TAC ATTACK

MARCH 1984

ANGLE OF ATTACK

It's a pleasure to step into Jim Mackin's shoes as editor of *TAC Attack*. I think I know a number of RF-4 aircrews who are glad I'm writing anything but Stan/Eval examinations!

In DOV, my concerns were readiness and professionalism. They still are, and they should be the concerns of each of us in TAC. Flight checks and examinations are a measure of readiness. So is our ability to train realistically and to consistently return safely. Each jet that doesn't return attrits our already outnumbered force. Likewise, it takes a full ten years of training a new pilot to replace a pilot who has ten years flying experience. The cost of failing the readiness test is too high. Only by striving to be professionals can we keep the cost down.

Tactical aircrew members, crew chiefs, supply clerks, computer specialists — each of us has the opportunity to be a professional. God created each of us individually; we can each contribute unique insight, inspiration, and experience. But each of us must *choose* to give our best, no one can force us. Our air force is interdependent; several people may depend on your work. Someone may stake his life on your work. The cost of failing the professionalism test is too high too.

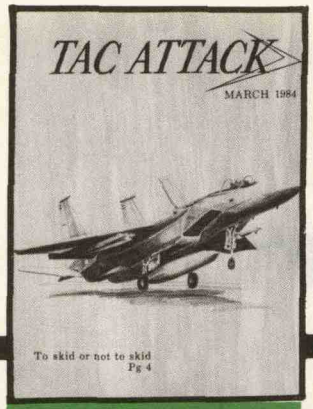
Our charter is to be professional and to be ready. It's also to help our wingmen achieve their potential. That's what *TAC Attack* is all about. Several articles in this issue present practical tips that might help you do your job better.

Capt Bob Patch offers an informative quiz (with my Stan/Eval background, I couldn't resist printing a quiz) on F-15 antiskid operation. Captains Allen Kohn and Edd Chenoweth present articles about professionalism in communicating and the value of backup systems. Lt Col Joe Zak also earned a Fleagle T-shirt for his enlightening feature on protecting the Eagle against lightning strikes.

Read, enjoy, and learn. And remember, your job *is* important. The attitude you display today will affect both your present performance and future position. *Faithfulness in small responsibilities leads to greater responsibilities.*

Lew Witt

Lew Witt, Major, USAF
Editor



On the cover:
To skid or not to skid.

MARCH 1984

DEPARTMENT OF THE AIR FORCE

TACRP 127-1

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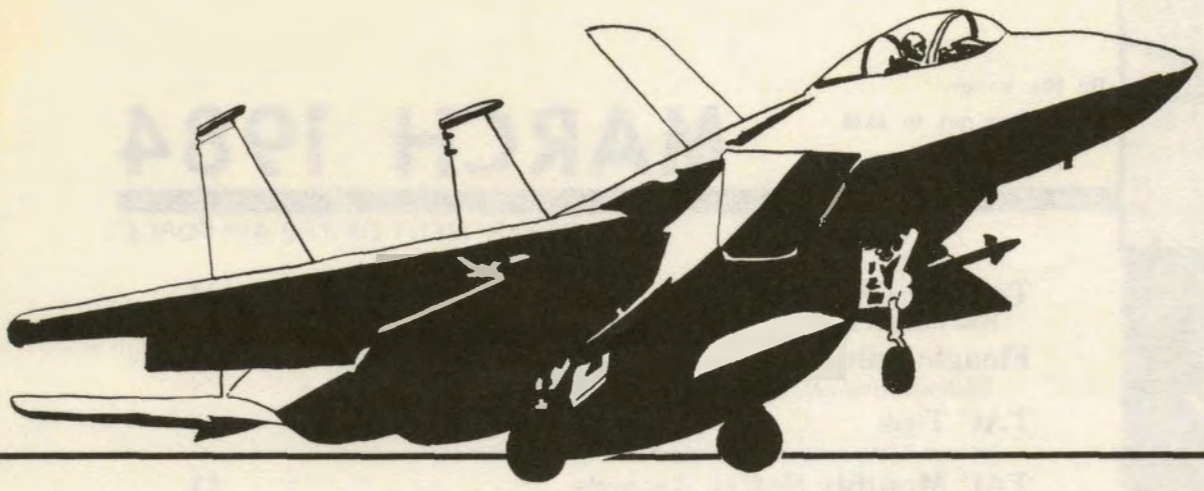


TO

or how smart is the F-15 antiskid?

By Capt Bob Patch
318 FIS
McChord AFB, Washington

How well do you understand the F-15 antiskid system? The system knows when the wheels have locked up, and then relieves pressure. Right? Wrong! You don't have to read this entire article to find out about the system; if you can answer the questions, you know plenty. Here are the ground rules:

1. The antiskid is turned on and is working properly.
2. There may be more than one correct answer for each question.
3. If you chose all the right answers and weren't guessing, skip on down to the next question.
4. Answers to each question can be found in the first sentence after the question.

OK, here we go:

Question 1. The F-15 antiskid provides touchdown protection by not letting you apply brakes until it's sure you're on the ground to stay. How does it know?

a. It waits until the nosewheel is on the ground.
b. It waits until the main wheels spin up to 50 knots.
c. It waits until all three gear indicate weight on wheels.
d. It waits until five seconds after the weight on wheels (WOW) switch makes contact.

If you didn't know that correct answers were b. and d., read on. If you did know, skip on down if you like. When the WOW switch on both main gears indicates weight on wheels, a five-second timer starts; once the timer expires, brakes are available regardless of wheel speed. If weight is removed from the WOW switch (as in a bounce), the timer is reset at the next touchdown, and you'll have to wait another five seconds. Each main wheel has a speed sensor. Once the wheels spin up and the sensors indicate 50 knots, brakes are immediately available. It's sort of a 5/50 guarantee. Once weight is on the wheels, you get brakes after five seconds or 50 knots, whichever comes first.

Question 2. Once you're rolling down the runway, how does the antiskid know you're about to enter a skid?

a. It waits until either wheel stops rotating.
b. It waits until both wheels stop rotating.
c. It senses wheel deceleration that is too rapid for your current speed.
d. It senses a difference in tire speeds.

If you said c. and d., congratulations. The antiskid box knows what the current speed is, and what the maximum possible rate of deceleration is for

SKID OR NOT TO SKID

that speed. If the box senses anything faster than that, it thinks you're about to skid. If the two wheel speeds differ, it thinks one wheel is about to skid.

Question 3. If the antiskid senses a skid, what does it do?

a. It relieves pressure to the slow wheel.

b. It relieves pressure to the fast wheel.

c. It dumps all pressure.

d. It increases pressure to the fast wheel.

You should have said a., b., and c. First it tries relieving pressure to both wheels. Relief to the slow wheel is to stop the skid. Relief to the fast wheel is to keep you from being pulled to that side because of differential braking. If relieving pressure doesn't help (that is, deceleration is still too fast or wheel speed difference exceeds 50 percent), all brake pressure is dumped. Once the problem is solved, it reapplies pressure. That's what is happening when you feel the antiskid cycling. It is interesting to note that if you smoothly apply full pedal pressure, you will probably never feel the antiskid cycle. The reason is that you've given the system time to figure out the maximum pressure that can be applied without skidding a wheel; it then limits you to that amount.

Question 4. The Dash One says antiskid protection is reduced below 30 knots. Why?

a. It's too hard to provide skid protection that slow.

b. Even if you lock the wheels you won't blow the tires.

c. So you can stop the airplane.

d. That's the minimum wheel speed difference the antiskid system can detect.

If you said b. and c. you're doing well. If the system wouldn't let you lock up a wheel, it would be like trying to stop with pulser brakes. MCAIR picked 30 knots because you can't blow a tire at 30 knots and that speed worked well in tests with their wheel speed generators.

Question 5. You land and have one wheel on a wet paint stripe; you don't feel any braking. Is the antiskid inoperative?

TO SKID OR NOT TO SKID

a. Yes.
b. No.
c. Maybe.

The correct answer is a definite maybe, c. It could be that it's not working, but more than likely, the wheel on the paint stripe is trying to skid, so the system is relieving pressure to both wheels. Wait until you get off the stripe and try it again.

Question 6. You have an inoperative WOW switch. What type of antiskid braking do you have on landing?

a. Normal, starting five seconds after touchdown.
b. None.
c. None below 50 knots wheel speed.
d. None above 50 knots wheel speed.

I hope you said c. With the WOW switch inop, the timer never gets activated, and the system is looking strictly for 50 knots wheel speed. Once your wheels slow below 50 knots, you don't fill that square anymore either; hence, no brakes. You'll have to switch to pulser, off, or select emergency brake/steering to get any braking. If you're coming back to land and you suspect an inoperative WOW switch, please *do not* turn off your antiskid; It may still work and should still give you touchdown protection. Just be prepared to lose brakes at about 50 knots. If you do, *then* turn off the antiskid.

Question 7. You come back for a heavyweight landing on a wet runway and grease one on a little hot. Unknown to you the airplane is hydroplaning. Seven seconds later you're still doing 115 knots and the wheels have not spun up. If you apply brakes now, what will happen?

a. Nothing, the antiskid will protect you.
b. The wheels will lock.
c. You will get normal braking.

If you've been paying attention, you would know that the right answer is b. You get brakes at five seconds (5/50 guarantee) and the wheels think you're below 30 knots so they lock.

Now for summary.

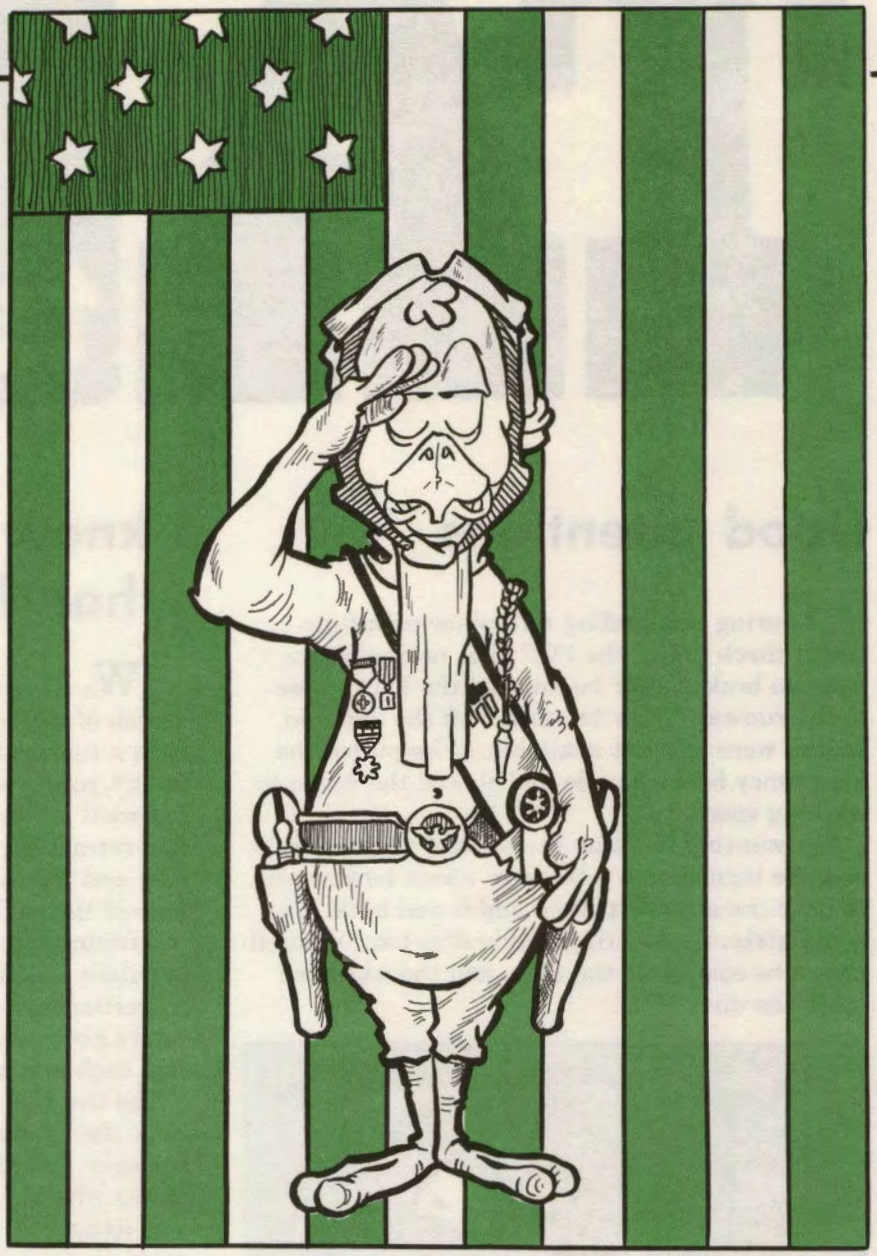
1. The antiskid will not give you any braking power until you've been down five seconds or have 50 knots of wheel speed (5/50 guarantee).
2. The antiskid detects a skid by monitoring wheel spin-down rate and wheel speed differences.
3. When the system detects a skid, it can relieve pressure to both brakes or dump all pressure, depending on severity.
4. You have no antiskid protection below 30 knots.

The antiskid system is smart but not foolproof. The best way to use the system is by not depending on it to work. Don't develop sloppy habits by accepting hot or long landings just because you have a long dry runway in front of you. Practice for the day when you're looking at a short, wet runway. Know what the antiskid system can and can't do for you. And when you need it, use it.

Happy landings!

Captain Patch graduated from the University of Washington in 1974. He completed UPT at Laughlin Air Force Base, Texas, in February 1977, where he was also an instructor pilot in the T-37. He flew F-106s at McChord Air Force Base, Washington, and is now flying F-15s.

FLEAGLE SALUTES -



Capt Curtis Bottesch and **1st Lt Jeffrey J. Blessing,** 21st Tactical Air Support Squadron, 507th Tactical Air Control Wing, Shaw Air Force Base, South Carolina. Captain Bottesch and Lieutenant Blessing were flying a night low level mission in an 0-2A when electrical fumes filled the cockpit. The pilots turned off both engine alternators and the battery. Unable to isolate the problem, they recovered the aircraft without electrical power. The crew used outside references for navigation aids, a flashlight to see their instruments, and a PRC-90 survival radio to declare an emergency with the local approach control.

Capt John S. Krebs and **Capt Rodney N. Casey,** 72d Tactical Fighter Training Squadron, 56th Tactical Training Wing, MacDill Air Force Base, Florida. Twenty-five miles from base, while returning from a syllabus BFM mission in their two-place F-16B, Captain Krebs and his instructor pilot, Captain Casey, noticed a slight rumble and vibration as the throttle was moved. Despite the absence of cockpit indications, the pilots sensed engine problems; they sent the wingman to a chase position, set the power at 80 percent, and climbed to a position for a flameout pattern. Trailing progressively thicker blue smoke, the engine held together all the way to landing. Their early analysis and superior airmanship allowed them to safely land the aircraft before catastrophic engine failure caused by broken turbine blades and complete loss of oil.

Capt Howard L. Hendricks, 549th Tactical Air Support Training Group, Patrick Air Force Base, Florida. Captain Hendricks was flying an 0-2A on a routine functional check flight. As he pulled back on the yoke during a max power climb, his seat back snapped and gave way, and he immediately fell backward to a prone position. While lying helplessly on his back under six Gs, Captain Hendricks released the yoke and rolled the aircraft with rudder. When the nose fell back through the horizon, the pilot was able to regain control, accomplish a controllability check, and land the aircraft.

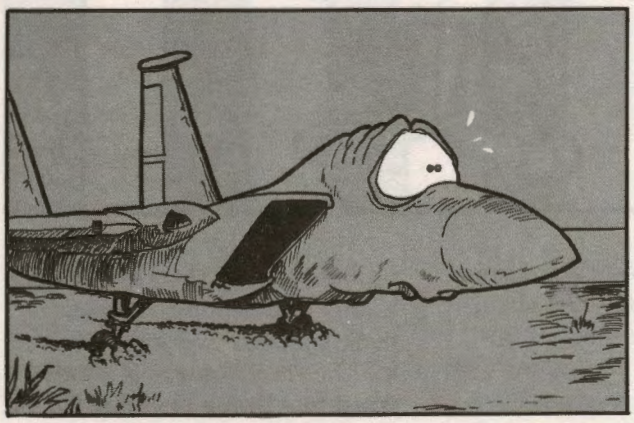
TAC tips

INTEREST ITEMS,

Good intentions

During the landing roll following a functional check flight, the FCF pilot noticed there were no brakes after he lowered the F-15's nose to the runway. After he turned off the antiskid, brakes were still not available, so he pulled the emergency brake handle and slowed the Eagle to walking speed.

Not wanting to tie up the airfield's busiest runway, he turned onto a taxiway where he planned to have the aircraft pinned and towed back. Unfortunately, the steering and brakes totally failed before he completed the turn, and the jet ended up in the dirt.



The emergency brake/steering system in the F-15 can lull you into a false sense of security since there's a chance of its accumulator being continuously replenished. But how can you be sure UTL B is operating? If you ask the emergency system to do more than its primary job of stopping you straight ahead, your emergency may not be over.

I know what it says — what does it mean?

We recently had an F-4 crew do an admirable job of safely recovering a "three bag" aircraft from a serious takeoff emergency. Actually, it wasn't your standard "three bags full" fuel load, but we'll get into that later. Just after gear and flap retraction, the pilot noted the left engine Fire and Overheat lights illuminated. He performed the boldface emergency procedures while continuing the takeoff. When he pushed the panic button to jettison all external tanks, only the centerline was released. When the aircraft was safely airborne, the pilot maneuvered the Phantom back around for an uneventful landing.

The fire was caused by a leaking centerline tank (failed seal) which was venting fuel through the open aux air doors into the engine compartments where it ignited. Once the burning tank was jettisoned, the fire extinguished. Leaking centerlines and resulting engine fire indications are not new — but only jettisoning one external fuel tank when trying for all three bears looking into.

After the aircraft pulled into the chocks from the first sortie, the pilot told the crew chief that he'd had problems with one of the external wing tanks feeding slowly; he requested that the outboard tanks not be refueled. That presented a problem because normally either all or none of the external tanks on the F-4 can be pressure refueled. The refueling crew was resourceful, however, and jury-rigged the aircraft to make it think it was only carrying a centerline; they disconnected the outboard tank cannon plugs to pre-

vent the tanks from filling. They properly documented the disconnected plugs in the aircraft forms with a red diagonal.

Since this was the last flight from the deployed location (the pilot was flying the aircraft home on this mission), everyone figured the slow-feeding tanks could be fixed on home turf. The ground crew also reckoned that the pilot knew exactly what he was doing. They thought he should have thoroughly understood their write-up in the aircraft forms.

When the pilot read the write-up, he just didn't make the connection that the same cannon plugs that control refueling the outboard tanks also contain the jettison circuits. He probably could have reasoned the answer to such a question, but the write-up just didn't stir the thought.

The maintenance guys and gals usually hustle to help aircrews get their steeds airborne. Let's be sure we understand what we're asking.

Good news for F-4 jocks

According to AFLC Public Affairs, the safety modification of the afterburner fuel pump on each J-79 engine in the Air Force's F-4 fleet is complete.

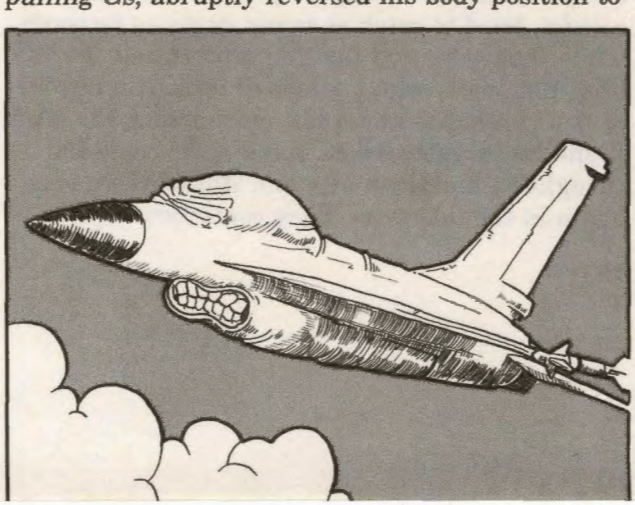
The afterburner fuel pumps had a defective hollow shaft within them. The shaft, which holds a spinning impeller (a small propeller that creates suction to move the fuel) was supposed to shear completely if the pump's bearings failed. The walls of the shaft were too thick, so when the bearings failed, the shaft only bent, and the still-attached impeller continued to rotate. Eventually, friction from the impeller wore through the pump's housing and spewed fuel into the engine compartment, often causing catastrophic fires.

There was no effective test that maintenance crews could use to determine which pumps were about to fail. Likewise, there were no consistent warning signs in flight to alert aircrews of the problem—until a raging engine fire erupted. So all the afterburner fuel pumps had to be modified.

High-G maneuvering a pain in the . . . back

An attached F-16 pilot had flown regularly with the squadron but hadn't done any high-G (over 6) maneuvering for a couple of months. When the Aggressors flew their F-5s into town, he was one of the first pilots scheduled for a multi-bogey melee.

During the second engagement of his first mission with the Aggressors, the Falcon pilot was looking over his right shoulder while in an 8.5-G defensive turn. When he'd forced one of the trailing F-5s to overshoot, the F-16 pilot, while still pulling Gs, abruptly reversed his body position to



check his left seven o'clock. He felt a twinge in his lower back, but thought nothing of it. Perhaps the adrenalin masked the pain for the remainder of the fight.

After the mission, however, his back felt like he had a charley horse. He figured it would soon go away; and since he wasn't on the schedule to fly during the next week, he decided not to visit the flight surgeon. Six days later, when his back still wasn't better, he hobbled in to see the Doc and found that he had pinched a nerve in his lower spine. After medication and therapy, the pilot is once again healthy.

Attached aircrew members aren't the only ones liable to layoffs between flights. Most of us have grumbled because of days when we just can't seem to get airborne because of desk/RSU/SOF tours, broken jets, or miserable weather that even grounds the ducks. These circumstances are frustrating, but it's long vacations, non-flying TDYs, and extended periods of DNIF that are more likely to produce long intervals between flights. Extended layoffs can contribute to neck and back injuries when resuming high-G events. Easing back into the high-G environment at your own pace can help.

And by the way, when you're hurting, go to the flight surgeon. Don't put it off. He can even help with real pains in the . . . back.

Paper chase

During an engagement on a basic fighter maneuvering mission, when the pilot unloaded the aircraft, the map case in the aft cockpit flew open. Instrument approach books and maps were everywhere. The instructor pilot, in the rear cockpit, tried to catch as many items as he could while they were still floating around and above him. But there were a bunch of books, and he only had two hands and a few moments of unloaded flight. So he gathered as many as he could (he thought he had them all), and stowed them once again in the map case. They continued the mission and recovered to the VFR pattern, so they didn't think of the instrument books again — until the canopies were opened after landing and a letdown book fell from behind the IP's seat into the right engine. Cough, cough, sputter, Master Caution Light. Then they both thought about the books.

Map cases have spilled their contents into the cockpits of fighters for a long time. And it seems jet engines have had an afinity for letdown books equally as long. Taking a few seconds to make sure the map case is secure during a fence check before the fight begins will pay dividends. Unlucky pilots may still have to gather all the books from time to time. If or when you lose the fight because you lost sight of your adversary behind a flock of letdown books, knock it off; after you've gathered them, inventory the contents of the map case before opening the canopy back on the ground.

We get real concerned about what is and isn't in the map case when the weather's poor. On mission profiles like BFM, where there's a possibility of a paper chase, having a good idea of what's supposed to be in there might help.

TAC SAFETY AWARD

INDIVIDUAL SAFETY AWARD

SSgt Harold W. Poe

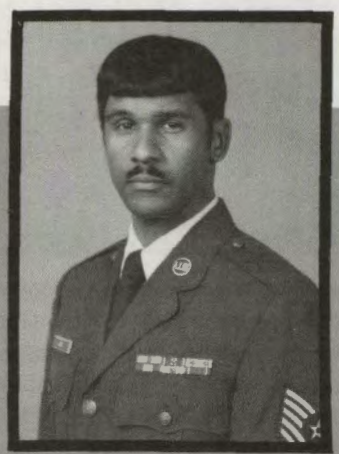
SSGT HAROLD W. POE, an F-15 pneudraulics systems technician in the 94th Aircraft Maintenance Unit, 1st Aircraft Generation Squadron, 1st Tactical Fighter Wing, Langley Air Force Base, Virginia, shares this month's Individual Safety Award honors.

While performing an operational check on an F-15 hydraulic system, Sergeant Poe noticed a leak had developed. Hydraulic fluid under three-thousand pounds per square inch (psi) pressure began dripping and then spraying from the coupling fitting adapter that connects one of the high pressure hoses of the TTU 288/E hydraulic test stand to the aircraft.

Sergeant Poe shut down the unit and closely inspected the area of the leak. He found that the adapter was not fitted to the high pressure hose according to technical data. Realizing that this problem could exist elsewhere, Sergeant Poe then inspected other hydraulic test stands assigned to the 94th AMU and discovered that they also had improperly fitted adapters on the hoses. He presented the problem to the Aerospace Ground Equipment supervisor who decided to have all hydraulic test stands inspected; faulty hoses were removed and refitted.

Sergeant Poe's prompt response and initiative prevented possible injury to personnel and has earned him the Tactical Air Command Individual Safety Award.

INDIVIDUAL SAFETY AWARD



TSgt Michael A. Lugo

Also sharing the Tactical Air Command Individual Safety Award this month is TSGT MICHAEL A. LUGO. He is a unit weapons loading technician with the 4507th Consolidated Aircraft Maintenance Unit, 507th Tactical Air Control Wing, Shaw Air Force Base, South Carolina.

Sergeant Lugo was the flight line weapons expediter during the postload inspection of an 0-2A, when the timer assembly of one of the LUU-2A/B flares popped out. Sergeant Lugo caught the timer assembly approximately four inches from the flare and pressed it back into the flare body, preventing the parachute from being deployed. While holding the timer assembly pressed into the flare body, Sergeant Lugo called for someone to bring him a roll of masking tape, and directed other people to notify the maintenance coordinating center, 507th weapons safety and the NCOIC of the 4507th CAMS weapon loading. While these people were notifying the appropriate agencies, Sergeant Lugo taped the timer assembly into the flare body and held it in position until help arrived.

Later inspection by munitions storage area personnel indicated that the incident was caused by a faulty flare. If the parachute had deployed, the flare would have ignited and burned which would have destroyed that aircraft and endangered personnel and other aircraft.

The quick reaction and professional response of Sergeant Lugo prevented the possible loss of valuable Air Force resources. He has earned the Individual Safety Award.

CHOCK TALK

INCIDENTS AND

Cockpit comes clean

Crew chiefs, you probably thought it never happened, but one afternoon, a pilot became sick and vomited while he was flying. When he landed, the F-15 was impounded. The pilot's sickness

was later attributed to his improper diet. No discrepancies were found in the aircraft. The next morning when the aircraft was released, the crew chief finally had a chance to clean up the cockpit. This unit routinely used "Spray Nine," a general purpose cleaner purchased locally, to wipe down the cockpits of their aircraft.

Shortly after the scrubdown, an eager pilot arrived at the jet for his morning flight. During his preflight, he noticed a very faint smell similar to ammonia. He didn't consider it important and pressed on with the flight.

During the mission, he noticed his G-tolerance was lower than normal, he was slightly dizzy, and he had a metallic taste in his mouth. The pilot returned to base. Because of his symptoms and the incident the previous day, he felt there was still something wrong with the aircraft.

The aircraft was impounded again. Once more, environmental health folks tested for noxious gasses and found none. As they investigated further, the cleaning fluid became suspect. Analysis showed the product contains a couple of chemicals with long names: Dimethyl Benzyl Ammonium Chloride and Dimethyl Ethyl Benzyl Ammonium Chloride, both in concentrations of 0.15 percent. According to the poison control center nearest the base, these compounds can produce moderate dizziness, euphoria, vertigo, some sedation, and a metallic taste in the mouth.

We're not saying that this particular product is the only culprit. We're suggesting you look for these chemicals in any locally purchased general purpose cleaners that your unit uses. Better yet, have the cleaners used in the cockpit analyzed.

One more thing. There are no official guidelines governing the length of time to air out a cockpit after maintenance that introduces fumes in the cockpit. A good rule is to wait until no odor can be smelled.

All present and accounted for?

An A-10 failed a functional check flight when its left engine stagnated at 58 percent core rpm after an airstart. The FCF pilot made an un-

eventful single engine landing. Maintenance workers found and replaced a leaking fuel bypass valve, and the next day the Warthog flew again. The second FCF pilot observed identical results.

After the aircraft landed, troubleshooters replaced the main fuel control. During the subsequent engine run, the idle core rpm was higher than normal and did not respond to fuel control adjustments, so another fuel control was installed. Same story. The clue bag was empty now, so they pulled the engine and shipped it to tear down.

When the engine was disassembled, some blades in each stage of the compressor were nicked or rubbed. Impact marks matched those of a 5/32-inch diameter stem from a pop rivet.

Maintenance supervisors reviewed the aircraft forms to see what jobs had been done that would have required using this size rivets. Several repairs have been made in the previous three months, but only one involved the suspect rivets replacing the engine nacelle nose assembly. That operation required drilling out and installing about fifty such rivets.

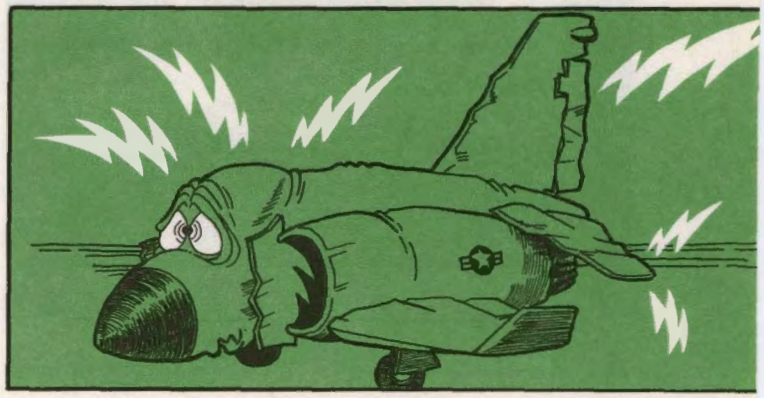
One of the stems (residue from the work) was misplaced and probably rested against one of the fan stator blades. Undiscovered, the stem was later ingested into the compressor inlet during engine start (when the turbine was spinning too slowly for by pass airflow to blow it away. The damage reduced the efficiency of the compressor enough to show up at 15,000 feet during the FCF, but not enough to hinder ground starts. A couple of A-10 pilots are glad the A-10 has two engines.

The workers accounted for all the rivet stems but one. Supervisors didn't see the lone foreign object when they inspected. Forty-nine out of fifty is a great batting average, but when it comes to working around jet engines, only one mistake is costly. It may be a nuisance to interrupt the work we're doing to continually retrieve scrap residue; but on a big job, it really helps insure that spare parts aren't left behind to become FOD.

FO trap

One F-4 maintenance unit has noticed that a lot of apparently unrelated aircraft malfunctions are traceable to one cause. The Central Air Data Computer (CADC) has been the common thread to discrepancies involving flight controls, cockpit instruments, and weapons delivery systems in their Phantoms.

Many of the CADCs in their jets have been ruined by foreign objects getting lodged in the electrical circuitry innards. Part of the problem



CHOCK TALK

may be that the computer invites FO because of its location down low under the seat in the rear cockpit.

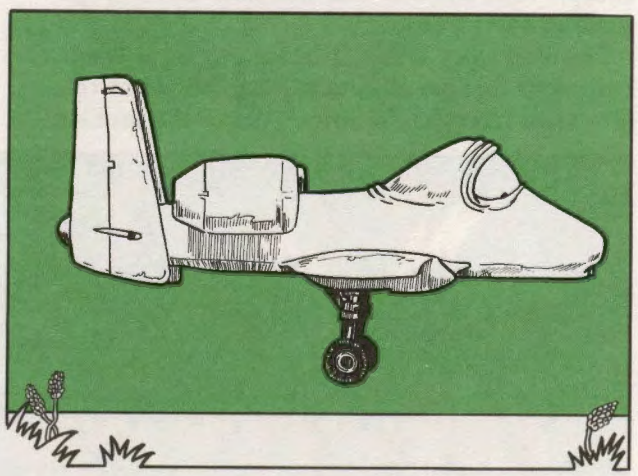
In one of their jets recently, a small piece of metal mesh (used to shield the insulation around an electrical wire) dropped inside the computer. Three line replacement units were ruined by the tiny culprit.

The unit has submitted a suggestion to install a protective cover over the CADC, but it may take a while until you see one. In the meantime, sounds like here's a good place to routinely inspect for foreign objects when the seat is removed. It might also be an area to investigate when troubleshooting.

Button-up

One part of the interior of a number of jets that takes a lot of unintentional beating is the throttle. It's sometimes in the way of the very control head that needs to be replaced, or it gets banged up when the ejection seat bucket is being removed, or it gets in the way of tools or equipment laid on the left console. Occasionally one of the switches on the throttle is bent and later shorts and sparks and scares the pilot during his pre-engine start checks or the crew chief working in the cockpit at night.

An A-10 pilot was returning from a mission and discovered as he began a descent that he couldn't retard the right throttle below 94 percent rpm. By varying the thrust on the other engine, the pilot was able to safely land the Thunderbolt II. He shut down the engine that was stuck with the T-handle after touchdown.



Maintenance workers found a throttle-mounted button (the one that controls slewing and tracking the Maverick missile) had fallen into the right throttle quadrant and jammed the throttle. When the button was removed, the throttle moved freely.

The button is held in place by two set screws that were loose. No one had recently performed maintenance work on the throttles so the button must have been loose for some time and finally gave up.

We hear a lot about foreign objects damaging engines and falling into the stick well and binding the flight controls. Another important area to check for foreign objects is the throttle quadrant. Can you imagine the dilemma a single engine fighter pilot would have had?

That wraps it up

An Aardvark pilot decided to ground abort the F-111 he was preflighting because of excessive free play in the left horizontal stabilator. Instead of less than an inch, the stab moved four or five inches.

Troubleshooters found the bolt and bushing that secure the forward horizontal tail servo-actuator (HTSA) pin laying loose inside the access panel. This pin connects the actuator to the airframe. If the pin had been lost in flight, the aircraft would have been uncontrollable.

About a week earlier, the servoactuator for the left stabilator was replaced because of a hydraulic leak. The jet flew three times the next two days before this pilot discovered the problem.

The tech order requires the technician to safety wire the bolt holding the HTSA pin. But no one could find any residue of safety wire in the access compartment. Either the wire broke off at two attaching points and couldn't be found in the compartment, or the bolt was not safety wired.

If the bolt wasn't safety wired, the supervisor who inspected the work missed it. So did the crew chief; checking the pin is a required step in both the post and through flight inspections.

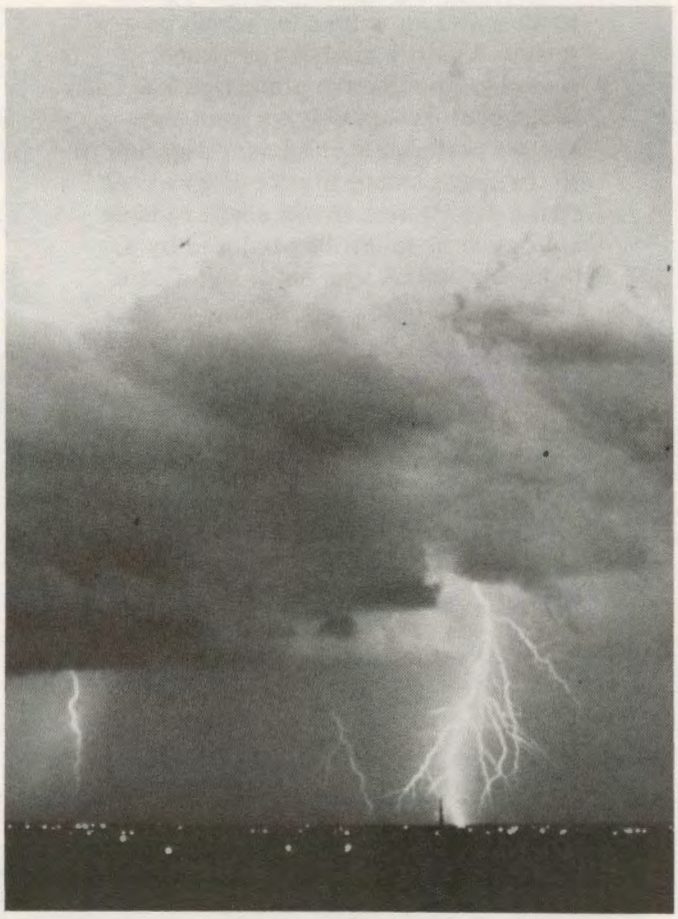
PROTECTION FOR THE EAGLE

pass down the probe, through the pitot heater wiring, into the aircraft power system. This may or may not destroy the radome. Lightning can also weaken small pieces of the radome, or even blow them away. Where a radome does not have a pitot tube, lightning may attach to the tuning wire, attachment rings, or just go through the radome to the radar antenna itself.

Those are the vulnerable areas on an aircraft. For any specific aircraft, one of the first things we need to know is where the lightning will most likely attach. In 1970, tests to find these so called attachment points on the F-15 were done using model aircraft at the Lightning and Transient Research Institute in Miami, Florida. Since then, McDonnell Aircraft Company has developed its own lightning research facilities and has continued testing. Test results have shown that the aircraft nose has the highest capture area (about 135 degrees). The horizontal stabilator was next, followed by the vertical fin, canopy, and the center fuselage engine area, which had the smallest capture area (approximately 10 degrees).

Once the attachment points are known, lightning protection can be implemented. Here are some areas in the F-15 that receive special attention:

- Lights. Lightning arrestors have been installed on all the lights that might be struck and could couple current into the aircraft, that is, the wingtip and forward formation lights. The wing and tail position lights, the tail anticollision lights, and the in-flight refueling light were protected by modifying their mounting shell. The formation lights on the aft fuselage and the anticollision lights on the leading edge of the wing near the root were considered to be in a safe zone, free from vulnerability to lightning strikes.



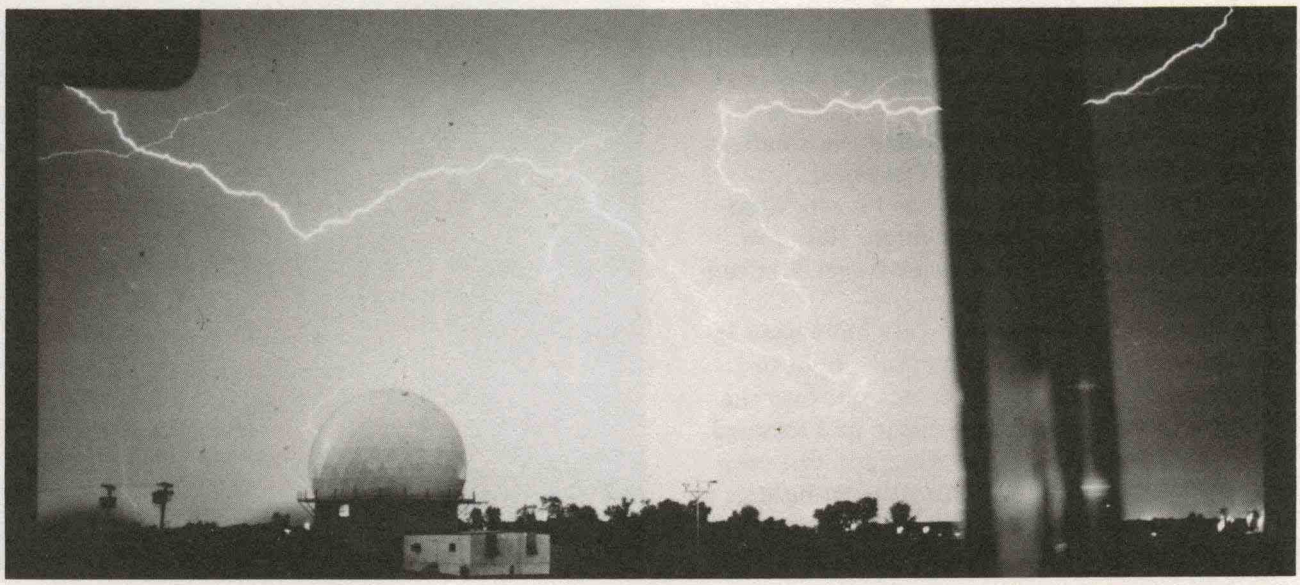
Lightning protection for the Eagle

- Antennas. F-15 antennas were designed so that a strike to an antenna would be diverted to the aircraft frame rather than through the coaxial cables within the aircraft.
- Fuel System. A flame arrestor was installed in the fuel vent and dump line in the F-15. Foam was installed in the wing fuel cells for explosion suppression. The external fuel tank was designed with adequate skin thickness and bonding to exclude internal sparking. Plastic was used on the air inlet and fuel outlet probe to eliminate sparking at the tank-to-aircraft interface.
- Probes. Lightning arrestors were installed on the heater lines of all probes.
- Electrical system. The F-15 electrical system incorporates a split bus that provides greater protection for the generators than could be expected in a parallel generator system. The leak paths for lightning entrance into the system are the lights, probes, and antennas, for which protection had already been provided.
- Radome. No effective protection has been found that doesn't detract from the radar's performance. An investigation into the flight safety impact of a radome strike determined that a small radome hole, such as might be produced by a lightning strike, was not a significant flight safety item.

The F-15 lightning protection program has been one of the first total programs for a fighter in which lightning protection was considered from the very beginning in the initial design phases and was included in production aircraft. Many steps have been taken to insure that any lightning encounters produce a minimum amount of damage. But, since your aircraft is not immune to lightning, you can help the situation tremendously by staying well clear of thunderstorms. Your aircraft is vulnerable when you are flying even 25 miles from the radar precipitation echo if there are other cells nearby and cirrus above you.

During your weather briefing, find out if any part of your trip will be in the clouds, near CBs, or in precipitation. Try to arrange it so as few of those "ingredients" of a lightning strike as possible are present, even if that means a delay or rerouting. And your awareness of weather shouldn't end with the weather briefing. Check again just before you leave to see if there are any last minute changes. Also check frequently en route and listen to weather broadcasts, so you'll be continuously aware of the location of threat areas with respect to your flight plan. →

Prior to his present assignment where he works for TAC/WES and Air Weather Service (AWS), a MAC organization, Colonel Zak has been an AWS Staff Meterologist for Space Division, AFSC, Buckley ANG, Colorado; part time meteorology faculty member at Metropolitan State College, Denver, Colorado; and a Department of Defense Representative to the Prototype Regional Observing and Forecasting Service at Boulder, Colorado. He has 19 years of military service and holds a BS and MS in meteorology from the Pennsylvania State University and a PhD in Meteorology from Texas A&M.



Self-Testers for Blood Alcohol Concentration. Self-testing kits are now being sold that tell whether you've had too much to drink to drive. But don't think you're safe if the reading is below your state's limit, usually 0.1 percent. The kits are accurate when they show a positive alcohol reading, but they aren't reliable when it comes to *how much* alcohol is in your system. The kits don't get the "deep lung" breath sample necessary for accurate readings. And they don't allow for the fact that the maximum blood/alcohol level for some people occurs 15 minutes after drinking and 3 or 4 hours later for others.

Lifting Heavy Objects. Lifting from the floor is worse than from knuckle height; so if you have the choice, don't store heavy loads on the floor. Unbalanced lifts, where you have to handle loads with one hand or you have to twist while you're lifting are two reasons for back injuries. And keep in mind that almost all recommended lifting techniques take more energy, so keep in shape.

Thinking About Aerobic Dance? Aerobic dance is becoming one of the most popular ways to exercise today, but there is a potential health hazard — the instructor. According to Dr. Kenneth Cooper, founder and director of the Aerobics Center and Clinic in Dallas, Texas; "Almost anyone can lead a class without any type of education, and that is simply not safe. Aerobic-dance instructors should be required to have some basic knowledge in exercise physiology, should be certified in cardiopulmonary resuscitation (CPR), and must have some type of medical consultant with whom to work in questionable cases."

Driving While Hung Over. Some Swedish researchers have found that driving while hung over could be just as bad as driving while intoxicated. The researchers threw a party for 22 volunteers, serving beer and wine, punch, and appetizers. The volunteers slept in the lab, and the next morning they were served breakfast. Then they hit the obstacle course to test their driving abilities. Nineteen of the twenty-two scored worse with hangovers than they did while sober. Their ability to drive was reduced by an average of 20 percent. And those who said they felt fine were just as likely to drive poorly as those who said they felt awful.

My Aching Back. Backaches are the leading cause of activity restrictions for people under 45. They're second only to the common cold for time lost from work. What's the real problem? The National Safety Council says that 85 percent of all back pain is linked to muscular weakness, not a specific injury. How can we prevent it? Change our habits. *Eat right* — an overweight person's spine has to support that extra load. *Exercise regularly* — if it feels good, do it. If it doesn't, stop. *Maintain good posture* — straining to hold that rigid, chest out, shoulders back position increases pressure on the lower back. Concentrate on the lower end, not the upper end. *Sit properly* — knees should be slightly higher than your hips. *Sleep correctly* — don't sleep flat on your back, turn onto your side or put a pillow under your knees.

Audio Headsets. Manufacturers are now providing safety pamphlets advising people not to use the headsets while operating a motor vehicle. And more than 12 states restrict headset use by drivers. Make sure you *hear* the word of the law in your state.

Don't Pop the Cork. Champagne is used for almost any celebration — weddings, promotions, births. But popping the cork can be dangerous. It could hit someone in an eye. To open a bottle the right way, tilt the bottle to a 45-degree angle, pointed away from you and every one else. Remove the foil and wire muzzle. Then put either your thumb on the cork or a cloth napkin over it. Grip the cork and twist the bottle, not the cork, until the cork slips out. And never use a corkscrew to remove a champagne cork — the bottle could explode.

DOWN TO EARTH

Seat belts score another save

By Capt B.J. Stanton
U.S. Air Force Academy, Colorado

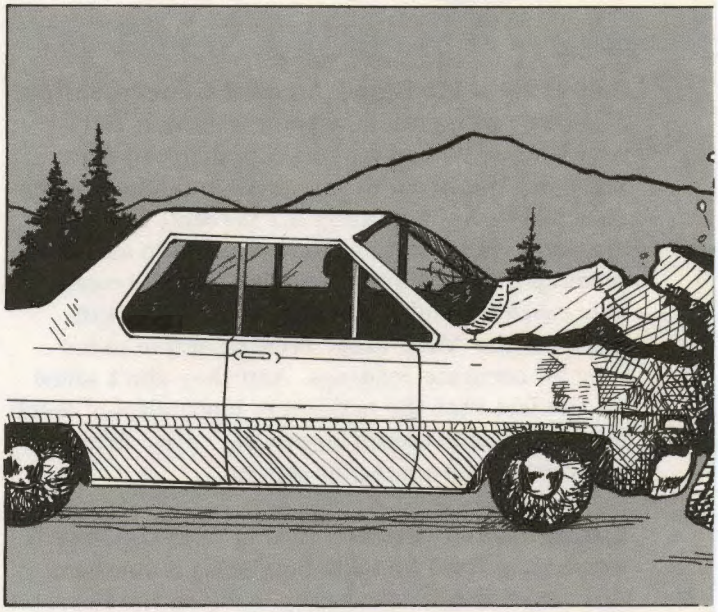
I'll never forget the morning of November 10, 1983. My routine was normal. At 6:30 a.m. the sun wasn't quite up yet.

After dressing and readying myself for work, I got into my pickup and cranked it up for the drive to the office. After a brief warmup, I was on my way. Soon I was out of the maze of residential streets and onto the four-lane divided boulevard that connected my housing area with many others, some of which were still under construction.

Nearly 400 yards down the boulevard was an intersection where another large avenue crossed.

At 50 yards from the intersection my speed was a little more than 30 miles per hour. Suddenly, there was a car coming toward the intersection on my right. But something was wrong — I had the right of way but the other car wasn't slowing down and we were on a collision course. To complicate matters, the glow of the sunrise blinded him. It took at least a second before I slammed on the brakes, but it was academic at this point. A crash was inevitable.

I remember very clearly the events that followed. At the instant of impact there was an immediate deformation of the right interior portion of the truck cab, along with the cracking of the windshield. The right door bulged toward me. The passenger area shrank. I was thrust laterally as my truck gave way to the force of the colliding car.



Within a fraction of a second my pickup began to roll counterclockwise and I was looking forward through the cracked windshield. The next time my truck made solid contact with the pavement was after it had rolled over 180 degrees. It came down on the passenger side of the roof and caved it in somewhat, the passenger area becoming smaller still. The truck rolled again, and by sheer luck the second roll ended with the truck upright.

During the entire procedure I was gripping the steering wheel with both hands, looking straight ahead. My position and posture never changed. My seat belt and shoulder harness had kept me securely in place.

To speculate the outcome without the seat belt is quite simple. Upon the initial impact, inertia would have caused me to slide right out of my seat and over to the passenger side. My legs, however, would have remained in the clutch and

accelerator area. I would have been stopped by the passenger-side door, which was now leaning into the passenger compartment.

The other driver came running over and yanked my door open. Are you OK? Are you all right? I'm so sorry, mister," he blurted in a trembling voice. He unlatched my seat belt and I slowly got out of my truck. I walked away looking back at the spectacle of rearranged metal and glass. The time was 6:40 a.m., less than ten minutes since I had left home.

After being thoroughly checked at the hospital, I was released with only minor cuts and bruises. Moving about required a certain amount of effort because of strained muscles, but at least I was in one piece.

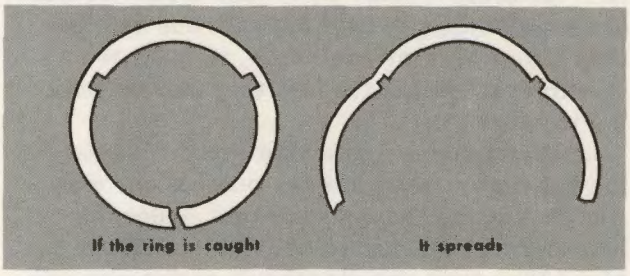
So what's the point? Let me restate it: I slowly got out of my truck and walked away. The reason: seat belts.

—Courtesy Air Force News Service

Make wearing a ring safer

Wearing rings can be dangerous, especially when working around machines. The ring could get caught on or by something and yank your finger off, or a least a part of it.

Now you can make wearing rings safer by cutting slots in the ring. Then, if the ring gets caught by something, it will break away instead of tearing your finger up. Slotting is simple and inexpensive, and it doesn't spoil the ring. You'll need a jeweler, unless you have a fine-metal saw. And if your jeweler isn't familiar with slotting rings, here's the instructions and a diagram.



1. Enlarge the ring to the correct size if it's too tight.
2. Cut two slots partially through from the inside at the 2:30 and 10:30 positions.
3. At the 6 o'clock position, cut through the ring completely. From the inside of the ring, cut a slot straight down for ⅓ of the diameter, then angle the cut diagonally to the right for the remaining ⅔ of the diameter. For a ring with a thin diameter, make the whole cut diagonal.

Slotting a ring is not a substitute for the regs. When rings are prohibited don't wear them at all.

WEAPONS WORDS

Breaking up

Whew! The exercise was finally over. No more gas masks, sirens, or sortie surges, at least for a while. Now to download some of this extra hardware and get back to business as usual.

First thing in the morning of the day after the exercise, a load crew went to an A-10 to download an AGM-65B Maverick missile.

Because the exercise disrupted everyone's normal working hours, schedules were still messed up. The three weapons loaders who formed this crew didn't usually work together; they were each members of other three-man crews. Because of the unfamiliarity working with one another, they began working cautiously, right by the checklist; at least that's how they started working together.

Later, the number two man was down retracting the ejector feet while the number one man was positioning the launcher rack under the launcher. It happened so quickly that no one realized they were simultaneously performing two steps. When the load chief raised the launcher rack, no one was in position to clear the aft end of the missile. Crunch. The stand banged into the Maverick's middle bottom fin and bent it enough to require depot repair.

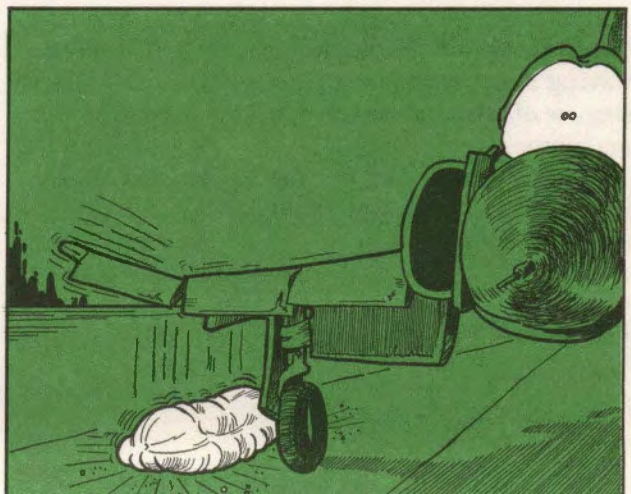
Working together as a crew helps develop predictable patterns. Each member generally knows what the others are going to do at any given point in the operation. AFR 66-5 recognizes this cohesion and strongly encourages loading crew integrity (training, certifying, and working as a crew). Although we try, we can't always maintain that ideal in the real world. Short-notice TDY's, illness, exercises, and other circumstances occasionally require breaking up a crew.

When we find ourselves among less familiar workmates, that's the time to be especially aware that we *don't* know what the others are going to do at a given point in the operation. Assuming that a new partner will perform a certain step (because that's when or how Charley always does it) can be costly. And what are the others expecting from you? Taking a little time to discuss the nuts and bolts of the download in detail before starting would help. And the load chief who recognizes this situation as an opportunity to exert leadership and direction is worth his weight in unwritten mishap reports.

The ad lib jettison check

While two weapons load crew chiefs were cleaning MER/TER breeches during postflight of an F-4, they began talking about jettison checks. One crew chief told the other that when he was overseas, he had seen people do battery-powered jettison checks. The other crew chief said that he had never seen a battery-powered jettison check. So the first crew chief said he'd demonstrate one.

They climbed up to the cockpit. The first crew chief turned on the engine master switches, set



the external stores jettison switch to stores, and moved the master arm switch to arm. Then he hit the external stores jettison button. The 370-gallon fuel tank on the right outboard station crashed to the ramp.

When the tank hit the ramp, fuel spilling out of the standpipes caught fire. The two load crew chiefs climbed down and ran over to the CB fire extinguisher. They didn't know how to use the extinguisher, and they had trouble unwrapping the hose, so they couldn't get the fire out. A maintenance worker from another unit saw the fire and put it out with a different extinguisher.

In trying to fight the fire, one of the load crew chiefs got CB agent in his eyes. He was treated at the base hospital and released. No airplanes were damaged, thanks to the maintenance worker who knew how to use his fire extinguisher.

We don't need to point out the obvious lesson here. But after you've reflected on the lack of wisdom involved in using unauthorized procedures and the failure to safety pin the tanks, ask yourself whether you could use the fire extinguisher that's available to you if you had to. Are you sure? How about fire extinguishers at deployed locations that may be different from those at home?

The other guy

While a crew was preparing to transfer a rocket motor from its shipping container to an MF-9 trailer, one of the team members was just about to install the safety bolt when he was called away. He didn't get the bolt in before having to leave.

When he returned, he thought one of the other team members had installed the latching plate and safety bolt. Sure enough, the other two team members thought *he* had done it.

When the rocket motor was lifted and positioned over the trailer, it fell down onto the trailer. It didn't hurt the trailer, but the rocket motor didn't fare so well; a four-inch crack in the

fairing rendered the rocket motor unusable.

Interruptions in the midst of complicated tasks are frustrating but inevitable. They don't have to lead to expensive mistakes though. In this case, everyone assumed the other guy accomplished a critical step, but no one asked. Tech order checklists can also help us recover from interruptions because we can check that each step is complete before moving on. But we gotta use 'em.

WEAPONS WORDS

Misplaced initiative

A load crew working the graveyard shift reported for duty. The maintenance operations center tasked them to download some training ordnance from one of the F-111s. One of the trio arrived at the airplane earlier than the others. He didn't have anything else to do with the free time, so he decided to get a little ahead on the assignment. Since he didn't have any tech data with him, and his load chief wasn't there, he didn't want to tackle anything major, just a couple of routine, uncomplicated tasks to help pass the time. So he removed the fins from the GBU-12A/B practice bomb that was supposed to be downloaded.

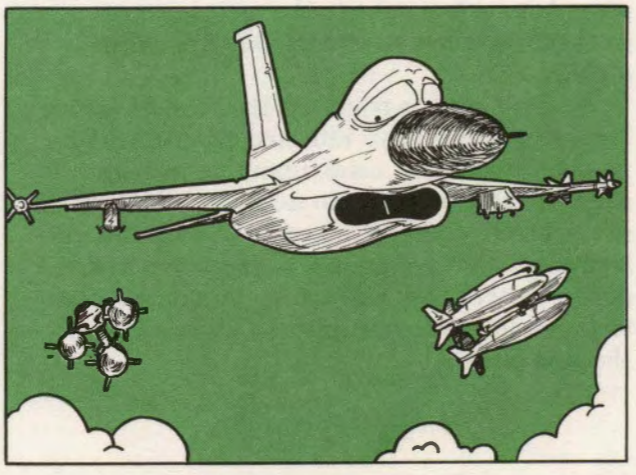
When the load chief and his co-worker still hadn't arrived, the lone technician began removing the computer control group from the nose of the bomb. As he removed the arming wire, without attaching the safety device, the thermal battery discharged. Whoomph! One fried computer control group.

How often we get burned when we try to save time by cutting corners! Impatience, no tech data, and no supervision is a combination that spells disaster, not efficiency.

Racks away

A couple of F-16s took off for a surface attack mission which included dropping several live 500-pound bombs. When they arrived at the range, the aircrews found that a thunderstorm had stolen their scheduled range time. In fact, the weather in the whole area, including the home 'drome, wasn't pure. Because of the extra weight of the bombs and the wet runway back home, lead really didn't want to haul all that iron back for a landing. So he led the flight to the approved jettison area where he planned to pickle the bombs before returning to base to fly instrument approaches.

The leader selected the selective jettison position on the stores control panel for rack stations 3 and 7 (where the bombs were loaded) and turned the master arm switch on. When he released the bombs, the TER-9As went along for the ride too.



Way back before takeoff, the pilot set up the SCP to jettison the racks and bombs in case of a takeoff emergency. He didn't reselect the "weapon" position again before jettisoning, so the delivery system did what he told it to do. This is a case of having good ideas but failing in execution. Another second to recheck *all* switch settings would have saved a set of racks — and more than a little pride.

SPIT IT OUT

By Capt Allen E. Kohn
63 TFTS/FSO
MacDill AFB, Florida

Failure to communicate precisely led to embarrassment for a pilot on a cross-country flight. He was the number two man in a flight of two F-16s preparing to land from an overhead pattern. A rain shower had just passed over the base and the runway was wet. While in the final turn, flight lead asked tower, "Is the cable in the raised position?" The 10,000-foot runway was equipped with BAK-12 cables approximately 1,200 feet from the approach and departure ends. The approach-end cable was not connected, but the departure-end cable was. Tower's only reply was "Affirmative." Both F-16 pilots interpreted this to mean that the approach-end cable was connected and they would have to land past it.

Number one had to go around because of insufficient spacing behind another flight. Number two landed past the approach-end BAK-12, blew both main tires trying to stop, and ended up in the departure-end overrun. The pilot had executed a normal landing approximately 1,500 feet down the runway. When he lowered the nose at 100 knots and applied the brakes, he felt no deceleration. (Sound familiar?) He changed brake channels but still did not feel the aircraft decelerate. He then called for the cable and lowered the hook, but the hook didn't extend because of a malfunction. As a last resort the pilot turned off the antiskid and attempted moderate braking. That's when the tires blew. Fortunately he was able to get the aircraft stopped while still on a hard surface.

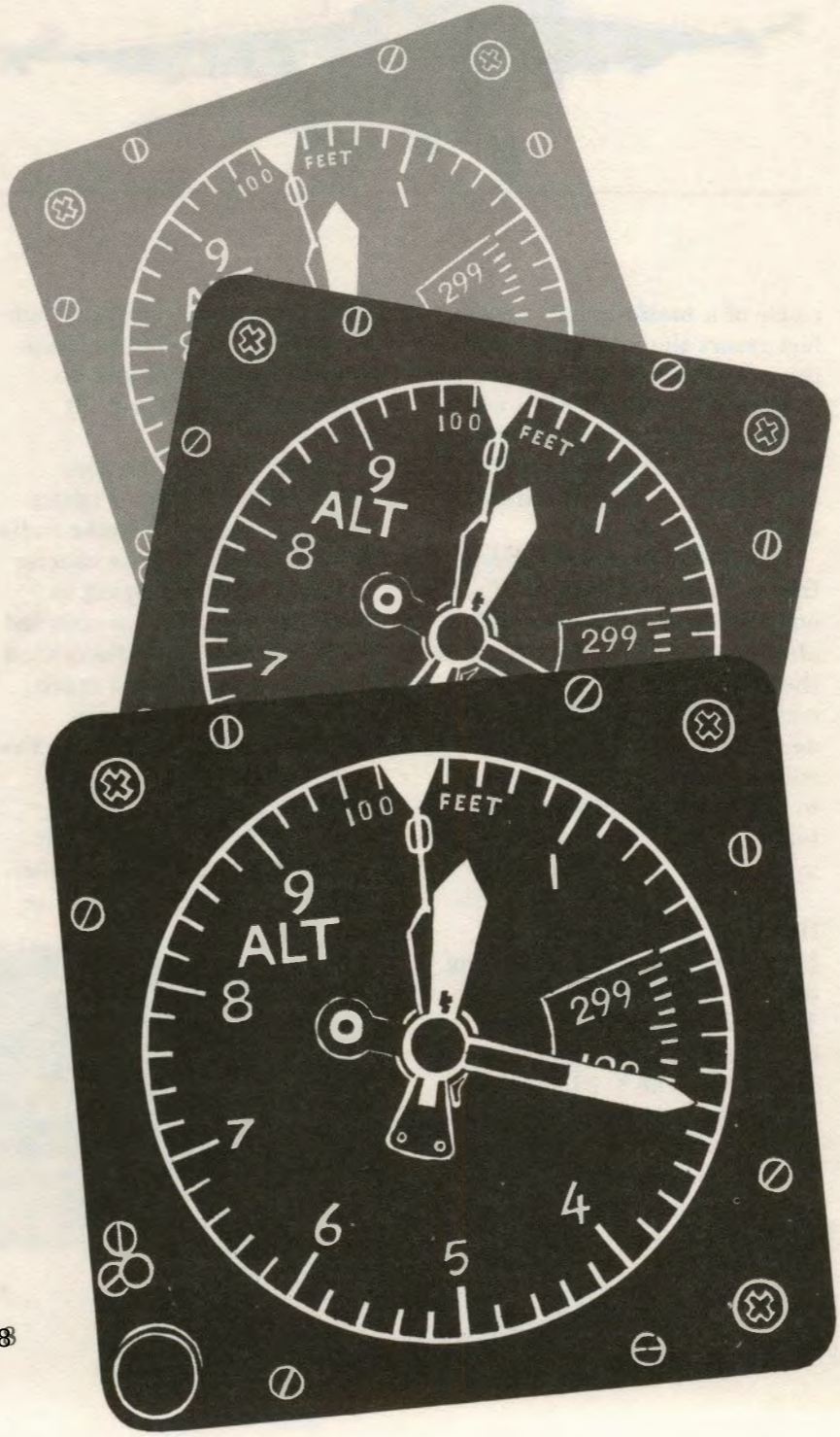
Three factors contributed to this mishap; elimination of any one of them would have probably prevented it. The first was the tail hook failure. The second was the perceived lack of deceleration on a wet, slick runway and the pilot's decision to override the antiskid protection. The third was the communication problem.

As pilots we can do very little about faulty tail hooks. However, we can do something about the other two problems. Turning off a good antiskid continues to be a big problem in the F-4. The F-16, however, has a pretty reliable antiskid system as well as backup antiskid protection. Falcon drivers would be wise to give the antiskid a chance to do its job when landing on wet or slippery runways. Keep in mind that you probably won't feel any deceleration above about 70 knots.

Lastly, there is the communication problem. Fighter jocks are trained to make radio transmissions (R/T) as concise as possible. When flying in large exercises or in a crowded traffic pattern, well disciplined R/T is a must. But too much brevity can result in misunderstanding. Don't make the same mistake; use enough words to get your message across without ambiguity. It could keep you out of the overrun and out of trouble. ➢

Captain Kohn is a 1975 graduate of the University of Michigan. He completed UPT at Columbus Air Force Base, Mississippi, and upgraded to the F-4 at MacDill Air Force Base, Florida. He had subsequent tours in the F-4 at Torrejon Air Base, Spain, and Kunsan Air Base, Korea. While at Kunsan he transitioned to the F-16. Currently he is an F-16 RTU IP at MacDill Air Force Base, Florida.

IT'S ONLY THE STANDBY ALTIMETER



By Capt Edd P. Chenoweth
366 TFW/FSO
Mountain Home AFB, ID

"We won't need it — the primary altimeter looks OK, and the weather shouldn't be all that bad. Besides, we're number two. We won't need one at all." How many times have you heard that about a backup instrument or worse, how many times have you thought those same thoughts?

Recently, an F-111 crew called for a red ball because their standby altimeter indicated well below the field elevation. Good decision. The standby altimeter error was not discovered until after engine start and now takeoff time was approaching. The right engine was shut down and the maintenance specialist handed a new standby altimeter to the WSO. After exchanging the new one for the bad one, the crew compared the primary and standby altimeters. Both indicated field elevation. "Chief, they look OK to me. We're gonna crank up and get out of here." Bad decision. Any work on the pitot-static system requires an extensive checkout before flight to check for leaks. A simple comparison with field elevation just won't hack it.

Here's why: the pitot static

system is a sealed system. A leak anywhere in the line will affect *all* components in the line by an amount proportional to the size of the leak. In crew dog talk, if there's a leak somewhere in the line, then the rest of the system is tango uniform. The bigger the leak, the bigger the error.

The pitot-static system in most jets supports not only the airspeed indicator, altimeter, VVI, and the standby altimeter, but also the central air data computer (CADC). And in the F-111, the pitot-static system also supplies inputs to the translating cowl pressure sensor and the escape capsule's Q-sensor.

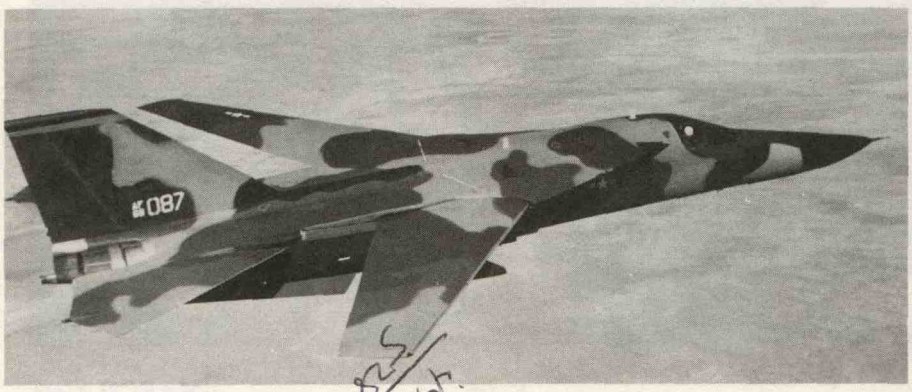
Erroneous CADC data can affect a number of seemingly unrelated systems including IFF, engine fuel control, bomb-nav system, lead computing optical sight, terrain following radar, angle of attack indexer, and several warning systems. Incorrect pitot-static data fed to the Q-sensor for the F-111's escape capsules could be deadly; the flight manual warns, "If ejection occurs in the low speed mode at actual aircraft speeds greater than 300 knots, high spinal loading, serious structural damage, and recovery parachute failure may occur."

A complete failure of the pitot-static system, such as a disconnected line, would be quickly noticed. But a slow leak could go undetected for several sorties. It's likely that the first indication of a leak could be something that you wouldn't associate with the pitot-static system. A good example might be an engine that compressor stalls while you're turning and pulling the aircraft during some range work. The stall may have resulted from bad CADC data being sent to the fuel control and engine bleeds. Or the ranger's call that your bombs are unscorable at twelve might be the result of false data sent to true airspeed indicator and bomb-nav system. I'll let you build the rest of this hypothetical scenario. Don't forget the landing gear warning, stall warning system, cowls, and AOA indexers.

With all these systems that could be affected by a leak in the pitot-static system, what happened to the crew in this incident? Nothing. Everything worked as advertised even though the pitot-static line to the new standby altimeter hadn't been fully tightened. The surprise was waiting for the aircrew who flew the aircraft on the next flight. This crew took off on the wing for an air refueling mission. En route to meet the tanker, the flight lead noticed a thousand-foot difference between his primary and standby altimeters. He queried the wingman (flying the mishap aircraft) who reported that the altitude on the leader's standby altimeter was correct. It wasn't. The flight lead assumed that his primary altimeter was malfunctioning. The flight changed leads, and climbed to what they thought was the assigned altitude. ATC confirmed that their mode C indicated the assigned altitude. During the rendezvous as they rolled out in trail about two miles behind the tanker, the flight broke out of the clouds and saw they were co-altitude with the tanker.

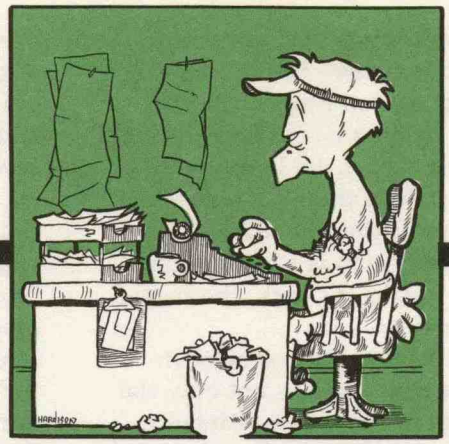
Once on the tanker's wing, the aircrew found out that their airspeed was reading sixty knots slow as well. The original flight lead verified with the tanker crew that only his standby altimeter was in error. So he was able to lead the incident aircraft home.

The moral of this story is if you have to change any component of the pitot-static system, you're gonna be in the chocks a while. Get a thorough check of the pitot-static system for leaks. Don't let anybody, including yourself, convince you to take the jet without the check. As a matter of fact, the pitot-static system isn't the only system this logic applies to.



Captain Chenoweth graduated from Oklahoma State University in 1974 and is currently working on a masters in management. He flew the F-4 in Japan and Korea and has been at Mountain Home Air Force Base, Idaho, since March 1981 as an instructor for the F-111. He's also been wing flight safety officer since January 1983.

LETTERS



Dear Editor

First off, I wish to express my thanks on the outstanding job you accomplish each month, in your publication. I personally learn a lot of interesting facts from your very informative articles. Reading your November issue, I ran across an article that has me really puzzled. The crew chief safety award for Sgt. Delarosa is the article I am refering to. It says: "One time Sgt. Delarosa was completing an intake inspection on an F-16. He didn't find any damage to the engine, but he did smell a strange odor. He asked the aircrew to *shut down* the aircraft . . . ."

Having worked on F-16s a little over two and a half years, I know for a fact that you cannot perform an intake inspection with the engine running. According to T.O. 1F-16A-2-10JG-00-1, you are not to stand any closer than 25 feet in front of or 5 feet to the side of the intake while the engine is running.

I am sure that Sgt. Delarosa is very deserving of this award. Since *TAC Attack* deals with the safety issue, I feel this article should be corrected. Thanks again for the good work you do each month and keep 'em flying.

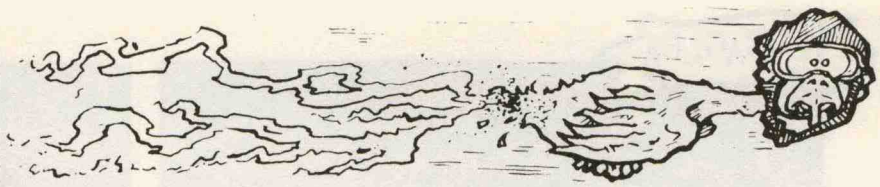
Nancy A. Rittgers, SSgt, USAF
F-16 Crew Chief/431X1
51st TFW/MAEM MT

Dear Sergeant Rittgers

You're correct. When we condensed the story, we inadvertently mixed tenses. The award citation should have said that Sgt. Delarosa completed an intake inspection without finding any damage. But once the aircrew started the engine, he noticed a strange odor coming from the intake and asked the aircrew to shut down the engine. Thanks for pointing out our mistake.

Ed

TAC TALLY



Tac tally

	TAC			ANG			AFR		
	JAN	THRU JAN		JAN	THRU JAN		JAN	THRU JAN	
		1984	1983		1984	1983		1984	1983
CLASS A MISHAPS	2	2	4	0	0	2	0	0	0
AIRCREW FATALITIES	3	3	2	0	0	1	0	0	0
TOTAL EJECTIONS	0	0	1	0	0	1	0	0	0
SUCCESSFUL EJECTIONS	0	0	1	0	0	0	0	0	

TAC'S TOP 5 thru JAN 84

TAC FTR/RECCE	
class A mishap-free months	
50	355 TTW
29	58 TTW
22	4 TFW
19	37 TFW
16	27 TFW

TAC AIR DEFENSE	
class A mishap-free months	
132	57 FIS
85	5 FIS
82	48 FIS
41	318 FIS
32	87 FIS

TAC-GAINED FTR/RECCE	
class A mishap-free months	
141	188 TFG (ANG)
133	138 TFG (ANG)
132	917 TFG (AFR)
110	114 TFG & 174 TFW (ANG)
105	112 TFG (ANG)

TAC-GAINED AIR DEFENSE	
class A mishap-free months	
115	177 FIG
81	125 FIG
64	119 FIG
48	107 FIG
39	147 FIG

TAC/GAINED Other Units	
class A mishap-free months	
174	182 TASG (ANG)
158	110 TASG (ANG)
154	USAF TAWC
146	84 FITS
142	105 TASG (ANG)

CLASS A MISHAP COMPARISON RATE

(BASED ON ACCIDENTS PER 100,000 HOURS FLYING TIME)

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TAC	1984	3.4												
	1983	6.9												
ANG	1984	0.0												
	1983	0.0												
AFR	1984	0.0												
	1983	0.0												

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FLEAGLE
ICE
SLIDE! SLIDE!
BRAKE! BRAKE!
HONK! HONK!
HONK!
HARRISON
KNOCK!
SKID!
GUSH!
©STAN HARRISON 1981
SPLAT!
SPLOP!
OH MY OH MY
OHMYOHMYOH MY
I BACKED UP T'SEE
IF YOU WUZ OK.