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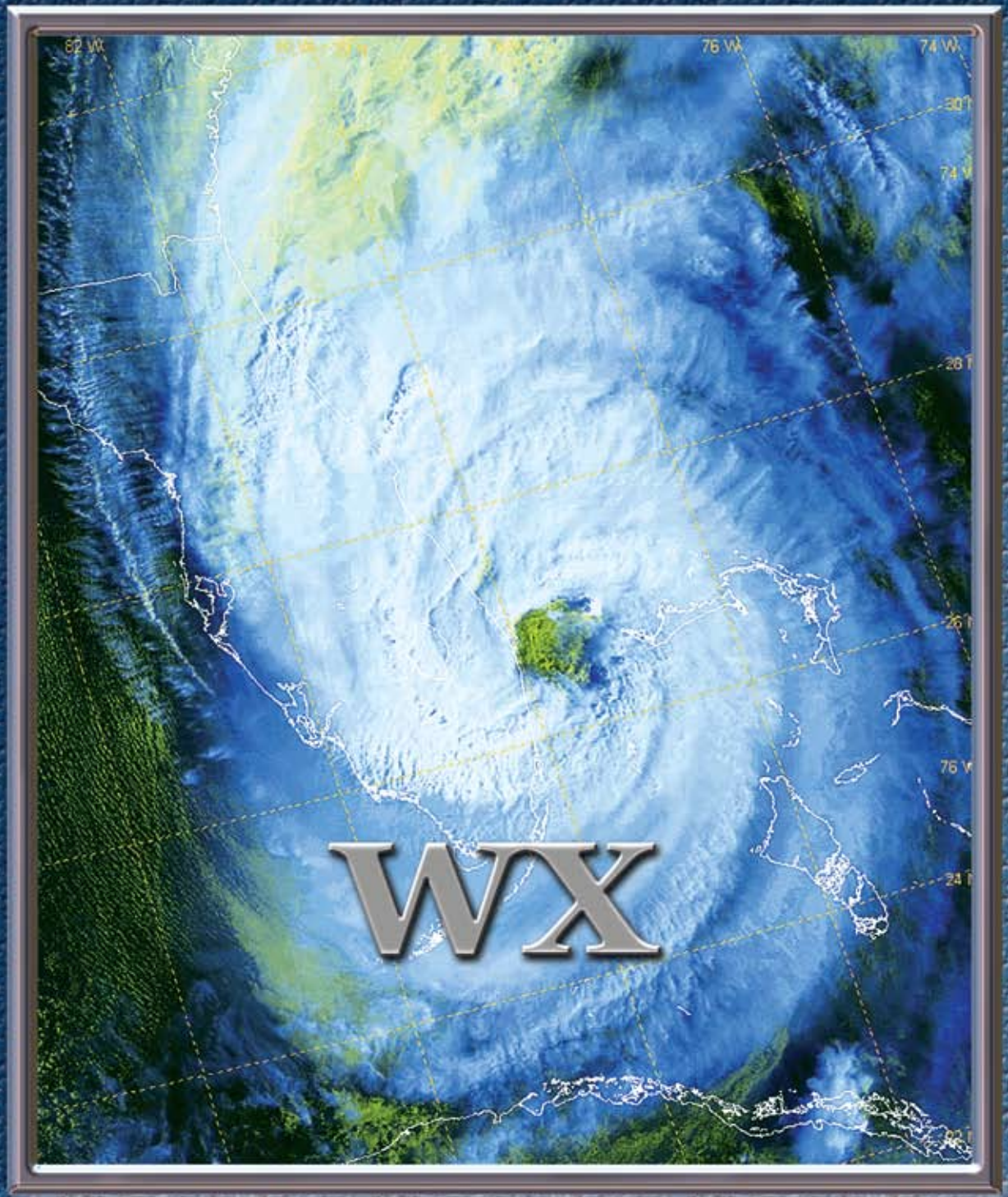

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U.S. AIR FORCE

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Back Cover: U.S. Air Force photo by Chief Master Sgt. Don Sutherland

The View from Blue 2

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It comes with many names. At Spangdahlem, they call it the Fog Monster. This creature creeps up the valley off the north end of Spang's runway, pushed along by the prevailing northeast breeze until it envelopes most of the runway. Typically, the morning SOF's first question at the weather shop is, "Does the monster live?"

I'm talking about winter weather. We're entering the time of year when the weather becomes a primary flight risk to green beans and old pros alike … when the monsters come out of hibernation.

You'd better have your divert wallet loaded with euros, pounds, or whatever fugagas they're spending these days. Your pubs had better be up to speed, and I hope you're current in precision and nonprecision approaches and formation landings (if that's a player for your aircraft type). Where's the icing level? Did you properly adjust your bingo in accordance with Vol 2? Who's in your flight? Is the squadron's newest el-tee on your wing? If so, what are his minimums? Even if he's legal for the approach, is he ready to fly to the decision height in the forecasted weather conditions he just briefed? Are you?

What about combat ops? When was the last time you climbed through 24-solid-thousand feet of cloud for a turn-on intercept on the tanker padlocked to instruments and radar the whole way, while hanging on every word from your co- or your wizzo? Did you call a knock-it-off even though you felt "… only a little wobbly. I'm good to go." Will these conditions compromise your weapons', pods', or nogs' effectiveness … or maybe even damage them?

My flying experiences in the goo changed the way I look at aviating. We simply had to be on top of our game. I can only hope I was useful to my nose-gunners, because they sure as heck did a fine job getting my pink butt back to the airpatch (or at least to an airpatch). Maybe it was because we flew as crews. We never seemed to forget anything and always seemed to know what the other guy needed next on the approach. This kind of thinking makes it absolutely vital that all of us green baggers — whether we fly single-pits or family models, rotors or fixed wing, manned or not — start prepping ourselves, our wingmen, our systems and our equipment for the coming monster. Read on.

I'm passing the chalk to some of your wingmen who shared their own lessons learned regarding weather ops, its risks and hazards, and some great sermons from the holy church of what's goin' on. Some of them nearly busted their butts, but yet they're here to tell you about it in the "heritage room." After you've listened, hand me a 1554, and I'll tell you about the time Sheepstain and I busted three international borders trying to fly the widow-maker into Norvenich. Somehow we survived the monster.

— Blue 2's in!

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U.S. Air Force photo by Dennis Spotts

ANONYMOUS

There are some days as a flyer when I feel satisfied that I've fully prepared for a day's sortie. I've also had days when things began to fall apart, the crew wasn't hitting on all cylinders, lead telling me I was out of position, I wasn't anticipating what was next, and I was holding onto the tail of the aircraft trying to claw my way back in. We've all had that feeling of being behind the aircraft, and as professional aviators, we try to ensure those days of big power inputs and low SA get fewer and far between. When I think of why we get behind the aircraft, there's one reason that stands out more than the rest: complacency.

Our Air Force has a culture of working smarter and not harder, seeking to maximize efficiency and minimize workload. This has resulted in many of the mission-planning aspects of a sortie being delegated to other entities. Mission-planning cells present us with our mission information pre-canned for each tactical sortie, and tanker/airlift control center flight managers produce mission materials, akin to mission-planning fast food. Although it's the responsibility of the aircraft commander to ensure that the materials are correct, it's all too easy to trust the materials with a cursory check when pressed for time and to become complacent in preparing for flight.

It was an early Sunday morning, about 4:30 a.m., when I just finished alerting my crew for the day's flight. As I threw my break bag together and stepped out the door, I was greeted with six inches of snow covering my boot and rising above my ankle. As far as I knew, it didn't snow too often at my new duty station, maybe twice a year at the most. About the time that I threw my bag into the back seat of my car, the duty officer called stating that maintenance wanted to know if we were going to take off and if they should prepare the aircraft for flight. Murphy's Law was gaining momentum. That the aircraft wasn't being prepared for flight, and that I was receiving a phone call, meant that we were behind schedule already. We'd have to hustle to take off in time to stay on frag for the next day of our

Cold, Wet a

The Gradual and Cumu

three-country, three-day trip. Arriving at the squadron, I delegated tasks as we signed in and prepared for flight. The co-pilot printed the flight manager-prepared mission materials, the navigator checked the routing, and the rest of the crew began the preflight and loaded the aircraft.

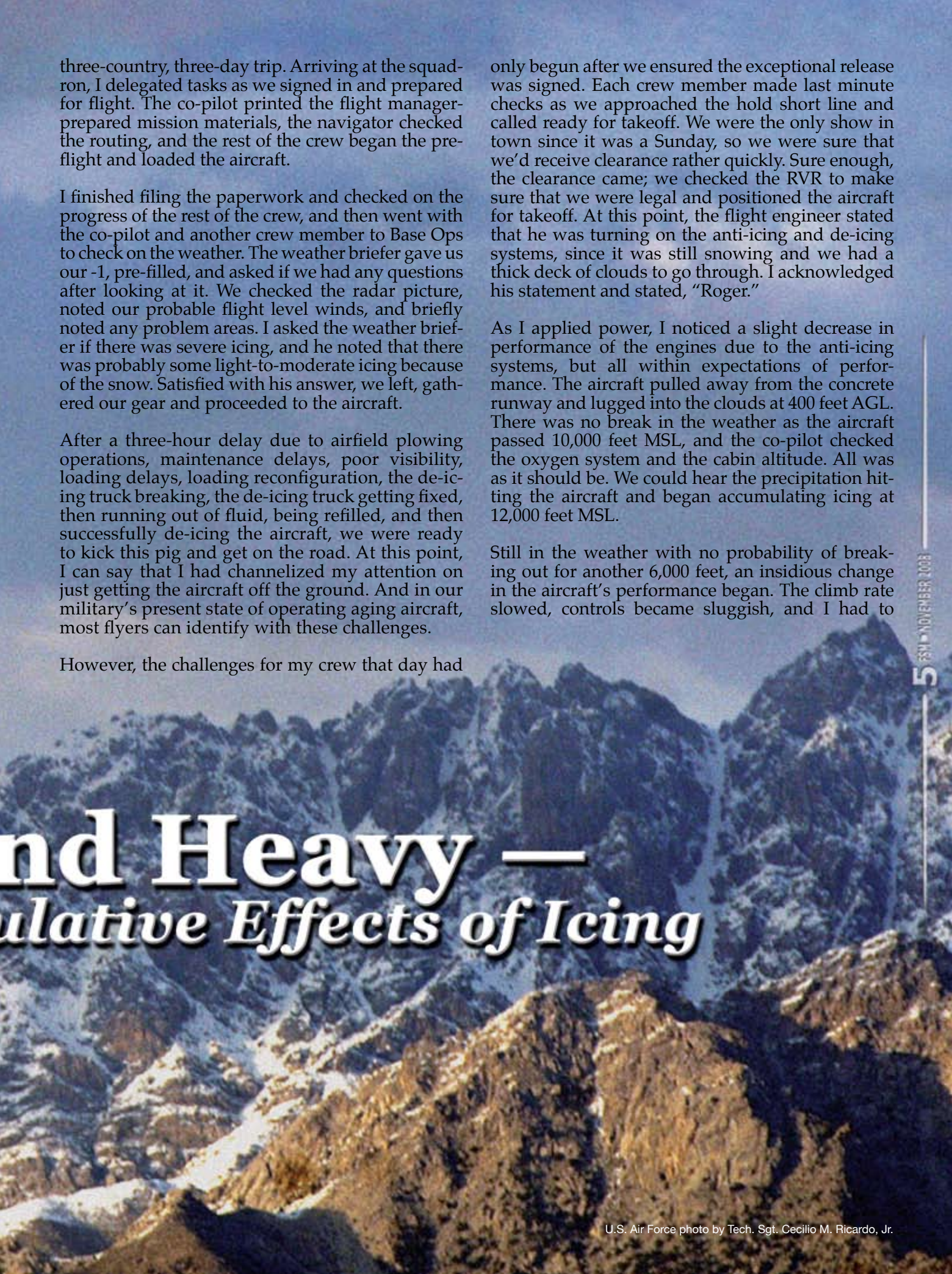
I finished filing the paperwork and checked on the progress of the rest of the crew, and then went with the co-pilot and another crew member to Base Ops to check on the weather. The weather briefer gave us our -1, pre-filled, and asked if we had any questions after looking at it. We checked the radar picture, noted our probable flight level winds, and briefly noted any problem areas. I asked the weather briefer if there was severe icing, and he noted that there was probably some light-to-moderate icing because of the snow. Satisfied with his answer, we left, gathered our gear and proceeded to the aircraft.

After a three-hour delay due to airfield plowing operations, maintenance delays, poor visibility, loading delays, loading reconfiguration, the de-icing truck breaking, the de-icing truck getting fixed, then running out of fluid, being refilled, and then successfully de-icing the aircraft, we were ready to kick this pig and get on the road. At this point, I can say that I had channelized my attention on just getting the aircraft off the ground. And in our military's present state of operating aging aircraft, most flyers can identify with these challenges.

However, the challenges for my crew that day had only begun after we ensured the exceptional release was signed. Each crew member made last minute checks as we approached the hold short line and called ready for takeoff. We were the only show in town since it was a Sunday, so we were sure that we'd receive clearance rather quickly. Sure enough, the clearance came; we checked the RVR to make sure that we were legal and positioned the aircraft for takeoff. At this point, the flight engineer stated that he was turning on the anti-icing and de-icing systems, since it was still snowing and we had a thick deck of clouds to go through. I acknowledged his statement and stated, "Roger."

As I applied power, I noticed a slight decrease in performance of the engines due to the anti-icing systems, but all within expectations of performance. The aircraft pulled away from the concrete runway and lugged into the clouds at 400 feet AGL. There was no break in the weather as the aircraft passed 10,000 feet MSL, and the co-pilot checked the oxygen system and the cabin altitude. All was as it should be. We could hear the precipitation hitting the aircraft and began accumulating icing at 12,000 feet MSL.

Still in the weather with no probability of breaking out for another 6,000 feet, an insidious change in the aircraft's performance began. The climb rate slowed, controls became sluggish, and I had to



nd Heavy —
ulative Effects of Icing

U.S. Air Force photo by Tech. Sgt. Cecilio M. Ricardo, Jr.

U.S. Air Force photo by Airman 1st Class Desiree N. Palacios

keep a higher nose high attitude to continue the climb. Yet, there were no visual clues to validate what I was seeing on the leading edge of the wing and what I thought was happening. Ultimately, the plane had a higher deck angle than normal, we couldn't reach our calculated altitude, and our VVI was now zero. Now that we were past the terrain, I commanded the co-pilot to request an immediate descent due to icing. The center complied, and we began a descent to 10,000 feet. For the next hour, we ran our anti-icing and de-icing systems continuously until all the ice had melted.

Knowing that fuel was now becoming a factor and being in a position to climb once again, we requested and received a clearance to climb to our final altitude. This time the aircraft made it, and we were able to get on top of the cloud deck. At level-off and acceleration, the additional crew member said that he had calculated that we were plus four minutes on gas to make it to our destination with the necessary reserves. I checked fuel quantity, fuel flow and ground speed, and was satisfied with his calculation. Yet, there was something nagging in my mind. I checked fuel again, ran fuel-consumption calculations, and with our groundspeed affected by the 125-knot wind on our nose, we weren't going to make it with our necessary reserves. I stated my calculations to the crew, had someone else confirm the calculations, and then set a bingo for diverting to an alternate field for fuel.

Ultimately, we reached bingo fuel, diverted, refueled and proceeded on to our destination and continued the mission, but one thing was clear from this experience: I was complacent. Although no disaster occurred, it very easily could have because I didn't do the proper pre-mission planning to ensure that I operated the aircraft and the crew in the safest manner. As the aircraft commander, I am responsible, period. It's a simple fact that is easy to forget, but being responsible means being prepared and taking the steps necessary, however inconvenient, to take care of the crew and the mission.

What lessons can be learned from this experience? Would I have taken off again? Yes, I would have, and I would be blowing smoke to say that I wouldn't have. But one of the biggest lessons I gleaned from this experience was that pre-mission TOLD can make a difference in departure planning. Sure, as aviators we may think about losing an engine and the steps we would take in a high, hot and heavy situation, but not too often do we think about the decrease in performance that can occur in cold, wet and heavy conditions. Icing is insidious and doesn't always provide the visual cues we often look for to validate what we're seeing on our performance instruments in the plane. Icing is also cumulative. The longer one stays in icing conditions, the worse it is. The aircraft's weight increases, aerodynamics change and stall speeds increase.

I could have done a better job in pre-mission planning by asking about the freezing level, comparing that to the cloud thickness, time-to-climb calculations, and calculating correctly the service ceiling, fuel flow, and TAS effects of operating the anti-icing/de-icing systems. I could have done all of this the day before the mission.

It's easy to be complacent when it comes to performance. We operate within our respective MWS's envelope and notice small changes at the margins. But it's the margins that can make a difference in an emergency or critical situation. As we move out of the winter season and into the spring and summer, icing can still be a factor. More than likely, you may find yourself in that high, hot and heavy situation. Take the time and run some numbers, plan for the most inopportune time, and find those margins.

U.S. Air Force photo

Leaving the Land of Smooth Runways

CAPT. E. KEELEY HARRINGTON
116th Air Control Wing
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Most of an E-8C Joint STARS pilot's world revolves in a triangle formed by the Robins AFB, Ga. home station, Nellis AFB, Nev., and flying operational sorties in the Middle East. Because of security requirements and an expectation that a landed JSTARS is a broken JSTARS, it's rare when we're able to take an aircraft off-station for transition training. When five other pilots, two navigators, two flight engineers and I had the chance to take our jet on a weekend TDY to Offutt AFB, Neb., to do transition, we jumped at the chance.

In the past, during many TDY opportunities, the aircraft had failed to perform due to maintenance delays in a variety of aircraft systems. This time, the crew felt like we were under the microscope — the test case for future off-station training in our wing. It was time to prove that the E-8C could fly to an outbase, do a few training sorties and return to Robins, without leaving the crew stranded and our wing one plane down for the next week's flying schedule.

Mission planning was extensive. We built folders for each emergency airfield along our route of flight and for each potential training field. We checked NOTAMs, suitability reports, found required climb-out gradients and accomplished all the other tasks necessary to prepare for the trip. Our primary goals were to gain experience flying into unfamiliar airfields, to mission-plan effectively and correctly to eliminate potential trouble, and to fly a healthy jet home ON TIME.

To get the training, we planned to drop in at Lincoln, Neb., and Forbes Field, Kan., but at the end of each day, we'd finish at Offutt AFB. Two factors could put a stop to the training quickly: a damaging bird strike and tire wear. Our plan to mitigate those factors was to honor the bird prediction software and observed bird conditions, and to minimize the number of touch-and-go's we performed, instead accomplishing missed approaches. We also ensured that maintainers checked and replaced any tires that were even close to the wear limits. We expected tire wear would be particularly severe at Offutt, which has a 0.7 percent upslope on the primary runway and was known for crosswind conditions, so we planned not to accomplish touch-and-go's from Offutt's runway.

The flight out to Offutt was uneventful, especially since we were able to land downhill. Half the flight crew and our maintainers disembarked, and, after about 30 minutes of brake cooling, we took off for Lincoln. En route, we cruised at 5,000 feet MSL. We saw no birds, but as soon as we were in the pattern again, it became evident that their "Bird Condition LOW" was optimistic. We saw birds throughout the pattern, but a close encounter with a flock of large birds on final approach convinced us that it was time to change what we were doing. We decided to stay with the tower for a few VFR approaches. Our time at Lincoln ended when their radar went offline. A madhouse of inbound VFR traffic ensued, and we departed for Offutt just as the controllers were becoming frustrated.

After a few approaches at Offutt, we landed, feeling great about the training we'd received. We'd

U.S. Air Force photo

performed three touch-and-go's (one per pilot) and two full-stop landings. As far as we knew, we'd avoided all the birds, and our tires should have been barely touched. Our post-flight walkaround, however, revealed a different story. We'd had two bird strikes. Luckily, both were small birds and caused no damage. On the other hand, our tire wear was distressing, despite our efforts. Every time the tires had touched the runway, it had created a wear pattern that looked like a patch of cracks in a chevron shape, and every main-gear tire was cut. Thus began our education in off-station tire wear and the dreaded "4T" (T.O. 4T-1-3, *Inspection, Maintenance Instructions, Storage, and Disposition of Aircraft Tires and Inner Tubes*).

To determine the type of damage the chevron patches were, we went to Table 2-1 of the "4T." The "Chevron Cutting" block of the table sent us to the "Cuts and Damage" and "Chunking Voids" sections. "Chunking Voids" said, "Minor chipping less than 5/32-inch deep shall not be regarded as chunking voids," and none of our chevrons exceeded that depth. Therefore, we used the "Cuts and Damage" section to determine whether we could fly again with our current tires. The depth limit for cuts — found on the sidewall of aircraft tires and measured in "32nds of an inch" — of E-8C tires varies between 9/32 and 10/32 of an inch. Luckily, none of our chevrons came close to the cut depth limit.

The question then became whether we should fly another pilot-training profile the following day, or just save our tires for the return flight to Robins AFB and plan for one full-stop landing back at home station. Since most of the chevrons were nowhere close to the cut limit, and the larger ones still were at about half the limit, our maintenance crew and instructor pilots determined that it would be safe to continue with our plans to accomplish more training the next day.

The second half of our crew flew Saturday, traveling to Forbes Field, Kan., another grooved runway. They also tried to minimize landings, managing to limit theirs to eight. However, when they rolled to a stop at the end of the day, a new problem emerged. In addition to more chevrons, one of the main gear

U.S. Air Force photo by Staff Sgt. Matthew Hannen

tires had a slice in one of the longitudinal grooves. Close inspection revealed that the slice was deep enough to make one of the cords visible.

Once again, we turned to the "4T." In this case, the slice exceeded the cut depth, so we technically needed a new tire. We were still eager to show that the E-8C could be flown off-station and return home on time, and we debated overnight whether the tire would be good enough to request a waiver to fly home — one takeoff and one landing. We talked about our flat-tire taxi limits, the possibility of a blown tire on takeoff and on landing, and tried to consider all the factors and possibilities. We also started exploring whether we could use a tire from one of the similar aircraft stationed at Offutt. When we found that none of the other aircraft there used the same brakes, and therefore all had different tires, we finally inquired into having a tire shipped to us from Robins. Monday was the first available day for pick up, pushing our likely departure from Offutt back to Wednesday, three days beyond when we were scheduled to be home.

When we returned to Offutt's flight line the next morning to re-examine the tire in the daylight, we were still debating about the best course of action. However, the tire slice had doubled in size. Additional investigation revealed two cords were exposed and damaged, and that the slice had expanded to undercut the tire ribs on both sides of the tread groove. According to the "4T," if a cut doesn't penetrate the cord body, and as long as the tire damage doesn't become progressively worse, the tire may continue in use. However, if a cut penetrates the cord body, it must be shorter than one inch at the cord body to continue use. Our tire damage had gotten worse overnight and exceeded the one-inch requirement. We finally discarded our illusion of getting home Sunday and had a spare tire shipped. We returned to Robins AFB uneventfully Wednesday, and were met on the ramp by the OG commander, chief flight engineer from OGV, and Wing Safety. Although the sliced tire was no longer on the aircraft, our chevron patches caused quite a stir in the Southeast, a land of flat, smooth runways and gentle winds that typically allow very gradual tire wear, unless a rough landing causes a flat spot, something to be laughed about and rounded out

U.S. Air Force photo by Staff Sgt. David Miller

during the remaining life of the tire.

The lessons learned from our off-station TDY were myriad, but the importance of gaining knowledge outside required publications, trusting our publications and maintainers, and proper mission planning when flying outside our normal area are paramount. In this case, everyone on our trip became much more familiar with T.O. 4T-1-3. It contains very helpful information, such as the causes of our various tire problems. Chevron cuts are caused by landing on grooved runways. Undercutting of the tread blocks occurs during high-crosswind landings or sharp turns. Offutt AFB is set up so a takeoff from either runway requires back-taxiing into position and a 180-degree turn to use the full length. Plus, the Midwestern runways seemed to perpetually be misaligned to the prevailing wind direction during our trip.

If we'd read those two captions in the "4T" before having our tire problems, we would've been much more vigilant to these unfamiliar causes of tire wear and further limited our landings or considered intersection takeoffs. Once we'd damaged our tires, our maintainers proved very knowledgeable about how to grade each tire and which classification each instance of damage fell under. More than any other factor, they advocated for the proper decision of replacing the tire, despite our best efforts to misread the "4T."

Finally, our mission planning had been adequate, but we'd failed to identify the grooved, high-friction runway surfaces, which eventually led to delaying our return home. Although there are a few airfields within the normal flying area from Robins AFB with grooved and sloping runways, we had very little experience with tire wear resulting from multi-day training programs. It's something that we JSTARS pilots have simply not often dealt with.

Incorporating these lessons into future mission planning will increase the chances of off-station sorties returning on time and will make unplanned flight deviations better thought-out. The result will be a safer flying program in the future.

Flying in Ice — A Review

CAPT. WILLIAM DeWALT
Unit/Base - Data Masked

If you ask any pilot what aspect of flying causes him/her the most concern, the reply might be flying in icing conditions. As the CONUS is being hit by another Nor'easter, and we continue flying in the icing conditions over Afghanistan, it's important that all pilots review their icing knowledge. Here is a quick overview of some icing considerations, but it's no substitute for getting in the regs.

The Aeronautical Information Manual defines reportable icing conditions as:

- Trace* — Ice becomes perceptible; rate of accumulation is slightly greater than the rate of sublimation.
- Light — The rate of accumulation may create a problem if flight is prolonged in this environment (over one hour); occasional use of de-icing/anti-icing equipment removes/prevents accumulation; it doesn't present a problem if the de-icing/anti-icing equipment is used.
- Moderate — The rate of accumulation is such that even short encounters become potentially hazardous and use of de-icing/anti-icing equipment or flight diversion is necessary.
- Severe — The rate of accumulation is such that de-icing/anti-icing equipment fails to reduce or control the hazard; an immediate flight diversion is necessary.

***The FAA is considering completely eliminating trace icing from its regulations since it recognizes that all icing has the potential to cause accidents.**

Ice forms on aircraft surfaces at 32 degrees F when liquid water is present; therefore, clouds are normally associated with icing.

The No. 1 technique for combating ice is avoidance. Avoiding ice begins in the planning phase. Use all available planning tools. You might want to consider adding the following Web sites to your planning checklist:

Aviation Weather Center's Current Icing Potential — http://cdm.aviationweather.gov/cip
Aviation Digital Data Service — http://adds.aviationweather.noaa.gov

Take note of frontal boundary location, movement of the front, cloud tops/bases and the existence of moisture. When you couple this information with good en route planning, you'll be able to plan your route accordingly. What to think about:

- How effective are your de-icing/anti-icing systems?
- Based on the clouds and the terrain elevation, can you climb/descend to avoid the ice?
- Do you have emergency airfield information available in the vicinity of the ice?
- Can you turn around?

En route, be alert to even minor deviations in aircraft performance. A slight drop in airspeed or a minor increase in AOA may be an indicator that your aircraft has entered icing conditions. Time to react. If your de-ice/anti-ice equipment isn't already on, get it on and check for proper actuation. If the auto-pilot is on, turn it off. Maneuver to get out of the icing conditions. Don't forget, if you're on an IFR flight plan, keep ATC advised. Start working clearance changes early. And, if necessary, don't be afraid to declare an emergency. Icing is an emergency situation in all aircraft and should be treated as such.

Sometimes conditions may force you and your aircraft into conditions that have the potential for ice. Due to many variables such as terrain, bodies of water, wind, temperature, moisture and pressure, it's easy to forecast general areas that could produce ic-

U.S. Air Force photo by Airman 1st Class Christopher Griffin

ing, but it's difficult to locate specific areas of actual icing. So it's important to be familiar with the effects of icing on aircraft performance, aerodynamics and weight. This is intuitive to most Air Force pilots, but there are still some situations that many pilots may overlook and need to be taken into consideration.

Wing stall is the problem most associated with icing, since ice tends to decrease aircraft performance while it increases stall speeds. Most pilots are quick to recognize ice accumulation on the wings, because it's easy to see the wings from the cockpit. But don't forget about the tail section. Due to its smaller leading edge radius and chord length relative to the wings, the tail can collect proportionately two to three times more ice than the wings. In a tail stall, the downward lift normally generated by the tail is reduced or even removed, which will cause the nose of the aircraft to severely pitch down. As a pilot, you need to be aware of the signs of an impending tail stall. Watch for abnormal control forces when the flaps are extended. Also, a buffet in the controls that isn't matched with airframe buffet is a sign of tail stall.

To recover from a tail stall:

- Raise the flaps immediately to their previous position
- Pull the yoke/stick toward you
- If altitude permits, reduce power; don't increase airspeed, unless a wing stall develops

Often, pilots think only about icing on the en route portion of their flights, but the most critical areas to consider when flying in ice are the approach and landing. Remember that you will have an increased stall speed when structural ice is present, and this will only become more critical as you slow to land. A smart pilot will carry extra power and speed on final — at least 10 knots. Don't plan an approach with full flaps, as this will increase the likelihood of a tail stall. Be very cautious of turns in the pattern — turns increase your stall speed under normal conditions, and you're already in a high stall-potential situation. Ensure that you're maneuvering for the longest runway available. Not only are you flying faster speeds than normal, but there's also a good chance that the runways are either wet or icy.

Icing is one of the most dangerous situations associated with flying. Between 1990 and 2000, 27 percent of all icing incidents resulted in fatalities. Don't let yourself become part of that statistic. As long as you're prepared, icing is a survivable situation. Proper planning, familiarity with icing effects and constant vigilance are all actions that can help you mitigate the risks associated with flying in icing conditions.

U.S. Air Force photo by Tech. Sgt. Keith Brown

Thunderstorms

ANONYMOUS

U.S. Air Force photo

Seventeen days after becoming a qualified instructor pilot in the T-1A, I experienced a sortie I'd never forget. As a second lieutenant first-assignment instructor pilot, I had no illusions I'd be prepared for any situation. I did, however, assume I would gain moderate experience before that preparation would come into question. One day, I was scheduled to fly with a student on a 2.0 navigation sortie to Amarillo, Texas. There were some possible thunderstorms in the area, but our intended route of flight was forecast clear.

During the benign cruise flight from Vance AFB, Okla., I attempted to instill as much wisdom an 18-month aviator could possibly instill into a student who'd already flown commercially and had been flying far longer than I had. We worked in the Amarillo traffic pattern with my flight commander and one of our check pilots. We all kept watch on storms building to the north and south of our route back. About halfway through our intended training, the convective situation started to worsen. We made the conservative decision to return, not wanting to push our luck with the weather. All three planes got the same clearance back to Vance; we departed last.

Flying back, I was able to track the other two airplanes via our traffic/collision avoidance system. We were routed through Gage, a navaid, where we make an easterly turn toward Vance. We could see the thunderstorms building to the south and north. I was excited, as this provided ample opportunity to show off the features of the weather radar to the student. I knew the T-1A was one of the more advanced airplanes with its avionics and displays. It has an all-glass cockpit, so all my displays were digital and vastly superior to every other airplane I'd ever flown. I wasn't worried about the build-up, as we were right behind a flight commander and a check pilot. Everything must be OK. We were all talking on the common frequency, aware of where the storms were and which way they were building. The other two pilots didn't sound concerned, so neither was I.

Making the turn at Gage, we were able to get a clear picture of what was happening. I was "painting" completely red to the north and south, with centers of magenta. The magenta color told me we were dealing with some very real thunderstorms. I had been taught that magenta was the worst of the worst when it came to "painting" convective activity. The red was also severe enough to be avoided at any cost. With some minor deviations, I was still "painting" green for a route into Vance. As my flight

commander asked for a deviation, followed by the check pilot, I followed suit. They both flew through the middle of the area I was "painting" green.

Continuing east toward Vance, we penetrated the green; we were in solid IMC but no precipitation. I was still "painting" green all the way to Vance, with red and magenta to the north and south. That was when it happened, immediately and without warning. The noise was deafening. We immediately lost the ability to hear anyone over our radios. The pitot static instruments became completely erratic. The altimeter and airspeed indicators were rapidly spinning up and down, with the vertical velocity indicator showing random climbs and descents in the thousands of feet per minute. This was about the time I made the biggest mistake of my flying career: I looked outside my window and aft. To that point, I had no idea how much a wing could actually flex in the vertical. They no longer looked like a soaring bird's wings. They were now big flapping pieces of metal that looked more like a guy riding a unicycle off a cliff with homemade wings of paper and wood, flapping madly to stay airborne.

In retrospect, it seems like I watched those wings for hours, anticipating the inevitable snapping of metal. In reality, it was only a second, as almost every warning horn was going off in the airplane. Then I heard a new warning — the one you get when throttles are pulled back and the gear is not down. That one got my attention. The student, still flying, had the instinctive reaction to pull power off as the gauges showed a massive descent and airspeed going above the operational limit of the airplane. As I had more free brain cells at the moment than she did, I realized the last thing we wanted to do was take any power away from the airplane.

I took the airplane, pushed the throttles back up, and attempted to take stock of the situation. I'd always been taught that once you're in a storm, it's generally better to find the quickest way out in the general direction you're going. The alternative of turning around would take you a few more miles into the storm, only to reverse course and retrace those miles out, usually keeping you in the storm longer. That was when it occurred to me that it was still not raining! Well, not raining water, anyway — it was raining huge masses of ice. I remember seeing what looked like tennis ball-sized pieces of ice. In reality, they were probably more like golf balls. I then noticed what looked like worse conditions ahead, including lightning. I made the decision to turn around and get out of the hail. As I did this, I made a radio call to ATC, heard by the other T-1As as my yelling, **"I'M TURNING AROUND!"** I never did hear ATC, and we had to yell in the cockpit just to hear each other. I'll never forget that turn. I had a pit in my stomach as we continued to get pummeled. Once I'd made the decision, there was no going back, and we would soon find out if it was the right decision.

We got turned around, and at some point the pummeling ceased. Soon thereafter, our instruments came back, and we could hear ATC again. As things settled down, we realized we came out more than 5,000 feet lower than we went into the weather. We spent another 45 minutes attempting to work our way into Vance or find a VMC hole to Wichita, Kan. I was unwilling to go into IMC again, regardless of ATC assurances that it was clear of storms.

We eventually landed uneventfully, and everything seemed fine until I taxied into parking. It wasn't until I saw the looks on the faces of every crew chief and maintainer, as they waved anyone nearby over to look, that I realized I'd made a mistake. I never declared an emergency, so no one was expecting a damaged airplane. I didn't need traffic priority as I was getting all the ATC attention I wanted. It wasn't a conscious decision — it was oversight. I quickly got out of the airplane to look. I don't know what I expected, but seeing the damage on an airplane you just landed hits you a certain way. The leading edges were all dented, some flattened; the nose cone looked as if it had been sandblasted; the pylons holding the engines on were simply beaten; a quarter of one windshield wiper was broken off; and the GPS antenna was smashed.

The rest of the day consisted of paperwork, and eventually, a private meeting with the operations officer. Of all the lessons I learned, one was definitely an example of how a great leader handles this type of situation. He took me into his office, and he asked me about the radar and weather. When he was satisfied I knew the things I was supposed to know, he ensured I was on the schedule to fly the next day. He told me very succinctly what he thought about our attempt to "shoot the gap," and he was disappointed that I didn't declare an emergency. Aside from that, he made it a learning experience for a very new pilot.

Another important lesson I learned was just because someone has more experience, higher rank or a command position in the squadron doesn't mean blindly following or agreeing with a decision they make is OK. They may have made the best decision for their aircraft, but ***I*** was in charge of my aircraft and owed it to myself and my student to ensure it was the best decision for us, as well. The lessons learned that day will not be forgotten. Not by me, my student or anyone else who was around to see that airplane, or our faces when we returned.

ORM and Common Sense — One and the Same?

ANONYMOUS

"Operational risk management!" Ha, what a joke. Are all these guidelines really designed to help keep me, God's gift to aviation and the Air Force, extra safe? Or are they just to help increase the rate at which we destroy forests and to give me extra paperwork? Why does someone like me, fresh from the best pilot training program available, need to worry about extra stuff like that? All I need are the keys and I'm good to go. That's what I thought about a year ago. Soon I'd find how useful ORM is in every situation as a final safety check of your common sense.

When I first arrived at my unit, I was on top of the world — shiny silver wings blazing across my chest, a new wife prettier than a sunset over the Rocky Mountains, and my ego, barely able to fit through the door. I knew how to take off and land, figuring that was all there was to UPT. I figured that was all there was to flying any jet.

On my first mission in the sleek C-21 Super Taxi, I was along mainly to load bags and see how a mission was run operationally. What we do on the road is what everybody learned to do in T1s: take off, full stop somewhere else, pick up a pax or two, fly somewhere else, and continue until done. Pretty simple. My first assumption is generally correct; our missions normally go as planned, without a hitch. Every once in a while a problem creeps in, and the chain begins.

We arrived at the first stop on time and dropped off the Space-A passengers and went in for the base ops drill. We flew over some T-storms on the way in, but those shouldn't have been a factor, because we were scheduled to take off in 40 minutes, and the storms were about two hours out. We had one duty pax waiting in the DV lounge, and another was running late. So we waited and kept checking the thunderstorms, and waited some more. Now we were out at the jet waiting with the GPU running. Two hours passed and those T-storms were then overhead, so we went back inside and started checking our crew duty time. It looked like we'd make it home, but just barely if we took off in the next hour. The final pax

U.S. Air Force photo
U.S. Air Force photo by Bill Thornton
Digital illustration by Felicia M. Hall

showed, but then there was lightning within five miles. We then got a call that we were cleared for takeoff. We scratched our heads and wondered how lightning within 5 miles could be "waived," so we talked to weather to see what was up. We found out that it was safe to head out to the jet, and our escape route through the storms was to the south, which was where we were headed. We pressed.

The GPU was running and we started to crank engines, when we noticed the GPU was off line and our AC unit had been running the whole time, draining the batteries. The engine started, but the batteries overheated. We had to shut down, go back inside and wait for maintenance to replace the batteries. Another two hours passed and we knew we probably weren't going home that night, since we were going to run out of crew duty day.

Our day kept getting worse. The pax was restless, because our final lift, the one who arrived for an on-time takeoff, couldn't go to his final destination because it had closed two hours before. We had to off-load him where his car wasn't, and the lift who arrived two hours late was mad, because now he was five hours late. Either way, we weren't having a good time anymore. In the end, everything worked out … no emergencies. We got everybody where they needed to be, albeit a little late, and maybe a little bit farther from home than they would've liked, but home, nonetheless, and home safely. This is because of our common sense and good ORM skills.

How did ORM filter into any of this? I never once mentioned that we filled out an ORM worksheet. ORM is a continuing process, used very much like common sense to filter out what you should be doing or what you could do to mitigate associated hazards and risks. One obvious hazard and associated risk in this situation was the thunderstorms.

The ORM loop has us look at six things to determine what should be done:

- Identify the hazards
- Assess the risk
- Analyze risk control factors
- Make control decisions
- Implement risk control
- Supervise and evaluate

Hazard identification was easy: thunderstorms. The assessed risk is getting struck by lightning or crashing due to wind shear. Along with assessing the risk, we look at how long we'd be exposed to the danger. Being exposed to lightning on the ramp and in the air is the greatest threat, because of time and the ability of a Learjet to be able to fly through wind shear on takeoff. In analyzing risk control factors, we determined the best solution was not to go onto the ramp with lightning, and delayed due to weather. Deciding and implementing happened almost simultaneously for us, as we were the ones with the authority to decide if we would enter the ramp. Evaluating later was easy, as we still completed the mission, just a little later.

The process isn't complicated and isn't a waste of time. You do it every day for every action. It's simply common sense. ORM is the name of the process for common sense. Does it waste time, paper and money? No. It's just another tool you can use to help make things easier and less stressful when things go awry.

U.S. Air Force photo by Tech. Sgt. Scott Laforest

U.S. Air Force photo by Senior Airman Tabitha Kuykendall

Reading the skies, not tea leaves

An Obvious Mistake — Haste Makes Waste

ANONYMOUS

U.S. Air Force photos by Airman 1st Class Jonathan Steffen

You've probably heard it more than once from an instructor, "When you allow yourself to get out of your habit pattern, watch out!" Anyone who has stepped late or stepped to a spare pressed for time knows this truth.

Rushing to the Viper for a complex SEAD ride, the foremost thing on my mind was not my walkaround. Instead, I was trying to grasp this sortie in my budding, non-mission-ready mind. I soon discovered that Murphy was working against me again, with a jet parked on the far side of the ramp. After checking the forms, I sped around the aircraft flying through the checks. What I failed to notice could have cost the Air Force a valuable asset and ended up costing many man-hours and dollars.

After a normal start, I began to perform the check on the secondary engine control by running up the PW-229 engine. I then followed up with a check of the emergency power unit by running up the engine to 80 percent again. When the test failed, I ran the engine up to the max of 85 percent for the check. The EPU check again failed, so I called for a redball and prepared to shut down the aircraft for this no-go item. After shutdown, I headed back to the squadron without performing another walkaround, disappointed that there wasn't a spare available.

Ten minutes later in the squadron, I overheard words that made me sick. Maintenance found an ingested intake cover in my tail number for that go. At first I thought that it wasn't my aircraft; there was no way I would have missed that. Yet, there was no disputing that it was me. I knew that I would soon get an education on how maintenance pulls a motor from an F-16.

How did I miss something so obvious? I was in disbelief. Every time I

do a walkaround, I physically poke my cranium into the intake to look for FOD. Every time, except this once. I walked quickly across the nose checking the AOA probes and never noticed the intake. I also allowed myself to become accustomed to seeing the intake covers in place as I walked up to the aircraft I was about to fly. Sometimes the crew chiefs, probably wanting to protect the engine until the last moment, leave the plug in the intake. I allow the crew chief to remove the cover during my walkaround, rather than remove it immediately myself. This time, I missed it, and the crew chief missed it.

It was fortunate this mistake didn't cost more. I ground-aborted the aircraft for an unrelated reason. The engine showed no abnormal indications during start or during the higher RPM checks. If I had taxied and attempted to run up to mil power at takeoff, engine damage would have been much worse, and the consequences of an abort or even a takeoff with a damaged engine could have been catastrophic.

I spent a lot of time with the maintainers and engine troops after this incident. Most of the vinyl and foam plug disintegrated and blew through the bypass and out the back of the engine. Portions of the vinyl stuck to the fan and melted on. Fortunately, damage was minor. The mistake, however, remains major.

How did I make this mistake? First, let me say that there are no excuses for an incomplete walkaround. It's true that some of the responsibility falls on the crew chief, but I'm the one taking the aircraft, and it's a big red cover … c'mon. However, certain smaller factors caused me to miss an obvious discrepancy.

First, I didn't put my mind in the right state at step. My mind was on my role as wingman in the sortie. That's exactly where it should have been, but not at the expense of the "here and now." I didn't prioritize the tasks at hand. Ground ops took a back seat to tasks that wouldn't happen for another hour.

Second, I'd allowed myself to become accustomed to seeing an engine cover while doing my walkaround. This is something that should always look out of place on an aircraft ready to fly. If there are pins or covers present that shouldn't be there, the first priority should be to have the crew chief remove those "remove before flight" items, or do it myself. A final "big picture" check in front of the aircraft to check for obvious discrepancies before jumping up the ladder would have saved me on this one.

Third, I was rushed from the brief to step to engine start. Despite the need to start and taxi on time, it isn't worth a second-rate preflight. Nobody in my squadron would have held me in disdain for taking the time I needed for safe and effective checks.

Finally, and most importantly, I got out of my habit pattern. Physically peering down the intake of the engine was a habit I'd had since RTU, as was a final walk in front of the aircraft to check for big-picture discrepancies. I deleted those habits that day, and Murphy was there to take a chunk out of my ego and my engine.

When your good habit patterns are broken, watch out. Do a mental inventory and checks as necessary to rewind and recheck. It may take more time, but it might save much more.

Say Something ... Anything

CAPT. TYLER WICKHAM
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All in all, I'd say I'm a pretty lucky guy. Lucky in life. Lucky in love. And definitely lucky in the cockpit. All of us have had our fair share of experiences we wish we'd only have to do in the simulator. Engine shutdowns, smoke in the cockpit, gear not down and locked … you get the point. But if I'm writing an article about them, it means I really have very little to complain about. What gets you through these problems, benign or complex in nature? Systems knowledge, good checklist discipline, sound judgment and airmanship are some of the big ones. Oh, and a little bit of luck can go a long way.

Instead of luck, call it "trusting your instincts." When something doesn't feel right, you speak up. You get that little voice in the back of your brain telling you, "Hey, say something — this shouldn't be happening." It's not luck, but rather a trust of what you know is right and what your body is telling you. Back to my co-piloting days, I learned a lesson one day, and it's a lesson I still use today, every time I fly.

It was a daytime pilot-proficiency sortie; take off from home base, hit a tanker for some air refueling work, and roll back to base for some IFR and VFR pattern work. Talk about sweet — three or four pilots getting to fly around to their hearts' content! The sortie began as normal, with an overcast deck dropping into the picture at about 2,000 feet. I've personally always preferred that; it's great practice for instrument work, but still allows for a VFR pattern. Our takeoff and cruise to the tanker were about as smooth as they get. No issues to note and the training was great. It was when we returned to the pattern that things got a bit weird.

I was a co-pilot with minimal hours and still trying

U.S. Air Force photo by Staff Sgt. Jason Barebo

to find a "feel" for the jet. I could fly engine-out approaches, landings and touch-and-gos, but by no means were they perfect. I was in the right seat, with my instructor in the left. We were flying our first approach and had already simulated the loss of an engine. Checklists were run, outside agencies were notified, and my entire crew was on the same page. Three-engine touch to a four-engine go to a simulated engine failure, takeoff continued. The purpose of a SEFTOC is to practice flying the jet if you lose an engine just after your decision speed and need to continue the takeoff.

We got the jet configured and brought it in for a nice touch-and-go, all four spooling up and rotating off the ground just like we always do. However, when I was airborne again, I felt a violent rolling tendency that I wasn't expecting. Then, at 200 feet, there goes the IP taking my No. 1 throttle to idle. Wow, now this was bad. I could barely keep the jet level, let alone fly it where I wanted to. It was the combination of that violent roll, coupled with the yaw from the simulated engine-out, all compounded by having to push the other three engines up to compensate for the loss of my No. 1. This was more than weird; it was downright wrong. Scary wrong. I couldn't shake the feeling that I was causing the roll. It had been so long since I'd flown three-engine approaches that I thought it was me.

It was time to get cleaned up and turn back into the IFR pattern for another approach. Talk about a handful of airplane. I have an engine out, rudder in to compensate for that, and the powerful rolling tendency that I was correcting with more than 50 percent opposite yoke input. I was at max effort just getting my gear and flaps up. I barely had any control authority left for the turn. I was really feeling scared. My instructor looked at me, wondering why my turn was all of about 15 degrees, and saw my hands full. He began to ask what was going on, but by that point, I had enough. Quickly, I said, "Sir, something is just not right, and I don't think it's me. I'm putting No. 1 back in and I'm going to figure this out." As No. 1 spooled back in, that helped. It eased the yaw that I had been controlling with rudder. But I still had a very noticeable roll to the left. I was controlling it with right yoke control, but that was nuts. A clean, equal-throttle airplane doesn't need more than 50 percent right yoke to fly level. Maybe the flaps didn't retract properly, or an engine wasn't producing thrust like it should, but something was definitely wrong.

By then, the IP took the jet and quickly noticed the roll. Immediately, he made the same face I'd made about 60 seconds before. You know that face — the one that says, "Something's really wrong, and I'm not sure I can fix it." He took the jet and flew a four-engine low approach to get a feel for the controllability. The next approach was the IP's full stop. I was just glad to be on the ground.

We didn't even need to get out of the jet before maintenance started grilling us with questions. Why did we land early? Why did we fly that low approach? What was wrong? Honestly, we could only guess. The IP, the engineer and I started to explain when I heard a voice pipe in. It was one of the maintenance guys. "Let me guess, it was rolling on you and you didn't know why." Yup, but how did he know? "Your left spoiler — one set is stuck up about six to eight inches." That would do it.

Why that spoiler wouldn't fall flush to the wing after working perfectly for the first two hours of flight is beyond me, but it didn't, making for one scary touch-and-go.

During debrief, we all talked about the incident and what we could have done better. My big mistake was waiting. What did I think I was going to do? I knew something was wrong, but I kept trying to fix it myself until I just couldn't handle it anymore. I physically couldn't make the airplane do what I wanted, and that was the first time I said anything. If that's your mindset, why have a crew airplane? What harm would have come from my saying something sooner? None. I'm thankful that nothing really came of it, but it could have been much worse.

As it turned out, there was a malfunction in the hydraulic valve leading to the set of spoilers that wasn't allowing all the fluid out, therefore, not allowing it to lie flush on the wing. A tiny bit of spoilers raised on the top of the wing can decrease your lift pretty significantly.

In the end, my crew was praised for great aircraft control and crew coordination, but it was more a learning experience for me than it was time to pat myself on the back. From that one experience, I learned that there's no reason to keep a secret to yourself, especially on a crew aircraft. Even if you're completely wrong and it's something you should have known — big deal! It's always better to speak up and say something, say anything, than to lead your airplane, your crew and yourself into a situation you can't get out of.

There I Was ...

ANONYMOUS

It was 10 minutes before arriving on station for my crew's last combat sortie of the deployment. We'd started picking up some light, mixed icing about 15 minutes earlier, and this was pretty normal during our last few sorties. Another night of icing meant extra vigilance to back up our Herc's automatic ice-detection and de-icing systems. Just before we ran our combat-entry checklist, the co-pilot kicked off one of the most exciting 30 minutes I have flown in an EC-130H. "Hey, Eng," he said, "are you sure the prop anti-icing is working?"

In C-130s, we use engine bleed air to keep our engines and wing and empennage leading edges ice-free. Electric elements heat the propellers, pitot tubes and windscreen. These systems easily cleared the kind of trace and light icing our crew had experienced so far.

This night was different, though. While the engineer double-checked the de-icing power flowing to the props, the precipitation outside grew heavier. Although we verified our icing systems were operational, that was our first clue that this icing was different from the nights before. The next indication came when the flashlights we were using to check the propellers flashed across the ice building up on the windscreen, despite the windows' internal heating elements.

Since our onboard systems couldn't keep up with the unforecast icing in our fragged airspace, we needed to arrange a new block or go home. Just like in training, we delegated our crew duties and began to solve our problem. The co-pilot continued to fly, my navigator focused on his weather radar to find us a clear patch of air, and the engineer and extra navigator scanned the engines and wings to keep track of the accumulating ice. We were already operating at our cruise ceiling, so I radioed Center to let them know we would need a descent of 5,000 feet to get clear of the severe icing. The descent still left us above the freezing level, and although the icing was not as dramatic, our systems still couldn't keep up. With no hope of operating in our planned airspace, we turned 180 degrees back toward the clear air we had come from, and our de-icing systems finally started to catch up.

With the situation marginally under control, I radioed the local Metro station. The meteorologists didn't have much new info for us, except that the existing weather conditions were not forecasted to change anytime soon. I filed a quick PIREP to keep other aircraft out of the mess that night.

The navigator's radar indicated that our only chance for finding clearer air where we could employ our weapons system was about 10 minutes away at the western end of our orbit. We weren't yet ready to abandon our fragged support for the Army, so I coordinated with Center for a climb to the west. During our climb, the co-pilot reported that the aircraft's performance was beginning to suffer — despite max power, we were rapidly losing our ability to climb. Once again, just before arriving on track,

U.S. Air Force photo by Master Sgt. Lance Cheung

our de-icing systems began to fall behind, forcing us to descend and turn back toward home.

Although we felt good giving the Army our best effort, it was clear that Mother Nature didn't want us flying our mission that "dark and stormy night." Now, we had to get home.

By then, we'd descended below our tactically safe altitude. No big deal in the clouds where nobody could see us, but we wanted to climb on our way home across the clearer skies of central Iraq. As the co-pilot added power and raised the nose to climb, the whole plane began a slow, hammering buffet at our charted four-engine climb speed that none of us had ever felt before. This was the first time we realized how much ice we'd be carrying home with us. Although we could see the inches of ice on some of our nonheated leading edges, like the external fuel tanks, we now realized that the dozens of antennas we use for our mission were carrying too much ice to climb even from these medium altitudes.

We quickly plotted a new route home to avoid the highest threat areas of Iraq and began to consider our approach to our base. As dawn crept across the sky, we were able to see the extent of icing on our plane. Antennas and unheated windows were coated with chunky mixed ice more than four inches deep. With hundreds of pounds of ice clinging to our plane's nose, external fuel tanks and dozens of extra antennas, we knew we needed to thaw out before we slowed and configured for landing. We executed an en route descent over the unpopulated desert along the Kuwaiti border and began to melt the glacier that had built up on our nose and antennas. When the football-sized chunks of ice finally stopped breaking loose and dramatically flying past our windows, we completed our descent and final approach for a safe landing.

This mission taught me a dangerous lesson about icing: don't delay the decision to fly out of icing conditions. Although our heavy, high-drag EC-130H didn't have the performance to climb to the clear air just a couple thousand feet above, we shouldn't have hesitated to descend and turn toward clearer air.

How much icing is too much in the C-130? From now on, I'll be alert for the two most obvious signs: ice building up on prop spinners and ice building up on the windscreen. We demonstrated that the C-130's wing and empennage anti-icing system is powerful enough to keep up with even severe icing. However, if prop de-icing and windscreen heat cannot keep up with ice, the crew cannot afford to delay maneuvering clear of the icing. Every moment you press into icing conditions may cost you hundreds or thousands of feet of service ceiling. Even in aircraft without the EC-130H's generous ice-collecting surfaces, there are too many fairings, pods and antennas that can accumulate dangerous icing.

Good CRM made the difference for our crew. We clearly designated who was responsible for flying, radios, weather radar, de-icing systems and visually monitoring ice build-up. Each crew member contributed to our successful recovery by making clear, assertive statements about the weather radar picture, the "feel" of the flight controls, and observations of ice building up on our special system antennas. Collectively, we were able to make informed decisions and safely recover from a dangerous situation none of us had experienced before.

U.S. Air Force photo by Airman 1st Class Christina Ponte

Cross-Country in the Weather

ANONYMOUS

There I was, in one of the best situations a flier can find himself/herself in, with the "keys" to a two-ship for the weekend. What could be better? This is the story of how the weekend turned into a leadership challenge, on the ground and in the air.

Several weeks before, as a flight commander, the director of operations told me I could take a two-ship anywhere I wanted, as long as the jets performed a fly-by for a race Saturday and returned Monday. I selected the other crew members and we began to plan for the weekend. We planned a simple one-sortie Friday, two-sortie Saturday, including the fly-by, and then a return to base Monday. However, because of many maintenance aborts, the squadron was behind on sorties, so the Thursday before, the DO told me we needed to come home Monday with at least eight sorties.

I scrambled all day coming up with a plan, dividing duties among the crews who were not flying and coordinating for PPRs, permission to land at a base and receive service. Our plan was to fly three sorties Friday — leave home station, fly a basic navigation flight to another military field, take off and fly a low-level to land at a training base to show the aircraft to students, and then a final sortie to land at a reserve/civilian field before dark. On Saturday — two air navigation flights to military fields to stage for the fly-by, and then the third sortie to perform the fly-by and land back where we started Saturday morning. On Monday — two basic sorties then return to our assigned base.

Friday began with completing the plan and getting underway. Only one issue arose as we finished our planning and went to base weather to coordinate. Significant weather was beginning to build throughout the southeast and could be an issue all weekend. However, all airfields were in the green and under VFR conditions. The first sortie was uneventful. We got a weather update saying that the weather should still support our plan. All the fields and diverts were in the green, but a look at the weather radar caused doubts to creep into my mind. As we began getting close to our next landing, a call to Metro told us the weather was now extremely bad and below our weather categories, and that our divert was under the same conditions. However, we got lucky and found a third base within range and with good weather. As we landed, I remembered thinking "That that was a little more difficult than briefed," and I hoped the rest of the weekend would be better. The last flight of the day was uneventful, and we managed to arrive on time, only to learn that although we had a PPR, the crews who knew how to service our aircraft had departed for the day. Yet another omen of things to come. After another hour and a half of making calls and pleading, the crews re-

U.S. Air Force photo by Master Sgt. Andy Dunaway
U.S. Air Force photo by Bill Thornton

turned and serviced the aircraft for the night. We got in our rooms within minutes of having crew rest for the schedule tomorrow.

Saturday began with weather barely above takeoff minimums and gusty winds, but within 10 minutes we were in clear air and had an enjoyable, relaxing first sortie. After eating and talking to weather, we took off again and enjoyed good conditions until 30 minutes before landing at the next location. Once again, we entered difficult conditions, although the weather was above minimums, and we broke out with several hundred feet to spare. As we landed and entered base ops, we began discussions with our ground crew and race officials about whether the fly-by would proceed. We ended up delaying on the ground for more than 30 minutes, waiting for word on whether to launch. Meanwhile, the same weather that built the day before was back and standing between us and getting to our final destination. However, because of the push to make the fly-by, we were unaware of the thunderstorms in our path. Finally, we learned that the fly-by had been cancelled, and we were cleared for takeoff, to fly straight to our final destination.

We took off and immediately entered the weather. Within 30 minutes, we got word of a large thunderstorm in front of the flight path. We coordinated with air traffic control for vectors around the system and to the final destination. As we moved around the initial cell, ATC informed us of more build-ups. Suddenly we were surrounded by thunderstorms, with all of our divert bases now in the red. We weighed our options and had several radio communications with military pilot to Metro stations. Finally, we decided our only option was to push through the final wall of storms and attempt to land at our planned base. We put our radars out front and began to dodge cell after cell inside the front. We lost radio contact with ATC several times before finally breaking through the cells and making the approach to our planned base. We broke out slightly above minimums and landed uneventfully. As we landed and began to talk, we realized how many lightning strikes we'd seen and just how lucky we'd been. After a day of relaxation, we flew our assigned sorties on Monday and RTB with no issues.

We learned several lessons during that chaotic weekend. First, as the mission changed from a basic three-sortie weekend to an eight-sortie marathon, aircrew members must ensure they get a very good feel for the weather forecast for that period. I recommend you look at radar yourself, do a face-to-face with the base forecaster, and ensure you have a good understanding of how your diverts and gas requirements could factor into the mission. Don't allow ground crews and potential deadlines from fly-bys to change your step-time habits. Don't get caught in situations where weather can build without your knowledge. Overall, aircrew judgment and discipline are key factors that should not be left behind for sorties or fly-bys.

Digital illustration by Felicia M. Hall

Murphy's Gunship

ANONYMOUS

It looked to be another boring conclusion to another dull mission until the co-pilot put the gear handle down on final approach. The old Chinese curse says, "May you live in interesting times." When our AC-130's left main gear continued to show that the gear was in transit instead of the usual, comforting down and locked, the lives of 14 crew members suddenly became interesting, and that was only the beginning.

We had to execute a go-around and entered the pattern to try again. The pilots cycled the gear with the same result: left side stuck in transit. The loadmaster took a look through a small portal over the wheel well and visually confirmed that the gear was out of position. He could see that something, possibly a rag, was jammed in there and preventing the gear from coming down all the way. Try as he might, he couldn't dislodge the object. We weren't going to get the gear all the way down and locked. In that position, it would crumple under the aircraft weight and leave us sliding down the runway on our belly, spewing sparks and possibly departing said runway in God knows what direction. Maybe into some parked fires or a fuel pit? And since we were a gunship returning from an uneventful mission, we could also contribute a full combat load of 105 mm and 40 mm ammunition to the proceedings.

After notifying tower of our predicament and with their clearance, we climbed back up to altitude to work the problem. The aircraft commander and navigator agreed that it would be best to hold over the nearby range where we normally test-fire and tweak our guns. As fire-control officer, I gave the pilots computer guidance for an orbit over our usual target area. We were well clear of airfield traffic, and the pilots had something easy to fly while working the gear issue.

Once established in our orbit, the flight engineer went to the back and confirmed the LM's assessment. He consulted the flight manuals and concluded that the only course of action was to use the emergency tie-down straps. Once in place, our hope was that these straps would keep the gear in place during the stress of landing. Sounded simple enough. This procedure is rarely practiced and requires considerable dexterity and patience to properly execute. The FE, LM, and aerial gunners would all be involved in the effort, but even the most experienced among them confessed to only practicing it once in training. They further recalled that it was quite the challenge even at 0 mph in a classroom setting. Fortunately, the flight manual in this instance was clearly written and included helpful diagrams. With one gunner reading and another dispensing straps, the others set about the delicate task.

It was a slow, grueling process. The space available for them to work was far from ample, lighting was poor, and the slipstream made proper placement of the straps a labor of Hercules. Meanwhile, we were holding at length over the same point on the ground — never a tactically sound thing to do, and now even less so since the sun was coming up. We were now plainly visible in the morning light, so the electronic warfare officer opted to start punching off pre-emptive flares. There was no danger of highlighting our position, as there was no more question of hiding in darkness anyway. IR-trackers would now have difficulty tracking us, and we were steadily lightening the load of flares we'd have onboard for a possible belly landing. The remainder would be jettisoned on final approach over a safe patch of ground.

Fuel was becoming a concern, but for now we had enough since we were minutes from the base. Finally, the crew in the back announced their triumphant placement of the tie-down straps on the afflicted gear. It had been dicey, with the limited number of straps nearly being lost in the slipstream.

After some crew discussion, the AC decided to get clearance to go hot on the firing range to try to shoot out all our ammo. Jettisoning all of it would be very time-consuming and would create a less-safe condition on the ground. As FCO, I opted for dual-target attack mode, which uses both guns simultaneously, to expeditiously expend all our rounds. We executed the pre-strike checklist, the sensor operators visually cleared the impact area, and we were ready to go. I ran through my final procedure and gave the guns to the pilot. He and the sensor operators pressed their triggers and … nothing.

Our second problem of the night: fire-control issues. In this case, the hydraulic-trainable gun mounts were not driving the guns to the correct angles for firing at our current flight regime. The mission computer recognized the aiming discrepancy and refused to pass a firing pulse to the guns. I began my normal troubleshooting, but time was critical — the sun was rising and gas was burning. The AC wisely suggested I switch to a degraded fire mode, which bypassed the computer's safety inhibits. I did so and the firing commenced, though with only one gun at a time. As suspected, the rounds landed way off, since the guns were pointed incorrectly. There was no quick fix to this in the air. The guns' inaccuracy was an annoyance, but not critical. The rounds were still striking well inside the range area with plenty of room to spare, and the misses were consistent, not wandering off. Most importantly, we were lightening our net explosive weight for our uncertain landing. Back at the base, there was a missing man ceremony. Onlookers thought it was impressive that a gunship turned out for a daylight shoot, complete with flare launchings, for the commemoration.

Meanwhile, our condition got further complicated when the No. 4, right outboard, engine's prop low oil light came on for a bit and then extinguished during the shoot. The FE judged that oil was indeed getting low, but he was comfortable keeping the engine running for now. He recommended to the AC, who agreed, that they should shut that engine down on short final and feather the prop, lest it suddenly seize up on its own and remain unfeathered when we're low and slow. That would cause a wallop of drag on the right side at a critical time — an already complicated landing wherein we wanted to land on the left gear as late as possible, as it might not hold up.

By this time, the crew felt that it was in one of those ridiculously overloaded emergency procedure simulators. You know the ones where so much goes wrong at once that you think, "This would never actually happen." Wrong. Murphy wasn't quite done with us.

During the course of the firing, the hydraulics near the guns developed another problem: springing a geyser of a leak all over the now-heated 105 mm gun. As soon as the fluid hit the hot metal, we had severe smoke and fumes in the cargo compartment, so bad that it was IMC back there and getting smoky even on the flight deck.

We ceased fire immediately, donned oxygen masks and flipped them to 100 percent. It was at this point that we became concerned. Once everyone checked

U.S. Air Force photo by Senior Airman Julianne Showalter

in on oxygen, the AC announced, "All right, @#*% this, we're going to land ASAP." No one argued. The plane didn't want to fly any more today. Fortunately, the hydraulics problem was confined to the utility system — we still had flight controls. We completed our post-strike checklist and shut down the guns. We still carried almost half our ammo load, but we could no longer shoot and hadn't the time to jettison. The lead gunner had the presence of mind to inspect the tie-down straps again, in case they jarred loose during the shooting. Verdict: good to go.

The co-pilot declared an emergency with tower and got us clearance for a long, straight-in approach. After running the checklists, they set us up on final. We removed the flight deck overhead escape hatch both to disperse the smoke and to provide a ready exit in case we needed it after landing. On short final, the EWO jettisoned the remaining flares, as planned. The pilots and FE shut down No. 4 engine and feathered the prop, so we'd get no nasty surprises from it while trying to land as delicately as possible. I thought it good that our pilots practice three-engine stuff all the time.

The AC touched down first on the untroubled right gear, then, as gently as possible, let us down on the tied-down left gear. It held, and we taxied clear of the active runway. After shutdown, we egressed the aircraft, as we'd briefed, because of the persistent smoke and fumes. No casualties, and the plane would fly again within days.

Because my duty position meant I was mostly not involved in the emergency, I was able to observe the crew response relatively unfettered. From the veteran AC down to the rookie LM, the crew exhibited excellent CRM principles. No one forgot the priorities of aviate, navigate and communicate while working the various problems. Information flowed readily between crew positions on the 14-member crew, and always at the proper time. Needed tasks were accomplished with the requisite sense of urgency, but not a hint of overly hurried panic. "Slow is smooth, smooth is fast," as they say. The crew's effective combination of thoughtful analysis and methodical accomplishment at each stage, properly coupled with a due sense of urgency, demonstrated excellent CRM principles and led to a successful recovery.

U.S. Air Force photo by Chief Master Sgt. Gary Emery

U.S. Air Force photo

The Aviation Well Done Award is presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Mishap Prevention Program.

The Aviation Well Done Award is presented to Capt. Gregory Barasch, 85th Test and Evaluation Squadron, Eglin Air Force Base, Fla. On March 11, 2008, Capt. Barasch was No. 2 in a two-ship, F-16CM operational test mission to drop two inert 2,000-pound laser guided bombs. Immediately after takeoff, Capt. Barasch noted an "engine lube-low" light, indicating the engine's oil level was below 40 percent. Quickly determining that engine failure was imminent, he established a one-to-one glide ratio, despite a low cloud ceiling. Capt. Barasch scanned his engine instruments and noted that the oil pressure was reading below normal and steadily decreasing. He immediately began a climb to establish a one-one glide ratio back to Eglin. He elected to delay jettisoning the two inert bombs and two 370-gallon fuel tanks because of his proximity to the densely populated beach resort area of Destin, Fla. and base housing. This decision prevented possible damage to people and property. Flying a simulated flameout approach, he successfully recovered the aircraft. Capt. Barasch's exceptional flying skills and situational awareness allowed him to safely recover a high value test aircraft and prevent injury to personnel or property damage. The outstanding leadership and superior skill displayed by Capt. Barasch under extreme circumstances reflect great credit upon himself, Air Combat Command, and the United States Air Force.

The Aviation Well Done Award is presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Mishap Prevention Program.

The Aviation Well Done Award is presented to Maj. Kent S. Currie, Studies and Analysis Squadron, Randolph Air Force Base, Texas, in recognition of his exceptional attention to detail and decisive action during an in-flight emergency. On March 5, 2008, while flying a distinguished visitor indoctrination sortie, the single-engine aircraft experienced significant engine vibrations followed immediately by a master warning, indicating imminent catastrophic engine failure. Demonstrating outstanding situational awareness and system knowledge, Maj. Currie immediately terminated maneuvering and initiated a return to Randolph. While en route, the engine failed. Due to his quick and deliberate actions at the onset of the vibrations, Maj. Currie had achieved sufficient altitude for an engine-out glide into the field. Displaying remarkable poise and airmanship, Maj. Currie deftly completed all emergency procedures in full accordance with technical publications while maneuvering the engine-out aircraft into position for landing. His emergency was further complicated by a malfunction of the flaps, forcing time-critical energy management decisions while in close proximity to the ground. Demonstrating remarkable flying skill and unflappable concentration, Maj. Currie compensated for the flap malfunction and continued his flawless execution of a forced landing to runway 14R. The quick and deliberate actions of Maj. Currie saved a valuable $4.5 million asset and the lives of two crew members. Maj. Currie's actions reflect great credit upon himself, Air Education and Training Command, and the United States Air Force.

U.S. Air Force photo

Class A Flight Mishaps

FY09 (Through Oct. 16, 2008)

	Class A Mishaps		
	FY09	Same Date in FY08	Total FY08
ACC	0	0	9
AETC	0	0	6
AFMC	0	0	1
AFRC	0	0	3
AFSOC	0	0	0
AFSPC	0	0	0
AMC	0	0	4
ANG	0	0	3
PACAF	0	0	1
USAFE	0	0	0
AF at Large	0	0	0
Total	0 / 0.00	0 / 0.00	27 / 1.37

Flight Rate Producing

None

UAS

None

- A Class "A" aircraft mishap is one with loss of life, injury resulting in permanent total disability, destruction of a USAF aircraft, and/or property damage/loss exceeding $1 million.
- USAF safety statistics are online at http://afsafety.af.mil/stats/f_stats.asp
- If a mishap is not a destroyed aircraft or fatality, it is only listed after the investigation has been finalized.

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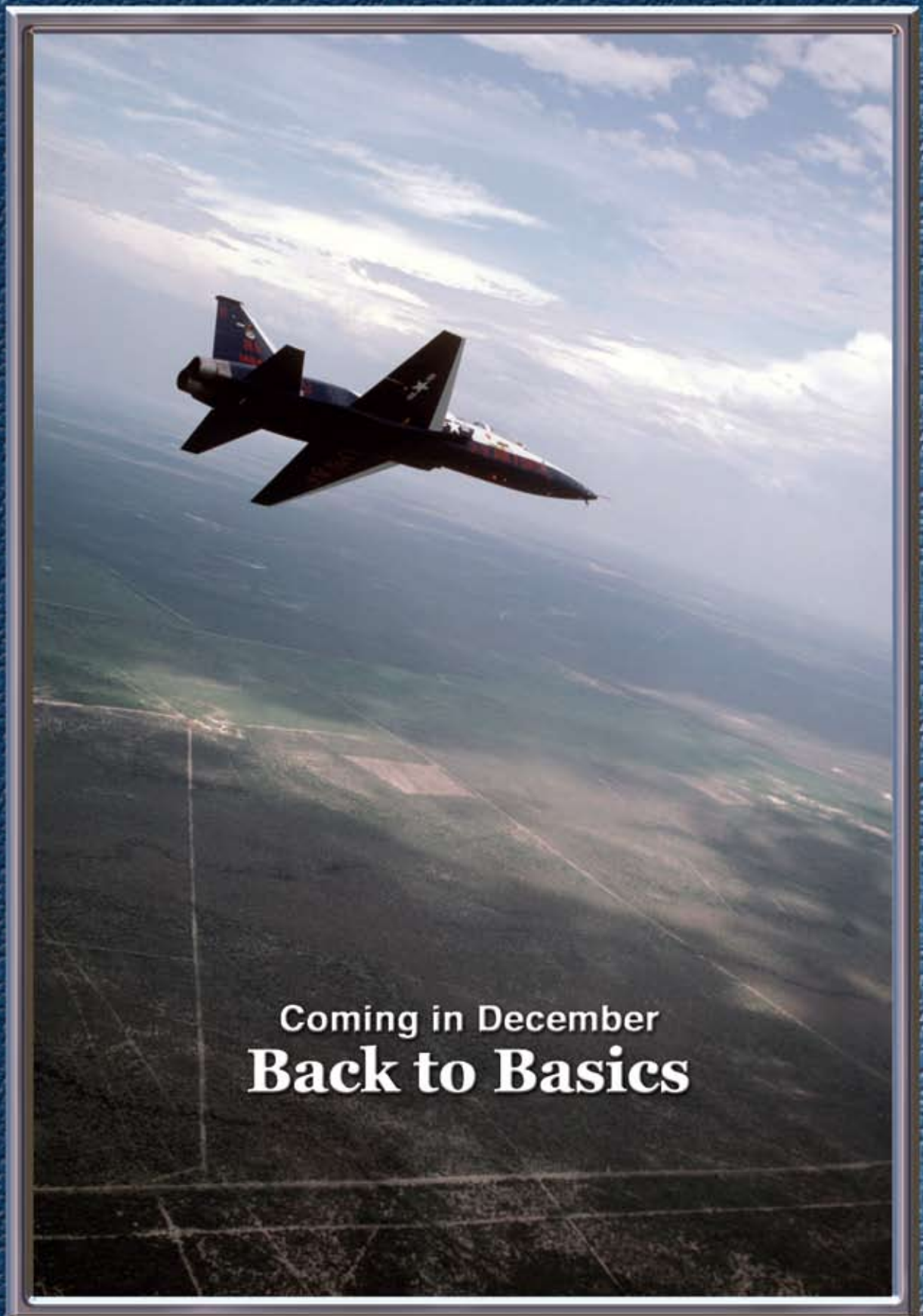
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