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Approach

Transforming Naval Aviation

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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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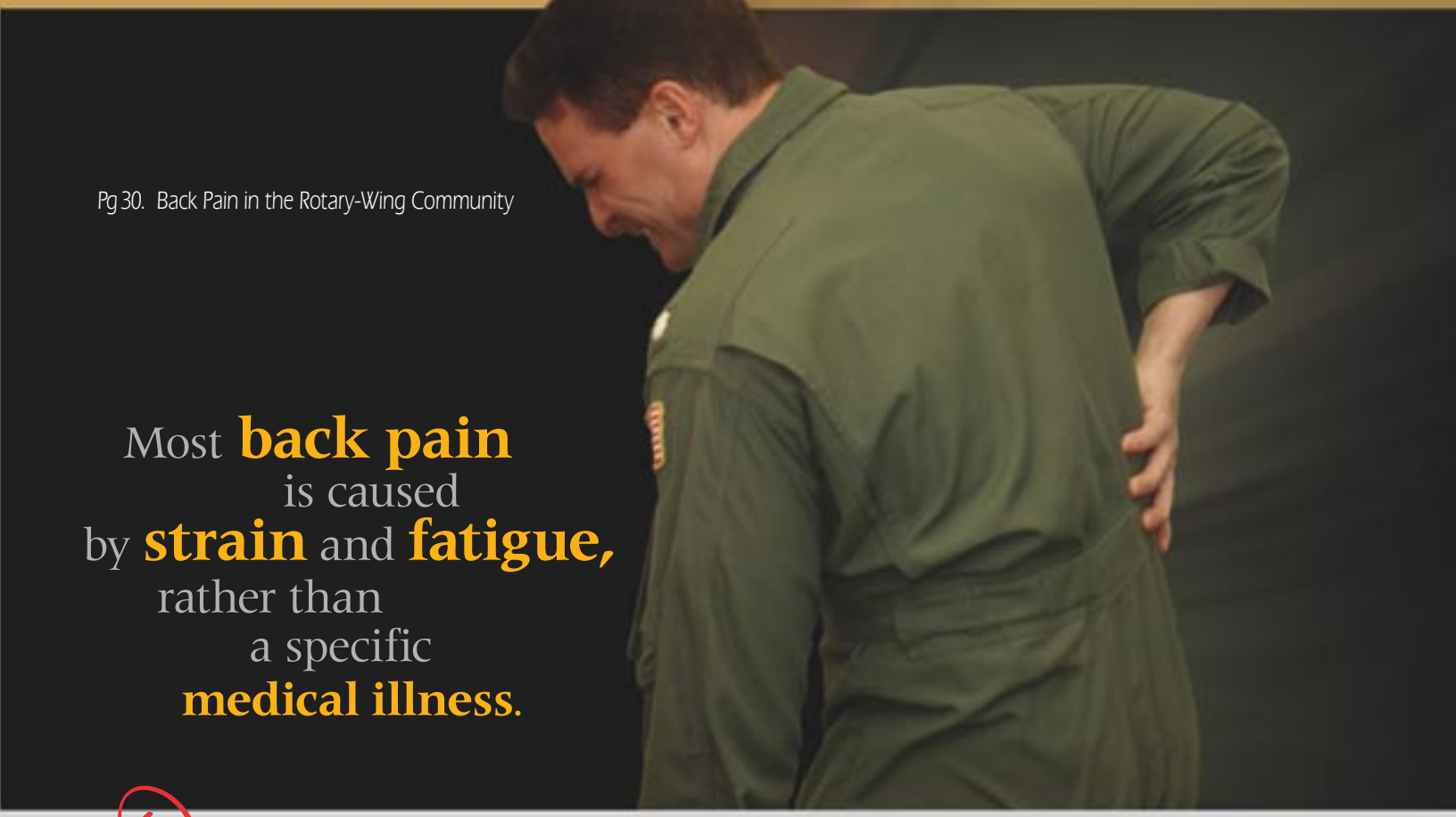

Most **back pain** is caused by **strain** and **fatigue,** rather than a specific **medical illness.**

Departments

On the cover: A pilot assigned to the Sun Kings of VAW-116 conducts preflight checks on an E-2C Hawkeye prior to flight operations aboard USS *Abraham Lincoln* (CVN-72). Photo by PH3 James R. McGury.

March-April Thanks

Thanks for helping with this issue…
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Maj. Glen Butler, USMC, HMLA-169
LCdr. Jeremy Brunn, VFA-146
LCdr. Larry Kistler, HSL-51
Capt. Ann Edmondson, USMC, VT-31

Admiral's Corner

From Commander, Naval Safety Center

Self-inflicted Punishment

I will admit that I've done some boneheaded things in my life, and, each time, I looked back at the situation in disbelief and asked why. Maybe I made a bad decision during a flight, or maybe it was a bad decision on the commute home from the squadron. Each bad decision, on its own, made me question my judgment—especially after a less-than-optimum postflight debrief. Afterward, I'd have to regroup and vow to improve my performance.

Whether flying or driving, a poor decision can be fatal. Already this year, we have lost too many young Sailors and Marines because of PMV mishaps. We have also lost too many aviators and aircraft. Human factors continue to be the primary causes for these mishaps, which tells me that each mishap was preventable, and our losses were self-inflicted.

Leading this issue is an interview with VADM Massenburg, Commander, Naval Air Systems Command. He shares his views on where naval aviation is today and where it needs to go. The future of naval aviation will bring many changes in the way we do business and, more importantly, how we get the mission accomplished. Building efficiencies of people and materials will allow us to meet today's needs while taking on tomorrow's challenges.

If aviation safety is to continually improve, then we must effectively use the tools we have. Hazard reports are one of our best tools to identify and fix our problems. Because problems won't fix themselves, everyone must take the lead and be part of the fix. Our *Approach* staff receives articles pointing out the value of proper reporting, and this issue contains several articles that reinforce how reporting can make improvements—but, you have to get proactive and complete accurate reports.

The inside back cover contains information to help us make the right and timely decisions that will help reduce PMV mishaps. The Critical Days of Summer starts Memorial Day and goes through Labor Day, but don't view this period as a start to driver safety—every day is critical, and every day can bring tragedy. Now is the time to refocus on preventing our No. 1 killer. Since Oct. 1, 2005, we have lost 68 Sailors and Marines on the highways (through Feb. 26). Our Critical Days of Summer campaign provides information and points of contact to assist every command prevent PMV and off-duty mishaps.

Whether the topic is driver safety or aviation safety, the goal is to eliminate mishaps and the self-inflicted punishments as the result of poor decisions. We can't allow ourselves to be our worst enemy.

RADM George Mayer

Photo by PH3 Kristopher Wilson. Modified.

Transforming Naval Aviation

By Dan Steber

It's essential that future leaders of Naval Aviation understand the whole process.

Editor's note: The author recently did an interview with VADM Wally Massenburg, Commander, Naval Air Systems Command, on recent and future changes in Naval Aviation and maintenance. VADM Massenburg had plenty to say about Naval Aviation in general, about past performance measures, and about the impact of these changes on aviators, maintenance and readiness. The Mech *portion of the interview, printed in the Fall 2005 issue, can be viewed at: www.safetycenter.navy.mil/media/mech/issues/fall05/.*

We present below part of the interview that will be of interest to the readership of Approach. *Included are comments from PR2 (AW/SW) Jason Moore of AIMD North Island on changes he has seen. Some readers may already be aware of the changes referred to, but the rest of the fleet soon will feel their full effects.*

In a conference room just off his office at the NAVAIR headquarters building at Patuxent River, Md., VADM Wally Massenburg discussed with us the need for fundamental change in the way Naval Aviation does business. It didn't take long to see and feel his passion for the Navy, the Marine Corps and the need for change.

"We had it wrong for so many years," said Massenburg, pausing shortly before asking a rhetorical question. "What happens at the end of every fiscal year? We think that we have to burn up that gas, we've got to use up those hours, because if we don't get to zero we'll get fired." He went on to explain that we did this without focusing on a specific training goal or a specific return on investment. Success was to fly as much as we could.

The admiral recalled a time when he was part of that process. "At the bottom of every CO's fitness report," he said, "we reported the number of flight hours flown and mission capability rates, and the more the better. The goals, metrics and measurements for years simply had been on mission-capable/full-mission-capable rates, flight hours, and sortie-completion rates. We were grading performance on a number, not on how useful those hours were or how well the numbers were managed."

"At an aviation executive board meeting," recalled Massenburg, "the CNO put up a slide that showed traps per fiscal year. He was frustrated and wanted to know from the aviators what was driving up those numbers each year. CNO believed it was a behavior of consumption without understanding why they were consuming."

He continued, "If you truly asked yourself what we were doing, you'd simply say we're using up the flying hours. What the CNO said was, 'You are burning up my air force and I won't have it when I need it.' He then turned to VADM John Nathman, COMNAVAIRPAC at the time, and said, 'You, sir, are now are in charge of all Naval Aviation.'"

That initial step helped to fuel the fire for change and provided one of the first successes. "If you ask me why we've been successful with the transformation," Massenburg offered, "it's because a single-process owner was given the responsibility and accountability, and what I call 'fire-ability.' If you can't be fired you can't be a success. And he was charged with fixing Naval Aviation."

The admiral told a story about VADM Mike Malone and the moment when he understood the transformation. "Malone stood up at a meeting and humorously said, 'Hi, I'm Mike and I'm a readiness abuser. I've got X-number of hours and X-number of traps, and I've been abusing readiness for 30 years of my life, and I've had it wrong and we're going to change.' That admission took some courage, but it was the necessary acknowledgement of the transformation from a consumption-driven approach to a results-driven method concerned with quality and the effective, efficient use of assets."

These first steps led to the formation of the Naval Aviation Readiness Integrated Improvement Program (NAVRIIP) and later to the Naval Aviation Enterprise, or NAE, which is the vehicle for fundamental change in Naval Aviation. There are a number of steps, processes and terms used in the NAE, including AIRSpeed, Boots on the Ground (BOG), NAVRIIP (now a cross-functional team under the NAE), Lean, Theory of Constraints (TOC), and Six Sigma. VADM Massenburg explained these terms and others in straightforward succession. While some have been around for several years, they may sound like a strange foreign language, but they all have a place, and fill a need in the overall transformation effort. They are worth the time to learn about.

One early effort that showed success was NAVRIIP and its BOG events. NAVRIIP began in August, 2001, when CNO appointed VADM Nathman, then Commander, Naval Air Forces. The regular BOGs are an effort to get senior leadership out and around the fleet, leading transformational change from the front. Massenburg explained how and why these efforts have been successful.

"Shake 1,000 Sailors' hands" was his metric for success with BOG. "Senior leaders have to get out from behind a desk and go face the customers. Everything that 'providing organizations' do starts with Sailors and Marines and ends with Sailors and Marines. If you aren't always focused on them, you have missed the boat."

The NAE has evolved from NAPPI (Naval Aviator Pilot Production Improvement) and the AMSR (Aviation Maintenance and Supply Readiness) through NAVRIIP and its BOGs after the Navy's earlier attempts to recapitalize the force fell short. "People with good hearts said the only way to get new equipment is to get rid of the older equipment quicker," said Massenburg. "But we mortgaged our future on the backs of our Sailors and Marines in the attempt to recapitalize our force."

The admiral explained that 1999, 2000 and 2001 were bleak years as the Navy and Marine Corps fought to recapitalize its assets. He mentioned the efforts to get out, to see the fleet, to talk about ways to improve readiness, and to make use of dwindling dollars. "I visited every Naval and Marine Corps base each year for four years in my role as a logistician," he said. "It was an opportunity for the Sailors to vent. There weren't supply parts on the shelf; support equipment was older than stuff we were flying; tech pubs were falling apart with no replacements in sight. We even had NATOPS manuals that hadn't been updated in three years. We had to do something."

He went on to explain that as the budgets went down and our buying power went down, the cost of aircraft and equipment went up. "We had to get the money from someplace," said Massenburg. The current scenario made it clear that the effort to recapitalize was going to be tough.

His point, though, was that the initial transformation strategy had to change. A catalyst for that effort was the then-new CNO, Adm. Vern Clark. With a little stick-and-rudder and some

seasoning as NAVRIIP, the Naval Aviation Enterprise was born. Formed as a group effort between CNAF, CNAL, NAVAIR, CNAFR, CNATRA, OPNAV N78, and HQMC aviation, the work has continued and has shown tremendous success in depots and intermediate-level commands. These industrial types of activities were the right places to begin the process to change the way we look at maintenance, readiness, funding, and success.

That effort would take place and a force now was being assembled to deal with it. "Consumption was killing us in the current readiness world and also in the future readiness world," said Massenburg. "It was about production, not what you produce. In 2003 we made a fundamental change in what we valued. It was apparent that we were taking good care of current readiness... maybe too good. That's when we made the decision to get us out of the business of consumption and into an understanding and culture of readiness. That decision changed the single-driven metric from aircraft ready for tasking to aircraft ready for tasking at reduced cost."

"We had to learn to live with less, and as you learn to live with less, you change the rheostats of your future. Now, with good conscience, we moved money out of readiness accounts, because we knew we could live with less, and into recapitalization accounts. This move led to the vision statement in the NAE: 'To deliver the right force, with the right readiness, at the right costs, at the right time—today, and in the future.' It is a much more mature understanding of the connections to all the pieces. You have to take care of the current readiness needs and all the logistics elements so you can safely fly your air force, but at the same time you're driving your cost down because you're more productive. These steps allow you to get to the future. How do we understand the connections so can we get the most recapitalization while taking care of current readiness? That question helped lead us to the NAE, which was born in July 2004."

These early programs and successes also led to Enterprise AIRSpeed, which uses the tenets of Lean manufacturing, TOC and Six Sigma. AIRSpeed is teaching aviators and maintainers a new language that includes a variety of tools and terms, such as value-stream mapping, the 5 S's, Kaizen events, Kanban, Six Sigma, and a host of others. These terms, functions or processes are part of a new revolution in Lean thinking that is now a critical part of the NAE. Even young enlisted personnel are understanding and liking the change.

"Enterprise AIRSpeed has had a huge impact on the way we do business," said PR2 (AW/SW) Jason Moore of AIMD North Island. "It was a major shift in the way we think and act. Before AIRSpeed, we might work on every part, regardless of priority. Now, we concentrate on high-priority parts and don't work on 'pri 3' parts with little or no demand."

He explained that the time saved through that approach, and a reorganization of work flow, tools, and consumable parts, has allowed AIMD North Island to make dramatic financial savings while simultaneously producing a greater number of items of higher quality.

"In our T-700 engine shop, we reorganized the flow of work, put the right tools into our maintainers' hands, increased and moved consumables closer to the worker, and made tremendous improvement," Moore said. "The turnaround time went from 72 to 48 days, using the Theory of Constraints and then from 48 to nine days, using Lean and Six Sigma."

This transformation in Naval Aviation truly is dynamic and ensures that effective, efficient and more productive work is being done to improve current and future readiness. But Petty Officer Moore said the biggest change is that maintainers are now being empowered to make change.

"AIRSpeed has changed the way we think and work," said Moore. "Earlier efforts didn't have buy-in from junior troops. Now E-1s through O-5s meet in team meetings where junior Sailors interact with senior members, get a voice in the final decision and can see their suggestions come to life. That is real change."

Although our resources are limited, the national commitment requires us to meet the challenges ahead. That will require fundamental changes in the way Naval Aviation does business, and VADM Massenburg and the NAE are taking the steps to make those changes.

For more information on the Naval Aviation Enterprise, AIRSpeed, NAVRIIP, and the Lean tools mentioned, visit the Naval Aviation Enterprise website at: http://www.cnaf.navy.mil/nae or the NAVAIR site at: www.navair.navy.mil/navairairspeed—Ed.

The Initial Approach Fix

How Are We Doing?

Every flight requires an untold number of decisions and actions to get the mission done and return home. That's just the way it is: a complex aircraft manned by highly trained professionals getting the job done. And we're good at what we do, but how are we doing safety-wise? So far in FY06 (through Feb. 26) our Class-A aviation mishap rate is 2.22 for Navy and 2.53 for Marines. When compared to last year's rates (at the same time) of 1.99 for Navy and 1.89 for Marines, we're doing worse. Keep in mind that our goal now is to reduce mishaps by 75 percent from the FY02 baseline and we have much to do. Our math and stats folks track the mishap rates and this information can be viewed at: www.safetycenter.navy.mil/statistics.

Hazreps

Just knowing the mishap rates and tracking the statistics isn't enough, the challenge is to be proactive in taking steps toward improvement. Hazard reporting (hazrep) has been getting a lot of attention lately, and justifiably so. The four purposes of hazreps reports are:

- To report a hazard and the remedial action taken, so others may take similar action.
- To report a hazard and recommend corrective action to others.
- To report a hazard another organization may determine appropriate corrective action.
- To document a continuing hazard in order to establish risk severity and exposure.

The next three stories in this issue, "What Do You Mean, It Didn't Go Out?," "Barry Gets Schooled," and "Sins of the Father," are linked to hazreps and reinforce the value of reporting.

Runway Incursions—Get the Ultimate Guide

The NSC has a new CD that focuses on runway incursions. The CD contains information and training aids, and is highlighted on page 11 of this issue of *Approach*.

Web-Enabled Safety System Improvements Underway

The WESS BRT (barrier-removal team) has been listening to fleet feedback and is working on several initiatives to make the system better. Visit our WESS website for more information on the BRT, get simple answers to common questions, or learn how to use the system. WESS can be found at: www.safetycenter.navy.mil/wess/.

Investigations

Your squadron has a mishap: a plane has crashed. Is your squadron mishap plan current? Does everybody, not just the ASO, know the reporting procedures in the event of a mishap? Our aviation investigation webpage is a good place to find information and provide resources for squadron training. Visit it at: www.safetycenter.navy.mil/aviation/investigations/.

Aeromedical—Human Errors in Naval Aviation

Progress has been made in reducing human-errors, but they continue to be the primary cause of aviation mishaps. As we work toward reducing mishaps, we need to focus on understanding the components of human error and how to combat them. Eliminating skill-based and decision errors is the goal. We also must continue to focus our intervention strategies on improving crew-resource management and avoid adverse mental states, which contribute to unnecessary risks.

A new addition to our aeromedical webpage is "The Fishwrapper." This new feature includes information and analysis on a variety of topics for all aviators. View this new webpage at: www.safetycenter.navy.mil/aviation/aeromedical. Our POC for "The Fishwrapper" is LCdr. Greg Ostrander, email at: greg.ostrander@navy.mil, (757) 444-3520 ext. 7229 (DSN 564).

What Do You Mean, It Didn't Go Out?

By LCdr. Kent Moore

I remembered thinking, "It doesn't get much better than this."

We were scheduled for an eight-hour, banker's-hours flight off the coast of Central America. Generally, every event is a zero-dark-30 (middle-of-the-night) preflight and launch for a 10-hour-plus grinder of a mission. I should have known then that what seemed to be a perfect day probably wasn't going to end that way.

I was just four months into my department-head tour and flying with a junior crew. I just had knocked off the rust from being out of the plane for two years. We had a gorgeous day, not a cloud in the sky, and just a calm breeze blowing. The crew was excited about flying; everything went like clockwork, and we got airborne 15 minutes early.

The mission proceeded as planned. About two hours after takeoff, I swapped seats with the 2P, then headed to the back of the plane for a break and something to eat. As I got halfway down the tube, the radar operator reported smelling fumes. I spun around and headed back up front. When I got there, the flight station already had been notified. The 2P and 3P had commenced a climb from 300 feet AGL and had initiated the fire-of-unknown-origin checklist.

I felt comfortable with the situation up front, so I went aft to perform runner duties, as discussed during our planeside brief. The runner relays information from the tube to the flight station and assists as necessary. I remember thinking, "It's probably some radio that's overheated, and this scenario would be an excellent training opportunity for the two junior pilots to work through an emergency checklist by themselves."

As I passed the main-load center to check in with the tactical coordinator (TACCO), the inflight tech (IFT) reported fumes were coming from the F rack. Yep, just as I had suspected, an overheated radio. At almost the same time, sensor operator one (SS1) reported flames coming from a box on the wall in the main-load center. I thought, "Flames, yeah, right." I peeked inside the main-load center to confirm. Yep, flames were coming up from the shroud that surrounds transfer relay No. 2. The off-duty flight engineer had

arrived on scene and agreed the flames were from transfer relay No. 2.

I headed to the flight station to direct the securing of the No. 2 generator and the pulling of the Bus A, control circuit breaker to cut all possible power sources to the transfer relay. Once all power was secured, the TACCO directed the discharge of a portable fire extinguisher into the shroud of transfer relay No. 2. The flames had subsided, but the relay still glowed.

I felt uncomfortable not being in the left seat, so I initiated a three-way seat swap to get my 2P in the right seat. About the time I got strapped in, the TACCO reported that flames had returned.

I thought, "OK, we've secured all possible sources of power to this thing and put a fire extinguisher on it. What do you mean it didn't go out? That can't happen, can it? So, now what do we do?"

We guessed that the transfer relay still had power. We recalled the aircraft-discrepancy book (ADB) documented problems with the No. 2 generator and supervisory panel, and we also knew a generator still would supply power to the panel as long as the engine was rotating. Base on this information we secured the No. 2 engine. Seconds after E-handling the motor, the TACCO reported the flames were dissipating.

The No. 2 engine failed to completely feather because of a loss of Bus A. We quickly reset the Bus A, control circuit breaker to let the prop feather and then tried again. We opened the aux vent to help get the fumes out of the aircraft as quickly as possible.

We already were pointed toward home and, because we had only been 70 miles away when this thing started, we quickly declared an emergency and had an uneventful 112K landing. Afterward, the IFT and SS1 reported some symptoms of smoke inhalation, so I directed the whole crew to see the corpsman. Everyone was medically cleared by the next day.

> I don't know what caused the fire to keep going. At the time of the emergency, my concerns were a fire in the main-load center that wouldn't extinguish, the safety of the crew, and getting the aircraft on deck.

Having an emergency like this wasn't on my top-10 list of things to do.

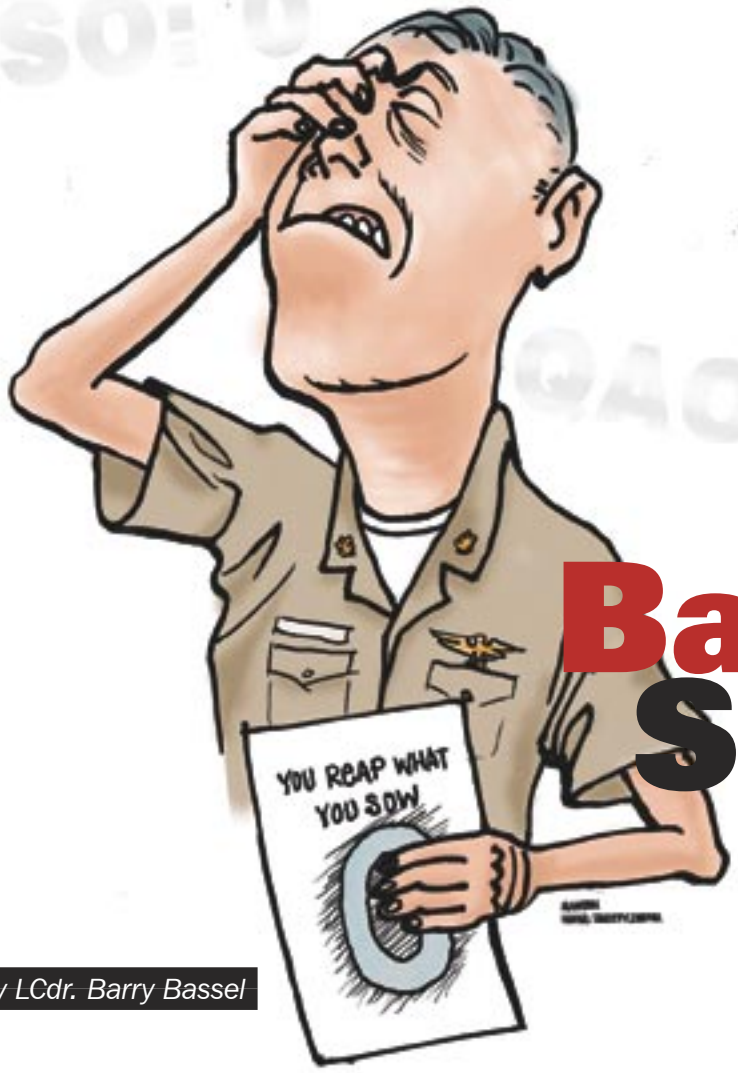
We learned a few things that day. Our NATOPS has undergone continuous refinement for 40 years. Its preface will tell you that procedures are only guides to action, "not a substitute for sound judgment." NATOPS can't possibly cover everything that can fail on an aircraft, especially an aging aircraft like the mighty P-3. Increasingly, we see malfunctions and emergencies not addressed in NATOPS. When something unusual happens, we must fall back on fundamental systems knowledge. NATOPS procedures are written from systems knowledge, not the other way around; a specific malfunction and situation may require a modification of NATOPS procedures.

Crew coordination was a major factor in handling this emergency, and we all were on the same page as the emergency progressed. The only time it got a little strained was during our three-way seat swap. You always hear people say, "Oh, that never will happen." But, unlikely things can and do happen all the time.

I've done plenty of fire-of-unknown-origin drills but never one where I wasn't in the seat or where the fire didn't go out. Everyone knew their job, how their role fit, and everyone contributed. This was our first fire on board an aircraft as a crew; we won't complain if we don't see another one.

LCdr. Moore flies with VP-10.

Great timely article submission via Approach. *LCdr. Moore also submitted this hazard in a hazrep in WESS. BZ to VP-10 for reporting. Thanks for helping us all gain from your experience.—RAdm. Rico Mayer, Naval Safety Center.*



Barry Gets Schooled

My past came back to haunt me

By LCdr. Barry Bassel

I was sitting in the system-safety-working group (SSWG) for the E-2/C-2 program, thinking this was another conference where we come up with a wish list that will never see the light of day.

"COD community, we need more hazreps and hazardous-material reports (HMRs) from you to document these issues," was the opening comment to the working group.

This comment hit home for me, as I felt poked in the chest for the next four hours of the meeting. My past came back to haunt me; I was in VRC-40 from April 1998 to April 2001.

• The number of hazreps I had documented for the ASO: 0.

• The number of HMRs I documented for the QAO: 0.

• The number of circumstances that could and should have been documented—I don't have that many fingers and toes to count the number.

• Having your past come back to haunt you—priceless.

NavAir has an outstanding group of folks to support the fleet. However, they can't help us if they don't know there is a problem. The fleet needs to document problems so NavAir can get funding to fix the problems: no documentation, no funding, no fix. One report is not enough—we have to keep after it, and keep the documentation flowing. The answer can't and shouldn't be, "We already released a hazrep on that, so NavAir should be coming up with a fix." Continue to release appropriate messages and follow up with the fleet-support team. Chances are they need the additional information from several reports for their engineers to properly diagnose the problem, as was the case with our community.

As for me, I'm fortunate to be in position to correct the errors of my past. Thanks for the NavAir team educating a dumb COD pilot.

LCdr. Bassel is the VRC-40 safety officer.

Sins of the Father

By LCdr. Sean P. McDermott

While in the FRS in 1995, I was riding in the back of a C-2 as a student during an FCLP hop when I heard a loud noise. It sounded like something striking the side of the fuselage. I notified the aircraft commander on ICS and was surprised when he responded, "The HF antenna has separated from the rudder and is hitting the fuselage. If we land, we will not be able to use reverse thrust, because NATOPS states we might bring the antenna into the prop and cause a missile hazard." He added, "What we need to do is have you open the ditching hatch and, with your helmet and gloves on, stick your upper body out into the air stream and pull in the antenna."

That flight was 10 years ago. I still can't remember if I had my FRS instructor repeat himself more than once, but, reluctantly, with a fellow student holding my legs, I stuck my body out into the wind stream and pulled the antenna into the aircraft. This event marked my introduction to the C-2 community.

Fast forward a few years, and roughly eight similar HF incidents, to my stint as officer in charge of a C-2 detachment. I brought an aircraft on cruise that had an unusual propensity to lose its HF antenna, having lost several during our cruise.

My most memorable antenna event was during a distinguished-visitor mission, when we had to ask a diplomat to get up from his seat while an aircrewman retrieved the antenna.

This same aircraft and my growing complacency culminated in another memorable moment on my fly-in from cruise. As the aircraft commander, I certainly was responsible for the mission, but I fell into a false sense of security because I was flying with my operations officer. My Ops O never had missed a beat during eight months of cruise. Still, he was green, having never yet needed an HF radio to talk to ATC.

After a downing discrepancy that required an extensive fix, we launched from NAS Bermuda for our return leg to NAS Norfolk. When ATC asked us to switch to HF for our translantic flight, my Ops O and I shared a look as we each thought, "This aircraft doesn't have an antenna. It hasn't been replaced because it has a history of coming off."

We ended up flying in poor weather, across the Atlantic, through the Bermuda Triangle, at night, and NORDO for almost an hour.

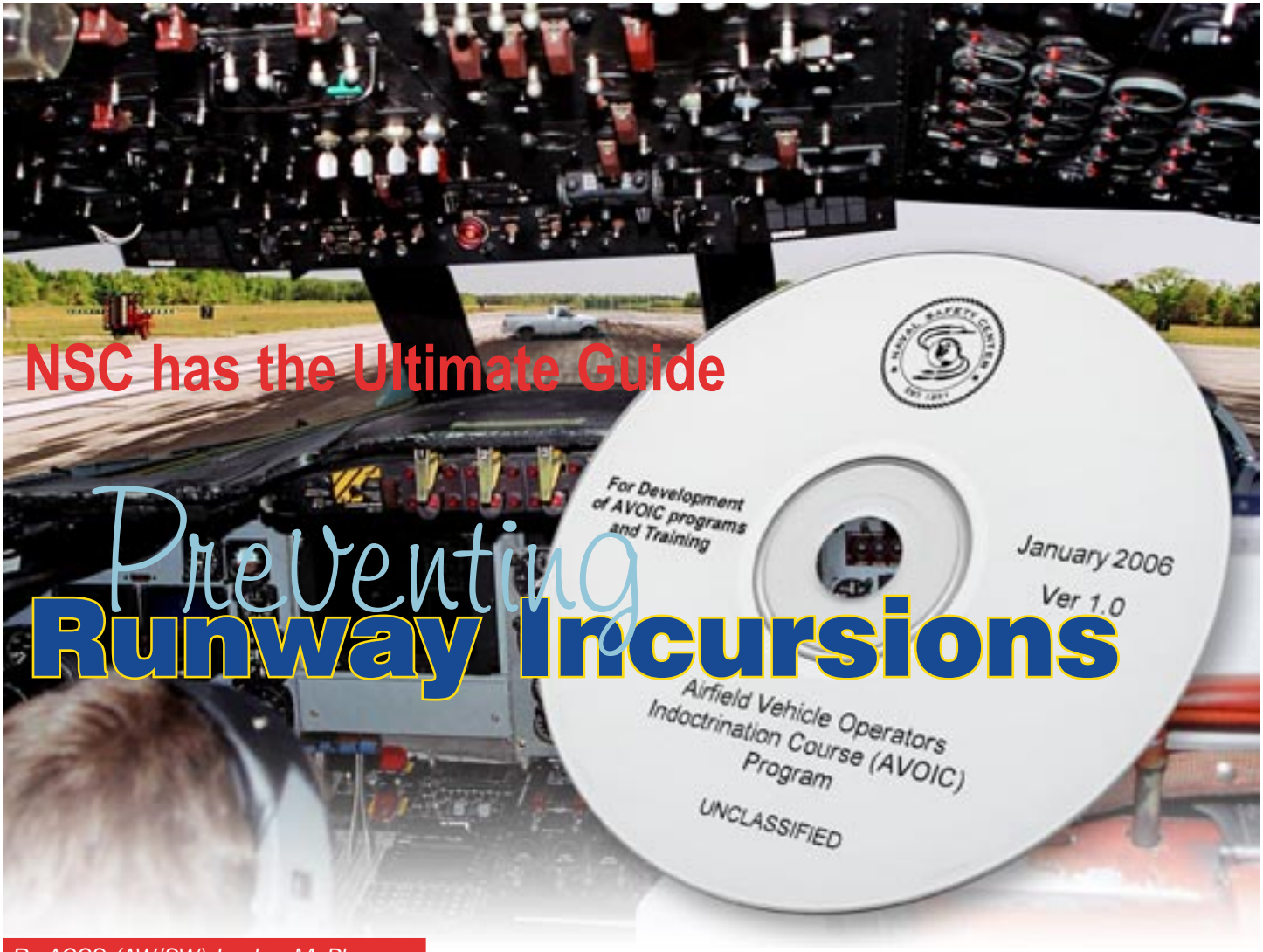
The C-2 community operates an airframe that just has celebrated its 40th anniversary. Over the years, problems have been fixed by developing work-arounds. The HF antenna separating is a case in point. If I were the reader of this article, I'd be thinking, "What an idiot you are!" No arguments here, but it turns out I'm not alone.

After my cruise, a ready-room discussion revealed there wasn't an aircraft commander in the command who hadn't sent an aircrewman out into 120 knots of wind to retrieve an antenna. The fact the community work-around hadn't made it into NATOPS meant that, while the practice commonly was accepted, you would be on your own if something went wrong during the maneuver.

Following my OinC tour, I found myself stationed at NavAir. At an integrated-logistics-support-management- team (ILSMT) meeting, I was being briefed on how the fleet-support team was working on a fix for the E-2 HF-antenna problem. Naively, I asked if they were endeavoring to fix the C-2 HF-antenna problem, as well. I quickly was told that not only were they not planning to fix the C-2 HF-antenna problem, but the fix for the E-2 antenna was to make it exactly like the C-2 antenna that has no recorded history of failing.

I've found religion. Mea culpa… mea culpa… mea culpa. Documentation is the only cure for fleet work-arounds. A dedicated team of highly trained professionals works incessantly to provide the warfighter with the tools to project power for national interests. This awesome team can only work issues they know about. Assume nothing, document everything, take an active role in making our Navy the best in the world.

LCdr. McDermott flew with VRC-40.



NSC has the Ultimate Guide

Preventing Runway Incursions

By ACCS (AW/SW) Leslee McPherson

The Ultimate Guide to Runway Incursion Prevention is now available from the Naval Safety Center (NSC). Developed by our aviation directorate, this guide is available in CD-ROM format or on the NSC website.

Runway incursions are the No. 1 air-traffic-control hazard report received at NSC; most incidents are caused by vehicle operators. To mitigate the risk of these runway incursions, NSC developed an Airfield Vehicle Operator's Indoctrination Course (AVOIC) guidelines and training curriculum. This product assists Navy and Marine Corps airfield personnel in developing a comprehensive airfield-driving program.

The new guide provides commanding officers, aviation-safety personnel, and airfield-driving-course managers with a concise, one-stop shopping resource. It includes procedures and policies concerning vehicle access and operation on the airfield, AVOIC curriculum, training and enforcement.

The interactive CD-ROM contains current versions of OPNAV 3710.7, NAVAIR 00-80T-114, FAA Advisory Circulars for Airfields, and guidance and curriculum documents for an in-depth program.

The CD-ROM also contains a sample AVOIC instruction for naval air stations and one for Marine Corps air stations, plus training videos, study guides, PowerPoint presentations and tests. Because no two airfields are alike, the documents and presentations can be downloaded and adapted for each airfield.

CD-ROMs were mailed to Navy and Marine Corps commanding officers. You may download additional copies from the NSC website at: www.safetycenter.navy.mil/aviation/operations/avoic.htm, or e-mail ACCS McPherson at: leslee.mcpherson@navy.mil. Provide your command mailing address, and NSC will mail your copy within a few days. We welcome TyCom requests for CD-ROMs for redistribution.

ACCS McPherson is the air-traffic-control analyst at the Naval Safety Center.

BRAVO Zulu

HMLA-169

Event 1

Misfit 21 and 22, a section of HMLA-169 AH-1W Cobras, in support of Operation Phantom Fury/Al-Fajr, launched for their fourth sortie of the day at 1428. The section already had completed missions spanning many of the tasks of a Marine Light Attack Helicopter squadron: close air support, armed reconnaissance, time-sensitive target overwatch, point-of-origin searches for anti-Iraqi force indirect fire and small-arms assets, and screening missions north of the river and west of the city. During this time, the section was flying between 500 and 2,000 feet above the ground because of small-arms engagements on previous days in this vicinity.

The section flew to the peninsula, which defined the western edge of Fallujah, to continue supporting Third Light Armored Reconnaissance's (3rd LAR's) Comanche 6 because the convoy still required escort back to Camp Taqaddum. Before contacting the ground unit, the section swept north at 1,000 to 1,200 feet, 120 knots, on the west side of Route Boston. After clearing the area to the north, the flight began a right turn to the south. At 150 degrees of turn, the lead aircraft, Misfit 21, began to automatically dispense flares. Simultaneously, Misfit 22 took a direct hit by an SA-14 surface-to-air missile (SAM). Misfit 22, piloted by Capts. Jon Towle and Shawn Anderson, had more than eight hours of flight operations that day.

The SAM exploded above the rear seat pilot's canopy, just below the rotor blades. Then-1stLt. Anderson had been leaning forward, scanning for enemy positions with the aircraft's night-targeting system. Neither pilot observed an automatic-flare dispense, any missile-warning-system indications, or the missile's origin. Capt. Anderson described the impact of the missile as being equivalent to two cars colliding. Capt. Towle sustained an open fracture to his right arm, a broken left hand, and numerous shrapnel wounds to his back and legs. Capt. Anderson had shrapnel wounds to his upper back. The primary aircraft damage was to the rear-seat pilot's left, right, and overhead canopies, the rear instrument panel, one main-rotor blade, and the upper transmission cowling.

As the aircraft rapidly lost altitude, and Capt. Towle made distress calls over the inter-flight radio frequency. Capt. Anderson immediately grabbed the flight controls to help stabilize the flight. Both pilots felt unusual vibrations and control feedback during the descent. The explosion had destroyed the aircraft's rear canopy, crippling the inter-cockpit communications system. The pilots communicated by shouting and continued to operate effectively as a crew.

Capt. Anderson took control of the aircraft, identified electrical power lines in the flight path, maneuvered the aircraft, and positioned to land. The pilots confirmed the clearance of obstacles and location of friendly positions. After clearing 3rd LAR's position, Capt. Towle jettisoned the ordnance at 50 feet.

Capt. Anderson landed the helicopter in an open field and quickly egressed, while Capt. Towle completed the shutdown procedures. Capt. Anderson helped Capt. Towle from the aircraft, and then provided security for the area until Marines from 3rd LAR arrived. Capt. Towle received first aid from a corpsman, and immediately was moved to a casualty-evacuation (CasEvac) zone. After gathering items from the helicopter, Capt. Anderson was picked up by a separate CasEvac aircraft.

Witness Info:

Our platoon was tasked to provide a screen line and blocking positions. We had daily enemy contact in the area, receiving numerous indirect fires, RPGs, IEDs, and machine-gun fire. While pushing south, several IEDs were identified adjacent to an area the enemy used for ambushes. While waiting to detonate the IEDs, a section of Bradleys were ambushed with machine-gun fire. The Bradleys returned fire, and the insurgents fled. Shortly after the engagement, two Cobras flew in and helped locate the enemy. RPGs were heard in the distance,

Left to right: Capt. Shawn Anderson, Capt. Chris Parson, Capt. Dale Behm.

but the source could not be established. Immediately, our element was halted and told a Cobra had taken a direct RPG hit, and the pilot was badly wounded. The pilot found an open field, ditched his ordnance, and landed. An air MedEvac was conducted to Camp TQ. My platoon then shifted to provide a security perimeter of the downed Cobra. An assessment team arrived late the same night, investigated the damage, and departed. A few days later, a recovery team returned, prepared the Cobra for transport and the ordnance for destruction. Again, enemy contact in the area was daily, with more RPGs, indirect fire, IEDs, and machine-gun and small-arms fire. The crew of the Cobra appeared to handle themselves spectacularly.—SSgt. Henderson, 3rd LAR

Event 2

After establishing section integrity with their Dash 2, an HMLA-169 AH-1W Cobra, call sign Misfit 06, piloted by Capts. Dale Behm and Christopher Parson, provided support to Mercy 01. The Mercy 01 event was a CH-46, which launched at 1350 on an urgent, casualty-evacuation (CasEvac) mission in support of Operation Phantom Fury/Al-Fajr, during Operation Iraqi Freedom II.

The CasEvac aircrew picked up their patient at the Al Taqaddum Surgical Shock Trauma Platoon (SSTP), and the section flew to the 31st Combat Support Hospital (CSH), located in central Baghdad. After dropping off the patient, the flight was cleared to transit out of Baghdad's airspace on routing that passed just north of Fallujah, where offensive-combat operations were raging.

At 1450, the section was five miles north of the small city of Al Karmah and heading west. Suddenly, the Mercy 01 pilots heard and felt a loud thump beneath the cockpit, broke right, and radioed Misfit 06 they were taking fire. Misfit 06 confirmed that Mercy 01 was taking small-arms and rocket-propelled grenades (RPG) fire, and that they would be engaging the target. Mercy 01's aircrew then reported that two RPGs had airburst 100 feet to their rear. The Cobra turned to suppress the threat to allow the CH-46 to safely egress.

On their attack run, Misfit 06 was hit by anti-aircraft artillery (AAA) fire from a previously concealed position. The AAA extensively damaged their aircraft, crippling several flight-critical systems, and rendering inoperative both hydraulics systems. Despite the difficulty encountered in maintaining control of the helicopter, Capts. Behm and Parson maneuvered their sinking aircraft around several obstacles, and completed a textbook, high-speed slide to the grass near the enemy positions. The Cobra pilots completed an emergency shutdown, quickly gathered as much of their gear as possible, and ran to the back of the Mercy aircraft, which landed next to them for their extraction. Once the Misfit pilots were confirmed on board, Mercy 01 lifted out of the zone and returned to Al Taqaddum.

Capt. Jon Towle receiving his Purple Heart medal.

Out of the Heat *and Into the* Fire

By LCdr. Karl Garcia

Within two weeks of my return from a six-month TAD to CentCom as an individual augment, I became the squadron safety officer. I was integrating myself back into squadron life, getting current in the aircraft, and settling into my new job.

I was a bit apprehensive about taking over as safety officer because I hadn't been to ASO school, nor had I served in the safety department as a junior officer. I felt like a fish out of water, but, at the same time, I welcomed the new challenge. Fully aware of my shortcomings, I paid close attention during my turnover with the outgoing safety officer. I also thoroughly reviewed most of the publications.

During my turnover, I noted the mishap plan needed a few adjustments. I quickly keyed in on the fact that the example messages for OPREP-3 and the mishap-data reports (MDRs) still used the PLADs for ComCarGru versus ComCarStkGru. I made a quick mental note that a few other PLADs likely would need updating.

My ASO and I discussed the mishap binder. We needed to update the formatted-message disk with the proper PLADs. We also had to format it to comply with TurboPrep, because the squadron had shifted format during my TAD period. We made plans to have TurboPrep training for squadron duty officers (SDOs). I gave the task of updating the binder to my ASO and gave him three weeks to complete the project.

Within a week, the squadron had a scare. We received word that a Sailor assigned to an S-3B squadron had died in the barracks overnight, and, that he might be one of ours. Our squadron began an immediate recall, while a fellow department head and I worked through the decision tree in the mishap binder. We familiarized ourselves with the applicable messages and processes and prepared to generate a SITREP message.

We learned that the Sailor was not in our squadron, but, as a result of our efforts, we realized our mishap binder was not entirely user-friendly or clear when dealing with a Sailor's death. In hindsight, this incident should have served as a wake-up call to take a closer look and immediately update our mishap binder. I gave my recommendations and the task to update the binder to my GSO.

I bore you with these details on updating the squadron mishap binder because, exactly two weeks after taking over the safety department and giving the original guidance to update the mishap binder, the worst thing happened: We had to execute the mishap plan.

I don't recall if I was called to the ready room, or if I walked down to see what was happening. Most of what occurred on Sept. 21, 2005, is a blur. A powerful thunderstorm was rolling through, and I remember someone telling me 704 was down at the end of the runway. The SDO was in contact with base operations and trying to verify if 704 was safe on deck. A tremendous amount of confusion centered on the status of 704, and, at some point, I ended up with the mishap binder in front of me. Aircraft 704 had crashed short of runway 9.

While I still was coming to grips with what was happening, the XO and Ops O quickly organized the efforts. We began marching through the mishap plan and gathered information required for the reports. We got the OPREP-3 Navy Blue phone call to ComLantFlt within the five-minute time limit. By the time the 20 minutes had expired for the OPREP-3 Navy Blue message, the initial aircraft-mishap board (AMB), consist-

ing of the XO, Ops O, AMO and aircraft division officer (previous ASO), were on their way to the crash site. The local news stations already had the story.

The OPREP-3 message gave us our first insight we had more problems with our PLADs than the shift from CCG-CCDG to CSG. Locating the correct PLADs delayed the process and created additional fog and friction. However, with the help of several outstanding junior officers and tremendous support from the admin department, we continued to march through the mishap plan's checklists and procedures. The tasks were divided, and the squadron was a hub of activity, as everyone contributed. An interesting note is that my ASO was conducting JUMPS validation testing in Pt. Mugu, Calif., leaving the squadron short on mishap expertise and heavily reliant upon the mishap binder.

The CO had been airborne at the time of the mishap and had diverted because of weather to a nearby base. After he was notified by phone of the crash, he made it back to the squadron just in time to chop the MDR (the four-hour message). We had additional delays with the MDR as we sorted through more problems with formats and PLADs. After finally collecting and verifying weather information, the MDR was drafted, but we did not meet the four-hour timeline. We easily would have made the deadline if our PLADs had been correct, and if we had started the MDR simultaneously with the OPREP message, instead of walking down the checklist step-by-step.

The moral of the story is to make sure your mishap binder is completely up to date. Review it to make sure the information is clear, concise and readily executable. You never know when you will need to execute it. In this case, two weeks was too long from the moment the mishap binder discrepancies were noted to the time it was needed. Things will happen when you are the least prepared and least expect it. In this case, my ASO was unavailable at the time of the mishap, which increased our reliance on a well-maintained mishap plan and binder.

Fortunately, I had familiarized myself with the procedures and identified some of the binder's shortfalls before the mishap. An up-to-date mishap plan would have saved precious time and significantly reduced the confusion already present after our mishap.

Fortune follows the prepared.

LCdr. Garcia flies with VS-32.

Dude, Where's My Jet?

By Ltjg. Charles Liles

I walked to my jet for a night training flight. Our squadron was eight days from departing on cruise, so the schedule was full of training flights. Earlier in the day, I had completed my level II, 2 v 1, air-combat-maneuvering (ACM) syllabus flight.

Although I was tired, already having spent 10 hours between flying and working on my ground jobs, I felt relatively confident I could complete this final evolution of the day. I still was within our squadron's crew-day limits stated in our standard-operating procedures (SOP). The flight was to consist of section, night-vision goggle (NVG), high altitude, roll-in attacks, followed by a field-carrier-landing practice (FCLP) period at Fentress Outlying Field.

I read the aircraft-discrepancy book (ADB) for aircraft 403, signed the "A" sheet, and walked to the jet. After preflight, I climbed into the cockpit. As the plane captain helped strap me in, he mentioned something about the previous pilot not parking aircraft 407 in the correct spot. He then asked me to park farther up the line when I returned.

> I remembered looking at him and saying, "Alright, but I'm in 403." He smiled, nodded his head, and said, "Yes sir."

The start-up, taxi, launch, goggle-up, and join-up were uneventful and required little attention as we flew south to the target complex. However, once we started our section roll-ins, things became more difficult. I lost sight of my lead during the first pull off target and then again while trying to join up. I attributed these problems to having trouble adjusting my goggles after pulling 5 Gs off target. We subsequently made two more attacks that went smoother. Complete with the NVG training, my lead detached me for the FCLP period, while he stayed back to work with another nugget in the target area.

My bounce period began uneventfully until another section joined me in the pattern. After both members of the section made their first passes, I realized that Dash 2 was calling the ball as 403. Thinking that the pilot just had made a mistake, I continued to make my calls, using the same callsign. However, the other pilot continued to make his calls as 403, as well.

After about three passes, I remembered my earlier conversation with the plane captain before takeoff: something about 407 having parked in the wrong place. It then hit me: I had manned-up the wrong jet. Trying to compartmentalize, I continued to work the pattern but changed my callsign to 407. When complete with the FCLP period, I left Fentress for the visual straight-in at Oceana.

Feeling a bit tired and very embarrassed for having someone else's jet, I failed to pick up on arrival control telling me there had been a runway change since we had launched. I flew to about seven miles from the approach end of runway 05 before seeing a string of taxi lights lined up for runway 32. I finally realized my mistake, told tower, and sequenced myself for an approach to the duty runway.

By this point, I was very concerned about my performance. I had launched in the wrong jet, lost sight of my lead twice on NVGs, and started an approach to the wrong runway—not exactly a solid flight. I also was beginning to feel signs of fatigue. I focused the rest of my attention on making a safe landing back at Oceana.

After debriefing with my lead and having an awkward discussion with my skipper, I had plenty of opportunities to rethink the flight. I took away several learning points. First and foremost, safety of flight is more important than the ground tasks I had been

"OK, 403 here, ready to go..."

working on earlier in the day. Instead of spending three hours running errands for the coffee mess, I could have stayed home a little longer and rested. I knew these two events would be challenging. An ACM hop, followed by my first NVG section roll-ins, with an FCLP on the back end, is a fairly dynamic day.

Although I was technically within the limits of our squadron SOP as far as crew rest and crew day goes, I should have paid more attention to the level of stress I faced that day and adjusted my schedule. My all-or-nothing attitude directly correlated to the level of fatigue I felt as I walked into my second flight.

Second, I learned not to ever rush when something feels wrong. I should have listened more closely when the plane captain was talking to me while I strapped in. I did not understand exactly what he said: that 403 and 407 had switched positions in the line. Instead of hurrying to start engines and beat my lead to marshal, I should have paused for a second and asked the plane captain what he was talking about. In retrospect, I bet the plane captain thought I was joking with him. Had I taken the time to figure out what he was saying, I could have saved myself some embarrassment, and realized earlier that my situational awareness was significantly degraded that night.

Finally, I never should have allowed myself to get complacent after discovering I had walked to the wrong jet. My level of concern simply was not high enough. Had I been a bit more ill-at-ease with my previous performance, I probably would have listened more carefully to arrival control and avoided any confusion as to the active runway.

What should have been a routine night-training flight became a source of mortification for me professionally. However, as naval aviators, we must learn from our mistakes. Fighting complacency, ensuring procedural compliance, and preserving safety of flight take precedence over all other issues. I thought I knew and understood these concepts well before manning up on that summer night; however, I managed to violate all of them at least once.

Ltjg. Liles flies with VFA-87.

Belly Up in Corpus

By Ens. Christopher J. Huebner

As I drove onto Naval Air Station Corpus Christi on a warm August morning, I knew I was about to have a one-of-a-kind aviation experience. You see, I was about to embark on my airnav solo with a fellow flight student. I was relaxed and at ease that the rigors of Review Stage finally were over, and that I successfully had completed every graded event in the advanced-maritime syllabus at VT-31.

I was ready to sign for a multi-million-dollar aircraft and gain the invaluable experiences and confidence from navigating the airways without an instructor. Little did I know the confidence gained from this flight would have nothing to do with navigating airways or operating at altitude: I only would make it as high as 2,500 feet and as far as 2.1 miles from NAS Corpus Christi.

I met with the command duty officer (CDO) to discuss which approved airport to go to with my copilot, 1stLt. Jeff Noble, USAF. Based on weather restrictions and traffic at other airports, we settled on Laredo, Texas. Jeff and I went to base ops to flight plan, get a weather brief, and file our flight plan to Laredo. We then went to aircraft issue in our hangar to print out NOTAMs and to review the aircraft-discrepancy book (ADB) for our aircraft. We met with the CDO one final time before he released us for the solo. He discussed the importance of crew-resource management. He also reemphasized using every available resource, inside as well as outside the cockpit, stressing the radios. Not knowing it at the time, his words would prove very important in the next hour.

We completed our preflight and were ready to start engines at 10:50 a.m. We had an uneventful preflight, taxi and run-up. All our checklists were complete, and everything seemed to be going according to plan. Tower cleared us for takeoff at 11:15 on runway 13L, and we were well on our way to Laredo for lunch, or so we thought.

The takeoff roll was normal, and Jeff called rotate at 91 knots. As I applied backpressure on the yoke, our T-44 Pegasus flew off the deck. The plane felt out of trim right after takeoff, so I took a few extra seconds to apply a little rudder trim before verifying our two positive rates of climb. I then called for the landing gear to be retracted. Jeff flipped the gear handle on his side, and we had three-up-and-locked indications. He then began to make his off-the-deck call to Montana base.

While Jeff was toggled to VHF, I thought I heard our call sign, Navy1G466, over UHF from tower, clearing us for a left downwind. I thought they must have confused their call signs. When Jeff was done with his off report, I asked if he had heard the call from tower. Before he could answer, tower again called and cleared us for an immediate left downwind but did not give an explanation for the call. Jeff responded by saying something to the effect of, "That's a negative for Navy1G466 solo; we are on the Arrow 3 departure going IFR to Laredo."

By now, we were well above pattern altitude. Solo students always are briefed that, if tower tries to clear you for something you are not expecting, or think you shouldn't be doing, simply remind them that you are a solo. Fortunately, what we thought was an error by tower ultimately would save our lives.

Tower came back on UHF and said we were cleared for an immediate left downwind because our port wheel

had departed the aircraft. I initiated my left turn as Jeff told me we had to go back and land because a plane had lost a wheel. That's when I told Jeff I thought tower had said it was our wheel that was gone. Jeff called tower and asked them to verify the tail number of the plane with the missing wheel. Reality hit me when I heard, "Navy1G466 solo—your plane has lost a wheel."

I knew a left downwind was not what we needed. So I had Jeff request a delta pattern for us at 2,500 feet overhead the field. Once tower cleared us for the delta pattern, Jeff called Montana base and told the CDO of our situation. The CDO remained calm on the radio and told us to standby. We then entered a left-hand delta over runway 13L. It eventually would be a 45-minute delta pattern over 13L before a plan was put into place. We were in constant communication with base, which helped put us at ease. If there was any silver lining in having an emergency on a solo flight, it's that it was gear-related. Knowing it was a deferred emergency, we could get things set up in advance.

Circling for nearly an hour gives you a lot of time to think. Ironically, all of the things Jeff and I had discussed now pertained to us. I say this was ironic because, about an hour later, base told us we would have to do a belly landing. Because we already had raised the gear, there was no way we would cycle it for a gear inspection and run the risk of strut problems and worsen our situation. The plane was in a stabilized condition, and we were comfortable with what we had. We reviewed the NATOPS procedures and knew our only time constraint was fuel; we had lots of gas to burn.

Two facts kept running through my head while I looked at the procedures. First, the T-44's landing gear operates so that, even when the wheels are fully retracted, the bottom rubber of the wheel protrudes from the wheelwell. This fact is important because we could have a visual inspection without cycling the gear and without having another aircraft join on us. Also, by having the rubber on the starboard side, I knew we still would have a slight bit of braking effectiveness. The second fact I recalled was that a former VT-31 IP had made an intentional gear-up pass a year and a half earlier. Our confidence was building.

About an hour after entering the delta, base discussed the possibility of landing on runway 17. This plan worried me because it was a shorter runway than

Left to right, 1stLt. Jeff Noble, USAF and Ens. Christopher Huebner.

13R, and I never had landed on 17. The winds in the summer always were right down 13, so that's the only runway I had used. After a few minutes of discussing the winds and other factors, base came back to us and said runway 13R would be ideal. Jeff and I entered a right-hand delta over runway 13R.

We switched VHF radio frequencies from Montana base to Pegasus base (maintenance frequency) to talk with one of our squadron functional-check flight (FCF) pilots. He went over the NATOPS procedures three times with us to make sure we were clear on our responsibilities. He said we would have to fuel chop both engines just as we entered the flare. The plan also included executing the emergency-shutdown procedure once the aircraft came to a stop, and then exiting the plane through the starboard emergency-escape hatch.

The plan was in place; it was time to practice. Tower cleared us down to pattern altitude, and I began working on flying a wider pattern than I was used to. This maneuver would compensate for the faster speed off the 180 because we had less drag without the gear.

It was odd hearing Jeff transmit, "Navy1G466 solo is right 180, three up and locked on purpose, looking for the option 13R."

I made sure to give myself an extended final, so I could have more time to properly set up.

The first approach felt all right, and we executed a waveoff at 200 feet, so we could try another practice with the new power and airspeed parameters. I felt fast on the second approach, and we again executed a waveoff at 200 feet. We now were ready to bring it in for a full-stop on the next pass.

Approaching the 180 position, Jeff called tower and told them we were a full-stop. Speed was tapering off nicely, and we were a little low, possibly because of the extended final. We got back on parameters, and Jeff began to call out airspeed and altitude in increments of 20 feet. The big 13R lettering began to fill my windscreen, and I was ready to initiate my flare. I began setting a flare attitude and started reducing power to idle. As briefed, I called "chop," and Jeff put both condition levers to the fuel-cutoff position. An eerie silence came over the plane as the props made a sudden woosh and wound down. All I could hear was the sound of the electric trim running to the stops during my auto-flare. The plane seemed to be sitting in a very odd and uncomfortable nose-high attitude. Without the wheels under us, we were sitting a lot lower and had a new sight picture.

Then there was dead silence, and it felt like time stood still for a couple of seconds, while I sat there in an unfamiliar position. The belly hit the deck. I heard the antennas and drains scrape across the asphalt. Then the props hit the deck. I used right rudder and brake to help keep us on the runway. The plane came to a screeching halt, and we executed the emergency-shutdown procedure. We left all our belongings in the plane, egressed from the emergency-escape hatch, and cleared the runway to get as far away from the plane as possible. We were rushed to the hospital for the standard mishap tests and exams but only after we had photos taken in front of our slightly mangled bird.

A crucial lesson from this experience was seeing the importance of teamwork. From Jeff and me working together in the cockpit, to the VT-31 instructor pilots talking to us and setting up the emergency-action plan, everyone knew their job and executed it flawlessly. The key play was the two petty officers in the tower who saw the wheel fall off and notified us. If they had not made that catch, no one would have, and we would have gone to Laredo, showing three-down-and-locked because the strut and downlock still were in place. Who knows what would have happened or how tragic it could have been if we had landed on a strut with no wheel.

Besides having a great sea story to tell and gaining a better understanding of crew-resource management, I take away from this experience an appreciation for the training given to student naval aviators. I started with no previous aviation experience, and I was given all the tools necessary to perform under pressure when the situation demanded the most out of me.

Ens. Huebner now flies with VP-30 at NAS Jacksonville. 2ndLt. Noble now flies with 62nd Airlift Squadron.

The wheel fell off because a conical bearing failed. The wheel is held on the axle by this bearing, which, in turn, is retained by a washer and castellated nut. The inside diameter of the bearing cup is larger than the outside diameter of the washer and nut, so, if the bearing fails, there is nothing to hold the wheel on the axle. The bearing assembly is covered by a small hubcap, which prevents visual detection of impending failure of the bearing during preflight. The design of the wheel assembly since has been changed so that a single-point bearing failure no longer should allow the wheel to depart the aircraft.—Maj. Anthony Taylor, USMC, VT-31 maintenance officer.

AS THE ROTOR TURNS

By Ltjg. Tony Arendt

We were operating from a cruiser in the Yellow Sea in the middle of a dark night—and I don't mean just any ordinary dark night.

As we eventually would learn, we were within 200 yards of the ship (as reported by the ASTAC), with the crew shining every possible light at high power, including two SAR lights from the flight deck and two more from the bridge. The crew also was dropping smokes down the starboard side from the LSO tank-commander hatch. Nevertheless, we couldn't see the ship, even with our NVGs.
I still find it hard to believe this really happened.

It had been foggy all afternoon, but the fog had started to burn off toward evening. The forecast called for light fog at our land divert more than 90 miles away, and visibility at our location was about one to three miles. At our brief time, we could see the last of the daylight sky peeking through the 1,500-to-3,000-foot ceiling. Although the waters off the Koreas are notorious for low visibility and fog during the summer, we gave little thought to the weather once the conditions started clearing up.

We had good forward-looking-infrared-radar (FLIR) ranges, and we had identified many fishing vessels. We also had encountered occasional IMC conditions in isolated areas.

The flight had been relatively uneventful, and we headed back to the ship about 30 minutes before recovery time. As we flew toward mother, we went popeye and descended from 1,000 to 500 feet, hoping to come out below the layer. Still in the clouds at 500 feet, we crept down to 200 feet, searching for better conditions as we set ourselves up behind the ship. A quick check of the gas indicated about 1+00 until min fuel. We found that 200 feet didn't have much more to offer than 500 feet, so we began an alternate approach sequence and descended to 100 feet. We also slowed to 50 knots and tried to locate the ship by one-half mile.

The approach was standard, with a fairly stable platform, but, when we got to one-half mile, we couldn't see a thing. We waved off and brought it back around. With the pucker meter pegged, we started to crunch our numbers for our alternate. We decided if we singled up the engines, we could get there. We told control and the LSO about not locating the ship, and then turned inbound for another run. This time, we requested the ship's lights to be turned on and explained that we planned on descending to 50 feet and slowing up earlier.

The second approach had a few close altitude calls. We tried to get low and slow and bring the ship in a bit closer to see if we could capture it within one-quarter mile. Waving off again, we started to get disoriented from being in continuous IMC conditions while varying the airspeed.

We instructed our aircrewman to back us up, as usual, with closure and range calls. The ASTAC gave us our position relative to our base-recovery course (BRC), along with heading calls. We recaged ourselves, swapped controls, and descended to try again. This time, we asked that all the lights on the ship be turned on high power, and we reported our current state of 0+45. With our divert airfield now out of range, we had no choice but to recover to the ship.

Knocking out the automatic-approach checklist, we dialed in 50 feet and 20 knots of forward ground-speed and engaged the approach at two miles out. As we descended, we were on the gauges and backing up each other on altitude and airspeed. Coming into a slow forward creep, the radalt warning went off as the aircraft descended below our set altitude of 40 feet. Pulling in power, we recalled how this particular aircraft had a tendency to momentarily dip below the dialed-in altitude. This recollection was too late, however; our BDHIs started spinning as the flying pilot experienced vertigo. Swapping controls again, we pulled in an armpit full of collective and climbed to 600 feet until we could work on forward airspeed. We turned away from the ship and went out to four miles to take a break, catch our breath, and again recage ourselves.

Already performing emergency-low-visibility-approach (ELVA) procedures with the ASTAC, we requested an emergency-smokelight approach and set up for our next run. As we turned inbound, we dialed our approach to a more standard 80 feet, instead of 50 feet—we had learned from our previous effort. We decided to get direction from the ASTAC to position us two miles from the stern, on top of the wake, on BRC, and then engage our automatic approach and ride it down to a hover. From there, we planned to creep in as previously briefed.

The front half of the third approach began uneventfully. As we progressed forward, nearly stable in our hover, we received a call from the ASTAC, saying we were nearly 180 degrees out on our heading. Our sensor operator (SO) confirmed the bad heading. We recalled the spinning directional gyros on the previous approach, which had led us not to trust our instruments. We briefly selected alternate altitude-gyro-control assembly (AGCA) mode for our gyros and put in a big correction

Reports from the lookouts later claimed we had over
ASTAC reported the night-capable, flight-deck camera

to get back on course. We momentarily experienced vertigo once more and pulled away from the water.

Recovering at about 1,100 feet, we reexamined our instruments under some welcome starlight. We probably had the correct heading but were in a side drift, which, therefore, had us going the wrong way, according to both the SO and the ASTAC.

Confident we had the situation licked, we went in for another try. As before, we descended to 50 feet and established a forward ground speed of 30 knots for the entire approach. With a few smokes in the water to help, we were certain to acquire the ship this pass. Coming up on one-quarter mile, we slowed to a near crawl. Not until the ASTAC called us 200 yards off the fantail, though, did we wave off to the port side, with still no ship or light in sight, and all the while still on NVGs.

Nervous again, we set up and reexamined the whole procedure; we were sure our methods were sound. The LSO assured us all the lights were turned on bright, including two SAR spotlights brought from below, and several smokes were in the water. Also, all available personnel were mustered to man the deck and listen for our aircraft, and then to make vectoring hand signals to the LSO.

Once more, we proceeded inbound. Down to 40 feet and creeping forward at 30 to 40 knots, we were about two miles out when the ship's TACAN went down. Venting our frustrations at the control tower, we switched to our aircrewman for closure and range calls, using our radar. Established in a hover and receiving range, closure and position calls from the ASTAC and SO, and as the nonflying pilot backed up airspeed, altitude, and heading, we came to within one-half mile when the TACAN came back up.

With no ship or visual reference in sight, we crept forward, holding 10 to 15 knots of ground speed. Inside of 150 yards, one of us picked up a faint light that quickly developed into a glorious, bright, green glow of a burning smoke. Looking farther, we made out a few more smokes but no ship. As we headed down the smoke trail, we began to detect, with our NVGs, a faint light through the fog. Straining to make out a ship, the dim lights began to take form. The nonflying pilot, as briefed, came off his goggles and kept a lookout for the ship. Seeing lineup lights and bright spotlights, the nonflying pilot took controls from the flying pilot, whose goggles were blooming out. Fighting the onset of vertigo, we picked up a visual scan and oriented ourselves to the ship's stern. We brought on our searchlight and got a verbal confirmation from the LSO of our position off the ship's fantail. Switching controls another couple times, we finally found ourselves in a hover over our flight deck, surrounded by spotlights and smokes. Stunned, we sat there in a hover, exhaled a sigh of relief, and lowered the helicopter into the trap.

Reports from the lookouts later claimed we had overflown the ship on two separate occasions, while the ASTAC reported the night-capable, flight-deck camera couldn't even see the flight deck through the fog. The LSO said we broke out over the harpoon launchers when we flipped on our searchlight. The HCO in the tower said she briefly had lost sight of us, even as we were coming over the flight deck.

Grateful to be aboard, we completed our post-flight inspection. As I took the opportunity to reflect, I couldn't help but gain a whole new respect for the sea. Besides, this experience allowed me to appreciate the aircraft a bit and actually switch my gyro out of the alternate mode selection for other than system checks.

Ltjg. Arendt flies with HSL-51.

This article brings up several issues of interest for helo ops from small-boy ships. First, the bridge and CIC watch teams are vital cogs in the CRM and ORM machines. Obviously, the OOD knew the ship was encountering fog. Timely notification to the helo crew of degrading visibility conditions would have given them more options and time to make decisions, but that didn't happen in this case. Second, in-depth knowledge of the divert and the ability to get updates on its weather conditions are essential to give aircrew the tools needed to make an informed decision whether or not to divert.—LCdr. Bruce Bicknell, helo analyst, Naval Safety Center.

flown the ship on two separate occasions, while the couldn't even see the flight deck through the fog.

Our Last HH-65A Flight

By Ltjg. Ian Neville-Neil, USCG and LCdr. Larry Littrell, USCG

We were enjoying another cool, summer night in Humboldt County, Calif., with surprisingly good visibility and clear skies. The air station just had completed the transition to the bravo model of the HH-65 but still had the last alpha model in the fleet (CGNO 6592). Our 6592 was just waiting to be flown back to Elizabeth City to be converted into a charlie model.

With a syllabus flight scheduled for that night (an unaided, night rescue-swimmer operation for a copilot's right seat upgrade), and several aircraft availability issues with the bravos, we decided to use 6592 one last time before sending her away. That thought alone, "one last time," should have, in and of itself, set off numerous warning tones.

We took off just after sunset, with an HH-65B providing cover, and positioned ourselves two miles off the coast. The bravo helo flew out to about 10 miles, giving each of us plenty of room to maneuver. We had mounted our night-vision goggles (NVGs), so we could roll right into aided ops in the event we finished the unaided portion early. After kicking out our rescue dummy, Sponge Bob, we harness-deployed the rescue swimmer from a 25-foot hover into the 56-degree-Fahrenheit Pacific Ocean. He disconnected and gave the "swimmer OK" sign.

As the rescue checklist part II was being completed for a basket recovery, I [the confident, suave, highly motivated pilot under instruction (PUI) in the right seat and at the controls] drifted closer to the rescue swimmer—a typical nugget mistake. The instructor pilot (IP)(oafish, self-absorbed, and in the left seat—not at the controls) asked where the rescue swimmer was. I replied, "At 2 o'clock."

Unable to visually acquire the swimmer though his windscreen, the IP leaned forward and right, looking out my windscreen. Still unable to spot the swimmer, he leaned back and his goggles, which still were in the up position, caught on the No. 1 fuel-flow-control lever (FFCL). This action almost brought the lever all the way back to idle.

At this moment, now frozen in time, several things happened very quickly. As I heard the engine spool down, I initiated a collective pull to set rotor rpm at 91.5 percent. I then put the aircraft in a wings level, nose on the horizon (accelerating) attitude per the flight manual.

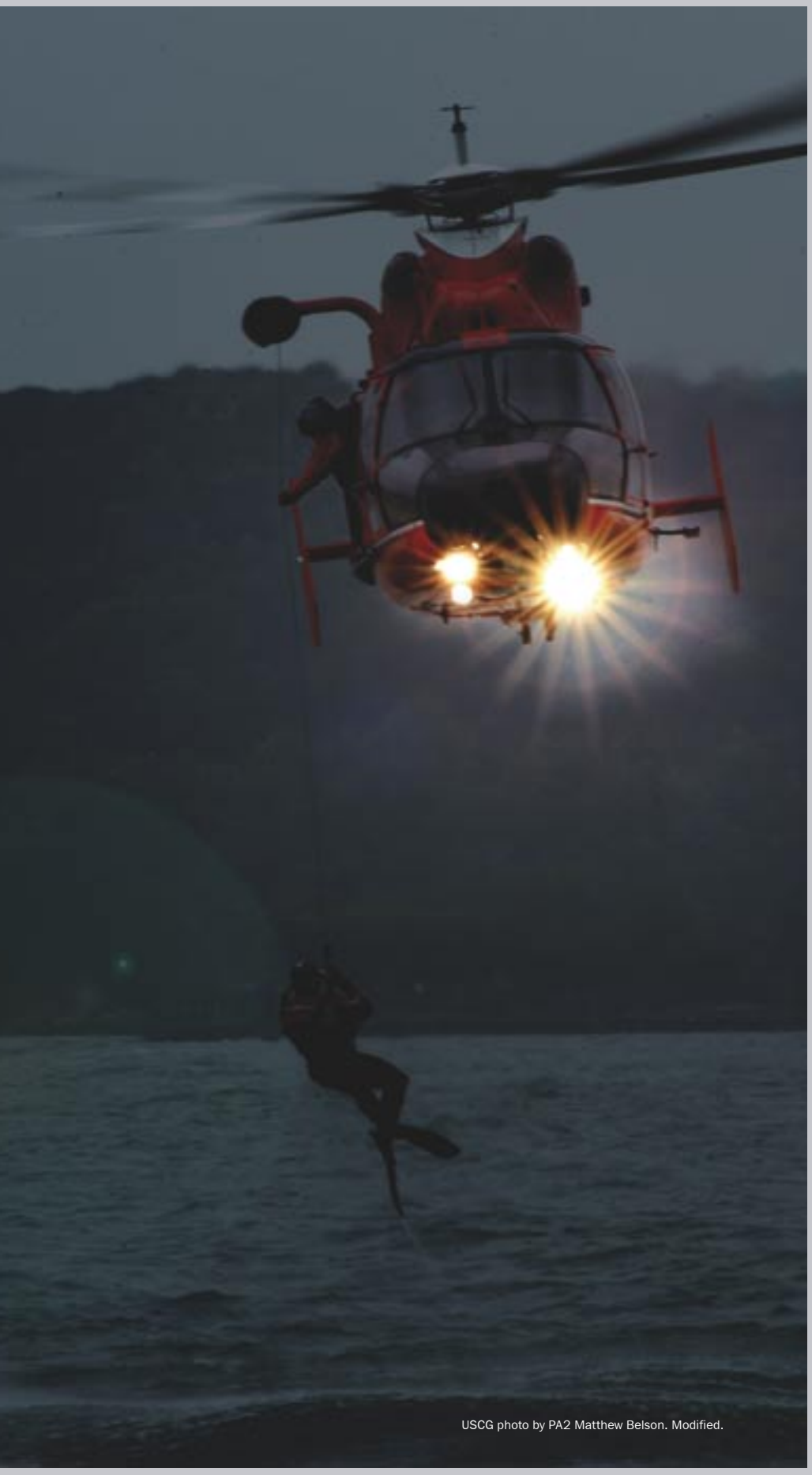
I still was wondering why we were doing simulated emergencies with a swimmer in the water when I realized this was for real. As I calmly reported "nose on the horizon," at only three octaves above my normal voice, the IP said, without even raising the pitch of his voice, "Transition."

Meanwhile, about 500 milliseconds later, the IP realized what had happened, and he pushed the No. 1 FFCL back to the flight-detent position. Since I still had an armpit full of collective, I was reminded of Newton's third law, "For every action, there is an equal and opposite reaction." This law explained the "ringing of the bell," with simultaneous engine overspeeds and transmission over-torques that we had.

Once forward flight was achieved, I started a right-hand orbit to keep the rescue swimmer in sight. I then established comms with the swimmer and directed the cover helo to move in and recover him. We continued to evaluate the warning lights and instruments to make sure the aircraft would continue to fly until the cover aircraft arrived.

About four minutes later (which felt like two days), the cover aircraft reported, "Rescue swimmer in sight."

From there, we had a two-minute flight back to base where we flew a running landing, taxied to the line, and pulled our undergarments and seat cushions out of some uncomfortable places.



USCG photo by PA2 Matthew Belson. Modified.

On a side note, we later learned that, as we were wondering if our SGLI was current, the rescue swimmer, upon hearing the engine spool down, was doing his best Mark Spitz impression in the opposite direction. I think he is ready for the next Olympic tryouts.

A few learning points came out of the ensuing discussion and mishap report. First, we were not the only people who have bumped the FFCLs with the NVGs, though apparently we are the only crew to have succeeded in pulling them out of the flight detent. Second, in the charlie model, this problem won't exist, because toggle switches replace fuel-control levers. Third, it might behoove us to keep the cover helo a bit closer, just in case its services are needed. Finally, learn, love, and live those emergency procedures; you never know when your life may depend on them.

The time it takes an object (a helicopter, for instance) to fall from 25 feet is 1.25 seconds—Newtonian physics once again. I believe we only dropped 5 to 10 feet, but that was more than enough for us. Fast thinking and faster action were the saviors of our intrepid aircrew that night. As I later told a friend of mine, "At least our drysuits were still dry on the outside."

Ltjg. Neville-Neil and LCdr. Littrell are stationed at Coast Guard Air Station, Humboldt Bay.

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

A Crash Course

By Lt. Dave Shuster

I taxied to cat 3 to be launched on a five-hour Operation Iraqi Freedom (OIF) mission. We were more than three months into cruise and had been flying OIF missions for a month. What was about to transpire would not be a typical OIF sortie. I was about to get the ultimate indoctrination into how crew resource management (CRM) can influence the outcome of an in-flight emergency. The question was, "Would the outcome be positive or negative?"

The cat shot was uneventful: No abnormal indications or noises were noted. I did my clearing turn and started to clean up. The gear-position lights extinguished normally, but the gear handle remained illuminated, indicating all gear were not up and locked. I thought the gear just was slow to retract, so I slightly pulled off power to remain below 250 knots to protect the gear from an overspeed. Then I waited… and waited… and waited. The light never went out.

I told tower I was climbing overhead to 2,000 feet and needed to speak with a Hornet rep. There was no scheduled recovery because I was on the first cycle of the day. I also wasn't sure how long a respot would take for any potential pull-forward.

Because I was an early launch, no one was airborne who could join for the inspection. As a result, tower coordinated a flyby. I flew the profile at 230 knots and 250 feet with the gear handle up. Tower and other aircraft on deck confirmed the left main-landing-gear doors were open. By this time, an S-3 had launched, and tower had him join on me for a visual inspection.

The S-3 said the port, forward, main-landing-gear door looked to be folded in half and had wedged itself between the remaining aft gear doors. Tower told me to remain overhead, and they would recover me during the next cycle. I climbed to 17,000 feet (our medium holding altitude) and set max endurance to save fuel.

While climbing, I contacted strike with sierra codes to pass to our ready room and advised them I would be monitoring button 18. Five minutes later, our maintenance officer (MO) called me from CATCC. I now had two sets of eyes and ears to help me with the situation. CATCC advised me that a Hornet would be joining for another visual inspection at 17,000 feet. After joining, the Hornet pilot confirmed the condition of

CRM Contacts:

CRM Instructional Model Manager
NASC Pensacola, Fla.
(850) 452-2088 (DSN 922)
https://wwwnt.cnet.navy.mil/crm/

LCdr. Deborah White, Naval Safety Center
(757) 444-3520, Ext.7231 (DSN 564)
deborah.j.white@navy.mil

I thought the gear just was slow to retract.

the left main-landing-gear doors, and the decision was made to execute an emergency pull-forward.

The MO told me to try to extend the landing gear, with the other Hornet flying formation, so that the gear could be visually confirmed down-and-locked. The thought process here was to make sure if the gear would not come down, we would have plenty of time and fuel to troubleshoot. I tried to lower the landing gear, but only the right main and nose gear successfully extended down and locked. This was my first indication the problem was a little more serious than I originally had thought.

The MO began reading the steps for "landing gear unsafe/fails to extend," while others began coordinating tanker and divert options. As I worked through the checklist items, I was told the divert field would be Ali Al Salem in Kuwait, and the ground crew at the airfield already were in the process of rigging the short-field arresting gear. We eventually completed the "landing gear unsafe/ fails to extend" checklist twice without success.

I flew toward the divert field while the S-3 again was vectored to my position, so the other Hornet and I could receive fuel. The other Hornet would stay with me throughout the divert. My wingman worked wonders helping me deal with the "language barrier" of the air-traffic controllers in the region. Although the decision was made to take an arrested landing in Kuwait, I still wasn't in the clear.

Because I was supposed to go on an OIF mission, my ordnance consisted of bombs, flares, a loaded gun, and a Sidewinder on the left wingtip. In addition, I was configured "goofy," meaning the drop tanks are mounted on the centerline and right, inboard, wing station.

I vividly remember the next question the rep asked, "306, which station is the 'Winder loaded on?"

I quickly answered, "The AIM-9 is on station 1," meaning the left wingtip.

I promptly followed this statement with a very disappointed, "Yeah, it's on the left wing."

Wingtip missiles can't be jettisoned, only shot. It sunk in that if I landed with the left main in the up position, I'd have to drag a live Sidewinder along the ground as I came to a stop.

In accordance with NATOPS, the rep began reading the "Landing Gear Malfunction Landing Guide."

A few steps needed to be followed for "one main landing gear retracted or trailing." First, I needed to make a fly-in arrested landing. Because the ship already had coordinated with the airfield, the gear was rigged, and they were ready for my arrival. If the ship had been blue water, the only course of action for this emergency would have been a barricade arrestment.

Second, I needed to jettison all external ordnance. We knew we couldn't jettison the Sidewinder, so we focused our efforts on the two GBU-38s located on the left and right, outboard, wing stations. The S-3 pilot, who by this time had more than earned his weight

in gold, began offering up his services as a sea-search platform and swept the ocean for a clear area to jettison. The MO began reading the steps for select jettison over the radio. I followed them word-for-word and replied when I had completed each step. However, because the gear was not up and locked, I was unable to select "jettison the bombs." To make sure it wasn't a procedural error, we tried once again from the beginning of the procedure. Unfortunately, the second attempt produced the same results. Finally, I had to emergency jettison the bombs, which meant the two fuel tanks were jettisoned as well. Because I was forced to jettison the tanks, I couldn't comply with step three, which states, "Retain and depressurize empty external fuel tanks." The idea behind keeping the drop tanks is they may help prevent aircraft damage during landing.

As expected, the language barrier began to present itself as the other Hornet pilots began talking with Kuwait Center. To help drive home the point I was declaring an emergency, I squawked 7700. The rep quickly read the two remaining steps to the procedure just before we lost radio contact with him; we were out of range.

We subsequently were cleared for the short-field arrestment on 30L at Ali Al Salem. I had one shot to grab the cable. If I missed the cable, I had to make sure I had enough airspeed before the left wing touched down to take the jet flying again. As I began my descent, I searched the approach end for the exact location of the cable. As we got closer, I remember saying, "Well this is not what I thought I would be doing today." The pilot in the other Hornet replied with a forced laugh. I soon spotted the cable.

As I tried a fly-in arrestment, I concentrated on the final two aspects of the procedure the MO had said several times before losing radio contact. He said to make a minimum-descent-rate landing and to hold the damaged gear off the deck until engagement.

I spent the next few moments collecting my thoughts. I thought about what I would do if I didn't catch the cable; I thought about whether or not I was sitting on the ejection-seat handle; I thought about holding the wing off as long as possible to prolong the impending swerve; I thought about how I was going to keep the plane on the runway; and I thought about how I quickly would get out of the aircraft once it came to a stop.

As I approached the gear, my only thought was to keep the plane off of the deck until the very last second. I modulated the power to float the landing as long as possible. At the very last second, I took a little power off the jet, and 306 settled onto the runway. Once I felt the

plane touch down, I immediately went to full afterburner and started programming in right stick. I figured if I missed the gear or the hook skipped the wire, full afterburner was the best way to make sure I had enough energy on the jet to fly again. I held that wing off the runway for what seemed like an eternity. I then heard the words I was hoping to hear, "Good cable!"

My wingman saw the cable begin to stretch as the hook engaged it. I felt the aircraft slow, and I started to slowly pull the power to idle. I continued to "fly" the jet as the cable paid out in an attempt to prolong the inevitable. As the jet continued to slow, it began to slowly lean to the left.

As the wing touched the pavement, the aircraft swerved violently to the left. I counteracted this movement with opposite rudder. As the nosewheel grabbed, a very similar motion to the right immediately would follow the left movement. This sequence repeated itself several times until the aircraft came to a stop on the runway.

Once all motion ceased, I secured the engines, unbuckled, opened the canopy, and egressed the aircraft. I didn't hesitate when I jumped from the LEX to the ground; I just didn't want to be anywhere near the aircraft. I jogged to the side of the runway and looked over my shoulder. The Hornet just was sitting there, silent, motionless, and almost peaceful. As the crash crew arrived, I walked toward them, and they greeted me with a relieved smile.

I walked away from this incident without a scratch. It wasn't pilot skill, circumstance, or dumb luck that afforded such an outcome, but the culmination of a lot of hard work and valuable inputs from many people. Sometimes, we in the single-seat community think that crew resource management may not apply to us like it does in other communities. That thought process couldn't be further from the truth. A lot of people from a lot of different platforms were involved throughout the various stages of this emergency. Each knew his role and effectively played his part, offering only pertinent information at the appropriate time. Those who were not involved remained observers and only spoke when the situation warranted it.

This scenario shows how CRM is supposed to work and confirms why we preach CRM concepts over and over, time and time again. Quite simply, it works.

Lt. Shuster flies with VFA-146.

Mishap-Free Milestones

VFA-27	80,000 hours	18 years
HSM-41	130,000 hours	23 years
HMM-161	50,000 hours	11 years
HMH-362	65,000 hours	22 years
VP-46	288,000 hours	42 years
VP-69	75,302 hours	25 years
HMH-466	60,000 hours	21 years
VMA-223	60,000 hours	16 years

Special recognition:

Aviators flying the MH-60S have completed 100,000 hours of mishap-free operations, a first in Naval helicopter aviation.

SK1 Joyce Ingle recently retired from VR-58. She had amassed more than 16,000 hours of flight time during mishap-free operations in C-9A/B and C-40A aircraft. Well done.

SK1 Joyce Ingle

Back Pain *in the* Rotary-Wing Community

By Lt. Paul Sargent, M.D. and Lt. Angela Bachmann, M.D.

Eliminate or reduce back pain and you get:

1. Decreased time lost from work
2. Increased combat readiness
3. Decreased attrition rates, based on chronic pain and injury
4. Decreased healthcare costs
5. Overall improvement in your health, quality of life, and operational effectiveness

While most aviators and aircrew complain that back pain is an occupational hazard, the truth is that it's an overwhelming problem for aviators and non-aviators, alike. Back pain is the fifth most common reason for a visit to a physician and is the second most common cause of work absenteeism.

Back pain is a problem across all aviation communities, but, by many accounts, it's worse in the rotary-wing community. Long hours in the cockpit, ineffective seat padding, poor posture, NVG use, and constant vibration all may contribute to strain and fatigue in the lumbar muscles. For aviators involved in a mishap, the sudden deceleration can create overloading stresses, resulting in an acute back injury, causing chronic pain for the rest of their career and beyond. The pain can be a mild, intermittent annoyance, or may be so debilitating it affects the safety of flight. Besides being a problem for aviators, back pain also can affect squadron operations.

Types of Back Pain

Back pain can be classified into three categories:

- localized, which is confined to just the back,
- radicular, which can originate in the back but radiate to the limbs, or
- referred, which comes to the back from another area, typically caused by a problem with one of the internal organs.

Most back pain is caused by strain and fatigue, rather than a specific medical illness. All helicopter aviators are familiar with the term "helo hunch," which

Naval Safety Center photo by Dan Steber

Most **back pain** is caused by **strain** and **fatigue**, rather than a specific **medical illness**.

refers to the bent-forward posture most pilots assume while flying. In the lower back, this posture converts the spine's normal S-shaped curvature to more of a C-shape, which is unstable and results in excessive fatigue. The front edges of the vertebrae are forced together, pulling the posterior edges apart and putting uneven pressure on the intervertebral disks. The pilot is forced to hyperextend the neck (nose up) to see out the windscreen. Both of these unnatural positions lead to fatigue, overload and pain.

When the helo's vibrations are factored in, the situation becomes more complex. Injury leads to inflammation, and chronic inflammation can lead to changes in the shape of the bones and more chronic low-back pain.

The most common effects of back pain on flight operations are decreased concentration, shortened or hurried missions, and, to a lesser degree, cancelled flights.

Treatment Options

See your flight surgeon whenever you have back pain. The flight doc will carefully interview you, checking intensity, frequency, timing, and neurologic involvement. If the pain is relatively new, without neurologic symptoms or a history of significant trauma, the physician often will treat the symptoms with non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen or naproxen. Bed rest also may be prescribed for a time not greater than 24 hours. The aviator should be able to resume flight and may not require a waiver.

If the pain is persistent for several weeks, without relief, the physician often will obtain X-rays to rule out underlying medical causes. If neurologic symptoms are present (radicular pain, numbness, or weakness), the physician may order more advanced radiologic studies, like a CT or MRI scan. If more severe nerve damage is suspected, the flight surgeon even may request an electromyelogram (EMG) study to identify the extent of the injury.

Ongoing, nonradicular back pain may be treated with occasional NSAIDs, massage therapy, physical therapy, chiropractic manipulation, and, if necessary, steroid injections or surgery. If the pain is persistent enough to merit invasive treatment, the flight surgeon will need to take the aviator off flight status to complete treatment.

The NAMI Whammy

The Naval Aerospace Medical Institute (NAMI) in Pensacola, Fla., provides guidelines that naval flight surgeons are expected to follow in returning ill or injured aviators to flight status. If the pain is not alleviated within 10 days of treatment with NSAIDS, the aviator will require a waiver to remain on flight status.

If the pain is caused by a more serious, underlying condition, the requirements are more stringent. While

a bulging disk or other nerve problem may ground you for six weeks, a surgical treatment may result in a six-month grounding. A return to flight status also requires passing the physical-fitness test. Again, consult your flight surgeon for more details.

The Price of Safety

Modifying the cockpit can improve the ergonomics and reduce back pain, but modifying cockpits often is not economically feasible for operational aircraft. However, many new airframes (AH-1Z, UH-1Y, MV-22) present an opportunity to look at ergonomic changes to improve aviator posture, reduce the risk of pain, and improve the overall safety of these aircraft. Doing nothing costs nothing, but allowing most helicopter aviators to suffer from back pain does have very real costs.

The Marine Corps has around 3,000 rotary-wing aviators, and, if 80 percent of them suffer with back pain, the annual cost has been estimated to be $3.6 million. This cost does not even take into account back pain among Navy rotary-wing aviators. Consider the high cost of replacing an aviator who is permanently grounded by pain. Also, consider the loss of an aircraft because of a pilot's fatigue or distraction from back pain.

Prevention

Prevention is the best approach to most back pain. Engineering modifications to the aircraft may prevent many back problems, but the costs involved make this option unlikely. However, several actions can prevent or decrease the amount of back pain suffered by rotary-wing aviators: posture modification, strength and stretching regimens, and personal-equipment modifications.

Good posture reduces the stress applied to the soft tissue surrounding the spine. Maintaining the normal "S" curve of the spine would reduce the probability for low-back pain. We do not have a formal training program to teach aviators the benefits of good posture while flying.

Some experts have suggested a flight-specific stretching and strengthening regimen for the muscles of the trunk as a way to stabilize the spine, increase flexibility and prevent back pain. Specific exercises are complicated and should be taught by a physical therapist. However, spending five minutes before and after each flight stretching the lower back should help. Go to the gym, and slowly and progressively strengthen your abdominals, hip flexors, and back extenders to prevent or alleviate some pain.

Personal-equipment modifications, such as lighter helmets, lighter NVG gear, and seat pads, also may decrease back pain. Some communities already have experimented with lumbar-support cushions. Many different commercial products are available, several of which have been granted flight clearances by NAVAIR.

Conclusion

Though back pain among rotary-wing aviators is a well-known problem, not enough has been done to alleviate it. The problem affects not only aircrew but also squadron operations, combat readiness, and safety of flight.

Because of the need to maintain high physical standards, the treatment options available to aviators are more limited than those available to the general population, so prevention is a paramount concern. Ideally, cockpits would be redesigned for better ergonomic performance. Seat-cushion modification, to include lumbar support, is a high priority. Aftermarket lumbar supports and seat pads issued by squadrons have proven to be an inexpensive way to reduce back pain. A flight-specific training program, or back school, involving physical therapists to instruct proper posture, strengthening and stretching exercises, may be another low-cost way to address this problem.

There is no quick and easy way to eliminate a problem that has plagued rotary-wing aviators for so many years, but with careful attention, sustained focus, and further research, much progress still can be made.

Lt. Sargent is with HMLA-267, and Lt. Bachmann is with HMLA-169. Both are flight surgeons.

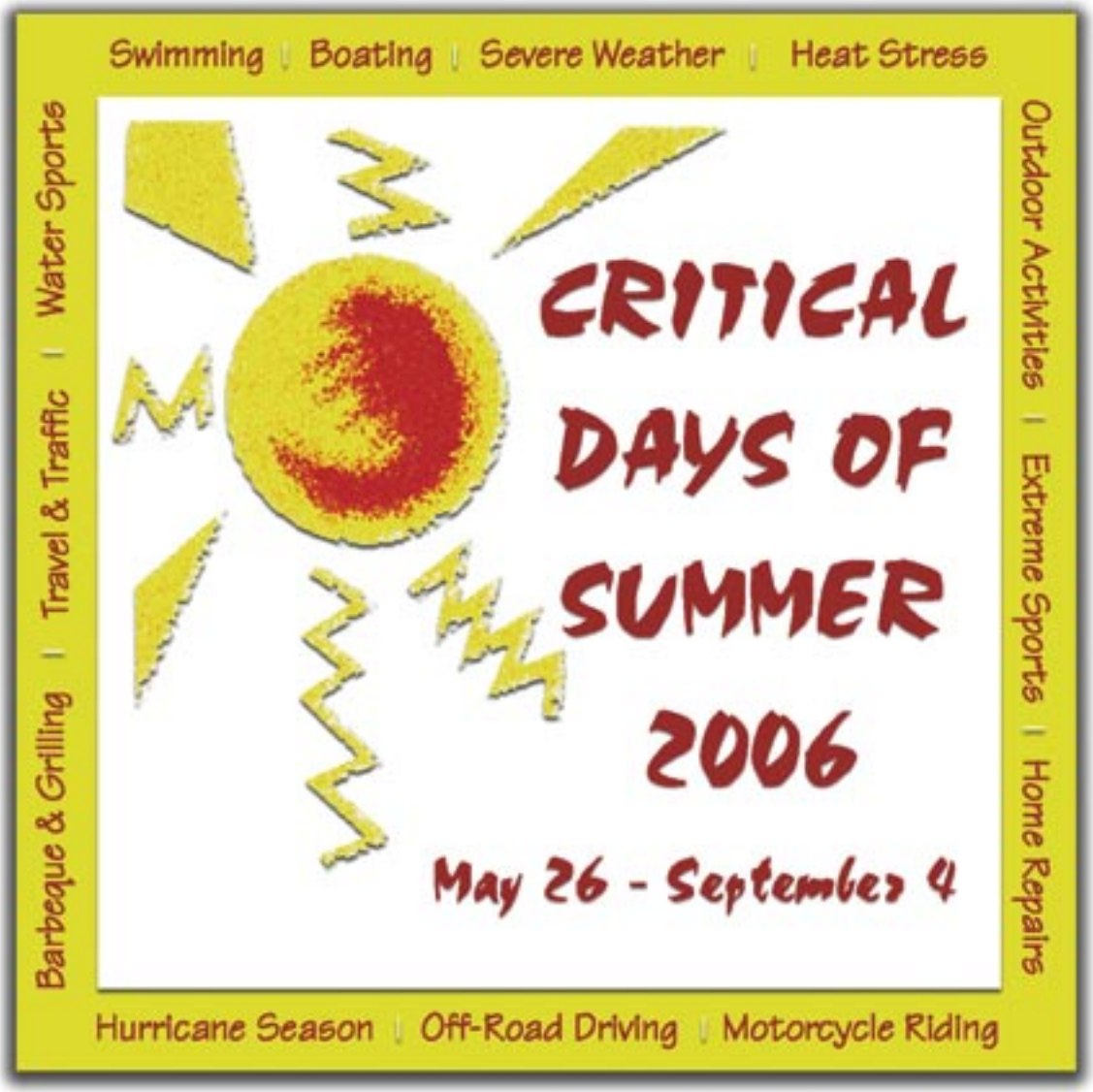
Consult with your local aeromedical safety officer (AMSO) for all medications, equipment or flight gear. A more detailed article by the authors on back pain can be viewed at: http://*www.safetycenter.navy.mil/aviation/articles/back_pain.htm—Ed.*

TOOLS YOU CAN USE

Campaign Tools
CDS Campaign Kit
Fact Sheets
Activity Calendar

Multimedia
Presentations
Audio/Video
Posters
Logos & Slogans

Outreach
Partnerships
Ad Campaigns
Success Stories



Contact the Motor Vehicle Division at 757-444-3520 ext. 7602 or request your Critical Days of Summer (CDS) Campaign Kit at NRFK_SAFE_PAO@navy.mil

Will You Survive?

Read about your shipmates' survival stories. Learn how a mother copes with her son's death. Know the rules of the road. Read all about it in the Spring 2006 issue of *Sea & Shore* Magazine.

DON'T WAIT . . . BUILD YOUR CRITICAL DAYS OF SUMMER CAMPAIGN NOW.

GET YOUR TOOLS @

www.safetycenter.navy.mil/seasonal/criticaldays.htm

WHENEVER WE TALK ABOUT A PILOT WHO HAS BEEN KILLED IN A FLYING ACCIDENT, WE SHOULD ALL KEEP ONE THING IN MIND. HE CALLED UPON THE SUM OF ALL HIS KNOWLEDGE AND MADE A JUDGMENT. HE BELIEVED IN IT SO STRONGLY THAT HE KNOWINGLY BET HIS LIFE ON IT. THAT HIS JUDGMENT WAS FAULTY IS A TRAGEDY, NOT STUPIDITY. EVERY INSTRUCTOR, SUPERVISOR, AND CONTEMPORARY WHO EVER SPOKE TO HIM HAD AN OPPORTUNITY TO INFLUENCE HIS JUDGMENT, SO A LITTLE BIT OF ALL OF US GOES WITH EVERY PILOT WE LOSE.

—AUTHOR UNKNOWN

For more information on Crew Resource Management visit:
https://wwwnt.cnet.navy.mil/crm/ or call the CRM schoolhouse at:
(850) 452-2088 or DSN 922-2088.