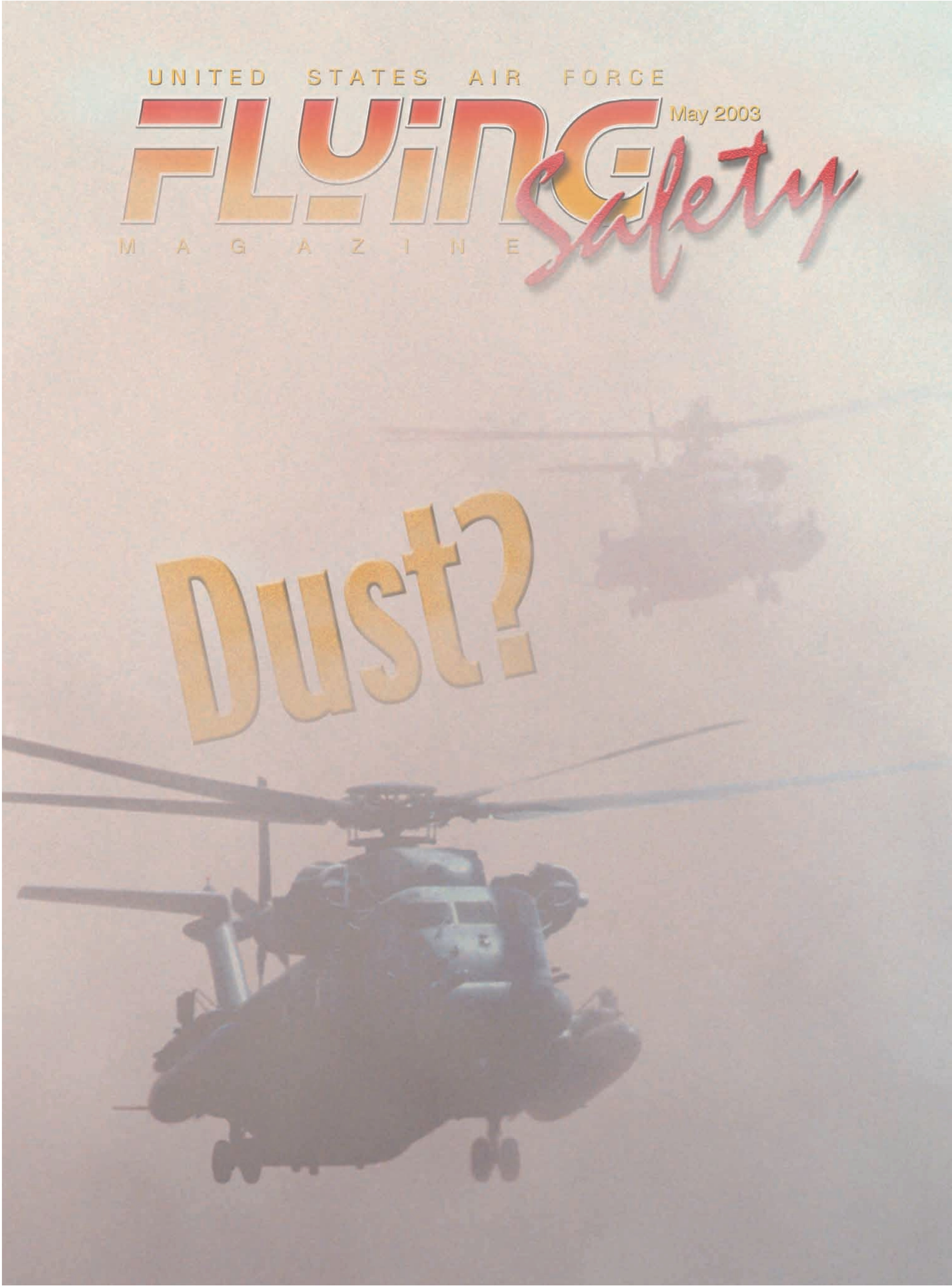
UNITED STATES AIR FORCE

FLYING Safety

MAGAZINE

May 2003



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SAFETY sage

136TH AIRLIFT WING REACHES FLYING SAFETY MILESTONE!

On May 2, 2003 the 136th Airlift Wing (AW) based out of NAS Ft Worth JRB, TX, reached a safety milestone that few have attained, 150,000 flying hours *without* a Class A Mishap! The unit's last mishap occurred in June 1965, when they lost a KC-97. Since that mishap they have changed from the KC-97 to C-130Bs, and to their current C-130H2 aircraft. Throughout this change of people, machines and mission, they have maintained their focus on safety, and ensured they maintain their mission capability and their critical resources of people and aircraft. According to 136 AW Operations Group Commander, Col Donald Harvel, "The achievement of reaching 150,000 hours of Class A-free flying is a tribute to the professionalism and dedication of over two generations of aircrews and maintenance personnel. They have remained focused on safety as the number one priority, as they very successfully completed numerous deployments in support of major contingencies, AEFs and exercises. Their attention to CRM and ORM issues has been repaid by reaching this milestone. During this accident-free period of over 38 years our unit was guided by more than 10 Wing Commanders. Each Commander has been committed to providing time and assets to ensure safety prevailed as the prevalent culture within the Wing."

Maj Gen Kenneth Hess, Air Force Chief of Safety said, "The fact a unit can go through the changes this unit has, over the course of the last 38 years, without a Class A mishap is testament to their dedication to the Air Force mission and to their people. Without the dedication to safety from senior leadership to the lowest-ranking airman, an accomplishment of this magnitude would not be possible. I challenge all units to examine how the 136 AW does business and help the Air Force reduce flight mishaps. Congratulations to all the men and women of the 136 AW for setting another benchmark for the entire Air Force to follow."

Look for more information on this unit in a future issue of *Flying Safety*.

"How many grains of sand must we see,
Before we can no longer fly?
And how many knots of the wind will it take,
Before we must not even try?
Yes, and how many storms must we know face to face,
Before our patience has died?
The answer my friend, is blowing in the wind…"

Sand, Dust And Ash:

The Answer Is Blowing In The Wind

COL TIMOTHY MINER, USAFR
Reserve Assistant to the Director of AF Weather

Sandstorms can, quite literally, grind operations to a halt.

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by TSgt Michael Featherston and Dan Harman

Goggles on and visors down, please.

Long ago, in a class that I've almost forgotten, the teacher tried to make weather simple by saying that all you need to create Earth's important weather is our gaseous atmosphere plus water plus energy from the sun. While that simple formula might apply to most weather that we've discussed here over the last few years, it is not complete. Air Force aviators are finding out, right now all over the world, that some hazardous weather depends not on gases and liquid (in all its forms), but upon solids. I'm talking about sandstorms, dust storms and volcanic ash plumes.

grains to break contact with the ground and move forward. For sand dune-covered areas, the wind speeds need to be about 10 to 15 mph, or 8.7 to 13 knots. For sandy, arid areas without the benefit of concentrations of material found in sand dunes, the speed needs to be about 20 mph or 17.4 knots. In an article in the March-April 2002 issue of "ObserveR" magazine, the official publication of Air Force Weather, Ms. Melody Higdon, from the Air Force Combat Climatology Center (AFCCC) in Asheville, North Carolina, created this chart on the required wind speeds to get material moving. (See Chart 1.)

Horizontal Wind Speeds Required To Lift Material

Material	Speed/MPH	Speed/KNOTS
Fine to Medium Sand (Dune Areas)	10-15	8.7-13
Sandy Areas with Poor Pavement	20	17.4
Fine (Desert Flats)	20-25	17.4-21.7
Alluvial Fans (Fine River Deposits)	30-35	26.1-30.4
Hard Desert Pavement	40	36.8

Chart 1

Dust storms tend to average heights of about 3000 to 6000 feet.

While such gritty subjects haven't usually gotten much press coverage in the past, I predict that these weather hazards will soon blast us in the face quite literally. Perhaps a look at these topics is in order for everyone.

SANDSTORMS AND DUST STORMS

Sandstorms can, quite literally, grind operations to a halt. They don't call it "sand blasting" for nothing. Knowing some of the clues and processes that point to a sandstorm will make you a more "environmentally aware aviator" with the ability to anticipate and exploit the environment around you.

To make a sandstorm you need several ingredients. First, start with dry ground and very limited vegetation to hold down the earthen material. Add to this environment straight-line wind of a specific speed to move the loose material forward in a process called "saltation." While we have moving sand now, it is still not a sandstorm until we add vertical motions.

Horizontal winds are a key ingredient, since it is this force which allows the

Winds can come from a number of sources. Most arid areas are surrounded by higher mountainous terrain, where the air gets much colder and "drains" into the desert valleys. Strong localized winds are produced by convective storms (think thunderstorms). Finally, larger weather systems produce weather fronts and broad areas of strong winds.

Vertical motions of the atmosphere give the phenomena "depth." Strong horizontal winds produce their own vertical component. This is usually about one-fifth the horizontal speed of the wind. Unstable air can come from several ways including the daily heating of the ground from the sun. Diurnal (daily cycle of the sun) temperature extremes come with large areas of dry, arid ground; that sets up convective currents. If a thunderstorm starts the process, the horizontal and vertical motions in the atmosphere are stronger and more intense, thanks to the lifting from the vertical motions of the air associated with the storm ("entrainment" is the technical term). If there is a large weather system with a low-pressure area, stronger sustained motions take place and a capping effect from inversions occurs. These larger weather systems are associated with a jet stream aloft, which is another clue to potential problems.

Fortunately, sandstorms have some limitations, thanks to the relatively "heavy" nature of the material. First, sandstorms tend not to get much higher than several thousand feet, with most of the material fairly low. Second, they are dependent on the strong winds to keep the sand aloft—when the wind dies, the particles drop. Sunset is a good time to look for many sandstorms to settle.

> Volcanic material can travel up to the cruising altitudes of jet aircraft.

Dust storms, on the other hand, are really the same processes working on finer material. However, there are some very important differences that we need to plan for.

On the AFCCC chart of material and wind speeds, you will see that it takes more wind to move the lighter material. The stronger winds create a greater hazard.

Dust storms tend to average heights of about 3000 to 6000 feet. When a large storm system moves through, the heights almost double to about 10,000 feet. There are reported extremes of haze and dust at elevations from 35,000 to 40,000 feet.

Low visibility associated with dust storms can be severe; this is the greatest hazard to aviation. With strong storm systems, the wind may be so strong and the amount of material aloft so great that visibility is near zero. According to AFCCC, most dust storms produce visibilities from one-half to three miles near the strongest winds at the edge of the storm. The visibility picks up within about 150 NM to almost two to five NM.

Unfortunately, once the finer particles are aloft, the wind speeds can decrease and the dust remains in the atmosphere. Reduced visibilities can last for several days, with slant range visibility being worse than the horizontal visibility. Like ice crystals at higher altitudes, the dust can create some interesting light shows using reflected and bent sunlight to create halos and coronas.

Besides visibility restrictions, the next biggest hazard to aviation is the "wear and tear" from slow abrasion of dust and sand. Aviators and maintainers can expect that equipment will need to be checked more often and cleaned continuously to permit sustained operations in these environments. Fortunately, there are no known reports of direct and immediate failures to engines or other aircraft components according to AFH 11-203, *Weather for Aircrews*.

We can expect to see more examples of sandstorms and dust storms as the Air Force continues its operations in Southwest Asia. Large areas of arid, fine material and the chance for strong wind flows make these hazards, unfortunately, all too common. But there is an even more destructive "solid hazard" waiting in the atmosphere right now. Fortunately, it is limited in its scope and relatively rare.

VOLCANIC ASH

If a sandstorm is bad and a dust storm is even more of a concern because the particles are smaller, then a volcanic ash plume is worse. It is worse for several reasons. (Here, I won't dwell on flying near an erupting volcano where the plume produces its own lightning source and flying debris of very large size—as big as a small automobile.)

First, the nature of the material ejected by volcanoes is hazardous to airplanes chemically. Besides of its microscopically abrasive nature, there can be some

very serious wear to aircraft parts that encounter the ash plume. Turbine fan blades will suffer with any contact. Glass windshields and light lenses can be rendered almost opaque. There is a chemical acidity that corrodes metal. And the silicon component in ash can be melted in the heat of a jet engine or pitot static systems, creating a "glass plug" or "glazing" and severe damage. I can't emphasize enough the very bad nature of volcanic ash.

Next, because of the force with which volcanic material is ejected from some volcanoes, the very fine material can travel up to the cruising altitudes of jet aircraft. At these altitudes, the material is caught up in the fast-moving winds aloft; it can travel very far and be dispersed over a large area. After the 1980 eruption of Mount Saint Helens in Washington State, there were two major areas of deposition for the ash. The first was northeast of the volcano for several hundred miles, and a second relatively major concentration was in the state of Oklahoma, thousands of miles away. The jet stream carried remnants of the very fine ash plume literally around the world and kept some particles aloft for many months.

A third major hazard is the benign appearance of the ash plume at high altitudes. Pilot encounters with plumes have produced visual descriptions very similar to flying through harmless cirrus clouds. It is only when the aircraft enters the plume that other indicators manifest themselves. These indicators (from AFH 11-203) include:

- Smoke or dust appearing in the cockpit
- Acrid odor "like electrical smoke"
- St. Elmo's fire along the windshield and engine inlets
- Multiple engine malfunctions including stalling, torching and flameout
- Fire warning in the forward cargo areas
- Flight instrument malfunctions from blocked pitot systems

As I mentioned earlier, we are fortunate that volcanic ash is relatively rare. However, there are still some active volcanoes that exist right now—17 as of this writing. Last week I had to maneuver around a plume in the Caribbean. Mountserrat, near Antigua, has been gently releasing a plume for the last two years. The visible plume sometimes extends to Puerto Rico and, depending on wind conditions, can be as high as 30,000 feet and as low as 10,000 feet.

With all the hazards associated with volcanoes, let me leave you with the current "doomsday scenario" for aviation and volcanoes. At certain times during the day there are hundreds of aircraft crossing the North Atlantic. The aviation authorities are creating reduced horizontal and vertical spacing between aircraft thanks to the demands for those routes. When (not if) a volcano erupts again on Iceland, depending on the day and the warning, it could do a lot of severe damage to lots of aircraft.

The jet stream kept some particles aloft for many months.

Aviation weather is more than just wind and water, it is also solids. It is sand blowing and dust reducing visibilities. It is caustic volcanic ash traveling with the winds aloft. How many aircraft will they get? Hopefully, with the help of your weather provider, none. Pay attention to the weather briefs and be aware that there are still weather hazards we can't engineer our way out of yet.

(Author's note: Interested in finding out about the current volcanoes in the world? Visit this website from the University of North Dakota: http://volcano.und.nodak.edu/vwdocs/current_volcs/current.html)

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by Dan Harman

Air Force Weather Reengineering: A Final Report To The Warfighter

BRIG GEN DAVID L. JOHNSON
Director of Air Force Weather

The experts in the OWS need the input of their "eyes-forward" and local base experts.

In October 2001, I reported in *Flying Safety* on our progress at reengineering the way we do business. Our goal in this effort was to become a leaner and more efficient force for your global environmental situation information. Today, I'm happy to report that we are there. You should expect better forecasting accuracy and better point weather warnings for the protection of your resources from the Air Force Weather team.

REENGINEERING FOR A TEAM FORECAST

Almost everyone (a few exceptions are being worked) now gets a weather forecast produced by a team effort. On that forecast are the fingerprints from many different individuals at several organizations.

The forecast at your airbase began with data and weather observations col-lected by the Air Force Weather Agency (AFWA) from many sources—everything from satellites to your base's Combat Weather Team (CWT). AFWA's computing center—one of the largest in the world—processed that data to produce the global and hemispherical products you see today. But those big-picture products don't have the temporal or positional resolution to help you plan for tomorrow's takeoff or target run. For that, we turn to our regional Operational Weather Squadrons (OWS).

Eight OWSs worldwide provide the regional modeling capability and exper-tise to produce the weather products that will help you plan your next mission. Teams of experts in the OWS create the Terminal Aerodrome Forecasts (TAFs) for your base. We take advantage of this effort to provide great on-the-job training (OJT) for recent graduates from the initial skills schoolhouse. But the experts in the OWS need the input of their "eyes-forward" and local base experts, your CWT members, to make it the product you expect.

When weather is complex and changing rapidly, your CWT personnel provide the kind of details about local conditions and topography that will create a reliable forecast. Our policy is that the forecast released by the OWS is jointly owned between the OWS and the CWT, so you should never hear talk about "us" and "them" from your local weather provider.

Your CWT adds value by understanding your mission and the kinds of specific products you require to get the job done. Because they work where and when you work, they know the kind of specific data you want, in the form you want it, for the exact time that you need it.

This is your weather process from beginning to end, so we are giving you only well-trained personnel who can help you get exactly what you want and need. The initial skill course graduate spends two years in an OWS learning and becoming a 5-level before being assigned to your CWT at the base level. That way, they know the skill and the art, they know the OWS, and they know the strengths and weaknesses of the models and products before they come to advise you and provide you with a mission execution forecast.

REENGINEERING FOR WEATHER WARNINGS

As a former flying Wing Commander, I know how important resource protection is to get the job done. As we've reengineered the way we do business, we've worked to give you the best in 24/7 coverage to help you know when severe weather is on the way.

Before reengineering, the local base weather station was responsible for your warnings. We tried to have weather radars—the key to providing commanders with environmental situational awareness—available in most bases. Some bases used them a lot and some only rarely, and the result of this was inconsistent forecasting. Sometimes, people knowledgeable in local weather were not outside assessing the storm, they were inside with their faces in a radar screen. As base-level weather manpower has been decreased, they can't provide 24/7 coverage for very long, so we are staffing the OWS to be your 24/7 provider.

The OWS has a number of advantages over the local CWT. As mentioned, the OWS has the staff to do it around the clock, every day. Secondly, the OWSs have the real experts in radar "knobology" and upgraded equipment, providing a center where the analysis can be done.

We are increasing the requirements on our people and processes. Rather than give you only one hour's notice, we've increased the requirement to two hours of warning for many significant hazards. Commanders always have the option of settling for less warning, but most agree that the extra hour's notice is a great benefit of AFW reengineering.

One final note: Beyond the weather warnings for resource protection, instead of grading ourselves in macro categories like IFR, VFR, etc., Air Force Weather will forecast what the ceiling, visibility, winds and precipitation will be. Metrics will gauge deviations by the knot and degree, by 100-foot intervals for ceiling and by 10-degree azimuth segments. This will result in better tools for the weather career field to improve timeliness and accuracy, and better forecasts for your mission execution forecasts.

It has been a long road to reengineer AFW to meet the needs of the Air Force and Army. Over the last three years, we've seen operational results that confirm the reengineered approach in combat. I'm proud now to organize, train and equip the folks who provide environmental situational awareness for you. It takes a team effort by AFWA, the Weather Squadrons and your Combat Weather Team to make this work. The weather team should be giving you the best forecasting and warning capability available. If not, then I want to know about it! ■

So we are staffing the OWS to be your 24/7 provider.

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by Dan Harman

LT COL KAY ARMSTRONG
HQ AFSC/SEFE

MFOQA. M-Foe-Kwa. No, it's not a cuss word, or slang from a foreign language; it's Military Flight Operations Quality Assurance.

Not that Quality word!

Calm down! This is a program designed to make flying safer, by constantly reviewing flight data recorder information.

I thought the flight data recorder just showed what went wrong during a mishap. If it's reviewed every time I fly, that's spying!

No one is trying to spy, nor is anyone concerned about those little mistakes you make once in a while. Instead, by reviewing data collected by the flight recorder, the MAJCOM uses MFOQA to uncover and trend deviations from standard procedures and parameters, and monitor any corrections made.

For instance, many of us heavy drivers have flown approaches over the water into Guam. It's tough to get an accurate visual reference over water, and thus it's easy to get low on final. If MFOQA analysis uncovers persistent drug-in approaches at certain locations, the appropriate MAJCOM section will determine the best course of action. Perhaps that would be increased training, with emphasis placed on situational awareness when flying approaches over water, or maybe just a simple reminder stuck into the mission folder prior to the crew's departure would be effective.

You don't fly heavies, you say? How about weapons release parameters? I know you can see how you yourself did during your post-flight mission review, but what about tracking the performance of the fleet? Also, various weapons and fuel tank configurations change the point where your yanking and banking cause you to depart controlled flight. A review of the MFOQA data could show particular combinations that consistently bring you close to that fine line; you can then confirm you're getting max performance out of your aircraft.

You know, the idea isn't new. British Airways initiated their FOQA program (or as they call it, OFDM—Operational Flight Data Monitoring) in the mid 1960s, tracking just six specific bits of information. As technology improved and capabilities grew, so did their program, and many other European airlines jumped on the bandwagon. In the mid 1990s, the FAA funded the development of FOQA in the American airline industry. Currently 10 major US airlines have FOQA programs, and many more have programs in various stages of development.

The returns on investment have been high for the airlines. Here are a couple of examples:

Some airlines use FOQA data to investigate GPWS alerts. FOQA software allows the analyst to review the flight data and surrounding terrain just prior to and after the warning, and to locate the trigger. In the case of one airport, the FAA was convinced to raise the minimum vectoring altitude, and to change the approach course for arrivals.

One airline, after experiencing a series of high EGT readings on a particular engine series, examined the FOQA data and discovered the cockpit indications were erroneous. This resulted in a savings of $245,000 for each unnecessary engine inspection.

Here's one near and dear to your, uh, heart. Authorities at three airports were convinced to resurface their runways after FOQA data revealed roughness was causing high vertical acceleration rates during ground operations. Ouch!

OK, I guess the idea sounds interesting, but how does the program really work?

Good question, but time is up for today. Tell you what, come back next month and you'll find out how an MFOQA analyst does his or her job. See you then!

HQ AFSC Photo by TSgt Michael Featherston
Photo Illustration by Dan Harman

J.S.T. RAGMAN

Two conversations, 22 years apart. First day, first squadron: My first squadron commander led this newly-assigned second lieutenant and copilot into his office for what we now term a "mentoring" session.

He went by the name "E-Squared" in reference to his first two initials. I called him "Sir." And this is what he had to say:

"During the course of your flying career, however long that may be, the number of times in which golden hands will mean the difference between mission success or mission failure, the number of times in which golden hands will mean the difference between living and not living, will be minimal, if any.

"Rather, the difference between mission success or mission failure, the difference between living and not living *every time you go out to fly*, will depend upon the degree to which you are able to build a crew out of crewmembers; it will depend upon the degree to which you are able to listen to, rather than merely hear, their inputs; it will depend upon the degree to which your judgment is influenced by caution rather than ego; it will depend upon the degree to which you do the 'right thing' rather than the 'pretty thing.'

"Work on the golden hands, *but* be remembered for far more."

Yesterday, I overheard a similar "mentoring" session, out of which the following statement was most noteworthy: "A pilot is only as good as his last landing." Sadly, this was not a conversation between two airline flight attendants with little knowledge of what did, or did not, make for a "good pilot." Rather, the words were that of an instructor delivered to a "new guy."

E-Squared had his detractors, and he had his admirers; but he was on target with his words of 22 years ago. The instructor of yesterday was not. Aviation history, along with wheat fields, mountainsides, and ocean depths, is littered with the remains of pilots who were indeed only as good as their last landing; who are remembered for flying a "single-seat" crew aircraft; for "hearing" but not "listening;" for doing the "pretty" thing as opposed to the "right" thing; for their "hands," but for little else.

There is very little written upon the pages of aviation history regarding the pilot who built a *crew* out of crewmembers, who heard *and* listened, who was cautious rather than ego-driven, and who did the *right* thing, each and *every time.*

E-Squared's words of 22 years ago can keep each of us out of the history books. That is a good thing.

("J.S.T. Ragman" is the pen name of a C-130 pilot and unit commander in the Air Force Reserve. He is also a Boeing 777 pilot for a major airline.)

"Work on the golden hands, but be remembered for far more."

Where Are We And How Did We Get Here?

USAF Photo
Photo Illustration by Dan Harman

COL DONALD C. WINDRATH
USAF (Ret)

There we were again, going right through the same barrage of 85's near Phuc Yen AB in the heart of the Red River Valley and very close to Hanoi. It was a bit disconcerting to see flak exploding and hearing the blast in the cockpit. That meant we were very close to a mid-air, with dire consequences (only my laundry lady knew for sure). I looked ahead, and here came a SAM boring down between lead and me. Lead took no evasive action, so I yelled, "Break right!" He finally realized that he and his WSO were about ready to share a long stay at the wrong Hilton or be listed as MIA. He yanked the Thud hard right so that vortexes and vapor came off the wingtips and elevator. I broke left, and the SAM went between us and did not explode.

I mouthed an unprintable but frequently-used expletive

During the debriefing, the tape of the conversation between lead and his WSO revealed the following. Lead to WSO: "Help me, I'm lost." (As in "Where are we?" That kind of lost.) I mouthed an unprintable but frequently-used expletive that roughly translates, "I can't believe my ears!" Fortunately, the WSO knew where we were and told lead to "take the needle," as in "get out of Dodge."

Lead had over 30 missions up in Pack 6. It was one of the most clearly defined topographical regions I had ever flown in. Thud Ridge ran north and south, the Little Thud was oriented east and west, and the NE Railroad bisected the area, with the Red River flowing NW to SE and a mountain range to the south. Then there was the sun (yes, that very sun that rises in the east and sets in the west every day). It was not like flying over water with land out of sight. Since we were flying a Wild Weasel mission supporting the strike force, we had all the flexibility in the world. We could have turned in any direction at any altitude while covering the SAM threat. My point is: What had lead been looking at for the past four months? His feet? His lack of competence nearly cost us our lives.

The worst part of the whole affair was I was told to shut up and not mention this fiasco. I didn't shut up, and I also made certain that I never let that guy lead me into harm's way again.

Later I became the commander of an F-106 squadron. Those who have never flown the F-106 cannot appreciate its complexity. Fifty-eight maintenance hours were required for one flying hour. Flying the F-106 required a high degree of experience in using degraded systems. The squadron had few pilots with that experience. You could always count on at least one system failure during a mission, and more like two or three. Although the airframe was the best I've ever flown, the electronics were absolutely the worst. One night I lost everything—transponder, TACAN, radio, heading indicator—and wound up making a no-gyro GCA at 200 and a half, using guard from the data link receiver. But that's another story.

The Air Defense Command (ADC), in a desperate attempt to remain a separate command, made the decision to change its tactics from a straight interceptor role to one that also included Air Combat Tactics (ACT) with a gun mounted in the missile bay. The gun was a long time coming, but pilots practiced the tactics in the meantime. To improve visibility, a clear canopy replaced the one with a bar over the pilot's head. However, the canopy had to be degaussed to make the standby compass reliable. This was a long process, so for a while some airplanes had reliable standby instruments, and others did not.

On the day of the mishap, a two-ship ACT mission was scheduled, with lead being the Squadron Weapons Officer and wing an "experienced" captain. At the conclusion of the mission, a join-up was attempted that resulted in wing losing sight of lead, and the join-up was not completed. Since F-106s could be singularly employed in the interceptor role, it was not uncommon for pilots in this situation to part formation and land separately to save fuel and expedite recovery.

Wing's problems began when he lost sight of lead. Then those problems were compounded when wing failed to recognize that the heading indicator had slewed 180 degrees out of phase, and he started flying east with the morning sun shining brightly in his eyes. He also failed to note that the TACAN mileage was increasing although he thought he was heading towards home plate. It wasn't long before he was out of radio range and over an undercast. It was only after an "old head" former F-106 pilot and Senior Controller was called to the dais that the problem was recognized. The controllers finally got the airplane turned around through data link. Fuel was now critical. The airplane flamed out six miles short of the coast and plunged into the sea. The pilot parachuted to safety and was recovered unharmed.

During the accident investigation the pilot claimed he had the necessary fuel when "bingo" was declared by lead. The accident board determined that wing had 1200 pounds less than lead when join-up was attempted. The aircraft was recovered from the sea, and the fuel systems indicated no malfunctions. One can only conclude that wing was not providing accurate information.

After the accident board adjourned, I questioned the pilot thoroughly. He claimed that no one could have saved the airplane.

"Where was the sun?" I asked.

"What does that have to do with it?" he responded.

I pointed out that it came up in the east and went down in the west, since the ancient mariners had used it for navigation along with the stars.

This accident happened nearly 25 years ago, and had the pilot used some basic navigation (dead reckoning) he could have at least had a chance of finding a runway on land. It seems that as we fly around in a "fishbowl" environment with some agency telling us what direction and altitude to fly, where the target is and how to get home, we forget the basics.

Flying is a lot safer now, both in peacetime and in combat. But we need to be more aware that malfunctions can and do happen. When they do, pilots should be able to recognize them quickly and take corrective action. When you get that "local" checkout in the combat zone, pay attention to the terrain and defenses. Know where you are constantly. Your life may depend it, and your wingman will love you.

Wing failed to recognize that the heading indicator had slewed 180 degrees out of phase.

Dust In The Overrun

JOHN "DUKE" PARRETT
Columbus AFB, MS
Reprinted from ATC Approach 1982

It was a beautiful Saturday morning for a student cross-country. The blue sky was exceptionally clear as the T-38 Talon exited a low-level route which had taken it over some breathtaking mountain scenery near Sierra Blanca in New Mexico. Traffic at the destination AFB was non-existent…alone in the pattern…what an opportunity to practice landings. The Instructor Pilot (IP) and student pilot took full advantage of the tower's offer: "…closed traffic approved until further notice." Then, with barely enough gas to be legal for landing, the IP took the Talon to demonstrate and instruct a minimum roll landing for the full stop. *(Editor's Note: This incident occurred at a time when practicing T-38 minimum roll landing was acceptable. It was a procedure used to land safely at heavy fuel weights and wet runways.)*

With stern determination and a steady glide path destined to plant the main gear on brick number uno, the instructor's concentration was interrupted by a call from his otherwise quiet and placid student: "Sir, there's dust in the overrun."

Dust in the overrun!? What could this possibly mean coming from my student? I was flying jets when he was still in high school. Surely it must be insignificant and undoubtedly inappropriate. Plus, it was annoying in light of the fact it interrupted my all-important instruction; words of wisdom which would someday help make this student a most capable pilot and soon a witness to the perfect min roll landing.

Without a second's hesitation, my thought processes returned to concentrating on perfect aircraft control as I allowed the airspeed to decrease precisely 10 knots below normal, thus ensuring a firm touchdown, simulating a wet runway, at the threshold. As the nose came into the overrun with almost the max landing angle of attack, I was abruptly awakened as to the significance of my student's comment. Our aircraft instantly rolled right to an inverted attitude of 120 degrees of bank and only 35 feet above the ground!

What was this student's perception of dust in the overrun which was obstructed from the back seat (the IP's position)? My left leg muscle tightened to apply opposite rudder to upright the Talon (since ailerons are totally ineffective at the lower airspeed and higher angle of attack).

What did he see that I could not? (I quizzed myself brutally while taking life-protecting measures with the flight controls!) At this same precise moment of rudder application, the opposite side of the miniature tornado assisted in the rudder roll and the aircraft again took just as quickly a new bank angle of 30 degrees of left bank upright. Then, simultaneously applying rudder, ailerons, power and a prayer, I completed a successful go-around after only slightly touching the runway with the left main gear.

I then quickly analyzed that this situation was actually the result of an "omnipotent" IP who met a New Mexico dust devil that had planted its swirling cloud in the runway overrun. I also analyzed that the "student" was an individual with insight and instinct well grounded in survival.

Several comments are appropriate. First, I will never again commit myself to the full stop with only enough fuel for a min fuel go-around.

Second, and more important, this incident prompted me to examine my attitude toward the student as a species. While it's true that IPs typically know a lot more and have a vastly greater experience level than their students, nevertheless students are quite capable and perceptive, and are always an important—often critically so—part of all dual flights. From now on, I will "go placidly amid the noise and confusion of the universe" and listen, because even the inexperienced and the few-of-hours have their story, too. And in flying, all stories are worth the time to listen to.

(Editor's Note: When this article first appeared, the author was a T-38 Instructor at Reese AFB, TX. Currently he is a simulator instructor at Columbus AFB, MS and the Operations Officer for the GTR Squadron of the Civil Air Patrol, the USAF Auxiliary.)

A Bad Day For A Dirty-Up

LTJG CHRIS SAUFLEY, USN
VAQ-131

We had been in Japan for about a week or so, and were just getting used to flying in the local area around MCAS Iwakuni. Our Prowler squadron was supposed to be aboard the USS Constellation (CV-64) bound for a traditional WesPac cruise. However, the day prior to embarking aboard "Connie" we were ordered to Iwakuni, Japan.

Conducting flight operations from Iwakuni was new to the entire squadron. We were conditioned to flying around the boat and not a foreign airfield. In true Naval Aviation fashion we managed to quickly adapt to the local course rules and standard operating procedures and focused our operations on unit-level training and FCLPs. A week into the detachment our crew was scheduled for a division low-level with an FCLP period at the backend of the sortie. It was primed to be a fun hop, with some good low-level training and ball-flying in prep for the boat. There aren't many better ways to finish up a hop. However, it turned out that the low-level was obscured by a low cloud deck, necessitating a flight at the top of the route structure in prevailing VMC. As we popped off the route and began heading back towards Iwakuni, our crew began to focus on the upcoming FCLP evolution.

We were "Dash 3" in the formation approaching the break at Iwakuni from the south. This is a particularly challenging approach because it restricts aircraft to a minimum amount of straight-away prior to the approach end. Lead barely had enough time to level the flight for the break after the required dogleg pattern entry. As our jet broke and decelerated through Prowler gear speed of 250 KIAS, my pilot lowered the gear, flaps and slats. As the EA-6B has notoriously poor handling characteristics below 250 KIAS without the slats and flaps extended, it is SOP that during landings and takeoffs the backseaters will visually monitor the slats downward progress. Today was no different, with the notable exception that I noticed out of the corner of my eye that something wasn't right. My "spidey senses" started tingling. Although the slats were coming down, they were coming down too slowly. The EA-6B's slow flight characteristics with flaps down and slats up is even more troublesome than if nothing had extended, with a dramatic pitch-up and departure from controlled flight within 5-10 KIAS of anticipated normal approach speed. As the aircraft continued to decelerate I immediately called over the ICS "stuck slats." Nearly simultaneously, my pilot and ECMO 1 stated "barber-poled slats." The pilot immediately applied full power and accelerated the aircraft to a safe airspeed. Approaching the abeam position we coordinated a climb to 2500 feet in order to fully evaluate the situation.

With a good indication on the flaps, we suspected an electrical or mechanical failure in the slat drive. Repeated attempts to raise or lower the slats were unsuccessful, leaving the aircraft in an unfamiliar flaps down/slats partially extended configuration. With no reference to this configuration in NATOPS, we opted to fly the most conservative approach speed that came close to matching our predicament. A quick climb to 5000 feet AGL provided a safe margin to evaluate this configuration on approach. A precautionary short field arrested landing was coordinated with tower and we set up for an approach to the southern runway. Tower briefed the wind as from the south at six knots. The southern approach still required a sharp dogleg turn to final, which became the focus of attention for all members of the crew. The pilot carried some extra energy through the turn and was controlled to an uneventful rolling engagement by our own squadron Landing Signal Officer.

We felt relieved to be safely on deck but immediately began to wonder if we had handled the situation in the best manner. In retrospect we did, given our unique configuration problem. The lesson learned from this hop was that NATOPS doesn't cover every possible situation. The best way to prepare yourself is to know your jet inside and out, and think outside the NATOPS box for "what if" situations. You should be flexible in these situations and apply common sense to uncommon situations. In addition, you should always think things through to landing. In hindsight, we could have foregone the dogleg to final by accepting a 6-knot tailwind to an arrested landing on the opposite runway. It would have offered the lesser of the two threats.

How Do You Spell

HQ AFSC Photos by TSgt Michael Featherston
Photo Illustration by Dan Harman

LT COL LEONARD G. LITTON
71 FTW/SE
Vance AFB OK

"Safety? I don't even know how to spell safety!" That was my first reaction when I was hired for the job as Chief of Safety at the 71 FTW at Vance AFB, OK. Throughout my Air Force career I have always found that safety is one of those topics that can be difficult to define or narrow down to where you can get your arms around it. It can be one of those things that you have trouble describing precisely, but you know it when you see it, or you miss it when it's not there. As pilots, we know if takeoffs and landings are equal, we had a "safe" sortie. But how did we get there? What were all the things that had to happen, or not happen, to make that sortie safe?

I have not had an extensive background in safety billets during my career. So, in preparation for this assignment, I figured I had better be quick to figure out what safety was all about. After much in-depth thought (as much as a former fighter pilot is capable of), I have decided safety is not so much an entity in itself, but rather more of a by-product. We don't "manufacture" a successful aircraft sortie by mixing in the ingredients of proper training, well-maintained equipment, motivated student and IP, proper supervision, good weather, and then add a dash of "safety" just for good measure. As well, you don't have a safe holiday weekend just because you received your pre-departure safety briefing prior to beginning your travel and off-duty activities. Rather, I believe safety is *built into* the way we do business, both in the air and on the ground, if we will just take the time to do things "right" the first time.

"How do you do things 'right'?" you ask. Well, there are several ways. First, you do things "right" by adhering to established rules and regulations. Our Air Force Instructions provide us a proven way of doing our job and set up parameters designed to keep us safe. It is one of our primary tasks as flight instructors to teach our students the concept of flight discipline. As Air Force aviators, we are to do things "by the book" the first time, every time. You cannot afford to allow your students to leave SUPT without this valuable lesson ingrained in their flying habit patterns. On the ground, you need to ensure you use the tech order when repairing airplanes, you actually check the vehicle before signing off the AF Form 1800, and you follow the established guidelines for length and driving time on that holiday "road trip."

You also do things "right" by instructors and supervisors calling "knock-it-off" when things don't look right. The primary reason experienced people are placed in supervisory positions is so they can use their experience to prevent unsafe situations before they even begin. Our rules and regulations cannot possibly foresee every situation that might occur. If it doesn't look right, feel right, or smell right, call "knock-it-off" and take a step back. Reevaluate the situation, and if it makes sense, proceed. If not, terminate the activity and accomplish the task another day.

Another way you can do things "right" is by employing your operational risk management techniques both on and off the job. ORM is a decision-making process designed to systematically evaluate possible courses of action, identify risks and benefits, and determine the best solution. Simply put, you need to think about what you are doing, and the risks associated with those actions, before you accomplish the task. If the task is unusual, different, or seems to have a higher-than-normal risk level, elevate the issue to your supervisor for further evaluation.

Finally, you do things "right" by watching out for and taking care of each other. No matter what airplane you fly or what job you do in the Air Force, we are all on the same team. As teammates, we each have a responsibility to watch each other's back. How many times have you let your wingman step out the door to fly when you know he or she was up too late last night with a sick child? As well, how many times have you allowed your buddy to drive home after having too much to drink at the club on Friday night? Cancel the sortie, take the keys and drive him or her home. Doing it "right" the first time just might prevent a mishap and save someone's life.

Safety does not stand on its own; it is a result, a by-product. Safe outcomes don't just happen, they take each and every one of us doing things "right" the first time, every time. Doing things "right" takes knowledge of the rules and regulations and the discipline to follow them, it takes the "guts" to call "knock-it-off" when things don't look right, it takes the proper analysis of risks and rewards, and it takes all of us "Checking six" for our buddies. I believe you spell "SAFETY" by taking the time to do things the "right" way the first time. Our great Air Force deserves nothing less! ❐

Timeless Topics

Lesson For A Line Chief

MAJ KARL K. DITTMER, HQ TAC
Reprinted from Aerospace Maintenance Safety June 1963

"Cannibalization adds too much to the workload."

Old Sarge shoved the door closed, stomped the water off his shoes, and exclaimed, "Man it's wet out there!"

The short, white-haired Master Sergeant picked up the papers that had blown off his desk when they entered and turned toward Old Sarge. "How'd we look?" he asked, trying not to sound as worried as he felt.

Old Sarge took off his raincoat and laid it across the back of the chair. "Not too badly on most things, Harold. You have a pretty good Quality Control Section… but you have some troubles, too."

"Uncovered some red cross items on that bird you were shaking down?" Harold's query was more of a statement.

"Three," Old Sarge murmured, reaching for his battered corn-cob pipe. "Along with sixteen diagonals." He looked at the shorter man.

Harold pursed his lips. "Of course, that's just one bird…the rest might all be clean," he ventured.

"They might be, Harold," Old Sarge replied, "but do you honestly think they will be?"

Harold pondered this for a moment, then said, "No, I guess not. Let me have everything you found wrong…and don't pull any punches. Basically, I think I know where the trouble starts, but…" His voice trailed off and he waited for a reply.

Old Sarge filled his ancient pipe, firmly pressing the tobacco in with one broad thumb. "Harold," he said, "you can't blame this one on the system. The system will work if we support it, just like the brains say it will…." He struck a match and played the flame over the bowl of his pipe without taking his eyes off the other man.

"Dammit!" Harold exploded, "lets not dig into that…I want you to give me your honest opinion on what we're doin' wrong…I don't want a lecture on the party line."

Old Sarge shook his head and grinned, then exhaled a cloud of acrid blue smoke. "Okay," he began, "but brace yourself. No matter what concept you're working under, certain basic rules apply. One of 'em has to do with cannibalization. It's like drinking...a little never hurt anyone; in fact, there are times when it could do 'em some good. But on the other hand, too much is too much and will do nothing but cause trouble. We both know why. Cannibalization adds too much to the workload. You actually end up doing the job twice—with more than twice the chance for error. Worse yet, you lose all track of time-change items, unless your bookkeeping is superb...and yours is hardly in that category. I found cases where your people robbed parts from aircraft that were due to finish PE in a day or two. They robbed 'em just so they could get a day's flying time on another bird…"

Harold started to interrupt, but changed his mind when Old Sarge jabbed his pipe stem at him and continued: "I know you have supply problems, but you don't solve 'em this way… and you don't gain enough time to warrant the extra work.

The extra work has helped put you in an untenable position. You've been working yourself and your people overtime so much that they are making more errors than they should. Correcting these errors takes still more time and they have to work longer hours to make up for it. We both know the answer…but no one seems to have the courage to come right out and do anything about it."

He paused and puffed on his pipe while Harold gnawed on his lower lip. Finally Harold said, "You're right. We should've told Ops we couldn't hack their program. We really knew we couldn't at this time, but dammit we always have to give it a try…"

"Yeah," Old Sarge agreed, "most of the time you have to. But when you do, you should point out what's going to happen…but that's another story. This year you've busted eight aircraft because of material failures. We both know that better maintenance might have detected or prevented some of these failures. These accidents also added to the workload. Then you had this last accident that confirms what I've been talking about. It's a good example of what happens when you try and stretch yourself too thin."

Harold had to agree. The bird in that accident had been written up for an oil pressure problem. He had submitted a work order on it and had gone out to the trim pad to run it up. He could remember exactly what had taken place. It had turned out to be a faulty oil pressure transmitter and the instrument people had replaced it. It checked out OK but, when they shut the engine down, hydraulic fluid was pouring from the left wheel well.

That's the way things had been going. No sooner get one thing fixed than something else would break. To make things worse, this had happened Friday afternoon, and they had promised the crew chief Saturday off.

Well, he hadn't gone back on his promise, even though he didn't have anyone else to follow the bird through. Come to think of it, he probably would've used the crew chief out on the line anyway. He glanced out the window and noticed that it was starting to rain again. Lousy stuff. It'd keep the birds down so they could work on them, but Ops would push for a max effort as soon as it cleared up. Harold felt hemmed in. He finally spoke, "You're right again. I guess I should have had someone follow that bird through while they changed the accumulator. That way he would have known that they'd disconnected the heat and vent line and the bleed air vent line in order to get at it.

Old Sarge nodded, "Yes, and as you well know, you'd have squeaked through then, 'cept no one entered the disconnected lines in the Form 781."

Harold was just a little grim. "That falls right on me again. I should've been tougher; so gol'darned tough no one'd dare to cut corners."

Old Sarge interrupted. "Yes, but it's a terrific temptation to shortcut when you're working 'way late on Friday. You get to where all you can think of is hitting the pad, which is…"

"...why you get so hard-nosed about all the overtime," Harold finished for him.

"Right," Old Sarge grinned. "Especially when you try to operate that way most of the time."

"Yeah, but still if they had put it on the form, we'd have checked for heat and vent leaks and would've caught the disconnected line before turning the bird loose on the test hop—we're lucky the pilot had enough altitude to get out. We could've killed him."

Old Sarge puffed his pipe contemplatively.

"There's more to it than all this," Harold continued. "I really didn't realize how lax some of this stuff looked until I read it in the accident report. For instance, take the way some specialists will unbutton a bird and button it back up, while others will only work on the broken part, then sit around waiting for the crew chief and mechanics to do the rest."

Old Sarge rubbed his chin. "You have a point there. Which proves we have a way to go before we reach perfection. But it's here that I see another weak spot in your setup. The hydraulic people signed this one off, instead of a seven level from your shop. I know you're short-handed—which is one more problem beyond your control—but it's too bad we have to bust up birds to smoke out all these things."

Editor's Note: Common problems we still see today. How effective is your CANN program, your documentation, and how much overtime are you working to "just" *meet the schedule?*

"It's a terrific temptation to shortcut when you're working 'way late on Friday."

Temporary Flight Restriction Areas

THE DOMESTIC "NO FLY ZONE"

USAF Photo
Photo Illustration by Dan Harman

MAJ TODD E. MCDOWELL
HQ USAFA

Americans are familiar with the images of the Twin Towers and the Pentagon engulfed in flames and the horror of watching those buildings collapse. For the first time since World War II, a foreign enemy attacked the United States at home. The events of 9-11 marked a turning point in how America views security on the home front. Old ideas of what were considered legitimate risks were re-examined and new vulnerabilities were discovered. Aviation security was one of the areas where the government focused a great deal of attention. Some of the changes were quite visible to the public—added inspections at airports and stronger cockpit doors on commercial airlines.

One change most people outside of the aviation community are not familiar with is the temporary flight restriction (TFR) area used by the Federal Aviation Administration to create no fly zones around certain high profile events like the Super Bowl. Prior to 9-11, the TFR was used primarily at disaster sights. Now, it is being used most often to restrict airspace over high profile events, where terrorism attacks or other disruptive acts could occur. While the TFR cannot prevent an attack from occurring, it creates a buffer zone around the point of interest, which gives those monitoring the situation time to react.

> Now, the TFR is being used most often to restrict airspace over high profile events.

The most common TFR is the one used for disaster and emergencies. This TFR allows for three different response options, depending on the needs of the emergency situation. The first hazard option restricts all aircraft from operating within the designated area unless participating directly in the relief activities and under the control of the on-scene commander. This first option is used when there is a risk that flight operations in the area may aggravate the hazardous situation on the ground. For example, the prop wash from a helicopter may cause a hazardous gas to disperse more quickly or sonic vibration from a low flying plane may set off secondary explosions or interfere with sensitive rescue equipment.

The second hazard option gives the FAA greater flexibility for dealing with a disaster situation after the immediate impact of the event is ascertained and the risk of further harm is known. Aircraft not participating in relief activities can only fly within the restricted air space if (a) carrying law enforcement officials; (b) operating under the air traffic control (ATC) approved IFR flight plan; (c) flying directly to or from an airport within the area or, because of weather or terrain, VFR flight above or around the area is impractical; or (d) when carrying properly accredited news representatives. For the last two exceptions a flight plan must be filed with the appropriate FAA facility responsible for controlling the TFR. The flight plan must include at least aircraft identification, type, and color; radio communication frequencies; times of entry and exit from the restricted area; and the name of the sponsoring news media or organization and the purpose of the flight.

The third hazard option is used to prevent unsafe congestion of sightseeing and other aircraft above an incident or event that may generate "a high degree of public interest." Originally intended for use in emergencies, it didn't take the FAA long before it began using this type of TFR for planned events which were not obvious or immediately hazardous situations. In these situations, TFRs enhanced the safe use of airspace surrounding the events, but were being used outside of their original intent. Rules intended to protect rescue and recovery workers were now being applied to events like the World Series and the Indy 500. Officials argued that safety was the purpose behind these uses, but many people, particularly aerial advertisers, criticized this use.

Even before 9-11, the value of more specific regulations for aviation safety and security at major sporting events and air shows was recognized by the Department of Defense and other interested parties. In May 1999, the Department of Defense requested that the FAA establish a new TFR category to prohibit outside aircraft from operating near airspace used by aerial performance teams and other military aircraft performing aerial demonstrations. The military's concern was that pilots and parachutists were executing aerobatic maneuvers, operating in close formations and were performing opposing solo maneuvers at high speeds. In these situations, the pilots cannot be focused on watching for the inadvertent aircraft wandering into the performance area. A TFR for such events provides sanitized airspace in which to perform air shows and other training safely.

In response to these concerns, the FAA created a new special event TFR which was published, ironically, on September 11, 2001 and took effect the next month. The new rule clarified that the hazard TFR options could only be used for legitimate ground emergencies, but it also gave the FAA express authority to create TFRs for air shows, sporting events and other special events to protect spectators and maintain a safe flying environment. Included among the specific events covered were demonstrations by the Thunderbirds and other military demonstration teams. For air shows, the restricted air space within the TFR will normally be limited to a five-nautical-mile radius from the center of the demonstration and an altitude 17,000 MSL for high performance aircraft. Typically, the TFR will be issued at least 30 days in advance of the event as a NOTAM.

The two remaining TFR categories are important, but infrequently used outside of particular situations. The Presidential support TFR is used to restrict flight operations near areas to be visited by the President, Vice President

A TFR provides sanitized airspace in which to perform air shows and other training safely.

HOW TO REQUEST A TFR FOR AN AIR SHOW

For more specific information about TFRs or what to include if you're requesting one for an upcoming air show, check out sections 91.137, 91.141, 91.143 and 91.145 in Title 14 of the United States Code of Federal Regulations (CFR). This volume of the CFR contains the FAA flight regulations. For non-specified aerial demonstration or sporting events, there is a list of twelve factors which will be evaluated by the FAA when considering your request. These factors are:

1. Area where the event will be held
2. Effect flight restrictions will have on known aircraft operations
3. Any existing ATC airspace traffic management restrictions
4. Estimated duration of the event
5. Degree of public interest
6. Number of spectators
7. Provisions for spectator safety
8. Number and types of participating aircraft
9. Use of mixed high and low performance aircraft
10. Impact on non-participating aircraft
11. Weather minimums
12. Emergency procedures that will be in effect

TFRs are securing the safety and security of the nation.

or other officials. The space operations TFR is invoked near areas used for space flight launch and recovery operations. The intent behind these restrictions is fairly obvious—for security of senior public officials and the prevention of unsafe congestion in the airspace around events likely to develop significant public interest.

Although not intended to be so, in the past 18 months, TFRs have become an important arrow in the quiver of homeland defense. They have been ensuring aviation safety and security for over 25 years. Now, they are securing the safety and security of the nation. In the past, they have been most often utilized to respond to natural disasters or hazardous situations. The risks of aerial attacks have become all too realistic, and the value of the TFR to deter similar attacks in the future is self-evident.

While no one wants to see an attack during the Super Bowl, the World Series, or other major events, the possibility is all too real. Despite the criticism against them, it is likely that TFRs will be used even more as the war on terrorism and the demands of protecting the homeland continue into the foreseeable future. Fortunately, the Air Force, through the FAA, as well as the rest of the federal government now has a valuable tool to be used in the fight. As long as these restrictions are reasonably applied, the TFR will continue to be a necessary instrument of safety and homeland defense.

WHERE TO GO FOR MORE INFORMATION

Many organizations, particularly private pilot groups like the AOPA, support the safety objectives of the TFR change. However, even though they support the change, these groups have urged the FAA to develop additional resources to aid the flying community. Resources for the general aviation community like online TFR data to give dynamic, real-time updates are considered imperative. As a result, TFR NOTAMs are published in the Airport/Facility Directories and are available on the world wide web at http://www.faa.gov/NTAP.

These resources give the basic data and are a good starting point, but some people find them to be difficult to work with. One of the continuing challenges for pilots since 9-11 has been keeping track of the increased number of existing TFRs, and changes to them. For instance, just hours before the President's 2002 State of the Union Address, the TFR for Washington DC was expanded. For pilots in the air, it is hard to prepare for such short-notice changes.

Another challenge faced by the general aviation community is trying to interpret the text-based TFR descriptions published in NOTAMs. As an example, here is the NOTAM text describing the restricted area over Washington, DC in June, 2002.

SPECIAL FLIGHT RULES AREA IS AN AREA BOUNDED BY A LINE BEGINNING AT THE WASHINGTON (DCA) VOR/DME 300 DEGREE RADIAL AT 15 NM (385655N/0772008W) THENCE CLOCKWISE ALONG THE DCA 15 NM ARC TO THE DCA 022 DEGREE RADIAL AT 15 NM (390611N/0765751W) THENCE SOUTHEAST VIA A LINE DRAWN TO THE DCA 049 DEGREE RADIAL AT 14 NM (390218N/0765038W) THENCE SOUTH VIA A LINE DRAWN TO THE DCA 064 DE-GREE RADIAL AT 13 NM (385901N/0764832W) THENCE CLOCKWISE ALONG THE DCA 13 NM ARC TO THE DCA 282 DEGREE RADIAL AT 13 NM (385214N/0771848W) THENCE NORTH VIA A LINE DRAWN TO THE POINT OF BEGINNING; EXCLUDING THE AIRSPACE WITHIN A 1 NM RADIUS OF FREEWAY AIRPORT (W00) MICHELLVILLE, MD FROM THE SURFACE UP TO BUT NOT IN-CLUDING FL180...

While this description is oriented to coordinates on the aeronautical chart, as one can see, a picture would be worth a thousand words. A pilot of a Cessna 182 found this out the hard way last year when he violated the TFR and the White House was evacuated.

The FAA acknowledges that it currently offers few graphical depictions of TFRs, but it is taking steps to improve TFR dissemination in the future. Recently, it posted graphical depictions of the Camp David Prohibited Area 40 (P-40), the Crawford, Texas, Prohibited Area 49 (P-49), the White House and Vice Presidential Residence Prohibited Area 56 (P-56) and the Washington, D.C. Special Flight Rules TFR in a NOTAM. The FAA is also taking steps to reinforce accurate TFR reports during preflight weather briefings by air traffic control specialists at the flight service stations (FSS). The FAA has also begun to upgrade the software used by flight service operational support center personnel to allow for the transmission of graphical TFRs to the FSSs. As the Acting Administrator of the FAA stated in a letter to AOPA, they anticipate making the graphical TFRs available to the public once the new software has been fully tested and is operational. In the interim, if a general aviation pilot prefers visual depictions of TFRs, they can be obtained from non-governmental sources like www.aeroplanner.com or www.aopa.org.

"Deacon, You Are Really On Fire Now!"

USAF Photo
Photo Illustration by Dan Harman

MAJ ROY QUALLS
159 OSF/CC
Louisiana Air National Guard

On the first day of pilot training, my instructor told me that the handling of every airborne emergency could be boiled down to four basic steps: 1) Maintain aircraft control, 2) Analyze the situation, 3) Take the appropriate action, and 4) Land as soon as possible. He was right.

"Toast 8, you are trailing smoke and venting gas."

Those words from my wingman blared into my helmet just seconds after the illumination of a Master Caution light had disturbed the relative peace of an eight-ship of Eagles marshalling east of Student Gap. A scan of the engine instruments revealed zero oil pressure on the number 2 engine. Almost immediately, the Cockpit Voice Warning System alerted me to further problems when a disarmingly disinterested voice declared, "engine fire right, engine fire right." Simultaneously, my jet abruptly

"You've got a hole the size of a cantaloupe in your right afterburner," pitched hard left. Although quickly corrected with a moderate input of right stick, this flight control anomaly in conjunction with a Fire Warning Light, and an ever-growing number of other caution lights now ensured the jet had my undivided attention. Glancing at the fuel gauge, I noted 16,000 pounds of fuel—too heavy for a safe landing—so I began dumping gas and turned towards home. The voice repeated, "Toast 8, you are trailing smoke and venting gas." I replied, "No, I'm *on fire* and I'm *dumping* gas." I requested and received the lead on the left, and Toast 7 moved into chase position as I rolled out and pointed toward Nellis Air Force Base, 90 miles to the south.

Maintain Aircraft Control repeated itself in the back of my head as I attempted unsuccessfully to trim out the right stick required to keep my jet flying straight and level. I cautiously removed my hand from the control stick, and the plane again began a roll to the left. Forced either to fly with my left knee or keep my right hand glued to the stick, I began to realize that maintaining aircraft control was going to require more conscious thought than I'd like to expend on such a simple task. Meanwhile, a myriad of other problems were demanding my consideration, so I began to address those concerns while maintaining aircraft heading with my knee.

Fire had engulfed the aft end of my jet and flames were trailing behind about 20 feet.

Analyze the Situation and Take the Appropriate Action is a concept easier said than done while flying with limbs usually reserved for stumbling home from the Officers' Club, but having no other ideas I initiated steps two and three from my old instructor. Scanning the cockpit, I discovered that retarding the throttle to idle had extinguished neither the Fire Light nor the fire itself, so I mentally reviewed the next steps of the checklist, *"Push, Throttle, Bottle"* before pushing the Fire Warning Light, pulling the throttle to Off and actuating the fire extinguisher bottle. By this time Toast 7 had rejoined into a close chase position and reported, "You've got a hole the size of a cantaloupe in your right afterburner, and I can see a small fire burning inside." Looking outside at the mountainous terrain, I fumbled for the checklist, hoping that Step 5 of the Engine Fire Inflight checklist had miraculously changed since the last time I checked. It had not. *"Step 5. If fire persists—Eject (Refer to page H-11 for EJECTION checklist)."*

Having no inclination to refer to page H-11, I elected to continue towards Nellis. The Telelight Panel was lit like the proverbial Christmas tree, so I began to perform triage on the jet, attempting to put together the pieces of this puzzle into a coherent whole. I reset the Control Augmentation System (CAS), and switched the right ramp to Emergency. Four caution lights dutifully disappeared from the panel—just twenty more to go. Then things got *really* interesting.

The AMAD Fire Light illuminated, indicating a fire in one of the jet's two Airframe Mounted Accessory Drives—a fancy term for a device that powers the flight controls. Since one AMAD was already inoperative as a result of shutting down the right engine, if the AMAD on fire was the left one I'd have no choice but to refer to page H-11, whether I wanted to or not: The plane can't fly without at least one operating AMAD.

Out of the corner of my eye, I saw Toast 7 move further away from my aircraft as I heard this radio call: "Deacon, you are *really* on fire now." And I was—fire had engulfed the aft end of my jet and flames were trailing behind about 20 feet. Having already expended my only fire bottle on the first fire, and having watched too many World War II movies, I began a steep dive in an attempt to blow the fire out. To my utter amazement, the AMAD Fire Light extinguished, and Toast 7 moved closer, advising me that the fire was under control but was still "cooking in the afterburner section." (The safety investigation revealed that the fire receded due to running out of oil to burn, not due to my poor impression of "The Flying Leathernecks.")

Relieved, I leveled off and once again began dealing with knotty little details like useless gauges—both my airspeed and my fuel gauge now read zero. Evidently, the fire had fried several wire bundles, including the ones responsible for those gauges. Due to the malfunction with the fuel gauge, I could no longer dump gas, which was troubling since I figured that I still had about 13,000 pounds of fuel remaining—at least 5,000 pounds more than I'd like to have upon landing. Having little choice but to drop my external tanks, I pressed the Emergency Jettison button—and absolutely nothing happened. Add the jettison circuits to the list of wires destroyed by the fire.

Land as Soon as Possible was right up there with my top priorities at this point, as I had little desire to see what else was going to go wrong with this jet. Before landing, I knew a controllability check was in order, since I obviously had some sort of flight control problem that required constant right stick. Flying off the standby airspeed indicator, I slowed to 250 knots and dropped my gear. Unbelievably, the gear came down normally, as did the flaps. As I slowed further, the jet required more and more right stick to maintain level flight. At 190 knots, with the stick full right, the jet still rolled left at about a degree per second. My game plan was to land at 200 knots, at which speed I still had about an inch of stick authority. Knowing that stopping a fast, heavyweight Eagle on the runway would be difficult, I planned on taking the departure end cable, reasoning that I would probably rip the approach end cable out of its moorings if I attempted to use it.

I aligned my jet with the runway and concentrated on getting it down in the first 500 feet of runway at 200 knots. At that speed, a flare was out of the question. I essentially flew the aircraft onto the ground in a three-point attitude, in what Toast 7 later described as "the ugliest landing I've ever seen." Be that as it may, I was on the ground and glad to be there. Once I passed the approach end cable, I lowered the hook and then focused on staying on the runway centerline and carefully applied the brakes. Just as I was beginning to relax, my chase airplane said, "Deacon, drop your hook." I double checked the position of the switch and replied that I *had* lowered the hook. "Well, it's not down" was the unwelcome answer. "This is not your day" flashed in my mind as I applied maximum breaking and for the second time in five minutes prepared for ejection. However, much to my relief, the jet slowed to a stop 300 feet from the end of the runway. As I was in the process of shutting down the engines and performing an emergency ground egress, the radio blared one last time, "Toast 7 request vectors back to the fight." I had to laugh.

While most sorties have something to offer in the way of fodder for the fabled clue bag, this particular sortie was fraught with lessons learned. I'll just mention two.

First, *it can happen to you.* Years of flying with no major emergencies can naturally lead to complacency, unless we make a concerted effort to defeat this subtle enemy. I had the misfortune/luck to burst my personal complacency bubble in the real world. This was my second engine fire at Nellis in five years. We lost the number two engine on a heavyweight takeoff out of Chicago on my second trip as an airline pilot. Complacency is no longer one of my vices. Actual in-flight emergencies, while a great complacency buster, are thankfully not absolutely necessary in this battle. A weapon in the arsenal is simulator training. The multiple emergencies we love to hate in the simulator are invaluable. Take advantage of that training to challenge yourself and prepare for the worst.

Second, *a good chase ship is indispensable*, especially during a complicated emergency such as this. In addition to all I've mentioned before, Toast 7 took care of a multitude of details I was simply too busy to handle. These included, but are not limited to: coordinating with the Supervisor of Flying and Air Traffic Control, reading checklists, offering suggestions for alternate landing sites (Area 51 was closer, but covered by a cloud deck), monitoring the status of the fire, and reminding me to fence out when I inadvertently dropped a flare on ten-mile final. During the entire sequence of events, my chase maintained a cool, yet confident voice. His use of my name (Deacon) as opposed to our flight call sign (Toast), while not standard procedure, had a calming affect and ensured extremely time-critical information was passed without any chance of confusion. His demeanor and outstanding airmanship had a direct and profound impact in the safe recovery of this jet.

I am grateful to my pilot instructor, and for the fact that his words are still with me. He was right.

Just as I was beginning to relax, my chase airplane said, "Deacon, drop your hook."

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

See & Avoid! Well aviators, it has not been a good year in the skies for near misses, and we have had too many *actual* hits. Here are a few examples where they were lucky and missed, but the potential for a collision is always there. Keep your eyes open and sharp, and listen to air traffic control (ATC), TCAS and each other to ensure you See and Avoid.

Whoa Horse!

A C-17 crew was descending into home base and was cleared from FL270 to FL130. Unfortunately, as they passed through FL214 their clearance was amended to FL210. Now just think about this, a C-17 in a 3500-foot per minute descent at 330 KIAS, do you think the crew was able to stop at FL210? In this case they didn't, but they did stop the descent at FL200. As they leveled off at FL200 the crew immediately heard ATC issuing traffic calls to a civilian aircraft. As they looked outside to clear their aircraft they saw the civilian aircraft making evasive maneuvers. Luckily, the aircraft passed about one-half mile behind the C-17. Both aircraft were talking to the same controller, but on different frequencies.

ATC is investigating this report citing possible controller errors and equipment deficiencies. Never forget who has the ultimate responsibility for accepting or declining clearances, especially clearances you are unable to comply with. Communicate, and see and avoid.

Flying The Crowded Skies!

At an Air Force base here in the states the pattern got quite full, and we had a close call between two C-130s and three A-10s coming in to land. Here is how it went.

• The first C-130 was the first aircraft established on final at 2000 feet MSL.

• The flight of three A-10s arrived at initial close enough behind the first C-130 that they overshot initial to the south of the track, to avoid flying directly *above* the C-130. The A-10s then requested a 360-degree turn for spacing, but the tower disapproved the request due to the second C-130 entering initial behind them. The A-10s corrected back to initial maintaining 2500 feet MSL until within 6 DME in accordance with local procedures. The A-10s then started descending to 2000 feet MSL.

• The second C-130 was coming in from the north at 2000 feet MSL and was cleared by approach to follow the C-130 traffic in front of him. The aircrew reported they had the C-130 and the A-10s in sight. He then asked if he was number two to land behind the C-130. The tower replied that he was number two to land, and the A-10s were in front of the first C-130 for the overhead. Tower then instructed the second C-130 to switch to the tower frequency.

• At this point the second C-130 had entered the initial from the north at 2000 feet MSL, and the A-10s were correcting back to the initial from the south while descending to 2000 feet MSL. Is this, like, totally wrong?

• The second C-130 detected the impending conflict and descended to 1500 feet MSL to ensure vertical separation from the A-10s.

• The A-10s, unable to see the second C-130, continued with their overhead approach while the second C-130 maneuvered for spacing and continued on initial behind the A-10s.

• While still on an IFR clearance and cleared for a visual overhead, the second C-130 came within 500 feet vertical separation and one-half mile of the A-10 flight's third aircraft, who was operating on a VFR clearance with the tower.

This situation highlights a former CY01 AMC Special Interest Item of Visual Avoidance and Radio, "As stated in FAR 91.113, 'regardless of whether an operation is conducted under IFR or VFR, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft'." It continues, "…ATC has no responsibility to provide separation vectors between non-participating and IFR traffic, unless requested. Finally, if you believe that the conflicting traffic is unaware of your position, try calling the pilot of the aircraft itself (on Unicom or other frequency, if necessary) to advise of your intentions. Any evasive action taken must be reported to ATC." Now, what does all this mean?

• They did the right thing by filing the HATR to report this incident.

• Despite the fact that ATC provided minimum spacing between aircraft IAW AFMAN 11-217, Vol 1, the aircrew of the second C-130 was responsible for maintaining separation.

• Don't forget that AFMAN 11-217, Vol 1, sect 14.3.1.4. states, "When visually following a preceding aircraft, acceptance of the visual approach clearance constitutes acceptance of pilot responsibility for maintaining a safe approach interval." In addition, sect 14.3.2 states, "Be aware that radar service is automatically terminated (without advising the pilot) when the pilot is instructed to change to advisory frequency." Plus, a "Note" states, "An aircraft conducting an overhead maneuver is VFR and the IFR flight plan is cancelled when the aircraft reaches the initial point."

• As was their responsibility, the second C-130 did the right thing and avoided the A-10s. But should they have been in the position to have to take evasive maneuvers in the first place?

• The tower also received a lesson from this incident, and can help *prevent* aircraft from getting into a situation where they have to avoid other aircraft when they are in the pattern.

Same Spot In The Sky!

The first aircraft was Visual Meterological Conditions in the ingress corridor at a deployed location in contact with the airborne controller (AC). The first aircraft's weather radar showed numerous traffic returns, with the second aircraft in this fun about 20 miles in front of them. They visually acquired the second aircraft at about 12 miles. The first aircraft looked at the second aircraft for a few seconds and determined they were at the same altitude and course as the second aircraft. The crew made an evasive maneuver to the right and passed within half a mile of the second aircraft. They then queried the AC, who asked them to cycle their transponder. The AC confirmed that the aircraft were co-altitude and course. I don't think they planned things that way.

To prevent further occurrence, the leadership changed the rules so that the AC will call out all traffic within 1000 feet and 15 NM of another aircraft. Keep your eyes open folks, and if it doesn't look right, ask the question and take action!

Do You Exactly Follow The Clearance?

Here is a case where a deployed KC-135 crew had a close call and it could have been worse if they had not used their TCAS and eyes to avoid another aircraft. The crew was recovering to the base on a southwesterly heading at 11K, and their clearance was a direct to the landing. At approximately 15 miles east of the approach point, their TCAS picked up a second aircraft at an altitude of 10K converging on them from the south. This second aircraft was flying directly to the same point they were for an ILS approach in accordance with their clearance. Both aircraft were on IFR clearance under the control of a host country controller. At approximately 10 miles east of the approach point, the KC-135 visually acquired the second aircraft at their nine o'clock on a converging course. The KC-135 called approach, saying they had the aircraft in sight and to please confirm they were cleared for arrival. Approach confirmed their clearance.

As the aircraft passed the arrival point the approach controller issued a traffic advisory to the second aircraft and advised the KC-135 to maintain visual separation from the second aircraft, as the second aircraft will turn north to arc the 15 DME. The KC-135 advised the approach controller they had the traffic in sight and that the aircraft was behind them. They proceeded with the approach and both aircraft landed safely.

The lessons to be learned? First, keep your eyes open and pay attention to the instruments the USAF has given you, i.e., TCAS. Second, listen to the controllers, but use everything you have to make that big decision. In this case, had the KC-135 crew exactly and blindly followed the procedures established for this location, they most likely would have descended into the second aircraft. This crew used all their options and equipment to make the decision to see and avoid and have a relatively uneventful mission. We fly all over this great world of ours and into a lot of crowded places. The controlling activities may not always be up to the normal standards we expect. Keep the eyes open, watch the instruments and make informed decisions about flying the aircraft. You are the one at the controls and your life, and others, depend on your actions!

Maintenance Matters

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

This edition is about hardware. Not the kind from your local hardware store, but the kind we have forgotten to tighten or properly install on very high-priced aircraft. Plus, the fact that we had to redo work because someone forgot to do it "right" the first time.

Another Loose Nut!

An F-16 was flying a local continuation sortie and had a great first 35 minutes of flight. Unfortunately, he received an engine fault light and corresponding engine lube low light. The pilot did that pilot thing and was able to safely recover the aircraft back to home station with the engine running.

The aircraft was on its first flight after a phase inspection in which the engine was also inspected. They had discovered some damage to the second stage fan blades that were repaired. They also accomplished the alternating current (AC) generator rotor seating check, which IAW tech data required them to remove the stator generator. All the paperwork was done correctly, so the jet was good to go!

Once the aircraft was returned back to maintenance, the jet gods removed the engine panels and found an oil leak in the gearbox area. Good reason for the low oil light to come on. By the way, the 42-half-pint oil tank was estimated to be 22 half-pints low. The reason for the oil leak? The AC generator stator packing was cut in two places and the upper nut on the stator was only "finger tight." Two very good reasons for an oil leak. The larger question is how could this happen after the work was accomplished IAW tech data and all the paperwork was done? This is one of those mishaps where we had to do the job a second time to get it right. But should we have had to do it twice?

Am I Missing Something?

A KC-10 crew were doing what they do best, passing gas, when their mission got cut short. After they had passed about 15,000 pounds of fuel, the receiver had to disconnect. During the second contact the boom operator received a boom flight degraded light, so he cleared the receiver off to the pre-contact position. As the receiver came in for the third time, they noticed some pieces and parts hanging off the boom. Not a good thing. They couldn't tell the extent of the damage, so the crew called it quits for the night. The boomer asked the receiver to observe the aircraft as he stowed the boom to see if they could see anything else. As the boom was retracted, sparks could be seen coming from the boom ice shield area as well as pieces falling off the aircraft. The crew then safely recovered back to the base.

Upon landing, maintenance discovered damage to the boom ice shield, one fuel transducer, boom nozzle lights, and boom marker lights. Now, what could have caused all this? The boom had under-gone some maintenance 35 days prior to the mishap, and the boom independent disconnect system (IDS) shelf, shelf panel and transducer cover panel had been removed for work on a damaged signal coil cannon plug. Tech data requires the panels to be removed in order to access the cannon plug. However, in the aircraft 781 series forms, only the damaged cannon plug was documented; the panels were not written up as removed. Is it "standard" procedure IAW T.O. 00-20-5 to not write up the panels on separate entries? If you aren't sure what the book requires, then you need to get into the book. If you can't find the book, contact your Quality Assurance office. Why is this important? The investigation revealed 10 screws missing from the boom fuel transducer top cover panel. What happens to a panel with missing fasteners in-flight? It usually comes off and usually damages other parts of the aircraft. Could we have prevented this mishap? *YES*. Make sure you document the panels you remove to ensure they are properly reinstalled. Another case of redoing previous work.

Does Size Really Matter?

A B-1 had an engine changed and after the leak and ops check they found FOD damage to nine first stage blades and three inlet guide vanes. All the pre-run inspections had been accomplished and no defects were found or noted. Then how did we damage the aircraft?

The aircraft inspection after the engine run found a screw missing from the forward upper inboard seal panel of the forward nacelle duct/forward inlet vane. This engine had been removed for repairs due to an aircraft birdstrike that had damaged the potato chip panel or splitter vane. Now this damage also requires removal of the forward and aft inlet vanes. This is not a common task and requires a lot of skill on the part of the maintainers performing the task. What's the rule when you are doing a non-routine task? The running torque of the nut plate was checked and found to be in good working order, so what next? The only other discrepancy found on the panel was a –6 screw installed instead of a –4. Could this be the cause of the mishap? They never found the screw that did the damage, so we will never know for sure. Use the right length hardware for the task at hand, as it could save you a lot of future work.

What Block Is This Bird?

An F-16 had flown a great mission, but the landing roll didn't quite go right. After landing, the aircrew declared a ground emergency with a potentially blown tire. The responding maintenance crew found damage to the left main landing gear wheel assembly.

On tear-down, the maintenance crew found a failed inboard wheel bearing. This in turn caused the failure of the wheel and brake assembly, plus non-repairable damage to the axle. A lot of damage from one little bearing. The key to this incident was that the failed bearing was for a block 40 aircraft, and it had been installed on a block 50 aircraft. How could the bearings get mixed up?

Who is building up your wheel and tire assemblies? Do they know the difference between block 40 and block 50 bearings? We have a lot of Air Force bases with a mixed bag of aircraft, so be careful. The wrong bearing *can be* installed and you won't know it until it is too late. Imagine the cost difference between buying one bearing and buying one wheel assembly, one brake assembly and one axle!

How Many Chances?

After a test cell run on an F-16 engine, the workers found major damage to the third stage fan, compressor section, and variable stator vanes. What were the links in this failed safety chain?

It all started when the flightline found a cracked flameholder. The flightline crew that removed the flameholder found the augmenter-mixing duct was also worn beyond limits. Unfortunately, this is a back shop task. They contacted the propulsion flight and verified the worn mixing duct, so the engine had to come out. The propulsion flight member wrote up in the logbook the problems with the engine to include missing headless flameholder pins. Isn't it standard procedure when you lose things to write them up in the aircraft/engine forms and possibly impound the aircraft?

The engine was removed and taken to the back shop where it was accepted, and the engine had a 350 tag attached stating "pins under liner." A back shop technician was assigned to the engine and was surprised when he had to remove a headless liner pin with mechanical fingers from the fan bypass duct. Now, how did that get there? After 25 days in the shop, the engine was certified complete and taken to the test cell for the fateful engine run.

What steps could have prevented this mishap? Write up the missing pins in the aircraft/engine forms! How about as soon as something was determined to be missing the worker and/or supervisor impounding the engine? Why didn't the other personnel who were informed of the missing pins impound the engine? Why didn't the technician who unexpectedly found a pin identify it to supervision for further investigation? Several links in the safety chain failed US again this time, and we paid for it with $217,000 in damage to an engine and a lot of extra work. Doing it right the first time really pays!

USAF Class A Flight Mishaps

FY03 Flight Mishaps (Oct 02-May 03)	FY02 Flight Mishaps (Oct 01-May 02)
18 Class A Mishaps	21 Class A Mishaps
10 Fatalities	7 Fatalities
13 Aircraft Destroyed	12 Aircraft Destroyed

18 Oct	✈	A TG-10D glider crashed during a student sortie.
24 Oct		An F-15 experienced an engine failure during takeoff.
25 Oct	✈✶	An RQ-1 Predator crashed during a training mission.
25 Oct	✈✈	Two F-16s collided in midair during a training mission. One pilot did not survive.
13 Nov	✈	An F-16 crashed during a training mission. The pilot did not survive.
04 Dec	✈✈	Two A-10s collided in midair during a training mission. One pilot did not survive.
18 Dec		Two F-16s collided in midair during a training mission.
20 Dec	✈	Two T-37s collided in midair during a training sortie.
02 Jan	✈✶	An RQ-1 Predator crashed during a training mission.
26 Jan	✈	A U-2 crashed during a training mission.
06 Feb		A manned QF-4E departed the runway during takeoff roll.
11 Feb	✈✶	A QF-4 drone crashed during a landing approach.
13 Feb	✈	An MH-53 crashed during a mission.
08 Mar	✈	A T-38A crashed during a training mission.
17 Mar	✈	Two F-15s collided in midair during a training mission.
19 Mar	✈	A T-38 crashed during a runway abort. One pilot did not survive.
23 Mar	✈	An HH-60 crashed during a mission. All crewmembers were killed.
31 Mar		A B-1 received damage during weapons release.
16 Apr		An F-15 experienced a single engine failure in-flight.
21 Apr		A C-17 suffered heavy damage to the MLG during a landing.
02 May		A KC-135 experienced a birdstrike during landing roll.

- 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://safety.kirtland.af.mil/AFSC/RDBMS/Flight/stats/statspage.html
- Current as of 27 May 03.

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

Lt Col James E. Bower
OO-ALC/LC-2
Maj Michael G. Fuller
421 FTF
Mesa, AZ

On a cross country, Lt Col Jim Bower (IP) and Maj Mike Fuller (front seat pilot) experienced a near-complete electrical failure in a newly modified T-38C. Prior to engine start, with external power applied, a problem with the VOR pointer was noted. After maintenance, the aircraft was idled for more than 15 minutes to ensure the VOR functioned properly. Then the crew took off for their first refueling stop at Dyess AFB, TX.

While cruising at FL 370 north of El Paso, above a solid undercast of unknown height, they received clearance to proceed directly to Dyess, where the field was VFR with a scattered layer at 12,000 feet and multiple layers below. Handed off to Fort Worth Center, Lt Col Bower reported in.

An unexpected silence on the headsets coupled with blank displays caught their attention. Without warning, the right essential AC bus failed, causing a loss of electrical systems including all radios, intercom, navigation and engine management systems, normal landing gear extension system and nose wheel steering. While Maj Fuller flew from the front cockpit, Lt Col Bower hacked his watch to initiate time and heading navigation. The EGT had indicated 225 miles and 27 minutes to go about a minute earlier, so they calculated fuel remaining at 1000 pounds. The checklist for Mission Data Processor Failure says to proceed to VMC as soon as possible; however, the undercast posed a challenge. A "sucker hole" appeared about 20 miles ahead, but they did not know what the ceilings were below the cloud deck, and they calculated the fuel burn rate at lower altitude would preclude making Dyess safely unless they stayed at altitude for another 15 minutes. Communicating with notes and hand signals, the pilots decided to continue at altitude and proceed using timing and the standby compass. The standby ADIs worked for approximately six minutes, as advertised, before beginning to tumble.

Twelve minutes out, they initiated a VMC descent, found a clearing line and continued the descent while maintaining visual contact with the ground. Leveling the aircraft at 10,500 feet, Maj Fuller noted a DME began to increase at 30 miles. The crew initiated a left 90-degree turn toward north to start "homing" via the DME.

About three minutes later, Dyess appeared at their 1130 position. They elected to fly a south-to-north electrical failure pattern to alert the tower. Not knowing their fuel state, and wanting to minimize their time aloft, they executed a modified left teardrop to a straight-in final. When the landing gear did not lower normally, they used the alternate gear extension. With only the main gear lights illuminated, the pilots realized the nose gear light would not function with total DC electrical failure. Flaps were lowered and visually checked down. Maj Fuller flew a 170-knot approach to an uneventful full stop.

Post-flight inspection revealed a damaged circuit breaker and an unexpected design problem. The incident uncovered a single-point electrical failure node in the T-38C modification that was quickly corrected.

Photo Illustration by Dan Harman