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U.S. AIR FORCE

SAFETY SAGE

Communication

Our lead article this month states, "Communication and situational awareness play a large role in performance of a mission, and safety of the flight" (see page 4). Effective communication in aviation depends on a variety of factors: Terminology, radios, language barriers, hearing, just to name a few. We've tried to deal with some of them in this issue.

On "aviate, navigate, communicate":

What my Number One was doing with his aircraft was spot on! He was aviating and navigating....What was that last step they teach us in pilot training? Oh yeah, communicate." (See page 6.)

On language barriers:

"Not only did these language problems cause crews to land without clearance, but also land on the wrong runway....they landed on a closed runway, which happened to have workers just off the departure end." (See page 10.)

On hearing:

"Pilots, how loud is your cockpit? How long are you exposed to the noise?" (See page 7.)

On CRM:

"It's your duty as a professional aircrew member to speak up if you feel uncomfortable with issues concerning safety." (See page 14.)

"I realized it was now extremely quiet in the cockpit. We had effectively 'shut down' our engineer and he was no longer a participating member of the crew." (See page 20.)

On radios:

"The last technique I'll offer is simple clarity. On the radios, start with a clear and concise statement, and then expand on it, if it's appropriate." (See page 18.)

Good advice for all communication.

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USAF Photo

FIGHTER RESOURCE MANAGEMENT CRM AND THE SINGLE-SEAT PILOT

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When you hear the term CRM, what usually comes to mind is a flight deck of people (pilots, flight engineer, etc.)—a crew. That's what most people think the "C" stands for. However, what CRM (crew resource management) really refers to is a *goal*. In the USAF, that goal is to maximize operational effectiveness and combat capability, as well as to preserve personnel and material resources (AFI 11-290). The concept is to meet this goal, and to apply it to every single aircraft in the inventory.

In the world of single-seat fighters, the goal is still the same. Application of CRM training is taught with a slight twist, however. The single-seat pilot is obviously responsible for flying the jet, navigating, employing weapons, etc., all by himself. However, he is never alone—a two-ship formation is the minimum, and the norm. This means at least one other person is with you to help out and coordinate the flight to get the job done. As the flight lead of a formation of fighters, it's often easy to forget that they're there, and can both add to the fight or detract from it.

The wingman's experience can vary greatly, whether a newly qualified Command Mission Ready pilot or a high-time instructor, but the wingman is another resource at your disposal, despite being contained in another cockpit a mile or two away from you. Some of the principles that go into CRM include mission planning, decision-making, communication, flight integrity, situational awareness, and task management. There are many others, such as flying ability and technical skills, but the single-seat pilot must learn to use all these aspects within his formation of jets, not just within his own cockpit. I want to focus on the two factors I believe are most important to effectively and efficiently accomplishing a mission: situational awareness (SA) and communication.

CRM has been around for over 20 years. It began in the airlines, focusing on pilot attitudes and crew coordination. Later it expanded to include an emphasis on cockpit group dynamics. By the 1990s, team building was stressed, to include not just the pilots but ground crews, maintenance support, and air traffic control. Another item that was emphasized was decision making, particularly in non-standard situations or emergencies. All these concepts are familiar to us, carried over from the civilian world, and introduced in pilot training. Today, CRM includes examining the human error chain and ways to manage that error, which is inherent in nearly all aviation accidents.

Research has shown that human factors issues related to interpersonal communication have been implicated in approximately 70-80 percent of all accidents over the past 20 years. Helmreich and Sexton, from the University of Texas at Austin, showed this in a study that further stated that good "stick and rudder" skills couldn't overcome the adverse effects of poor communication. They discovered through the use of airline crews and flight simulators, crews with quality communication were also associated with higher performance. In addition, the use of elaborate or bigger words

tended to decrease SA They also discovered that there was a correlation between word count and error. The more words used, the more likely errors in communication were found.

Communication wouldn't be important if things always went exactly as planned. Theoretically, an entire sortie could be flown without saying a word. But when the mission doesn't go as planned, communication is crucial to addressing contingencies, the unexpected, and briefing a change in the game plan. Effective communication aids in building SA and keeping SA levels high. It confirms the plan, what has happened, and what is going to happen next. Even the tone of voice used can help convey a message, especially when speaking from jet to jet in a formation of fighters. Words spoken slowly and deliberately can let the wingmen know that what's being said is critically important. Words shouted create a sense of urgency. Communication also must be a two-way street. It's important to ask questions to clarify instructions, or make suggestions to the flight. Without feedback (acknowledgement of the message) you would never know if the other pilot understood your guidance or direction. Either way, it must be precise and standardized. AFTTP (I) 3-2.5, *Multi-Service Brevity Codes*, is one place to find commonly-used words, particularly in a communication intensive environment.

Communication must be directive and descriptive to be effective. It must be acknowledged positively, or clarified on the spot if there is any confusion. Many situations, such as during BFM or during weapons employment, can benefit from practiced and rehearsed communication. Seconds can mean the difference between life and death in these types of fluid environments.

One technique for squadrons is come up with a standardized communication plan for precisely what to say, when to say it, and what that comm means during a bomb run. For example, a flight lead saying, "captured" can be pre-briefed or understood to mean certain things. It is a call made after the wingman announces "30 seconds" (prior to the wingman's roll-in on a bomb attack) and prior to his "10 seconds" call. "Captured" informs the wingman that the flight lead has the target in his targeting pod screen, is in the proper position to lase the wingman's LGB in, and that the wingman is cleared to continue the attack. As you can see in this example, a rehearsed comm plan can save time and give clarity to a situation where effective word choice is critical. It is concise and direct.

When's the last time you called a knock-it-off (KIO) for loss of SA? Part of keeping that SA high includes preparation and anticipation. Preparation starts with mission planning. The flight lead must know his capabilities, those of his wingmen, and their proficiency levels. It may include reviewing and/or memorizing critical portions of the mission. Anticipation is a difficult skill to learn. This is what most pilots refer to as "staying ahead of the jet." Thinking of the next event, planning the formation's next move, keeping track of your wingmen, and making sure they are following your lead will maintain a high level of SA. Many pilots refer to this as "the cup of SA." Keep in mind that the cup has leaks, and every pilot has to make inputs to keep it full.

Losing SA is going to happen from time to time. First, you have to recognize that SA has been lost. Missing a radio call, lack of acknowledgment from a wingman, being fixated on something, or doing something unintentional are all signs that SA has been lost. Once recognized, something needs to be said. The flight lead should re-brief or communicate the plan, and take a spin outside the target area to get everyone back up to speed. Always remember the basic principles learned in pilot training: Aviate, Navigate, and Communicate—in that order. No one else is going to fly the jet for you.

Communication and SA play a large role in performance of a mission, and safety of the flight. Quality communication (choosing the right words, not big words) and being concise equates to higher performance. Being verbose and using "big" words have been shown to degrade the mission and decrease SA, and should be avoided if possible. Situational awareness is a rather broad subject. It can mean many things, but basically it's an accurate perception of what has happened, is happening, and is going to happen. It is a combination of anticipation and preparation. Every pilot in the formation has something to add in order to keep that leaking cup of SA full. By using your wingmen and other resources, you can stay ahead of the jet and keep SA levels high.

Communication and SA go hand in hand when it comes to mission success and flying safety. It all aids in achieving the goal of maximizing effectiveness, capability, and preserving people and airplanes.

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That's What They Taught Me In Pilot Training

USAF Photos
Photo Illustration by Dan Harman

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There I was…it was Day Five of the war, and there were bogeys like fireflies. Well, not quite. Truth be told, it was another beautiful day in sunny Phoenix. I was getting settled in my new job in the new squadron. Making the transition from teaching B-Coursers to Taiwanese pilots to flying F-16s was no big deal. Heck, my flight commander was hooking me up by flying me with the guys who spoke the best English. Their abilities were pretty good, the flying was almost CT. This new job rocks! But it has its difficulties…

Let me set the stage. My student that day was an experienced Viper driver. So good that the DO said, "If he wants to lead the sortie, go ahead and let him lead; it's good practice." Well, heck, it was BFM. Sure, I'd let him lead. It was just getting to the area and back. I was there to back up his decisions anyway. It didn't matter that it was his sixth sortie since arriving in the United States, and English was his second language (his English was much better than my Mandarin). The brief went very well; he spoke to the objectives of the mission. The mission was looking good so far.

Everything was uneventful through takeoff until I became airborne and Number One was about 1000 feet AGL. What I heard was, "MYTAI ONE JUS BIR EFGLIN!" What did he say? At this time Number One initiated a hard right turn and was proceeding to a key position. To a non-Viper driver, this means he has an engine problem and needs to land *now*! In a calm voice over VHF discrete, I said, "Two is going chase. Say again, One." After a minor delay he said; "Mytai One hit bird… Land now."

What we teach every Viper driver, and what we brief every mission, is:

If you think you hit a bird.

1. Assume it went down the intake until proven otherwise.
2. Get to a key position as soon as possible.
3. Once landing is assured, check your engine instruments. If everything looks normal and you don't smell burnt chicken, get a chase ship on your way to High Key (8-10K over the airfield) and accomplish a BD (Battle Damage) check.

What my Number One was doing with his aircraft was spot on! He was aviating and navigating. He knew he hit a bird and later on told me it smelled like burnt chicken. Just like in the Emergency Procedure Simulators, he maneuvered his jet away from the ground and proceeded direct to a key

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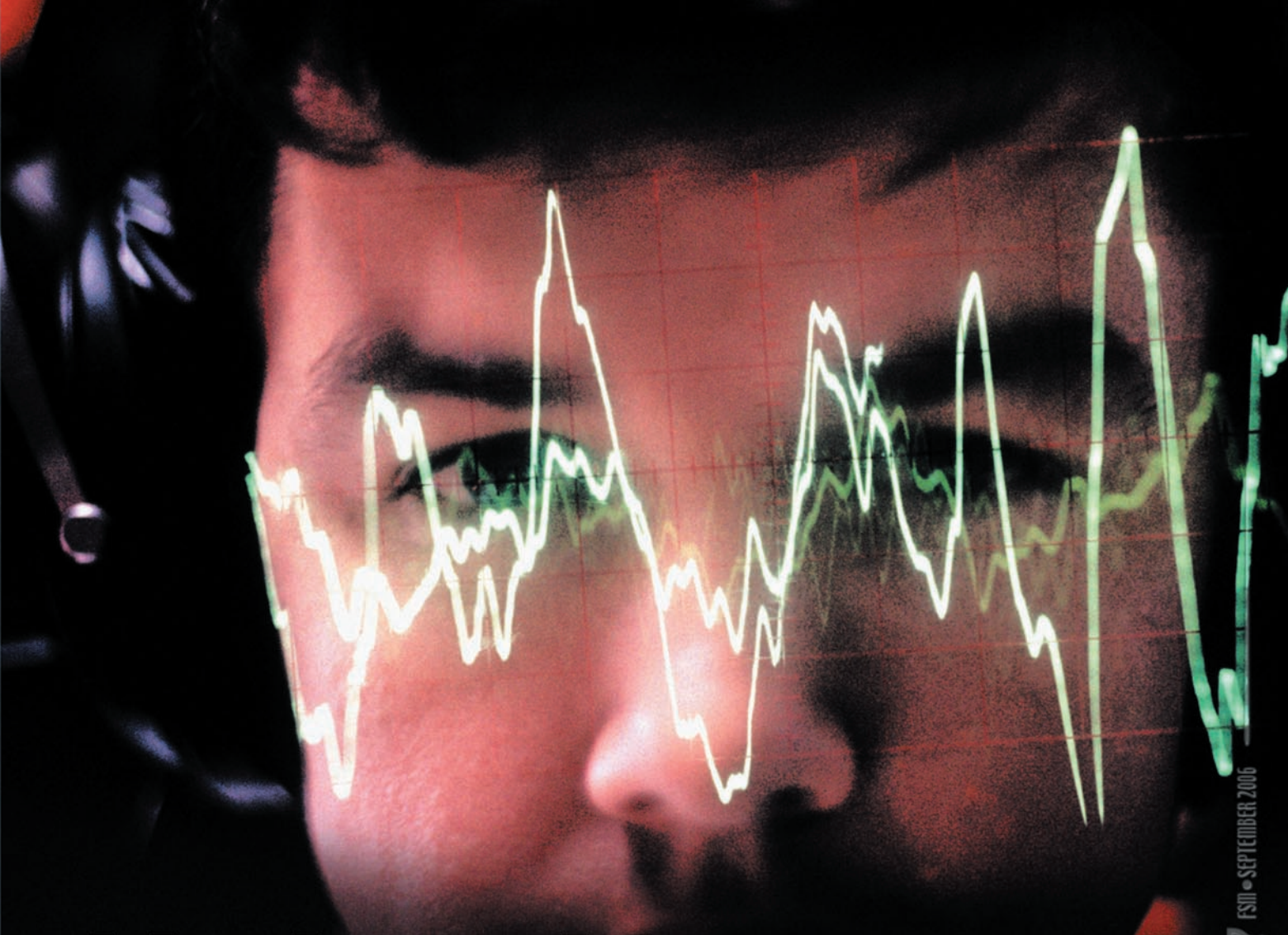

Noise Happens

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You're not safe. And you're not lucky enough to avoid paying the price. You've already paid a real price. So have I; so have your buds; so has your family.

It's long past time to take an open-minded look at an eminently preventable problem that we are all at least partly guilty of ignoring: hearing loss caused by exposure to loud noise.

This isn't like seat belts, or Nomex, or safety goggles, where you only pay if something bad happens. You pay, because noise happens.

Loud noise causes permanent, cumulative, irreparable damage to the hearing mechanism in our ears. Almost everybody is frequently subjected to unsafe noise levels, and most of us don't protect against that noise in a manner appropriate to the danger. It's time that we as individuals and as a society wake up to the fact that noise can be, and consistently *is*, hazardous—just like we woke up to the need for sunscreen when exposed to the sun. Awareness of the problem, and the factors that affect its severity, is the key to stopping any further damage to our already overexposed ears. Further, reducing exposure to noise has other, more subtle but significant benefits.

AWARENESS

First, with all apologies to the medical community, let's get a rough layman's idea of how noise damages our hearing. Think of a strong wind blowing across

a field of tall grass. If the wind stops, the grass returns to its normal position. If the wind blows real hard, the grass is bent over pretty far. Then, as the wind dies down the grass slowly returns to its normal position again. Now, if a hurricane comes through, the grass is flattened and damaged, so that even when the hurricane is gone, the grass blade or root connection is broken and does not return to normal.

We each start with around 20,000 to 30,000 microscopic hairs in our inner ear. Sound, like a wind, causes hair movements, which stimulate nerve cells and ultimately the auditory nerve to the brain. So a sound (above damage threshold in either intensity or duration) which damages some cochlea hairs or nerve cells is permanently reducing the number of usable hearing sensors you have. Once you lose all the hairs or cells, you lose your hearing. Of course, well before that you begin suffer some hearing loss, most typically in the higher frequency bands first. It doesn't take a rocket surgeon to understand that if you've got fewer sensors, you're gonna have less quality and quantity of hearing.

An impulse sound (single event, like an explosion or gunshot) above about 140 decibels (dB) will cause permanent hearing damage. Prolonged exposure to sound as low as about 82 dB can cause permanent damage (USAF Flight Surgeon's Guide). Max time at 82 dB is 16 hours; at 100 dB is 15 minutes; at 115 dB, 30 seconds.

What noises are you exposed to, and which do you wear ear plugs for? Pilots, how loud is your cockpit? How long are you exposed to the noise? Musicians, one study found 52% of classical musicians and 37% of rock musicians had measurable hearing loss. Concert goers, note that 30 seconds at 115 dB is both a damage threshold, and shorter than most songs. Hunters, wear protection *every* time you shoot. You and your son standing beside you are exposed to some of the loudest noises out there. Fans, you'll be at the ball game long enough to get some permanent damage every time you go if you don't protect. Airman, just because you're young doesn't change the fact that the sound level you and your friends party at is way too high to go unprotected. Sergeant, your custom car stereo is impressive—and dangerous! Chief, you can still damage what hearing you have left. Colonel, don't you wish you had protected yourself better when you were younger? Well, it's not too late to start being smarter, and protecting what's left.

Everybody, do you want to hear when you're older? Maybe worse yet, do you want to risk getting tinnitus? (Imagine continuous loud ringing in your head in some frequency that never, rain or shine, asleep or awake, ever goes away!) Then *stop* damaging your already-damaged hearing *now*. Simple awareness and active prevention will make you safe.

PREVENTION

It's simple! Cover your ears…or move away from the noise.

Covering your ears with your hands may not be very practical for working or lengthy exposure, but does pretty well in unexpected, short-duration exposures. Earplugs, properly worn foam types, are worth about 20-30 dB of protection. There is your long-term solution. They are very portable. Make a habit of taking them with you everywhere you go. Most important, *use them*! They don't distort the sound much at all. They just decrease the hurricane force entering your ear. Earmuffs are another solution, though bulkier and prone to be less effective since they require a good seal. Better yet, wear earplugs underneath the headset. If you want to go bigger bucks, you can jump on the internet to research and look for stuff like active noise reduction technologies, custom solutions, pre-molded earplugs, or semi-aural devices. The key is to do *something* that works. Do the foam earplugs. Headsets and fancy stuff just don't find their way to all the noise-offending sites. Plugs are an easy habit, and they're there when needed.

An important thing to understand is that permanent hearing loss by noise exposure is almost never "noticed" by the person. It is neither painful (below 140 dB) nor recognized at the time, and usually not noticed at all until sufficient damage has already occurred to cause other people to notice some symptom. Do not wait until you think you have a problem to start being more proactive about wearing protection—that's way, way too late.

TAKING IT A STEP FURTHER

Everybody needs awareness of noise hazards, and an understanding of the consequences of not using adequate protective measures. There just doesn't seem to be an active forum, public or otherwise, that adequately teaches the subject. Whether you're a pilot, parent, commander, spouse, safety person, troop, new LT, or just a friend, *you* have a valuable role in both setting the example and educating others.

Pilots: If you don't know too many people with hearing problems, try talking to your buds in the airlines. There's a large percentage of old airline captains who don't hear too well. (Read: They've been around loud noises for a long time, particularly earlier in their career when cockpits were even louder and hearing protection was less emphasized.) How many of you airline guys out there are thinking, "Yep, seen that!"? To be fair, there is certainly an age component to nerve cell loss, but noise-induced hearing loss (NIHL) is far from restricted to the old. (A study in the *Journal of the American Medical Association* showed that 15 percent of kids from age 6-19 who were tested showed some hearing loss. Another study found

evidence of high frequency hearing loss in nearly 1/3 of a group of college students.) But don't take just *your* experiences if you don't know too many with problems yet. Ask around, and remember, most people with damage don't even know it yet. That's probably about all of us, including me.

Parents: What do you value more than protecting your own kid from irreversible bodily damage? Are your kids educated that noise exposure is a permanent, life-long damage to their body? Teenagers are really at risk, since they are approaching the ability to make some choices of their own. Don't *just* read this; go educate your kid. Or cut this article out and ask them to read it. Set the example for them with your own use of plugs. The family may think wearing earplugs is a little "different" at first, but they don't think sunscreen is different. The only difference is that the message about sunscreen has gone mainstream, whereas the message about noise protection has yet to, but *will* soon go mainstream. Be on the leading edge of that trend.

Commanders: Are the work areas under your responsibility doing the hearing thing right? Make sure your people are really *getting* the message on noise/permanent body damage, not just doing the minimum required to get by.

Safety officers: Have you taken a part in really promoting awareness of the NIHL problem? I challenge you to take a more active approach to this subject which is, as we speak, *actively* damaging our people. Not hypothetically, and not from mishaps—"actively damaging."

Troops, new LT, or just best of the best: Show the boss you have some initiative and concern: "Hey, here's an interesting article that maybe we could put a short briefing together on—not only for our people, but also for our mission, and our families, because it makes sense."

Set-The-Example people: Stick to your convictions that it's worth saving your hearing for your future, even if you get ribbed about wearing plugs at the hockey game. Making the noise level 90 dB instead of 110 dB is significant, for the rest of your life! Besides, you're not doing it just for yourself. It's not just the hearing loser who pays. Their family pays when it becomes obvious there's a problem. Their friends pay. Even a unit pays, if the mission is somehow made harder (missed commo, extra commo, radios, etc.) Families facing hearing problems could certainly add to the list.

No matter who you are, share your knowledge about this unseen hazard.

A FEW THINGS TO PONDER

Now a word for those who say they don't like earplugs: Think what it might be like when you're 65 and can't hear. Or when you're 60 and already withdrawing socially because it's too much work to hear conversations in a room. Or when tinnitus

USAF Photo by SSgt D. Myles Cullen

grabs you. This isn't like seat belts; you *pay*.

If the level and duration on some noise you'll be exposed to is below the damage threshold, consider wearing earplugs anyway. Here's why: At the end of a long day you'll be less tired. You'll have less of a headache. Sometimes you can actually hear conversation better with the plugs in, if the background noise is high pitched. Get used to the sounds of your cockpit with the plugs in. Another benefit is that you can listen to single-volume-knob radios that the deaf captains have to set way too high. Did you know that U.S. Federal Law prohibits OSHA from regulating pilot noise exposure? People don't seem to think yet that ear plugs are worn for noise hazards issues—they still think it's to sleep or block out something else. Research on the effects of high noise levels has shown impairment in concentration, fatigue, and insomnia. Psychological responses to noise include irritability, anger, and anxiety. If you can reduce the effects of noise with a simple measure like earplugs, then who knows? Maybe there's a lot to be gained even well below currently accepted hearing damage levels.

What's the chance that 10 years from now, the medical community will tell us that hearing loss starts 10 or 20 dB lower than we thought it did 'way back in 2006?

Your choice, dude. Here's hoping you hear well when you're old!

Language Lessons

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Even with the huge advancements in technology over the past 50 years, the medium of communications between pilots and controllers has remained relatively the same. As the radio equipment our predecessors used in the past is unchanged, so are the barriers in communication that still plague us today. These barriers have been involved in numerous aviation accidents throughout history that we have learned and studied, yet we still make the same mistakes today. I will focus on one of these barriers, the language barrier, which has become more prominent for the Air Force as we continue to spread our global reach to new places throughout the world.

On a recent deployment to the Middle East, we were briefed on multiple incidents that easily could have developed into Class A mishaps under the right conditions. In only a few weeks, our base experienced several runway incursions, all of which precipitated from language barriers between our crews and host nation controllers. All of these incursions could have been prevented with better adherence to ICAO standards, improved local procedures, and extra vigilance by the aircrews.

ICAO standards have been established to standardize aviation procedures including air traffic control communication throughout the world. As most pilots know, the clearance to taxi to a specific runway gives you the right to taxi on all taxiways and runways to get you to that runway. Yet many times aircrews were spanked by the host nation controllers for automatically crossing the inside runway when cleared to taxi to the outside runway. This led to uncertainty for the aircrews on what exactly they were cleared to do. It could also lead to potentially disastrous situations if the controller is planning on landing an aircraft on the inside runway while another aircraft believes they are cleared to cross that same runway.

Have similar incidents occurred in the past? Of course they have. Over 70 percent of all reports sent to NASA's Aviation Safety Reporting System involve a form of miscommunication! Unfortunately some worse than others, such as at LAX back in 1991 when 34 people were killed when a USAir 737 landed on top of a Skywest Metroliner holding for takeoff. Although ATC was ultimately responsible for clearing two aircraft onto the same runway, the pilots could have prevented the mishap with better vigilance. The two aircraft were on the

USAF Photos
Photo Illustration by Dan Harman

same frequency, but both crews failed to hear the controller issue the clearance to the other aircraft.

We were also briefed on a few crews landing without proper landing clearance. These incursions were also due to language barriers coupled with the fact that the crews were fatigued after returning from long sorties in the box. Luckily these incidents never developed into serious mishaps, but they easily could have with other compounding factors such as poor weather conditions or NVG ops. This is where local procedures we learned at UPT could have prevented most of these incursions, such as the "cleared to land runway X" followed directly after the mandatory "gear down" call. I'm sure a couple of IPs out in an RSU dishing out IRTs would have solved that problem.

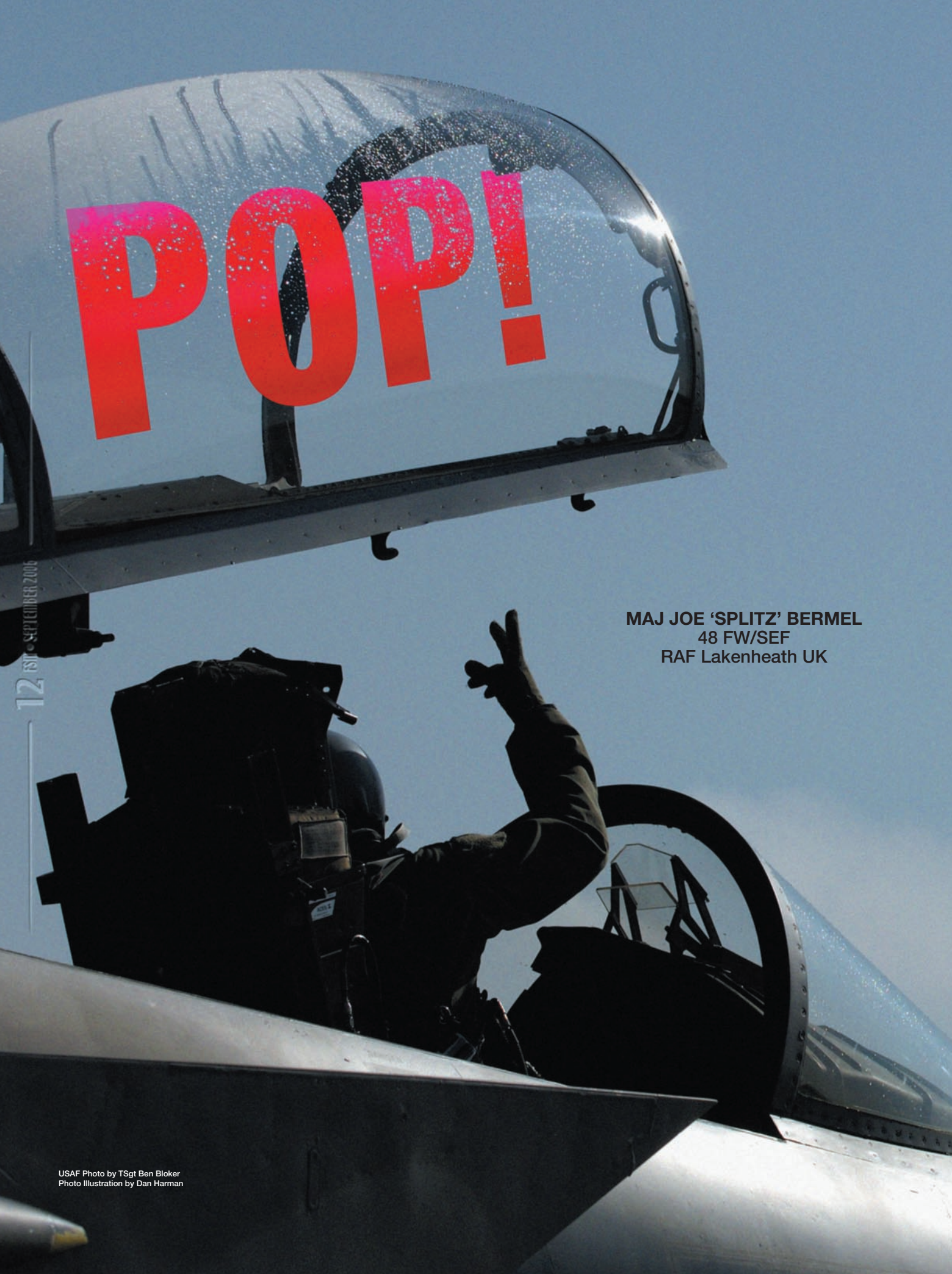
Not only did these language problems cause crews to land without clearance, but also land on the wrong runway. One of the most serious incidents involved a crew that believed they were cleared to land on the right side, but were actually just cleared for the approach. The crew continued the approach and landed on the right side without clearance to land. Not only did the crew land on the wrong runway, but also they landed on a closed runway, which happened to have workers just off the departure end. This is unacceptable for many reasons. First of all, the crew should have noticed the runway was closed in the NOTAMs, but then they never should have been cleared for the approach on the closed runway. Also, if the airfield had an ATIS, it would have alerted the crew of the closed runway, which in fact didn't have the proper markings of a closed runway such as a giant X on the approach end. Once again adherence to ICAO standards and better local procedures would have prevented this incident.

Another problem addressed at our location was the inconsistent use of altimeter settings. While we flew using QNH, the host nation aircraft often used QFE. This resulted in an altimeter error of over a thousand feet if you happened to set the QFE altimeter setting and believed it was the QNH. The host nation controllers were also random with whether they were giving inches of mercury or millibars. If they transmit an altimeter setting of "niner, niner, two" without expressing the units afterwards, that could easily be interpreted as 29.92 inches of mercury instead of 992 millibars. This would give you an altimeter error of approximately 640 feet high! Now, in day VMC this might not be a problem, but in a sandstorm or night IMC it could be disastrous.

Once again, we've experienced these problems before with improper radio phraseology. In 1989 a Flying Tigers 747 was flying an NDB approach into Malaysia when it crashed into a mountain. The crew was cleared to descend to the published altitude of 2,400 MSL, but the controller used improper phraseology and transmitted "descend two four zero zero" and the crew understood it as "descend to four zero zero." By descending to 400 MSL, the 747 didn't have proper terrain clearance over the mountain. If the crew would have cross-checked the altitude with their approach plate, they probably could have averted the fatal mishap.

To this day, the greatest loss in aviation history was caused by a runway incursion due to poor communication. In 1977 two 747s collided at Tenerife killing almost 600 people. Although that was 29 years ago, we still have many of the same problems today. Even though our technology has greatly improved to include ground radar, which provides all-weather surveillance of the airport movement areas, the communication problems are still there. This puts the burden on the aircrews to remain extra vigilant.

Communicating over the radios is approximately five percent of the workload distribution of the average aircrew. Maybe if we increased the distribution to six or seven percent by taking an extra few seconds to clarify clearances with ATC, then we could avert many more future incidents that could lead to mishaps.



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USAF Photo by TSgt Ben Bloker
Photo Illustration by Dan Harman

It started out pretty much like most of the other days I had experienced while deployed to Norway in early 2002. We were there in support of NATO Exercise Strong Resolve, which took place in March. Early spring in Scandinavia is not known for long periods of nice, sunny weather. Gray clouds remained low over the rugged hills surrounding Örland Norwegian Air Force Base. The van, loaded with groggy Eagle pilots, seemed more like a bobsled than an automobile as we drove over the fresh snow that had fallen the night before. So far, this was all normal, except for the fact that earlier I woke up with a slightly sore throat that disappeared while eating breakfast.

Thinking no more of the sore throat, I concentrated on the mission at hand. We were to be OCA for some Italians on a simulated strike mission. Coordination, preflight, and the flight went off all without a hitch. The weather had moved in for the recovery. Not bad enough to close the pattern, but enough weather to be in the "goo" from nearly FL 300 to just above pattern weather. My flight lead elected to descend through the weather with me in fingertip so we could beat up the pattern with our remaining gas, as cloud had previously closed the pattern numerous times for us in the preceding days. It was only as we descended further that I began to notice it was increasingly difficult to stay ahead of clearing my ears. This was made more difficult by the fact that I was flying close formation with my flight lead. None of the usual tricks seemed to work very well, and it became an effort to valsalva while maintaining formation. Each time the discomfort grew into a little pain and I considered requesting a level-off or a lead change, I was able to force my ears to clear well enough to continue.

We broke out of the clouds and widened our formation. I was able to perform a good, lengthy valsalva maneuver and pop, pop, POP! That brought things back close to normal. A couple of patterns later, and we were back in our parking locations.

Later on, through the debrief, I was starting to feel definite cold symptoms. The next day I was fighting one of the worst colds I've had in recent memory. There was no way I could clear my ears, so flying was done for me for a few days.

Why did that one catch me by surprise? Usually I'm able to tell when I'm catching a cold. The only sign I experienced was a slight sore throat which went away so quickly that I attributed it to the dry, late winter air. Not until the descent did I realize that it had progressed to the point where I could barely clear my ears.

What is ear block? The FAA points out that on ascent the structure of the middle ear allows air to escape through the eustachian tube, equalizing the pressure in the ear with that of the cabin pressure. During the descent the cabin pressure increases, and the pilot must allow the air to reenter the eustachian tubes. This can usually be done in any number of ways from yawning or a chewing motion to more forcible methods such as the valsalva maneuver, whereby the nose is held shut while trying to exhale through the nose. This forces air into the eustachian tubes and equalizes the pressure.

An upper respiratory infection, like a cold or a sore throat, can often produce enough congestion surrounding the eustachian tubes to make this air transfer difficult if not impossible as the pressure differential builds up.

Ear blocks can result in severe pain and fluid build-up in the middle ear. Not only can the pain interfere with the pilot's ability to control the aircraft, but the pressure differential and fluid build-up can open up the pilot to a whole host of spatial disorientation situations. Hearing loss can also result from an ear block. This is usually temporary but can last from a few hours to several days. In very bad cases, the ear drum itself can actually rupture, and that can lead to an infection which means no flying for up to a few weeks while everything gets patched back up.

Another related malady is a sinus block. The causes are similar to an ear block but in the sinus passages above each eyebrow or in the upper cheeks. Depending on severity, these blocks can result in severe pain, sometimes requiring surgery to correct.

What could I have done differently in this situation? The simplest answer given in most cases of preventing ear or sinus blocks is to not fly. If I can clear my ears I can fly; training time is just too valuable. I did then and still do fly with a bottle of Afrin in my helmet bag. I didn't need it for the flight in Norway as I was able to stay ahead of the pressure—just barely. Use of Afrin results in DNIF status, but if you need to use it you shouldn't be flying anyway.

A note: It isn't an instant fix but it does work quickly to reduce the inflammation restricting the eustachian tubes. Also, prolonged use (in excess of about three days) will actually cause the membrane to become inflamed and swell, counteracting the affect it is supposed to have.

I was caught by surprise by the quickness this cold struck me down. Many times earlier in my flying career, I was able to feel a cold approaching but still fly without problems while being able to clear my ears. This one case was different. What it's taught me is to be more vigilant on my own condition as I assess my readiness to fly. It is one more thing to add into the equation for exploring the risks and benefits of the mission at hand.

EXPERIENCE:
A BLESSING OR A CURSE?

CAPT MICHAEL S. LAURO
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Tinker AFB OK

A veteran Air Force aviator told my Specialized Undergraduate Pilot Training (SUPT) class that the secret to longevity in the aviation business is to "always fly a little scared." Those words didn't mean too much to me back then, for I was just a fledgling aviator. However, that wise old man's advice would ring true for me in the not-too-distant future.

Upon graduating SUPT, I was an Air Force Reservist going back to my home unit. There, I would be a copilot flying the E-3 AWACS with the wing's most experienced pilots. Shortly after completing E-3 Initial Qualification Training, I was assigned as a copilot on an E-3 training mission. The sortie would take us from Tinker AFB OK to an AWACS orbit located over Albuquerque, NM. We would return to Tinker approximately six hours later.

The Aircraft Commander (AC) I was paired with was a seasoned LC with a wealth of knowledge and experience. In fact, almost all the crewmembers in my reserve unit are highly experienced flyers. Our flight engineer that day was an experienced MSgt, one of the squadron's best. The navigator was the squadron's chief navigator and held evaluator status. The sortie was uneventful from preflight to level-off. We were heading along our planned route of flight, and right on schedule. Then things became very exciting.

Our weather forecaster had briefed us on the possibility of isolated thunderstorms en route. However, shortly into cruise, our weather radar began picking up a large line of cells off our nose. There were several cells painting red at our 12 o'clock position. This left the crew with a decision to make. We could either deviate around the cells or find a gap and pick our way through. As we neared the line, it became evident that the best option would be to deviate south of course, away from the weather. The cells had grown larger and more intense than previously observed. Assuming we would go around the thunderstorms, I asked the AC how far south he wanted to deviate. The deviation from our planned route of flight would take us quite a bit off course. As a result, we would most likely be late for our scheduled mission activity.

The AC thought about this for a moment and then informed the flight deck crew that we would stay on our present heading. We would just have to "pick around the big stuff." This decision made us all a bit uncomfortable, but the pilot was a senior instructor pilot whom we assumed had done this

USAF Photo by TSgt Keith Brown
Photo Illustration by Dan Harman

before. Besides, who was I, the "newbie," to override the AC's decision? This lack of assertiveness on my part proved to be a mistake.

As we approached the line of thunderstorms, I could tell we would be in for a rough ride. It looked as if a black wall was closing in around us. The area we thought would be an opening turned out to be a "sucker hole." In fact, there was a larger line of cells behind the first ones, and we were heading straight for it. At this point, our only option was to continue straight ahead. Hopefully, our aircraft and aircrew would escape unharmed.

The AC slowed the aircraft to turbulence penetration speed, while the flight engineer armed the continuous ignition. The navigator informed the mission crew to fasten their seatbelts and stow all loose objects. As we entered the first cells, we encountered heavy rain and moderate turbulence. The aircraft then encountered several updrafts and downdrafts. We did our best to keep the aircraft under control, but it was quite clear we were just along for the ride. Fortunately for us, there was a weaker cell along the line. We opted to make our egress route through it. Once reaching the backside of the line, we encountered smooth air. The AC polled the crew for any injuries. The crew was visibly shaken up, but fortunately no one was seriously injured. A few mission crewmembers suffered minor injuries. We had averted a potential disaster.

The flight crew's poor decision to penetrate severe weather, coupled with my reluctance to voice my concern, ultimately resulted in an unsafe flight condition.

This could have been avoided if anyone had voiced their concern. In this case, there are several lessons to be learned:

1. It's your duty as a professional aircrew member to speak up if you feel uncomfortable with issues concerning safety—regardless of your experience level.

2. Don't assume anything. Experience can help you, but it can harm you just as well.

3. Remember, you're not up there alone—use the resources available to you (crew, ATC, PMSV, etc.).

As Air Force aviators, we must continually strive for excellence. We must always put safety first regardless of other factors. Don't be afraid to speak up. Your input may be the intervention that breaks the mishap chain of events. Remember, it's your responsibility to voice your opinion when dealing with safety of flight issues. I know I will.

Can you hea

Don't be the poster

USAF Photo by SSgt D. Myles Cullen
Photo Illustration by Dan Harman

ar me now?
rchild for a mishap.

CAPT DENIS CASAUBON
92 ARW
Fairchild AFB WA

"Main-tenay fleuhhh alaveh too tlee seero."

What?! You're having enough problems with reviewing the next base you're landing at, and now you can't understand the controller through the busy radios. With an increasingly expeditionary Air Force and less time to train at home, the language barriers abroad are becoming more of a safety hazard.

The first problem of our evolving mission is the variety of accents we encounter on a single-mission. This is more prevalent on AMC missions, which are constantly traversing the AOR, but other commands also see it. The attitudes of different cultures can also complicate a mission. Russian and former Soviet bloc people appear to get all fired up easily but mean no disrespect, but if you don't know that you may take offense. While clarifying a clearance we heard, "Reach 4338NV, do you under-STAND *ME*?!" Easy, buddy.

Once our crews get to an airfield, the host controllers are often difficult to understand. A recent example is getting cleared to taxi by a Base X tower controller: "Taxi to holding position…" Do you taxi and hold short, or do you go on to hold? The answer is yes. Depending on the traffic load, it meant both. We had to clarify each time whether it meant "Hold short of the runway" or "Taxi to line-up."

In places like Iceland, the taxiway signs are confusing, too. The ramp is uncontrolled, so the taxiway signs mark the beginning of the controlled movement area. Working out a taxi clearance with Ground can get interesting. Hopefully after you take off, things get easier, but, if anything is out of the norm, you're out of luck. Overseas airfields often have approach liaisons, but they don't always know all the applicable terms. RVSM should be somewhat standard, but recently a controller and his liaison had no idea what I was talking about. If there's an emergency, things need to happen fast. If the controller doesn't understand what you're saying, you may be compounding the problem by throwing out complex military-speak.

As for the CONUS, we're not there very often lately. That makes it more important that we keep

USAF Photo / Photo Illustration by Dan Harman

our situational awareness high when flying training missions. Usually on these missions there are students or inexperienced pilots. Students have a long and sordid history of misunderstanding things, so IPs need to be ready. Ever hear the story about the IP who told a solo formation student on his wing to "Break out" twice? The student was a foreigner and later told the controller that he would have *bailed out* if he had heard "Break out" a third time. Wow.

We fly with other foreigners, too—the Navy. Just remember, *port* has four letters and so does *left*. After that, you just have to work out the differences term by term. This goes for our Australian brethren as well. I listened to two of them discussing our techniques once, and they agreed that they just do things their way, despite being instructors for U.S. guys. They're great instructors, but it clearly illustrates how language can hinder doing things the accepted way.

Has anyone out there flown with a copilot who catches 10 percent of a clearance on busy radios? One of the frustrating truisms out there is that heavy pilots garbage-up the radios. Many heavy pilots don't listen to how busy a frequency is before rattling off, "Albuquerque Center, good afternoon. This is Reach 9326 Golf checking in with you up here at flight level three-three-zero, we'd like to request higher when able, and do you have any reports of icing at our level?" On the other hand, I've heard fighters keep their transmissions so short that the controllers have to get them to repeat their call more than once.

Despite all of these barriers, we don't crash planes at every turn. That's the good news. However, I'm sure we have plenty of close calls, and we put ourselves in situations that could become much worse with a little less luck. As with any safety and ORM program, there are ways to mitigate the risks associated with language barriers. To deal with different attitudes, accents, and vocabularies, an in-depth study of the appropriate countries is necessary. Well, it's unlikely that mission timing will let you do this, so the next best thing is to include some preflight planning. There are other crewmembers who have flown in many areas, so you can ask them what to expect. If you have time, you can look up cultures online to get some insight, and maybe even listen to a few translated words to get familiar with the emphasis and tempo of the appropriate languages. Then you won't be hearing these words for the first time when you're trying to coordinate border crossing clearance. Another suggestion is "my salami." In Arabic "ma'a salaama" means goodbye, but associating words with ones you know, like "my salami," will help you remember difficult phrases.

Reviewing airfield layouts and getting info from crews already in theater will better prepare you in locations with odd configurations. Then, questioning the controlling authority while staying conservative may make you a minute or two late, but you'll be alive and uninjured.

The last technique I'll offer is simple clarity. On the radios, start with a clear and concise statement, and then expand on it, if appropriate. If you're in the middle of an EP at home or abroad don't worry about telling Center exactly what's going on, just what you need. Remember Step 1: Maintain aircraft control. If distractions would potentially kill someone, tell Center the altitude and heading you need until you can organize a better request. Starting off with technical details about your EP only wastes time and patience.

I haven't said anything here that pilots shouldn't already know, but hopefully it will help you to put an adequate amount of planning (even if just in the nugget) toward a subject that affects nearly every phase of flight. By briefing how language barriers may interfere in each phase, the entire crew will be much more prepared to deal with these problems as they arise unexpectedly.

Say What?

CRM AND NON-STANDARD COMMUNICATIONS IN THE COCKPIT

USAF Photo by SrA Joshua Strang

CAPT BRIAN L. BEEKMAN
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Travis AFB, CA

"FLARE, FLARE, FLARE!" is all I heard as we settled onto the runway for a perfectly acceptable landing. My eyes darted over to my Instructor Pilot (IP) as these hair-raising words were thrown about the cockpit. His lips weren't moving.

We were on a local night sortie finishing up our traffic pattern requirements at the end, as is typical on a KC-10 flight. The weather was clear and winds were the Travis AFB standard 220/15G20, right down the runway. We were accomplishing our touch-and-goes to 21R, where there is minimal approach lighting and the runway markings cannot be seen until illuminated by the aircraft lights, right at the "slot," or decision point, at 300 feet AGL.

Why had I been given this correction when I had flared at the correct height, on speed, had completed it at the correct nose angle, and had landed on centerline within the touchdown zone parameters? Many a copilot has heard these words from the Aircraft Commander (AC) or Instructor Pilot (IP) sitting across from them, advising them to immediately pick the aircraft nose up to avoid a hard landing. As a new "Co" I had heard the words myself, but it was well over a year since that time.

"Continue!" I barked, as we transitioned from a landing to a touch-and-go stance, reconfiguring the aircraft for flight and taking off within the runway remaining. I was annoyed by the comment, now known to have been expressed by my Flight Engineer, a seasoned tech sergeant who had flown the "Ten" for many years. At this point there was some confusion in the cockpit, and I wanted to break through that by getting the aircraft flying again and in a safe position to talk about what happened.

On climbout back into the traffic pattern, I asked my engineer why he had given me the correction. "It just didn't look right," he said. "I felt uncomfortable with the approach to landing."

"Well, it looked just fine to me," I said. "The next time you are uncomfortable like that, I need you to tell me to 'go around,' not provide instruction."

"I agree," said my lieutenant colonel IP. "Leave the instruction to me. We'll debrief what happened on the ground."

We continued our preparation for another approach, and I realized it was now extremely quiet in the cockpit. We had effectively "shut down" our engineer and he was no longer a participating member of the crew. "Are you still with me? I need your help to finish the sortie!" I said, attempting to bring him back into the fold. He begrudgingly came around, and we completed our approach work without incident. We discussed what happened in depth on the ground, and the IP spoke with the Chief Engineer the next day to provide feedback to the chain of command.

These circumstances highlighted a need to standardize terminology during critical phases of flight in order to avoid confusion, prevent delayed reaction, and reinforce reliance on ingrained training. Aircrew members often fly multiple aircraft and work for different organizations during their careers. Standardized terminology eases the transition by allowing flyers to rely on their original training when reacting to emergency situations. Both formal Crew Resource Management (CRM) training and everyday "line flying" should stress this standardized communication method.

There are a few "take-aways" you should grasp from my CRM experience. First, *always maintain control of the aircraft and get away from the ground* if you decide to keep flying.

Second, *limit communication during critical phases of flight* to the least required to facilitate the previous point.

Third, once in a safe position to do so, *thoroughly discuss what happened* by gathering inputs from each crewmember and other sources if necessary, i.e., ATC, aircraft, Stan-Eval, Command Post, etc.

Fourth, based on the evidence presented, *make a sound decision to complete or abort the mission and land safely* at an appropriate location.

And fifth, *bring any "wronged" crewmembers with dissenting opinions back into the fold* to ensure complete participation.

When a crewmember refuses to participate in further flying activities, the aircraft commander (AC) must immediately replace him or her with another available flyer of the same crew position. If no other such person is available, the AC should declare a physiological emergency and take all necessary actions to safely land the airplane and subsequently report the incident to safety channels for prevention study and to a flight surgeon for medical evaluation.

Emotions in the cockpit are unavoidable at times but should ultimately remain under control. Our very survival during a flight, along with the survival of any passengers, depends on our ability to stay ahead of the airplane, effectively control its systems, communicate and operate until we are back in the chocks. We all can feel a little "shut down" by the rest of the crew or our flight lead from time to time, but it is our duty to ourselves, our comrades, and our country to never accept defeat and keep flying until our career as aircrew is over.

Phraseology

Here are some proposed phrases and their definitions that I think could be normalized across all flight operations (ICAO, FAA, DoD):

1. **Abort** – Command given by any flight deck crewmember to cancel the takeoff and apply braking devices sufficient to stop the aircraft in the remaining distance of the runway, including any stressed departure end overrun. Crew discussion and reason for abort should be determined only after the aircraft is in a safe position, preferably clear of the runway environment.

Some civilian and military flying communities instead use the term "Reject," which can be confused with colloquial meanings and in my opinion is sub par to the word, "Abort," which can have only one meaning in the cockpit environment.

2. **Continue** – Command given by Pilot In Command (PIC) only during an abnormal or emergency situation or in response to a crewmember query or aircraft indication that informs the other cockpit crewmembers of the intention to continue a takeoff/touch-and-go and fly the aircraft away from the ground. This keeps the crew on task and leaves no doubt as to the course of action.

3. **Go Around** – Command given by any flight deck crewmember or authority on the ground (Tower, SOF, ground vehicle, etc.) to cancel the planned landing or low approach, immediately fly away from the ground, and execute the briefed Missed Approach Procedure (MAP) or coordinated ATC climbout instructions if under Instrument Flight Rules (IFR) or remain visually clear of traffic/obstacles and coordinate with Tower/ATC if under Visual Flight Rules (VFR). Crew discussion and reason for the "Go Around" should be determined only after the aircraft is in a safe position (away from the ground and clear of obstacles and traffic conflicts), and preferably is on radar vectors, in holding, and/or on autopilot navigation.

4. **Time Out** – Command given by any air or ground crewmember to stop the current course of action and evaluate the safety of such action. The Aircraft Commander or ranking ground person will ensure the aircraft is in a safe position, get inputs from all members, and choose the safest course of action, while still attempting to complete the mission. The intent is to be a "trump card" to break the chain of events that lead to a mishap.

If a "Time Out" is called while maneuvering in formation, "Knock-It-Off" should be called over formation frequency, and all formation aircraft should cease maneuvering and attain adequate separation. If a "Time Out" is called during air refueling (AR), a "Breakaway" should be called over AR frequency and the tanker and receiver should attain adequate separation.

5. **On To Hold** – Clearance given by a tower controller allowing the aircraft onto the runway and stop to await takeoff clearance. Aircraft will read back this clearance exactly as given.

Most International Civil Aviation Organization (ICAO) controllers use the term "Line Up and Wait." This phrase may confuse U.S. pilots as to whether they must stop on the intersecting taxiway at the runway Hold Short Line or actually proceed onto the runway and in my opinion is substandard to "On To Hold."

Hey Co, Don't Step On The Radios

USAF Photo
Photo Illustration by Dan Harman

CAPT MARK MULLARKEY
550 SOS
Kirtland AFB NM

(Editor's note: As Capt Mullarkey notes, this local "crowded sky" story has applications everywhere.)

Flying operations in the vicinity of Albuquerque International can be rather exciting when it comes to deconflicting with other aircraft. Obviously, there is a lot of civilian traffic to avoid: civilians enjoying the good weather, medevac helicopters and fixed wing flights, and the never-ending flow of airliner traffic. Add to this environment a hefty amount of military flying: new aircrews learning operations in the HC-130P/N, MC-130P, MC-130H, MH-53, HH-60, UH-1N, NMANG F-16s, as well as non-local airframes flying on the numerous MTRs in the area. ATC flight-following and TCAS (in the HC-130) are nice things to have in this environment. However, the number of aircraft we fly with TCAS are in the minority, and ATC cannot always lend us a watchful eye, like in the pattern of an uncontrolled airfield. VFR deconfliction with other airframes is done the old-fashioned way: eyeballs and ears.

The need to clear over the radios has been emphasized to me since I began flying. In UPT, we had mandatory radio calls to make around the pattern announcing to everyone else where we were and what we were doing. It had the benefit of allowing others to know where to look for us, thereby keeping the pattern operations running smoothly. The ability to spare a few brain cells to process all the radio chatter and fly the airplane simultaneously takes some time to learn, but not every pilot/crew out there does it. The same basic lesson is beat into student flight engineers, loadmasters, radio operators, etc., while they go through their FTU training. The common motivating phrase on those crew airplanes is "Don't step on the primary radio!"

As a little background, the pattern at ABQ gets rather saturated with airliners, aeroclub aircraft, and F-16s during certain times of day. It is hard to get the volume of overhead/downwind training we need at ABQ, especially when two of its four runways were under construction. A short C-130 flight to the south is a small, but fairly quiet uncontrolled airport, which serves as our training area. Typically, if another general aviation aircraft is beating up the pattern for more than a few minutes, we will move our business back to the controlled environment at ABQ. If someone will just be a full-stop or a departure, we will get out of the way for the appropriate amount of time and then press with our training. We also favor Runway 03 as part of a "good neighbor policy." This way we avoid the majority of the housing in the valley just to the east and north. The runway is too small to do touch-and-goes, so all patterns are to low approaches only. Our typical profile is an overhead to Runway 03 low approach, rejoin eight miles to the northwest, left "high speed" downwind Runway 03 low approach, rejoin again, lead change...second verse, the same as the first.

As I said before, not everyone is good at listening to the radios. I had the distinct pleasure of dealing with one such "deaf" pilot when accomplishing MC-130P FTU formation recovery training at a small, uncontrolled field a little south of Albuquerque International Sunport (ABQ). Our mission was straightforward—a two-ship of MC-130Ps with students in multiple positions on both aircraft, including formation departure, join-up, single-ship airdrops, formation low-level to a helicopter air refueling, multiple rendezvous, multiple recoveries to low approaches at the uncontrolled airfield, and lastly a formation overhead recovery and landing at ABQ. Start, taxi, takeoff, and the first 2/3 of the mission went off great. Next came the one-hour block for multiple formation recoveries at our small airport, just a little south of ABQ...a favorite of all the other crewmembers behind the two front-seaters.

On this nice spring day I was leading a formation overhead to Runway 03 low approach. While setting up for it, a little Cessna called over UNICOM to land at our small airport and requested advisories. The winds that day were about 220 degrees at 20 knots, at 1000-1500 feet AGL. I advised our "new guy" that a two-ship of C-130s were working low approaches to Runway 03 ("good neighbor policy"), but that the winds appeared to favor Runway 21. He acknowledged, and we requested he call us in sight. Meanwhile we continued our training, making all the standard position reports around the pattern, first for the overhead, then for the left downwind, again to Runway 03. After the downwind recovery, we rejoined and I passed the lead off to my wingman. He assumed control of the radios and made all of our advisories. We set up for another overhead left break to Runway 03. Again we requested the position of our other traffic...he guessed 16 miles out for runway 21...again we asked him to call us in sight. How can you miss a two-ship of mighty Herks 300 feet apart, with a long JP-8 exhaust trail behind 'em?

We kept flying and looking for him up the seven-mile initial, up to the break...for sure he should see us...maybe he was still pretty far out. We configured on inside downwind and perched. Our lead aircraft called, "left base, gear down, low approach Runway 03," over UNICOM. I called, "Left base, gear down, low approach Runway 03" over UNICOM as Number 2. Now our new pattern buddy chimed in—reporting base to Runway 21! Obviously, he was not concerned about our ground track! Both MC-130s aggressively searched visually to find this conflicting traffic. I discontinued my approach during the base turn to get a little room between myself and lead, and began to offset to the northwest of the runway, away from where I expected this Cessna to fly. Finally we saw him on an approx two-mile base leg. Lead got directive and told him to do an immediate right 360-degree turn, while they executed a go-around to remain well clear of him. Our friend then called us in sight, complied with our request, and subsequently full-stopped on Runway 21. We rejoined the formation and tried that pattern again. The rest of the training mission went fine.

After all this "fun" in the uncontrolled pattern, my crew wondered what was that bozo thinking? (The typical aircrew response.) We made five position reports to him, advised him of our intentions, and of where he should look for us. He should have been clearing on the radios! Luckily, we were doing just that—not just the pilots, the whole crew: navs, FE, LMs.

This kind of thing can happen easily, and it reaffirms the reason why we should not "step on" the radios. The radios are there to provide us useful information and to get useful information out to those flying around us. It helps fill your Situational Awareness bag of tricks. SA is good for everyone to have. If one party is a little low on SA for one reason or another, hopefully the second party is on top of the situation and will make up for it, as we did that day. But, when both parties are low on SA because they aren't looking or listening, and aren't "lucky enough" to have TCAS, bad things can happen in the air.

UPT patterns are busy places with nine-plus aircraft flying continual racetracks. You may be more worried about conflicts in that environment rather than at a small, quiet airport with hardly any traffic. However, on that particular day we just happened to have all the right planets come into alignment, leading one formation and one single bug-smasher to the same block of air at about the same time. Thankfully, this is not a common occurrence, but if it is likely to happen, it is going to happen near a runway at an uncontrolled field, frequented by the fearless Joe-Bob and his flying machine.

Obviously, the lesson illustrated here has application to military operations around the world: How about night, blacked-out or min lighting operations out of austere FOLs using min communications, frequented by helos, Herks, heavies, UAVs? At those places, the ATC controllers and other air traffic depend on you to make position reports as the primary means of deconfliction. If ATC directs you to report your position, practice good CRM, make sure the crew does not forget to make the report, and make sure you all are listening to the other guys, too.

Look and listen out there, just like your mom told you to do in kindergarten when crossing the road. Don't be the guy who didn't listen to the radios. Fly safe!

COMBATING COMPLACENCY WITH CRM
IT'S NOT JUST FOR TRAINING MISSIONS ANYMORE

USAF Photo

CAPT JEFFREY D. ROBINSON
7 BW
Dyess AFB

If someone back at home station would have told me that I could ever experience complacency while flying combat missions in a B-1B over Afghanistan, I would have thought they were nuts. That was before my umpteenth mission ferrying JDAMs back and forth to the AOR. The average mission duration was over half-a-day, included two or three aerial refuelings at about a half-hour apiece, a three- to four-hour theater vul, and often ended with an approach shot through weather onto a wet, low-RVR runway. Other than that, these missions were exactly like the 3.5-hour training sorties we'd grown accustomed to back in the states.

On this particular mission, our original three-hour fragged Close Air Support (CAS) was extended to six hours. That extension meant hitting an extra in-country tanker, bringing the total to one each—day, dusk, and night boom session, for a total of over 250,000 pounds of fuel on-load when the Control and Reporting Center finally ended the pain and released us for return to base.

After six hours of orbiting in our darkened kill box with no Joint Terminal Air Controller (JTAC) contact, we were more than ready for the long trek home. The weapon system officer's selection of "good" music had long expired, so the front station was now being kept awake by a horrid selection of Barry Manilow crooning. (Of course, that's a topic worthy of a safety investigation in and of itself.)

We monitored the radio traffic of friendly forces tangling with Anti Coalition Militia (ACM) throughout the duration of our sortie and anxiously awaited the call to help our guys engaged on the ground. A combination of caffeine, modern medication and the waves of adrenalin created by our expectations kept the crew awake and alert before the call came to RTB. We initiated the gluttony of radio calls necessary for egress as well as the discussion of which episode of "The Sopranos" we were going to watch later, when we first heard the Troops In Contact (TIC) call about 13 hours into our mission.

The good news is that we had not yet switched the AOR frequencies off, so we heard the call. The bad news is that we had switched from a tactical mindset to airline mode—readying for the long journey home with our 2,000-pound passengers still tucked in the weapons bays. Although the sun had risen, our hopes of getting in the fight during that mission had set. Instantaneous and orchestrated bedlam ensued as we copied down coordinates, swapped our headsets for helmets, re-strapped into our seats, and mercifully convinced the WSO to cut off Lawrence Welk's Greatest Hits. We expeditiously computed our remaining fuel duration and turned 180 degrees back to the north while coordinating with all the necessary agencies en route to the JTAC's position.

Although our duty day was now stretching into the seventeenth hour or so, we were all suddenly alert and ready to go. In fact, somewhere in the controlled chaos our crew laid out the battle plan, re-emphasized bomb run duties and backed each other up countless times on the weapons coordinates. ORM and CRM were seamlessly and automatically integrated into our plans, and as much as I hate to use the cliché, our years of combined training just took over.

We were the first air asset to arrive and assumed the airborne mission commander role in conjunction with a two-ship of A-10 Warthogs. We learned that our troops were taking fire from a building located in the center of an ACM compound, which they had encircled at a range of 300 meters. The battle had ensued for the past 24 hours, and our forces had suffered several friendly casualties earlier in the engagement. Our guys wanted the complex leveled and were ecstatic when we checked in with sixteen JDAMs. Our fangs were out, and we wanted nothing more than to help the occupants of that compound achieve martyrdom.

Unfortunately, the friendlies were too close to the target for us to safely employ our weapons. The rules of engagement specifically state how far our troops need to remain away from the desired point of impact, and by no means were we going to drop over or into the Americans who had formed a ring so close to the building. A long or short miss would result in disaster. We recommended to the JTAC that the attack be passed to the Warthogs that were in visual contact with the compound and carried smaller footprint 500-pound bombs. We weren't happy about making that call, but it was undoubtedly the right thing to do. Of course, the A-10s were more than happy to step in and help the soldiers out.

However, the JTAC declined our recommendation and instead moved all friendly troops a safe distance south of the compound and passed the ground commander's initials over the radio, indicating that he willingly accepted the risks associated with his proximity to the impact area. We were cleared hot and continually verified coordinates until the point of release. The last thing anybody on our jet wanted was to "fat finger" an entry due to fatigue and cause any injury to our own guys.

We worked in amazing concert with Warthog lead, who selflessly stepped aside and provided an excellent "talk-on" enabling our offensive weapons officer to confidently slew his cursors over a mud-enhanced target that wasn't exactly built with radar reflectivity in mind. Looking back, I am amazed at the level of CRM that flowed from cockpit to cockpit of such vastly different airframes. We watched the door bays open and the clock count down to zero, and felt the one-ton bombs separate from the plane. It seemed like an eternity until the JTAC announced "direct hits" and immediately requested a re-attack. Unfortunately, on the ensuing bomb run, we lost radio contact just before the final clearance to drop. We chose to continue the run until the last possible moment, frantically trying to reach the ground commander through all the static, to no avail. Even though the target location hadn't changed and we knew we would have been cleared to drop, again ORM and training took over and we were forced to call a withhold and declare bingo fuel 15 hours into our sortie.

We finally reestablished contact and signed off with an extremely grateful controller en route to our fourth AR, and reflected on what had just happened. We debriefed the high- and low-lights of the mission and settled in for the uneventful ride home from one of the longest combat sorties in the history of the B-1B. We couldn't help but mention phrases like Operational Risk Management and Crew Resource Management, and we realized they are much more than just numbers on a sheet and currencies tracked by the AFORMS troops.

Make The Right Call

ANONYMOUS

As fighter pilots trading stories in the bar, we've all heard the tale about the young wingman who "knocked off" the entire Red Flag war for minor issues and earned himself a new callsign later that night at the O Club for stupidity. Having just returned to the home drone from Red Flag less than a week before, the adrenaline and "big war" mindset was still fresh as we stepped to our Vipers in a 10-ship mini LFE DACT opposed SAT sortie against Eagles. The plan was to blast off as three separate flights in a 2+4+4 configuration. My flight, the two-ship, took off first, refueled first, and hung out in holding until everyone was established in their cap waiting to push at the Fight's On.

I was number two in the two-ship, and the mission commander was leading the first four-ship. AWACS fell out of the mission and Red Air was briefed to operate on the common strike UHF, allowing the flights to maintain separate VHFs for inter-flight admin. Red Air wasn't keen on providing reverse GCI, so forget BVR shooting today.

We pushed out as a two-plus-eight-ship wall, and my lead and I were to subsequently spin back underneath and fall in behind the eight-ship wall as a two-ship stinger. As we flowed to the target area both four-ships were calling out bogey group positions and assigning responsibilities. Seemed like all was well despite a very busy (standard) strike freq due to no GCI and Blue Air executing old-school intercepting. Mowing and flowing to the target area, all went well except that all Blue Air ended up in the target area fairly compressed due to air-to-air targeting and by airspace boundaries to the north. My two-ship ended up getting split up at the IP due to both of us VID-ing and shooting separate Red Air players end-game.

Still managing to drop our weapons deconflicted within the TOT, Lead and I fought hard to regain our visual mutual support until finally rejoining on the target egress. At this time I could hear the second four-ship target a pop-up group post-egress behind us, when he asked us where we were: "Say posit"...pause..."Say posit!"

As I keyed the mike and spilled out our bull's-eye position, I saw lead start rocking his wings. Damn! Fortunately at this time, all Blue forces were off target going same way, same day. Unfortunately we were all flowing toward a regenerating four-ship of Red Air in the south. A mere two minutes sooner and this thing would have been a *huge* chocolate mess.

I rejoined on Lead from line abreast and could hear him clicking the mike and giving the "deaf-dumb-and-blind" visual signal.

"Can you hear me?" I asked on our inter-flight freq.

"Yes," he nodded.

"Terminate?" I asked him, not knowing how serious his radios were bent. No response. "K.I.O.?" I asked. I denied even saying the full three words over the radio. The whole time, no kidding, I thought about being the jackass to knock off the entire war and defending myself in the bar.

USAF Photos
Photo Illustration by Dan Harman

"Naw," he shook, and sort of shrugged.

Did I mention the strike freq was still busy as hell?

Well, I rationalized, technically it was in the training rules, but we were no factor. We were right next to the border, in our block even. Besides, I'm not going to degrade training for the other two flights. With Lead on my wing in route I stayed in our block as I cautiously turned the flight 90 degrees to the fight and pointed west toward the airspace boundary.

"Looks like number one's NORDO," I told the mission commander over the strike freq.

"Roger, flow to the border and take him home," he replied.

"See ya," I responded. "We're at angels 210 flowing west…" "Whew, that sucked, but no sweat," I remember thinking as we approached the border. Still listening to the fight, just then I thought I heard Red Air calling a kill near our position. Damn, there was an Eagle rolling in on Lead! I keyed the mike with a non-player call, and Lead was also shaking him off with continuous wing rocks. With no acknowledgement, the Eagle finally peeled off our tail with nothing less than 10 seconds of good gun footage, I'm sure.

Flying north up the border I also found out at this time that lead's HUD was also completely gone. Great. This was going to be a factor, because the weather at home was socked in from about 1700-5500 feet AGL, and icing was possible in the clouds.

Although it took us several miles to fight through the comm-out signals of "I must land on your wing, etc., etc.," I thought we did a pretty good job of CRM-ing our main and contingency arrival and landing plan. Within range, I called the SOF and he concurred with a formation ILS, giving him the lead with clearance to land, with me executing a low approach back to the radar pattern, which all went as planned.

Finally back on the ground I was shocked to find out that two Blue wingmen didn't even know we went home early with radio failure. On the phone to Red Air, I also heard Blue 1 explaining to Red 1 that we were NORDO and that's why Red 3's kill was on "non-players."

After reviewing the tapes in the debrief, it was so crystal clear. Man, there was no doubt there should have been a "Knock It Off" call. Even more obvious was the fact that the call should have come from me. And when it didn't, Blue 1 should have for sure followed up with the call instead, giving everyone situational awareness, clearing up any doubts, and solidifying the deconfliction between all 14 airplanes. We all agreed there were plenty of opportunities to correct ourselves and we were lucky nothing else had happened.

"Wow, how ironic," I thought, when it hit me: Even though nobody was looking I felt my ears turning red when I instantly felt worthy of a new callsign. I had become the jackass who *didn't* knock off the entire war when he should have…

NOT A VANILLA MISSION

CAPT JAMES MARION
79 RQS
Davis-Monthan AFB AZ

So, there we were at Camp Lemonier, Djibouti, Africa, on the tail-end of a 70-day deployment. I am a copilot on the HC-130 Combat King Rescue aircraft. Our mission involved providing Combat Search and Rescue assets for a multitude of local missions. The threat level in Djibouti is considered low, and as a result our unit ended up flying a lot of training lines, what we would consider "Vanilla Missions." Treating each mission with this mentality almost jumped up to bite us one day.

The night prior to the incident, we briefed up a mission we had flown at least five times during the deployment. We were going to perform live personnel static line and HALO drops on the DZ located approximately 500 yards from the departure end of the active runway. Given our experience flying this exact profile, and the professionalism and experience of our crew, I went to bed early and didn't give the mission a single thought. I would rely on past experience and previous mission planning to prepare for the morning flight.

In the morning, mission planning was accomplished without incident. The jumpers requested two lifts, performing one static line stick and one HALO stick on each lift. We requested a face-to-face brief with the jumpers because they were new to the camp and it was the first time they were jumping with us. We wanted to make sure we were all on the same page. We didn't anticipate the chain of miscommunications and poor CRM that would exist through the entire flight. It took three seconds for the jumpers to announce they were changing the plan. We planned on dropping at 9,999 feet MSL, an altitude that would not require breathing oxygen. They wanted to jump at 13,000 feet . The jumpers were not jumping with oxygen, a detail that would limit our time above 10,000 feet to 30 minutes.

We took off on time to make our NOTAMed time for the first static line drop. The French controllers cleared us for takeoff and the first set of drops went off without a hitch. We climbed to 13,000

USAF Photo by SrA Richard Rose

feet and set up for HALO. We ran all appropriate checklists and flew out to a 10-mile final for the drops. The Navigator was gathering wind data for the drops, loadmasters were preparing the cargo compartment and communicating with the jumpers, the engineer was clearing outside for other aircraft, the aircraft commander was flying the airplane, and I was communicating with ATC. We ran all appropriate checklists, obtained drop clearance, and the jumpers were up and ready to go. About five miles out, the navigator and the jumpmaster analyzed the winds and agreed upon a release point. At one mile we confirmed the field in sight and gave control of the door to the jumpmaster. At green light time the jumpmaster called no drop because "it didn't look right." The jumpmaster had not gotten a clear enough picture of the release point from the navigator and thought the drop profile was off, when in fact we were right on. I told ATC we were "No Drop" and informed them we would proceed out to a 10-mile final for a second attempt.

The navigator and the jumpmaster reconfirmed the release point and cleared up any confusion the jumpmaster had. We ran all appropriate checklists and prepared to jump. Approximately 10 seconds from green light, ATC called and cancelled our drop clearance to launch two French Mirages. We were then instructed to hold approximately 10 miles from the airfield at present altitude for arriving traffic. ATC's instructions were, "Proceed to a ten-mile final for drops, and hold at present altitude for approximately 25 minutes. We will call you back when ready for drops."

This presented two problems. We only had about 15 minutes of time at 13,000 feet, and by the time we were cleared, the wind data we collected as we climbed would be off. We were worried that if we waited any longer we would risk dropping the jumpers off the DZ, which could result in injury. We talked it over as a crew and decided to descend to 9,999 feet and observe the winds as best we could to determine a good drop point. After about 35 minutes ATC cleared us to drop. We were unable to discern whether or not the winds had changed so we decided to drop based on our previous wind data. We climbed to our altitude at 10 miles from the DZ and proceeded inbound for drops. About five minutes out we were told by ATC that we had two minutes to complete drops because of arriving traffic. We decided to proceed inbound even though we could not make it in two minutes and got the jumpers up and ready to jump. This time we made it to about two seconds prior to green light time when ATC cancelled our drop clearance again.

We were forced to proceed outbound for a fourth time. The fourth change to the plan came when we decided to drop all the jumpers in one pass instead of doing two passes. We were given another tight timeline to complete the drop, but this time we were able to complete all the checklists and get the jumpers away on a good profile. All the jumpers got good chutes, and all landed on the DZ.

The errors of this flight produced no injuries and no damage to government or civilian property, but there were too many chances for disaster, and plenty of room for improvement. Our first mistake was made way before we stepped to the airplane. We had it in our minds that just because it was in the NOTAMs that we were dropping, the airspace would be clear for our operations. We were wrong, and it created an attitude of invincibility that we were not prepared to deal with. This attitude clouded our judgment and caused us to make poor decisions.

The first "no-drop" was due to a lack of trust between the Navigator and the Jumpmaster. As it would turn out, the first run-in was our best opportunity for a safe drop. The second "no-drop" should have given us a clue about our traffic priority. It should have convinced us to be more cautious and more conservative. We tried to rush our third drop and as a result we almost dropped nine people on top of a commercial jetliner. Had the words "green light" come out before the drop cancellation, our jumpers would have been face to face with a commercial airplane.

Additionally, we chose to jump all the jumpers at once, on 35-minute-old wind data, on a DZ designed for less jumpers, and with fighters and commercial airliners making approaches less that 500 yards from the DZ. We discussed options and thought we were using good CRM when in fact we were displaying destructive thinking. We allowed the urge of completing the mission to force our decision instead of making choices with safety in mind.

So, what should we have done? First, we should have developed a clear plan and stuck to it. Changing the numbers of jumpers per pass should never have occurred, given all the confusion. We should never have rushed our third attempt when we were given two minutes to drop, five minutes from our release point. Despite our frustration with ATC, we should have taken our time to reanalyze the winds for the drop. If it was so important to drop all the jumpers at once, we should have recomputed drop data to account for the extra jumpers. And most important, once the mission started to fall apart we should have called a timeout and discussed in detail the safest way to accomplish the mission while considering all the factors.

We did not effectively communicate our options to each other and rushed our decisions and the implementation of those decisions. We were lucky this time. Next time we might not be so lucky.

continued from page 6

position. What was that last step they teach us in pilot training? Oh yeah, communicate.

"Mytai push 9" (VHF SOF frequency).

"Mytai push 3" (UHF Tower frequency).

"Myati 1 check victor." Nothing. "Mytai check" (UHF) Nothing.

In the complexity of the EP, I had lost my wingman on the radios. From the time Number One turned to a key position until the time he was at Low Key ready to land was about 6-9 seconds. I had lost him on the radios, but Luke tower needed to know what was going on. Luke air patch is a very busy airfield with jets constantly taking off and landing. Not having time to get Number One on the correct frequency, I told tower Mytai One was an emergency aircraft and was going to be landing immediately. Tower understood and cleared Number One to land on either runway. The SOF acknowledged that he heard what was going down. Mytai One flew a perfect SFO pattern and landing, popped his drag chute and came to a complete stop on the runway. Just as advertised, right?

With every sortie there are lessons learned. The lesson learned this day was good old Step Three of the "aviate, navigate, communicate" EP checklist. My wingman did a great job in getting his crippled jet safely on the ground. In our debrief we discussed how the radio drill went amiss. I wanted him on tower frequency so he could declare his emergency and get the emergency response crews rolling. I wanted him on SOF discrete so our discussion could be heard by the SOF, and the SOF could add insight from 1G, or add information we may not have thought about. The radios didn't go as I had planned, in part because I didn't brief him how I expected the radios to run. Add the fact that English is his second language, and doing anything non-standard will throw him for a loop, and exacerbate the situation.

At the next pilot meeting the squadron discussed the scenario. The instructor pilots threw in their ideas, and the students gave their thoughts. The squadron came to a consensus on how to handle future EPs right after takeoff.

How does this apply to your jet? Here are a couple of things to think about.

Single-seat dudes and dude-ets: As the mayor of cockpit city, aviate and navigate are critical. Get the jet in a safe position to land, but don't forget your wingman. We employ as a flight. We also handle emergencies as a flight. The wingman is there to back you up. Use them to coordinate your intentions on the radio if you need them to.

Pilot training IPs: Make sure you know who is flying the jet. A new student trying to handle an EP will be a handful. Listening to them try to talk on the radio may sound like Chinese. When and if the situation dictates, step in over the intercom. Consider coordinating with ATC, Tower, SOF, etc., yourself.

Crew aircraft: Use the CRM they taught you in pilot training. If the Aircraft Commander is doing his best to handle the EP, the copilot may be there just to back him up with the checklist or talk on the radio when required. In any event, effective communication between the crew will result in an effectively handled EP.

Whatever the situation, remember your training. Break it down to the basics; Aviate, Navigate, and Communicate. Just like they taught you in pilot training.

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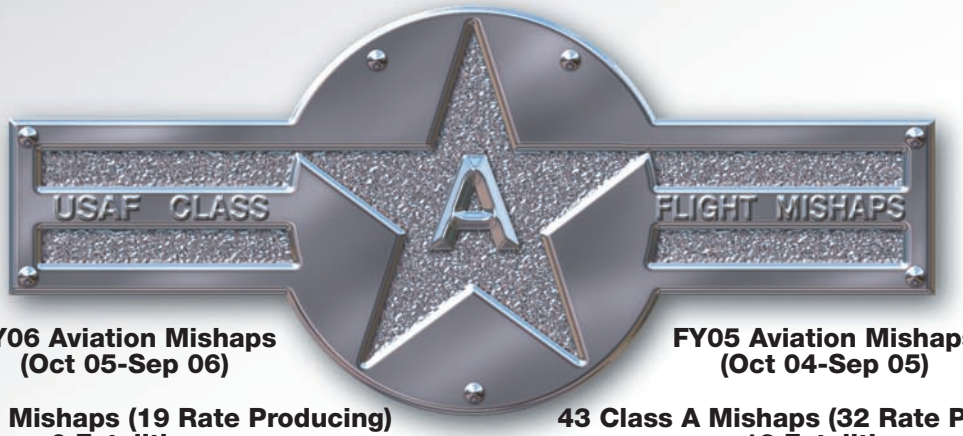

FY06 Aviation Mishaps
(Oct 05-Sep 06)

31 Class A Mishaps (19 Rate Producing)
0 Fatalities
8 Aircraft Destroyed

FY05 Aviation Mishaps
(Oct 04-Sep 05)

43 Class A Mishaps (32 Rate Producing)
12 Fatalities
11 Aircraft Destroyed

09 Oct		An F-16C departed the runway on landing rollout; pilot egressed safely.
20 Oct	✶	An F-22A ingested an NLG safing pin into the #2 engine; no intent for flight.
21 Oct	✶	An MQ-9L landed short of runway; gear collapsed.
28 Oct		An F-16C departed the runway on landing rollout; pilot egressed safely.
02 Nov		A C-5A had a #2 MLG bogie fire after landing.
17 Nov		A C-17A had a #4 engine compressor stall and fire.
28 Nov		An F-16C departed the runway on landing rollout; pilot egressed safely.
30 Nov	✶	A B-1B practice munition ignited a 26,000-acre range fire.
06 Dec	✶	An A-10A had a landing gear collapse prior to takeoff.
13 Dec	✈	A T-38 had a bird strike; aircraft crashed, pilots ejected safely.
17 Jan	✈	An F-15C crashed into the ocean; pilot ejected OK.
01 Feb	✶	An MQ-1 crashed during landing.
14 Mar	✈	An F-16C experienced buffeting and uncommanded pitch/roll; pilot ejected safely.
21 Mar	✶	An MQ-1 crashed during flight; pilot experienced loss of control.
30 Mar		A T-38C landed short of runway.
30 Mar	✈	An F-16C crashed; pilot ejected safely.
03 Apr	✈	After an emergency RTB, a C-5B landed short of runway; aircraft destroyed.
05 Apr	✈	An F-16C crashed into the ocean; pilot rescued with multiple injuries.
11 Apr	✈	An F-16C crashed after takeoff; pilot ejected with minor injuries.
21 Apr		An F-16C sustained engine damage from bird strike on takeoff; RTB OK.
25 Apr	✶	A QF-4E was command-detonated inflight due to control failure.
27 Apr	✶	An F-15C ingested an NLG safing pin during ground operations.
08 May		A B-1B landed gear-up.
26 May	✶	An F-16D incentive ride passenger suffocated inflight; died at hospital.
22 Jun	✶	An MQ-1 crashed during flight; engine failure due to oil loss
17 Jul	✶	A C-130E had a brake fire post-landing.
03 Aug	✶	An MQ-1L crashed short of runway.
10 Aug	✶	A QF-4E crashed on takeoff.
02 Sep		A KC-10A suffered a #3 engine failure.
08 Sep		An F-22A had a left MLG collapse on landing.
14 Sep	✈	An F-16C collided with a ground object during low approach; pilot ejected.
14 Sep		An F-16B had a right MLG collapse on landing rollout.

Editor's note: The Air Force has experienced 4 fatalities that are not considered rate producing. One fatality was post-flight (26 May), and the other 3 were attributable to other services.

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "✈" Denotes a destroyed aircraft.
- "✶" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Aviation Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: http://afsafety.af.mil/stats/f_stats.asp
- **Data includes only mishaps that have been finalized as of 26 Sep 06**.

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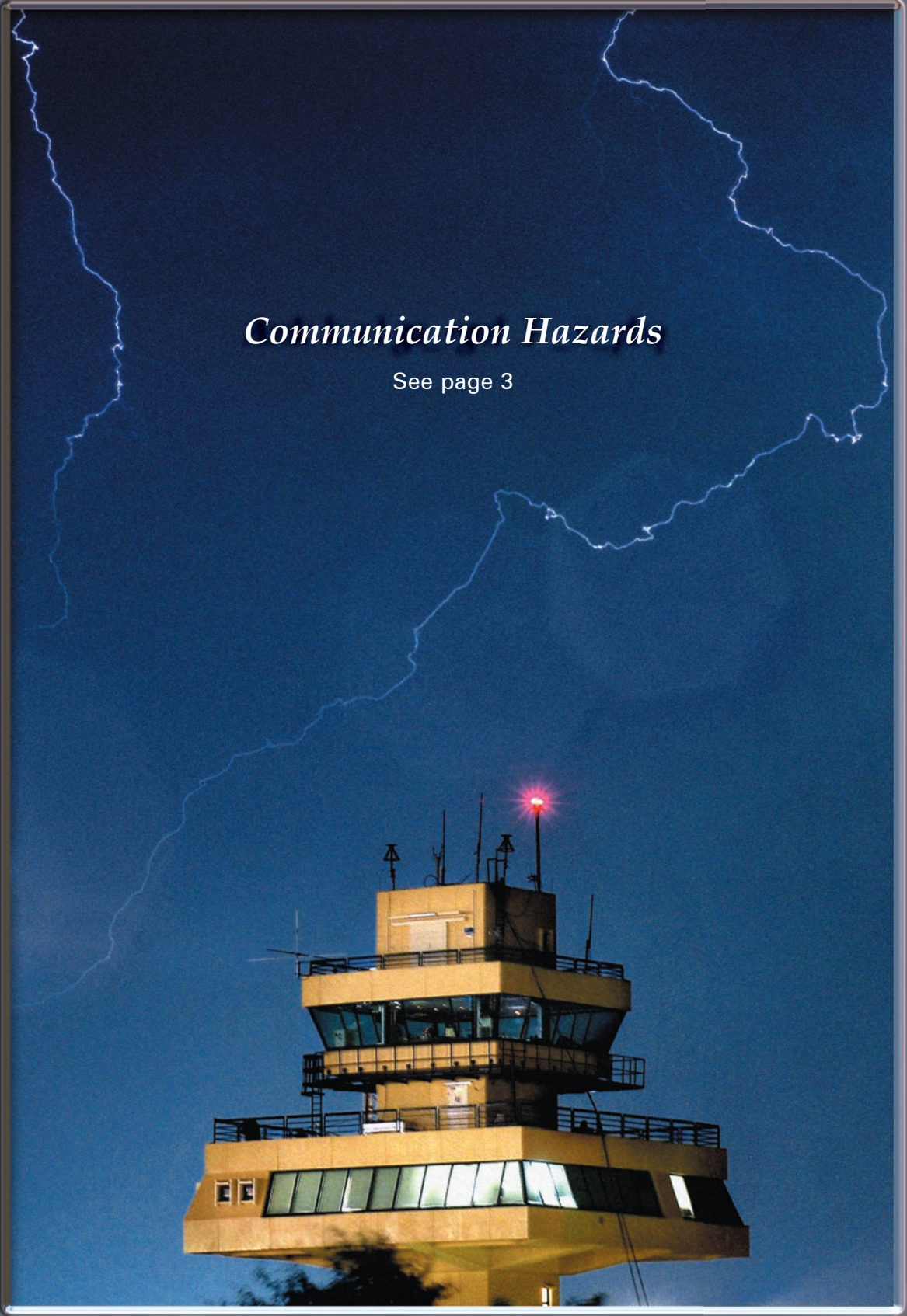

Communication Hazards

See page 3