UNITED STATES AIR FORCE

FSM

OCT 2005

FLYING SAFETY MAGAZINE

Safety First

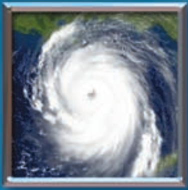
In all Contingencies

FSM

FLYING SAFETY MAGAZINE

AIR FORCE RECURRING PUBLICATION 91-1

CONTENTS



Cover: ANG Photo by TSgt Bill Conner
Rear Cover: USAF Photo by SSgt Jacob N. Bailey
Photo Illustration by Dan Harman

U.S. AIR FORCE

Flying Safety Magazine on line: http://afsafety.af.mil/magazine/htdocs/fsmfirst.htm

U.S. GOVERNMENT PRINTING OFFICE 2005-773-482-53091

Another HAP

Here's another HAP that may be of interest to the Egress folks, plus of very keen interest to the QA shops that make sure things are done right. Not to mention the pilots who rely on the ACES II seat.

The following HAP was previously reported as applying to all ACES II MDSs. Further investigation has revealed the issue at question concerned A-10s alone.

Depot contacted the mishap wing (MW) concerning an ACES II ejection seat constructed improperly by the wing maintenance. The notification affected all MW aircraft. The ejection seat had improperly connected ports on the seat catapult (i.e., proper connections would connect to the C & D ports as opposed to the A & B ports actually connected). These ports were joined at the MW base maintenance. The discovery was made by depot while the MW was in the middle of flying operations. Depot recommended an immediate recall as well as a one-time inspection of all wing ACES II seats. With that recommendation, leadership cancelled flying operations and recalled aircraft airborne at the time. The one-time inspection was accomplished and an additional aircraft was found with a similar discrepancy. Further investigation revealed that the mis-connected ports, in themselves, would not have resulted in a failed ejection sequence (if needed). However, the proper connections preclude chafing in the lines which, undetected, would cause a failed ejection sequence. In summary, A-10s should have the C & D ports connected, whereas F-16s, F-15s, etc., should have the A & B ports connected.

Something you may need to be aware of to ensure the last line of defense works as advertised.

DEPARTMENT OF THE AIR FORCE — THE CHIEF OF SAFETY, USAF

PURPOSE — *Flying Safety* is published monthly to promote aircraft mishap prevention. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. The contents of this magazine are not directive and should not be construed as instructions, technical orders, or directives unless so stated. SUBSCRIPTIONS — For sale by the Superintendent of Documents, PO Box 371954, Pittsburgh PA 15250-7954. REPRINTS — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Managing Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments.

DISTRIBUTION — One copy for each three aircrew members and one copy for each six maintainers and aircrew support personnel.

POSTAL INFORMATION — *Flying Safety* (ISSN 00279-9308) is published monthly except combined Jan/Feb issue by HQ AFSC/SEMM, 9700 G Avenue, SE, Kirtland AFB NM 87117-5670. Periodicals postage paid at Albuquerque NM and additional mailing offices. **POSTMASTER:** Send address changes to ***Flying Safety***, 9700 G Avenue, SE, Kirtland AFB NM 87117-5670.

CONTRIBUTIONS — Contributions are welcome as are comments and criticism. The editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

Commercial Prefix (505) 846-XXXX

E-Mail — jerry.rood@kirtland.af.mil
Address Changes — patricia.rideout@kirtland.af.mil

24-hour fax: DSN 246-0931

HQ Air Force Safety Center web page: http://afsafety.af.mil/
***Flying Safety Magazine* on line: http://afsafety.af.mil/magazine/htdocs/fsmfirst.htm**

Threat Of The Day: The Drool Bucket

USAF Photo
Photo Illustration by Dan Harman

CAPT PHILLIPS
20 FW
Shaw AFB SC

While the Drool Bucket may get sidelined by the SA-6 or the Mig-29 during the daily threat brief, history tells us that the DB-1 may be a much more potent adversary… be it in training or in combat.

What is a Drool Bucket? It is any item that steals away a good crosscheck in the jet and draws you into anomalies of attention. Of all flight mishaps influenced by human factors, channelized attention is the most prevalent human factor in Class A and B flight mishaps. Other attention anomalies (task prioritization, inattention, cognitive task oversaturation) are not far behind. This enemy can creep up on even the most experienced aviators and have devastating effects. As professional aviators, we must make every effort to keep the Drool Bucket from getting any more kills to its name.

Although pundits understand the phenomenon fairly well, preventing future mishaps resulting from channelized attention is a whole different ballgame. One of the factors that perpetuates the problem is the fact that modern tactical aircraft continue to add data sources in the cockpit. These data sources increase pilot workload for information processing, which translates into additional pilot tasks during a given phase of flight. For example, the USAF is currently adding a targeting pod, a helmet-mounted cueing system, and a multi-platform datalink to the F-16CJ. These are on top of the already abundant data sources currently in the aircraft. Each of these systems, while greatly enhancing the tactical capabilities of the aircraft, pose a significant threat as a potential pilot Drool Bucket. Huge quantities of detailed information compete for the pilot's finite amount of attention to comprehend and apply this data.

This trend of increasing information sources is not limited to the fighter world; indeed it exists well beyond the world of airplanes. Consider the competing information sources available to a car driver on the roads today. Moving maps, multimedia stereos, multi-function diagnostic displays, not to mention that cell phone and hamburger in your lap, all provide distractions to the business of safe driving. While the mostly two dimensional world of driving automobiles pales in comparison to the dynamics of the 3-D world of tactical aviation, the problems associated with channelized attention in both environments are similar. In order to be a safe driver, or a safe pilot, one must make sound decisions in task prioritization and attention management.

The task environment almost always dictates how to best allocate attention. While flying in close formation in the weather, a wingman cannot spend more than fleeting moments looking at anything but the flight lead's aircraft. However, in one mile line abreast, the wingman can afford to spend much more time looking at data sources other than at his flight lead's aircraft. Likewise, line abreast straight and level going to the working airspace affords more time than line abreast on a low-level in the mountains.

Another factor that affects attention management is experience, or practice. A person who has done tactical intercepts for 10 years in line abreast formations can allocate more attention to outside tasks than a person who has been doing them for 10 days. Also, individual factors that vary daily influence attention management. Fatigue, stress, motivation, coordination, and cognitive ability all affect what a given person in a given situation is capable of doing with a given set of information and tasks. These and other factors enter the equation that describes the resources a pilot has available to do his job in the cockpit.

Deciding on what to spend your attention is a fundamental skill of being a pilot. Sometimes pilots will channelize on a specific item without realizing it. Sometimes, though, pilots will channelize knowing full well that they should not succumb to a Drool Bucket, even as they allow themselves to do just that. Why, then, do they do it? The fact is that much of our judgment, or ability to discern how much time we can spend on a given task, comes from trial and error over the course of experience. Fortunately, most of the time the cost that we allow ourselves to risk by channelizing is negligible. For example, the pilot who finds himself 200 feet off intended altitude because he decided to take a closer look at the map in his hand has just learned that he spent a little too much time looking at the map instead of the flight instruments. Noted… press. Sometimes the consequences of attention anomalies are more severe.

The same judgment process occurs when driving a car. The task environment while driving on a crowded downtown freeway at night and looking for an unfamiliar exit is vastly different from driving down a familiar rural road Sunday afternoon at 40 mph with no traffic. The latter allows more time for playing with the radio, dialing a cell phone number, etc., but anomalies of attention can still have consequences. The driver might judge as acceptable the risk of drifting slightly off the road because he was trying to get a pen out of the glove compartment. However, what happens when a deer jumps in front of him while he's fumbling for the pen? A much more serious consequence than what he expected results. This scenario is the root evil of the Drool Bucket syndrome. The difference is that, in an aircraft, these unexpected consequences are often extremely severe. Severe consequences for mistakes, not just with attention anomalies but all causal mishap factors, is a characteristic of aviation that drives much of the time and money spent on flying safety.

Most pilots have long known of the dangers of attention anomalies, and yet the problem continues to plague aviation. Crew aircraft have someone to catch a lot of each other's mistakes, which provides something of a safety blanket. Crew aircraft are not immune, though, as demonstrated by the L-1011 controlled flight into the ground when the crew was channelized on an inoperative gear light.

The countermeasure for the feared Drool Bucket often boils down to having the personal discipline to spend time on the information source that is the priority, rather than on the information source that you would like to watch. "Aviate, navigate, communicate" still applies whether you need to get that radar lock or not. Pilots must be brutally honest with themselves when they know they are spending too much time on a particular task to the detriment of something else that is more important at the time.

Reflecting on experiences at 1 G and 0 KIAS about our bad decisions with attention management, sets the tone for the next flight when similar situations arise. Pilots themselves must defeat the Drool Bucket.

A Hard Habit To Break

CAPT JOHN BUSKE
81 FS
Spangdahlem AB, Germany

It was the perfect sortie for the last flying day prior to Christmas, my second pattern-only solo in the mighty Tweet.

With 20 hours under my belt and having passed a ride with a hammer for an IP earlier in the day, I was feeling confident as I stepped out to the jet. Ground ops and taxi proceeded normally, and as I took the runway I glanced at the windsock and noted the slight left-to-right crosswind. I pushed up the throttles and waited the obligatory 12-15 seconds for the engines to spool up. After break release, the jet screamed down the runway at speeds approaching 100 knots. Just as the wheels left the runway, a gust of wind caught the left wing, causing the jet to dip uncomfortably to the right. Slamming the stick to the left, I recovered to level flight and patted myself for saving a valued Air Force asset.

Turning crosswind in the pattern, I began constructing the "There I Was" story to regale my classmates about saving a nearly uncontrollable jet in 40-knot crosswinds. I also noticed that my rate of climb was a lot lower than I expected, and I wasn't gaining any airspeed. As I was trying to wrap my inexperienced brain around the situation, I heard the radio call you never want to hear as a solo student: "Aircraft on crosswind, check configuration." Oh crap, I thought, I sure hope there's another jet behind me.

I glanced down into the cockpit, but I already knew what I was going to see. Sure enough, handle down and locked, three green lights, and flaps set for takeoff. At this point, temporal distortion took over as I contemplated my fate, tried to figure out what went wrong, and began planning my defense, all prior to reaching downwind. Finally,

USAF Photos
Photo Illustration by Dan Harman

I managed to croak out a call to the RSU: "Speedo 23, request high pattern and a chase ship…I just oversped everything."

Twenty minutes later, I was on the ground, having learned two very important lessons. One: It is entirely possible to hook a "low-threat" ride on the day before Christmas (in fact, every IP who was airborne or in the RSU that day stopped by my flight room to make sure of that). Two: It really doesn't take a whole lot to disrupt a habit pattern, especially one that's just been formed.

We all learn about the importance of good habit patterns early in pilot training. They serve as an internal warning system. Break a habit pattern, and your body starts throwing out signals; a vague, uncomfortable feeling in the pit of your stomach, a nagging sense that you forgot something, or the hair standing up on the back of your neck. They can point to something unsafe or warn you to take another look at your checklists or procedures.

Habit patterns also free up brain bytes for essential mission tasks. In complex or high-stress situations, the human brain can only attend to one task at a time on the conscious level. If you had to consciously think about throttle settings, stick and rudder actuations, and trimming the aircraft, you would be continuously task-saturated and would never accomplish the actual mission—bombs on target.

So, how do we form these habit patterns? They are lodged into our subconscious through a building-block approach to training and the process of overlearning. We spend the first 40 hours of UPT learning basic aircraft control—practicing until we can get from A to B, trimming the aircraft, and most importantly, managing to raise the gear and flaps after takeoff without thinking about it. In this way, no further attention has to be put on those skills when they are used in actual practice, and attention can instead be put on the finer skills, such as navigation, coordination, tactical maneuvers, and weapons employment. Under stress, the skills will not let the person down. This idea of overlearning should be familiar to anyone who drives a car; thousands of hours of practice have made the skill automatic. This allows you to make the drive home, even as your mind wanders to your vacation to Fiji or you take that all-important cell phone call.

The problem with habit patterns is that they are perishable. Much like Situational Awareness (SA), when habit patterns are lost or corrupted, you won't realize it until you gain them back. The key is to recognize when you are at risk, utilize the checklists, and make sure your habit patterns are based on the proper procedures. Habit patterns take time and discipline to develop. This is especially true if you are new to flying, as in my example, or new to the airframe and trying to overcome negative transfer. Time out of the cockpit can also make habit patterns unreliable. As little as 30 days out of the cockpit can have a significant impact on performance in the cockpit. You may find yourself falling back on habit patterns that your subconscious can't completely reconstruct. In this case, you are not only performing tasks incorrectly, but also relearning the pattern without those steps. This negative training will only exacerbate the problem.

I learned a valuable lesson about habit patterns—the hard way. However, 'gear up, flaps up, lights out' will probably be wedged in a corner of my brain until the day I stop flying. If you are new to an aircraft or getting back into the jet after an extended layoff, be vigilant about checklist usage and correct procedures so the habit patterns you develop are sound, and the signals your body gives you are for the right reasons. It just might save your life, or at the very least allow you to save face.

Complacency—"I've

CAPT JAMES R. MOSCHETTI
347 RQW
Moody AFB GA

This article isn't about a high-speed ejection out of a multi-million dollar aircraft, nor does it deal with a near-midair collision between two Air Force assets. We've all read about such safety-related incidents, and hopefully learned from them. This article is about a more formidable problem, one that goes to the root of many mishaps and "close calls." It is a problem that affects not only flyers, but all of us serving in today's military.

Complacency. Merriam-Webster's Dictionary defines it as, "self-satisfaction accompanied by unawareness of actual dangers or deficiencies." Everyone serving in the United States Air Force has had, at one time or another, a commander or supervisor drill this term and its negative effects into his or her head. Each and every one of us is subject to its wrath. However, does that deter us from glossing over a seemingly complex and dangerous task by using the excuse "I've done this before"? Not always. This cavalier attitude is especially prevalent in the flying business, where the risks associated with this way of thinking can quickly lead to a damaged aircraft, injury to aircrew, and even death.

During real-world military operations, complacency isn't as great an issue. Those of us in flying career fields go to painstaking depths during mission planning sessions, threat update briefs, and crew briefings to ensure that every aspect of our impending mission is reviewed and understood. Then we double-check. And re-check. Finally, we fly the mission as planned, or as close as possible. Obviously, circumstances arise where we must deviate from the plan and select other options. But in these situations, we revert to our training and press on. Granted, many missions during combat become routine themselves, and I'll be the first to admit that complacency can begin to creep in. But the thought of falling into the wrong hands or having a mishap over enemy terrain is enough to remedy that problem.

Home-station training is a completely different matter. An average week for most flyers is two, sometimes three, training flights. The scenario for these flights is usually a cookie-cutter replica of all the previous missions. In the rescue world, a typical training line is as follows: night low-level on night vision goggles (NVGs) to a simulated airdrop or helicopter air refueling (HAR), an actual airdrop, an actual HAR with one or two helicopters, followed by navigator-directed approaches to an airfield. It may sound like an extremely task-saturated flight, and it is. But after flying these missions over and over, aircrew members get into a "zone" where they are able to deal with the influx of information and perform with little or no trouble. Herein lies the problem. We become careless. We tend to gloss over those items that seem less threatening, but could end our day in an instant.

I see this attitude nearly every time I fly. As a navigator, it is my job to know the ins and outs

Done This Before”

USAF Photo TSgt Molly A. Gilliam

of our route of flight. I must know where to enter our route, where to exit, and where to fly, should we become “boxed-in” by weather or terrain. It is the navigator’s responsibility to brief the entire route of flight to the pilots prior to the mission. As such, these briefs can be very time-consuming and detailed. It’s inevitable that I glance up during my brief and notice that one or both pilots are looking elsewhere, completely detached from our mission. On more than one occasion, the pilots have been engaged in a conversation, usually discussing dinner plans or weekend getaways. But pilots aren’t the only culprits. Often, it is the navigator who minimizes the importance of a certain portion of the route or the mission. The navigator’s lax attitude may be the most detrimental of all, for the entire crew gauges their level of confidence on the navigator. In their minds, they are thinking, “If the navigator is secure with not going into greater detail about the route, then so am I.” At this point, the entire crew is to blame. Each and every one of us reaches a stage where we know the mission so well, backwards and forwards, that we dismiss hazards that could end our careers—or our lives.

This careless attitude is prevalent in every military career field, not just flying. Obviously, flyers are scrutinized more for their complacency because it often leads to the greatest damage or loss of life. But everyone suffers from it. Aircraft maintainers, life-support personnel, and even schedulers are subject to complacency. We all become so desensitized to our daily routine that we can’t see the forest for the trees. All too often, we resort to the idea of “blood priority,” which, simply stated, is correcting a problem only after someone has died as a result. Or we hold the belief that “it can’t happen to me.” This is when we must stand back and reevaluate our jobs. It may be an old cliché, but we must treat each day as if it is the most important of our lives. For a flyer, that means planning and briefing a mission as if it is the first day of a major conflict; no threat, route portion, or checklist item should be left out. For a maintainer, it means scouring each and every system, component, and part with a fine-toothed comb. A life-support troop should take extra care in inspecting parachutes, helmets and survival equipment.

Safety, in all its forms, should be a proactive endeavor. And it should be an everyday occurrence. The next time you witness someone making a careless mistake or oversight that could result in injury, speak up. Remind them of the consequences.

Obviously, not every mishap is a result of complacency. Sometimes parts fail. Sometimes systems malfunction. We have very little, or no, control over these occurrences. But if we take the few extra minutes to be thorough and complete in our responsibilities, we can greatly reduce the number of accidents that never should have happened. And it may just be the life of a friend or colleague that you save. Or your own.

Automation And The Halo Effect

Illustration by Dan Harman

MAJ RANDLE A GLADNEY
Chief Pilot, C-32A
Eglin AFB FL

The increase in aviation technology has been outstanding over the last 15 to 20 years. We, as aviators and aircrews, fly more advanced machines that were designed to reduce the workload on the pilots and crew. Human System Integration (HSI) was designed to lessen pilot stress and workloads, with one of the goals being to reduce pilot errors and possible loss of life. The question must be asked, "When is too much—too much?" At what point does the crew flying the plane become passengers on their own plane? With automation being what it is, it is conceivable that pilots might become monitors rather than pilots.

I am lucky enough to be a pilot in a unit that has one of the Air Force's newest aircraft, the C-32A (Boeing 757-200). It is designed to be flown on autopilot, and it is designed to be a "quiet, dark cockpit." This aircraft has auto-brakes, auto-throttles, auto-tune for navigational aids, and can even auto-land. The autopilot will not let you overspeed the flaps or landing gear, and it will not let you fly away from any assigned altitudes or take off or land without the correct configuration. It is a great piece of modern technology, and we have become used to its abilities. As a new pilot assigned to this unique squadron, it took me a while to break my old C-130E habits of hand-flying the plane in just about all phases of flight. It took several months for me to get used to the automation and let it work for me and not against me. All in all, it's a great aircraft to fly, and the automation is years ahead of the 1962 model C-130Es I used to fly at Pope AFB, NC.

So, what happens when the HSI doesn't quite work out the way the designers had planned? What happens when the human mind compensates for all the checks and balances? When pilots become used to someone, or something in this case, always being "right" they can justify just about anything. We all have been taught about the "Halo effect" and how it can happen when you have an instructor pilot or senior pilot on board. We feel we have a safety blanket in those cases where there is someone with more experience than you. Have we given "Halo" status to our "never wrong, always right" autopilots? This story is about a case when a crew did do just that!

The C-32A has a few warning systems that alert the crew when a system goes out of tolerance and requires adjustment. The Electronic Initial Caution Alert System (EICAS) is such a system. EICAS will give you a message and even a reference page to look up the malfunction. Most of the warnings are just for "crew awareness;" it's the plane's ways of informing the crew of possible impending situations.

In light of recent events at the Boeing plant, Boeing has released a message for all of its 757/767 aircraft to turn off the center fuel tanks with 1000 pounds of fuel remaining in the center tanks. This procedure will leave enough fuel in the tanks to cool the fuel boost pumps and not ignite any fumes that may be around if the tanks were empty. The C-32A burns fuel from the center tanks first, due to higher pump pressure, then the main wing tanks. The fuel system was not designed to have 1000 pounds of fuel left in the main tanks and thus causes an EICAS message; FUEL CONFIG. This message normally means that there is a fuel imbalance of 1800 pounds, or there is fuel in a tank and the boost pumps are turned off. EICAS will give us a warning when the tanks reach an imbalance of 1800 pounds; the system can take up to 2000 pounds before action has to be taken. EICAS will also give a FUEL CONFIG message when the center tanks are turned off due to the improper fuel configuration.

There are crews who are used to seeing FUEL CONFIG lights every flight and who erase the message because it is due to a mismatch in the software from the fuel change message. There isn't one crew in the five years of the C-32A's existence that has had a fuel imbalance. The plane's automation takes care of all of that and makes it fail-proof. Or does it?

That question and many more were answered for me in May 2004 on a flight from Virginia to Washington State. I left just before 10 a.m. with a crew of five and 35 passengers. Two hours into this four-and-a-half-hour trip, I turned off the center tanks and, as expected, got a FUEL CONFIG EICAS message. As I had done hundreds of times before, I cleared the message and noted to the young copilot (Capt X) that it was due to the center tanks being off. The next hour or so was uneventful, as it was VFR and a beautiful day for flying. I then called for the other pilot to come up front to relieve me so I could eat my lunch and take a break before we landed at Fairchild AFB, WA.

When the second pilot (Major Y) got to the cockpit, he did his normal getting situated in the seat, and figured out where we were and what Center we were talking to. A few minutes after getting settled, Major Y noticed that the FUEL CONFIG message was on and looked up to see that the center tanks were indeed turned off. Captain X reassured him that I had turned the pumps off and that it was normal to get the EICAS message. The two pilots settled in and enjoyed the ride. The autopilot was hooked up, and we were cruising at FL380; all seemed normal. About 30 minutes later, Major Y noticed that the yoke was almost two degrees off center line; this would indicate that the plane was flying in uncoordinated flight. The two pilots discussed what might have caused this and came to the conclusion that the autopilot was straight and level and that it was less than two degrees—"No big deal; must be the strong crosswind."

I was in a deep sleep when I was awakened by a frantic copilot. "Get up, man, get up! We have a problem! You've got to see this!" I walked up to the cockpit, trying not to startle any of the passengers. What I saw next hit me like a ton of bricks: a 7000-pound fuel imbalance! How could this happen? How could we not have gotten a warning, message or caution light? How could my automated 757-200 let me get into such a severe imbalance situation? Captain X informed me that he had noticed that somehow during start the crossfeed valve was pushed in along with the fuel pumps, which allowed the engines to burn from either tank. This in itself would not cause an imbalance situation. The main tanks are not used until the center tanks are empty (or turned off), and the wing tank fuel pumps are rated at the same psi pressure, so they should burn at the same rate. So, again I asked myself, "How did we get to this situation?" Had this "high tech" aircraft failed in its primary purpose?

What I learned from this event was that the aircraft had not let me down; I had let the crew down. The primary mission of the automation was not to replace the pilots or their judgment. The automation was designed to aid in aviation, not replace aviators. Going back to pilot training, we are taught to "aviate, navigate, and then communicate." Those lessons are in that order for a reason. There isn't a reason that we, as pilots, should ever stop aviating. The automation had tried to warn the crew on several occasions and was ignored every time. The crew received an EICAS message, the yoke showed several degrees of trim difference, and in every case, the crew justified the reason for the indications. Never did the crew take the time to see what was actually causing the warnings.

The crew went into a holding pattern, added drag with the spoilers, flaps and gear, and burned the imbalance away in less than 15 minutes. The lessons learned would last a lot longer than 15 minutes.

I share this story so that other aircrews will learn from my crew's mistakes. An automated warning system and good autopilot will never replace a safe crosscheck and good airmanship. Always use the tools around you to help in all your crew duties, but never forget that you are responsible for the aircraft and all of the crew/passengers aboard. Automation is good, but good aviation and coordination is better. Pay attention to your environment, and understand the situations that arise around you. Fly safe!

Safety First—Not!

MAJ PAMELA J. NORKAITIS, USAFR
914 AW
Niagara Falls NY

What? This goes against everything I've ever been taught in the Air Force. We always put safety first, don't we? The surprising answer is no. If we were trying to be completely safe, we would tie all the airplanes to the ramp and never let anyone fly them. This would definitely be the safest course of action and would guarantee no more inflight mishaps. We obviously can't do business this way. We fly in Iraq and Afghanistan; if all we were concerned with was safety, we would definitely not be flying in these counties. Safety is not our mission. Our mission is to support and defend the United States and our way of life.

What we are really trying to do is get the mission done as safely as possible, and to eliminate as much of the risk as we can. The Air Force spends millions of dollars and untold hours a year on safety. There must be a safety program out there to reduce risk, and there is: Operational Risk Management (ORM).

WAIT, DON'T STOP READING! You may think the ORM sheet you fill out before every flight is completely messed up, and that it's just something the bosses have dreamed up to make it easier to blame the AC if something goes wrong. Or that the numbers don't really tell us anything. If that's the general perception in your unit, then maybe your ORM sheet is bad. Some of the false indicators I've seen are things like "more crewmembers mean more risk." For example, sometimes we fly with one loadmaster and sometimes we fly with two. If neither of the loadmasters is an instructor, then each of them gives the risk assessment five points. Is flying with two loadmasters twice as hazardous as flying with one? No. So, the risk assessment matrix needs to be adjusted to reflect only one loadmaster, the one with the lower qualification. The opposite effect occurs when we fly without a navigator, no points for navigator experience are added. Is it safer to fly without the extra set of eyes and ears in the aircraft? Probably not. These are just a couple of indicators that might make your risk assessment wrong. They are easily fixed, since they are locally generated forms. So, the first step in managing your mission risk is to make sure your risk assessment tools are asking the right questions.

USAF Photo
Photo Illustration by Dan Harman

All right, we've updated the risk assessment sheets. They now include valid measurements of crew experience, mission complexity and length, aircraft maintenance issues, weather and a catch-all category for outside personal issues. What now? We have a great tool; now we need to train people to use it effectively. A few years ago I was flying a standard five-hour local low-level mission, with the usual 5 a.m. show time. We had a fully qualified crew, and I expected everything to go smoothly. This particular day, though, I kept having to prompt the flight engineer on his checklist responses. It wasn't a very challenging flight and it didn't really cause any major problems, but I asked the engineer if we were doing anything different that day that was causing him a problem. He told me he hadn't been getting much sleep, because his wife was nine months pregnant. He felt like he had to keep flying because we were short on engineers, but he wasn't really feeling 100 percent. He hadn't put anything down on the ORM worksheet under personal issues, and the squadron was big enough that I didn't know his wife's due date. In further discussion, I discovered he hadn't had sufficient training on how to use the ORM worksheet. He never even looked at the section where personal issues could be annotated. The real issue here is communication.

It's important for everyone to know if you're tired or have any other issues that increase the risk for the mission. The aircraft commander may try to find another crewmember to fly the mission, or shorten the flight, or even decide to cancel the mission. The second step is to be sure you are actually answering the questions your ORM worksheet is asking and that you are getting a valid risk assessment number.

The final step is to take your risk assessment number and decide if the mission you're flying is worth the risk you are taking. Most risk assessment matrixes will have a scale that tells you what's normal and what's severe, and usually a severe risk will require one of the top three to sign off on the mission. Your DO or OG/CC may decide that the mission is important enough to go without reducing the risk, or they may decide to eliminate some of the mission elements that are adding to the risk. I was recently flying a mission in the AOR when the CAOC made a fairly big change in the flying schedule from the soft schedule to the hard schedule, requiring my crew to alert two hours earlier than planned. The major issue, though, was the new alert was only five hours from when the final schedule was released, and none of the crew had slept yet. The aircraft commander and DO talked about the options available to the crew. One was to fly the mission with the changed schedule and accept the added risk of very limited crew rest coupled with a crew duty day of more than 14 hours.

The second option would have been to call the CAOC and tell them we didn't have a crew rested for the mission because of the late schedule change, alert the crew as originally scheduled, and just fly the mission two hours late. It was decided that the mission was important enough to accept the additional risk, but that decision was made above the crew level. This is how the ORM system is supposed to work. The mission was a higher risk than the crew alone should assume, so the DO looked at crew experience, the intelligence report and the weather, and decided that the mission was worth the added risk. We flew it safely, as scheduled.

So, safety isn't really first, but it is a major consideration in all of our operations. We need to think about safety throughout the mission planning and execution, continuously asking the right questions and answering them. Then we must assess what the information is telling us and look for ways to make mission risk acceptable. Then we can continue to do what we really do well, which is getting the mission done, safely.

Culture: Whose Job Is It?

CAPT CHRIS HEIM
96 BS
Barksdale AFB LA

Your squadron is 150 hours below the flying curve. You took two weeks of leave last month, so you didn't achieve RAP requirements. If you don't fly today you aren't going to make look back and lose your combat mission ready (CMR) status. Furthermore, the pilot in the other jet needs a formation departure to finish his Flight Lead Upgrade (FLUG) training. The maintainer looks at you and says, "I have no idea what's wrong with it, sir. It should work in flight, though." You look over at your young and impressionable copilot, navigator or whatever. He's looking at you with that "I have absolutely no idea what is going on or what to do" look. What do you do?

To many of us, "culture" is one of those cliché words used to describe how leadership is ultimately responsible for safety. But is it? How you handle the situation above will make a lasting impression on the younger, inexperienced crewmember next to you. One day he is going to be the senior, experienced crewmember setting the example for another young crewmember. He or she may not have to make the same exact decision, but the fact that you at one time made a decision that pushed a tech order directive or "bent, but didn't break" a rule will be ingrained in their memory. Especially if you take the jet and nothing happens. Were you lucky, or did you really know what you were doing?

Does leadership have anything to do with this? Absolutely. How leadership responds to a late takeoff, failure to fly sortie duration, or even possibly a cancelled sortie, will go a long way in determining whether you made the right call or not. Certainly the question of "What's leadership going to say about this?" will go through your mind.

Furthermore, like it or not, you are considered to be leadership. You may not be the Squadron Commander, DO, ADO, or even a Flight Commander, but just being in the position to make the decision identifies you as a leader. In the minds of the people on your crew you are, in fact, a leader, and what you say and do sets an example.

Think about your habit patterns and the techniques you use in the plane. Where did those habits and techniques come from? Chances are, you can trace just about every one of them back to something you were taught in flight training or your FTU, or picked up from a more experienced aviator along the way. How many times have you seen a senior crewmember blow off a checklist or do something you felt was questionable? Did you ask them about it? Did they have a good reason for their actions, or did they just blow you off as young and inexperienced? Did you, in turn, start blowing off that step of the checklist? What process do you use when you make a decision in the jet?

USAF Photo by SSgt Jacob N. Bailey

When you make those decisions, do you take the time to explain why to the rest of your crew? When you were a young and impressionable guy, did you take the time to question the decision-maker on why?

Some people make the argument that ORM is the way we handle the issue of culture. It is supposed to give the younger, inexperienced crew-dogs the proof that they need if something is unsafe. I would have to agree, to an extent. ORM is an excellent tool—when it is implemented properly. Oftentimes, when you are working a maintenance problem and pushing up against your takeoff time, you don't think to pull out that ORM sheet and re-work the data. Also, I have yet to see an ORM sheet that accounts for the people who think that certain steps of the checklist don't apply to them or skip them.

We could sit down with ten different people and come up with ten different factors for developing a positive culture. No one can tie it to just one thing, and you would certainly have to agree that it depends on the mission. One thing is certain. You can always tell when a bad culture exists, but you can never trace it back to just one thing. Oftentimes, it has several factors—poor training, the evaluator should have hooked him and didn't, he scared the daylights out of his crew on multiple occasions and no one acted on it, etc. These are indeed extreme cases, but what about that checklist step he routinely skips? What about the time he took the jet with the bad generator? Nothing happened, so that had to be OK, right? Leadership didn't say anything, so that means I can do it, right? Why is it leadership's responsibility to say something? Why can't you or someone else say, "Hey, why in the world did you do this?"

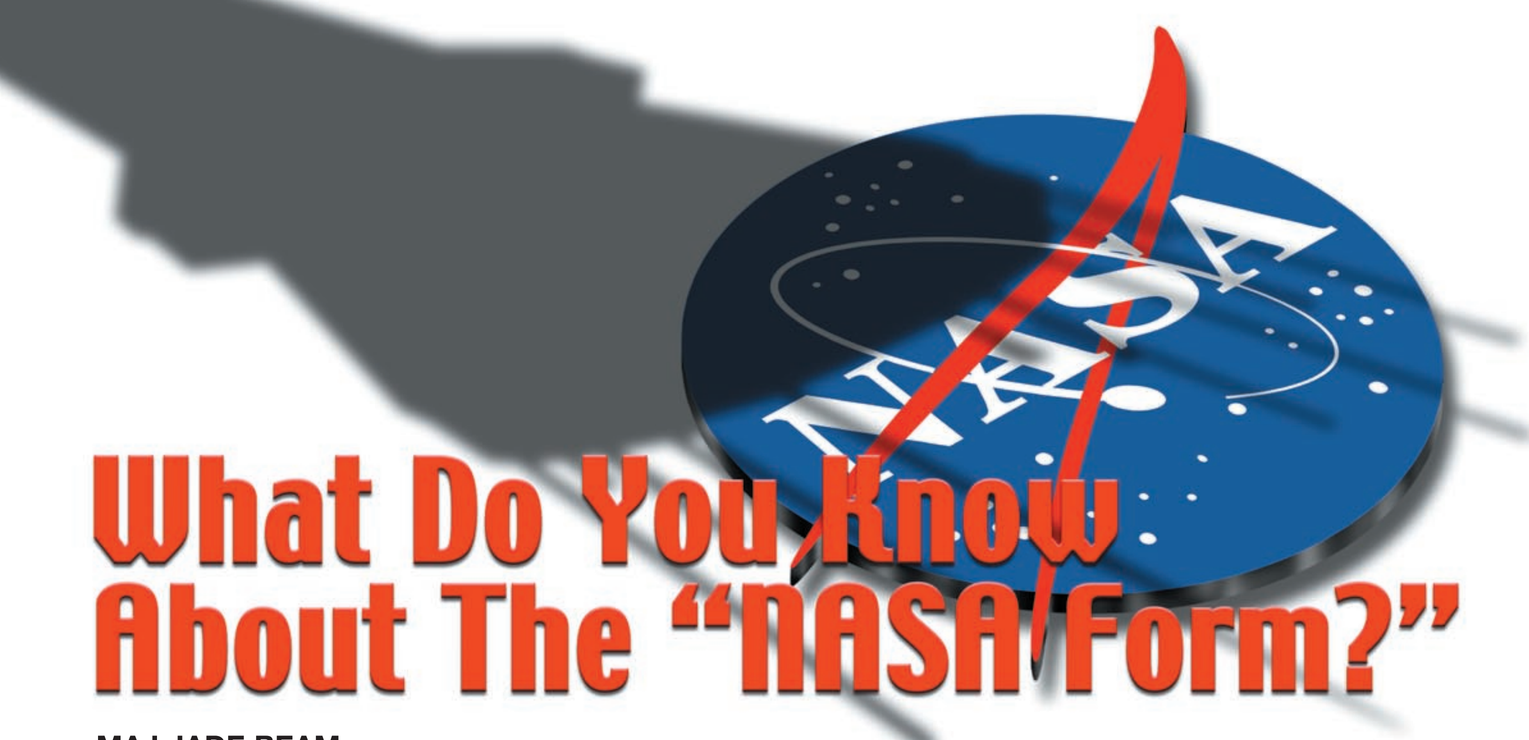
Ultimately, your Senior Leadership should have a good handle on the "culture" of your squadron. As soon as problems come to their attention, they should be in a position to deal with them. However, is it necessary to run to the commander every time someone misses a checklist step or uses some off-the-wall technique that makes sense in some galaxy far, far away? Or is it more prudent for you or someone else to discuss it with them?

As you can see, establishing culture is a very broad topic, and can be extremely vague. Commanders certainly have an influence in establishing this culture with their own policies and practices. However, when it comes to day-to-day operations, in and out of the jet, it falls on every one of us. If you think about how often you come in contact with the younger guys in the squadron and how often the commander comes in contact with them, odds are you will have more influence.

It's *your* job.


Human
Ca

Hurricane Katrina Satellite Image Courtesy of NOAA
USAF Photos
Photo Illustration by Dan Harman



What Do You Know About The "NASA Form?"

Illustration by Dan Harman

MAJ JADE BEAM
64th ARS
Portland IAP OR

ATC: "Slash 52, what altitude are you at?"
Slash 52: "Slash 52 is, uh, climbing out of one two thousand for one four thousand"
ATC: "Slash 52, that's not what you were cleared! Level off at one three thousand, that's thirteen thousand feet! Lear 469D, I need you to stop your descent; you're now cleared to one four thousand feet. Be advised, traffic at 12 o'clock and one mile, opposite direction."
Lear 469D: "Yes sir, we've already climbed back up to fourteen, we got a Resolution Advisory on the TCAS."
ATC: "Thank you, Lear 469D. Slash 52, advise when ready to copy."
Slash 52: "We're ready to copy, sir."
ATC: "Slash 52, your clearance was to thirteen thousand. Call me when you land at (303) 555-1234. You're now cleared to turn left heading 185, climb and maintain FL 230 and contact Center on 124.5!"

Does this situation give you a sinking feeling in the pit of your stomach because you've been in a similar situation? What would you do if you were Slash 52? We've all made mistakes while flying. Fortunately, most of our transgressions as military aviators are protected through the anonymity provided by our military flight plan system. However, like the old saying, "An ounce of prevention beats a pound of cure." Anyone with a civilian aviation license or certification should know about the "NASA form," officially known as the NASA Form 277. NASA oversees a safety reporting system that effectively protects an aviator's or controller's certificate from administrative action. It is called the Aviation Safety Reporting System, or ASRS.

Background

Over two-thirds of all aviation accidents occur because of the human element involved in aviation. Planes need pilots, crewmembers and ground crew. ATC needs controllers and flight service technicians. The common thread in aviation is people, and people inevitably make mistakes. In an attempt to better understand how to fix these human errors, the FAA decided they needed a way for people involved in aviation to self-report. The problem was that no aviator wanted to report their mistakes to the same agency that controlled their certificate.

So, in 1975, the FAA established the Aviation Safety Reporting System (ASRS) under a Memorandum of Agreement (MOA) between the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA). The FAA determined that the reporting system effectiveness would be greatly enhanced if the receipt, processing and analysis of raw data were accomplished by NASA rather than by the FAA. This would ensure the anonymity of the reporter and of all parties involved in a reported occurrence or incident and, consequently, increase the flow of information necessary for the effective evaluation of safety and efficiency of the system.

Accordingly, NASA designed and administered the ASRS to perform these functions in accordance with an MOA executed by the FAA and NASA on August 15, 1975, as modified September 30, 1983, and August 13, 1987. Current ASRS operations are conducted in accordance with an MOA executed by FAA and NASA on January 14,1994. Pilots and controllers heavily utilize this program. It now averages 727 reports a week and more than 3153 reports per month.

Purpose

The ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports in order to lessen the likelihood of aviation accidents. ASRS data is used to:

1. Identify deficiencies and discrepancies in the National Aviation System (NAS).
2. Support policy formulation and planning for, and improvements to, the NAS.
3. Strengthen the foundation of aviation human factors safety research.

Immunity

This cooperative program allows pilots, air traffic controllers, flight attendants, mechanics, ground personnel and others involved in aviation operations to submit a report. Quoting Advisory Circular 00-46D, which describes the program, "the filing of a report with NASA involving a violation of the Federal Aviation Regulations (FARs) is considered by the FAA to be indicative of a constructive attitude." The effectiveness of this program in improving safety depends on the free, unrestricted flow of information from the users of the National Airspace System.

The ASRS program has its roots in federal law. The FAA is prohibited from using information gained in reports for enforcement purposes. This is spelled out in Section 91.25 of the FARs (14 CFR 91.25). As with any law, there are several exceptions that apply:

(1) The violation was inadvertent and not deliberate. Sorry, you can't buzz your hometown at 100 feet and then absolve yourself by filling out a NASA Form 277.

(2) The violation did not involve a criminal offense or accident. Any accident or criminal offense will be immediately forwarded to the FAA, NTSB or appropriate law enforcement agency.

(3) The person has not been found in any prior FAA enforcement action to have committed a violation of the FARs, for a period of 5 years prior to the date of the occurrence.

(4) The report must be submitted within 10 days after the violation.

The FAA has also instituted some recent changes in the system. Previously, all parties involved in a report received immunity. Now, however, only the submitter gets the protection. This encourages multiple reports of an incident and offers different points of view.

Confidentiality

One of the most important features of this program is the confidentiality it provides to its reporters. NASA program director Bill Reynard stresses that the ASRS staff is, "Absolutely paranoid on this subject." The analysts who first read and code the reports go to great lengths to "de-identify" all reports.

Dates are retained only as month and year. Codes are used to replace specific information on reports. Boxes of whiteout and black markers are used each year to ensure the reporter's anonymity.

Security is tight, even at the main offices in Mountain View, California. A buzzer lets the staff know that someone is at the locked door. Reports are treated much like we treat classified information. They are kept in vaults except when being worked on. Visitors are escorted at all times. There have been situations in the past when this strict standard of anonymity caused moral dilemmas for the ASRS researchers. Due to the priority placed on confidentiality, some of the flight hazards reported have gone unresolved because of the possibility of revealing the identity of the reporter due to the peculiar facts of the incident.

Process

How do you go about starting the process? First, you must fill out the appropriate NASA Form 277. Check with your safety office or help your busy FSO and get them yourself by printing them off the web at www.asrs.arc.nasa.gov, or by writing to: NASA ASRS, P.O. Box 189, Moffett Field, California, 94035-0189. Different series are aimed at different aviation personnel. The pilot, for instance, utilizes NASA Form 277B. The report is filled out and mailed in via "snail mail." (No provisions exist for electronic filing. However, NASA is working on resolving this.)

Each report is read by a minimum of two aviation safety analysts. These analysts are experienced pilots and air traffic controllers. Their experience is considerable and covers the full spectrum of aviation activity: air carrier, military and general aviation, and Air Traffic Control in towers, TRACONs, Centers and military facilities.

These analysts must first identify any aviation hazards discussed in the reports. When these hazards are identified, an alerting message is issued to the appropriate FAA office or aviation authority. Analysts' second mission is to classify reports and diagnose the underlying causes to each event. Their observations and the de-identified report are entered into the ASRS database. After entry into the database, an ID strip on the top of the report is date- and time-stamped and returned to the mailer. This serves as their receipt and proof of compliance in case FAA action comes from another source.

Program Outputs

ASRS uses the information it collects to promote aviation safety in a number of ways. Alerting Messages have already been discussed. They are primarily issued when a hazardous situation exists—for example, a defective navigation aid, confusing procedure, or any other circumstance that might prevent safe flight. ASRS has no direct operational authority of its own and acts solely through the cooperation of other agencies and people.

CALLBACK is a publication distributed as a monthly safety bulletin, much like our *Flying Safety* publication. It goes to more than 85,000 pilots, air traffic controllers and others. Each issue of *CALLBACK* includes excerpts from ASRS incident reports with supporting commentary. Editorial use and reproduction of *CALLBACK* articles and information is encouraged. Copies are free and available online at the NASA ASRS homepage (see References).

ASRS *DIRECTLINE*, introduced in 1991, is a magazine published to meet the needs of operators and flight crews of complex aircraft such as commercial carriers and corporate fleets.

All the information in the ASRS database is available to interested parties. Individuals and organizations wishing access to data on a particular subject may submit a statement of need. The ASRS will then search the database for the requested information and then print, bind and mail the data to the requestor. To date, more than 3000 searches have been accomplished in support of government, industry and academic study. In addition to database support to individuals, ASRS also supports the FAA's ongoing safety efforts. Information from the database is used to support the FAA and NTSB during rule-makings, procedural and airspace discussions, and accident investigations.

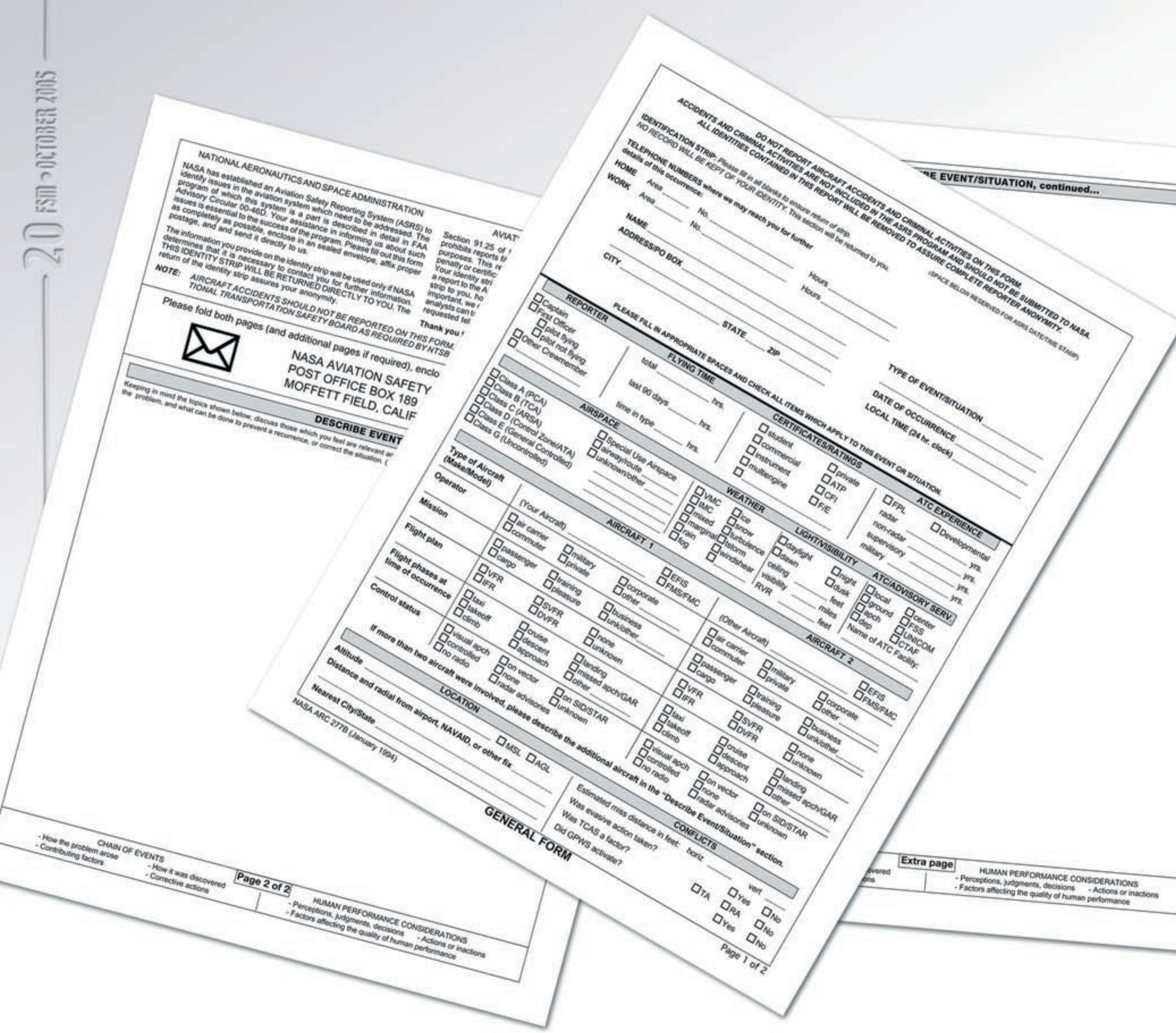
ASRS is a critical element in the safety of our national aviation system. Aviators have used its limited immunity to share errors and problems with the FAA for over 25 years. As military aviators, we can utilize this system to help protect our civilian tickets from errors made while "pushing the envelope" in support of Uncle Sam. The bonus is that the information we provide can only help us all better understand many of the problems and hazards encountered in aviation.

References

FAA Advisory Circular 00-46D 1 October 1996.

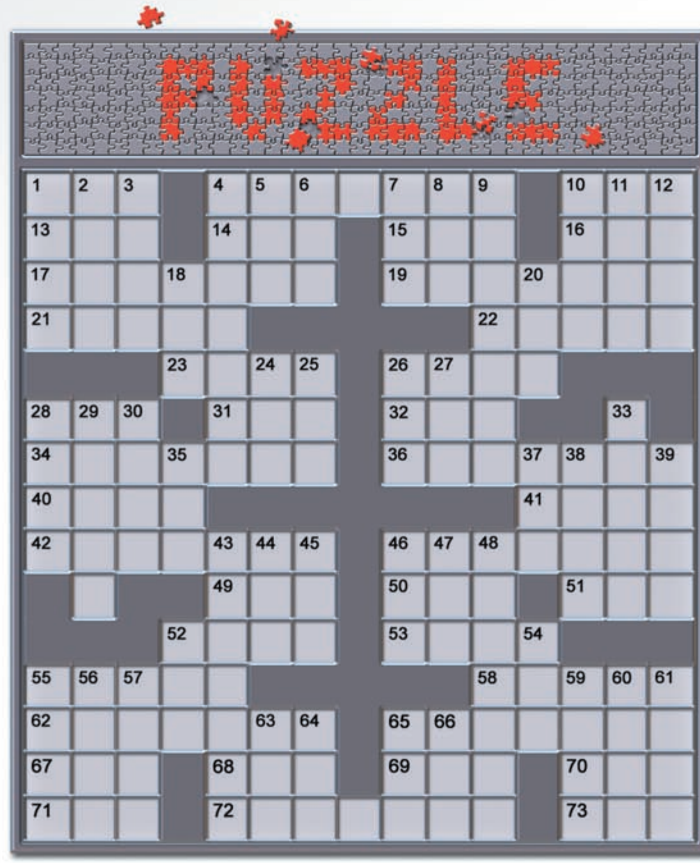
"Inside the 'Immunity' Program" Douglas S. Ritter Aviation Safety, January 15, 1994.

NASA Aviation Safety Reporting System website www.asrs.arc.nasa.gov



AIRCRAFT MAINTENANCE

CAPT TONY WICKMAN
Alaskan Command Public Affairs



Solution to puzzle on page 31

ACROSS

1. "Price is Right" host Barker
4. What can prevent safe flight
10. Abate
13. Military address overseas
14. Long time
15. Yes
16. Spy organization
17. Places to park aircraft out of the weather
19. Places where many fear to go
21. Need to stay fresh at work on flightline
22. Hanging instrument
23. Knowledge
26. Dry
28. ___ relief
31. Neither's partner
32. Weapon
34. Supervise
36. Aircraft suck, bang, blow devices
40. Run, ___, Run
41. Steak order
42. What causes workplace back injuries
46. Place for pilots to sit
49. U.S. spy satellite organization
50. Pay entitlement
51. Golfer Ernie
52. Law school student test, in short
53. Pierce
55. Inferior, at times
58. Span
62. They provide maintenance a step up
65. Juice provider?
67. Mining goal
68. Company head
69. SW Native American
70. Cool!
71. X
72. Pointed
73. Be in debt

DOWN

1. Words from Scrooge
2. Precious stone
3. Skeleton part
4. Things that go BOOM
5. Last stop before takeoff
6. Ques. response
7. Short laugh or snort
8. Hurricane center
9. ___ in (slowing)
10. Phonetic "E"
11. Drill pieces
12. Air Force location
18. Hair product
20. Zeus or Poseidon
24. ___ vs. Wade
25. Before, poetically
26. Aircraft ground equipmenmt (abbreviation)
27. Gallop
28. ___ weevil
29. Dodge
30. First person
33. Danger
35. Turncoat in the Mafia
37. Bother
38. Part of the neck
39. TVs
43. Required of all equipment prior to use
44. Gun lobby, in short
45. Acquired
46. NBC rival
47. Horse feed
48. Mapped
52. Young man
54. Wager
55. Congeal
56. Bunny
57. Biblical garden
59. Plane or drome lead-in
60. Gullet
61. Dr. Jekyll and Mr. ___
63. Actor Stephen
64. Way maintenance things are done (in brief)
65. Small drill
66. Dined

Call Sign: Evac 01

ANONYMOUS

USAF Photo by MSgt Val Gempis

It was 1230L, but most of the crew was asleep when the phone rang. “Hey, get your crew, pack your stuff, and be ready for pickup in 10 minutes,” ordered the commander. “It’s the Shirt…” he said seriously and hung up. My crew was in crew rest for missions supporting Operation Enduring Freedom, based out of Diego Garcia. We packed an overnight bag and our passports, zipped on the green bags, and ran downstairs. A car was already waiting and whisked us away. The driver, a Tanker Operations staffer, informed us that the Shirt was hurt really bad, but he didn’t know much else.

I met the Shirt when he came to the cockpit to stretch. We were on the way to Diego a month earlier, and the flight was a long one. The KC-135 wasn’t designed for passenger comfort, so most of the passengers come up front at some point in the flight just to see something besides a dull, gray cargo compartment. I learned that he was a Washington State National Guardsman assigned to be our First Sergeant for the duration of the deployment. “I’m a cop,” he said, “for a little town in Washington, but I was activated to hang out with you guys.” I was impressed by his presence, definitely a leader, definitely worthy of Senior Master Sergeant. He was tall and athletic and very well mannered. He quickly gained the respect of his newly adopted squadron, but now he was hurt. I could see it affected people. My commander was usually a pretty cool character, but this was the most serious I had ever heard him. The driver, usually a joker, was quiet. All we could do was take a breath and wish for the best.

We stopped in front of Base Operations and rushed inside. The driver would drop our gear off at the jet. Once inside, the commander said, “Your call sign is Evac 01. The staff has done what we could for you.” He handed me a stack of paperwork, including a flight plan and passenger manifest. “You’re going to Singapore, but we don’t know what airport. Brief the crew, and head to the jet. Your diplomatic clearances will be sent to you later.” So, we did just that, still not knowing the whole story. Right when we were out the door, the staff got a radio transmission: “The doc says he’s paralyzed.”

Of course, the first thing that came to me was whether or not the crew was up for this out-of-the-ordinary mission so fast. We briefed that we would be as safe as possible, and that we would make safety our number one factor when making quick decisions. But risks had to be taken, because the Shirt’s life depended on it. We were met at the jet by a flight surgeon who informed us that the patient has sustained a neck injury that paralyzed him from the neck down. As pieces of the story came in, we tried to make sense of it all. I can only put the pieces together after the whole thing happened. He was riding his bicycle out by the flight line, when a truck suddenly stopped in front of him. The Shirt didn't have any time to react and rammed into the truck head first. The driver of the truck slammed on the brakes, because he suddenly remembered that he shouldn't drive by the runway when an aircraft was approaching, as the wake turbulence might be dangerous. The Shirt was wearing his helmet and other safety gear. He had done everything right, but he was the unfortunate victim of an accident.

The next question that came to my mind was, "I've never done this before, and why am I doing it now?" There's nothing that I've seen that tells me how to transport a critical patient in, of all things, a tanker. There is guidance in the 11-2KC-135, Volume 3, regulation, but the guidance was only emphasized on schoolhouse check rides. And then, it was only a big picture synopsis. The questions today were much more personal. What power source would we use to keep our patient's life support equipment running? How were we going to secure the Shirt so that his neck wasn't further injured with normal flying maneuvers? How would we egress the aircraft if there were a problem with the jet? Would the Shirt survive all the way to Singapore?

The answers came when all the crewmembers (pilots, boom operator, flight surgeons and technicians, and crew chiefs) saw the necessity for a galley rally. We all seemed to meet at the same time at the aircraft's galley and talked about all the 'what ifs.' We answered as many questions as we could think of with our limited time.

The conversation stopped suddenly when a K-Loader pulled up to the cargo door. The maintainers found a way to get the patient up to the cargo door, something all of us aboard the aircraft had not even considered yet. We all took our places, and Evac 01 received clearance to start, taxi and take off at our discretion. Tanker Ops radioed that the new destination was Singapore Shangi International Airport, because Paya Lebar was closed for the weekend. The maintainers rigged a power supply for life support equipment, and the crew performed an alert start, a time-saving technique usually reserved for scrambling tankers. When ready, we taxied to the active runway, lined up, and set takeoff thrust.

The copilot's takeoff was flawless, and we all breathed a sigh of relief. The first ten minutes of flight was reserved for catching up with the aircraft. We had been alerted only two hours earlier. That breather was the only break we got, though, as our attention was quickly directed to the weather radar. A massive buildup of thunderstorms was right in our flight path. The copilot and I considered trying to thread our way through the storms when the senior flight surgeon came up to the cockpit to inquire about landing time. He took a look at the red and yellow weather radar screen and looked through the windows, only to see several lightning flashes in the distance. He assertively let the flight crew know that the Shirt couldn't afford to be bumped around, as any turbulence might cause his injuries to become fatal.

"By the way," said the Flight Doc, "try to have the best landing of your life." The reality of the situation sobered the flight crew to the bone.

The crew spent the next several hours dodging huge Indian Ocean thunderstorms. There was turbulence, but the Flight Doc kept everyone apprised of the Shirt's condition. The diplomatic clearances came to us via HF radio just in time not to be intercepted by foreign fighters. Everything was working. I was starting to see how we might pull this off. You might even say we were being taken care of. It was a miracle that, as we approached Singapore, the storms subsided and the air was as smooth as glass. It was night, but you could see for a hundred miles. There was no excuse for a bad landing now. Sterile cockpit procedures were used from entering Singapore airspace to over the runway threshold.

"Are we down yet?" asked the Boom. When he realized we were on terra firma, he smiled and said, "Looks like he's going to make it."

We taxied and parked nose first into a gate where an ambulance and two police vehicles had their lights flashing. A lift, similar to the K-Loader, was used to extract the patient from the cargo bay. I looked back and only saw the Shirt's sweaty, matted hair. That was the last time I saw him; the last time anybody from my squadron saw him. He was rushed to a hospital and stabilized. A week later his wife came to Singapore to escort him back to the States. I learned later that a year earlier she had to live through her son being paralyzed in a similar accident. Since then I haven't heard a thing about the status of his injuries or the condition of his family.

My crew did receive a Safety award for the job done that day. I often reflect on the experience and am glad that the tanker community is getting on board with the Air Force's 'technique guides' that other MDSs have used for some time. These guides gather all the operational knowledge of the previous generation of pilots for future use. The guides will be published later this year, and I recommend every aircraft commander keep a copy close by. These guides will only make daily operations safer, and it may one day make an otherwise bad day a piece of cake.

One final word. The Shirt's accident will go down as just that: an accident tracked by the Air Force Safety Center. Remember, though, that he is a casualty of our ongoing war on terrorism. The Shirt may never be the strong man that we knew, and his family will never function the same. Shirt, we appreciate your service and pray for your recovery, wherever you are.

Flight Briefing ORM

CAPT JEFF KENNEDY
524 FS/SE
Cannon AFB NM

"Knock it off, knock it off, knock it off…Miller 2 and 3 just had a midair!" As Miller 1, my heart stopped. Those are words that no pilot ever wants to hear. As I snapped toward their location, my mind was racing, trying to figure out how to get two damaged jets back to the airfield, if they were both flyable. After what seemed like a minute (really only five seconds), Miller 2 explained they had a close pass, but had not collided. After a couple of thorough battle damage checks this was confirmed, and we all went home.

Back in the squadron, we watched the tapes and pieced together what had happened. The sortie was briefed as a Continuation Training (CT) Air Combat Maneuvering (ACM) sortie with each element getting two perch set-ups, then splitting the rest of the gas for intercepts. On the first intercept, I split Miller 2 off to the trail group as briefed. I merged with Miller 4, while 2 and 3 merged 12 miles away. Their fight developed into a stack, with Miller 3 high. As the fight progressed, Miller 3 became ballistic and was turning to maintain sight. Miller 2 recognized the conflict and turned away as Miller 3 flew through his wash from above. The resulting jolt and caution lights, along with seeing Miller 2 about 200 feet away, convinced Miller 3 they had swapped paint. Luckily, this was not the case.

As a flight lead, I felt terrible that the sortie I briefed and led had nearly resulted in a midair. As part of the debrief, I thought about the flight leadership aspects of the sortie and how I could minimize flights like this in the future. The biggest lesson I learned was that as a flight lead, it is my responsibility to figure out what the major hazards to the flight are going to be, and adequately cover them in the brief.

As I was getting ready for safety school a few months later, I found that the thoughts I put together fit into the six steps of Operational Risk Management (ORM). Most of us probably already do most of these steps over the length of a sortie, so beginning to apply ORM is not a difficult step. As an example, I will use my eventful sortie and how the ORM steps may have made that sortie less exciting.

1. Identify the hazards. As you begin to mission plan, it's your responsibility as the flight lead to decide what you are going to brief and fly for that sortie. As part of this, you must find out what issues you will have to deal with to accomplish your sortie. These issues could be weather, airfield construction, range restrictions, or your wingman's currencies. At this point, you are just gathering information that will affect your flight. On my sortie, I had to deal with infrequent ACM/BFM sorties due to the squadron's air-to-ground training focus. Miller 2 requested a formation takeoff and landing for currency. It was a CT sortie, so I wanted to split the blue air time. Weather was good, but we were single runway ops due to airfield construction. These were the hazards that I would call factors to our sortie.

2. Assess the risks. Once you have your information, you need to decide what it means to your flight. We don't often do formation takeoffs, so that's a risk. Splitting the time as blue air had some risk because there was the potential for deconfliction issues and confusion on roles, altitude blocks, etc. The last risk was the ACM maneuvering. Proficiency, training rule adherence and maintain-

USAF Photo by TSgt Jerry Morrison

ing visual contact with all players are the main risks I would consider for this hazard.

3. Analyze risk control measures. This is where you decide what your options are to deal with the risks you came up with in Step 2. Your options may be limited by other risks, other flight member requirements or restrictions, but they range from dropping an event out of your profile to spending extra time covering the topic instead of briefing it as "standard." In our case, no one else was current, so the formation takeoff was nixed. For splitting the sets in the airspace, my options are to have a game plan for clearly defining which element is blue or to simply have one element keep the blue hammer for the entire sortie. For the ACM maneuvering, I could limit the level at which we would fight, script the set-ups to be more predictable, set a desired learning objective (DLO) to control how far a fight progressed, or a combination of these.

4. Make control decisions. Now, after deciding what options you have to control the risks, you decide which ones you will use on your sortie. On my sortie, the single runway operations made us carry more fuel to give us a divert option. The weather was good, so I would not have to carry so much gas as to make the role swap unfeasible. To limit the risk, I would brief that the elements would have mutual support, and then I would ensure deconfliction between the elements. I would also brief who would call the fight's-on and terminate, and who would command the next set. After that I would verbally command a role swap and we would keep the same blocks and points. For the ACM maneuvering, I want to maximize training, so I would fight unlimited under 11-214 training rules. I would also set restrictions to the red air. Now I can brief to a certain threat and give my wingman a better idea of how the fights will look. As far as a DLO, I want the fight to go to a logical conclusion, but if one of the blue air fighters gets killed, or a stack or neutral fight develops, a terminate call should quickly follow.

5. Implement risk controls. This step encompasses not only your brief, but your flight, as well. In the briefing, I would cover these items throughout the brief. I'm not adding an ORM section to the brief; I'm simply emphasizing or detailing the risk controls I've decided on for the flight. During the flight, I would continue to use my risk controls by confirming that everyone knows their role and directing the set-up for the next fight.

6. Supervise and review. Supervision starts when you step and carries throughout your sortie. It is one of the basic flight lead responsibilities to monitor your wingmen and ensure that your brief is adhered to. Deviations, dependent on their severity, can be dealt with immediately or saved for the debrief. The debrief is where you primarily review how you dealt with your hazards and risks. Pull lessons learned from what you observe as well as from what your flight members observed.

ORM may seem like an over-used buzzword, but it is an easily applied technique that will help you maximize your training and make your flights safer. I certainly wish I had thought of it before the day I had a near midair in my flight.

OPS TOPICS

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

We've discussed Traffic Collision Avoidance System (TCAS) before, but here are some more cases where TCAS was used, along with vigilant aircrews and ATC to avoid a mid-air collision.

TCAS To The Rescue

A KC-10A (EA1) was cleared directly to McGuire VORTAC navigation point at 3000 MSL. ATC (McGuire Approach) provided a traffic call, indicating VFR traffic (EA2) at the two o'clock position. This traffic was a civilian light airplane, not in radio contact with ATC. The crew of EA1 observed a traffic advisory (TA) on their TCAS, indicating an intruder at the two o'clock position, twenty miles, at 200 feet below their altitude (2800 MSL). The pilots of EA1 began searching for the traffic, and it was spotted by the copilot. EA1 then called traffic in sight to ATC. At the same time, EA1's TCAS provided a resolution advisory (RA), directing a climb. EA1 complied with the RA, climbing to approximately 3200 MSL. The crew of EA1 spotted EA2 passing an estimated 300 feet directly below them. EA1 informed ATC that they were deviating for an RA. Once clear, EA1 resumed course at 3000 MSL. EA1 then landed uneventfully.

This event took place in Class E airspace and EA2 was not required to be in contact with ATC. Also, EA2 was below 3000 AGL, so they were legal in not maintaining a hemispherical altitude. McGuire Approach did provide a traffic advisory to EA, and TCAS was instrumental in helping EA1 avoid EA2. This incident highlights the desirability of VFR traffic maintaining radio contact with ATC, even when not required.

It's always nice to have someone to talk to while flying.

Who Avoids Who?

The Mishap Aircraft 1 (MA1) was a C-130H on an airlift mission with an intermediate stop at Baghdad IAP (ORBI). Mishap Crew 2 (MC2) was an Iraqi Air crew departing from ORBI in Mishap Aircraft 2 (MA2), a Boeing 737. MC1 had reported 15 miles from the field and the tower controller cleared MC1 for a left pattern downwind entry for Rwy 33L (military runway). Shortly after issuing MC1 their clearance, tower cleared MC2 for an unrestricted spiral departure to comply with shoulder-fired-surface-to-air threat avoidance guidance. Tower then advised MC1 about the opposite direction takeoff on Rwy 15L (civilian runway) and to look for MA2. Both aircraft were flying in accordance with visual flight rules (VFR) in visual meteorological conditions (VMC). MC1 was accomplishing a random approach to vary their approach heading to the field and minimize wings-level time on final. MC2 started their climbing right-hand turn to accomplish the spiral departure. Iraqi tower controllers made numerous calls to each aircraft pointing out the position of the other. Both aircraft acknowledged the calls and reported having the other aircraft in sight. MA2 appeared to float its right-hand turn to get outside of MA1 as MA1 appeared to turn into MA2. MC1 received a TCAS RA off MA2. MA1 landed at BIAP and MA2 continued on without further incident.

According to the FAA controller supervising the Iraqi controllers, MA2 appeared to float its right-hand turn to get outside of MA1 and MA1 appeared to turn into MA2. The FAA controller estimated the closest proximity of the two aircraft was 3000 feet. MC1 assessed the miss distance as 1000 feet. Both aircraft were VFR and were visual of each other. MC2 lagged off their turn to get outside the perceived flight path of MA1 when MA1 turned back into him. MC1 should not have initiated his turn if he assessed a possible conflict.

Follow the flight plan because that is what plans are for, right?

TCAS Says Move!

A C-130 (A1), departed Greenville Mid-Delta Regional airport after completion of their transition work during a student sortie. Their IFR clearance was "cleared as filed to 3000 expect 12,000 10 minutes after, contact Memphis Center on 135.875. Their flight plan was GLH (a VOR 3 miles off the end of the active runway; 18L), V74, LIT, and then Little Rock AFB.

Upon departure, the tower instructed A1 to execute a "right downwind departure" and contact center. A1 contacted Memphis while passing 2000 MSL and turning to the north direct the GLH VOR; Memphis responded by acknowledging, "Climb to 3000 MSL." Approximately 1NM from the VOR, A1 observed a green traffic symbol (aircraft 2 a Mid-Delta Regional Cessna 172, A2), on the 5NM TCAS ring with +00 altitude (co-altitude); this caused a traffic advisory (TA). A1 acquired A2 visually and immediately began a turn to the left to increase lateral separation. On the roll out TCAS directed a resolution advisory (RA) and directed A1 to descend at 1000-1200VVI to miss the traffic. A1 descended to approximately 2400 MSL and missed the traffic by approximately 600 feet vertically and 1000 feet laterally. A1 immediately informed Memphis center of the RA and the deviation. Memphis control told them to do whatever they needed to do to avoid the traffic and asked if the traffic got within 500 feet of them. A1 responded "negative," and then approximately 30 seconds later Memphis informed them they were in radar contact and to intercept V74.

The remainder of the flight was uneventful. Greenville Mid-Delta Regional is a non-radar field with a tower. Memphis center controls IFR traffic in and out of the field, but doesn't pick the traffic up until 3000 MSL. On this day, A2 was a VFR aircraft in contact with Greenville tower when it asked to hold at 3000 MSL at the GLH VOR. 3000 MSL is a legal VFR altitude, so the tower approved their request, but failed to let A1 know there would be traffic holding over the VOR at 3000 MSL before A1 switched frequencies. Memphis center was not in contact with A2, nor did they inform A1 of VFR traffic in holding over the VOR upon initial contact.

A1's flight plan was GLH, V74, LIT. The clearance issued by Greenville tower from Memphis was, "cleared as filed to 3000 expect 12,000 10 minutes after departure, contact Memphis on 135.875." Greenville tower told A1 to, "Make a right downwind departure." There is no procedure for a right downwind departure, nor is it approved ATC terminology. The controller "assumed" A1 was going to pick a northerly heading to intercept V74 northwest of the VOR. The controller stated that about 95 percent of the aircraft filed the same way do not turn to the VOR to pick up V74, so she felt the VFR traffic in holding at 3000 MSL would not be a factor. She did let A2 know about A1, but A2 never called the traffic in sight. In an interview with Memphis center, ATC expects all the aircraft to go directly to the VOR to pick up V74, but did acknowledge they allow aircraft to intercept V74 northwest of the VOR after they are in radar contact. A2 was never in contact with Memphis, nor did they have to be.

Greenville tower created the conflict by making the "assumption" A1 would pick up a northerly heading instead of proceeding as cleared. The controllers' basis for this assumption was that 95 percent of the aircraft filed the same way, fly a northerly heading instead of turning to go directly to the VOR, like their flight plan says they would do. In addition, tower did not inform both aircraft of the traffic.

You know what they say about assumptions. Never, ever ASSUME!

Sorry, There's No One Home

The KC-135R (MA1) arrived into the A/R track at FL230 for rendezvous with a scheduled receiver. FL230 was scattered with light icing, so MA1 coordinated with ground controlling agency (GCA) to climb to FL250 for refueling. Prior to rendezvous, the receiver informed MA1 that they would not be able to refuel at FL250, so MA1 coordinated with GCA to use the southern half of the track at FL230. At this time MA1 was in the southern end of the track proceeding northbound to expedite the rendezvous. The receiver made visual contact with MA1 at the northern end of the area, as MA1 was turning south, again to stay within the borders for receivers. As MA1 rolled out southbound around 1200Z, with receiver one mile in trail, MA1's TCAS displayed an aircraft at FL230. MA1 immediately called on guard to the other aircraft (MA2) to egress the area as the altitude was occupied. At this time, GCA informed MA1 the call sign of MA2. MA1 made "four" subsequent calls on guard with no reaction from MA2. MA2 continued to close on MA1 formation. During this period, GCA was giving radar advisories. MA1 and receiver had to make evasive maneuvers to turn northbound coming within five miles and co-altitude of MA2. No response from MA2 was ever received. GCA had to MIRC (CAOC chatroom) MA2 to get them to egress the A/R track and altitude. MA1 and receiver completed their missions and returned to base without further incidents.

MA1 was scheduled for the Air Refueling track at the specified time and altitude. MA2 was an unmanned aerial vehicle (UAV), leading to MA1's inability to contact the aircraft. The Air Tasking Order (ATO) did not have MA2 scheduled for that area.

A new traffic threat to worry about, UAVs that can't talk back or change their course on their own.

Maintenance Matters

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

Here are some more cases where we didn't follow the rules and damage to the aircraft resulted. We continue to be our own worst enemy, as we are on a record pace for mishaps caused by maintenance malpractice.

Wrong Wing

A KC-135's left and right outboard aileron lockout gearbox assemblies were improperly installed during programmed depot maintenance (PDM), resulting in damage to both gearbox assemblies and structural support casting during aileron rigging. Worker 1 (W1) was tasked with the removal and replacement of both the left and right wing outboard aileron lockout gearboxes on the PDM input aircraft. Replacement of outboard aileron gearbox assemblies is a non-routine job during PDM. Typically, the assemblies are inspected and left intact on the aircraft unless found to be defective. In this case, the gearboxes were scheduled for replacement due to excessive leakage. W1 was certified on this task, but because of its infrequent nature, had not accomplished it recently. W1 removed both gearboxes with the lockout jackscrew attached. W1 tagged them with the aircraft number, but did not note their wing positions. W1 then placed both gearbox assemblies on a workbench, awaiting arrival of their replacements. When the new gearboxes arrived, W1 removed the lockout jackscrews from both old gearboxes and installed them on the new gearboxes. W1 then installed the new gearbox assemblies, one on each wing.

The jackscrews are left-hand or right-hand threaded and are not interchangeable between wings. The jackscrews are made by various manufacturers and are not always marked with the part number that would identify their wing position. The mishap jackscrews did not have the part numbers marked. Without part numbers, an experienced mechanic must determine the proper positions by observing the threads on the jackscrews.

The aircraft was later moved from the inspection phase to the operational check phase. Worker 2 (W2) was tasked with rigging the ailerons and began adjusting the outboard aileron lockout. W2 connected the outboard flap drive torque tube to the outboard aileron lockout gearbox torque tube and made adjustments to the outboard aileron pushrod. Worker 3 (W3), a hydraulic technician, then operated the hydraulic test stand to provide power to reposition the flaps from the full-up to full-down position to continue the aileron rigging process. W2 stood behind the aircraft in full view of both flaps to observe flap movement while W3 operated the flaps. Just after the flaps began to lower, they heard a loud pop from the right wing outboard aileron area. W2 directed W3 to stop the flap movement and shut down hydraulic power. Immediately, a second loud pop was heard coming from the left wing outboard aileron area. W2 and W3 discovered that the lockout jackscrew on each wing had driven through the stop nut and wing support structure.

W2 was required to follow the steps in the local KC-135 aileron rigging process order for adjusting the outboard aileron lockout. Those procedures require rotation of the aileron lockout gearbox torque tube upward or forward until the jackscrew positions the aileron lockout crank against the stop nut. This would have indicated the jackscrew was in the correct wing position. The wrong jack-screw installation should have been detected during this procedure, because it would have positioned the lockout crank away from the stop nut. The stop nut sits just forward of the support structure. When the system is properly rigged, the aileron lockout crank would be rotated up to and pre-loaded against the stop nut. The outboard aileron lockout torque tube would then be connected to the outboard flap torque tube with the flaps in the full-up position. When lowering the flaps, now connected to the ailerons, the aileron lockout crank would then move away from the stop nut in conjunction with the flap movement. However, in this case, with the jackscrews installed in the wrong positions, the lockout crank moved further against the stop nut in conjunction with the lowering of the flaps. As the flaps lowered, the jackscrew drove through the stop nut and the support structure, causing the damage.

What went wrong? It started when W1 installed the gearbox assemblies with the jackscrews in the wrong wing positions due to infrequent performance, and he did not note the wing positions of the old gearbox assemblies as he removed them. In addition, W2 failed to follow the procedure for lockout adjustment in the local process order.

How many times do we perform non-routine tasks on the flight line or in the hangar? That should be a clue to slow down and make sure you are following established procedures to prevent damage and more work.

Raft Versus Life Support Tech

The survival kit (SK) was inspected IAW tech order and stored in the life support storage area for future use. Due to extenuating circumstances, the quality assurance inspections required by ACCI 11-301, were not accomplished on the SK. Life support technicians (LST1 and 2) removed the SK from storage and proceeded to the event aircraft to install it in the ejection seat. All steps to change the seat kit were uneventful until trying to close the seat pan lid on the newly installed seat kit. The seat pan lid would not close IAW tech data, so LST1 climbed into the cockpit and sat in the seat to apply additional pressure to get the seat pan to latch. Is this where someone says, "Watch this?" When this did not work, LST1 rose up and bounced on the seat pan twice to get the pan to latch, all to no avail. At this time LST2 opened the seat pan to check that no fabric was interfering with the closing and found it was okay. LST1 then bounced once more on the seat pan and at this point the life raft inflated pinning LST1 against the instrument panel and glare shield. LST2 grabbed the SK and removed it from the seat and subsequently, from the aircraft freeing LST1. The recently removed serviceable SK was then placed back in the ejection seat without incident. The SK was then brought back to life support, where the raft was removed and sent to the parachute shop for inspection and re-pack. This was done due to a shortage of serviceable seat kits and the need to generate aircraft for a deployment. Once they realized the seriousness of the event, the life raft was impounded along with the rest of the SK. The SK was then sent to the life sciences laboratory for analysis.

The container assembly exhibited considerable damage. The damage included ripped stitching, torn nylon cloth, and elongation and indention of the grommets. This damage was consistent with the reported inflation of the life raft assembly. The inflation assembly show-ed no indications of any damage. The valve cam had clearly rotated and released the CO_2. There were no indications of system failure. It should be noted the tech data stresses the importance of ensuring that the cam of the FLU-2A/P valve is in the fully-closed position prior to installation in the survival kit container. Life support engineers, item managers and experienced life support technicians agree that if the cam was not fully closed, it can easily be jarred into activating the valve, thus inadvertently inflating the raft.

Examination of the relevant technical orders, as well as past experience, indicate that if the cam of the FLU-2A/P valve is not placed in the fully-closed position prior to installation, it can easily rotate to an open position if jarred, resulting in an inadvertent raft inflation. Therefore, it is considered most likely that the cam was not in a fully-closed position following the most recent functional test. Here is a case where the technicians involved didn't follow established procedure and failed to check a critical item for their task.

Rules are good! ⌧

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

The United States Postal Service requires all publications publish a statement of ownership, management and circulation.

Title of Publication—*Flying Safety* Magazine
USPS Publication No.—02799308
Frequency of Issue—Monthly
Location of Office of Publication—
HQ AFSC/SEMM
9700 G Avenue SE
Suite 282A
Kirtland AFB NM 87117-5670

Publisher—U.S. Air Force
Editor—Jay Johnson
Owner—U.S. Air Force
Total number of copies printed—16,648
Number of copies distributed—16,398
Number of copies not distributed—250
Total copies distributed and not distributed—16,648

USAF CLASS A FLIGHT MISHAPS

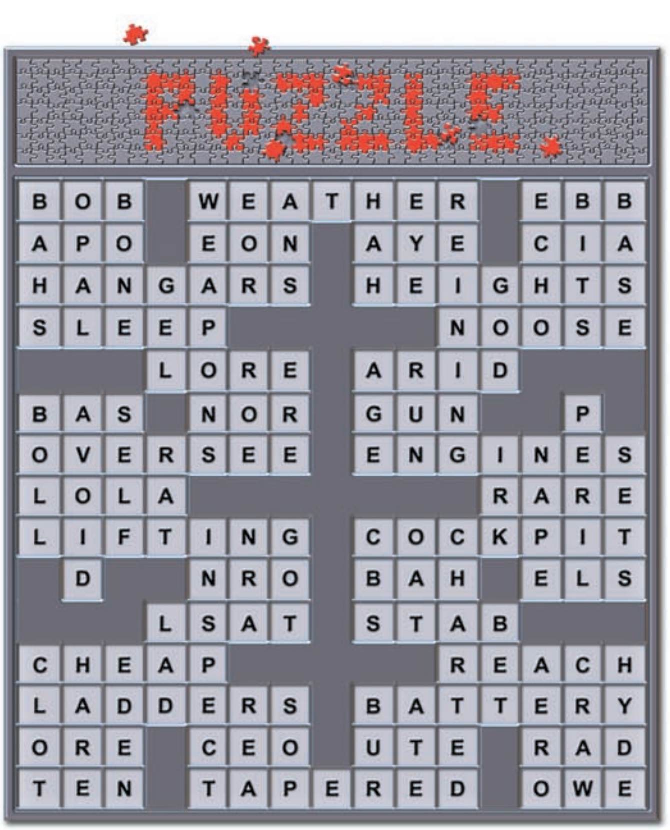
FY05 Flight Mishaps (Oct 04-Sep 05)	FY04 Flight Mishaps (Oct 03-Sep 04)
33 Class A Mishaps	25 Class A Mishaps
12 Fatalities	13 Fatalities
11 Aircraft Destroyed	11 Aircraft Destroyed

03 Oct	A C-5B sustained damage to 2 engines after multiple bird strikes.
04 Oct	Two F-15Cs collided in midair; both returned to base safely.
13 Oct ✶	An MQ-1L experienced damage from a hard landing.
18 Oct	An F-16 tire tread separated on takeoff; barrier engaged and gear collapsed.
20 Oct ✈	An HH-60G crashed during a rescue mission; 1 fatality and 5 injuries.
27 Oct	A KC-10 experienced a No. 3 engine failure in-flight.
24 Nov ✶	An MQ-1L crashed during an FCF.
30 Nov	A B-1B had an in-flight fire in the aft equipment bay.
09 Dec	An HH-60G experienced a hard landing.
14 Dec	A B-1B nose gear collapsed after landing.
20 Dec ✈	An F/A-22 crashed immediately after takeoff.
29 Dec ✈	An MC-130H impacted a hole in the runway on landing and was destroyed.
05 Jan	A C-17's right MLG strut failed on landing.
14 Jan ✶	A UAV lost its satellite link and crashed.
18 Jan ✈	A T-37B collided with a civilian aircraft; crew ejected safely, 1 civilian fatality.
22 Feb	An E-4B experienced a bird strike to the No. 2 engine.
10 Mar	A C-17 experienced a bird strike to the radome and No. 3 engine.
18 Mar ✈	An F-16D crashed short of the approach runway; pilot ejected safely.
22 Mar	A B-1B had an engine compressor stall, resulting in HPT/LPT damage.
25 Mar ✈	An F-15C crashed during a BFM mission; pilot ejected safely.
27 Mar ✶	An RPV was destroyed by an engine oil fire.
30 Mar ✶	An RPV crashed after propeller failure.
31 Mar ✈	An MC-130H crashed during a training mission; 9 fatalities.
05 Apr	A B-52H experienced a lightning strike to the radome resulting in a fire.
07 Apr ✶	A sheet metal technician fell from an F-15C and was fatally injured.
13 Apr ✶	An F-15C ingested a comm cord into the No. 1 engine; FOD damage.
18 Apr ✈	An F-16D crashed after engine failure; crew ejected safely.
28 Apr	A C-17 experienced a wing fire in-flight.
05 May	A C-17's No. 4 engine failed in-flight.
11 May ✈	An HH-60G crashed during a training mission; 1 fatality.
14 May ✶	An Aerostat broke its tether during a lightning storm and was damaged.
15 May ✶	A KC-135R experienced clear air turbulence; several severe injuries.
30 May ✶	A foreign aircraft crashed with USAF crewmembers on board; 4 fatalities.
31 May	An F-16 was damaged after an aborted takeoff and barrier engagement.

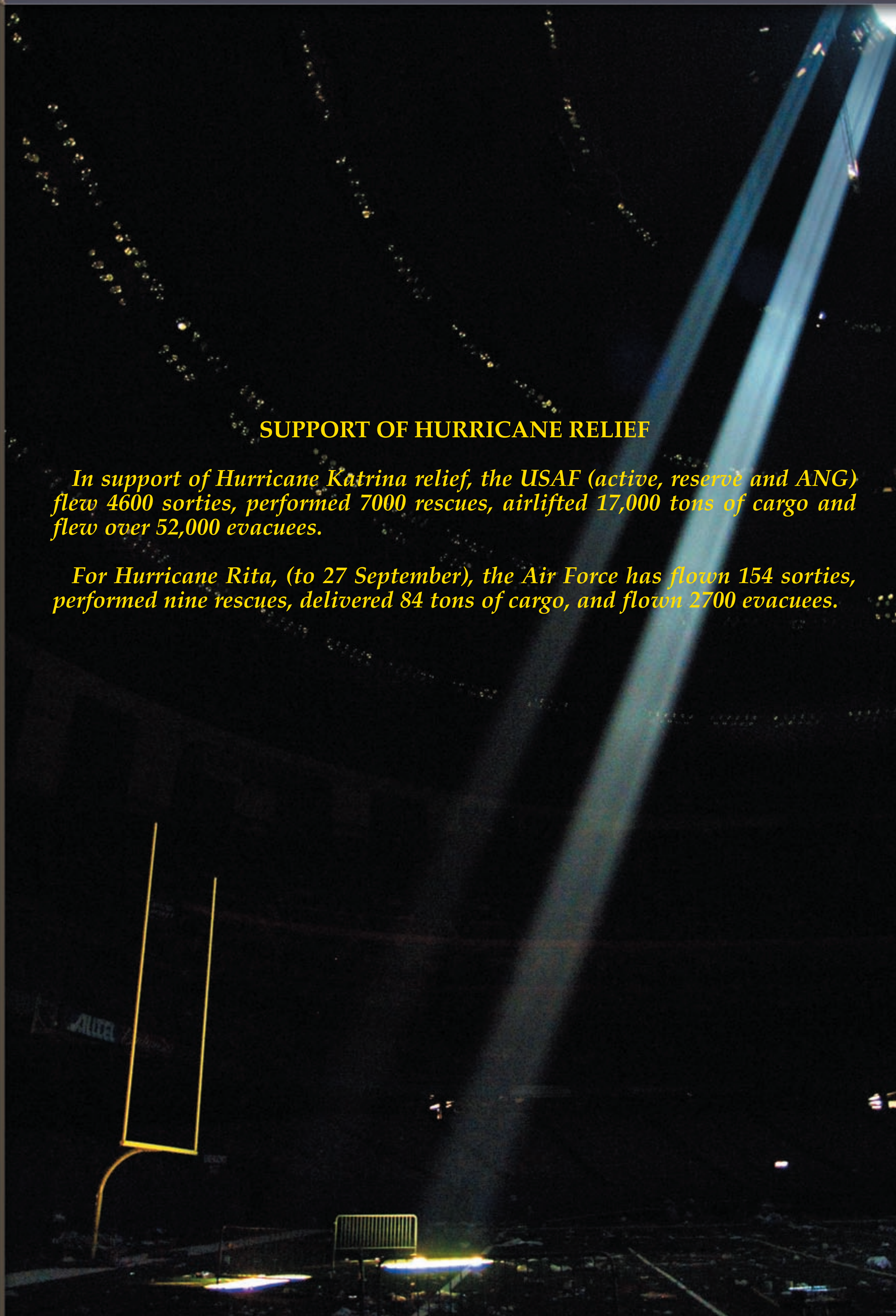
U.S. GOVERMENT PRINTING OFFICE 2005-773-482-53091

06 Jun A C-17A experienced a hard landing with underside damage to the fuselage.
08 Jun ✶ An MQ-1L departed the prepared surface and was damaged.
22 Jun ✈ A U-2 crashed on approach; 1 fatality.
28 Jun ✈ An F-16C was destroyed on landing; pilot ejected safely.
03 Jul An HH-60G had a hard landing due to rotor decay.
08 Jul The main rotor on an HH-60G contacted the intermediate gearbox and tail rotor driveshaft.
05 Aug A C-17A departed the runway during landing.
29 Aug A B-1B had an engine shutdown from an EGT spike.
12 Sep An F-16C suffered a No. 1 engine augmentor duct liberation.
15 Sep A B-1B had a RMLG fire on landing rollout.

- A Class A mishap is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million.
- These Class A mishap descriptions have been sanitized to protect privilege.
- Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.
- Reflects only USAF military fatalities.
- "✈" Denotes a destroyed aircraft.
- "✶" Denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Ground" mishaps that are shown here for information purposes.
- Flight and ground safety statistics are updated frequently and may be viewed at the following web address: http://afsafety.af.mil/AFSC/RDBMS/Flight/stats/statspage.html.
- **Current as of 26 Sep 05**.



Solution to puzzle from page 21



SUPPORT OF HURRICANE RELIEF

In support of Hurricane Katrina relief, the USAF (active, reserve and ANG) flew 4600 sorties, performed 7000 rescues, airlifted 17,000 tons of cargo and flew over 52,000 evacuees.

For Hurricane Rita, (to 27 September), the Air Force has flown 154 sorties, performed nine rescues, delivered 84 tons of cargo, and flown 2700 evacuees.