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FLYING SAFETY MAGAZINE
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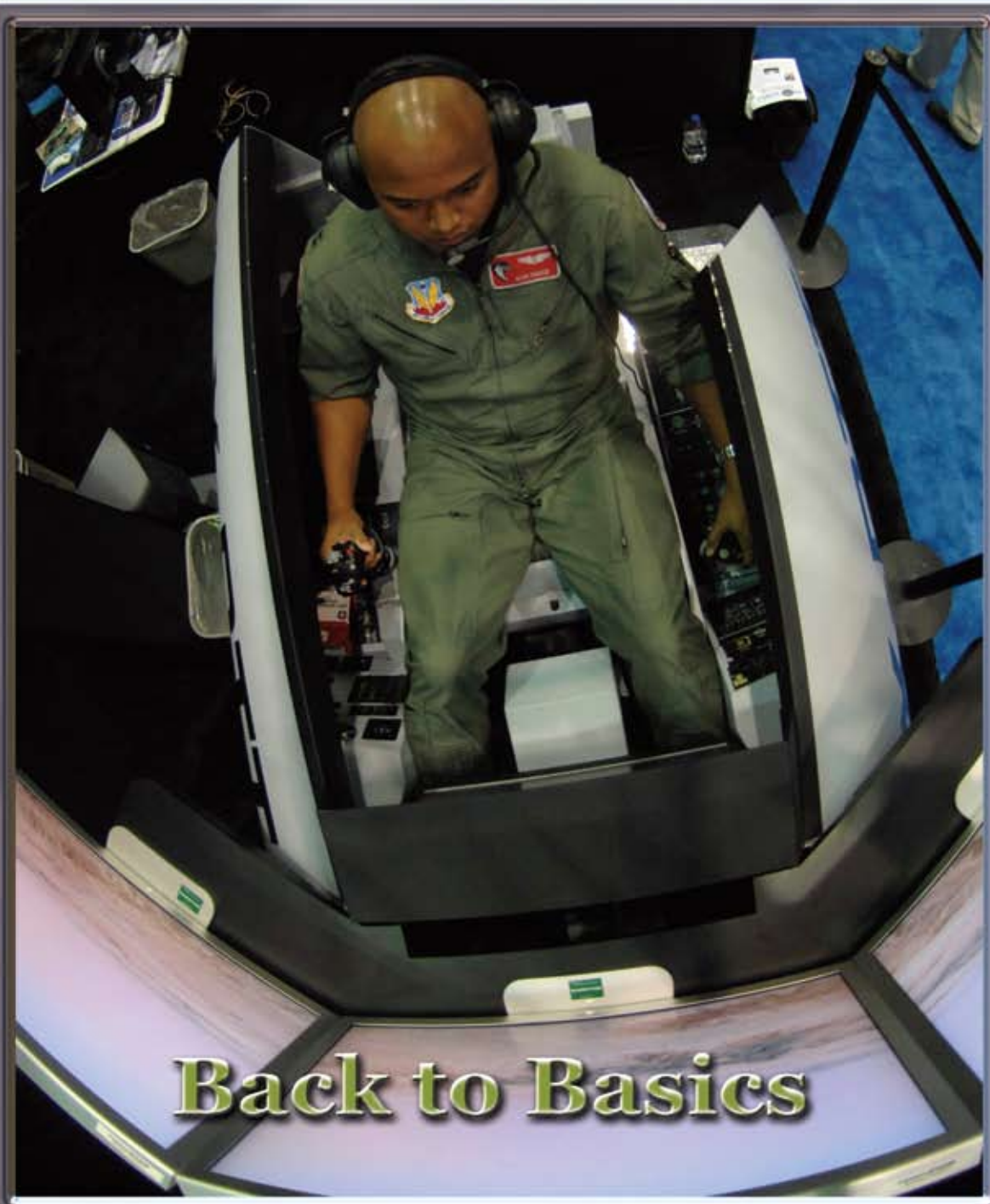

Back to Basics

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U.S. AIR FORCE

Front Cover: U.S. Air Force photo by Tech. Sgt. Larry A. Simmons
Back Cover: U.S. Air Force photo by Staff Sgt. Samuel Morse

The View from Blue 2

COL. SID "SCROLL" MAYEUX
Chief, Aviation Safety Division
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Square away the jet, finish up the 781s in maintenance, hang up the helmets and speed jeans, and wrap up the paperwork at the ops desk. Grab your cards and tapes, review your shots, and get your lines straight — let's tackle the debrief.

The postflight debrief — that's when the real learning takes place. And now that we have landed the Fiscal Year 2008 jet, we have plenty to learn. It's not that we flew a bad jet in 2008 — our 27 aviation Class A flight mishaps remained fairly close to the FY07 numbers, and we are, for the most part, right on time and on target with the 10-year average of 27.6 mishaps.

The score: We lost 15 aircraft in the FY08 push, one more than last year, but one less than the 10-year average. Man, this was a costly year. For the first time ever, we lost one of each big bomber — a Bone, a Buff, and a Spirit. Two years ago we flew our safest year ever with only eight destroyed aircraft, so clearly we can execute better.

Now, here's what's really filling my list of debrief items: We lost 13 wingmen in aviation-related mishaps last year; 11 of them in crewed jets (throw a nickel on the grass). We only lost two Airmen last year, and only one in 2006. Now, one is too many, but we've flown better missions, so this one got my attention as I stepped into the Blue 2 role.

So now that lead has handed me the chalk, I say we've got to really get back to basics. Following are my debrief points (I'll also highlight them in my briefing/debrief guide). First, training rules. I'm seeing too many TR busts, so I'm hammering TRs and ROE discipline. I also want to see our leads and wingmen better prepared, so I'll stress mission prep and systems knowledge with the Ops-O, Weapons, and Stan/Eval. The same goes for adherence to guidance and procedures across the board for Ops and Maintenance.

Next, for instructional rides, I'll play stump-the-dummy on my wingmen's personal limits and how they plan to use their systems, crew mates, and flight mates to build, rebuild or enhance their SA. With that, I'll refresh my instructional brief on cockpit and crew resource management, a vital section of my overall operational risk management briefing. Because of just how important it is and because I haven't discussed it since my early FTU days, I'm returning ejection decisions to my briefings and debriefings, and especially to my crew briefing. It's long overdue.

Think about it. Sitting through the FY08 Aviation Safety mission debrief, you see that many of the mishaps, losses and paint swaps took place during the admin portion of the flight. You know — when everything is "standard." Maybe it's time to rebrief and debrief the standards, so with this issue of ***Flying Safety Magazine***, I'm parking the back-to-basics throttles in the northwest quadrant.

— Blue 2's engaged!

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U.S. Air Force photo by Dennis Spotts

Not Having Solid Fundamentals Can Kill You

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As I was transitioning into the flight lead upgrade, I did what many fighter pilots do. I begged, borrowed and stole as many briefing guides as I could get my hands on. During the upgrade process, I tried a few different ones, but could never find one that fit my briefing style. You then merge several different guides and change the order of things to fit your own personal briefing style. Inevitably, there is a lot of verbiage carry over. You know the stuff your bros always say. And in the fighter business, we use a lot of euphemisms during flight briefings, specifically during the "Motherhood" portion of the brief. This happens because we try to minimize the admin part of the brief to around nine minutes. This arbitrary nine-minute limit saves more of the allotted hour of briefing time for the "meat" of the mission. Here are a couple of examples demonstrating common canned statements. For task saturation, you might hear, "Fly the airplane first, drop nonessential tasks out of your cross-check." For spatial disorientation, you might hear, "Recover on the round dials."

What exactly does that mean? Of course I fly my airplane first, and I always cross-check my instruments. In most cases, these statements don't cover the topics in enough detail. You should spend more time expanding on your human factors issues for the day or mission. There may be a set of circumstances that compels you to forget about your nine-minute limit on the Motherhood. After all, how do you really recognize that you are task-saturated or disoriented, that you have channelized attention, unusual attitude or visual illusions? Instead of using a canned statement to cover these issues, try putting them into the context of the mission. Where would you expect to get task-saturated, spatial D or unusual attitudes? How do you prioritize cockpit tasks? When, during the mission, do these priorities change? Using operational risk management principles can help you highlight the higher risk areas of the mission and focus your mission preparation appropriately.

Unfortunately, during my Air Force career, I've lost two good friends to consequences attributed to human factors — flying the aircraft and setting priorities. One friend got spatially disoriented and flew into the ground with no ejection attempt. The second was initially task misprioritization followed by spatial disorientation. He also failed to eject. I just did a quick search of the Air Force Safety Automated System of 180 fighter/attack Class A mishaps. Of those, 50 can be attributed to human factors — losing track of the fundamentals. All but 18 involved fatalities.

The following are some details on the second mishap

U.S. Air Force photo

that I believe are sufficient to illustrate the importance of focusing on the basics … the fundamentals.

The mishap flight was an F-16 four-ship scheduled for a basic surface attack mission on the range dropping BDU 33 practice bombs and practicing strafing maneuvers. Flight lead was an experienced F-16 instructor with more than 1,000 Viper hours. No. 2 was an experienced wingman with about 500 Viper hours. The mishap pilot was No. 3 in the formation and was an experienced four-ship flight lead with over 1,000 Viper hours. No. 4 was an inexperienced wingman still in mission qualification training status.

The weather was down to No. 4's minimums, but within limits. The briefing, ground operations and departure were uneventful.

Upon range entry, the weather on range was a bit worse than the forecast, but after a weather check, the range events were changed to comply with operating procedure limits. There was a bit of haze below the ceiling due to rain and drizzle, but there was a clear discernable horizon, and visibility was within limits. Range execution was uneventful. The flight was in the middle of their strafe passes when the next flight checked in for the range. The "knock it off" was called, and flight lead initiated flight-rejoin in radar trail to expedite the range departure.

At this point, there was some confusion between the ranger and lead as to what departure procedure they would fly. In the meantime, No. 4 was having trouble getting radar lock and rejoining in the correct position. Flight lead initiated another 360 degree turn on range to allow No. 4 the time to get into formation. At the completion of the second 360 and No. 4's "tied" call, lead initiated a departure to the southwest and climbed into IMC, which was the commonly executed departure.

During the turn, No. 4 saw some strange data on his radar scope, but based on experience, he assumed that his radar had simply broke lock. He didn't notice a changing heading, but he did see a rapidly reducing altitude from 4,000 feet and increasing airspeed. His radar broke lock as No. 3 impacted the North Sea. No. 4 reacquired radar lock on No. 2, and fell into formation on him.

So, what happened? Based on flight data recorder information, the MP lost radar contact on No. 2 during the turn to southwest. Subsequently, the MP increased his left bank and started a rapid descent as airspeed increased, until water impact. There was no ejection attempt. To fill in the blanks, I've attempted to read between the lines based on my experience.

Was the MP confused about the departure procedure? Whether this contributed to his situation, we will never really know, but I have to believe that if he was confused, he should've asked as I would've done. Here's my perception of what was happening in the cockpit: I believe that the MP was concerned about No. 4's position and status before entering IMC. The MP was flying radar trail in a left turn, when he gimbaled No. 2 and lost radar contact. When this happened, he initiated a steeper left turn to reacquire radar contact, while channelizing his attention on the radar screen. When he eventually cross-checked his round gauges, if he ever did, he was spatial-disoriented and didn't have enough time to recover from the situation before the aircraft impacted the sea.

How does something like this happen in such a benign flight regime? It boils down to the fundamentals.

I'd like to believe that if I'm in an unrecognizable attitude and unable to figure it out, I'll look at my altimeter. If it's rapidly winding down, it's probably time to hop over the side and give the jet back to the taxpayers. Granted, you could come up with any number of situations that may lead me to say that I'd stay in the jet and figure it out. It always depends, right? I'm talking about a situation where you're turned upside down so much that you won't figure it out, or altitude is at a premium and you have no time to try to figure it out. Did the MP even recognize what was happening? Is his decision to try to recover the aircraft really the root cause of the mishap? I don't think so.

Based on this situation, what should the MP have done? "Fly his jet first," right? How about flying the departure procedure and cross checking his instruments? I try not to look at any one thing for more than about three seconds. I believe that if he would've just fallen back on his fundamentals, he'd be with us today. Apply the skills that have been drilled into you from Day One of pilot training; cross-check your attitude, altitude, airspeed and vertical-velocity indicators. "Recover on the round gauges." Use the information that makes sense to you; attitude in the HUD and the attitude indicator. Everything is built on a foundation — the fundamentals.

It's a true tragedy to lose two competent aviators — friends who got task-saturated and spatially disoriented and subsequently lost track of their fundamentals. It took losing two friends and 10 years of flying experience for me to realize that the nine-minute limit on the Motherhood is not really all that important. If I need to go over this self-imposed limit to ensure my flights' ORM concerns are covered, then so be it.

Now, I try to avoid euphemisms and focus the human factors portion of my brief to the mission at hand. Something I say in the brief may ring a bell during mission execution and save a bro's life. After all, not applying the fundamentals can kill you.

A Lesson in ORM Application

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To gain a better understanding of ORM, aviators have to appreciate the Air Force's definition of it and understand that it is a logic-based, common-sense approach to making calculated decisions on human, materiel and environmental factors before, during and after Air Force operations. It enables us as aircrew members to maximize our mission success and capabilities through a six-step process of assessing the risk and control measures to optimize our decisions in completing the mission. So how can we apply this to our routine of four months on, four months off of desert rotations?

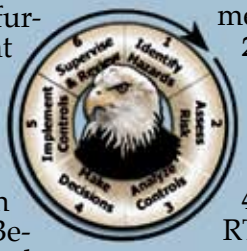
As a recently upgraded aircraft commander, my jump from passenger to driver began by stepping out on my fourth deployment. My crew was fairly stacked: co-pilot that had one rotation under his belt and nearing the hour requirements for aircraft commander; a basic engineer that had multiple combat rotations and was approaching his instructor school date upon his return; a navigator that was a newbie to the AOR, very sharp and eager to do the mission; and my loadmasters — young, energetic and knew what it took to complete a mission with success. With this type of experience, we felt comfortable in our own elements, but knew that we needed to jell to create a working crew. With that, it took about the rotation average of two weeks of flying and 21 chow hall visits to get a checklist, what I wanted to hear, who had the thinnest skin, and of course, who was the disgruntled aircrew member. Even though we were fluid in our crew elements, we needed to evaluate some of the outside elements.

U.S. Air Force photo by Tech. Sgt. Shane A. Cuomo

In Kuwait, the days grew longer. The weather reached ludicrously hot temperatures — 130 degrees Fahrenheit on the ramp, and the shelf life of a worn flight suit did not exceed two flights, even with the supremacy of Febreeze. Although the conditions got tougher, my crew still pressed on without complaint, without hesitation, and with respect for each other. Why?

It was about halfway through our rotation when we got called in from sitting Bravo Alert to perform a mission on what we thought would be a standard day. We read our frag and saw that the locations were the same, but the cargo we would be carrying was 12 fallen heroes from various locations in Iraq. This hit my crew hard. We were already leaning forward, but this made us push even harder to get our mission-complete rate higher. We would further discuss in flight how to minimize our delays in the air and on the ground. We knew that each mission we couldn't mark off the books meant a convoy might have to press out on these roads, risking IEDs and ambushes. Being a young aircraft commander though, how hard should I lead my crew into becoming "mission hackers"? The thought didn't cross my mind, and to be honest, I don't think it was on any of ours. Like a paper clip that gets bent too many times, your personal fatigue failure will occur … we just didn't know when, who, or how.

It was probably three-quarters into our total rotation when we met our fatigue failure. It was a routine mission, middle of the day with temps greater than 120 degrees Fahrenheit with no winds. Load-up and start was fairly benign with the occasional troubleshooting of a system before our fragged takeoff, but nothing significant to delay us. Our first stop was into an austere location where we ran into routinely expected ground delays due to peaks in pattern arrivals and departures, waiting for a fuel truck, and our upload. The temperature that day was hotter than in past weeks, so drinking was a definite must. I started throwing water bottles out to my crew members. As any good flight doc would tell you, getting behind on your fluid intake in this environment can be dangerous, maybe even lethal. Once we received our cargo and passengers, my engineer wrapped up his final walkaround of the aircraft and stepped onto the flight deck, commenting with choice irritating words about the heat once again. Not really thinking much of it, I called for the checklist, and we all switched from individual ground mode to flight crew mode. As we taxied out, we noticed even the engines increased in temperature quicker than usual, giving another indication of how extremely hot this day was. It wasn't until about 2,000 feet AGL when my engineer transmitted over interplane that he was feeling weak and nauseous. I remember looking back — he didn't have the beads of sweat rolling off his face like the rest of us, and he had no focus on his surroundings. Immediately, our navigator administered self-aid buddy care procedures while my co-pilot and I focused on our urgent departure from our Class D airspace. Once we were able to level at altitude, we started assessing the engineer's situation and agreed that a RTB with declaration of a physiological incident would be ideal for his health and wellness. In the given time it took to arrive at home station, we all took a moment to evaluate our personal well being.



This is where we all used the application of ORM:

1. IDENTIFIED THE HAZARD as heat stress and measured our current "level" at that moment

2. ASSESSED OUR RISK to continue the mission

3. ANALYZED RISK CONTROL MEASURES that would produce an acceptable risk for ourselves

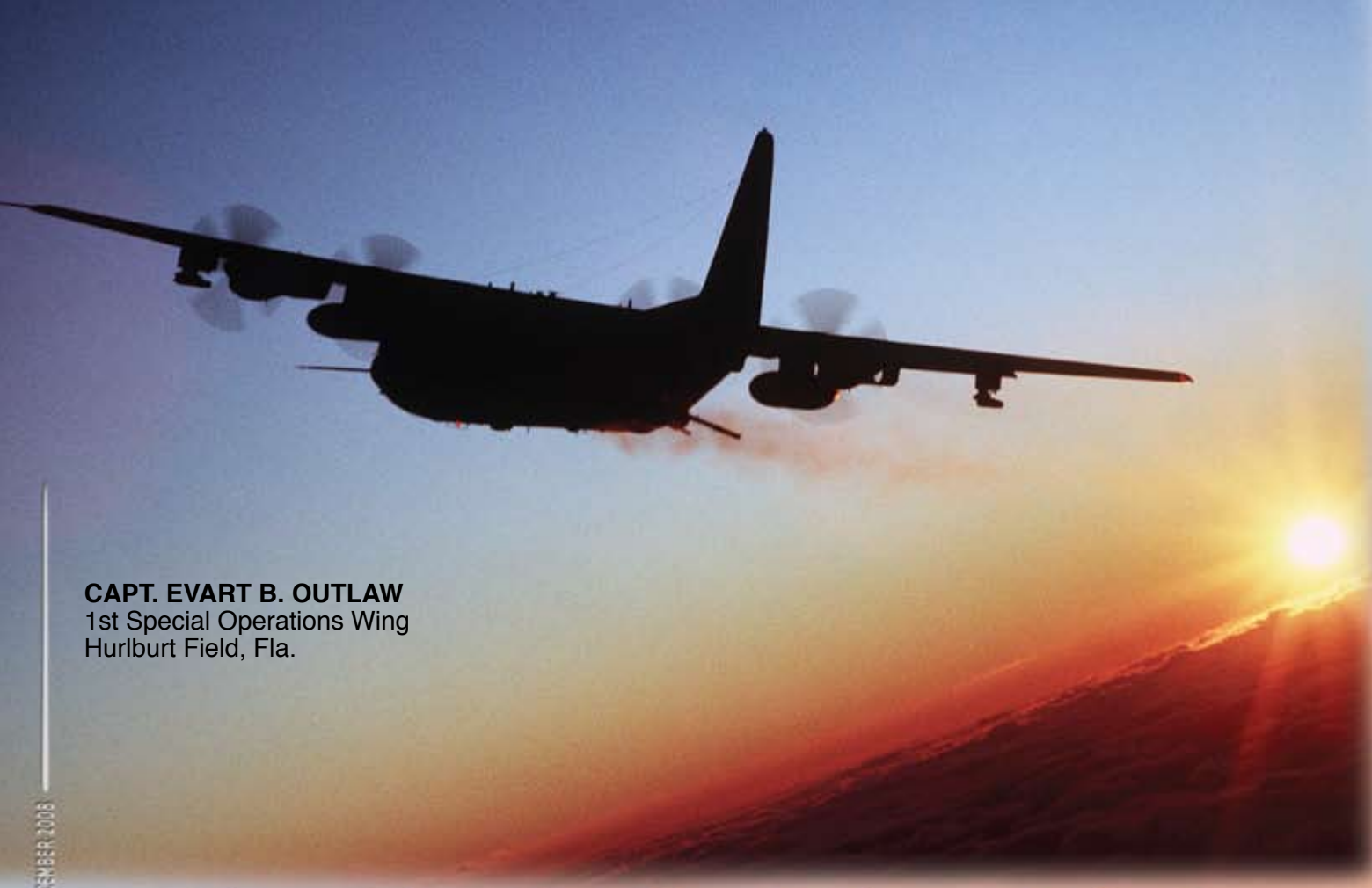
4. MADE A CONTROL DECISION — RTB with termination of the mission due to our crew's condition, followed by a ground discussion

5. IMPLEMENTED RISK CONTROLS to prevent an identical incident; and finally

6. SUPERVISED AND REVIEWED preceding mission's results.

I am a firm believer that accidents don't just happen. Instead, there is a chain of events that occurs. We must identify the error in the chain to stop the accident/incident from taking place. I challenge you to review your ORM processes and apply them to your on-duty, even off-duty events. This may be the difference between a Class A or Class E mishap in your future endeavors.

This is just one example of "There I Was" that I experienced. I hope you can learn from it and apply your own six-step process of ORM.



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How Far Is That Mountain?

I'm not fond of mountains. It's not that I don't like looking at them or appreciate what they can do as the backdrop for a beer commercial. It's just that when it comes to flying, I find them bothersome. They don't move. Thunderstorms move. Other aircraft move. Mountains just sit there.

On a recent deployment to a very mountainous AOR, my pilot picked up on my disdain for high terrain as I would squawk about every peak the radar painted.

"Nav," he would say chuckling, "I've got it. There's good illum tonight; I can see them on my NVGs."

I grumbled as I usually do, cursing the mountains, my radar, and my lack of a window. Actually, the Battle Management Center where the navigator sits on the AC-130U does have a window — a porthole that makes its occupants feel more like they are on a WWII frigate than on an aircraft. But it's covered for nighttime flying anyway.

My pilot, a former navigator himself, understood my lack of a view and reassured me by explaining what he could see from the flight deck. I didn't doubt him, but I felt obligated to tell him why I was so cautious around mountains. You see, I flew on a crew that almost hit a mountain after I was told, "Roger nav, I can see it on NVGs; we've got it up here."

Shortly after that statement, we nearly hit a large, well-known mountain called Pike's Peak. In perfect weather, no less. It's an embarrassing moment from early in my flying career that I haven't been too bashful to share.

We took an aircraft to Buckley AFB, Colo. for a week-long TDY. The problems started before we left home station. We were a young crew across the board. We had a brand new aircraft commander and a junior co-pilot and navigator. The flight engineer and sensor operators were the seasoned veterans. Being a young crew was not the problem, but the attitude we took toward the TDY was. We didn't plan enough before departing home station. There was no thorough review of the regulations governing the live fire range we would operate on. There was no in-depth chart study of the area surrounding Buckley or the live fire range. We had a "we'll-figure-it-out-when-we-get-there" attitude.

On the night of our first mission, we met with a liaison officer from the ground unit we would conduct live fire training with. It was a quick brief, and the mission was vanilla as far as our training goes. Our plan was to conduct the mission at 12,000 feet MSL. We filed a flight plan and did a quick route study. It

U.S. Air Force photo by Tech. Sgt. Lee Schading

was only then that we realized the range entry point plotted out very near to Pike's Peak, not in the vicinity of the live fire area. By the way, Pike's Peak, according to the Jet Navigation Chart I had, was listed at 14,100 feet. We considered it a nonfactor. Based on our routing, we expected to be cleared into the range before getting anywhere near the mountain.

We stepped to the aircraft confident in our abilities to ease through this simple mission. Once there, we learned the radar was broken and would not be fixed that night. No matter — their weather was great, so there was no need for the radar, right?

We took off and started the 30-minute flight to the range. We climbed to 12,000 feet MSL and flew straight south out of Buckley to a point east of the range. Once we got to that point, we turned west toward the range entry point, which was about 40 nm away. I made the obligatory call to the pilot, "Terrain 40 miles off the nose at 14,100 feet, and we're at 12,000 feet."

"Roger nav, I can see it on NVGs; we've got it up here."

My mistakes were adding up, but it hadn't dawned on me yet. I had good chart coverage of the live fire area on the range, down to 1:50,000 scale, but I had only JNC-scale charts of the surrounding area, scaled at 1:2,000,000, including the range entry point area.

Our aircraft is blessed with the finest 1980's technology, such as the tactical situation map, which shows us on our MFDs a stick-figure depiction of aircraft position relative to other points entered into the navigation system. I neglected to enter a point into the TSM for that mountain peak, which would have increased our situational awareness for the area. Again, we didn't think it would be an issue.

Then I simply disregarded the thought of the mountain and relied on the pilots to keep it in sight. While they could see it, they were on NVGs and unable to discern distance.

Finally, I fell victim to the same CRM issue that almost everyone else on the crew did — the "blinking red light," which in this case was a confused range controller. Once we made our west-bound turn toward the entry point, we started contacting the range controller, expecting quick approval to enter the airspace. Instead, the range controller didn't know anything about us or why we were there. Incensed at the controller and the lack of information that he had, we collectively turned our attention to that issue. We need only one person to talk on the radio to the range controller, but at the time, there were 12 people assisting the co-pilot in what to tell him.

This went on for a while, all with us at 12,000 feet, and Pike's Peak stubbornly remaining in its place, topping out at 14,100 feet, unsympathetic toward our problems getting onto the range.

Somewhere between the range controller's confused questions, the pilot asked me a very simple and alarming question: "Nav, how far is that mountain?"

The range controller babbled on about mission numbers, but we collectively went silent, all at once realizing there was a mountain in front of us that we didn't know the distance to, and that "12,000 feet" was in fact less than 14,100 feet. For an instant, I contemplated plotting our position on my chart, but judging by our IR sensor that was focused on the peak, I figured it was too close.

I shouted, "Pilot, climb!"

The flight engineer happily shoved the throttles forward, "Power's coming in!"

The pilot made a climbing right turn. It should be noted that the AC-130U has never once been confused for a fighter aircraft nor has been labeled as having good flight performance. But for the first time, and likely only time in its career, it got up and in a hurry.

We wouldn't have cleared the peak. That's why the pilot made the right turn. I watched the radar altimeter rapidly fall. Thankfully, the needle steadied, but not before it illuminated a readout of 1,080 feet. The radar altimeter readout increased, and the range controller continued to babble.

Our focus from there on out was surprisingly sharp. The range issue was straightened out, and we completed the live fire training. After we landed, the pilot did a thorough check of the underbelly of the plane. When asked what he was doing, he answered, "I'm checking for branches."

I felt responsible and apologized for the blunder. But the pilot pointed out that it was everyone's responsibility, and that we let our focus stray from our assigned jobs. If we had planned better and taken the mission more seriously, it wouldn't have happened.

The TDY wrapped up, more or less without incident. The radar was repaired, and I learned the meaning of the phrase "ignorance is bliss."

What are the lessons learned? For one, stick with your assigned job. In this case, only one person needed to talk on the radio to the range controller. Everyone else needed to stay focused on flying and navigating the aircraft. Also, remember the four P's: Planning Prevents Poor Performance. We started off treating the entire TDY as routine, and that just led us down a bad path. Many who have flown downrange can relate to how the missions become routine. Each mission should be treated with the same level of planning as if it were being flown for the first time.

A few years later, I was fortunate enough to instruct student gunship navigators at our schoolhouse. Nearly all my students have heard this story. Most of us are more than happy to share our stories of heroics and when and where we saved the day. I'm no different, but I've always felt it's important that others benefit from our lessons learned.

My pilot from the recent deployment enjoyed the story and shared some similar tales from when he was a navigator. I continued to call out terrain, that I saw it as a potential problem, to which my pilot would now reply, "Nav, thanks; I've got it on my NVGs, but keep us honest."

Adhering to TRs

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Here's something very basic, yet very important — following the training rules — specifically those having to do with altitude block adherence. A block is essentially an altitude sanctuary. Pilots fly in these blocks without knowing where everyone else is in the fight. As long as all aircraft adhere to their assigned blocks, they'll be safe from possible midair collisions. Typically a block consists of 4,000 feet, and a typical scenario will put blue air fighters in the 5-9 block and red air in the 0-4s, allowing 1,000 feet of separation between the blocks. You can transit low, medium and high altitudes, as long as you get into your block by 10 miles.

The rule states that unless you have supreme situational awareness on all players in the fight within 10 miles of the closest adversary, you need to be in your block. This is an attempt to reduce the chance of a midair.

From the perspective of young wingmen going out to prove themselves, we want nothing more than to do the right things, and in the air-to-air world of fighting, that means killing the group, maintaining visual contact and references, and surviving the fight. You fly a few miles away from flight lead, all the while maintaining visual on him, and flying the proper formation off of him. At the same time working all your sensors including the radar and tactical situational display. You switch back and forth between radar modes and ranges, listen to the radio calls from flight lead on one radio while listening to the GCI controller on another, all the while trying to mentally decipher the picture they, your radar and other displays are showing you. You pay attention to your defensive sensors and react accordingly to ensure you stay alive. You have to keep up on what fighter pilots call the time line, meaning that at certain ranges during the intercept, you're supposed to be doing certain things. Oh, by the way, before you shoot, you'd better be sure you're shooting the right guy. On top of all this, you're monitoring your own aircraft parameters to ensure your energy is at a proper state so you can react effectively when the time comes.

Now imagine the time comes just as you're getting close to that 10-mile range mark on the bad guys. At this point, you need to react defensively, which could lead you to losing the visual on your flight lead, or he/she may have needed to maneuver, making it difficult to keep the visual. You're struggling to keep sight of lead, still monitoring your own sensors to ensure the bad guys die, monitoring your defensive systems to ensure you don't die, and working through multiple different radar acquisition modes to ensure you've killed all the adversaries.

U.S. Air Force photo by Airman 1st Class Anthony Nelson Jr.

Throughout all this, you've made no mention of ensuring that you are in your block. This is because your thought process can easily lead you down this road. You can easily prioritize the tactics over the training rules. Are you really expect-

U.S. Air Force photo by Tech. Sgt. Quinton T. Burris

ing the enemy to be in his block approaching the merge? Our personality leads us to concentrate on ensuring we're executing the tactics correctly, and we sometimes put the TRs secondary.

Let's say you're in your block approaching the merge with an adversary, and you gain a tally on them. Your type A personality and aggressive nature say that the guy needs to die, and you point your nose up or down at him to get that radar lock or point that heat-seeking missile at him. In doing so, you unknowingly leave your block, only to notice it after the fact, or in many cases, during tape review.

You have two sets of aircraft approaching each other with 1,000 knots of closure, and most pilots won't know exactly where everyone is. This can be true in a simple 2 versus 2 scenario, all the way up to large force exercises involving 30 or more aircraft at night on NVGs. As simple or complex as the scenarios can get, not being in your block can bite you at any time. I admit I've been guilty many times in my debrief of having to raise my hand and say I committed a TR violation and was out of my block within 10 miles of the bad guy. Luckily, the big sky theory has avoided tragedy in my instances. As evidenced by the number of midairs in the history of aviation, the big sky theory is not foolproof. It is not to be relied upon.

I'm not downplaying the emphasis on achieving tactical objectives. Extra conscientious effort of pilots stepping to their jets while thinking about their altitude block can keep our aviators safe by helping us avoid midairs.

No one will look down on you if you had to admit not getting shots off because it would have required you to leave your block. You'll be looked at as a disciplined pilot, with enough SA to know to do the right thing in the heat of the battle.

Let's adhere to the training rules. By doing so, we'll be around and able to make it to the fight when our nation calls us to war.

U.S. Air Force photo by Staff Sgt. Samuel Rogers

Trust, But Verify

CAPT. KEVIN B. TEMPLIN
Det 1, 53rd Test and Evaluation Group
Holloman AFB, N.M.

He may not have been talking about flying airplanes at the time, but President Ronald Reagan made a wise statement when he said, "Trust, but verify." Flight leads and IPs are pretty sharp individuals. Students have to trust them, but also verify what they're saying. Don't be afraid (like I was) to speak up when the hairs on the back of your neck stand up. I learned this lesson the scary way as a young first lieutenant wingman flying the F-15C at Eglin AFB, Fla.

Halfway through my mission qualification training, I was No. 2 in a two-ship during a basic fighter maneuver sortie. BFM is basically 1 v 1 dogfighting in the traditional WWII sense. My flight lead for this mission was an IP. This was the first of three sorties planned for us that day during a massive BFM surge.

The weather was clear with unlimited visibility as we took off just after sunrise. It was absolutely beautiful. Since our airspace for the mission was less than 10 miles from our home base, my IP set a relatively low-fuel state for us to call "knock it off" and return to base.

After the last BFM setup, we would basically set the throttles to idle and coast right in for a landing, grab some fuel, and repeat the mission. Of course that's not what happened.

Instead of returning for a normal landing, we found ourselves in a pretty scary situation. After "knocking off" the last BFM set, I rejoined for the battle damage check and to get pointed home. By then I realized the field was completed socked in. Out of seemingly nowhere, Eglin now had an extremely low overcast ceiling, thanks to some pretty quick fog that rolled in off the Gulf of Mexico. Due to my low fuel state, I didn't have enough fuel to divert to a different airfield. If I was going to land, it had to be at Eglin.

I never used to believe any of the human factors stuff they teach us at the altitude chamber (because it could never happen to me!), but it turns out they may know something after all. Several items the HF gurus talk about came into play that day for my IP and me. They are:

Preparation (Mission Prep) — My IP nor I realized the possibility of the fog rolling in and covering the field.

Judgment and Decision Making — My IP made the call to use a low-fuel state to begin the trip back to base. He made the decision based on the fact we were almost right on top of the field. Hopefully he was also thinking about the fact that I was a very low-time wingman. Either way, I never questioned the call.

U.S. Air Force photo by Master Sgt. Sandra Niedzwiecki

Peer Influences — I didn't want to say anything about the low fuel decision, because I didn't want to be known as someone who would complain or question a call made by my flight lead/IP.

Mission Demands — We wanted to fight as long as we could to maximize my training. And let's face it, flying BFM is a lot of fun.

Channelized Attention — My IP nor I realized at any time during the mission that the weather was quickly approaching Eglin.

Situational Awareness — While the supervisor of flying could see the fog rolling in, he never made the call to RTB all jets to prevent the need to divert to other bases, even though he knew the qualifications and weather categories of all the pilots airborne.

I'm not blaming the SOF. The bottom line is that we had the opportunity to look outside, see the weather, speak up and call "knock it off" and RTB before fuel became an issue. Due to the reasons that I've listed, we didn't, and found ourselves with a low ceiling and not enough fuel for me to divert. The weather called by the previous flight to land was clear above the clouds, tops of the clouds at 450 feet, bottoms of the clouds just above 300 feet, and unlimited visibility below. As an MQT student, my weather category was 700 and two, meaning I needed to have a ceiling above 700 feet with a visibility of at least two miles.

The regulations state that you're not allowed to attempt an approach for landing if you don't have the required weather minimums based on your weather cat. The regs go on to state that if you find yourself in this situation, you need to divert to an airport with suitable weather. That was not an option for me based on my low-fuel state. I was either going to break the rules or break a jet when I ejected after running out of fuel.

My IP and I discussed our options. He decided to let me shoot the approach first. If I didn't break out of the weather on the approach by 300 feet, I would go missed. We train down to 200 feet and lower in the simulator, so I was confident that I could fly the approach in real life. If the weather was lower than 300 feet, I was to rejoin on my flight lead, and we would attempt a formation landing. I flew the approach, entering the weather as briefed at 450 feet and broke out of the thin layer of fog at 300 feet, safely landing out of the approach. I entered the weather 250 feet below my mins.

This incident taught me to be a believer in human factors, and it also taught me to be a believer in cockpit/crew resource management. My IP and I found ourselves in the bad situation of having to break rules. In order to recover the jet, we had to break a regulation. That was the only possible way to get out of the predicament without losing a perfectly good and very expensive Eagle in the process. We didn't enjoy explaining the incident to our ops officer, but I guarantee it was a lot less painful than a Class A investigation. We got lucky.

U.S. Air Force photo by Master Sgt. Sandra Niedzwiecki

Left to right: 1st Lt. Daniel Morrissey, Capt. Jennifer Whetstone, and Staff Sgt. Bryan Waits

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.

This Aviation Well Done Award was presented to the crew of Spear 25, a UH-1N assigned to the 459th Airlift Squadron, Yokota Air Base, Japan.

On December 19, 2007, the crew of Spear 25 departed Yokota Air Base for a two-hour theater indoctrination sortie. As ATC vectored the aircraft to an instrument approach, three caution lights illuminated simultaneously. The crew immediately analyzed the malfunction and categorized it as life threatening and devastating, since one of the cautions indicated metal fragments in the Huey's transmission. The aircraft commander took control of the aircraft, declared an emergency with Yokota approach control, and directed the crew to run the emergency procedures checklist and scan the ground for a suitable landing area in the congested Tokyo metropolitan area. The crew located a Japanese Ground Self-Defense Force Base and determined it to be the nearest suitable area for an emergency landing. During the landing descent, both engine torque meters failed, forcing the crew to fly the approach solely by "feel" without power indications. Despite the compound emergency, the crew of Spear 25 demonstrated excellent airmanship and crew resource management as they made a perfect, uneventful landing over a highly congested part of the city. This resulted in the safe recovery of the crew and the aircraft under very challenging conditions. The outstanding leadership and superior skill displayed by the Crew of Spear 25 reflect great credit upon themselves, Pacific Air Forces, and the United States Air Force.

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.

Left to right: Capt. Jeff Downing and Capt. Jacob Lindaman

The Aviation Well Done Award is presented to the crew of Animal 32, 494th Fighter Squadron, 48th Operations Group, 48th Fighter Wing, RAF Lakenheath, United Kingdom.

On March 6, 2008, the crew of Animal 32 was scheduled for a local two-ship surface attack tactics night sortie in Wales. During the flight, the crew experienced multiple in-flight system failures, requiring quick action and close crew coordination to resolve. They expertly contained a critical bleed air malfunction that could have resulted in catastrophic engine failure and then experienced a partial avionics malfunction, requiring the crew to transition to standby instruments and limited multipurpose display screens. These malfunctions were further complicated when Animal 32 entered unexpected, unreported instrument meteorological conditions and suffered total avionics failure, leaving them on standby instruments. Faced with flying a crippled aircraft at night, in unsatisfactory weather conditions, on standby instruments, with only one engine, the crew of Animal 32 utilized exceptional crew coordination and superior skill to set up for an emergency return to RAF Lakenheath while working to regain visual conditions and rejoin their wingman. Ten nautical miles from the field, Animal 32 broke out of the weather and successfully rejoined with their wingman for an uneventful landing. Animal 32's superior skill and ability to perform under extreme circumstances reflect great credit upon themselves, United States Air Forces in Europe, and the United States Air Force.

U.S. Air Force photo


The basics are the fo

U.S. Air Force photo by Staff Sgt. James L. Harper Jr.

The Fundamental Four

ANONYMOUS

I was a recent graduate from Specialized Undergraduate Pilot Training and a rated pilot with a mere 50 hours in my airplane. There I was, sitting in the first day of a Flight Safety Officer course in the Safety Center at Kirtland AFB, N.M. The instructors were discussing the curriculum they would teach and expect us to learn. My answer to their get-to-know-you question, "What kind of safety experience do you have?," was understandably, "None."

While I searched the list of typical safety topics for one that I might have come across before, I realized that despite my lack of direct involvement in a specific safety-related incident, I had been developing my aviation safety experience even before I started pilot training.

During my casual status assignment at a multi-fighter base, I got the rare opportunity to take an egress refresher course with an F-16 pilot who had ejected only a month before. The one-on-one discussion I had with him taught me my first lessons on the importance of mitigating risks through the use of operational risk management during preflight briefings and the life-saving results of Life Support Familiarization training.

Another lesson came in the form of a phone call I received late one Friday afternoon, initiating the accident-response team for an A-10 crash that happened nearby. I learned that the procedures set in place at a base before an accident occurs can greatly affect the outcome of a safe recovery of a mishap aircrew. Even more close to home was the lesson I learned while I was learning to fly a Cessna to earn my private pilot's license.

The airport I flew out of was sandwiched between the congested airspace of a military base and an international airport, teaching me the challenges of situational awareness and task saturation in flying VFR.

Moving on to begin my career as a military pilot, I immediately encountered a lesson on flight discipline and the effect of certain human factors on piloting an aircraft. The week of my PCS to my SUPT base, two experienced instructor pilots were killed in an accident. During the rest of my Phase I training, I heard many stories from fellow students of their experiences with minor engine malfunctions and avionics problems in flight, but most notably, a classmate of mine experienced a near-midair collision with local VFR traffic.

My incident occurred along a normal return route to base from the MOA in controlled airspace and theoretically deconflicted by ATC. The possibility for disaster in this situation impressed upon me that airspace deconfliction is truly the responsibility of every pilot. It had only been a few months before that I, too, had been a new civil aviation pilot without the mature skills or experience I should have possessed in such busy airspace.

"Fundamental Four" — maintain aircraft control, analyze the situation, take the proper coordinated action, and land as soon as conditions permit.

Beyond the lessons from accidents and stories of almost-accidents, I was learning to appreciate the importance of safety through the use of emergency procedures training in the flight room.

Day in and day out during Phase 1 training, instructors stressed the importance of following checklist procedures, maintaining situational awareness, and using proper cockpit resource management and operational risk management. Out of all of my training in safety of flight, what I consider the most valuable lesson for a pilot is something I call the emergency procedure "Fundamental Four" — maintain aircraft control, analyze the situation, take the proper coordinated action, and land as soon as conditions permit.

Every pilot in the Air Force has heard this headliner more times before 5 a.m. than they'd like to remember. It took more than a few embarrassing moments of fumbling through checklists and systems knowledge during those early morning tabletop EP training sessions before I would understand their straightforward direction. It was not until the end of my pilot training that I appreciated tabletop EPs for more than just a hazing technique to ensure I lacked sleep and pride. In the Phase II portion of my training, I had the opportunity to really understand what the Fundamental Four meant outside of the flight room.

During an early transition flight in the T-1, my aircraft experienced a failed trim situation. The procedures for this malfunction directed our crew, composed of an instructor pilot, another student and myself, into the trim runaway/trim failure checklist. After disengaging the trim switch and operating it manually, the aircraft commander decided to continue the sortie as briefed, and we ended the day with an uneventful landing back at home base. As inexperienced student pilots, it was only natural that we engrained this response to memory and chalked it up as in-flight emergency procedure "experience."

On the check ride following this incident, my flying partner and I received a similar trim malfunction during our tabletop EP that directed us to use the same checklist in the dash-1 as we had in the previous aircraft situation. As we followed the checklist procedures, we also used our real-life experience as a reference to how we thought we should handle the situation. In the end, we failed the ground portion of our check ride for not using conservative decision-making skills. The check pilot wanted us to react to this situation more seriously than we had experienced in the jet, as it was a slightly different situation. Due to our limited experience, we chose what we thought we knew, proving that one can only know as much as they have experienced or been exposed to.

The impact of this situation taught me that standup EPs are more than just a pain in the behind for a UPT student at o'dark thirty. I value the challenges and variables that standup EPs provide, and I know now that they are beneficial when a real emergency presents itself in the aircraft.

Sitting in the FSO course classroom, it occurred to me that even before I was exposed to the classroom definitions of "mishap" and "mishap prevention measures," I had been learning them all along, in the flight room and through lessons learned from a handful of mishaps I encountered during the start of my career. It's the learning lab nature of being an aviator that in the end teaches us the reality of these important lessons. And just like we learned from those tabletop EPs, it's essential to aviation success that a pilot take a step back to analyze the situation.

U.S. Air Force photo by Lt. Col. Russell Hopkinson

Got GPS?

ANONYMOUS

In 2001, I had the privilege to be in the first pilot training class for the new T-6A Texan II. I also came very close to being the first student to fly one into the ground.

The aircraft came with experienced instructor pilots, the new plane smell (better than new car smell), a global positioning system, glass displays, plenty of power and lots of torque. Some students actually had more flying hours under their belt than the aircraft we flew each day.

My event occurred on the way back to the pattern from the military operations area on my second solo sortie. As I re-entered the pattern at Moody AFB, Ga., I initially turned the wrong direction to enter the pattern. Over the previous week, I had formed a habit pattern of turning left while re-entering the pattern to end up on initial for runway 18. That day, the runway changed to 36, and low situational awareness on my part, combined with a habit pattern of turning left, led me in that direction. Shortly thereafter, I realized the error and attempted to fix it. Of course I wanted to do that before anyone else noticed. Somehow, nobody did that day.

The squadron at Moody developed the departures, recoveries and individual areas in the MOAs based on GPS coordinates, not radials and distance-measuring equipment. This most likely occurred to maximize the amount of airspace and take advantage of the new systems in the T-6. Once you loaded in the flight plan on the GPS, you had instant situational awareness of your location, nearby airfields and the MOA. As a result, I believe the easy use of this new system in the early days led students to rely on looking inside for quick information versus outside for visual references. Instructor pilots taught us to look at ground references, but it wasn't heavily enforced. Take that task out of the learning equation for the student and you can spend more time teaching other skills. I can't remember ever being denied the use of the system in the T-6. The traffic pattern was even loaded into the GPS, and it was normal procedure to load it on the way back to the pattern. This wasn't necessary for navigation during the day, but as a new student, you'll take anything that makes life easier. As a result, I developed a habit pattern of loading in the correct waypoints for my phase of flight and relying on looking inside for my positional orientation.

After realizing my mistake, upon entry to the pattern, I immediately made a right-hand turn back in the correct direction. While in this turn, I somehow felt the need to go heads down into the cockpit to load the GPS for the correct traffic pattern. In the T-6, the GPS control unit is located just below the glare shield on the left-hand side of the cockpit. So I'm now in a right-hand turn looking down and left in the cockpit, definitely not clearing my flight path. Normal entry to the pattern was 1,800 feet MSL, followed by a descent to pattern altitude of 1,200 feet MSL. I can't remember exactly what altitude I started the turn at, but it wasn't far from 1,800 feet MSL. The next thing I remember seeing was the green of the Georgia pine tree. It was November, but it's always green in Georgia. I immediately initiated a recovery. At some point in the process, I remember quickly glancing inside at the altitude; 800 feet MSL (~600 AGL) is what I saw. Somehow I had lost about 1,000 feet MSL in a descending turn, messing with avionics that were completely unnecessary for my navigation.

U.S. Air Force photo

Digital illustration by Felicia M. Hall

I was a bit shaken up, but proceeded to fly the correct pattern ground track. The next thing I heard was the RSU controller stating, "Cypress (the RSU) is closed." This was an incomprehensible statement to a new student in the air. The pattern structure I was used to just crumbled, not to mention I had just missed running into the ground. I found the aircraft in front of me in the pattern, and figured I'd just follow them and see what they did. The mistake was corrected in about a minute by the RSU controller, restoring order to my habit pattern. I decided it was time to land.

Looking back on the experience, what did I learn?

1. Beware of complacency in your habit patterns. Habit caused me to turn the wrong direction and attempt to load the GPS when unnecessary. Plus, I got flustered when the RSU closed. Eliminate habits in the air that could lead to poor decisions if something doesn't go as planned.

2. If you're an instructor, don't ever get complacent with students. Pay close attention to their actions, no matter what aircraft you're in and what level of training is taking place. Noticing and correcting just one poor habit pattern, like loading the GPS at an inappropriate time, might keep a mishap from occurring. I doubt that was the first sortie that I loaded the GPS at the expense of a more important task. Proper observations of my actions by my IP and subsequent debrief could have helped to prevent the habit from the beginning.

3. When in a turn at low altitude, look outside. How many times have we heard this in our careers? Do we listen to it, or do we believe our current skills and cross-checks allow us to disregard the rule at times?

I eventually returned to Moody as a first assignment instructor pilot. While I was finishing pilot training and pilot instructor training, the teaching methods regarding GPS and navigation changed. Students are no longer allowed to rely on it like I did. Visual lookout became necessary when instructors turned off the GPS. Everything came full circle when I ended up giving students check rides and required them to find their way to and from the MOA visually, without the aid of the GPS.

In the end, I thank God I was able to teach from the air and not from the pages of a mishap report.

U.S. Air Force photo by Tech Sgt. Jeffrey Allen

Combat Air Refueling

ANONYMOUS

There I was, a brand new KC-135 aircraft commander on one of my first combat air refueling missions during the first week of Operation Iraqi Freedom. Our mission that night was to cross the Iraqi border, set up an air refueling orbit, refuel three sets of fighters, and return to base. My crew and I had thoroughly reviewed the air tasking order during mission planning and felt confident this would be a rather routine tanker mission, despite the actual combat operations that would be evolving on the ground beneath us.

The first set of fighters arrived on time and took their scheduled fuel. This was standard operations for the last few missions, and since we were orbiting in a remote part of the country, we figured it to be a relatively quiet night. We observed surface-to-air fire off in the distance, and even discussed that it was nice to not have all that going on around us. Then again, this was just the beginning of the night.

About 30 minutes after the first refueling, we noticed a TCAS target approaching us from below and about 20 miles behind us. It seemed to be climbing fast and closing on us rather quickly. I thought to myself, "This obviously must be one of our receivers," so I advanced the throttles to accelerate to 315 knots and sent the boom operator to the boom pod to set up for the refueling. Normally, around 10 miles out, our receivers would call over air refueling primary frequency, request rejoin and confirm "nose cold/switches safe." However, no such radio transmission was made by the unscheduled receiver approaching us. When my boom operator checked up on interphone, I asked him if he had the receiver visual yet. He replied that he saw some lights behind us from what appeared to be a fighter-type aircraft. With that, I told him that he had the radio and to see if he could get radio contact.

Meanwhile, I had my co-pilot attempt radio con-

U.S. Air Force photo by Staff Sgt. Aaron Allmon II

tact on one of our other radios and also contact the tactical controller to find out who this receiver was and to have him contact us on air refueling primary frequency. Without warning, the next thing I heard from my boom operator was a very abrupt and anxious, "Breakaway, breakaway, breakaway!" Without question, I immediately jammed the throttles to the stop. Now, with my past experience and training, I'm used to hearing, "Receiver's well clear," from the boom operator shortly after the breakaway call. This time, however, I got another "Breakaway, breakaway, breakaway!" call from the boom operator. About that time, I looked down at my airspeed and it was approaching 340 knots. Just when I was ready to ask the boom operator what was happening, he yelled, "BREAKAWAY, (expletive), BREAKAWAY!"

With that, I asked the boom operator where the receiver was. He replied with anger, "If he was any closer, he'd be in the boom pod." I then asked if he was holding stable and the boom replied, "Yeah, he's right there." I backed the throttles off so as not to accelerate further and stabilized at 355 knots (our airplane placard speed). Meanwhile, my co-pilot had exhausted other means to contact the receiver on the other radios. Additionally, I made a radio call over guard frequency, explaining, "Aircraft attempting air refueling in (our assigned airspace) to come up on (the designated frequency)," and to no avail, was unsuccessful.

I knew it was now time to make a command decision. I told my crew this had gone on long enough, and we needed to get this guy on the boom and talk to him. In not so many words, I explained, "Obviously he's one of ours, and we're obligated to give him fuel, regardless of the circumstances." Even though none of us observed the receiver making radio silent signals to convey a fuel shortage, the receiver seemed to be in a great hurry to get some gas from us. We all agreed that the details could be sorted out later.

I asked the boom operator if he could lower and extend the boom without compromising safety. He replied, "Yes," and started to give me range calls over interphone. I told him I would be slowly decreasing airspeed to give us some buffer, in case the receiver became unstable and we needed to accelerate away.

The receiver then closed in on the boom and in no time at all, my boom operator made a smooth contact. "How's it going?" asked my boom operator over the boom interphone. The receiver pilot replied with a very distraught and relieved voice, "It's going good now, where are we at?"

To make a long story short, the receiver indeed wasn't one of our scheduled fighters that night. He was re-tasked from his assigned combat air patrol to provide cover fire for troops in contact with the enemy on the ground. He told us that they (him and his lead) were being fired upon from enemy ground fire, and it was "pretty dicey down there." He was directed by his lead to "go up and top off his tanks with the nearest tanker, and that he (lead) would provide close air support in the meantime and be second to tank." What I thought odd at the time was that the receiver never asked us why our boom wasn't down and why we delayed clearing him to the boom. It was all business, getting the fuel he desperately needed and ascertaining where we were in relation to the fight ensuing on the ground. He merely thanked us for the fuel and told us to expect his wingman shortly. We conveyed the information to our tactical controller, and immediately received a vector toward the TIC and clearance for an area to orbit. When the lead receiver came up to refuel, he explained to us that we were a godsend and without us being where we were, they would've been in a world of hurt.

So what did my crew and I learn that night? First and foremost, it made us realize that being prepared at all times is priceless, especially in a combat situation. We were caught off guard with a situation that my crew and I hadn't experienced before. However, our vigilance and CRM that night proved invaluable for those fighters that desperately needed us.

Second, it ingrained into us that flexibility is the key to airpower. We were caught in a dilemma between technical order guidance and a judgment call. Air refueling procedures specifically state (in a caution), "Except during an emergency fuel situation, air refueling operations will not be conducted when radio communications capability is lost between tanker and receiver. If radio communications are lost, or unreadable between the boom operator and receiver pilot, contacts will not be attempted." Even though there was not a bona fide "emergency fuel situation" declared, my crew and I came to realize that if the receiver didn't expeditiously get on the boom, receive his gas, return to the fight and reference our location to his wingman, there would be dire consequences. Maybe not a lost aircraft, but certainly delayed combat air support for coalition ground forces which, realistically, may have resulted in the loss of some of our troops on the ground. We were not ignoring technical order guidance; we were merely applying "sound judgment."

Lastly, in the heat of the battle, it's most important to remain calm, collective and always professional. There was no bickering or squabbling. Conversation included only the important information (who, what and where). The question of "why" was the last priority for us. In fact, once we learned all the pertinent information, the "why" answered itself … combat operations.

Risk vs. Reward

CAPT. J. DOTY
9th Airlift Squadron
Dover AFB, Del.

We had been tasked to redeploy a company of troops who had been deployed for well over a year. They and their families were told they would be together for Thanksgiving this year. We were proud of this mission and didn't want to let our guys down. We were up against the wire and any significant delay would put that mission in severe jeopardy. Unfortunately, the winds were not in our favor and a storm system was bringing isolated showers and high winds to the region over and around the airfield. The forecast indicated that the system might not let up for two days. The pressure was on to find a window and make the mission happen. We were going to have to lean way forward on this one.

"Man, those guys are going to be upset," I said to myself, as I watched the seconds tick by, signaling that our time was up. The entire crew was frustrated. We were all willing to wait as long as it would take for the winds to die down so we could take off. The frustration started six hours earlier.

We mission-planned as normal. The winds were right at limits for a wet runway. We knew it would be close, but thought a hole was sure to open up in the next four or even six hours. We decided to continue and hold at the approach end, so long as the winds were close. The tower was calling a nearly direct crosswind with gusts that were just out of our limits for a wet runway. We were so close that a 10-degree wind change or gusts that were one knot slower would have permitted a takeoff. For four hours, the co-pilot persistently queried the tower for wind updates every few minutes. The frustration mounted as a different type of aircraft received takeoff clearance. Eventually, the other C-5 crews gave up and reset their crew rest, but we were determined to do everything we could to move the mission.

Finally, the tower called the winds in limits, and we wasted no time taking the runway. In position, the tower cleared us for takeoff and stated the winds again. They were back out of limits. Frustration building, we resumed our position at the hold line. The runway was nearly dry, but a few areas around a repaired portion of the runway still had too much moisture to consider the entire runway dry. We continued to wait for hours past our scheduled departure time. The entire crew wanted to go all the way to six hours past scheduled departure, and that's what we did, keeping a close eye on the weather for any chance of takeoff. As we neared the six-hour mark, the winds were approaching 37 knots. There would be no chance of takeoff, but the crew would have stayed longer, if the rules had allowed it.

All of us know the rules governing takeoff. Why are they so restrictive? If the rules were just a little less restrictive, we would have taken off that day, and we probably would have been fine. What harm could one knot do with the proper control inputs? What damage could a little moisture cause on a part of the runway that we might not even use? Our augmented crew was well-rested with a daylight takeoff, and even if we waited a few more hours, we still had plenty of time to make a landing at our destination within the flight duty period. So is it really necessary to call it quits when we pull duty days just as long? Yes. These rules are written to prevent a mishap. While they may seem too restrictive, they are intended to provide a margin of safety between our crews and Murphy. We made the safe call that day.

U.S. Air Force photo by Staff Sgt. Tony R. Tolley

You may find yourself in a situation where the rules are not so clear. The regulations cannot cover every conceivable contingency. Ultimately, the goal is to weigh risk versus reward. If the reward for taking a great risk is small, then even a thorough practice of the ORM process may not be enough to sufficiently mitigate the risk. That's where your judgment must be used to analyze the pros and cons of the task. Let's apply this to the previous example.

One obvious pro would be getting the troops home on time. The crew would also complete the mission with no delay. The airplane could be turned to another mission. The most glaring con is the potential for a mishap on takeoff. If we were having small pockets of winds within limits, a legal takeoff may have been possible. But would the risk of a changing wind condition and the potential for a mishap on takeoff be too much risk? If this had been the case, and we made an uneventful takeoff, most of us would think not. But what would crews think if this were the case and the situation ended in a mishap? Many would think that the crew took on too much risk. That's the advantage of hindsight.

Another factor is pressure to complete the mission. Who wants to be the one crew member who holds a crew back when everyone else is eager and ready to execute the mission? The willingness of our people to hack the mission in adverse conditions is part of what makes our Air Force the best in the world, but knowing when to "knock it off" is even more valuable. Anyone can throw caution to the wind and attempt the mission. Understanding how to recognize risk, analyze solutions and apply them is what enables our crews to hack the mission daily.

One of our best tools for mitigating risk is the operational risk management process. We've all heard the six steps of ORM: identify the hazard, assess the risk, analyze risk control measures, make control decisions, implement controls, and supervise and review. Using the process doesn't have to be difficult. It may be as simple as taking a momentary step back and looking at other available options for completing the task at hand. In many cases, the entire six-step process may only take a few minutes.

We're all faced with difficult or ambiguous situations at one time or another in our careers. Using the ORM process and good judgment is what allows us to make it to the next one. ✈

Digital illustration by Felicia M. Hall

Task Prioritization in the Evolving Tactical Environment

CAPT. NICK "BONIS" HUET
94th Fighter Squadron
Langley AFB, Va.

Wingmen freshly emerging from the fighter and attack training units are required to perform more demanding in-flight tasks than their predecessors in the same weapon systems. With the introduction of new avionics, such as improved radars, advanced targeting pods, and fighter data link, the fighter pilots of today are forced to cipher through more information than ever before, demanding they focus more of their attention to the various "drool buckets" of the cockpit and reducing the amount of time they spend looking out the nice big window.

In the Eagle community, we pride ourselves on being the owners of air superiority and the keepers of the air-to-air training rules. For those not familiar with the AFI 11-214 training rules governing the safety of simulated air combat, here's the skinny. These rules pertain to every aspect of air combat training that can actually be regulated for safety purposes. They highlight weather restrictions for different maneuvering categories, bubble restrictions (how close can you get to an opposing aircraft), low altitude rules of engagement, altitude block adherence, terminate/knock-it-off procedures, and many other facets of the training environment. These rules, by their nature, exist solely to mitigate two opposing aircraft from hitting one another, but do not provide guidance or regulations to keep like formations safely deconflicted. Although a set of Air Force instructions dealing with element deconfliction would be nearly impossible to write and implement, it's a sobering topic worthy of constant review and discussion during flight briefs and debriefs. The ever-improving cockpits of today's fighter aircraft only make this topic more pressing as the probability of like-element midairs goes up drastically, due to task saturation and reduced positional situational awareness of what's going on in the aerial arena due to sensor-array fixation.

"Iron-72, locked group bull's-eye 270/30, 25,000 feet hostile."
"Iron-72, Darkstar; locked west group."
"Iron-72, fox III middle group, crank east."
"Iron-72, drop lock, target east group 15,000 feet."
"Iron-72."

The above communication excerpt is a fictitious ex-

U.S. Air Force photo by Tech. Sgt. Mikal Canfield

ample of the bane of an Eagle wingman's existence; letting your bros down because you didn't find your sort and failed to target the appropriate group. In this hypothetical scenario, our wingman, call sign Iron 72, will be most concerned with being debriefed on his tactical performance during this particular intercept, but the outcome could be much worse than a wrist slap from a flight lead. Imagine the outcome if this inexperienced wingman collided with his flight lead due to task saturation, sensor array fixation, and lack of positional situational awareness. This is a very real and scary threat facing the fighter pilots of today and is not limited to the air-to-air arena. With improved radar, air-to-ground targeting pods, advanced instrumentation, and moving map displays, the fighter jocks must remember to continually update their situational awareness of the outside world, as well as that of the tactical environment located primarily on their displays. A challenging feat to say the least, especially for a young wingman primarily concerned with finding the right target and not letting down the rest of his element.

As technology progresses in current fighters and new frontline aircraft emerge, such as the F-22A Raptor and Joint Strike Fighter, their pilots must remember to balance tactical awareness via sensor manipulation with old school external situational awareness. This in-flight prioritization must be continually driven into the craniums of all tactical aviators and be the baseline fundamentals for each missile warning system's tactics and standards. This concept becomes even more pressing when dealing with large force employment scenarios, where some of the participating aircraft are FDL-capable and others are not.

With the improved situational awareness that data link affords today's fighter pilots, it can become very easy to find yourself more comfortable in a deconfliction scenario that may have once made the hair stand up on the back of your neck. Improved instrumentation and data link can be a great asset, but should not be too heavily relied upon when dealing with deconfliction. During more than one large force employment mission at a Red Flag or similar training environment, I have mistakenly believed that I was safely deconflicted from opposing aircraft, only to get dusted off by a jet that wasn't being broadcasted on the link and whom I didn't pick up on radar. In most of these cases, the deconfliction issue was caused by me being outside my altitude block and under the assumption that no one else was around. These mistakes are frustrating due to their simplicity, and even more frustrating being on the other side of the coin. While I have caused a few scary conflicts due to my own buffoonery, I have also sucked up some seat cushion as other jets have almost speared my aircraft on multiple occasions while I was flying safely within the constraints of my altitude block. This all-too-common phenomenon warrants a continuous adherence to the training rules, as well as a "grass-roots" approach to instruction and mission briefing. The lesson in all this: no matter what you see on your displays and no matter how high you believe your SA to be, always remember to stick to the basics and adhere to the training rules whenever applicable, and keep your cranium on a swivel during even the most benign phases of flight.

Remember that as the number of low observable assets like the F-22 Raptor entering the inventory increases, the easier it will be for these aircraft to unknowingly become a conflict to your element. Further complicating the problem is the Raptor's ingress speeds which can exceed Mach 2, more than twice as fast as the speeds flown by strike trains of F-16s or F-15Es. These increased speeds, coupled with their ability to elude radar, make them not only a formidable asset to our combat air forces, but also a formidable threat to friendly aircraft. The improved sensor arrays of these new jets can effectively increase the SA of their pilots, but keep in mind that they don't currently share this with the rest of the assets in theater. F-22As currently use an FDL network that is only shared among their elements. And although future software will allow them to broadcast this to the rest of the link-capable air packages, in their current state, their FDL only benefits them. The result is a low-observable aircraft with a mind-boggling amount of displayed information being fed to the pilot, keeping his eyes inside the cockpit as opposed to outside the canopy while he is overtaking friendly forces at speeds in excess of Mach 1.

Sound like the unsolvable problem? The intent of this article is not to intimidate mission commanders by highlighting the deconfliction issues they may face, resulting in less attention being focused upon the real mission at hand: killing the enemy and breaking things. It is simply a reminder that this mindset has kept us the strongest and most lethal Air Force to ever take to the skies. Get the mission done in the safest matter possible. Flying is inherently dangerous, and the technologies of the future, while oftentimes affording the improved outcome of any given air battle or strike mission, can also hinder even the simplest administrative aspects of a mission. Continue to preach the basics, reinforce the training rules, and think outside the container when employing with new assets.

The fewer aircraft that run into each other, the more we'll have to take it to 'em in the AOR.

U.S. Air Force photo by Staff Sgt. Greg L. Davis

Never Let Your Guard Down

ANONYMOUS

An IP's Nightmare

As a relatively seasoned Introduction to Fighter Fundamentals instructor pilot in the AT-38C, I thought that I had seen it all. What were all these horror stories everyone seemed to be talking about, where student "x" had repeatedly tried to "kill me"? I felt quite sure of myself in either cockpit, as the pilot in command in the front seat and as the instructor pilot in the rear seat. Surely my cat-like reflexes, my unparalleled prowess and my cunning skills as an Air Force aviator and, more importantly, as a fighter pilot, would squash any feeble attempts these students could conjure up. It didn't take long for me to understand the importance of not only providing a comprehensive and executable brief, but to also never let my guard down in the air or on the ground.

I had wanted to be the IP that every student wanted to fly with — the guy who never took the airplane from the student — since my instruction on the ground and in the airplane would certainly resolve the situation at hand long before anything that drastic could develop. I soon learned differently having to take the airplane on landings when we certainly would have ended up in the overrun and short of the runway, on rejoins where I simply couldn't understand how the student actually thought this was going to happen, or perhaps during basic close formations where the student's attention was somehow diverted elsewhere just as the flight lead began a turn into us. The list goes on. All right, I got it. Now I understood what my squadron commander meant when he said, "Don't ever let your guard down, they (the IFF students) will try to kill you." I had initially thought he was half-heartedly kidding; now, I knew what he meant.

The incident in question occurred during a normal student sortie with clear and sunny skies. The mission, in my meager opinion, didn't take much mission preparation for the student and was essentially a freebie. I say a freebie because it was a spin-up sortie to get the student back in the T-38 and comfortable with the airplane and how our squadron did day-to-day business.

The student was a first assignment IP who had been assigned to a T-6 squadron for the previous three years; a "seasoned aviator"; an instructor who was certainly experienced and capable. I knew all this because we had flown together less than a week before.

The sortie was a formation flight. This ride was one where we were No. 2 of a two-ship, and our only job was to stay visual with No. 1, fly solid forma-

U.S. Air Force photo by Tech. Sgt. Cecilio Ricardo

tion, then run the rest of the systems in the jet as time and personal capability allowed. A no-brainer that I knew this student had done a hundred times before, albeit in a different airframe.

The ground operations were uneventful, with the student's capable skills shining through as a previous instructor. We were on the correct radio frequencies at the right time. We were in position on the taxi out, making appropriately aggressive corrections to maintain that position. We lined up for takeoff and gave No. 1 a big head nod to assure him we were ready to go. The takeoff was uneventful, as was the trip to the MOA. There were no significant hiccups in the student's flying skills or formation position throughout the flight. It had been smooth sailing up to that point. Then we started home.

The game plan for the approach and landing was to accomplish this as a formation — an IP's dream. Arriving on 10-mile final, No. 1 gave us the signal to lower the landing gear and extend the flaps to full. We did this with little issue, staying in some semblance of a safe close formation position. As we started down the glide path, the student began having some problems, tending to weave in and out of position, with the additional affinity to stack low. "Stacking low" simply meant that we were below the flight lead's plane of motion, which also meant that if we stayed there, we were more prone to land before him, and most likely short of the runway — again, an IP's dream.

"Let's stack level here and lock into about 10 feet of lateral spacing — you're weaving in and out. Just relax — helmet on the horizon." The calm and able voice of a seasoned instructor, right? Well, it was all the student could do to maintain position on No. 1, a handful of jet for the kid at this point. As we approached the runway, we again found ourselves low on the flight lead — not the best situation to be in close to the ground with less than optimal airspeed. In order to correct this state of affairs, the student "goosed" the power, putting us above No. 1's plane of motion as we arrived at the threshold of the runway to land. OK, no big deal, right? Happens all the time. Here is where the student eased back on the stick to land. We were a little too high and his maneuver gave us the opportunity to perform a "carrier landing," with the student momentarily striking the nose gear on the runway. We were on the ground but his antics didn't stop there.

After touchdown, the student failed to aerobrake (pull the nosegear smoothly off the runway while keeping the two mains firmly planted) and slow the jet down and maintain position on No. 1. Since he decided not to do this, we spit out front of No. 1 and assumed the lead of the formation on the runway. Again, no big deal as this exact situation was briefed to us.

I now realized the student was really behind the jet. His brain was full, and he desperately wanted to get out of the airplane at this point and take a nap to recover. Well, we still had work to do in order to get ourselves safely back to parking. That, however, would not happen.

As we approached the turnoff to the end of runway, the airplane began to drift toward the edge and then abruptly veered off the prepared surface.

"Dude! Keep the jet … ," was all I got out of my mouth before I heard, "You have the jet!" from the front seat. Not exactly the words you want to hear as you're getting your ejection seat and canopy safety pins installed. I took control of the airplane and brought it to an abrupt and certain stop with the right main gear off the runway and left main tire blown, but still on the runway. My major concern was not only to stop the aircraft, but to avoid hitting the bright blue taxi light directly in front of us. I then shut the engines off in accordance with the -1 checklist for departing a prepared surface and declared a ground emergency as we waited for the fire department and hung our nuggets in shame.

So what did I learn from this occurrence, and what did I impart to my "experienced" student? As my squadron commander had told me, "Don't ever let your guard down; they'll try to kill you." Never had truer words been spoken. Keep your guard up even when you think you've gotten the worst of it behind you. You're always the instructor, and you must act and react with that in mind, no matter how experienced you believe your student to be. Additionally, I appropriately debriefed my student that, "You have the jet" is in no way, shape or form the right answer to this particular situation. You cannot simply throw your hands up in the air, close your eyes, and hope for the best. IFF IPs are there to instruct students (winged aviators) to fly with a single-seat, fighter pilot mentality, not to revert to pilot training-isms and expect us to get them out of a bad situation they single-handedly managed to get into.

Other than the blown left tire, maintenance found nothing wrong with the aircraft's brake assembly or main landing gear. Sometimes students do some crazy stuff, but I guess that's why the IPs get the big bucks.

U.S. Air Force photo by Staff Sgt. Jeffrey Allen

Mission Risk — Not Yours to Take

LT. COL. DAVE MOTT
Chief of Safety
376th Air Expeditionary Wing
Manas AB, Kyrgyzstan

I recently attended the AFCENT Chief of Safety Conference, and besides realizing our base is a very safe place to work, live and play compared to others in the area of responsibility, I also gathered some points to ponder for everyone at Manas AB. One point involves mission risk and who is responsible to accept it.

The air refueling mission, as every aircrew member will tell you, is inherently dangerous. Flying two aircraft in close proximity to each other is a risk we accept every day in order to achieve the mission objectives. In order to do this safely, we follow special instructions or SPINS, tech order procedures, and published tactics, techniques and procedures, among other guidance.

Leadership has directed we follow this guidance in order to minimize mission risk and, while it can never be completely eliminated, has accepted a level of risk that all operators must be cognizant of and operate within to be effective in prosecuting the Global War on Terrorism.

Not every mission is the same, but the operators have the knowledge and guidance in order to take certain risks and be successful in a challenging environment — to be in the right place at the right time. The mission risk has been minimized by leadership and now the execution is on the shoulders of the individuals.

On a micro level, the 376th Air Expeditionary Wing's leadership has developed community standards. A better name for this document may very well be 376 AEW Operating TTPs. This is necessary to ensure the mission risk in our daily living is controlled to an extent while still allowing us enough room to operate independently to accomplish the mission. This guidance is a living document based on previously observed lessons. The only way we can categorize these as lessons learned is to apply recommendations so as to not repeat history and to avoid injury, property damage or death.

Some may look at this guidance as overcontrolling, while others will study it and comply with the guidance. My hope, and wing leadership's, is that the majority of you are in the latter group.

You may initially think it is ridiculous to wear the reflective "disco" belt in the TCA area of the base at night or in periods of reduced visibility since the biggest threat to your personal safety is vehicle traffic and it is restricted to a snail's pace in the first place. Or why do you have to wear certain shoes when you are playing a pickup game of basketball? After all, you've been playing hoops your entire life.

These measures are directed because history has shown these precautions have eliminated unnecessary injuries in the deployed environment. We also have those individuals that don't comply with the TTPs and create a hazard to your personal safety.

The guidelines for mission risk have been established, and it's your responsibility to accept or mitigate daily risk in order to make a positive impact on the mission. Many decisions will seem common sense, such as wearing the proper cold weather gear while operating outdoors in a blizzard. Others will require you to apply judgment that inherently involves taking risks.

What you shouldn't do is accept a new level of mission risk that may endanger yourself or others around you, i.e., not complying with the TTPs.

You all play a critical role in this enduring mission. Knowing the mission risk will help you in taking risk that is expected of you as an individual.

This is a great example of a deployed chief of safety expanding his wing commander's safety message — bringing it into focus for the whole unit while engaged in combat operations. Well done, Lt. Col. Mott!

Col. Sid Mayeux — Blue 2

U.S. Air Force photo

Class A Flight Mishaps

FY09 (Through Nov. 3)

	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

Oct 19		MQ-1B	Crashed short of runway
Nov 02	✈	MQ-1B	Crashed shortly after takeoff; destroyed

- A Class "A" aircraft mishap is one where there is loss of life, injury resulting in permanent total disability, destruction of a USAF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crew members successfully ejected/egressed from their aircraft.
- Reflects all fatalities associated with USAF aviation category mishaps.
- "✈" Denotes a destroyed aircraft.
- 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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