, operational risk management (ORM) and human factors are just a few of the items discussed. A realistic emergency scenario, along with an applicable NATOPS discussion is always encouraged. This helps provide aircrew possible answers to some of the "what ifs," so they have a plan, rather than thinking about an emergency for the first time over enemy territory.

No one can predict when an emergency will occur. Regardless of its severity, it always happens at the wrong time and place. Our emergency happened during our first month supporting Operation Enduring Freedom (OEF), following a compressed (yet successful) work-up cycle. Although the jet that night had a history of cabin-pressurization problems and environmental-control-system (ECS) failures, our maintainers had spent several hundred man-hours working to resolve these issues. After a few successful "confidence" flights, everyone was sure the aircraft's troubles were a thing of the past.

We had a late afternoon launch and headed north toward Afghanistan, on a scheduled six-hour combat mission. Everything went as briefed until we were about to join on our second tanker. At 23,000 feet, five miles behind the tanker in a left hand turn, the digital-flight-control system (DFCS) stability augmentation (stab aug) kicked offline and the altitude hold would not reengage. At the same time, we felt a massive rush of air, accompanied by a popping sound in the aircraft.

A quick look at the cabin pressurization gauge showed an ambient reading of nearly 24,000 feet. We had a complete cabin-pressurization failure, which resulted in a rapid decompression. All four of us readjusted our oxygen masks and decided to expeditiously tank as we had only 9,000 pounds of gas. This action would increase the number of options we had while we worked through the situation at hand. As we began to take fuel, we knew our tasked mission was over. We would have to descend as soon as we could.

The recent maintenance history of our aircraft ultimately would determine how we handled the situation. While tanking and running through the checklist, we noted 12 liters of oxygen remaining which, according to our oxygen-duration chart, gave us a conservative three hours of oxygen for a crew of four. This amount should have been plenty to get us back to the carrier, about one hour away. To expedite our transit, ECMO-1 requested the tanker drag us to the southern portion of the tanker track to get us heading in the general direction to the carrier.

We knew that flying at 24,000 feet in an unpressurized cockpit could lead to decompression sickness, so once we were clear of the tanker, we immediately descended. With the situation now under control, we completed our emergency checklist. We also noted that our canopy seals had deflated, the same problem this jet had several times before.

On our transit to the carrier, the three hours of oxygen we had initially planned for quickly evaporated into less than one hour of usable oxygen. A short while later, the OXYGEN caution light illuminated, indicating less than three liters of usable oxygen remaining or that the oxygen pressure is less than 50 psi. With at least 30 minutes of transit to go, the mission commander and I, in the backseats, decided to take off our masks to allow the pilot and ECMO-1 to share the remaining oxygen. Without oxygen, we were concerned about hypoxia, so we monitored ourselves for any symptoms.

All four of us readjusted our oxygen masks and decided to expeditiously tank as we had only 9,000 pounds of gas.

Just before going feet wet, we descended to 10,500 feet and communicated with the ship via the E-2 from our air wing. We also requested the flight deck stay open for an extra 15 minutes. We didn't want to aggravate the situation by running low on gas, because we wouldn't arrive during the normal recovery time. We descended to a safe altitude, and the rest of the flight proceeded uneventfully.

AFTER LANDING AND DEBRIEFING maintenance, we chalked the situation up to another pressurization failure, assuming the DFCS issue was unique and not related. We couldn't think of any relationship between the two failures that would have indicated the same malfunction, such as a weight-off-wheels (WOW) failure, because many items we should have lost with a left WOW failure were still available. Later that night, the data recorder from the jet revealed there was a partial left WOW failure because of a partially failed microswitch. This resulted in the aircraft sensing an incorrect weight-on-wheels condition for certain situations. Interestingly, once the landing gear came down the switch worked as advertised. The Prowler's left WOW switch provides nearly all the indications that differentiate between an in-flight and on-deck condition. Two of the items that are inoperable when the left WOW switch is on deck are the canopy seals and DFCS altitude hold.

Here's a few notes to take away from our flight. The first is to evaluate every scenario before taking any actions. Even if you think you've experienced the same problem over and over, it is possible that you're just seeing what you want to see. In any other jet, we might have talked about the weight-off-wheel switch, but because we were in this particular jet, we were programmed to assume we were dealing with a repeat pressurization problem. The rapid decompression was only a symptom of the real problem. It's hard to diagnose a malfunction when it only occurs for part of the flight. In our case, the left WOW failure occurred well into the flight, in a clean configuration and fixed itself while dirty. If the failure had remained present once dirty, we might have been more adept at diagnosing the problem.

Second, we must fall back on the most basic training that we are given from day one: aviate, navigate, communicate and checklist. We had control of the aircraft and made sure we were receiving oxygen to continue tanking. At the same time, we got the jet headed in the right direction by letting the tanker know we had a problem that required us to return to the boat. As we continued, we finished the checklist to make sure we did all we could to handle the emergency.

In any emergency, it is critical to get as far ahead of the jet as possible, without being unsafe or causing any confusion in the cockpit. It's disconcerting to have trouble breathing while running low on oxygen and fuel at night over enemy territory. Solid crew resource management (CRM) and foresight helped us conclude we needed to coordinate with the carrier, so we wouldn't have to wait more than an hour for the next opportunity to land.

Finally, this situation was a relatively minor emergency that could have quickly deteriorated. What if there were no tankers available for us at the time? What if we had even less oxygen than we thought but couldn't descend because of weather or terrain? What if? Obviously, there is no way to discuss every situation that you may one day find yourself in, but it is important to always analyze what has happened to your aircraft, and not just assume that you already know the answer.

LTJG. BELL FLIES WITH VAQ-131.

A Deadly Sport

NOTE FROM AUTHOR TO EDITOR: "I OFFER TO YOU THIS EMBARRASSING AND NEARLY DEADLY TALE FOR YOUR CONSIDERATION. I'VE HARDLY TOLD THIS TO ANYONE, BUT I THINK IT IS TOO IMPORTANT NOT TO SHARE."

BY LCDR. JASON GARRETT

I was an HSL department head with nearly 2,000 hours in the SH-60B. I had been an FRS instructor and had just returned from a second deployment as a detachment officer in charge (OinC). Nothing could happen to me in the air that I couldn't handle, at least if I were flying an SH-60B.

While on leave, I went for a ride with my dad in his Powrachute. This simple, little aircraft is nothing more than a two-seat go-cart with a motor and a propeller in the back, suspended beneath a parachute. Its controls are just as simple. The throttle is located between your legs, and you steer with push bars controlled by your feet. By pushing the bars, one side of the parachute dips, forcing a slow turn left or right.

With my dad at the controls in the front seat, we did a few touch-and-goes in a small pasture that he uses as an airstrip. After a few bounces, he wanted me to fly. We had to swap seats, because only the front seat had access to the controls. I waited for him to

My dad started to call out instructions, and then, at the worse possible moment, his microphone cord unplugged.

spread out the parachute on the ground behind us and get back in. As soon as he was strapped in behind me, he started giving me instructions over the headset.

I wasn't prepared to fly that day. I hadn't had any simulator events or fams in this aircraft. I hadn't even done a NATOPS brief. Beyond this brief flight, I didn't have any experience. But, I was a U.S. Navy helicopter pilot, at the top of my game. What could go wrong in such a simple, little aircraft?

I looked across the pasture and noticed the wind was light and headed straight down the length of the field. To the right and left of the field were large trees, most of them more than 100 feet high. I hardly paid them any attention, as I looked down the grass strip.

Dad called out instructions over the headset. I pushed the throttle as far forward as I could, demanding maximum power. I held on. You can't steer while on the ground, because it doesn't have a rudder like a plane. As we accelerated, I felt a tug from behind. The chute had shot into the air and was generating lift, as well as drag. We started to turn to the right and were headed for the tree line. I cut power and brought us to a stop.

From behind, dad said, "I'll get the chute spread back out. We still we have plenty of room to take off at this angle."

I gave him a thumbs-up signal, as he jumped out to spread the chute. I looked at the trees, which were now in front of me. This aircraft would have to climb like a bat out of hell to clear them. My little voice tried to tell me something, but my dad was the expert, and he knew what the Powrachute could handle. His words won out.

We were ready to go. I pushed the throttle forward to the stops and the motor roared. We started to move. I felt that same tug as the chute rose into the air and spread out above us. The aircraft stayed straight, and we suddenly lifted off the ground. I immediately knew we would not make it over the trees.

We headed toward the tree line at a 45-degree angle and out of the wind. I did not know how responsive the aircraft was to turns, so I didn't know if I could turn into the wind and away from the trees in time, or if I could increase my climb rate and squeak over the tops. My dad started to call out instructions, and then, at the worse possible moment, his microphone cord unplugged.

I stared at the trees looming before me and waited for his instructions to continue. By the time I realized he was unplugged, I had closed the distance to the trees. I quickly thought through my options. The aircraft was climbing well but was going to drag through the tree tops. As I neared them, my body went into autopilot. I reacted as if I was in the SH-60B, facing the same dilemma. Combining my instinct and my training at the controls, I decided to bunt up the nose to exchange airspeed for an increased climb rate. My timing was perfect, as I smoothly pulled back on the cyclic, expecting an increased climb. My heart sank as the engine wound down, and we began to settle. I wasn't in an SH-60B. Instead of pulling back on the helo's cyclic between my legs, I had just pulled back the throttle.

I threw power back in, but it took time for the motor to accelerate. The trees loomed in my field of view as we descended into them; we were going to hit. The only consideration left was to make the impact survivable for me and my dad. Options flashed through my mind. If I hit the tree dead on, I probably would have the chute collapse over the top of the tree, and we would fall down the front side. If I chose to turn to the left, into the wind, the tree was too dense, and the result would probably be just as bad. My only option was to head for the thinner branches and limbs to the right.

I kicked the pedal hard to the right, my turn slightly accelerated by the crosswind. I watched the trunk of the tree move slowly to my left. I had visions of falling, of having to tell my family, my daughters, that I had killed grandpa. I had visions of my wife and kids at my funeral, all because of a damn crash. In those nightmarish moments before impact, it's strange what goes through your mind.

We went right through the tree branches. I heard the grinding of the propeller blades hitting the limbs. I felt the vibrations from the imbalance caused by the propellers being torn up. Leaves, twigs, branches slashed across our faces as we slid through the tree. It was a miracle the chute didn't get snagged in the branches and fold up on us. We were nearly a 100 feet up, and I have no doubt the fall would have killed us.

As we moved past the trees, dad finally got his cord plugged back in. We looked at the parachute and the attachments; everything seemed in good condition except for the vibrations in the prop. He told me to land in the field straight in front of us.

As I looked ahead, I had a 90-degree crosswind blowing across the field. The landing area was overgrown with brush, and I had no idea how level the

I had visions of my wife and kids at my funeral, all because of a damn crash.

terrain was under it. I was listening to my little voice. I told dad I was going to cut the motor back to lessen the vibes, but that I was going to take it back to the field we had just left.

I was able to fly back to the field and land. I turned off the motor and got out just before dad. I looked at the fiberglass propeller. The tips were all torn off, and leaves and twigs were jammed in the steering cords. We were fortunate to be alive.

I could not apologize enough to my dad for destroying his aircraft. I felt terrible. A skilled, confident Navy pilot had just crashed his dad's plane. I wasn't sure how we were going to explain this to everyone when we got home. As we loaded it into the trailer, my dad must have been thinking the same thing. He said with a broad smile, "When we get home, let's not tell anybody about this." That was the best idea I had heard all day.

While I haven't told many people this story, I have written this embarrassing tale for my peers. As I think back, I have known nearly as many Navy pilots who have died or been injured in civil aircraft, as I do in military aircraft. I had lived through an experience that nearly killed me, and I know exactly how it happened.

AT LEAST THREE THINGS WENT WRONG on this flight. First, I mistook simplicity for safety. I could not imagine that a simple flying machine could be dangerous. I learned that day that a fall from 100 feet in any aircraft could be lethal, regardless of how simple the aircraft is to fly.

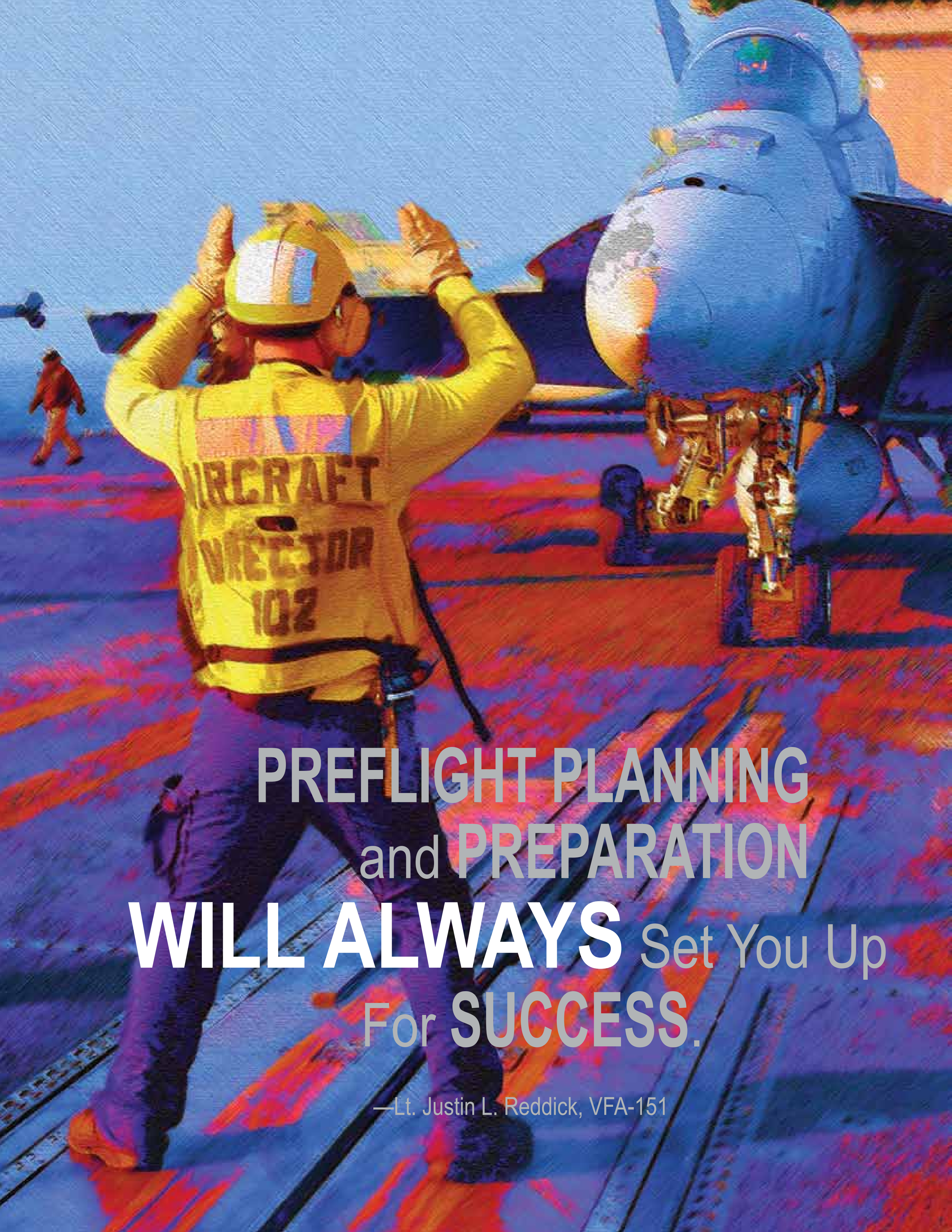
Second, I did not understand the performance limitations on this type of aircraft. Our naval aircraft have a tremendous amount of power and can get us out of almost any situation. This usually is not the case with civil aircraft, which we fly for recreational purposes.

Finally, and most subtle of all, is my military flight training. We become highly skilled in a specific type of aircraft, because we are repetitively trained to do certain actions the same way, over and over. We learn to expect a certain response from the aircraft every time we do those specific actions. This training serves us well in crisis, because we act instinctively when our skill is required to save our lives. During my crisis in the Powrachute, the problem was that my training and skill were perfected for the SH-60B. In turn, my reactions were exactly the opposite of those that I needed to miss the tree. My training actually contributed to the actions that made a bad situation even worse.

I made a series of mistakes that any of us can make when we take our valuable training into an unfamiliar cockpit. If you fly civil aircraft as a hobby, while flying military aircraft for your profession, I recommend you reconsider the idea, or at the very least thoroughly risk manage each flight. If you ever end up in a crisis, your learned instinct just might lead to your demise.

LCDR. GARRETT IS WITH COMPACFLT.

Please send your ORM questions, comments or recommendations to:
Cdr. Duke Dietz, Code 16
Naval Safety Center
375 A St., Norfolk, VA 23411-4399
(757) 444-3520, ext. 7212 (DSN-564) E-mail: duke.dietz@navy.mil


PREFLIGHT PLANNING
and PREPARATION
WILL ALWAYS Set You Up
For SUCCESS.
—Lt. Justin L. Reddick, VFA-151