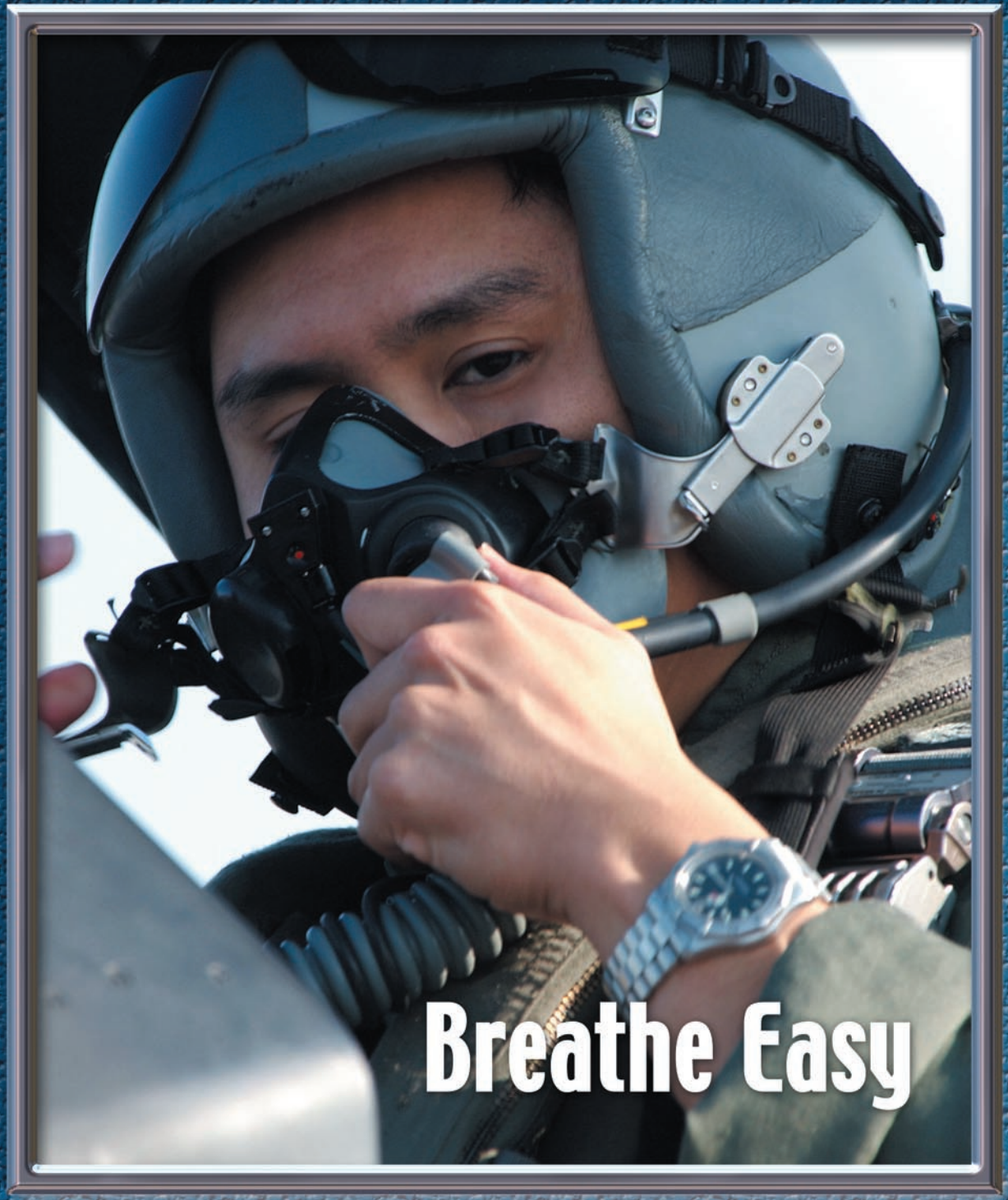
UNITED STATES AIR FORCE
FSM
APR 2005
FLYING SAFETY MAGAZINE



Breathe Easy

FSM
FLYING SAFETY MAGAZINE

AIR FORCE RECURRING PUBLICATION 91-1

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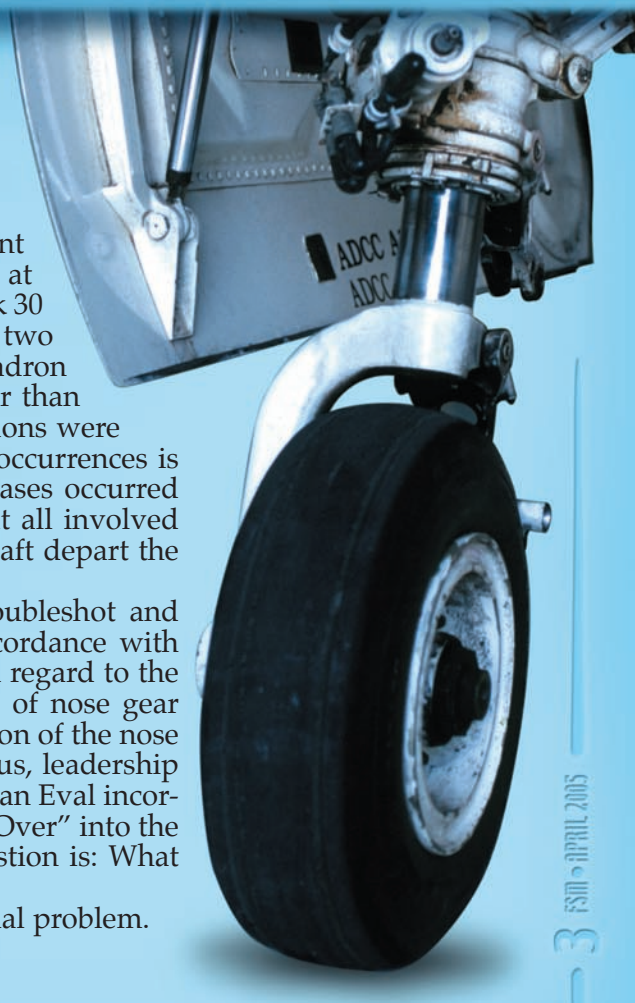
SAFETY SAGE

HEADS UP ON F-16 NOSE WHEEL SHIMMY

The HQ AFSC received a High Accident Potential (HAP) message from the folks at the 8 FW. Between 26 Dec 04 and 25 Feb 05, they had seven Block 30 F-16Cs experience significant nose wheel shimmies on landing, two of which nearly resulted in runway departures. Wing and squadron leadership, plus Flight Safety, were concerned about the higher than normal frequency of these events. Accordingly, these malfunctions were categorized as HAPs and investigated. The full text of all the occurrences is available by accessing AFSAS mishap #372912. Some of the cases occurred during braking, others when the nose gear touched down, but all involved nose wheel shimmy. The unit was lucky in not having an aircraft depart the runway, and was able to prevent damage to any aircraft.

What is this Wing doing about this issue? Maintenance troubleshot and corrected all but one of the malfunctioning nose gears in accordance with the T.O.s. There was no single root cause or trend identified. In regard to the operators, the pilots were briefed of the high occurrence rate of nose gear shimmies. Special emphasis was put on close pre-flight inspection of the nose gear and considerations for handling nose-gear-related EPs. Plus, leadership incorporated these incidents into the daily flying mass briefs. Stan Eval incorporated "Nose wheel Steering Failure" and "Nose wheel Hard Over" into the squadron's monthly Emergency Procedures Training. The question is: What are you going to learn from the lessons learned by this unit?

Thanks for making the rest of the Air Force aware of a potential problem.



SAFETY Q&A WITH SENIOR LEADERSHIP

LT GEN MICHAEL W. WOOLEY
Commander, Air Force Special Operations Command

USAF Photo

FSM: As Commander of AFSOC, what are your priorities for improving our safety efforts?

The easy answer is "people first." But what does that mean? It means I and all of our command leaders must ensure we provide the training and resources to allow our warriors to complete the mission safely.

To add to this is the home life of our troops. We must ensure when we are back at home station that the positive risk management decisions and lessons learned on the job carry over to the choices we make during everyday living. Bottom line, we are Airmen 24/7 and must protect ourselves from mishaps both on and off duty.

AFSOC personnel must practice personal risk management (PRM) off duty. Seventy-five percent of our reportable ground mishaps occurred off duty. These losses have a direct impact on our ability to wage war and meet our mission goals.

FSM: What do you believe we as AF members can do to improve our safety record in flight safety?

As you know, AFSOC's size nearly doubled with the inclusion of the rescue warriors into our command. In order to meet Secretary Rumsfeld's 50 percent reduction challenge, AFSOC's numbers would have to stay almost linear. In fact, from FY03 to FY04 our command's Class A numbers have decreased 33 percent and Class Bs have decreased 25 percent. Our Class A numbers, for our new size, have decreased by 66 percent and Class B numbers have decreased by 62 percent.

Don't get me wrong, I know the Air Force has transitioned to sustainment operations and more personnel are home than during the height of OEF and OIF, but we, as the Air Force, need to continue to stress proper implementation of ORM.

FSM: What do you believe we can do to improve our safety record in POV mishaps?

I look to supervision at all levels to step up their involvement with their subordinates. Setting a positive example is a first step. It does no good for our supervisors to hold "roll calls" and hand out safety tips, and then have the supervisors involved in mishaps due to speeding, DUIs or poor driving decisions. Second, I look to commanders and supervisors to identify individuals who need specialty training like motorcycle or drivers improvement training, and then ensure they are scheduled and complete these training opportunities. Finally, I look to supervisors to enforce corrective action (either through performance assessments or administrative actions) when individuals continue to show poor decision making and lawlessness. It amazes me when I read some mishap reports that identify the mishap individual as a habitual violator of traffic laws and yet they continue to receive outstanding performance reports until their mishap.

Next, I challenge all AFSOC warriors to be mentors. This can be as simple as taking the keys if someone's been drinking and getting ready to drive. Or it can be talking over a troop's long distance travel plans before they depart on vacation. Simply taking the time to look out after one another is so important, yet undervalued.

FSM: What special safety concerns are posed by our war efforts?

Ops tempo is a constant concern. Our folks maintain a higher than average deployment rate than the rest of the Air Force due to our special capabilities and limited resources. So, we have folks giving 110 percent while deployed, and when they get home we run the risk of continuing to live the "go-go-go" lifestyle. Issues that may be assessed as acceptable risks while overseas may not be acceptable while back in garrison. We must strive to get our folks to readjust their mindsets from "win at all cost" to looking at managing risks in a daily stateside operation.

Returning from unregulated driving conditions and throwing them into our driving environment poses special problems. Personnel deployed may not drive at all. Or they may drive, but in some of our locations, there are no roads or enforced laws. Driving habits must be adjusted.

Additionally, we have seen our sister units returning from real world deployments and failing to conduct a thorough reconstitution of all their gear. In one case, members returned with live small arms ammo and then months later, during a predeployment exercise, they accidentally mixed up the live ammunition with blanks and proceeded to fire them at their fellow unit personnel acting as EET aggressors. Thankfully, no one was hit, but it points to the real problem of complacency after deployments. We have to stay on guard and follow our procedures to include reconstitution.

FSM: Speaking of our war efforts, do you see any special concerns with the support side of aviation—our maintainers, weapons, security, supply, transportation and the rest of the Air Force?

Let me first say AFSOC's weapons and explosives safety personnel had zero reportable mishaps in FY04…what a great accomplishment.

Our personnel are obviously implementing ORM to mitigate risk. If you read our Safety magazine, *Focus*, the personnel submitting articles are consistently referencing the ORM techniques they employ to reduce mishap potential. I can't think of a better gauge than our own warriors' testimonies of ORM.

In my ORM letter to all members of AFSOC, I stress ORM implementation at all levels from commanders and chiefs to our youngest Airmen. We must take care of our greatest assets: our air commandos and rescue warriors.

FSM: What role do you believe supervisors and/or co-workers play in ensuring our Air Force works and plays safely?

As I have mentioned, the commander's/supervisor's role is absolutely critical. They set the standards and, through their actions, establish the tone of the unit's safety mindset and compliance. Leaders who cut corners concerning safety send the hypocritical message to their troops similar to the old "do as I say, not do as I do" policy. This cannot be further from the truth. I challenge all supervisors with ensuring safety is second nature throughout our AFSOC culture.

FSM: What role do you see ORM playing in our on- and off-duty safety efforts?

ORM is a proven means to protect people and resources. Our senior leaders have emphasized protection of resources through ORM practices. Everyone must understand that ORM applies in the cockpit, on the flightline, in the back-shop, in the office, at home and on the road; it applies to all AF personnel all the time.

It is and shall continue to be interwoven and second nature. Operational Risk Management is a commander's tool to ensure we meet the operational mission by eliminating/mitigating unnecessary risks.

As ORM spreads throughout our culture I want it to become a bigger part of off-duty as it is in our on-duty activities. For example, an Airmen coming off a week's worth of 12-18 hour night shift should look at his cross-country drive with a close eye to the potential risks…should he sleep before starting the drive? Can someone else share the driving duties? Is the vehicle in top shape? What is the weather going to be and will he need to bring cold weather gear? All of these are simple examples of ORM in our off-duty use, also known as personal risk management (PRM).

FSM: What do you see as the greatest safety problem with reference to off-duty activities?

Drinking and driving, not using seatbelts and speeding—bar none. It astounds me that even in today's Air Force we still have people who drink and drive and others who "forget" to wear their seatbelts, or are found consistently speeding. It's briefed at all levels of command and is pushed throughout the year. Yet statistics show we (the Air Force as a whole) suffer 68 percent of our POV fatalities with members who were driving while under the influence or speeding.

FSM: When you have completed your tour as commander of AFSOC, what would you like to have accomplished?

Reducing our off-duty mishap rates to meet the SECDEF's 50 percent reduction goal. It's a hard issue to accomplish since, statistically speaking, the Air Force is one of the safest places to work compared with civilian industries. Yet we do continue to suffer losses. Off-duty losses due to poor decisions are the most controllable, and therefore, provide the greatest chance to eliminate or mitigate. Losses due to combat operations are a lot harder to control. With all that said, the AFSOC goal is zero mishaps. One life lost or injury is one too many—one airframe lost or damaged is one too many. There is nothing we do at our home station that is worth losing a life or airframe over.

I would like to close with a reiteration of the SOF Truths:

- Humans are more important than hardware.
- Quality is better than quantity.
- Special operations forces cannot be mass-produced.
- Competent special operations forces cannot be created after emergencies occur. ✶✶✶

USN Photo by Photographer's Mate 1st Class (AW/SW) Bobby R. McRill

MAJ BRIAN T. MUSSELMAN
HQ AFSC/SEFL

(Editor's Note: The Air Force Safety Automated System (AFSAS) notations in this article refer to reports in the AFSAS. If you have an AFSAS account, you may look up the referenced mishaps.)

Remember your last physio refresher? During the course of the discussion, there was probably mention of Class A aviation mishap data with an emphasis on the contributions of human factors. Due to increased emphasis on human error causation over the last decade, discussion of this topic is important; however, there is another component of military aviation still contributing to aviation hazards: human physiological responses to flight. Confused? You shouldn't be! I am talking about hypoxia, decompression sickness, trapped gases, smoke and fumes, etc. In FY03-04, there were 58 Class A mishaps with a rate of 1.21 per 100,000 flying hours. During this same timeframe, the numbers for reported physiological incidents is somewhat surprising. These incidents are reported as Class E (Physiological) and in some cases Class E (Miscellaneous).

Feeling All Warm And Fuzzy

During FY03-04, hypoxia was reported on 59 separate occasions. Do you remember your cardinal signs of hypoxia? These 59 folks did! You may be thinking that these events are limited to UPT students. During one flight (AFSAS 305792), an F-15C pilot was setting up for his second maneuver and began to feel hypoxic. The pilot had tingling in his fingers, slurred speech and felt as though his body would not do what he wanted it to. He noticed the master caution light was illuminated and the oxygen gauge decreased to zero, paused, then started to spin-counter clockwise. The pilot gang-loaded the regulator and confirmed that his altitude was correct with other members of the flight. His symptoms worsened, so he activated the emergency oxygen system and disconnected from the aircraft oxygen supply. After two minutes his symptoms subsided, and he performed an uneventful landing. It was later discovered that a valve on the oxygen regulator was not allowing oxygen to flow properly. Having experienced his symptoms in the chamber, this pilot was able to identify hypoxia and implement the proper corrective actions.

The hazards of hypoxia are not unique to fighter/trainer aircraft either. An EC-130H (AFSAS 325957) crew departed for an OCONUS flight, and as they climbed through 10,000 feet MSL the pilot noticed a normal indication on the cabin altimeter. After receiving clearance, the pilot began his climb to a cruising altitude of FL210. As the aircraft passed through 17,000 feet MSL, the pilot felt what he described as "warm and uncomfortable" and noticed that the flight deck seemed "unusually quiet." The flight engineer also recalled losing his color vision. The pilot noticed that the cabin altimeter was indicating 17,000 feet MSL and directed the crew to go on 100 percent oxygen. Upon recognizing possible hypoxia symptoms, the pilot was able to correct what could have turned out to be

a bad situation. The crew eventually discovered a stuck valve in the cargo compartment under-floor heating system which was preventing the aircraft from pressurizing. The pilot turned off the heat and was able to pressurize the aircraft. Every AF crewmember is trained to recognize his or her hypoxia symptoms in a controlled environment to facilitate recognition and recovery during an actual flight.

Get Bent

We do not currently induce decompression sickness (DCS) in refresher students; however, this doesn't mean we haven't thought about using it as an incentive for students to remain coherent during the classroom instruction! Although some may think that DCS is no longer a hazard in modern military aviation, there were 12 reported DCS cases during FY03-04. Separating myth from reality, only four of these reported cases were in the U-2. DCS is a known hazard for the U-2 pilots and they receive additional training on DCS and take preventative measures prior to flight. What about the other eight cases, though? The majority of the cases occurred in fighter/trainer aircraft, but there was one reported DCS incident in a C-130E (AFSAS 307587). The crew was flying local High Altitude Low Opening (HALO) training missions. The first day, drops were between 13,000 and 14,500 feet MSL. On day two, the first flight was to 16,500 feet MSL and the second flight was to 17,900 feet MSL. There is only a limited possibility of experiencing DCS below FL180; however, the flight engineer presented with symptoms two and a half hours after landing and was treated for DCS at a local hyperbaric chamber. The flight engineer's oxygen source and life support equipment were in proper working condition and he met the pre-breathe requirements for the flight. Despite this, he still manifested symptoms of DCS, a physiological response which has many contributing factors and is sometimes difficult to prevent and/or diagnose. When preemptive measures are not enough, training in recognition of DCS symptoms is invaluable. Another physiological concern for aircrew is trapped gases in the ears and sinuses.

Ears Is What I Am Talking About

There were 51 Class Es (Physiological) reported during FY03-04. Once again, aircrew experience pressure change in the altitude chamber during physiological training and are taught how to compensate for this change. We all know that the number one way to prevent trapped gases in the ears and sinuses is to avoid flying with a cold or congestion, but much to my chagrin there were more reports than necessary that said something along the lines of, "Crewmember felt sick prior to flight, but thought he could make it." When's the last time you were questionable and flew anyway?

One particular incident involved a crewmember on an RC-135 (AFSAS 306924) who presented with sinus pain shortly after takeoff. Level-off and Afrin did not relieve the pain and the pilot returned to home station. The crewmember admitted to having flu-like symptoms prior to the flight. After the flight surgeon spoke with the rest of the squadron about the importance of not flying while congested, several crewmembers reported to the flight surgeon's office to be placed on DNIF for cold symptoms.

On another flight, an unqualified crewmember flew in the backseat of an F-16 (AFSAS 320107). During a rapid descent from FL400 to 15,000 feet MSL, the crewmember was unable to keep up with pressure changes. He felt pain and pressure in his left ear, but did not inform the pilot of any ear problems, as he did not want to interrupt the flow of the flight. If this guy had notified the pilot in a timely manner, it would have prevented or minimized his injury. After landing, the crewmember still did not report any ear problems! In fact, he waited approximately 24 hours before seeing a flight surgeon. During examination, the flight surgeons discovered blood behind an intact left eardrum. The crewmember had no indication of pre-existing medical conditions (like a cold) that could have contributed to the barotrauma. The fluid was cleared over five days with systemic medication. A follow-up examination, five days later, showed a full recovery and the crewmember was returned to flight status.

This report also mentioned that due to a couple of barotraumas within this wing, awareness training for local aircrew would be worthwhile as they approached the flu season. Training should discuss communication of physiological issues between the aircraft commander as well as unqualified crewmembers and passengers. Early recognition in any physiological incident is crucial to proper treatment. This individual could probably have avoided pain and DNIF by leveling the aircraft and providing himself time to adjust to the pressure change. Do not be afraid to mention a problem…because, let's face it, you are only human.

Smokin' A Slim Jim On Final

The final category discussion is smoke and fumes. A smoke and fumes incident should be reported as a Class E (Physiological) if there are "symptoms or health effects caused by toxins, noxious, or irritating materials such as smoke, fumes (including carbon monoxide) or liquids." If there are no symptoms or health affects, but "a member of the crew executed any portion of an emergency checklist in response to smoke and fumes," then the incident should be reported as a Class E (Miscellaneous). There were 50 reported Class Es (Physiological) related to smoke and fumes during FY03-04. Surprisingly enough, we reported 495 Class Es (Miscellaneous) related to smoke and fumes during the same time.

In a two-year period, 50 aviators had symptoms or health effects from smoke and fumes and the potential for the same result existed on 495 occasions. The numbers were split down the middle… about half of the incidents were in fighters/trainers and the other half in heavies.

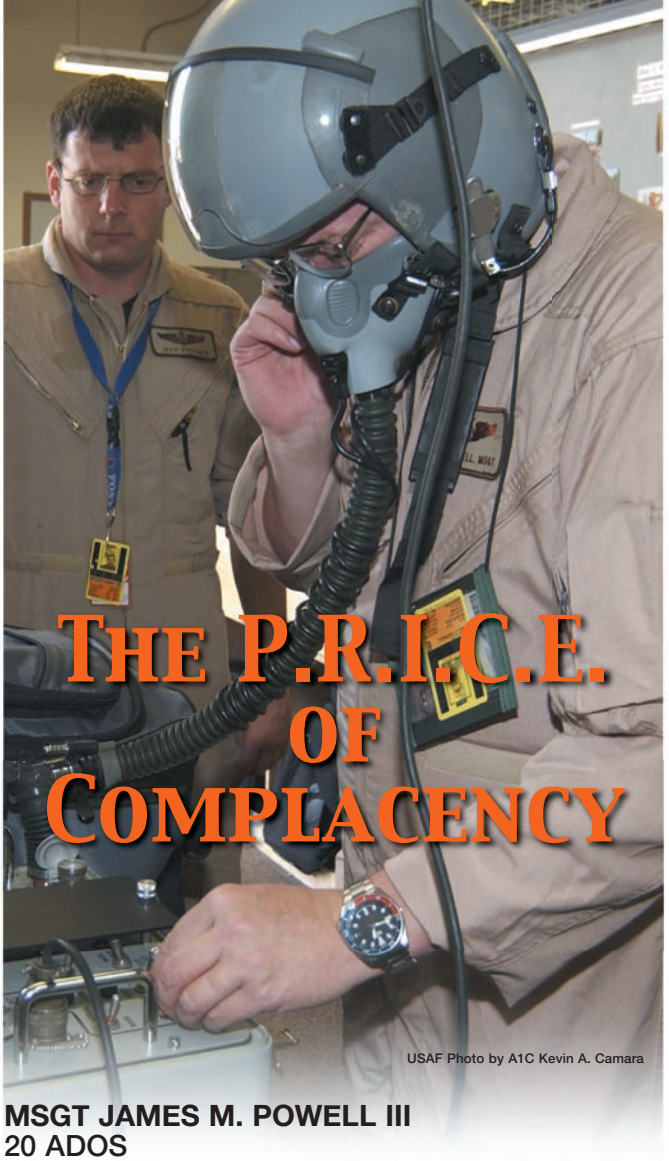
An F-15C pilot (AFSAS 305727) was No. 2 of a four-ship, and all actions up through engine start were uneventful. While taxiing, the event pilot noticed smoke and fumes from the right console. The pilot gang-loaded the oxygen regulator, turned into an empty parking spot, declared an emergency and shut down the aircraft. During the investigation, maintenance discovered what appeared to be a bacon bit in the interior light power supply. That's right, a bacon bit. This was the aircraft's first flight after returning home from a deployment. It seems the pilot consumed some beef jerky on the return flight and unbeknownst to him, a piece fell in the interior lights power supply and heated up sufficiently to generate smoke and fumes in the cockpit. Good choice of nutrition, bad oral hygiene!

USAF Photo SrA Karolina Gmyrek

A C-5B aircraft (AFSAS 368799) experiencing smoke and fumes on climbout was not as comical. Passing 8000 feet, Loadmaster 1 reported a burning smell, rising temperature and a shallow layer of transparent smoke along the top of the troop compartment. The flight engineer scanner discovered smoke in the environmental compartment coming from the right air conditioning system duct. A different flight engineer at the panel confirmed a high temperature (approximately 120 degrees F) on the troop compartment temperature gauge, shut down the right air conditioning system and adjusted the troop compartment temperature control valve to full cold. The evaluator loadmaster and instructor loadmaster promptly moved from the flight deck to the troop compartment, confirming smoke and high heat in the cargo compartment. The crew ran the appropriate checklist and donned oxygen masks. The crew assisted the passengers in donning emergency passenger oxygen systems while one crewmember restated donning instructions over the public address system. The pilot declared an emergency and performed a heavyweight landing. During taxi back, the tower reported smoke from the left aft landing gear and the crew stopped on the runway to evaluate the smoke. After confirming that the smoke was created by a hydraulic leak on the left aft main landing gear, they ran the Emergency Ground Evacuation checklist. The crew egressed all passengers (including infants and elderly) uneventfully. This crew performed checklists appropriately, cared for the passengers, communicated effectively and was able to deplane all individuals without incident and should be commended for their reactions in this potentially deadly incident.

Aerospace Physiology original and refresher training provides valuable information to assist aircrew in preventing mishaps. This article covered several of the Class E (Physiological) categories, but is not all inclusive. There are other physiological concerns in aviation that still require training and discussion. All physiological manifestations discussed during chamber training are ever-present in aviation. What are your hypoxia symptoms? Are you drinking enough fluids? What did you eat for lunch? How much sleep did you get last night? Do your passengers understand how to compensate for pressure change? What will you do if you recognize smoke and/or fumes in your aircraft? What flight conditions set you up for Spatial Disorientation? These are important questions you must ask yourself if you are to continue your career as an AF crewmember. The answers may very well prevent pain, DNIF or the next mishap. Fly safe! ✈

Maj Musselman served as an Aircraft Maintenance and Munitions Officer from 1994-1999. He cross-trained into Aerospace Physiology and served a tour at Beale AFB. He is currently assigned to a Human Factors Fellowship at the Air Force Safety Center.



USAF Photo by A1C Kevin A. Camara

The P.R.I.C.E. of Complacency

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After hours of attending briefings and mission planning, you are ready to finally step out to the flightline. Trying to take care of all your personal needs prior to the mission, you suddenly remember that you have not even stopped by Life Support to pick up your personal equipment. You rush over to your peg, grab all of the items you need for the flight and head straight for the crew bus. Once at your aircraft you immediately start your preflight and get yourself situated for the takeoff. Pressed for time, you continue to monitor the clock. Only a few minutes left before you must start taxiing and you haven't even strapped in yet. After you finally strap in, the crew chief waits for you to give him the thumbs up. You have still not been able to complete a preflight on your life support equipment. Knowing that everything worked just like it was supposed to the day prior, you blow off doing a 15-second P.R.I.C.E. check and give a thumbs-up to the crew chief.

Unfortunately, this situation happens more than you would like to think. With so much emphasis being placed on checking vital oxygen equipment, why do we continue to have mishap reports citing hypoxia and oxygen equipment failures as a chief cause? Is there too little emphasis on oxygen discipline and equipment checks? The objective answer is no. Aircrew members get extensive training on oxygen equipment during initial and refresher training. The subjective answer is complacency.

For any member who has attended aircrew training, inspections of the oxygen equipment is taught in terms of an acronym known as the P.R.I.C.E. (Pressure, Regulator, Indicator, Connector and Emergency) check. As with anything taught, if you don't use it properly or at all, it's useless, and the P.R.I.C.E. check usually gets the most attention and use immediately after it's taught. This is especially true of new aircrew members fresh out of training. This honeymoon continues until they become familiar with their particular environment and have a couple of hours under their belt without any incidents.

This is where complacency gets its start. It is human nature to get comfortable with situations and the environment as we spend time in them without incident. Our focus shifts from relying on our training to saving time. Then our procedures become loose, and we assume the best instead of preparing for the worst. We soon forget all the things we learned in initial physiology training, such as assuming that the previous guy will not report equipment malfunctions to Life Support, everything will not always be in working order when you reach the aircraft, and that the equipment is considered "fly to fail."

Attitudes begin to shift from checking your equipment before and after every flight to just checking it occasionally. With each passing hour of flight, this feeling turns into outright complacency when finally it gets so bad that it takes the member having a "There I Was" article in a safety magazine. This is sadly what happens in many situations reminding aircrew members to fall back on good training habits.

So, what can be done to break this cycle of complacency? The importance of oxygen equipment checks is formally addressed in AFI 11-202, Volume 3, *General Flight Rules*. One of the most important things to remember is that the Life Support equipment you are provided is not only there for you on the good days. It is primarily there for you in the event of an emergency. We don't like to think that mishaps can happen to us. But that attitude can place you in danger by not being fully prepared for the worst.

Take the time to perform a thorough P.R.I.C.E. check before, during and after each and every flight—and keep in mind that someday this little acronym just might save your life.

SEMI-RAPID DECOMPRESS

CAPT GREG "HOSER" CRAVEN
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Any good "There I Was" aviation story normally has some learning points to take away by the time the story is finished, and I hope you'll find some here. When my "There I was" story took place, I was a Check Pilot, flying the T-38A Talon with the 50th "Strikin Snakes" Flying Training Squadron stationed at Columbus AFB, Miss.

OK, so "There I was..." It was 24 Sept 01. The flight was an N-5490 navigation checkride. Students in the T-38 phase of training have four checkrides during their six months flying the Talon, and the navigation check is the last one. This particular flight normally consisted of an out-and-back profile, with the student pilot (SP) occupying the rear cockpit (RCP) and flying with a vision-restricting device, commonly referred to as "The Hood." I occupied the front cockpit (FCP) and acted as the safety observer. The SP is required to perform numerous tasks under "The Hood," including in-flight checks, holding, and precision and non-precision approaches, just to name a few.

The planning and briefing were all uneventful, and before we stepped to the jet I reminded the SP of the requirements needed to complete the checkride, as well as what he could expect out of me as the evaluator. The weather was severe clear and visibility was excellent, a far cry from the "Columbus Milk Bowl" of haze that we had become accustomed to flying in. The SP received Acadiana Regional as his base, and he planned to fly straight to his destination and fly both required approaches. Cruising altitude was planned for Flight Level (FL) 350.

Passing 10,000 feet on departure, the SP started running the climb check. One item to be checked at this time is the cabin altimeter, to ensure that your cabin pressure is functioning properly. Using bleed air from the engines, the T-38 would maintain a cabin pressure of your current altitude from sea level to 8000 feet, and would then maintain 8000 feet +/- 1000 of cabin pressure as you climbed to FL 230. Once above FL 230, the pressure would be maintained at a five pounds per square inch (psi) differential from the outside air pressure. A rule of thumb formula we used was: Current altitude minus 6000 feet, divided by two, with a +/- 2000-foot buffer. So, at a cruising altitude of FL 350, the cabin pressure would be 14,500, +/- 2000 feet. Since the cabin altimeter is only located in the FCP, the SP was required to ask the pilot in the FCP what it was reading. The cabin pressure was solid at 8000 feet, and we continued our climb to FL 350, which was reached with no problem.

About halfway to our destination, the SP coordinated for an enroute descent, which was approved. As soon as the throttles were retarded, my ears popped and I felt my mask get pulled away from my face slightly, a feeling I had experienced many times during over-the-top maneuvers such as loops and Immelmans. It was normally caused by the aircraft having a hard time maintaining the cabin pressure while it was in a high altitude/slow speed

ION AT FL 350

USAF Photo
Photo Illustration by Dan Harman

condition. I immediately looked at the cabin altimeter, which was now at 18,000 feet and continuing to climb. I instructed the SP to push his throttle up a little, fully expecting that a little extra bleed air from the higher rpm would fix the problem. I looked at the cabin altimeter again and it was now at 20,000 feet and rising faster. I again instructed the SP to push his throttles up, this time to full military (Mil) power, glanced at the cabin altimeter again, which was now quickly approaching 25,000 feet.

At this time, I took control of the aircraft, rolled inverted, pulled down to 45 degrees nose low, extended the speed brakes and started an emergency descent. I then gang-loaded my oxygen regulator and instructed the SP to do the same. I then made a quick radio call to the center controller, something along the lines of "Poison 15, emergency descent, stand by." The controller acknowledged our emergency call and informed us he was standing by. The cabin pressure maxed out at 30,000 feet as we descended through FL 300, and mirrored our altitude during our descent to 8000 feet. We would later find out the canopy seals were faulty and we were lucky to get any type of seal in the first place.

I knew Barksdale AFB was the closest military facility with a flight surgeon, so I dialed in the Barksdale TACAN and started proceeding direct to the field. We were 100+ miles from Barksdale, and didn't feel comfortable flying there at low altitude with our present fuel state. I elected to climb to a VFR hemispheric cruising altitude below 18,000 and chose 16,500. I returned my oxygen regulator switches to the normal position and asked the SP how he was feeling. He said he was feeling a little nauseous and light-headed, and I noticed his breathing rate was elevated. I directed him to keep his oxygen regulator gang-loaded and told him to get out the checklist and read the Cabin Pressure Loss and Oxygen System Emergency Operation out loud, figuring this would help slow his breathing rate down.

While the SP was reading the checklist pages and we were established at 16,500, the canopy seals decided to start working again and we quickly repressurized from a cabin altitude of 16,500 to 8,000. My vision went partially restricted, very much like looking through the soda straw, and the pressure inside my ears was very painful. A quick valsalva alleviated the pressure and restored my sight and hearing, and I quickly decided I had had enough of the malfunctioning cabin pressure, and decided to ram-dump the cabin pressure and continue the flight un-pressurized.

As we neared Barksdale, I contacted the supervisor of flying (SOF) to let him know we were diverting to his airfield and declared a physiological incident. I flew a straight-in approach, cleared the runway at the end and taxied into the end of runway (EOR). Crash and Fire Rescue (CFR) was waiting for us, as well as an ambulance from the medical clinic with the flight doctor. CFR checked us out and signaled we were cleared to shut down our engines.

I instructed the SP to keep his mask on and to stay connected to the aircraft until the flight surgeon cleared him to disconnect. The Columbus AFB in-flight guide, in the case of a physiological incident, stated: "After landing, the affected crewmember(s) remain in the aircraft until medical assistance arrives. Do not disconnect from life support equipment until medical personnel arrive."

Points To Ponder

As I think back on this entire incident, I can think of three main areas that, if faced with again, I would like to do differently. First, once I had descended to below 10,000 feet, I should have stayed there. The T.O. 1T-38A-1CL-1 Oxygen System Emergency Operation checklist page states: "If hypoxia/hyperventilation symptoms are detected: … 6. Descend below 10,000 MSL (cabin pressure) and land as soon as practical." My feeling of being low on gas was basically just a guess, determined by looking at the fuel gauge, seeing my fuel state and thinking, "I am very far away; maybe I should climb." If I had taken an extra 30 seconds, I could have done a groundspeed check, figured out my groundspeed and multiplied it by my fuel burn in pounds/minute to get an semi-accurate prediction of my fuel state when I would arrive at Barksdale. With the SP having symptoms of hypoxia/hyperventilation, staying at an altitude below 10,000 feet would have been preferable to climbing unnecessarily.

Secondly, it wasn't until I was attending the Flight Safety Officer course at Kirtland that I thought about submitting an AF Form 847, Recommendation for Change of Publication, for T.O. 1T-38A-1 and -1CL. My recommendation would have been to add a step that instructs aircrew to ram-dump the cabin pressure once established below 10,000 feet to prevent the rapid re-pressurization that I had experienced. Maybe no one had thought of that possibility before. My recommendation could have been the first on that subject, or could have been the last report needed to make people say, "Hey, we really do have a problem; lets update the checklist." My point is this: Everyone loves to complain about how the system is broken and how they could do things better, but very few people actually take the time to do anything about it. If you think a T.O. or pub is in error, or you have a recommendation to make a certain emergency procedure (EP) a little easier to handle, sit down and take a few minutes to fill out an AF Form 847. Contact a member of your squadron Stan Eval shop for more details.

Finally, I would have gang-loaded my oxygen regulator as soon as I noticed we were experiencing a cabin pressure malfunction. At FL 350, your time of useful consciousness is, on average, 30 seconds to one minute. I am not sure how much time expired from when I first noticed the problem to commencing the emergency descent, but I would have to guess at least 15 seconds.

We've all been through the altitude chamber at least once in our Air Force career, and I am sure you all remember the one victim of the physiologists who gets to experience hypoxia while reciting the alphabet or verbalizing individual cards from a deck of cards. How much time can go by before you become the victim when a pressurization/oxygen malfunction/smoke/fumes in the cockpit happens to you? Without sacrificing aircraft control, taking care of yourself should be the first step in maintaining aircraft control.

USAF Photo

At FL 350, your time of useful consciousness is, on average, 30 seconds to one minute.

Remain Within Holding Airspace

USAF Photo by TSgt Demetrius Lester
Photo Illustration by Dan Harman

MAJ MARK BEAUCHEMIN
12 OG/AIS
Randolph AFB TX

When AFMAN 11-217, Volume 1, Instrument Flight Procedures, changed holding procedures in December 2000, the new procedure read: *The aircraft must cross the holding fix, turn outbound and remain within the holding airspace.*

Unfortunately, the AFMAN left the door open to some unintended interpretations. Seemingly, pilots could justify turning just about any direction at the holding fix, so long as they could remain within holding airspace, right? Or wrong? By considering it safe to disregard the old entry techniques learned in pilot training, some pilots were going too far (despite the two approved techniques still prominently presented in the very same paragraph of the procedure referenced above). Many continued to rely on these proven techniques, but growing numbers were defending the approach that it was acceptable "procedure" to turn any direction they wished, as long as they "remained within holding airspace."

So, here's the million-dollar question: How do you know you are remaining in protected airspace with certainty if you don't follow some basic technique for holding entry?

The short answer is you can't (at least under all circumstances); furthermore, you negate some key buffers the TERPs folks build in for you if you turn the "wrong" way.

So, the latest AFMAN 11-217 (dated 3 January 2005) has removed the bolded italic statement above and the holding procedure now reads as follows:

"10.3.1 Holding Procedure. The angular difference between the inbound holding course and the heading at initial holding fix passage determines the direction of turn to enter the holding pattern. Holding pattern sizes can vary greatly depending on the altitude of the holding pattern, primary aircraft the procedure was designed for, and other factors. Pilots have no way of knowing the design limits of protected airspace for a particular holding pattern."

Vague and ominous as this new text sounds, it forces us to read on in the paragraph to fully understand what to do. Under Entry Turns it states:

"Entry Turns. There are a number of techniques to enter holding which should keep you within holding airspace. Although any technique may be used to enter holding, using the commonly accepted ones described below will keep you within holding airspace and ensure your actions are predictable to the air traffic controller."

The two recommended techniques for holding entry turns are still presented as they were before, though it is clearer based on the text above that you must use one of these (or have another working technique of your own) to ensure compliance with the intent to remain within holding airspace.

So, you mean I can bust my flight evaluation if I turn the wrong way? The answer has always been, "Yes." It just got a bit blurred by the way the procedure was interpreted. Now it should be clear that *not* using some form of the recommended techniques puts you at risk to exceed protected airspace and turning the "wrong" way is, in fact, possible.

Wait a minute—can you please give me something more concrete to help grasp this idea so I can understand how I might go out of protected airspace?

Consider this:

Keep in mind that there is *no way* for a pilot to know the design limits for a particular holding pattern. The following example, however, should provide you with a better understanding of holding airspace in general.

Figure 1 depicts one of the templates used by an approach designer to draw a holding pattern. In this case, it's template No. 9. The designer gets the template information from tables in FAA Order 7130.3A. Template 9 is the template used for a holding pattern at 8000 feet MSL, 230 knots and a holding fix between 15 DME and 29.9 DME from the NAVAID; a fairly typical holding pattern.

The outline you see is the area defining the primary obstacle clearance area. Inside this area, you would get the standard 1000 feet of obstacle clearance (2000 feet in mountainous areas). In addition, a 2 NM secondary area exists outside of this that is the exact same shape. The obstacle clearance in this area would begin at 500 feet and taper off to zero feet at the outer edge. The distances shown on the figure are there to give you an idea of the exact size of this particular holding area and come from Table 3 of 7130.3A.

"Pilots have no way of knowing the design limits of protected airspace for a particular holding pattern."

USAF Photo by TSgt Justin D. Pyle

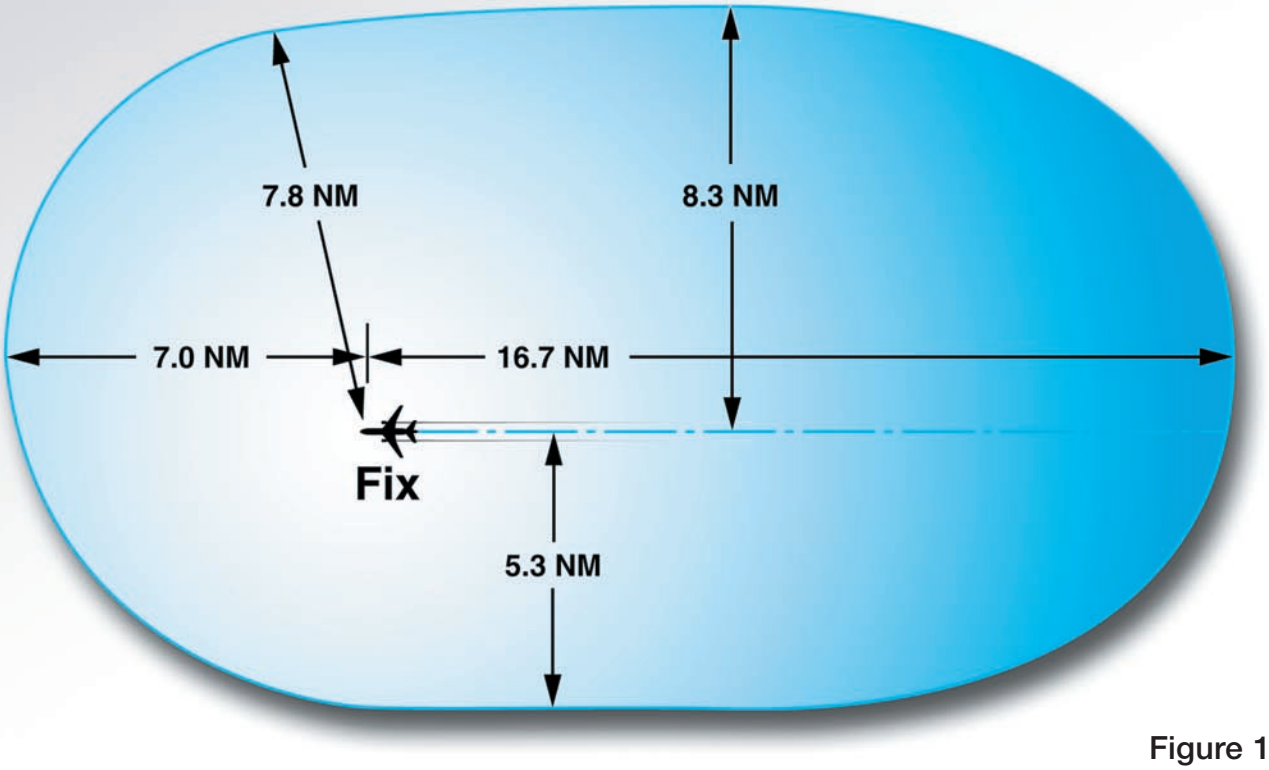


Figure 1

"Although any technique may be used to enter holding, using the commonly accepted ones...will keep you within holding airspace and ensure your actions are predictable to the air traffic controller."

As you can see, the overall area is quite large. You can also see that the area on the maneuvering side is larger than on the non-maneuvering side. The maximum DME leg length allowed in this particular pattern is 8 NM. The length of the pattern on the holding side of the fix is 16.7 NM long; so there is obviously some extra space built in. Why so much?

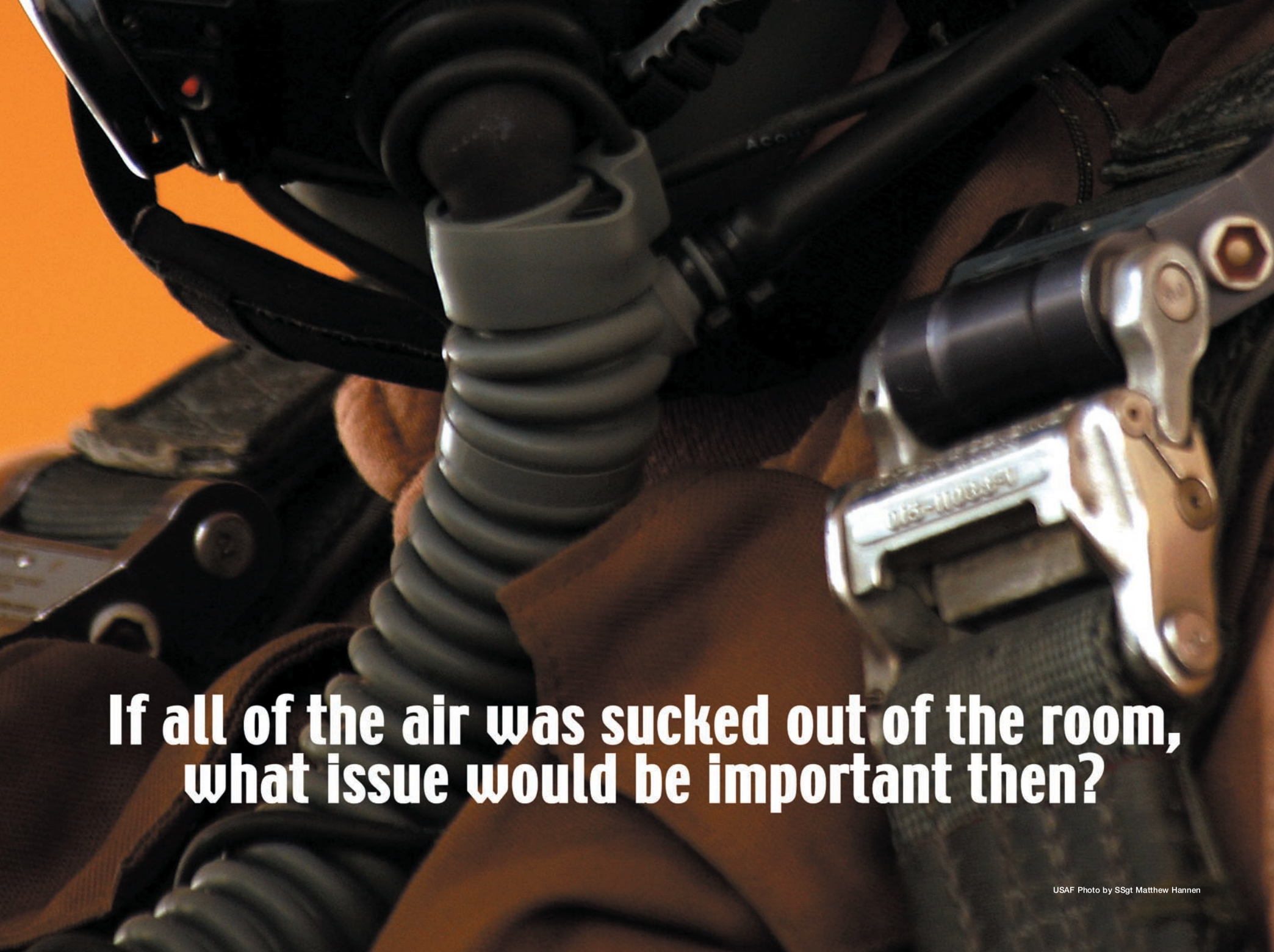
Well, some assumptions are taken into consideration when designing the size of the holding airspace. *First*, there is system error; ± 5 degrees are allowed for the ground station error. At 15 DME, that equates to approx 1.3 NM of displacement at the fix. *Second*, there is an allowance of ± 10 degrees for full scale CDI deflection; that's another 2.65 NM at 15 DME. *Third*, six seconds of reaction time are added for the pilot to recognize fix passage. *Lastly*, there is a wind allowance of 50 kts starting at 4000 MSL and increasing by 3 kts every 2000 feet; that's 56 knots of wind at 8000 MSL. This wind is applied in the most detrimental direction at all points in the pattern. (There is also an allowance for the "cone of confusion" if the fix is overhead a station, but it doesn't apply in this example. If we were to discuss a holding fix that is directly over a VOR, the numbers would still come out very close to the ones discussed here.)

So, let's take a look at our holding pattern example and apply the assumptions and see how an aircraft flying at 230 KIAS would do in this pattern. At 230 KIAS, 8000 MSL the TAS is approximately 260 knots on a standard day. That gives a turn radius of approx 1.7 NM. If the aircraft hits the holding fix tracking directly down the radial inbound and turns using 30 degrees of bank in the direction of holding, the turn diameter will be 3.4 NM. In addition, the aircraft might be off by 1.3 NM (system error) at the start of the turn and that 56 knot wind will blow it another 1.5 NM during the turn. The total displacement adds up to 6.2 NM from the holding fix when the aircraft rolls wings-level outbound (Figure 2, track A).

Notice from Figure 1 that the primary area is approx 7.8 NM wide abeam the fix; the aircraft is

continued on page 30


VP3



If all of the air was sucked out of the room, what issue would be important then?

USAF Photo by SSgt Matthew Hannen

Room For Recovery

MAJ JAMES GONGWER
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Tinker AFB OK

A transport is on approach at an unfamiliar field. They are in the weather, but are confident that they know where they are, established on course for the approach. Something all Air Force pilots are used to. But, well short of the runway, the aircraft runs into a mountain and all on board are lost.

Another transport aircraft is departing from another unfamiliar field. This time it is late on a dark night and visibility outside is once again nearly non-existent. Takeoff goes well. The climbout is working out just as planned. They believe they know where they are and where they are going. But once again a mountain appears, apparently from nowhere, and all on board are lost.

A third transport is attempting to land from an instrument approach, yet again at an unfamiliar field. Two attempts are made, both resulting in missed approaches. The instructor pilot decides it is his turn to give it a try. He backs up a PAR approach with the ILS, noting that the glidepaths are not coincident. He believes he knows where he is and that he is well established on final approach. But when he breaks out at decision height, a crewmember in a safety observer seat sees two trees directly in front of the aircraft. He immediately calls "Go around" but in the process the main gear strike the trees. This time the aircraft makes it home but with battle scars to show.

I am TDY to an overseas area. My luck is running high (or so I think) and I am directed to move my aircraft and crew to an even *better* location to keep it clear of some nasty weather that is on its way. I am on approach to an airfield I have never been at before (sound familiar?). I am flying a Non-Directional Beacon (NDB) approach, also something I am significantly unfamiliar with (strike two), but I am confident I know where I am, and where I am going. I am inside the final approach fix and cleared down to Minimum Descent Altitude (MDA). Down we go, targeting 1000 feet below the altitude I have just vacated. (Did I mention this is a non-radar environment? Strike three!)

After leveling off at the published MDA, I get that uncomfortable, "What the heck is going on?!" feeling. You know the one—where the hair on the back of your neck starts to stand up. "Dang, but that ground looks awfully close…" I repeat, "What the heck is going on…? Hey Co, hey Nav, we did pass the fix, didn't we?" Long pause. No answer. Until finally: "Well, I thought so, but I'm not sure."

OK, even the five seconds it took for that little exchange to take place is too long to be at an altitude I am not convinced I should be at. "Crew, we're going around. Engineer, set go-around thrust, leave the flaps where they are…" And up we go. Thirty seconds later, with more space between me and my archenemy, Mr. Granite, I have the room and the air to breathe, and time to consider: What went wrong?

OK, pop quiz. What are the two main differences between the first three incidents and my little

excursion into the not-so "fly right" zone? Hint: "That ground looks awfully close" and "room to breathe." Very good. You are exactly correct. (1) I had the blessings of clear visibility, and (2) My metal never touched mother earth's unyielding shell or outgrowths thereof. (That means I didn't run into the ground or the trees).

OK, what is my point? Just this. We live and work in an environment that is, at times, very unforgiving of mistakes, both great and small. Yet, at other times, it can be forgiving of the most heinous of mistakes. Our purpose is to ensure, by training, experience and solid judgment, that environment does not get the best of our aircraft and us.

How many times since you first started UPT (or SUPT for you young'uns) have you repeated to yourself, "Tune, identify, monitor"? I did, every time I flew an approach. The problem was, when I was confronted with a situation I was not familiar with, I relied on rote memorization of a mantra that was really intended to go much further than just three words:

USAF Photo by TSgt Scott T. Sturkol
Photo Illustration by Dan Harman

(1) I tuned—the correct frequency was in the ADF.

(2) I identified—the Morse code signal matched exactly what the approach plate listed.

(3) I monitored—the volume was loud enough so I would notice if it went away, but not so loud as to be distracting.

So, what did I miss? Why did the needle in my Radio Magnetic Indicator (RMI) point behind me when the station was still a good distance in front of me? (Yes, I *was* way below where I needed to be on that approach.) It was a very simple, and yet, potentially deadly mistake. *Simple stinking switchology.* In my aircraft, there is a switch that tells the RMI needle where to get its navigation information from; so, while I am sure that I am looking at the NDB, the needle is really telling me where a certain VOR, useless to my approach, is located. I never moved the switch. My only advantage over the other unfortunate crewmembers whose mistakes cost them so much more than momentary embarrassment? My approach was not complicated by weather, or nighttime, or frustrations over multiple missed approaches. I had a beautiful clear day, and nice flat terrain, the break in the chain that kept my airplane and all 25 people on board alive and well when I failed to do my job and *fly the airplane*.

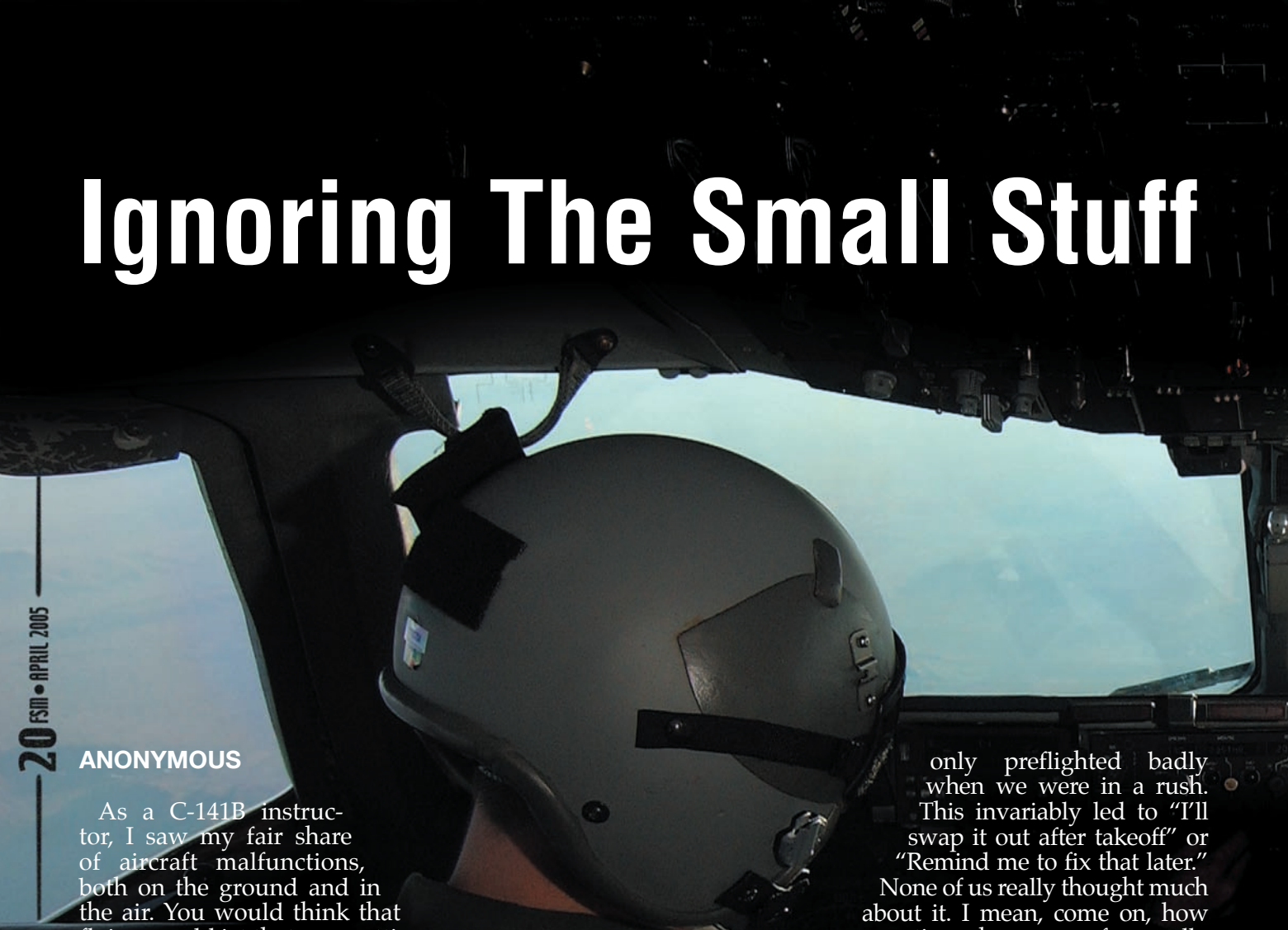
As aircraft operators, we are so good at knowing our jobs, so good in fact that we can, at times, be sure our SA is at 150 percent. But that, my friends, is when Murphy strikes and we are slapped, pulled, and beaten from the sky because our self-awareness is off by a magnitude of 100 and our SA is really at 1.5 percent—a very dangerous place to be when moving along only a couple hundred feet from catastrophe at 180 knots or more. So, take a lesson from me, the one who, but for the grace of God and His good weather, would have been another statistic in another SIB report, with 24 of my comrades-in-arms for company. Know where you are, but never stop looking for the mistake you made and missed, the one that will reach up from below and drag you into the ground, or into the trees.

I feel for those individuals in the examples I used. They were not fools. They were not incompetent. They were human. They made mistakes, just like me…just like you. The tragic thing is that their mistakes happened at the wrong place and the wrong time. There was no room for recovery. So, when you make your mistake, be aware, be active, look for it, so you can catch it early, while there is still air below the aircraft and fuel in the tanks. So you have that time for recovery, that time to live. Please…don't be the next statistic. I don't want to see you in a report, I want to see you on the line, where we can share our experiences, share our lessons and then "fly, fight, win"...and live.

HQ AFSC/SEFF Comment: This "There I Was" story is an excellent example of knowing when to call the knock-it-off or, in this case, the go-around. All too many times we are called to the site of a mishap to investigate why a pilot or an entire aircrew did not call the knock-it-off in time to save their aircraft and, in too many cases, themselves. CRM means different things to different aircrew out there. In this case, "passenger syndrome" seemed to have caught the copilot and navigator off guard during an out-of-the norm NDB approach at night. Backing up your crew during every phase of flight—including the switchology of your fellow crew members—is critical to flight safety. For the single seat types, always checking and re-checking your procedures and switches, and questioning your aircraft's position, is critical to safety.

We are pleased to see these lessons learned stories filtering up to HQ AFSC and allowing us to publish the lessons for all to learn. Keep these stories coming and Godspeed to your next destination!

Ignoring The Small Stuff



ANONYMOUS

As a C-141B instructor, I saw my fair share of aircraft malfunctions, both on the ground and in the air. You would think that flying an old jet that was getting ready to go to the boneyard would keep you on your toes and teach you to pay attention to even the smallest stuff. Unfortunately, we all had to be reminded of that once in a while.

We were on day 12 of a seven-day mission to Africa and finally on our way home after some quality time off in Kenya due to a bleed air leak. I was the instructor pilot giving a "buddy ride" to a brand-new aircraft commander (AC). Everything had gone pretty well through the whole mission, even with the maintenance problems we had encountered. The new AC had done everything great and really didn't even need a "buddy" (me) along to answer any questions that came up. We had the standard ground support, radio, flight plan, and diplomatic clearance problems that are all too normal for African Ops, and he managed his way through all of them.

One of the problems that had been "no big deal" and kept reoccurring throughout the mission was the AC's oxygen mask microphone. Numerous times, when he preflighted the mask, the intercom would not work. Of course, this was an easy fix; there were plenty of other masks on the 141 that we could have swapped it out with, but as luck would have it, it only preflighted badly when we were in a rush. This invariably led to "I'll swap it out after takeoff" or "Remind me to fix that later." None of us really thought much about it. I mean, come on, how many times have any of us really needed to talk on intercom while we had the oxygen mask on?

Well, I'm sure you guessed it. Today was the day the airplane decided to have a "minor maintenance problem" while airborne. We had just finished up a crew rest on Ascension Island and were all really happy to finally be out of Africa and on our way home. The weather was great all the way up to Saint Croix (for another hardship crew rest!) and the day seemed to be going rather routine. It was my leg to fly today, and I was in the right seat. The new AC was in the left with the still in-again/out-again oxygen mask mic. We pushed the power up and started rolling down the runway. As we lifted off and I raised the gear, all of a sudden the Christmas tree lit up in front of us. About this same time the Engineer started yelling that we were "losing No. 2," and then the Loadmaster started screaming that the cargo compartment was filling with smoke fast. The AC immediately directed everyone to get on oxygen, and then—you guessed it—he was NORDO and out of the loop.

While this was going on, I was getting my mask on and trying to figure out why the Engineer thought we were losing an engine. I was seeing a lot of flashing lights, but the engines looked fine.

Then the Scanner and both Loadmasters ran to the back to try and figure out where all the smoke was coming from and make sure our passengers are getting their Emergency Escape Breathing Devices (EEBDs) on while the Engineer was busy running the "Smoke and fume elimination" checklist.

As we continued to climb away from the runway, things were starting to make a little more sense. I finally had time to look at all those flashing lights and see that we actually lost our No. 2 hydraulics and not an engine; unfortunately we still seemed to be filling up with smoke. I immediately directed the AC to notify tower that we were going to tear-drop right back and land the opposite direction we had just taken off from. This resulted in a bunch of hand movements and a quizzical look coming from the left seat. I couldn't figure out what he was doing and told him to make the radio call again. Still nothing. OK, I thought, I'll give him one more chance. But I just continued to get that same funny look. I quickly flipped my wafer switch and made the radio call myself.

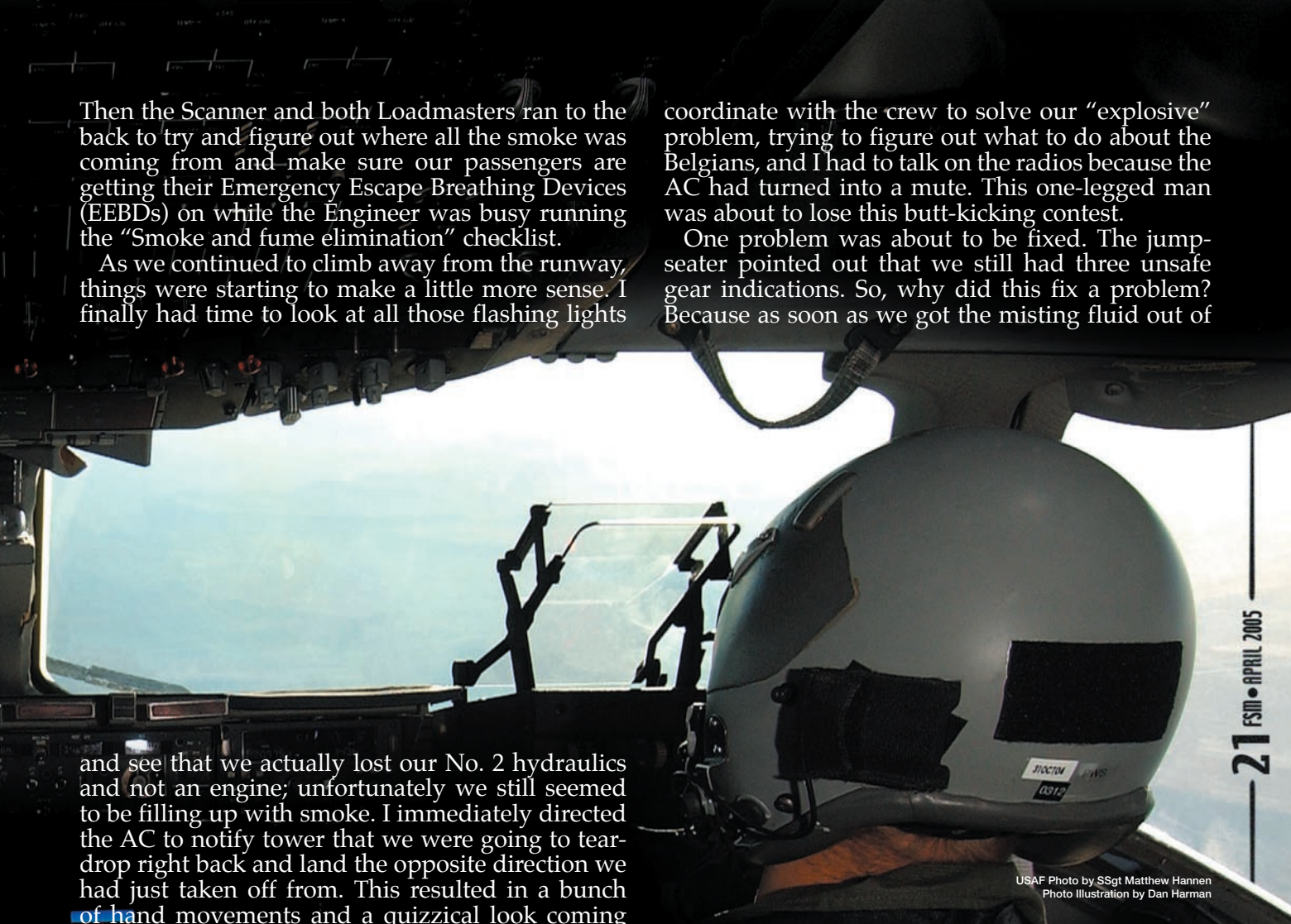
Tower immediately cleared us to land and said they were rolling the trucks. Then a Belgian Air Force KDC-10 called us and said, "Reach, can we land first before you close the runway? We're only about 100 miles out." Also about this same time the Scanner came back onto the flight deck and informed us that the cargo compartment was not filled with smoke, it was actually misting hydraulic fluid, an even better reason to get this thing on the ground ASAP.

Now, for those of you who have not been to Ascension Island, it's about 1000 miles past the middle of nowhere and only has one runway, which happens to be built right in-between two mountains. Not somewhere you want to be trying to emergency return to, even if it is VFR. I quickly let the KDC-10 know that we were filled with smoke and would have to land now. He then responded with, "Well, we passed along most of our gas, and if you guys close the runway we'll be going for a swim." Great, now I was flying the jet, trying to coordinate with the crew to solve our "explosive" problem, trying to figure out what to do about the Belgians, and I had to talk on the radios because the AC had turned into a mute. This one-legged man was about to lose this butt-kicking contest.

One problem was about to be fixed. The jumpseater pointed out that we still had three unsafe gear indications. So, why did this fix a problem? Because as soon as we got the misting fluid out of the jet, we would have to run the alternate gear extension check. That would leave plenty of time for the KDC-10 to land and clear the runway first.

The mist was finally starting to clear out and things were finally starting to slow down a little. I then directed the AC to inform tower we would have to hold south of the airfield (to stay out of the KDC-10's way) to get our gear down. As I was saying this, the AC was holding up a note that said, "My interphone isn't working." Oh yeah, I was supposed to remind him to swap that mask out when we weren't so busy. I asked the jumpseater to grab one of the extra masks off the crew bunk and give it to the AC while I coordinated with tower. Things were finally starting to calm down, and finally the AC was up and talking. We could now coordinate as a crew to solve this problem and get on the ground. Everyone did an outstanding job finishing off the numerous emergency checklists that we had to run, and we were able to land safely and bring the jet to a stop.

This whole experience really made me "sweat the small stuff" for quite a while after it happened. Even the most minor maintenance problem, no matter how much you think you don't need it, can really end up making your day a lot harder. I still have to remind myself of that. Often. ✈



USAF Photo by SSgt Matthew Hannen
Photo Illustration by Dan Harman

Task Prioritization During Combat Operations: Wingmen Experiences During Operation Iraqi Freedom

USAF Photos
Photo Illustration by Dan Harman

CAPT KRIS "TOWD" PADILLA
35 FW
Misawa AB, Japan

"Samurai 2 and 4, your priorities today are to stay visual, fly the correct formation, and—only after you've got those two things doped—monitor your sensors (e.g., radar and HARM Attack Display)."

Wingmen throughout the Air Force—regardless of experience level—hear these priorities every time they fly. They are first learned during the formation phases of SUPT, reinforced at IFF, and emphasized at our RTUs and first fighter squadrons where wingmen train to employ the most advanced aircraft and tactics, first in training and then in combat. In combat, however, CINC Objectives, Rules of Engagement and Special Instructions replace "Training Rules" and training-isms; and the combat environment's dynamic and volatile nature test these priorities every mission. Regardless of the operations, basic airmanship and wingmen priorities remain the same, and perhaps achieve greater significance as the mission demands and complexity increases. This article's purpose is to demonstrate the importance of correct task prioritization, exemplified by wingmen stories from OPERATION IRAQI FREEDOM (OIF). All of these examples illustrate times where correctly prioritizing basic tasks culminated in successful missions.

The contributors' identities and mission specifics have been sanitized to protect their identities and the sensitive nature of the material.

My Biggest Lesson Learned (Caesar, F-16):

Stay Visual: Wingmen never want to go blind on their flight leads, especially during combat where they entrust their lives to him, and vice versa. Although getting shot at by AAA and SAMs wasn't appealing, going blind was much more troubling. The one time I lost sight of my flight lead was over Baghdad, and even though this only lasted about 20 seconds, it felt like an eternity.

Nighttime Mixed Element Ops (Bodhi, F-16):

Our flight, a two-ship, got tasked to Combat Air Patrol (CAP) southwest of Baghdad, sanitizing the area against all surface-to-air threats for three vulnerability periods (VULs), and putting our bombs to good use when tasked. Since I was the only High Speed Anti-Radiation Missile (HARM) carrier in the flight (my flight lead carried cluster bombs), my primary job not only involved suppressing all surface-to-air threats for the strike packages entering Baghdad, but protecting our flight as well. We pushed into Iraq for the first VUL and the weather was not cooperating, forcing us to descend to lower altitude and well within range of many lethal low-altitude threats. As we entered our Suppression of Enemy Air Defenses (SEAD) CAP, our flight immediately got targeted and engaged by Iraqi fire control radars and AAA. We defended immediately, thereby spoiling their target solutions; but flying formation and sanitizing the area for the strikers

Our flight immediately got targeted and engaged by Iraqi fire control radars and AAA. We defended immediately.

Bodhi

and our flight while maneuvering with high-Gs, at night on NVGs, below a lit cloud deck, and at low altitude, proved to be the most challenging flying I've ever done. After a grueling first VUL, we refueled and returned for the second VUL. We found a workable layer between the cloud decks, allowing us to sanitize the area at higher altitude, thereby mitigating some of the surface-to-air threats and weather issues. We performed Close Air Support during the third VUL in addition to area SEAD. It was a grueling mission with a lot of tactical elements complicated by difficult weather.

Defense In Depth (Ox, F-15):

We were in the center Offensive Counter Air CAP on Night Two or Three of the war. There was some weather between ten and twenty thousand, but it wasn't that bad. AWACS provided an overwhelming amount of surveillance track information, one of which indicated an "unknown" status, i.e., "bogey." Seconds later, AWACS committed us to intercept and visually identify the bogey (at night below the weather, a tactic we train). The bogey tracked east towards Baghdad at about 7000 feet. At the same time, two additional Eagles from the west CAP committed, resulting in four Eagles racing towards the same piece of sky with low SA.

We were still about 20 miles away when the west Eagles reached the bogey, and, though we weren't on their frequency, AWACS was talking to both of us. The next thing AWACS queried was, "Confirm FOX II there?" I was convinced that a friendly just got shot at. Fortunately, the flight lead from the other formation replied, "Negative" and I felt relieved. Even though it was still early in the war and my fangs were out, I was pretty convinced none of the Iraqis would be flying in this war. Nonetheless, I realized this was probably our one chance to get an air-to-air kill in the war, so I couldn't believe it when my flight lead directed us to turn away from the fight. After talking to him after we landed, however, I realized it was a great decision. We had very little SA and there was already another flight of Eagles intercepting the bogey to get an ID. This decision was more tactically sound, giving us better SA on the bogey by preserving range so as not to stick our noses into a merge where we conflicted with other friendly aircraft or—even worse—got shot. We didn't get to take a shot that night, but my flight lead made great tactical decisions while I supported him as number two.

We had very little SA and there was already another flight of Eagles intercepting the bogey to get an ID.

Ox

Getting shot at by AAA and SAMs wasn't appealing, going blind was much more troubling.
Ceasar

We were IMC at 30,000 feet with only about 1000 feet of in-flight visibility, no discernible horizon, and unable to find clear airspace.
Towd

NVGs, Weather, Fuel Problem, And Iraqi Bullets—A Wicked Combo (Beaver, F-16):

I flew my first OIF sortie on Night Three of the war. As we entered our SEAD CAP just west of Baghdad, I started having problems with my fuel management system when my fuel gauges went to zero. I troubleshot the fuel problem while flying formation off my flight lead, and there were missiles and AAA all over the place. I knew I had plenty of gas, but my reservoirs both read zero—very disconcerting. In the midst of all this, I was supposed to take a Pre-Emptive (PET) HARM shot. I called unable and my flight lead reallocated the shot to No. 3 while I kept working the fuel problem. I RTB'd with a chase aircraft after the VUL.

My second sortie the next night was equally challenging, if not more so. I was No. 2 in a four-ship supporting a package of Hornets and Tomcats going downtown. The weather was solid from 15,000 to 31,000 feet, so we patrolled at 14,000 even though it appeared we were still in the weather. It took every ounce of concentration I had just to fly formation and stay visual. At one point, I was spatially disoriented and felt like I had a vector towards my flight lead. So, I set my lift vector away from him and pulled, but I couldn't tell you if I was pulling up, down, or sideways. I recovered on the round dials after that. It was actually a relief when I called "Attacking" for my PET shot because flight lead started flying formation off of me, giving me a little bit of a break and the opportunity to re-cage my gyros!

The Mission Isn't Over Until You've Landed (Oscar, F-16):

It was our second sortie for the night and the sky was starting to glow with the sunrise. These conditions complicated our RTB because it was not bright enough to fly visually and too bright to fly with the NVGs. I was relieved when we established radar trail so I could raise the goggles and follow the three radar contacts.

We initiated a descent and switched over to the approach control, but nobody answered. After some frequency hopping, we found approach and lead requested vectors for a four-ship, ILS trail. The controller directed us to split into two elements and assigned different frequencies to each element. However, our controller left our frequency as well and we again played the frequency hopping game. After reestablishing contact, the controller gave us vectors and a descent into a sandstorm. With two miles visibility I wasn't too worried leaving the FAF; but as I got closer to the field, the visibility diminished with the low lighting, blowing dust, and sky being the same color as the surrounding desert. Now the problem was figuring out which of the tan strips in front of me was actually the runway I was supposed to land on. At about one mile out, I found the taxiway that changed into a runway at the beginning of the war, did an aggressive correction, and landed. It wasn't pretty, but I was on the ground. I was surprised that after two combat sorties, the most dangerous part of the night was battling the radar pattern and landing at dawn.

"MAGNUM" From Fingertip (Towd, F-16):

I unexpectedly shot our squadron's 69th and final HARM during one of our last daytime OIF sorties. It was a PET shot against a SAM site in the vicinity of an early warning radar targeted by our No. 3, and it was the sportiest shot I took the entire war. Not only were we employing non-standard tactics as a three-ship instead of our fragged four-ship (No. 4 fell out for maintenance), but we were IMC at 30,000 feet with only about 1000 feet of in-flight visibility, no discernible horizon, and unable to find clear airspace in our assigned area of responsibility (conditions prevalent throughout the course of the war in which we had never trained to employ). So, I was typing in coordinates and setting up the shot while flying a fluid fingertip to route position off of my flight lead, multi-tasking between the weapons employment, staying visual, and not hitting him! One minute prior to the shot, I radioed "Samurai 2's primed PET Alpha"—still in fingertip, monitoring the shot, while still prioritizing deconfliction with my flight lead. As the time to take the shot arrived, I floated to visual limits (about 500 feet), lobster-eyeing my flight lead while QC-ing the shot. Within about 14 seconds, I hammered down, radioed "Samurai 2, Magnum SAM, Timeout 1+14," and repositioned to fingertip. It was a valid and accurate shot under challenging conditions to say the least. We certainly don't train to fly in those conditions or take shots like that, but our proficiency with the basics—"blocking and tackling," as our OIF Squadron Commander called them—enabled us to quickly adapt to the challenging conditions and employ lethally and safely.

There were missiles and AAA all over the place—I knew I had plenty of gas, but my reservoirs both read zero.

Beaver

Conclusion:

Although these examples are from wingmen flying fighters, the basic principles are universally applicable and illustrate some important points.

(1) First, there is a very good possibility that our combat operations in the next conflict will differ significantly from the way we train. For example, we continually operated in IMC throughout OIF—even at night with NVGs—a medium we do not train in because of the inherent risk. I don't expect the training restriction to change, leading me to the next, most relevant point.

(2) Prioritizing basic airmanship and tasks—such as staying visual and flying the correct formation before working sensors—achieves greater significance during the fog and friction of war. Getting shot at certainly changes the dynamic of a mission already complicated by weather and other mission elements; so, it's incumbent upon all of us to be the best "wingmen" and not further complicate matters by failing to accomplish basic tasks and possibly create another hazard to the mission.

So, never forget the importance of the basic tasks, because they may be the only constants during an otherwise chaotic combat mission.

As I got closer to the field, the visibility diminished with the low lighting, blowing dust, and sky being the same color as the surrounding desert.

Oscar

USAF Photos
Photo Illustration by Dan Harman

OPS TOPICS

Editor's Note: The following accounts are from actual mishaps. They have been screened to prevent the release of privileged information.

Here are some smoke and fumes and other physiological incidents that could have been prevented by knowing the proper procedure and following set rules. Rules are good!

When Do You Call It Quits?

The HH-60 crew was scheduled to fly a local single-ship day tactical sortie, and during the run-up, the instructor gunner (IG) and the flight engineer (FE) detected unidentifiable fumes from an unknown source. Initially the crew suspected the fumes were from the exhaust of a nearby KC-135. As soon as the crew completed the proper run-up checklists, they taxied away from the KC-135. The IG was experiencing some lightheadedness, but assumed it was residual fumes from the KC-135 and decided to continue with the mission profile. The crew ran all checklists in accordance with applicable directives and completed an uneventful departure. The crew proceeded to complete the pre-briefed energy maneuvers warm-up exercise. During the warm-up, the IG stated he felt light-headed and nauseated, and requested permission to land the aircraft in order to "get some fresh air." The crew immediately diverted to a nearby landing zone and landed uneventfully. Once on the ground the IG departed the aircraft and walked approximately 50 feet away. The crew opened all of the cabin doors and gunners windows to dissipate any residual fumes. After approximately five minutes, the IG returned to the aircraft and felt he was "ready to go." The aircraft departed and continued with the planned training mission.

Approximately ten minutes later, the IG again complained about the fumes. The instructor pilot (IP) terminated the training sortie and called for the smoke and fume elimination checklist. Upon execution of the checklist, the IP briefly detected the fumes. After executing the smoke and fume elimination checklist, the crew no longer detected the presence of the fumes, and quickly concurred that a return to base outweighed the need to conduct a precautionary landing. (Good example of ORM on-the-fly!) The crew contacted squadron operations to ensure the duty flight surgeon met them at the aircraft upon landing. The remainder of the crew did not experience any symptoms. Aircraft maintenance inspected the engine bay, left-hand relay panel, cargo bay, auxiliary fuel tanks and the dispatchable pyrotechnic bag on board. They were looking for leaks and chafed/burned wires, but the fume could not be duplicated. The probable cause could have been from an overserviced engine. Subsequent flights after the event have been uneventful to date of this message.

Here is a case of an unknown source of fumes, but it was detected before takeoff and a crewmember felt symptoms. Mission hacking is commendable, but this was a training sortie that could have been flown another day (and was), that should not have taken off. If it's wrong on preflight, why would it fix itself in flight?

Do You Know When You're Hypoxic?

The T-37 crew departed on a syllabus- directed navigation cross-country sortie. During the departure, the planned low-level was closed for weather, and the crew climbed to 16,000 feet and proceeded directly to their first destination. The crew accomplished the required servicing and post/pre-flight checks at the first destination and departed on the next leg of the cross-country. They planned an IFR flight and oxygen pressure was 350 pounds at departure, which would allow for a maximum duration at FL250 of over 160 minutes.

During climbout the crew accomplished oxygen checks after 10,000 feet and at level off at FL250, as directed by the checklist. Both checks appeared to be normal with the proper challenge and response. Approximately 13 minutes after level-off at FL250, when the left seat instructor pilot (IP) began to review the star procedures into the next destination, Center called to query the crew on numerous altitude deviations. At the time of the altitude deviations, the first pilot (FP) was in control of the aircraft. The IP assumed control of the aircraft and began to return the aircraft to the desired altitude. The FP did not remove her hands from the controls, but offered no resistance to flight control inputs. The IP again stated that she had the aircraft and did not receive the proper response. The IP declared an emergency and began a descent to 11,000 feet as directed by Center. The IP directed the FP to go to 100 percent oxygen on several occasions during the descent with no success. Physical limitations in the cockpit did not allow the IP to reach across the T-37 cockpit and activate the FP's regulator.

The FP finally responded to the IP's calls to go to 100 percent oxygen below FL180. The IP elected to divert and flew an ILS approach to an uneventful full stop. Here we have a case where the FP did not recognize her hypoxia symptoms, which were caused by an improperly fitted mask. When was the last time you thought about hypoxia, and can you recognize your symptoms? If not, you need to.

C-130 Burning Insulation

Can't do smoke and fumes and not talk C-130 insulation. The sortie was briefed as an air transportation flight. All preflight briefings, taxi and takeoff were normal. At 3.1 hours into the sortie, the crew noted the smell of burning plastic and visible smoke entering the flight deck. They ran the smoke and fumes elimination checklist, declared an emergency and landed at the nearest airfield. Upon landing the aircrew egressed the aircraft without incident. Maintenance investigation found the source to be caused by a breakdown in the insulation surrounding a bleed air duct at flight station 245.

This is an example of what they did right—knew the procedure and took the right actions. If you are a C-130 crewmember, or any aircraft for that matter, do you know what the most common causes of smoke and fumes are in your aircraft? You should and your maintenance experts and flight safety should be working together to identify the major risks.

How Does Your Mask Fit?

The T-37 crew delayed in the landing pattern for approximately 10 minutes and departed for the military operating area to practice stalls and spins. After entering their assigned area, the crew uneventfully performed two G-awareness turns and a power-on stall recovery. The crew was at 19,500 feet MSL, and had just begun a second power-on stall recovery when the instructor pilot (IP) began to feel lightheaded and dizzy, with tingling in her fingers. The IP also heard an unusual sound from the oxygen hose as she breathed. The IP immediately assumed control of the aircraft, gang-loaded her oxygen regulator and started an immediate descent. The IP's lightheadedness and tingling resolved shortly after gang-loading the regulator. The IP directed the student pilot (SP) to gang-load his regulator as a precaution, declared an emergency, and continued the descent. The IP returned to base and flew an uneventful straight-in to a full stop landing.

Life support technicians examined the IP's helmet and mask and found no deficiencies with the equipment. They performed a leak test with the IP by having her don the equipment and hook up to the ground tester. They noted the IP had the left bayonet pushed all the way in with the right bayonet at the recommended two clicks. This caused the mask to sit crooked on the IP's face but still gave a good seal. The IP mentioned that it was uncomfortable on her face. The technicians pointed out that how pilots connect their equipment on the ground is indicative of how it is connected in the air. An improperly adjusted mask could have caused the leak.

Maintenance thoroughly examined the aircraft and both oxygen regulators were tested for proper operation and found to be working correctly. All hoses were examined for leaks, but no leaks were found. There was adequate oxygen in the system and no other crews complained of oxygen problems in aircraft serviced by the same cart. Although this case couldn't be determined exactly, there were several areas that could have led to the incident—a mask improperly fitted or intermittent equipment.

The key lessons learned here are: Know your hypoxia symptoms, and as life support stated, what you do on the ground is indicative of what you do in the air. Habit patterns are a large influence on mishaps; make sure yours don't lead to a mishap.

Maintenance Matters

Editor's Note: The following accounts are from actual mishaps. They have been screened to prevent the release of privileged information.

Tech data usage, proper training and good supervision prevent mishaps. Unfortunately, those prevention aspects were lacking in the cases below.

Watch That First Step

An F-15 troop fell approximately nine feet from the aircraft inlet ramp while attempting to deplane the aircraft by using the retractable boarding ladder. He was part of a four-person swing shift maintenance crew dispatched to finish a gun installation on the aircraft. The weather at the time of the mishap was light rain, minimal cultural lighting and the sun had set, but it was not completely dark. The troop had been on shift for just over an hour and was a qualified five-level. The rest of the crew consisted of another A1C, a five-level SRA and a seven-level SSgt. A B-4 maintenance stand was positioned on the right side of the aircraft to facilitate the gun installation, and was raised to a height commensurate with the task, but not high enough to be used to go to and from the upper surface of the aircraft.

To access the upper surface of the aircraft he used the aircraft's retractable boarding ladder, a somewhat difficult task, as the canopy was closed to keep rainwater out of the cockpit. His task was to install the gun drum driveshaft (on top of the MA), while the other three personnel were located on the right side of the aircraft, two on the B-4 stand and one on the ground. When he attempted to deplane the aircraft, he accidentally hit the boarding handle with the back of his hand, lost his balance and fell to the ground. None of the other maintenance workers were in a position to witness his fall, so they didn't get to score it, but were alerted to the fall by his screaming.

Transiting to and from the top of the F-15 with the canopy in the raised position by means of the retractable boarding ladder requires a certain amount of dexterity under the best of conditions. This same procedure with the canopy closed, although not prohibited, can be extremely difficult. He attempted to transit from the top of the aircraft to the boarding ladder in the rain, at dusk, and with the aircraft canopy closed.

A certain amount of responsibility rests with the senior, qualified individual to ensure compliance with AFOSH standard 91-100, which states, "The maximum use of maintenance stands and work platforms, whenever possible, will reduce the exposure and risk (of falls)." On this note, a qualified five-level technician should also be expected to have the ability to make an adequate personal risk assessment of the task, and in this case, failed to do so, resulting in his injury. Are you making the right risk assessments?

Watch That Weight!

The F-15 CANN aircraft was being rebuilt to mission-capable status after 32 days. Maintainer two (M2) was sitting on the right stabilator performing micrometer checks of the right rudder actuator attachment point bolt holes. Maintainer three (M3) was standing on the ground outboard of the right stabilator reading the technical order (T.O.) to M2. Maintainer one (M1) climbed on top of the MA using the cockpit access ladder, walked aft to a position just forward of the vertical stabilizers, set down a small tool bag and the rudder actuator, and waited for M2 to finish. While waiting, M1 moved slightly aft to hand a tool to M2. As he began to move aft, he noticed that the aircraft was sinking.

He immediately began to move forward to attempt to rebalance the aircraft, but his efforts proved fruitless and the tail of the aircraft hit the ground and came to rest on the engine augmenter exhaust nozzles and the stabilator trail-

ing edges. The rudder actuator slid aft and fell off the aircraft, striking the ground just aft of the engines. By direction of M1, M1 and M2 remained in place to prevent the aircraft from tipping forward while M3 went to get help. Crash Recovery personnel responded and returned the aircraft to an upright position. M1 and M2 climbed off of the MA without injury.

What happened to damage this tipsy Eagle? A Chart A Basic Weight Check List Record inventory revealed that during the 32 days of CANN status, 49 parts of significant weight were removed totaling 1844 pounds forward of the main landing gear. The center of gravity (CG) was calculated and determined to be out of limits aft. The aircraft was determined to have a mean aerodynamic chord of 35.57 percent, compared to the normal operating limits of 22-30 percent as specified in T.O. 1F-15C-5.

At this point, it was determined that the mooring weight attached to the nose landing gear of the aircraft by crash recovery personnel was of unknown weight and was not properly certified. Also, due to exigencies of the recovery process, it was attached to the drag brace instead of the tie-down points specified in T.O. 1F-15C-2-10JG-00-1, procedure 10-00-02, *Aircraft Mooring*. Wing maintenance personnel then attached weights of known quantity IAW the *Aircraft Mooring* procedure.

During the weight and balance determination it was also discovered that the 165 pound radome, the 25 pound 022 LRU, the six-pound Flow Temperature Controller, and the three-pound standby altimeter were not included in the 1F-15C-5 Chart A requirements. M2 with equipment accounted for about 200 pounds on the right stabilator and M1 with equipment accounted for approximately 150 pounds situated somewhere aft of the speedbrake, but forward of the leading edge of the vertical stabilizers at the time of the mishap.

If you look at the applicable T.O. procedures, they revealed that T.O. 1F-15C-2-05JG-00-1, procedure 05-00-01, *Aircraft Safe for Maintenance*, contained the following warning: "If aircraft has 1000 pounds or more of component weight removed forward of the main landing gear, do aircraft mooring (10-00-02) before maintenance." Further, procedure 10-00-01, *Aircraft Parking*, Safety Conditions section, contained additional requirements for Unusual Weight and Balance Condition. Finally, the Wing supplement to the MAJCOM supplement included a requirement to attach a ballast barrel to the nose of the aircraft or remove an engine prior to commencing CANN status. The Wing supplement also stated that the Production Section will ensure all CANN preparation procedures are completed prior to aircraft going into CANN status. M1 did not complete or review the checklist or perform the Aircraft Safe for Maintenance procedures because the aircraft had been in CANN status for an extended period, and he assumed all input conditions were already accomplished.

A compounding factor was that AMU leadership unknowingly negated the weight and balance considerations of the local guidance by directing that engines no longer be removed as part of CANN preparation, in the interest of streamlining the unit's workload. Analysis of training records and interviews revealed that specialists training requirements did not include *Aircraft Safe for Maintenance* procedures. As a result, specialist personnel received only anecdotal training to check with the crew chief prior to conducting maintenance on aircraft, but often work on aircraft alone.

During this period, very little control was exercised over the MA other than production superintendents' authorizing individual CANN actions, and they did not include weight and balance in their considerations when approving CANN actions. I hope you can see the variety of links in the safety chain that led to this mishap. There is lack of supervision, lack of training, failure to follow tech data, and improper habit patterns with use of tech data and work practices.

When was the last time you looked at your CANN program, or any program, for habits or procedures that could set you up for a mishap?

Cold Weather Protection = Failure to Communicate

Flight line maintenance workers were in the process of preparing a C-17 for inspection. Maintenance worker 1 (W1) and maintenance worker 2 (W2) were positioning a motorized boom lift next to the left-hand outboard aileron when the boom descended and made contact with the aileron. Damage to the aileron consisted of delamination of the trailing edge aileron skin approximately 55.5 inches in length, and nine inches in depth. The cost of repair was $26,558.

How could this happen? As they were positioning the motorized boom lift next to the left-hand outboard aileron, W1 was moving the motorized boom lift at ground level next to the left-hand outboard aileron. W2 was in the motorized boom lift's basket, with controls in-hand guiding the lift up and down. W2 stated that as the boom lift was moving downward, he removed his hand from the control to stop the boom, but it continued moving downward, making contact with the left-hand outboard aileron. Due to extreme cold weather, both maintenance workers had protection hoods over their heads, resulting in poor communication between the two of them.

I know the cold weather season is almost over, but when was the last time you looked at how your people communicate in any maintenance operation requiring more than one person?

continued from page 15

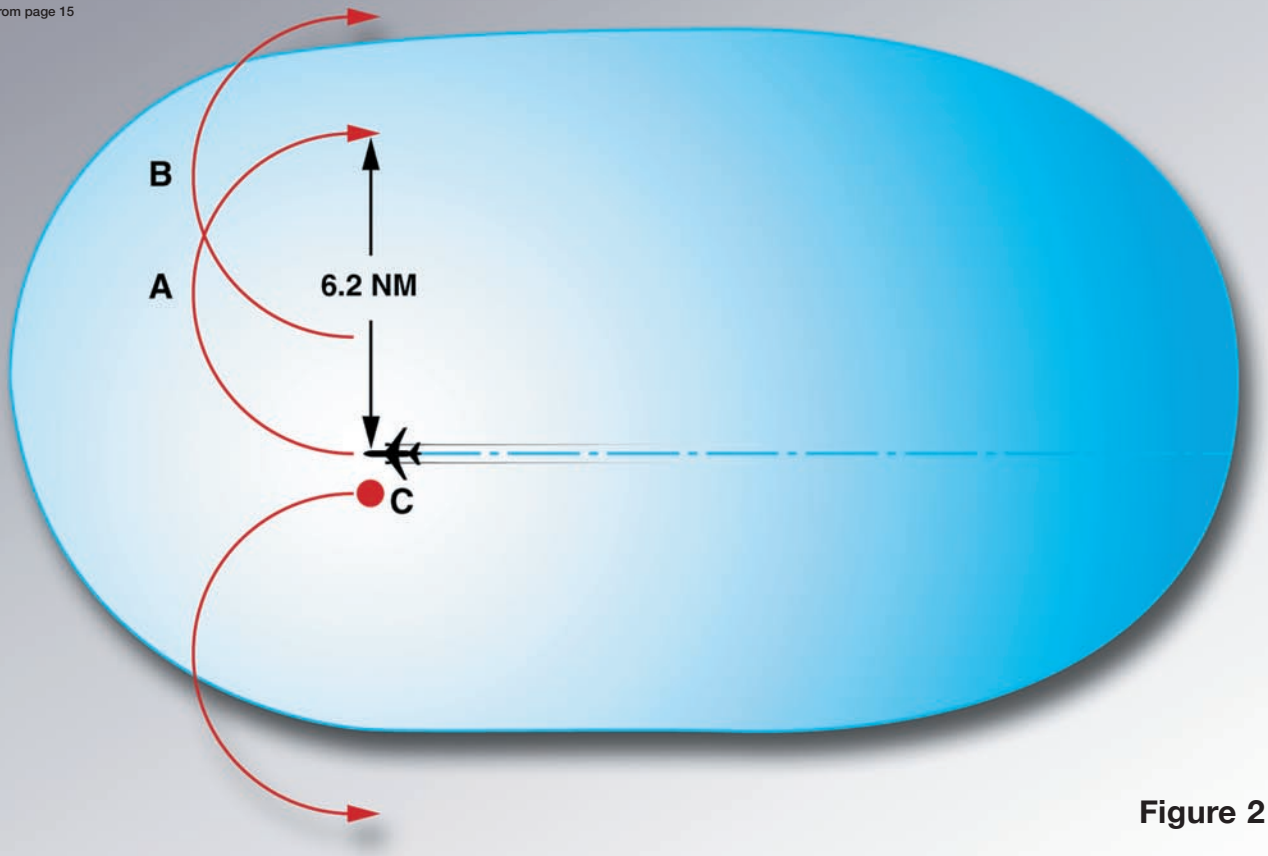


Figure 2

still inside the template. But what about those ± 10 degrees allowed for full-scale CDI deflection? It should be obvious that hitting the fix dead-on is the way to go. However, if you happen to be offset to the maneuvering side of the pattern and subsequently also turn into the direction of holding, you are going to find yourself displaced more than 6.2 NM when you roll wings level (Figure 2, track B). Exactly how much will depend on how far off course you were at the turn. If you were displaced a full 10 degrees, that would equal approximately 2.5 NM of displacement at 15 DME. Add that 2.5 NM to the original 6.2 NM and you are now 8.7 NM displaced from the fix. Keep in mind that the primary holding area only went out to approximately 7.8 NM at this point in the pattern. You are a mile into the secondary obstacle clearance area of the holding pattern…still safe, but your margin of error is shrinking fast! If you apply appropriate wind-drift corrections for the remainder of the pattern, you will remain inside of the secondary protected airspace. If you let the wind continue to blow you off course, you may be outside of the secondary area when you begin the turn inbound.

If you are displaced to the non-maneuvering side of the pattern (Figure 2, Point C), you had better think twice before turning left; you'll fly well outside protected airspace if all the negative factors are working against you. Remember the old paragraph? It did not require you to apply the time-tested holding entry rules many of us grew up with (within 70 degrees, turn in the direction of holding). You could procedurally hit the fix and turn any direction, but do you think you can prove you stayed in holding airspace? Good luck.

If you hit the fix as in the first example, and turn left instead of right, you will go 0.9 NM outside of the primary holding airspace with system error and wind buffer taken into account. Any CDI error now places you precariously on the edge of going out of the secondary area. A full 10 degrees will put you 1.5 NM out of protected airspace. Is a left turn in that case *ensuring* you remain w/in holding airspace? Not really.

Here's the real-world kicker: How do you know which template was used, especially if you fly to numerous airfields throughout the country? We discussed template No. 9 (a very common template), but there are 31 templates, of which eight are actually smaller than the one shown.

As the new 11-217 now states:

"Pilots have no way of knowing the design limits of protected airspace for a particular holding pattern."

So, it is indeed very important that we all teach and apply those tried and true holding entry techniques. By doing so as a regular practice, no matter where you are you can enter holding with confidence that you will indeed—remain within holding airspace. Fly safe.

FY05 Flight Mishaps (Oct 04-Mar 05)

14 Class A Mishaps
10 Fatality
7 Aircraft Destroyed

FY04 Flight Mishaps (Oct 03-Mar 04)

12 Class A Mishaps
10 Fatalities
5 Aircraft Destroyed

03 Oct		A C-5B sustained damage to 2 engines after multiple bird strikes.
04 Oct		Two F-15Cs collided in midair; both returned to base OK.
13 Oct	✶	An MQ-1L experienced a hard landing.
18 Oct		An F-16C tire tread separated on takeoff; barrier was engaged and gear collapsed.
20 Oct	✈	An HH-60G crashed during a rescue mission; 1 fatality and 5 injuries.
27 Oct		A KC-10 had a #3 engine failure.
24 Nov	✶	An MQ-1L crashed during an FCF.
30 Nov		A B-1B had an inflight fire in the aircraft equipment bay.
09 Dec		An HH-60G had a hard landing.
14 Dec	✶	A B-1B nose gear collasped after landing.
20 Dec	✈	An F/A-22 crashed immediately after takeoff.
29 Dec	✈	An MC-130H impacted a hole in the runway on landing.
18 Jan	✈	A T-37B collided with a civilian aircraft; crew ejected OK.
22 Feb		An E-4B suffered a birdstrike.
18 Mar	✈	An F-16D crashed short of approach runway; pilot ejected safely.
25 Mar	✈	An F-15C crashed during a BFM mission; pilot ejected safely.
31 Mar	✈	An MC-130H crashed; 9 fatalities.

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "✈" Denotes a destroyed aircraft.
- "✶" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: http://afsafety.af.mil/AFSC/RDBMS/Flight/stats/statspage.html.
- **Current as of 31 Mar 05**.

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It was later discovered that a valve on the oxygen regulator was not allowing oxygen to flow properly.

see page 6