THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

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Approach

Focus on
Midairs and Near-Midairs

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Mishaps waste our 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, and that any losses are due to enemy action, not to our own errors, shortcuts or failure to manage risk. 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 enough; the time to learn to do a job right is before combat starts.

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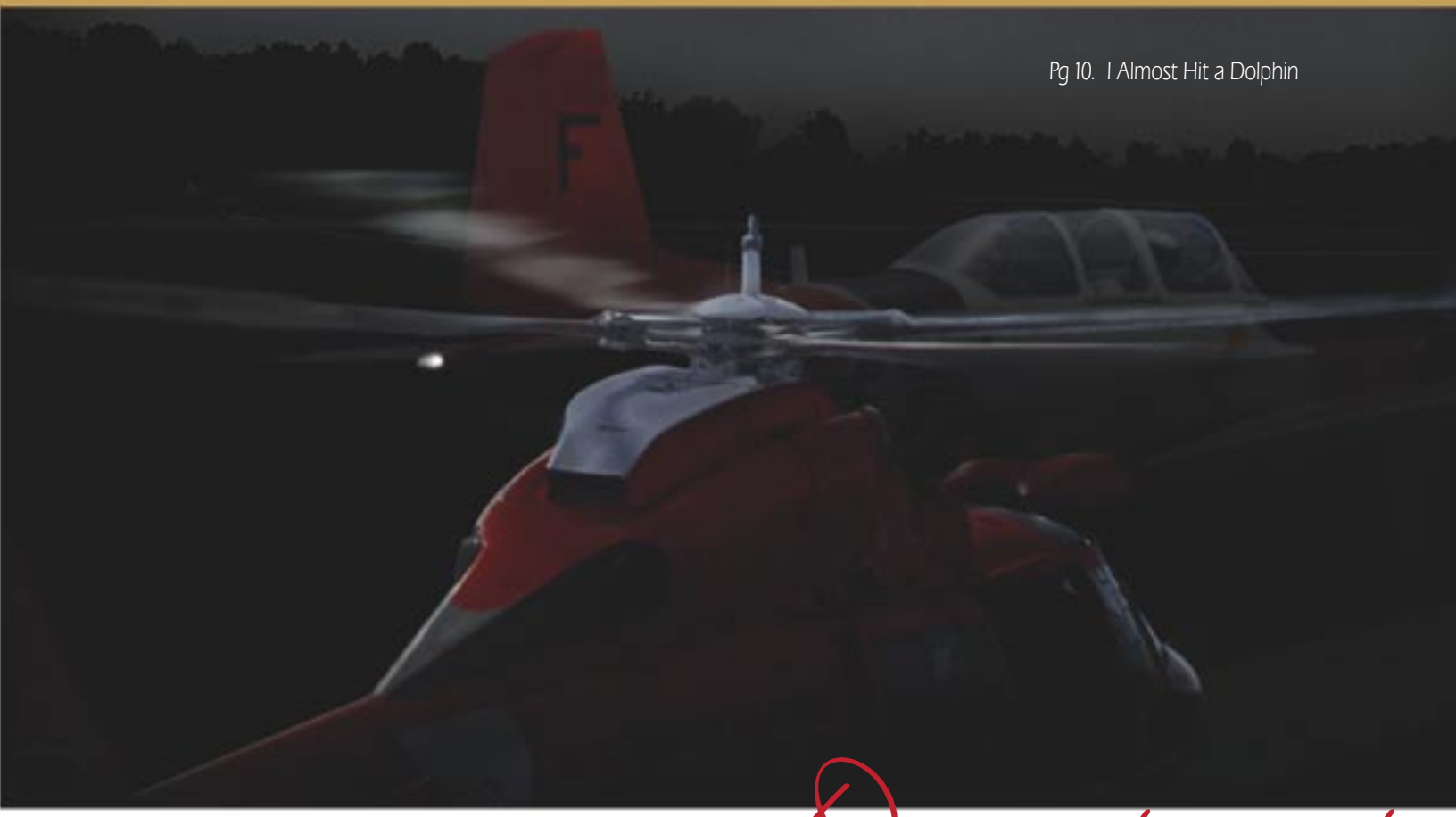

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January-February Thanks

Thanks for helping with this issue…
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Departments

THE HIGH RISK

Midair Collisions in the Hornet Community

Midairs and Near-Midairs

DoD Instruction 6055.7 defines "midair" as "a collision between aircraft or UAV when intent for flight exists." This definition is universally accepted among all of the services. We had 13 midairs in naval aviation alone in the last 10 years, resulting in 17 destroyed aircraft, 36 deaths, and over $1 billion worth of damage. Mishaps have occurred during ACM, tanking, tactical formation flight, rendezvous, while landing, with other military aircraft as well as civilian, day, night—in every possible arena and timeframe. In every instance, aircrew error was cited as a primary causal factor in the mishap.

This information does not include the "near-midair collisions," which far outnumber actual midairs. A near-midair collision is defined as when aircraft pass close by one another and, as a result, the pilot-in-command feels the safety of the aircraft or UAV is in jeopardy:

- A collision is avoided by chance, rather than by a conscious act on the part of the pilot.
- A collision would have occurred had no action been taken.
- Two aircraft inadvertently pass within 500 feet of each other.

This issue of *Approach* features four articles that focus on midair and near-midair incidents.–*Cdr. Mike Scavone, fixed wing branch head, Naval Safety Center.*

By LCdr. Steve Kiggans

What is the most dangerous aspect of flying an FA-18? If you answered, "The risk of a midair collision (MAC)," you'd agree with most Hornet aircrew.

Skill-based errors are the most prevalent causal factor in MACs. Midair knowledge and avoidance should be one of the Hornet aviator's primary responsibilities to ensure flight safety. What are the hazards of MAC and the risk to Hornet aviators? What can you do to reduce the risk?

The majority of Hornet MACs occur in the admin phase of flight. Surprisingly, just over 50 percent take place during formation flight with an aircraft that was part of their flight element. Only 3 percent of collisions occurred with non-element traffic, while 39 percent took place in the fighter intercept and engaged arena. These collisions were not nuggets smacking into the old guys as one may think; flight experience does not offer immunity to the dangers of MAC.

How does situational awareness (SA) fit into the problem?

Not surprisingly, the most common causal factor in Hornet MAC accidents is a loss of or low situational awareness. Building and maintaining SA in all phases of flight is crucial to avoiding a MAC. SA is built and maintained by prioritizing tasks. When all else fails, aircrew must revert to basic aviating while clearing their flight path. SA is maintained through standardized tactics and communication in every phase of flight. Unbriefed tactics and off-the-cuff evolutions cause confusion, which decreases SA and increases the likelihood of a MAC.

Hornet aircrew must follow proper mission-crosscheck times (MCT) to make sure adequate time is available for flight deconfliction. A wingman's primary responsibility is flight-path deconfliction with other element aircraft.

The main way to avoid hitting other aircraft is through strong adherence to the see-and-avoid concept. An aircrew's ability to perceive an impending flight-path conflict is critical.

Several things impede an aircrew's ability to recognize an impending collision. Channelized attention prevents the eyes from properly scanning and reduces the brain's ability to process incoming information. The ability to spot conflicting traffic also can be hampered by poor eyesight; environmental effects, such as poor visibility and night operations; or by the limitations of night-vision devices (NVDs). Wear correction glasses if needed, and fully understand the limitation of NVDs.

Formation Flight

The majority of MAC incidents occur within a flight element—the result of misplaced attention and complacency. The Hornet community has seen everything from flight leads breaking into their wingmen in the overhead to aircraft bumping during a section PAR. Tactical-formation flying has provided the most significant contribution to the administrative Hornet-midair rate, attributed in part to decreased aircrew eyes-outside time and a low aircrew perception of collision potential.

Admin-phase MAC can be prevented through strong briefs and solid flight discipline. Discuss the risk of form-flight midairs in the ORM section of your brief. Dust off the mission-crosscheck time stuff you heard daily in the FRS, and discuss it in your brief. Aircrew must maintain a constant spatial awareness of flight-member positioning. If a conflict exists, use clear, concise communications and predictable aircraft maneuvers to maintain separation. The debrief is a good time to air any dirty laundry concerning a near MAC and to maintain accountability of each member of the flight element. Additionally, I suggest the flight lead should hammer the low SA high-closure-rate pilot as needed.

Air Intercepts and Combat Maneuvering

The air-to-air arena is a high MAC-potential environment. As the saying goes, "There are those who have had near-misses and those who will." Extensive briefing time is spent on training rules to avoid MACs; we emphasize that most Hornet collisions have occurred post knock-it-off.

Another big potential for MAC occurs when aircrews become complacent about assigned altitude blocks and stop continuously scanning for the cheater. Most importantly, aircrew must not get sucked into the radar scope, but they must scan continuously for both blue and red guys.

During engaged maneuvering, MAC risk increases when aircraft get slow. As a community, we have had several mishaps with aircraft under ballistic conditions and during slow-speed scissor fights. Following the training rules leads to everyone's safety and career longevity.

Air to Ground

The low number of midairs in the strike mission doesn't mean there is not a great degree of risk. Historically, the circular-bombing pattern offers one of the highest risks of midair. Although the community has not had a collision between aircraft on low-level routes, a significant risk exists. Task time-sharing is critical to avoid collisions. Mission-crosscheck times must be adhered to when aircrew become tasked to find targets, release weapons, and avoid terrain.

Non-Element Traffic

Hornet pilots are good at using the radar and visually scanning for traffic. These good habits translate into a very small number of midairs seen in the high-density traffic areas. The see-and-avoid concept must continue to have priority while transiting to and from the area.

Flying under IFR handling doesn't mean you can blow off a good look outside under VMC conditions: Always scan. The 250-knot speed limit below 10,000 feet was established to keep fast movers from hitting slow movers. Respect the speed limit, especially in high-traffic zones.

A good understanding of IFR- and VFR-traffic patterns is important to flight safety. Aircrew may be surprised by the amount of conflicting and converging airspace in their local area.

Hazard Reporting

Do Hornet aviators accept near-midair collisions (NMACs) as the price of doing business? We have very few NMAC hazreps on the safety boards to maintain awareness and define high-risk evolutions and situations. A MAC SIR (safety investigation report) is too late to be reading about a known hazard. Fess up and let everyone learn from your "lucky to be alive" story.

Conclusion

The high risk of MAC in our community never will go away as long as we continue to fight as a team. The job of the Hornet aircrew is to mitigate this risk to the greatest extent possible by maintaining MAC awareness and knowledge. Our primary focus should be on enhancing good collision-avoidance habits in briefs, reinforcing them in flight, debriefing good habits, and correcting poor ones. Remember, you are not the only one trying to get to that merge, into that control zone, or to the initial. Don't hit me!

LCdr. Kiggans flies with VFA-195.

Squadron SOPs should address MAC avoidance. A good start is to emphasize mission-crosscheck (MCT) times and discuss the specific procedures expected of a wingmen who has lost sight in the admin and tactical phases of flight.

Building SA starts in the preflight brief; high midair-risk portions of the flight must be identified and hazard-mitigation techniques discussed thoroughly. Briefing and adhering to MCT is a good technique for preventing midairs, while altitude-block adherence and techniques for gaining tallies helps build SA. If inter-element midair potential is determined to be too great in particular phases of the flight, the flight lead should consider offering individual altitude assignments to increase available MCT.—LCdr. Milt Carlson, FA-18 analyst, Naval Safety Center.

Mishap-Free Milestones

VAW-121	75,000 hours	39 years
HSC-3	200,000 hours	31 years
VFA-136	50,000 hours	12 years 3 months
VAQ-140	30,940 hours	20 years
VMFA(AW)-332	100,000 hours	27 years
VP-9	165,000 hours	27 years
VAW-125	71,597 hours	37 years
VP-8	164,000 hours	27 years
VRC-40	96,700 hours	22 years
VFA-131	75,281 hours	18 years
Pacific Fleet Executive Transport Detachment	16,300 hours	20 years

CAN YOU BELIEVE IT?

By LCdr. David Mundy, Lt. Sven Lynch, Lt. Pascal Holmes, Lt. Andrew Gastrell, and Ltjg. Brian Strzemienski

PHA Michael B.W. Watkins. Modified.

We felt a slight hot and humid breeze from the northwest. The heat index on the flight deck hovered around 105 degrees Fahrenheit, and it only would get hotter once the Air Boss called away engine starts. The carrier would have to create its own winds to get our 54,000-pound aircraft off the deck, but that wouldn't be a problem because we'd been doing the same thing for the last four months. We faced just another day in the North Arabian Gulf.

As far as our mission was concerned, everything had gone smoothly. Our preflight turned up no problems, and our system turn-on/evaluation was 4.0. We were "mike alpha" and ready to launch. We looked forward to a great flight and another four-tenths of a point toward the ubiquitous air medal all aviators covet.

To get a jump-start on our faster air-wing brethren, our mighty, lumbering Hawkeye normally launches first. This early launch also gets us out of their way as we climb to an altitude high enough to maximize our fuel efficiency and weapon-system effectiveness. Anyone who ever has seen or flown in an E-2C soon realizes visibility outside the cockpit is not one of its attributes.

To make up for the lack of windows, the powers that be gave us an extremely reliable IFF system. The NFOs in the back use the IFF system to locate and identify contacts and to provide limited traffic deconfliction for the pilots. I can't recall the last time this system did not work.

For this mission, we had a seasoned crew in the back, two experienced pilots, a plane with a history of solid performance, and plenty of time. We were 20 minutes early. What could possibly go wrong?

Our problems began with the launch. After being delayed by four minutes, for reasons beyond our control, we took the cat and got launched—150 knots in two seconds. What a ride! The best roller-coaster ride doesn't even come close. After a proper Case I clear-

ing turn, we continued outbound and climbed. Passing through 2,000 feet, the "moles," as the back-enders affectionately are called, turned their seats and began to check the weapon system. Within minutes, the combat-information-center (CIC) crew had the system up and running and reported "mike alpha," which lets everyone on the carrier know we had full-up systems. We were going over the beach as scheduled, and our on-deck spare could shut down.

Launching late didn't hamper the mission. We still had plenty of time to gather situational awareness (SA) and report on-station on-time. The schedule is built with some slop in it to allow for such contingencies. We never thought that launching a few minutes late would lead us down the road we were headed.

We continued our climb-out as we raced toward Kuwait. The air-control officer (ACO) started to build the crew's SA of the air picture over Iraq, while the radar operator (RO) maintained the system. The combat-information-center officer (CICO) checked in with several control agencies and provided flight-following for the pilots. Because we were climbing out and not on profile, the radar wouldn't be as effective for maintaining SA on aircraft around us. Until we got to altitude, we would have to rely mainly on our IFF system.

Because this was an afternoon flight, the sun was out of the west, and, with no clouds to provide protection from the glaring brightness, the pilots effectively were blinded. Remember that limited visibility I'd mentioned? It just got worse.

As we passed through 15,000 feet, a few tracks were generated behind us, indicating our fellow air-wing bubbas had launched and were making their way toward Kuwait. About this time, our IFF system decided to act up: The CICO saw we weren't building any IFF tracks. As the RO troubleshot the system, the pilots no longer could expect accurate traffic calls, and, with the sun in their faces, the hair on the backs of their necks started to rise.

Within seconds, out of nowhere, an F-14 screamed overhead. With air-to-air radar, they probably had a "hit" on us and were able to avoid us, but they came close. Because they were climbing to altitude with the same blazing sun in their faces, they may or may not have had a tally on us until the last minute. Everything was OK: no harm, no foul. Our pilots were so unimpressed with what just had happened they chose not to tell the back-enders. Why bother us? They knew we were busy troubleshooting and checking in with the appropriate agencies. However, that close call was just the beginning. What happened next was enough to cause your heart to skip a beat.

Right behind the F-14 was an EA-6B, a plane blessed with no air-to-air radar. They were as blind as us. As the Prowler closed in on us, one has to wonder how these two aircraft could possibly try to violate the "big sky, little airplane" theory on a day that was CAVU (ceiling and visibility unlimited).

With everyone in the back consumed by the upcoming mission and troubleshooting our weapon system, we did not expect what happened next. All of a sudden, our plane violently shook from side-to-side, almost as if the pilots were wagging their wings to say hi to someone on the ground. Unfortunately, that was not the case, and, for the next 20 to 30 seconds, the pilots were fighting to keep the plane from falling out of the sky.

What had happened? The Prowler had crossed from right to left about 200 to 300 feet in front of us, and we flew through their jet wash. Scenes from "Top Gun" quickly came to mind. As the EA-6B departed as quickly as it had approached, the turbulence subsided, and we regained our composure and level flight.

After a brief discussion on how fortunate we were, we all took a deep breath and got back to the mission at hand. We still had to cover the AOR. The RO had successfully troubleshot the IFF system and gotten it working.

Looking back, one has to wonder how in the world two aircraft could have tried to occupy the same piece of real estate at the same time—especially with the weather we had. We had been flying this mission for four months and were pretty savvy. Could we in the back have done a better job painting the picture for the pilots? Sure we could have—we still had radar. We just got consumed with the mission that lay ahead and lost focus with what mattered most: our safety. As an E-2C aircrew, we are aware of our limited visibility, and we always brief that someone in the crew will provide flight-following to the front, but, for some reason, we failed to do so that day. In the future, I definitely will keep a closer eye on ownship.

We weren't the only ones to learn from this incident. For those flying near or around an E-2C, you must realize that, unless you are ahead of our 3-9 line-of-sight, we probably are not going to see you. Also, when we are climbing out at 21 units AOA and around 120 to 130 knots, we are close to our stall speed. I can't fathom the idea of getting out of my seat, shuffling to the door, and trying to bail out while the aircraft is falling out of the sky.

Don't ever get so consumed by troubleshooting or the mission to forget to keep an eye around your aircraft. Only you can prevent a midair.

The authors fly with VAW-121.

Photo by Phan Michael B.W. Watkins. Modified.

THE BRIGHT LIGHTS OF VEGAS

By Cdr. Russell McLachlan

The desert heat and sun instantly hit me as I stepped out of the Hawkeye. I was joining my squadron during the middle of what already had become a challenging detachment: the famous Red Flag exercise at Nellis Air Force Base in Las Vegas, Nev.

The next day of the exercise was a normal, two-sortie fly day for the det but would be a planning day for me. I would lead the command and control (C2) effort for the following day's evening mission. I quickly realized how unfamiliar I was with the Nellis range and was awed with the enormity of the air-tasking order our E-2C crews faced for each event. I was way behind the knowledge level of aircrew that had been involved with the initial strikes the previous week, but I was confident I could catch up.

We taxied with the usual Baja callsign, launched into the clear desert night, and transited north through the corridor to the Elgin airspace. I was as nervous as a cat in a room full of rocking chairs as I watched the amassing number of aircraft stack up in holding: F-15s, F-16s, C-17s, helos, tankers, AWACS, B-1s, and Tornados. You name it, they were all playing tonight. The Hawkeye picture was decent but ugly, with our track filled by aircraft tanking and waiting for their push times.

"Flight, let's lean east," I declared as I saw the increasing spillouts into the AWACS-tanker-E-2 station. The AWACS and tankers were fragged for the same airspace. The squadron had grown comfortable with the 2,000-foot altitude separation between Baja and the tanker with his dozen chicks in tow; I hadn't yet reached that comfort level. But, it was game time, and I turned my attention 120 miles west as the offensive counter air (OCA) pushed out ahead of the strike package. It was a good night for flying, and, while we expected lots of dead bogeys within the hour, something more awaited us.

The strikers pushed, and the comm nets became chaotic with the chatter of threat calls and shots down range. The first unusual transmission was from Majic, the British AWACS fragged as the backup controllers.

"Baja. Majic. Reaper 1 flight *[flight of two B-1s]* 10 miles west, 27,000."

I quickly went back to ownship on my screen for a glance.

"Radar contact," I replied.

Seemingly, there was no change to the picture; this was just your usual huge gaggle of strikers, waiting patiently for their chance in the fight.

Back to the strike control. What I did not see was the Reaper flight continue beyond their bomber track into our airspace only 500 feet above.

The next call was on guard. "Reaper. Baja. Co-altitude in Elgin!"

Flying at 27,500 feet, the top of their block of 27,000 to 28,000 feet, the B-1 lead immediately stepped down 500 feet, putting the two aircraft co-altitude with ours. Having just started a turn to the south, I called for the flight to level the wings in an effort to be predictable. There was nothing more for me to do; the damage had been done. How could I have been so complacent and trusting?

I held my breath and waited. Reaper 1 screamed across the windscreen.

Then, an incredible explosion brightened the dark ranges north of the sparkling strip of Las Vegas, I imagined. The fire and falling debris rained down like a scene in a black-and-white war movie.

But, back to reality. Reaper 2 crossed overhead within 200 feet of the E-2 cockpit, requiring the pilots to unload and drop approximately 1,000 feet. After making sure the situation was under control, the pilots initiated a slow, climbing turn back to mission altitude and away from future close encounters.

Anything to learn? Oh yeah.

I speak often about accountability to my junior officers and enlisted men and women, namely in the form of a postulate: To whom much is given, much is required. What was I given? Sitting in the Navy's premier C2 platform, I failed to help my pilots keep us out of harm's way. I can't just blame the B-1 crews. They must depend on their VFR lookout contracts only. One of my mission contracts was to use my radar and other sensors as a strong backup—a crew concept. Simply put, I failed. Brief your contracts and keep them.

Never underestimate the need for good mission planning. The first slice of Swiss cheese was laid out when the strike commander put the B-1s' holding track at the same altitude block as us. Whether or not they again would fly out of their track, they were planned 10,000 feet lower for the next evening's mission. Make sure the design is solid. Whether it is your first mission or 10th, give the plan a good look, and do not hesitate to offer your input. "I told you so," doesn't usually make it to the quote log or the aviator's eulogy. Say something before the situation happens.

The worst ever CRM was displayed by yours truly. I was extremely uncomfortable with the traffic, yet briefed and executed the standard stationing instead of going with my gut feeling. If I had said out loud, "I guess this is the only place to station. After all, I'm the new guy in this exercise," I would have been laughed out of the room. If it doesn't feel right, it probably isn't, so say something.

I later lay motionless in the darkness of my hotel room. I could not rest as the scene played over and over in my mind. We had cheated death. I am thankful I'm here to tell the story and didn't actually become another "bright light" in Vegas. Throw this one out at your next SAD CLAM review.

Cdr. McLachlan flies with VAW-121.

I Almost Hit a Dolphin

By Capt. Michael J. Long, USMC

We had a quiet night for our two night-contact T-34 flights. The weather was clear, with unlimited visibility—good conditions for my student's first VFR flight at night. He was in the front cockpit.

After a sunset takeoff, we climbed to altitude for high work. The student and I were getting adjusted to the night lights while we worked on turn patterns and level speed changes. After 30 minutes of high work, we went to an outlying field for a practice-precautionary-emergency landing (PPEL) to a low approach. The student was doing average for the flight, making typical mistakes for a student. He was thinking he was lower than he really was and getting slow because he started the landing transition too early.

We then flew to Corpus Christi International (CRP) for practice touch-and-go landings. We approached the airfield and asked for the break to enter the pattern for runway 17. Our request was denied because of a Coast Guard HH-65A Dolphin helicopter in the pattern. CRP tower directed us to execute a straight-in to runway 17. In a previous life, I had flown helos, but I never had operated a fixed-wing aircraft in the same pattern with a helicopter.

We were on a one-mile final for runway 17, and we already had been cleared for a touch-and-go when, from the backseat, I saw two stationary white lights (the helicopter) a little upwind of the approach end of the runway. I contacted tower to confirm our clearance to land. No response. Shortly after my radio call, I saw the two lights moving forward. I didn't call the tower again for clearance approval because we already had received it.

While I leveled the wings, I saw the helicopter pass down our right side. He still was in a hover at the approach end of the runway, and I was at eye level with his main rotor.

The first touch-and-go went smoothly. Then tower cleared us for left, closed traffic with the helicopter. We normally start our crosswind turn when our company traffic is abeam. I told the student to give the helicopter more space; I wasn't sure how fast he was or what his intentions were for his next approach. We let him get 45 degrees behind our wingtip before we turned.

As we rolled onto downwind, the helicopter approached the 180 position, which meant our spacing was adequate, or so I thought. I then realized the helo pilot was not talking on UHF, as we were. However, the tower controller was transmitting on both VHF and UHF, so I could hear when tower issued the helo pilot clearance for the option. As I concentrated on my student's airwork and pattern, I also split time between my student and the helicopter, so I could see what he was doing.

At the 180 position, I again told my student to extend downwind a bit, because I still was uncertain what the helo pilot was going to do on the runway. Tower gave us clearance for our touch-and-go as the helicopter touched down on the runway. When I saw the helicopter touch down, I told my student to start his turn to the runway. I assumed the helo was doing a stop-and-go: The helo comes to a hover, touches down, picks back up into a hover, and then starts moving

forward again. At this point, I was concentrating more on the helo than my student.

From our position at the 90, I saw the helicopter pick up into a hover and appear to be on the go for take-off. I shifted my scan back inside the cockpit to concentrate on my student's basic airwork; we were getting lower to the ground with little room for error. Turning onto a long final, probably a half-mile, I looked to find the helicopter. From the backseat, I looked around my student's head but couldn't spot the helo. From the previous approach, I remembered seeing just two white lights on the helicopter—the lights blended in well with all the background lighting, runway and rabbit lights.

As we got closer to the runway, I came back inside to check on our airspeed. Then, as I looked up to see the runway, at about 25 feet of altitude, my student turned to the left at about 45 to 60 degrees AOB and added full power. I knew his sharp turn was because of the helicopter, but, at the time, I was staring at the ground as our left wing tip rapidly approached terra firma. I immediately grabbed the control stick and applied right aileron to level the wings.

While I leveled the wings, I saw the helicopter pass down our right side. He still was in a hover at the approach end of the runway, and I was at eye level with his main rotor. I gave a big sigh of relief that we did not hit anything. I then called tower and said we were waving off and entering a left downwind for a full stop.

After shutting down at the FBO, I walked around the airplane and didn't see any damage. I later learned we had hit our left, wing-tip trailing edge on the runway and had bent the last five inches of the wing tip about 10 degrees. I walked in and called the tower supervisor, and we discussed what had happened.

A number of things could have been done to prevent this near-midair. We could have monitored VHF, as well as UHF, or asked what the helo pilot's plans were. We could have just moved over to runway 13 and avoided the situation all together. We could have executed a waveoff earlier when I didn't see the helicopter from the back seat on final. Finally, I could have communicated with the tower to verify the helo's position.

This incident was a real eye-opener to me about helicopters and fixed wing operating in the same touch-and-go pattern at night.

Capt. Long flies with VT-27.

Who's Got the Traffic?

Air-traffic controllers can greatly improve aircrew's situational awareness (SA). The tower environment can be a very busy place where a loss of SA can lead to disaster. Consider the different scenarios that may be happening at the same time: GCA or TACAN traffic (on single-frequency approaches); field-carrier-landing-practice (FCLP) aircraft (usually on their own frequency); overhead or straight-in traffic on the normal tower frequency, VFR transition aircraft on VHF; and rotary-wing aircraft, at fixed-wing bases, flying their own VFR course rules.

With all that activity, it's understandable that aircrews do not have all the information required for good situational awareness. Aircrews may hear only one side of the conversation. They may have heard the controller call traffic, but they didn't hear the response from the other aircrew. Did the other aircrew have the traffic in sight?

Air traffic controllers can greatly improve aircrew's situational awareness by making sure they:

- Provide thorough traffic calls. Include not just what the traffic is now doing. Ask if he will be changing altitude or turning.
- Reiterate intervals as necessary.
- Resequence as the scenario requires. This is important not just to the aircraft coming off the deck but also to the one behind him. The trailing aircraft's interval may have been extended, and he has to look farther upwind, crosswind, or downwind for his interval. A typical call would be, "AA123, your interval is in a deep crosswind."
- Explain the situation as time permits. The controller may say, "AA123, continue upwind. I'll call your downwind. Turning overhead traffic inside you."
- Always remember, "Traffic for one is traffic for the other."

A controller who provides the complete picture greatly increases the aircrew's situational awareness, and enables our controller-pilot team to operate safely.—ACCS(AW/SW) Leslee McPherson, air traffic control analyst, Naval Safety Center.

The Initial Approach Fix

Opening Night

On Jan. 9, 2006, the musical "The Phantom of the Opera" will become the longest-running show in Broadway history, with its 7,486th performance. And each spring, major league baseball opens a new season and each team plays 162 regular-season games. These are two different bits of information, but each accomplishment holds a parallel for naval aviators. How can the Broadway actors and the ballplayers go into each performance or game knowing that 100 percent is expected every time? Is that any different than flying almost every day on deployment?

When we read mishap reports and review the commanding officers' comments, or even when we read many of the articles in *Approach*, all too often the mishap or incident is linked to complacency. "It was a routine flight," or, "We've flown this same mission since we arrived here," or, well, you get the picture. Imagine eight performances of the same play every week. How about jogging out to first base to start a game every day for six months? On the surface, "Groundhog Day" might come to mind, a repeat of the same event over and over again. But professionals don't become complacent. Mistakes and subpar performances don't sell show tickets or score runs. Nor does a complacent aviator get a mission accomplished. Nobody has cornered the complacency market, but we do know the stakes are too high for us to allow it. Make every event opening night.

Do you man-up ready to give 100 percent to every flight? Our website has a message titled "Leadership Intervention Best Practices" that should be a starting point for discussions on this topic; view at: http://safetycenter.navy.mil/aviation/articles/LeadershipIntervention.txt.

As we move through the new year, take advantage of the resources the Naval Safety Center offers, whether safety surveys, culture workshops, online surveys, or the many products from our aviation or media and communications departments. Visit us online at: http://safetycenter.navy.mil.

Aviation Safety Surveys—Air Terminal and ATC

Aviation safety surveys are available to all Navy and Marine Corps active and reserve aviation squadrons, O- and I-level activities, air stations, aviation facilities and detachments. In terms of frequency, commands (other than air stations) are recommended to have surveys every two years. Based on aviation leaderships' requirements, the two-year cycle will be mandatory in the next OPNAVINST 3750.6.

Facility surveys are conducted aboard air stations. Areas surveyed include the air terminal/transient line/VAL, ATC, arresting gear, Airfield Vehicle Operator's Indoctrination Course (AVOIC), BASH, runways, crash/fire/rescue, and fuels. Air station facility surveys usually take one full week to complete. Each survey team has three members (one officer and two senior enlisted). In terms of frequency, air stations are recommended to have a survey every three years. The three-year cycle will be mandatory in the next OPNAVINST 3750.6.

Our Safety Center POCs for facility surveys are:

Lt. Mark Carstens, (757)444-3520 ext.7281 (DSN 564), email mark.carstens@navy.mil
ACCS(AW/AW) Leslee McPherson, ext. 7282, email leslee.mcpherson@navy.mil

Gloves—We need your feedback.

Do your flight gloves have the fingers cut out? We want your inputs on the flight gloves you're currently wearing. We want to know how prevalent is the practice of cutting off the finger tips of these gloves to improve tactility and sensitivity. Do you feel new fingertip designs are warranted? Log on to our Naval Safety Center website and complete our survey. Also, if you feel better gloves are needed, send in a hazrep to make sure funding and priority are given on this issue. Help us out; take a few moments and complete the survey at: http://www.safetycenter.navy.mil/aviation/aeromedical

Have you checked out your drysuit lately?

We're in the middle of winter and drysuits must be provided when operating in areas when the temperature is 32 degrees Fahrenheit or the water temperature is 50 degrees Fahrenheit or below (see figure 9-2 in OPNAVINST 3710.7T). Has your squadron sent your drysuit through AIMD for inspection and repair?

Inspect your drysuit before use. Make sure all the seals and fabric have no tears or deterioration. Also, make sure it fits. The March-April 2005 *Approach* ran an article "Size Does Matter," that points out the importance of a good fit; view it at: http://safetycenter.navy.mil/media/approach/issues/marapr05.

Take the time to make sure your drysuit is ready.

Divert to Shemya

The flight engineer predicted it only was a matter of time before the prop low-oil light would come on.

By Cdr. Karin Kulinski

After completing a successful tsunami-relief detachment from Atsugi, Japan, we boarded our C-130 for the first leg of our flight home to NAF Washington at Andrews Air Force Base. As the det OinC, I commended the 22 crew members on how well our aircraft had held up and the large amount of cargo and passengers we had moved. Once we had wheels in the well, I looked forward to a long, relaxing flight, followed by an RON (remain overnight) in Alaska.

Flight planning from Atsugi to Elmendorf AFB always was a bit tricky, especially in January. The 10.5-hour flight required almost a full bag of gas: 62,000 pounds. We could reduce some of the required contingency fuel for engine or pressurization losses if we could rely on several divert airfields along the way. However, we couldn't count on good weather at divert airfields during wintertime, and we'd pass over most of the fields during closed hours. Shemya Island, at the end of the Aleutian Island chain, advertised a closing time of 1700L. Out of curiosity, two days before our departure, I called Shemya's tower and found out that, contrary to the Enroute Supplement listing, they were open "24/7." That's nice-to-know information, but I doubted I'd ever end up anyplace that remote.

The transport aircraft commander (TAC) for that leg of flight obtained a thorough preflight weather briefing. Takeoff and divert weather for northern Japan's airports were good. Not surprisingly, though, Shemya had bad weather. Adak Island was predicting adequate but not great conditions. Cold Bay and King Salmon airfields were forecast to have progressively better weather. VFR conditions were supposed to greet us at our destination in Anchorage.

About three hours into the flight, the loadmasters noticed the No. 2 propeller leaking fluid. Experienced operators of the Hamilton Standard prop know that the prop seals tend to leak a little more in cold weather, but this leak looked worse than usual. The flight engineer predicted it only was a matter of time before the prop low-oil light would come on.

The TAC started a discussion of whether to turn back toward good weather in Japan. He obtained an updated weather brief, which indicated snow in Misawa and adequate weather in Adak; Shemya still was dismal. With no guarantee that the annunciator light would come on and with tailwinds already pushing us toward Alaska, we continued east.

Two hours later, the prop low-oil light came on, requiring an engine shutdown. We were about an

hour from Shemya and an hour and a half from Adak. Because Cold Bay was two-plus hours of flying with three engines, we felt it would be unwise to pass up the closer landing option. The crew secured the engine, and we initiated the radio comms to head toward Adak. Using our satphone, the TAC convinced the Adak airfield manager to keep the field open.

I received current weather observations from Elmendorf, and the information was not a cause for celebration. Adak's winds were gusting to 43 knots, with a scattered layer at 100 feet, a broken layer at 1,000 feet, and overcast at 1,900 feet. Although it sounded exciting to shoot an approach into low ceilings amidst mountainous terrain, with strong gusts, the crew thought it would be a disservice not to check out the other airfields. Shemya's overcast layer at 700 feet, two miles visibility in rain, and winds 40 degrees off the runway, gusting only to 28 knots, sounded better—not great—but much more comfortable. Eareckson Airfield on Shemya has a 10,000-foot runway, with no significant terrain in the vicinity, and, as promised on the phone two days earlier, Shemya was open for business. They approved our emergency landing; our destination was set.

Forty-five minutes from the airfield, I climbed into the left seat and briefed the three-engine TACAN approach. The flight engineer calculated we'd only be three knots under our wet-runway crosswind limit. The TAC hopped into the right seat and verified Shemya's 28.26 altimeter setting. This barometric altimeter setting yielded a 400-foot difference, with the radar altimeter in the uncomfortable direction. The approach would take us to within 500 feet of the water on the radalt, which would put the barometric altimeter within an unnerving 100 feet of the water. To prevent any confusion, I briefed that we'd fly off the radar altimeter only.

We posted extra personnel in the flight station during the approach and landing to help us find the field. On descent for the approach, our overheat-detection system (ODS) light came on, indicating an internal bleed-air leak somewhere. Although we had no secondary lights or warnings, this malfunction requires landing as soon as possible, which we hoped wouldn't prove to be easier said than done.

Through heavily scattered clouds and at 500 feet AGL, the TAC spotted the rabbit lights 30 degrees off the nose. Thankful for a PAPI (precision-approach-position indicator), I dove for the runway lights, and we kept the field in sight. We touched down uneventfully, and the 20-knot crosswind nicely offset the dead engine during the reversal. With only two engines to reverse, it was nice to have 10,000 feet of runway.

We spent 12 hours unsuccessfully trying to duplicate our prop leak and ODS warning light. The leak may have been caused by temporary debris in a seal or a previously rolled seal. The ODS light apparently was a result of wires incorrectly bundled behind the weather radar. We added three quarts of fluid to the propeller and analyzed our options for reaching home.

We waited a day for consistent, good divert weather all the way to Anchorage. We relaunched during daylight hours to better keep an eye on the prop. We successfully reached NAF Andrews 18 hours later.

I'm glad our crew had the good sense to thoroughly analyze divert options along a route we routinely fly. I plan to always proactively obtain and update divert weather like the TAC did. I learned it was worthwhile to pick up the phone and call several divert airfields beforehand.

I more fully appreciate the scan of the radar altimeter I developed during many years of flying P-3s at several hundred feet over the water. The excessively low altimeter setting immediately alerted me to cross-check my altimeter. Had a crew blindly followed the barometric altimeter, they easily could've ended up in the water.

Last, I am thankful for the amazing transient support on Shemya Island. In spite of the short notice and late hour, every emergency vehicle on Shemya greeted us. The airfield personnel towed our aircraft into a warm hangar within 20 minutes of arrival. Before we walked off the plane, they had 23 nice rooms reserved. Transportation through the pouring cold rain was standing by, and the island's only galley was reopened for us. Despite the wretched weather, this type of welcome makes Shemya one of my favorite diverts.

Cdr. Kulinski flies with VR-53.

My guess is there are dozens of stories like this in your ready room—stories of flights that were "not quite right" but ended on a happy note. There are lessons in all of them. Are you sharing your stories? Are you recording the lessons for the new guys? In the words of Emil Faber, "Knowledge is good." Pass it on.—Capt. Ken Neubauer, aviation safety director, Naval Safety Center.

BEFORE AND AFTER

By Lt. Matthew Burns and Ltjg. Landon Jones

The lion's share of work in a successful flight is spent in preflight: studying, flight planning, weather briefing, and working out every logistical and operational detail, no matter how small. A critical but underappreciated part of the brief is when the crew talks through each leg of the flight, identifies the potential hazards, and develops ways to eliminate or mitigate them.

We've all studied the academics of operational risk management (ORM), whether in flight school or in a fleet squadron. Five steps, four rules, three levels—although not rocket science, but sometimes ORM can seem unwieldy and overly structured. The application of those ORM principles, however, couldn't be simpler: A crew discusses all the mission's risks and then decides how best to deal with them.

Sometimes the risks are not all self-evident on preflight. Some hazards are a result of being in the wrong place at the wrong time. In these cases, it's not until after the flight that ORM principles can be applied. Debriefs capture the lessons learned that may prevent future mishaps. Here's an example:

Our squadron was home for a few months between deployments, and my crew's mission was to update our night overwater currency in the Sagami Bay, 10 miles south of NAF Atsugi. The night was clear, and our SH-60F was flying well. We proceeded via course rules to the dip areas and completed our after-takeoff and automatic-approach checklists. We then practiced dip-to-dip navigation (used to rapidly reposition the aircraft and its dipping sonar during active ASW prosecution).

Night search-and-rescue (SAR) training was next on our agenda. Our crewmen dropped a Mk-58 smoke on a simulated datum, and we turned to enter our first windline-rescue pattern. During the turn, one of our crewmen saw another aircraft about four miles east of our position. He called the traffic, and, after noting it, the crew continued with the rescue pattern.

We flew to a hover above the smoke and began the verbal sequence, simulating the deployment of the rescue swimmer. While in the hover, the left seat pilot saw a neighboring aircraft appear to have moved much closer to us. He had dropped two smokes in the water about a mile east of our position. We discussed their close proximity and decided the other aircraft probably was not on NVGs (night-vision goggles) and hadn't noticed we were in the same area. Any aircrew on NVGs almost certainly would have seen our aircraft at this distance.

We were the only crew in our squadron flying that night, but NAF Atsugi is home to several other helicopter squadrons, American and Japanese. We decided the most prudent course of action would be to expedite our ongoing simulated rescue, then depart to the southwest to gain some distance before continuing the SAR training. The crewman in the cabin door began reeling in the rescue hoist, so we could depart the hover.

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I glanced down at the instrument panel to check the engine indications, when, suddenly, I saw streaks of light passing in front of the aircraft. The crewman saw the same streaks of light and immediately recognized them for what they were: tracer fire.

He urgently called, "Depart. Depart. Depart."

At that moment, I realized how incredibly dangerous our position was. We were between an aircraft firing a machine gun and its targets, and they had no idea we were in the same airspace.

The basic gun pattern for a helicopter is shaped like a racetrack. This pattern easily can be modified for different situations, and its simplicity makes it easy for multiple aircraft to fly. However, when only one aircraft is flying the pattern, gaps occur in the firing legs as the aircraft turns downwind and reloads. After a few seconds, the streaks of light had stopped flashing past our aircraft, but I knew we only had a few moments before the aircraft would complete its orbit and again open fire. My HAC pushed the nose over, rapidly accelerated, and exited the area as fast as our aircraft could fly.

Once clear, we called the other aircraft on guard but received no response. We all took a few moments to look around the cockpit and cabin, searching for signs of damage. Fortunately, our aircraft didn't seem to have been struck, but we agreed to abort the training mission and have the aircraft thoroughly inspected. We turned north and entered course rules for home, with all of us breathing a deep sigh of relief.

At night, objects appear very different to the human eye. Judging distance is considerably more difficult than in daytime, and depth perception is degraded badly. Using NVGs can dramatically improve one's visual acuity, but depth perception continues to be poor, and the field of view is reduced from 188 to 40 degrees. The most likely explanation for the other aircraft not realizing we were flying nearby is that they were not wearing NVGs. With them, they would have seen our exhaust and our anti-collision lights.

Clearing a range—visually or using radar and FLIR—before opening fire is a requirement for any gunex. At night, though, visually clearing a range without NVGs is very difficult, and the likelihood of a blue-on-blue engagement increases. All of this is strictly academic in this case, however, because gunexs are prohibited in the Sagami Bay dip areas; naval aircraft from both nations regularly use the airspace, and fishing boats are very active in the area. Fortunately, we escaped being shot. Unfortunately, mission planning and ORM would not have prevented this event because no reasonable assessment of the hazards would have included two aircraft flying 20 miles out to sea to the same section of Sagami Bay, with one of them conducting an unauthorized gunex.

My crew's application of ORM came after the fact as a mitigating control for future flights. We coordinated with all the other helicopter squadrons on the base, Japanese and American, and established a common deconfliction frequency for the dip areas. This new policy will help prevent any future close calls, and no one else will have to experience the same level of excitement we did. We also incorporated the lessons learned into our gunex events; we now discuss range-clearance procedures and authorized ranges in every brief.

"Good judgment comes from bad experience." ORM capitalizes on this saying: Capturing the lessons learned from past flights ensures future flights are as safe as possible.

Lt. Burns and Ltjg. Jones flew with HS-14.

One can look at the five steps of ORM and think of it as a linear process. In reality, the process is a continuous cycle. This crew identified a new hazard during flight, used a time-critical process to manage the immediate risk, but then did something we don't often do—they understood that this hazard might not be isolated to this one occurrence, could be symptomatic of other similar hazards at night in a working area, and implemented a control (the common frequency) after the event. What now? Step 5: Supervise! Leadership in the units need to ensure their crews adhere to the new procedure (risk-control measure), and enter this risk-management plan into TRACS so others might learn from their experience. ORM—don't let it end when you exhale with relief after surviving a near-death experience.
—Capt. Ken Neubauer, aviation safety director, Naval Safety Center

What Did He Say?

By Lt. Taylor George

It was a cold, clear, dark night in the dead of a January winter off the Virginia Capes. The fleet replacement squadrons (FRS) from Oceana and Norfolk were flying carrier quals on USS *George Washington* (CVN-73). That night, I witnessed an event which proved that bad communication can cause a mishap, while crew resource management (CRM) can prevent one.

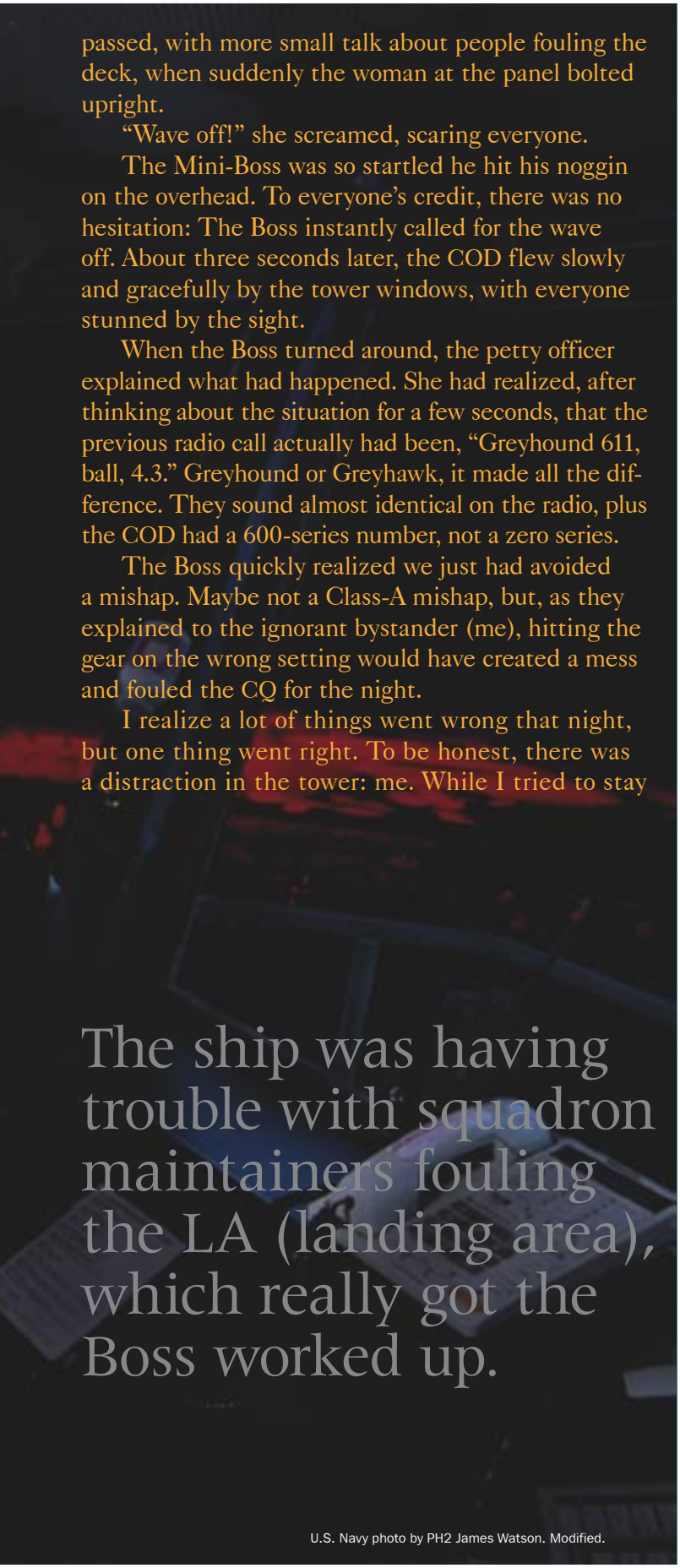
I am a JAG officer, not an aviator. While I have worked with aviators throughout my career and have a bit of flight time in F-14s and other aircraft, I freely admit when I am on board a CVN, I am a pure JAFO (just another freaking officer). That being said, I am a trained observer, and I try, every chance I get, to learn about naval-aviation operations.

On this night, I was standing behind the Air Boss, watching the launches and recoveries. He and the Mini were trying to educate me about what was happening on the deck, in pri-fly, and in the air. Over the course of a few hours, I had begun to understand the intricate actions around me. Just as we started a new cycle, a curious thing happened.

While listening to the radio calls, I noticed the E-2s were going by the call sign "Greyhawk." There were four Hawkeyes in the pattern, along with several Hornets and Tomcats. I also saw a lone COD in the pattern, getting ready to make his traps along with everyone else.

The ship was having trouble with squadron maintainers fouling the LA (landing area), which really got the Boss worked up. I soon heard background conversations in the tower about how many foulers we had. When the deck fouled with a Tomcat close in, the Boss exploded, but had calmed down by the time the next aircraft called the ball. I heard, "Greyhawk 611, ball, 4.3."

I looked over the shoulder of the young petty officer second class at the arresting-gear monitoring panel and watched all the arresting engines move to the setting I just had learned was for an E-2. Several seconds



passed, with more small talk about people fouling the deck, when suddenly the woman at the panel bolted upright.

"Wave off!" she screamed, scaring everyone.

The Mini-Boss was so startled he hit his noggin on the overhead. To everyone's credit, there was no hesitation: The Boss instantly called for the wave off. About three seconds later, the COD flew slowly and gracefully by the tower windows, with everyone stunned by the sight.

When the Boss turned around, the petty officer explained what had happened. She had realized, after thinking about the situation for a few seconds, that the previous radio call actually had been, "Greyhound 611, ball, 4.3." Greyhound or Greyhawk, it made all the difference. They sound almost identical on the radio, plus the COD had a 600-series number, not a zero series.

The Boss quickly realized we just had avoided a mishap. Maybe not a Class-A mishap, but, as they explained to the ignorant bystander (me), hitting the gear on the wrong setting would have created a mess and fouled the CQ for the night.

I realize a lot of things went wrong that night, but one thing went right. To be honest, there was a distraction in the tower: me. While I tried to stay out of the way, a lot of people were taking time from their regular jobs to teach me.

The ship was having trouble with squadron maintainers fouling the LA (landing area), which really got the Boss worked up.

U.S. Navy photo by PH2 James Watson. Modified.

Another hole in the Swiss cheese [*see editor's note at end of article*] came with the maintainers who were fouling the deck. After about the third incident, the Boss started to pay a lot of attention to them—instead of flight ops. I know they had no idea what the implications of their actions were, but they were contributing to a mishap-in-the-making.

My next observation lies with the squadron. They had a 600-series number on a COD. From one point of view, it makes sense: The E-2 and C-2 communities share an FRS. So why shouldn't all the squadron's aircraft have the same number? Consider, though, since the *GW* only recently had returned from a combat cruise to the Gulf, maybe the Boss was thinking about the air wing he had flown with for the last six months: the air wing where CODs had zero numbers, not 600s.

The last hole in the cheese that lined up was the fault of the pilots in the pattern. All the E-2s were using a call sign they didn't realize (I'm sure) was similar to the one the COD was using. The call signs were virtually indistinguishable over the radio. It's the same reason the Hornet drivers don't like to use "Super Hornet"; one radio squelch, and you have a problem.

As it turned out, the piece that didn't line up belonged to the team in pri-fly. Let's give credit to this young petty officer who was assertive and had the courage to call for a waveoff. She knew her job and made the call without hesitation. Something wasn't right, and she made a gutsy—and the right—call. Add a little CRM to the scenario with the Boss not questioning her call. A member of his team in a better position to see the problem had made the call, and he backed her 100 percent.

We say all the holes in the Swiss cheese have to line up for a mishap to occur. Everyone in naval aviation on the deck, in the tower, or in the cockpit, has a chance to block a hole. Situational awareness by any one of them can do the trick.

I'm still a JAFO, and I thank that young second class, whose name I don't even know, for teaching me a little about how naval aviation really works.

Lt. George is with the Naval Safety Center.

To learn more about the Human Factors Analysis and Classification System (HFACS), which describes the "Swiss cheese" model mentioned in this article, read the Approach *"Work Zone" entry in the July-August 2004 issue. View it at: www.safetycenter.navy.mil/media/approach/issues/julaug04 —Ed.*

We've Blown

By Lt. Albert Geis

Fleet-replacement-squadron (FRS) requirements always seem to conflict with good ORM analysis by evolving into a "get the 'X' no matter what it takes" attitude. I was getting ready to fly my first night formation in the EA-6B FRS, and our event would be the perfect reflection of that attitude. The day was a standard winter day for Whidbey Island: light to moderate rain, with overcast layers up to about FL200. The temperature was no more than 10 to 15 degrees above freezing.

A German exchange officer would be in the ECMO 1 position on my right side. The brief was standard. We took off from Whidbey as singles and planned to meet in the Okanogan military operating area (MOA). Because of the layers of clouds and snowfall, the lead selected a new join-up altitude for the rendezvous. We managed to press through that portion of the flight. However, on the first breakup and rendezvous, we had significant trouble finding lead as we went in and out of clouds. The poor visibility between clouds was because of the storms. We managed to fumble our way through the join-up, and, once aboard, we followed lead as we looked for workable airspace. After five minutes of flying in and out of clouds, lead called it quits. Because of the reported poor weather at Whidbey Island, we broke up the section as singles and headed back to the field.

On the return, we checked ATIS; the weather was worse than when we had taken off. The ceiling had dropped to 400 feet, and enough rain had fallen to cause standing water on the runway. There were no reports of braking action. We set up for an ACLS approach to runway 25. ECMO 1 and I discussed not aero-braking and not applying the brakes right after touchdown to mitigate the possibility of hydroplaning on the standing water. As a new pilot, I was a little nervous about the approach and landing, given the conditions and how the flight had gone so far.

After tip-over and while flying down the chute, I tried to squeeze the black out of the stick. I relaxed a little bit when we broke out with a little under a mile to go at 400 feet. Even after we broke out, the hard rain obscured the runway. ECMO 1 was Johnny-on-the-spot with the windshield air that nicely cleared the windscreen. The groove went smoothly, and, on touchdown, I let the nose fall to the runway.

Ze Tires

The landing went smoothly until the jet decelerated through 110 knots—then the fun started. The first indication of trouble was a yawing motion to the left as we continued to track straight down the runway. I slowly added in right rudder but with no effect. Then, in a violent motion, the starboard mainmount blew, and the jet's nose swung to the right. I now looked directly at the large—and getting larger—yellow ball that marked the right side of the arresting gear.

Startled, I jammed on full left rudder and nosewheel steering. It was either a failure of the sidewall strength, the pressure I put on the left brake, or a combination of the two that subsequently blew the port mainmount. This blowout turned out to be a good thing because it swung the jet's nose back to the left, away from the arresting-gear marker. We now were pointed off the runway to the left side.

About the same time as the left tire blew, my ECMO 1 called out to tower, "We've blown ze tires! We've blown ze tires!"

The jet's nose continued oscillating as we slid down the runway on two blown mainmounts. While passing midfield, ECMO 1 had the presence of mind to pull the arresting hook. We crossed the long-field gear aimed about 25 degrees to the left. We slid into a long-field arrestment, finally stopping 50 feet left of centerline.

We shut down in the wires and got out of the jet to talk with the crash crew. As we inspected the jet and surrounding area, we noted several things. Both mainmounts completely were blown, and the wheel was ground down to a flat base on the bottom of each tire. An inspection of the cross-deck pendant revealed a large gash in the wire, with frayed metal cable. The gash went about 20 percent of the way through the cable and was caused by the port mainmount going over the cable: metal on metal.

The most important lesson learned was our failure to discuss a short-field arrestment. With the bad weather, darkness, and our inexperience in the type aircraft, we definitely should have considered an arrested landing. Just having standing water on the runway automatically should have had us consider an arrestment. While we kept the jet on the prepared surface, with only minimal damage to the tires, this incident easily could have escalated into a Class-A mishap.

Lt. Geis flies with VAQ-139.

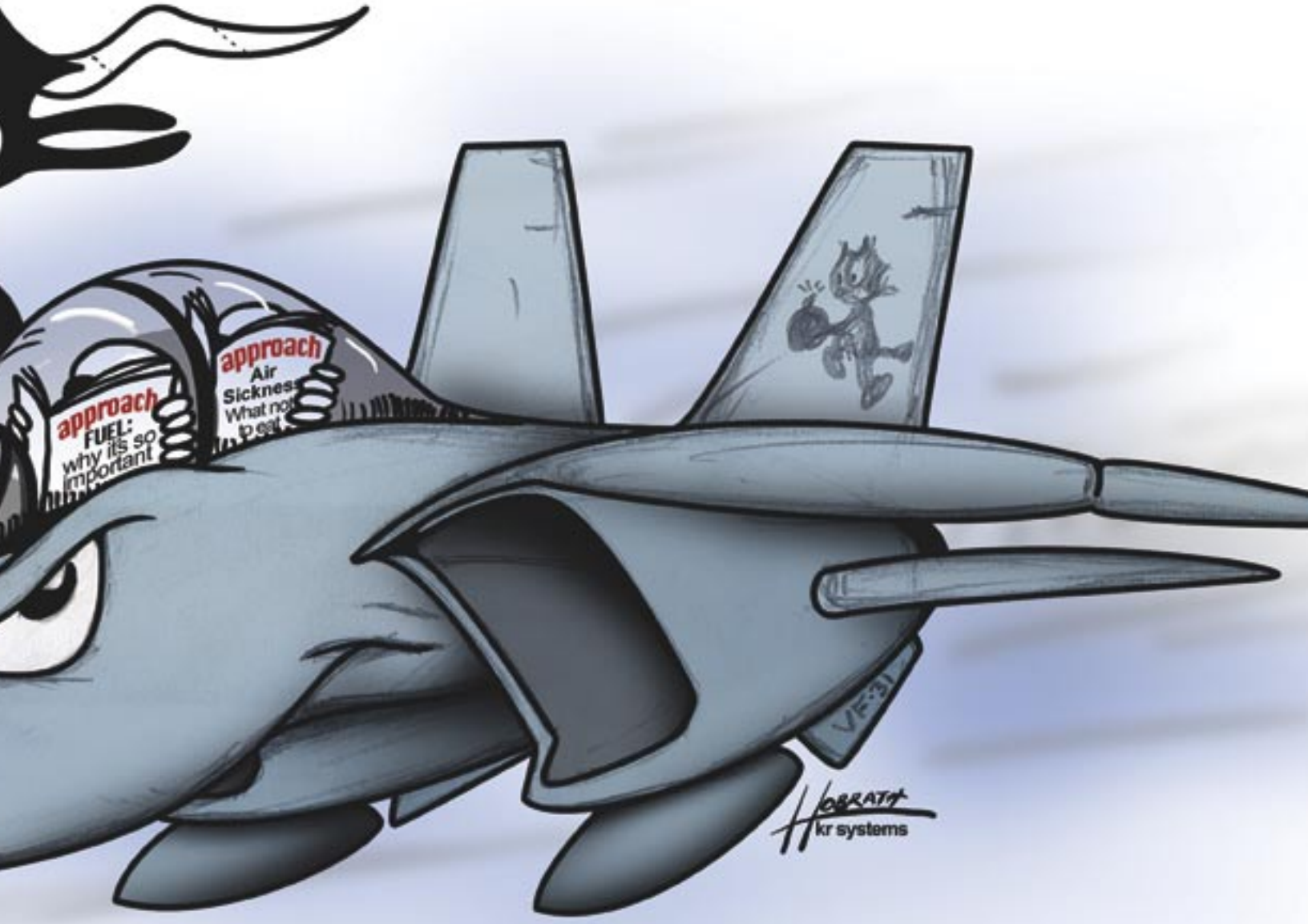
Stupid Chocolate Cake

By LCdr. Chris Wiseman

This story takes place during a weekend in March 2004. I was the safety officer at VF-31, and we were deep in the heart of our work-up cycle for a summer WestPac deployment.

The squadron maintenance officer (MO) and I finally had a plan for a weekend cross-country trip. We built a reasonable training plan to get us down to Atlanta, exercising some of the systems in the aircraft, so we could log the appropriate training codes, and submitted the cross-country request. The only sticking point in the entire approval process was that the squadron was departing for the West Coast at the end of the week, following our trip. We convinced the CO it was a good idea, and he signed off on our request.

The trip was incredibly uneventful, and the weekend was superb. The only potential downside was that one of the people we were visiting had contracted some sort of stomach flu just before our arrival and was a bit under the weather, praying to the porcelain god every few hours. We shrugged off that problem, and enjoyed a spring weekend in Atlanta. The friends we were visiting knew some people, who knew some other people, and we wrangled pit passes and owner's box passes for the Atlanta 500 car race. To make a long story short, we ended the afternoon at the race, sitting in the owner's box and enjoying one of the best buffet spreads I've seen in a long time. The final course offered on the buffet was chocolate cake that was about as far from shipboard cake as possible. I might have overindulged just a little on the chocolate cake.



We left the race early to pack and prepare for the flight home that evening. We had arranged with maintenance to have a duty crew come to the squadron to catch us around 8 p.m.

We arrived by the aircraft with plenty of time to file a flight plan and get started. Then the problems started. The aircraft was out of gas—a situation easily remedied. However, getting a gas truck on a Sunday night, at a reserve base, can take a while. That gave us plenty of time to get the flight plan together and to check the weather.

By now, I realized the second slice of chocolate cake was a mistake. "Oh well," I thought, "just press through, and we'll be home in a couple of hours."

We finally got fuel into the jet, and then the typical Tomcat huffer-ground-power dance started. The two ground crew "launching" us seemed like they'd never seen a starter unit, but, after many hand gestures and trips up and down the ladder, we finally got air and power on the jet. Just as the pilot cranked the first engine, though, the huffer died. The ground crew suspected it was out of gas. Off they went in their tractor to find another huffer (remember this is a Sunday night on a reserve base). We anxiously sat in the jet, awaiting their return.

The pilot wasn't anxious, but the chocolate cake was getting my attention—or was it the start of the stomach flu our friend had? I'm not sure, but I was sure that, after the second huffer failed to work, I had to get out of the jet. I hustled down the ladder (if you ever have tried to get a Tomcat ladder down from above, you know it's not easy), cruised over to the little operations

shack, and gave the chocolate cake back to nature. Five minutes of vacating the products of that superb buffet from my stomach made me feel surprisingly better. I returned to the aircraft just as our trusty ground crew returned from refueling the original huffer, at whatever gas pump one refuels huffers. I climbed into the back seat and started to strap in as the pilot began the start sequence. Sitting there, I thought, as I have on previous occasions, "Wow, this feels like it could be an *Approach* article." I had no idea how correct I was.

The start takeoff and climb-out were uneventful. We convinced the controllers that letting us go directly to Oceana was in everyone's best interest, and we put the nav point on the nose and began to speed home. If you look at a map, you will note that Atlanta to Oceana direct is not very far. The pilot looked at the time-to-go and decided that .97 to .98 Mach would get us home to make our original recovery time.

Meanwhile, I was experiencing another cycle with the chocolate cake. I tried my hardest to keep what was left of my lunch (I had to maintain my record of never being sick in the aircraft) and willed the jet to go faster toward home. Somewhere around the dividing line between North and South Carolina, the pilot gave me bad news. The jet suddenly decelerated, and he told me that we had a fuel split—normally not a big deal. Several procedures in the PCL address fuel malfunctions; the easiest of them is to select the high fuel side and let the system balance out. We tried that, but nothing happened. What he actually saw was the "feed" windows on the fuel indicator showing we were burning only the fuel resident in the right feed group. The remainder of the right fuel system seemed unavailable. The pilot said we had somewhere around 800 pounds (normally 1,600 pounds) available in that system and asked me to start looking for a procedure.

Did I mention the battle with the chocolate cake? Well, this is where the cake decided to counterattack.

It was dark, the cockpit was vibrating, and I had to get out the PCL and see if I could find the procedure to address the fuel malfunction. Out came the blue book, and, after a glance through the fuel procedures, I found nothing that addressed a diminishing feed group. However, there was a new procedure that might have addressed it, but, because of several errors during the copying of the replacement pages, the title bar was entirely left off the procedure. Nothing from the PCL could help me. And, the chocolate cake wanted to visit again.

I long since had stopped flying with an airsickness bag, but I fortunately had a couple of piddle packs in my nav bag. I broke one out and examined it for returned-chocolate-cake suitability. Good fortune again was on my side; I had one of the newer bags with a funnel built into the open end to prevent spillage. In my case, I determined this funnel might cause some very unwanted "blow back," so I modified the bag just in time.

Meanwhile, the pilot was up front killing his snakes, dealing mostly with the fuel system. He figured we had some sort of major fuel emergency. Fuel emergencies were fresh in everyone's minds, as VF-213 had lost a jet the year before to fuel issues, and we had been experiencing degradation of our fuel systems. As he asked me to find a suitable divert in the area, I had another cake-revisit magic moment. I mumbled something about "hold on" and, after completing my little situation in the back, turned to the chart. Again, the darkness, poor cockpit lighting, and small print on the chart combined to make me turn to the modified piddle pack one more time.

I finally got something typed into the nav system. We had reasonable diverts on the way, but we decided to continue to Oceana. The pilot set very specific gates of fuel and distance, and he continually updated our decision to continue. We felt it would not be a good idea to divert an aircraft away from home base after a good-deal cross-country the weekend before our detachment. We also considered that our jet contained two department heads, including the MO.

The pilot slowed down, kept the attitude off the airplane, and let the fuel systems try to sort out themselves. We finally got close to Oceana and were handed over to approach control. As they began to vector us, we threw out the "emergency" word and told them we were going directly to Oceana runway 5. There was a bit of discussion about our intentions over the radio, but using the "E" word really was effective. Norfolk approach handed us over to Oceana approach, and, again, we had to explain the entire situation. We had no idea what we had in the way of useable fuel, and we just wanted to get the jet onto the runway by the quickest means. That meant telling approach, even though Oceana was landing

runway 23, we intended to land on runway 5.

As we approached the runway, the pilot kept the nose down to prevent the fuel from migrating aft and being further inaccessible. Nose down also made our approach a bit faster than normal. As we approached the runway, we saw a C-130 (actually, all we saw was a large cluster of lights) heading straight for runway 23's threshold. We heard approach tell the C-130 an emergency aircraft was on final for runway 5 and to wave off. The lights kept coming—really—all the way to touchdown. We were astonished. Approach told us we had to sidestep to the left runway, a shorter runway, but still with plenty of concrete for our needs; we began to sidestep. Tower yelled at the C-130 pilots to clear the runway to make it available for us. They finally complied, with just enough time for us to sidestep back to the right and to make an uneventful landing.

I was in no shape to do anything but crash on the ready-room couch for about an hour, within easy reach of the head, before I could drive home.

Our maintainers later found that we had broken the high-pressure, motive-flow line that runs from the right engine to the right feed-tank boost pump. This fuel is used to drive the boost pump, which provides motive-flow fuel for fuel transfer within the right system, as well as provides high-pressure feed fuel to the right engine. This problem explained the right fuel-pressure caution light the pilot had seen.

A number of automatic features of the fuel system should have kicked in with the fuel-pressure light, including the opening of the sump-tank-interconnect valve and other valves throughout the aircraft. The pilot forced similar actions by moving the fuel-feed switch to the high side, aft and left. This action opened and closed valves in the fuel system in an attempt to balance out the system. We are not sure if any of these things had any effect on the system during our flight. Maintenance tore open the fuel cells and discovered the break in the motive-flow line, but they still can't explain the inability of the system to balance itself. The jet has been thoroughly tested, and the fuel system has returned to normal operation.

The next day, I went to base operations to discuss the C-130 situation with the tower controllers. They said they had given the C-130 the waveoff command and instructions, but the pilots didn't comply. Evidently, the C-130 was part of a Spanish Air Force exercise scheduled the next week. They were early and apparently had some communication-language issues with our controllers. The landings turned out fine, but they easily could have gone wrong had we been closer and committed to land or single runway. As the aircraft that was responding to tower's commands, we, the emergency aircraft, might have had to wave off.

Three weeks later, our squadron lost a Tomcat off the coast of California to a fuel-system malfunction. Looking back, I realize that just as easily could have been us. The questions I had to ask the mishap crew following their ejection would have been very uncomfortable for me to answer had they been asked of me. I'm talking about questions like, "Why did you not land as soon as you determined you had an unknown amount of useable fuel on board?" Or, "Why did you even go flying if you weren't 100 percent?" Puking in the back seat is definitely not providing the required back up and copiloting information to the pilot.

As usually seems the case in these types of incidents, we completed the flight, landed safely, and wrote about it later. As the safety officer, I should have called timeout on deck in Atlanta and flown back the next morning, after the chocolate cake had left my system. But, as time continues to prove, hindsight is always 20/20. The purpose of these articles is to share that vision with each other and, hopefully, give someone else the power and rationale to call timeout and to try again some other time.

Chocolate cake never has looked the same since that day.

LCdr. Wiseman flies with VF-31.

WESS Update

The WESS Barrier Removal Team (BRT) is working to improve the program. Help us make WESS better, use the on-screen feedback form or call the WESS help desk at 757-444-7048.

Crew Resource Management

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

CRM Contacts:

CRM Instructional Model Manager
NASC Pensacola, Fla.
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Sandbagging

By Lt. Steve Walborn

The routine of cruise was well-entrenched, and the days were starting to blend together. Missions flown in support of Operation Southern Watch had been going on for some time, and everyday events were becoming mundane. The situation would change quickly, though, with the beginning of Operation Iraqi Freedom.

One night mission forever will live in my memory. The strike took me north to participate in the initial wave of the "shock and awe" campaign. The division that evening consisted of my skipper as lead (Dash 1), me as Dash 2, a second-cruise JO as Dash 3, and another nugget as Dash 4. I was excited to be a part of the "A-team," so to speak. I had participated in the strike-planning portion of our mission and was very familiar with the route, the tanking plan, and most of the tactical aspects. I also had put

I felt myself

together the JDAM (joint direct attack munition) plan for our platform and a kneeboard card for the strikers.

Rehearsing every tactical detail over and over in my head made me feel like I knew the plan inside and out. I didn't want to be the weak link in the chain during the execution of this mission, especially on opening night.

The overall plan called for us to do something a little different than what we were accustomed to: We would get gas in a different region than usual. I had a few questions regarding the admin portion of our flight, especially because the procedures had changed. Not to worry though, I was the junior guy in the flight, and I always would have someone leading me around, right? And so the story goes.

The brief went without a hitch. I got to the flight deck early to get focused and to find some sort of comfort level. Start-ups went normally until a small snafu with the JDAM load appeared. This glitch got me spooled up; however, the problem was resolved, and I launched with a full mission-capable platform in sufficient time to proceed as planned.

We had briefed a running rendezvous en route to the first tanker. If we didn't join on the tanker, we planned to get our division together on the wing of the KC-10, then tank and go to the rendezvous point for the strike package. Fortunately for me, I joined the skipper about halfway to the tanker. The chore of finding the tanker and getting us established on port observation now was his. I had found my happy place, the position I knew best: the combat wingman. After a few moments, I was able to relax and take in the magnitude of the upcoming strike. The view to the south under the NVGs simply was awesome, and I watched as all the high fliers headed north. Tonight definitely was not a good night to be a target in Baghdad.

As we flew toward our tanker track, it became apparent that tonight's tanking evolution would be a little sportier than what I had been accustomed to. I was shocked to see so many thirsty airplanes hanging on a single KC-10. On a crystal-clear night, this scene may not have been so daunting. However, in the occasional IMC and turbulence we were encountering, this situation only added to my adrenaline surge. I felt myself starting to squeeze the black out of the stick.

Progress across the KC-10's two wing air-refueling pods (WARP) was slow, and time began working against us. The suppression of enemy air defenses (SEAD) assets got their gas. A few other strikers in the package got a portion of their total fragged give, as well. Our division was low on gas and dangerously close to reaching bingo fuel before our first plug. We now had a full-blown fuel and time problem that brought with it an increasing amount of pressure to expeditiously get into the basket. The turbulence wasn't helping things, either.

An eternity seemed to pass before any of our division made it to the pods. Dash 1 and Dash 4 were the first to go, and they established themselves behind the starboard and port WARPs, respectively. Dash 3 and I continued to wait in port observation for our turn. I would get my chance on the port hose as soon as Dash 4 was done. Dash 3 would get his stab at the starboard basket as soon as Dash 1 was complete. For some unknown reason, my attention was focused on Dash 1, and I watched as he entered the starboard drogue. In what seemed to be a fit of rage, the WARP's hose lashed back at him with a sine wave that snapped off his probe.

Here's the situation: Dash 3 was at bingo fuel, I was about 300 pounds above bingo, our division lead was in starboard observation with limited fuel and major issues, and Dash 4 was in the basket on the port hose. What was I to do?

starting to squeeze the black out of the stick.

Dash 1's immediate need was for a vector to the nearest divert. The planning lead that was airborne with us immediately came up on the radio and suggested "King K." That suggestion drew a question mark in my shrinking brain. Cycling through the waypoints, I found one that was listed as King. No, I wasn't the one diverting, but I wasn't sure if I would have to go with Dash 1 to that airfield. Dash 3 said he was diverting. A decision had to be made. Shall I stay or shall I go? Dash 1 did not say anything about me going with him. Because we were trying to get as many bombs on target as possible, I assumed from his silence I was to get my gas and go with two other Rhinos waiting in line on the tanker. I decided to tank and proceed on the mission as planned.

With one hose down, the need for jets behind me to get into the basket became more critical. My initial plug needed to be quick, and I needed to grab enough gas so the strikers behind me could get in and avoid having to bingo. As the sands of time continued to slip away, getting all the remaining strikers across the hose and allowing me to top off in time to make the TOT was out of the question. My trip north tonight was off. The plan now was to join a section of FA-18Cs that also were victims of the traffic jam on the tanker and RTB as Dash 3. The Charlies and I still needed gas, so we spent the next 45 minutes joining on another tanker.

Already flustered by the breakdown of our plan, I was further removed from my comfort zone when the lead of the Charlie section suffered a hydraulic problem and needed to immediately leave the tanker. Maintaining section integrity, the two Charlies started their return to mom. I would have to top off and RTB by myself.

My lack of basic knowledge began to show. I knew the strike route and the strike plan well, but my admin knowledge was weak because I had expected to be led through that portion of the flight. I now was faced with answering a lot of questions by myself: What altitude was I supposed to be at? What altitude was I supposed to be at on the way home? Where could I descend? Getting close to bingo, what airfield was I going to divert to in the event I found myself in the same predicament my skipper had had?

I had to focus on the closest alligator to the canoe. The priority was to get enough fuel to make it back to mom for the next recovery. The ensuing turbulence and lightshow caused by the static discharge jumping between my probe and the basket made the fueling task difficult. After some jousting, I got into the basket and topped off.

My thoughts drifted to my lack of participation in the war that night, but quickly refocused when I remembered the other alligator that had been swimming next to the canoe a minute ago. I still had to get myself out of country and back home to mom. The helmet fire I experienced as I rummaged through information probably was seen for miles. I eventually found the info I needed and made it back to the ship.

Although I was able to get home, there are quite a few lessons to be learned from my experience. The foremost is the basic breakdown in CRM. That my lead had to divert and that I was of no help to him bothered me. "King K" meant nothing to me until the instant lead's probe came off, and he was diverting there. I couldn't tell you anything about that place, other than its range and bearing from our position on the tanker. What if I had been the one who needed to divert? I wasn't fully prepared for the entire mission. I felt thoroughly prepared for the tactical portion of the flight, but I totally was relying on being led back and forth. I had not focused on the administrative portion of the flight.

Flying in and out of Iraq had become commonplace, and I relied too much on my experience from previous flights and the people I flew with. I did not know anything about our diverts. I didn't even know if they were going to be open. Had I planned to lead the flight that night, I would have been much better prepared to handle the events. To execute advanced tactics, you first have to remember the basics.

Lt. Walborn was a member of VFA-115 at the time of the story. He is currently an instructor pilot at VFA-122.

CRM and risk management apply to all threats: red and blue. Many "insurgent gremlins" attacked this mission during the easy part of the flight, and our intrepid strike fighter pilots were wanting for tactics and a plan. What are the hazards during all phases? How will you defeat them?—Capt. Ken Neubauer, aviation safety director, Naval Safety Center

From left to right: Capt. Cory Shackelton, Sgt. Homer Chambers, Sgt. Justin Scherrer, LCpl. Shawn Kinney, 1stLt. Andrew Durning.

BRAVO Zulu

The crew of Jailbird 45 was conducting a night general-support mission during Operation Iraqi Freedom. They departed Al Taqaddum airfield, in the Al Anbar Province of Iraq, under low-light-level conditions with 11 passengers, which put the aircraft at max gross weight.

Five miles from the field, they heard a change in engine noise, with corresponding changes in cockpit gauges. The pilot at the controls made all necessary flight-control inputs and turned back toward the field. The non-flying pilot diagnosed the malfunction as a No. 2 Nf flex-shaft failure. An aerial observer concurred with the failure call, and the non-flying pilot brought the No. 2 engine-condition lever out of the governing range.

With the aircraft single-engine capable and a possibility the No. 2 engine was damaged, it was secured. The Dash 2 aircraft declared an emergency for his lead and led the distressed aircraft back to the airfield. Jailbird 45 made a single-engine-running landing at Al Taqaddum.

During a summer, blue-water, unit-level-training (ULT) flight, the aircrew of Banger 600 had a starboard engine fire-warning light. The aircrew secured the engine in accordance with NATOPS and prepared for a single-engine arrested landing on board USS *Nimitz* (CVN-68). LCdr. Paul "Mo" Movizzo, the carrier-aircraft plane commander (CAPC), with assistance from Ltjg. Danny Westphall, his copilot, overcame asymmetric thrust and decreased waveoff capability to fly a near-perfect single-engine approach to a 3-wire arrestment.

Just four days later, the same pilots launched for another blue-water ULT mission. Immediately off the catapult, the aircraft's nose forcefully pitched down. The pilots executed NATOPS procedures but couldn't ease the pressure on the yoke. Based on available indications, they surmised they had an elevator trim-actuator failure. Ltjg. Westphall maintained a constant rearward force on the yoke, while LCdr. Movizzo flew a 10-mile, straight-in approach to a carrier landing. Excellent CRM, aviation skills, and adherence to NATOPS were displayed by the aircrew during both events.

From left to right: Ltjg. Danny Westphall, and LCdr. Paul "Mo" Movizzo.

Gold Cup Roll

By LCdr. Michael Barretta

The Model 367-80, known by its designers as the Dash 80, roars over Lake Washington at 400 feet and 400 knots. The graceful swept-wing prototype airliner pitches up, rolls inverted and then upright, amazing the thousands of spectators that have come to see the 1955 Seafair Gold Cup hydroplane races.

For good measure, Alvin M. "Tex" Johnston, the test pilot flying the aircraft, rolls the 160,000-pound plane again. Boeing President William Allen, escorting potential buyers, is stunned and horrified as he watches Boeing's entire future, embodied in the airliner, corkscrew through the sky. Airline representatives, delighted by the impromptu performance and impressed by the speed, strength, and obvious maneuverability of the aircraft flood the company with orders.

Years later, the Dash 80, magnificently restored, is ensconced at the National Air and Space Museum's Steven F. Hudvar-Hazy Center near Washington Dulles International Airport. Engineers and aviation aficionados alike still debate the roll, completely unplanned except in the mind of its test pilot. Was it an aileron roll or a true barrel roll? What is not debated is that the daring example of flathatting established Boeing as the premier manufacturer of jet airliners.

Imagine if it had all gone differently. The 128-foot-long airliner begins its roll and slices through the air, losing altitude. With just over 270 degrees of roll complete, a wingtip drags through Lake Washington. The aircraft disintegrates in an explosion of spray and fire and then sinks to the bottom of the lake, taking Boeing's future with it. If the roll had gone poorly, perhaps "Tex" Johnston would be vilified as the man who made Boeing the world's largest manufacturer of washing machines.

Flying is magnificent. The urge to push the limits, please the crowd, or become the ace of the base is almost overwhelming. Most aviators resist the siren call and satisfy themselves with merely getting the job done. Grabbing an OK 3-wire or jumping SEALs on time and in-position is good enough. A mission accomplished is it's own reward.

Others succumb to the showman lurking inside every aviator: An impromptu FA-18 airshow over the town of Petaluma, Calif., terrorizes and amazes its citizens in equal measure; an SH-60B crosses the stern of a *Perry*-class frigate so low that rotor blades hit the deck. Unlike the famous Gold Cup Roll, the shows for these naval aviators ended badly. Field naval aviator evaluation boards (FNEABs), JAG, and mishap investigations were the only rewards waiting at the end of the flight deck.

The best outcome for an embarrassed and disgraced aviator is the loss of hard-earned trust and flight qualifications. The worst outcome, if not death, is court-martial, loss of career, and loss of wings. There is, after all, a reason

why warfare insignia are fastened with pins and Velcro; they can come off a lot easier than they go on.

Any naval aviator worth his salt can appreciate and marvel at the sheer audacity of the Gold Cup Roll; however, flathatting is not likely to enshrine you in any aviation hall of fame. Only a rare set of circumstances will tolerate such a display. In all likelihood, a moment of cheap glory can have horrible personal and national consequences. Naval aircraft and aviators are expensive and represent an investment in our nation's warfighting capability. Each aircraft and aviator is precious; to risk one for personal aggrandizement is a criminal act. For want of a nail, the battle is lost. For want of a naval aircraft, a mission goes unfulfilled. When a mission goes unfulfilled, Marines, Soldiers, Sailors, and Airmen die. The same chain links that apply to safety easily can be applied to the criminal misuse of naval aircraft.

Of course, the pendulum swings both ways. Wimps need not apply to the profession; after all, if God had wanted your aircraft to simply go straight and level, he wouldn't have made so much sky. By all means, explore the established envelope and fly the aircraft to its NATOPS-designed limits. If you feel the need to be heroic and step outside the box, have a very good reason. The only individual who truly and genuinely should be in awe of your airmanship is the enemy, and he shouldn't marvel for very long—it's rude to keep him waiting.

"Tex" Johnston died in 1998 at the age of 84. He was fortunate to have been born in the golden age of aviation and to have been skilled enough to survive a career that claimed many of his contemporaries. Perhaps he thoroughly understood the capabilities of the aircraft and made a shrewd decision that catapulted Boeing to the forefront of aviation. Or, maybe he succumbed to his inner showman and discounted the investment of thousands of Boeing's employees to build the benchmark airliner of the times. I prefer to believe the former, rather than the latter.

LCdr. Barretta flies with HT-8.

2 out of 3 Ain't Bad

By Lt. Bryan Coultas

Here's a pop quiz for you hot-shot aviators. How many of you do a thorough review of your unsafe-gear EPs when going out to do a functional check flight (FCF) on a jet for an engine swap? I don't.

Our event started as any other FCF at the boat: An in-depth planning brief and a review of how we were to conduct the mission. The weather was clear and a million. We got a great brief by our maintenance guys on what work had been done, and we hoped to perform a flyby for the troops. I particularly was excited because I just recently had obtained my FCF qual, and I was ready to put it to use for the first time.

The flight began as planned, and the new engine worked as advertised, with all parameters falling well within prescribed limits. We had completed all checks up to the final 5,000-foot checks, where we would test the approach-power compensator (APC). The compensator notoriously never works and actually is not required but is part of the checklist. Checking it meant getting into an approach configuration, so we descended to 5,000 feet and, at 400 KIAS, started a level break. At 250 KIAS, we configured; at this point, things got interesting. The integrated position indicator (IPI) showed two down and locked; the left main indicated the always fun and exciting barberpoled.

What could we do except dutifully start the "Gear Handle Down—Indicates Unsafe" EP checklist? This EP is always a favorite of EA-6B NATOPS instructors in the sim because it's complex, has several branches that make

The PCL is a great tool, but the checklists don't necessarily cover all circumstances.

Photo by PH1 Brien Aho

the student think, and practically is guaranteed to ignite a helmet fire. I should point out we were 40 miles from the boat, with 25 minutes to recovery and more than 10,000 pounds in gas. While working the checklist, which included slowing to approach speed, checking the circuit breakers, and checking secondary indications of the gear being down (all were negative), we also coordinated with the ship to return overhead at our low holding altitude and got a rep in the tower for us.

While transiting, we continued the checklist, to include the steps for varying the G loading and yawing the jet, none of which affected the IPI in the least. Once we arrived overhead, an S-3, also recovering with our cycle, joined up for a visual inspection. Once joined, we cycled the gear up and then back down for their viewing pleasure. Unfortunately, the S-3 crew reported the forward and aft gear doors were open, the left main was up in the wheelwell, and none of these items moved in the least while the nose and right main cycled up and down.

Comforted that our problem was not merely an indication issue, we continued with the checklist and completed the steps intended to "relieve back pressure" on the hydraulic system. We again cycled our gear, with absolutely no effect. We were fast approaching the end of our EP checklist, and we were down to the final step of "blowing the gear down." This step is a pivotal moment of the checklist. Once done, it can't be undone, and we would be left in a very poor bingo configuration should we need to divert. We were hesitant to do that step until we had exhausted all other options. Fortunately, another Prowler crew had been manning up for the next event, and the skipper was in the back monitoring our progress on button 18. Coordinating an early launch, they joined up with us overhead and relieved our friendly S-3.

On the ship, gears were grinding, and plans also were being laid. Our XO was in the tower, working with the Boss, CAG, and CO of the boat. Diverts were being considered. The closest one was in India, but it didn't have field-arresting gear. The most viable divert option was in Saudi Arabia, more than 1,000 miles away. In the meantime, the barricade was being readied (being the first to barricade a Prowler is not exactly how I'd wanted to make history). All airborne assets were recalled, with the tankers ordered to hold all mission gas.

With all other avenues exhausted, and not wanting to blow down the gear, our CO told us of a procedure performed by an A-6 crew (the Prowler has the same gear) that he had read about in an *Approach* article. The procedure involved applying sustained negative G, while trying to cycle the gear in the expectation the mainmount had fallen off the J hook and was resting on the forward gear door. This negative-G maneuver would take the weight off the gear door, allowing it to open. As stated earlier, both the forward and aft gear doors were open, but the CO thought the gear might be jammed against the forward gear door. So, we raised the gear, accelerated to 250 KIAS, pulled up the nose to 15 degrees then pushed over, and lowered the gear handle while under negative G—with no change. Neither the gear doors nor mainmount moved. We nearly could hear the groans from people on the ship. By now, most everyone airborne was listening on button 18.

The CO asked exactly what we had done; it turns out we did not do what he had intended. He wanted us to try raising the gear and leave the gear handle up throughout the maneuver. Ideally, the negative G would allow the gear to lock in the up position and the gear doors to close. We again set up for the maneuver, accelerating to 250 KIAS, pulling to a full 20 degrees nose up, and pushing over as hard as we could. As the nose passed through the horizon, the gear clicked up and locked. Our wingman closed in to visually inspect the gear-up indications, and then we all held our breath as we again lowered the landing gear. Much to our relief, all three gear transitioned normally and indicated "three down and locked." After confirming all the secondary indications and a visual inspection by our wingman, we detached him and came back to the ship for an uneventful straight-in approach.

Always expect the unexpected, and be prepared to deal with them when, not if, they happen. If you had asked me before the flight to list the most likely EPs we might encounter, this wouldn't have been one. But, everyone was familiar with the EP and handled it competently and professionally.

The PCL is a great tool, but the checklists don't necessarily cover all circumstances. A little corporate knowledge and common sense go a long way, especially in this situation. Had we done the next step in the checklist and blown down the gear, with the gear already jammed, they likely would not have moved, and we would have permanently bought the bicycle configuration: Barricade, here we come.

Finally, *Approach* articles are a great way of preserving corporate knowledge and passing it along. Read 'em. Write 'em. Love 'em.

Lt. Coultas flies with VAQ-138.

THERE IS A CURE FOR SQUADRON DYSFUNCTION

Schedule a culture workshop at:
www.safetycenter.navy.mil/culture/request.htm