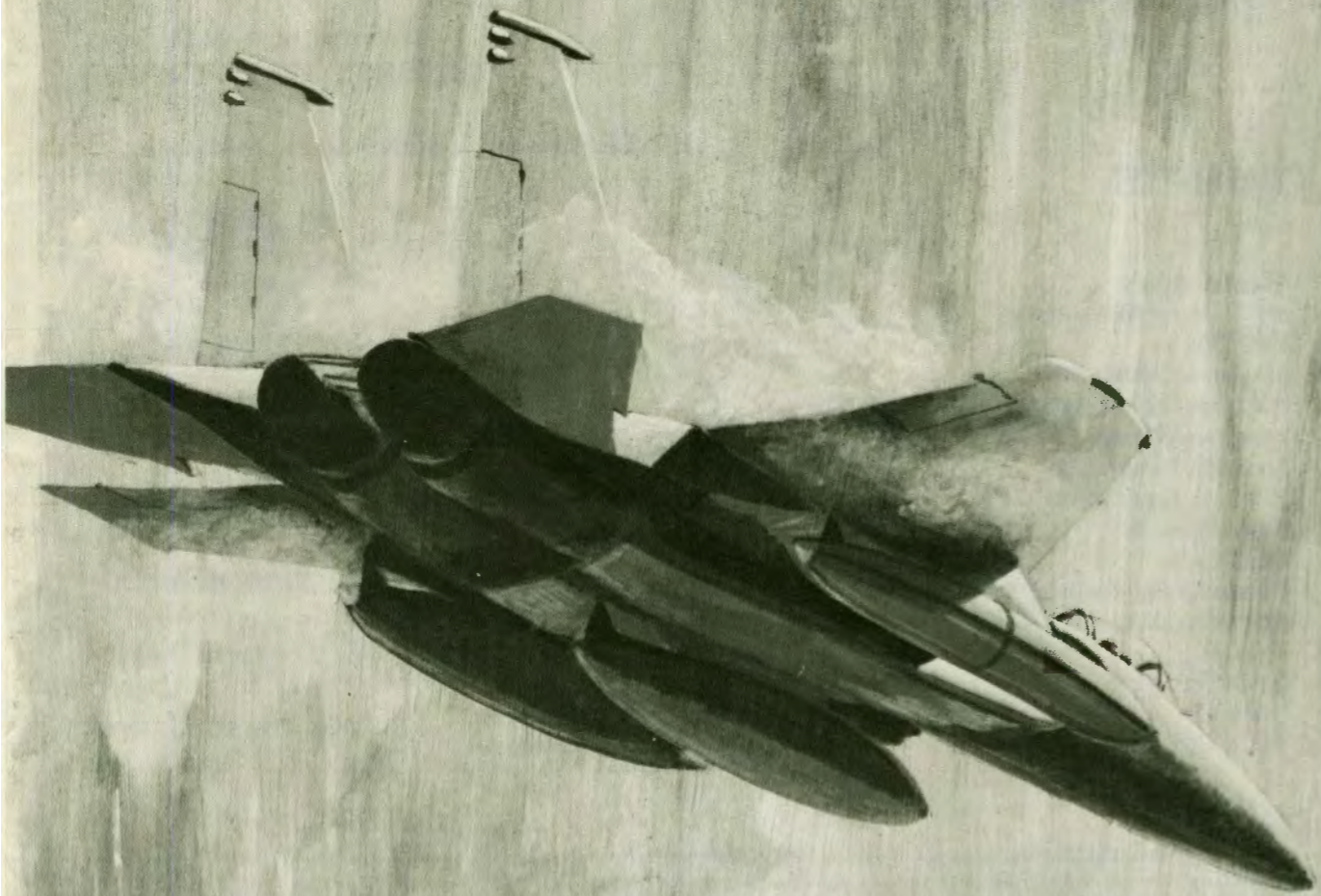
# TAC ATTACK



AUGUST 1981



# AUG


READINESS IS OUR PROFESSION

**TACTICAL AIR COMMAND**
**GENERAL W. L. CREECH**
*COMMANDER*
**LT GENERAL THOMAS H. McMULLEN**
*VICE COMMANDER*

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TACRP 127-1



TAC ATTACK (USPS 531-170) is published monthly by HQ TAC/SEPP, Langley AFB, VA. Controlled circulation postage paid at Richmond, VA.

POSTMASTER: Send address changes to TAC ATTACK, TAC/SEPP, Langley AFB, VA 23665.

VOLUME 21 NUMBER 8

# Angle of Attack

The hot, humid days of August are sometimes called the "dog days." The name probably comes from the effect heat has on dogs, or maybe from the "dog star" Sirius. In any case, it's hot and muggy. I hope you can take a break and cool off and, while you're at it, read some ideas that may help make August more bearable.

For Fleagle, the dog days (like any other time) mean trouble. This time, by jury-rigging his homemade cooling system, Fleagle brings on his own hurricane season. He's lucky it wasn't worse; with all that wiring around, he could have electrocuted himself. "Ohm's Shocking Law" in *Down to Earth* explains how dangerous electricity can be.

A FOD incident will make any day doggy. Take a look at *Chock Talk* and you'll find a couple of lessons on FOD that are worth reviewing.

Heat, humidity, and hard work can make us dog-tired. Controllers and pilots should consider the effects of "Controller Fatigue and Flying Safety." As a matter of fact, all supervisors should think about the effects of fatigue on the people who work for them.

Aircrews will enjoy reading "Stickbanger Rides Again," a lighthearted look at a serious subject. And anyone in a two-seat airplane should appreciate "That Still, Small Voice" of the WSO.

Don't let the dog days drag you down.

Richard K. Ely

RICHARD K. ELY, Colonel, USAF
Chief of Safety

# Stickbanger Rides Again

**By Major Kenneth P. Wicks**
**154th Comp Gp**
**Hawaii ANG**

Those of you who were readers of the *PACAF Professional* before its demise in 1975 will remember the exploits of PACAF's most fearless ace. (Yes, he had five to his credit—all ours!) The last time we saw ol' Harvey Stickbanger he was shoveling snow in Alaska as the base commissary officer at Icepick AFS.

Then the powers-that-be at MPC decided we need experience in the cockpit to lead the young troops into combat at Red Flag and Cope Thunder, so they punched a button and the computer spit out Harv's name. It was probably meant for the other file, the circular one. Anyway, Harv headed for Deep South AFB in the heart of the sun country.

As we pick up our hero, he is preparing for a BFM mission. Transition, advanced handling, and formation had been a piece of cake, but he had a little difficulty in BFM. All the IP's fault; something about regulations and ROE. He thought that stuff was just for new guys.

Harv was scheduled to repeat a BFM mission. On his last ride, one of the IPs had pinked him for doing a barrel roll underneath into a cloud deck to avoid getting gunned by Rick Stick, boy fighter pilot. The IP mumbled something to Harv about ROE, clouds, and "knock it off, we're going home." It wasn't like the old days. "Sure, we lost a few then, but you gotta expect some losses," said ol' Harv.

Today, Harvey had a plan. During the years of watching the food locker at Icepick AFS, Harv had conceived an ironclad, armor-plated, fully guaranteed guns break that no one could follow him through if he ever got a chance to try it in the air. Today was the day. That combination whipstall, snaproll, vertical whifferdill would be Harv's ace-in-the-hole after he trapped the bad guy at his six and suckered him in for a gun shot. He was tired of being on the wrong end of the "Fox three" calls. After his magic guns break, the bandit's only recourse would be an overshoot, and then a "splash," to use an old air defense term.

Harv had planned well, except that his maneuver fell into the not-to-be-done-by-anyone-but-test-pilots-and-John-Wayne category. He didn't mention anything about the maneuver to his IP for this flight, "Smilin' Jack" Smooth, the "007" of the IP force at Deep South. Jack flew Thuds and F-4s in the "big war" and had been an IP and the head of Stan-Eval at Deep

## MAJ WICKS IS THIS MONTH'S FLEAGLE T SHIRT WINNER

South AFB for two years. The squadron commander felt that Jack could handle Harv's misplaced exuberance and, if necessary, apply the well-placed two-by-four to get Harv's attention.

As we said, the ride was a repeat of his last encounter with Rick Stick, his wingie and fearless adversary. Aside from a who's-really-got-the-lead takeoff and a couple of abrupt turns into Rick, the flight was progressing better than Jack had expected, a pretty tame BFM hop. Jack started to relax, and then it happened. The two had set up for a "cap-n-tap," and the boy fighter pilot had gotten himself trapped at Harv's six (right where Harv wanted him).

All this time, Smilin' Jack is calling out ranges: "Four thousand feet. Three thousand, and forty degrees off. Two thousand feet, and twenty degrees off—he's moving into the plane. Jink!" Harv let out a blood curdling scream and bunted over to minus 3 G's, rolled, and reefed in 6 positive G's, still screaming. (That Kung Fu training really helped his concentration.) Jack, through dimming vision, hollered, "Stickbanger, what're you doing? Don't—"

It was too late. Rick shot past; and Harv, with fangs bared, was going in for the kill. "Not bad," Harv thought. He had gone from minus 3 G's to plus 6 G's in less than a second. The bird pitched up 30 degrees, departed, rolled inverted, and paused as Harv still attempted to pull lead on Rick. Jack continued to holler: "Stick forward—I got it—knock it off! Oh crap! Harv, deploy the drag chute. Oh crap!"

In the middle of all this, Harv called, "Fox Three! Oops—I guess I did it this time."

The aircraft entered a series of post stall gyrations and Harv popped the chute at 16,000 feet on his second try for the handle. Unfortunately, the handle missed the detent; and the chute came all the way out, bag and all! Jack saw the needle full left as he finally got control of the bird from Harv. (Jack said that the spin looked just like that McDonnell movie, and you could just about follow his commentary in chapter six of the Dash One.)

At 11,000 feet, with around 250 knots, the aircraft unloaded and threw Harv into the canopy. Scared him to death. He hadn't strapped in tightly because he wanted to be able to move around. He did—all around the cockpit. He thought they had gone into an inverted spin. When he got back into the seat, he grabbed the lower handle and hollered, "Let's get out!" (That's Stickbanger for "Eject.")

Jack screamed, "No, it's OK!" He was talking to himself. Ten seconds later, his chute opened; and he saw their aircraft hit, wings level and about 30 degrees nose down, in 8,000 feet of water.

Jack didn't have any trouble getting his gear deployed; it was just like parasail training. The water entry was a piece of cake.

Harvey wasn't so fortunate. He had problems unhooking his mask because of the beatings the clips took when he was slammed around the cockpit. He took off his helmet to get rid of the mask. No luck; so he put the helmet back on. His survival kit hadn't deployed; it was in manual. The kit was so loose he could hardly reach the handle to deploy it.

Harvey had gotten so preoccupied with his mask and survival kit that he almost forgot his LPUs. In fact, he couldn't find the lanyard knobs before he hit the water. He got tangled in the chute and had trouble keeping his head above water. After trying to blow up his G-suit and drinking half the ocean, he finally got his LPUs inflated.

Harvey climbed into his raft which had been bobbing 25 feet away, and he waited for the chopper. The chopper arrived and Harv popped a Mark 13 Flare. Oops! The wrong end, the one with all the bumps! "Gee, that thing's hot!" Harv tried to throw it into the water because it was burning his hands. He had forgotten the lanyard that tied it to the survival kit; the lit flare landed at his feet and burned a hole in the raft. Harv was back in the water again.

Well, from there the SAR went like clockwork—after the PJ jumped in to help. You see, Harvey tried to get into the sling while he was still hooked to his submerged raft and survival kit; so he was pulled back into the water.

The discussion of the mishap afterwards centered on terms like pitch rate, experience, overconfidence, and not paying attention during life support training. Harv got washed back a couple classes while they reconsidered the decision to put him back in the F-4. He was DNIF, anyway; he'd gotten swimmer's ear. from being underwater so long.

Looks like that rated supplement tour as commissary officer in Alaska almost did him in: He spent too much time in the food locker and froze some brain cells.

*EPILOG: These things really happened, but not all to one guy. I found out a while ago that there's a little Harvey Stickbanger in all of us intrepid fighter types. Most of us got away with the "yahoo" without breaking a bird, getting it broadcast, or getting written up. I hope we learned from the experience. The files at AFISC are full of reports of guys who weren't so fortunate. With the whims of the magic MPC computer, who knows where Stickbanger might show up next: in an F-15, A-10, A-7, or maybe back in a T-bird.*

# TAC TIPS

Tac Tips

...interest items, mishaps with morals, for the TAC aircrewman

Good judgment comes from experience, and experience comes from bad judgment.

—General Omar Bradley

## A GOOD DECISION

During a 5-G tactical turn at low altitude, the nose cone came off the F-16's left external tank. The wingman saw a fireball come from the left wing area, and he called, "Knock it off." The pilot began a climb and checked his fuel: his totalizer had decreased from 2,300 pounds to 800 pounds. Because he was unsure of the nature of his problem, the pilot decided to land at a nearby emergency field where he made a successful arrested landing.

It turned out that the fuel probes were damaged when the nose cone separated. So maybe he had enough fuel to go home. But he made a better decision in landing. We're always better off finding out that we could have made it after we've safely aborted than finding out we couldn't halfway home.

## WHODUNIT?

An instrument technician left masking tape on the A-7's cockpit static ports. The crew chief did not check the static port on his preflight as he should have according to his tech orders. The pilot didn't check it on his walkaround as his checklist says. On the runway during engine runup, the cockpit overpressurized and shattered the canopy glass.

So who's responsible? Guess you have to stand in line to take credit for this one.

## "... I'M TEN MILES NORTH OF THE SPHINX"

If you're flying in Egypt, as some of us do on occasion, be careful of your references when you talk to air traffic control. Civilian air traffic controllers in Egypt work without radar and use only civilian navigational aids as references. If you give your position relative to a military navaid, you're likely to be misunderstood.

It happened recently to an aircraft from another command. The aircrew gave their position relative to Cairo West military TACAN, which the controller understood as Cairo VOR. The result was a near miss with a civilian aircraft.

Come to think of it, the problem isn't restricted to Egypt. How about here in the States? Have you ever been navigating with the high altitude chart while talking to a controller who's referring to the low altitude chart? or been flying off the Bergstrom TACAN when the controller thought you were on the Austin VORTAC? or the D-M TACAN instead of the Tucson VORTAC? The problem is universal: we've got to be on the same wavelength to communicate.

## WHERE'S YOUR WALLET?

**By Major Gary Porter**
**HQ TAC Flight Safety**

Recently, some of our aircrews have suffered injury, occasionally severe, because they carried articles in their flight suit chest pockets. When they ejected, these articles caused bruises and even broken ribs as the harness chest straps pressed against them. There is no prohibition against carrying objects in your chest pockets, only the dictates of common sense. Ejection, however, even at relatively slow speeds, results in significant forces during chute opening. Of course, we don't go out to fly intending to eject, but taking a few moments to transfer keys and wallets to your locker might prevent some painful injuries—just in case.

## BE WARY OF WIRING

The F-104 was on a low angle bomb pass, planning on a 400-foot release. After release, as the pilot attempted to pull out of the shallow dive, the airplane began to oscillate in pitch. The pilot considered ejecting from the aircraft, but he realized he was out of the ejection envelope; so he stayed with it. He overpowered the pitch inputs, turned off the auto pitch control, and pulled out, bottoming at about 100 feet above the ground.

After much investigation, the maintenance troops found the answer in some cracked and broken wires in the stab trim actuator and pitch servo disconnect. When the pilot began to pull out, the increase in G-loading separated the pitch servo disconnect wires. That resulted in a rapid pitch movement, which caused the "stick kicker" to reduce G-loading. The reduced G allowed the wires to reconnect, and the pilot reapplied the G's, which started the whole sequence over again. The oscillations finally quit because the pilot reduced the G-load after pulling out.

There's some food for thought here: First, the pilot had obviously thought about his ejection envelope before hand; he didn't have time to mull it over when it happened. Have we all thought about the times when we are flying outside of the ejection envelope for our aircraft?

The second point worth thinking about concerns broken wires. Have you ever had one of those strange problems with an airplane that seemed to fix itself during the flight? Did you write it up? If it's bad wiring, it may go away; but if we don't write it up, it may return to haunt us at the worst possible time.

# TAC TIPS

## MAGICAL VERSUS MECHANICAL FLIGHT CONTROLS

An F-15 was making a 30-degree-nose-low conversion at 400 knots. The pilot pulled back on the stick and nothing happened. He pulled the power to idle and continued to hold the stick full aft. The airplane's nose moved ever so slowly back up to the horizon. The pilot aborted the remainder of the mission and landed safely out of a straight-in approach.

This appears to be a case of the electronic magic in the flight controls fighting against the basic hydromechanical system. The hydromechanical system eventually won the battle; and he pulled out, but not very quickly. If he had been at lower altitude, he may not have been able to wait on a slow pullout.

By now, Eagle drivers should have received a safety supplement which addresses the problem.

## F-106 BLOWN TIRES

Two recent incidents in the F-106 show that it's possible to apply the brakes without intending to. Even with your heels on the floor, you can inadvertently hit the brakes if you put in a lot of rudder and you happen to adjust the rudder pedals closer to you than the average pilot. The amount of braking is enough to lock up the wheel at landing speeds when the aircraft weight isn't fully on the main gear.


The way to avoid it is to adjust the rudder pedals close enough to get full rudder and brake authority, but no closer. And then be sure to keep your heels on the floor until you mean to brake.

## SAVE THE SCHEDULE

The F-4 squadron was on a weather hold during a planned sortie surge. An hour and 25 minutes after their scheduled takeoff time, the aircrew finally arrived at their airplane. They and the crew chief knew they had to be rolling in 35 minutes to avoid a schedule deviation. Then the pilot noticed that the emergency brake accumulator was reading 3,000 psi. He asked the crew chief to bleed the system. The crew chief pulled the emergency brake handle and pumped the brakes until the pilot told him the gage was at 1,000 psi. The crew chief climbed out of the cockpit, failing to reset the brake handle. The pilot finished his preflight, started up, and taxied out to the arming area before he realized that the emergency brake handle was pulled. He placed the handle back in its receptacle and mentioned to the WSO that the quick-check crew would have to reset the brake. They now had 8 minutes in which to takeoff without getting the schedule deviation. They forgot about the brake as they concentrated on making their takeoff on time. They took off just in time.

When they came back to land, the runway was wet. After touchdown, the pilot applied heavy braking, expecting the anti-skid to work; instead, both tires blew out. The pilot kept the F-4 on the runway, confining the damage to the tires and wheels.

Everybody seems to have been infected with an out-of-balance sense of urgency. The crew chief hadn't expected the weather hold to be lifted that soon; when the aircrew showed up, he rushed his preparations. The pilot rushed his cockpit check and overlooked the emergency brake handle while he was in the chocks. In the arming area, the distracted aircrew forgot to ask the ground crew to reset the brake. All for the sake of the printed schedule.

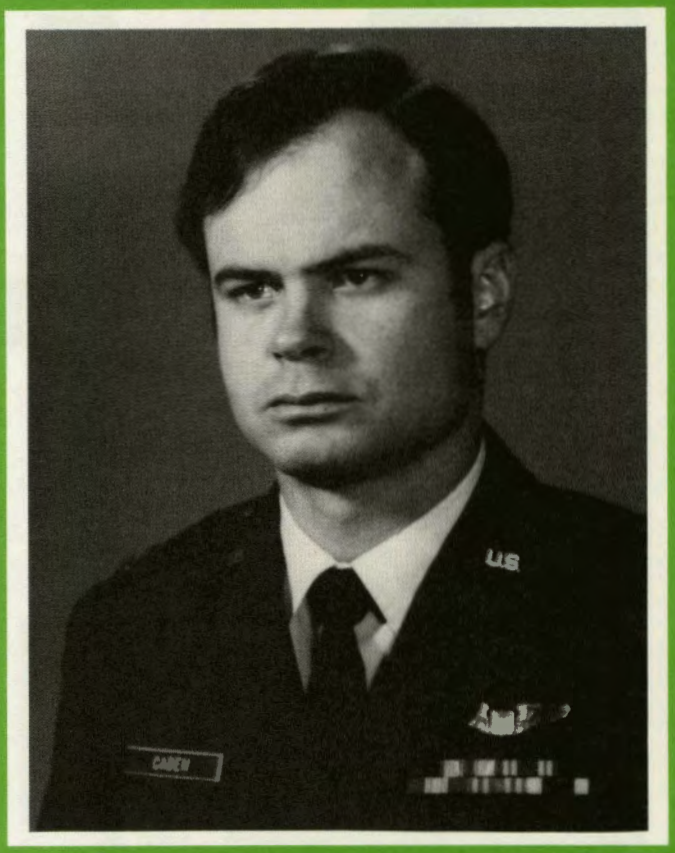
Maybe next time we'll use "all deliberate speed." The price of frantic speed is too high.

## VISIBILITY REPORTS GO METRIC IN EUROPE

If you're headed for Europe this fall, look for a change in the way prevailing visibility is reported to you. Local reports of prevailing visibility will be in meters instead of nautical miles. The date for the change is planned to be 29 October. That's also when FLIPS should have the approach minima published in meters.

Runway visual range (RVR) will continue to be reported in hundreds of feet. Stateside, there's no change: prevailing visibility will still be in statute miles.

# AIRCREW OF DISTINCTION



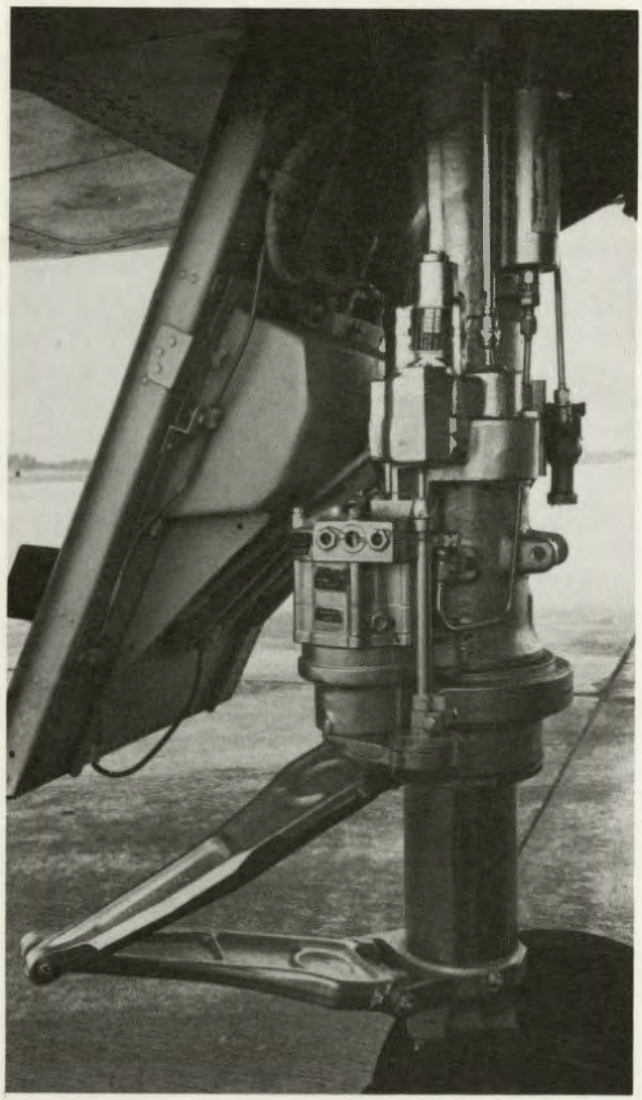

**Capt Michael J. Cadem**
**34th TFS, 388th TFW**
**Hill AFB, UT**

On 5 March 1981, Capt Michael J. Cadem was leading a flight of two F-16s performing a surface attack and low-level navigation student training mission. Five minutes into the low level profile, the aircraft hydraulics/oil pressure warning light illuminated; oil pressure was observed fluctuating between 10 and 20 psi. Captain Cadem immediately set the power at 80 percent RPM and began a zoom climbing turn to the nearest emergency airfield, 15 miles away. Within 10 seconds, the engine oil pressure dropped to zero. Captain Cadem skillfully adjusted his simulated flameout (SFO) pattern to accommodate minimum-G maneuvering, no throttle movement, and a 5,000-foot overcast. in spite of these limitations, he made an uneventful SFO landing at the remote, uncontrolled airstrip. Later investigation showed that the aircraft flew for 4 minutes at zero oil pressure without lubrication to the engine's number 4 bearing compartment; 15 percent of the oil supply remained at landing. Engine seizure was imminent.

Captain Cadem's precise analysis, quick reaction, and skillful execution of a modified simulated flameout pattern at a strange field saved the Air Force a valuable aircraft and prevented possible loss of life. His superb airmanship qualifies him as Tactical Air Command's Aircrew of Distinction.

# F-4 Nose Wheel

**By Captain Larry Wilder**
**Flight Safety, 363 TRW**



1.

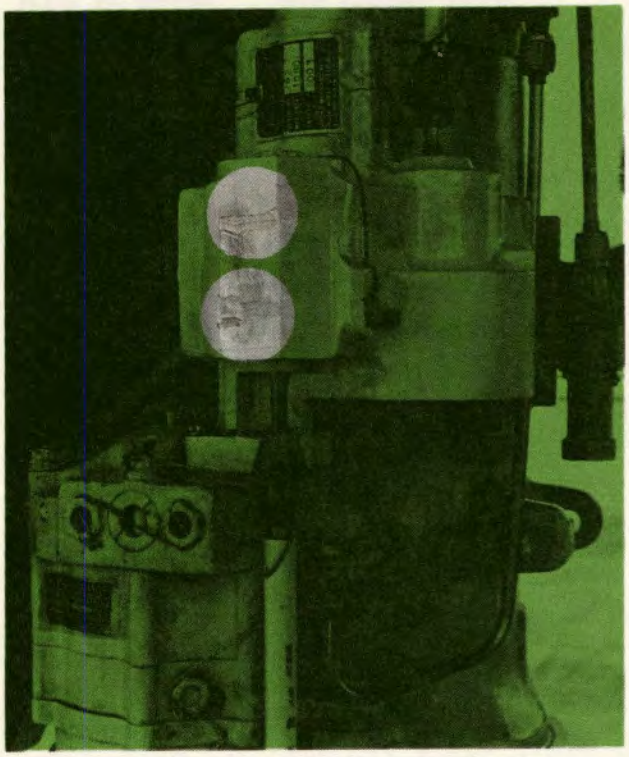
Your flight has gone very well. As the flight nears completion, all that remains is that *routine* landing back at the local air patch. Back in the pattern, you configure your Phantom for landing. Suddenly the WSO calls out the illuminated master caution light. You glance at the warning lights panel and then notice the utility hydraulic pressure has dropped. Another quick glance; the pressure is back in limits. You continue on and land, glad to be home again. The drag chute deploys, and the WSO again calls out the illuminated master caution light. You see the utility hydraulic pressure fluctuate and then suddenly drop to zero. Panic sets in as your normal turnoff taxiway passes by in a blur. You pull the emergency brakes and stop just short of the departure barrier.

Does this situation sound familiar? You don't expect it to happen to you? Don't count yourself out too early. Many aircraft in the F-4 fleet are now modified with TCTO 1154, which replaces the nose wheel steering system with a new hydromechanical unit. With this modification, there are a few items you should pay particular attention to on your exterior inspection. Unless you learn to recognize the warning signals, you may well find yourself in the situation described above.

Next time you go out to your Phantom for a preflight inspection, pay particular attention to the nose gear strut. If your aircraft has been modified by TCTO 1154, you will instantly recognize the new nose gear steering manifold, the input and feedback rods, and the absence of the electrical connections. (Photo 1). The manifold sits on the left side of the nose gear strut.

Notice that the left side face of the manifold has a flat surface. Check this flat area carefully for signs of nicks, scratches, or gouges (Photo 2). Evidence of nicks, scratches, or gouges indicates that adequate clearance does not exist between the manifold and the brake control filter assembly in the gear well when the nose gear is retracted. This could be due to the different sizes of the nose gear wells, although they vary only by fractions of inches. During a normal gear re-

# Steering

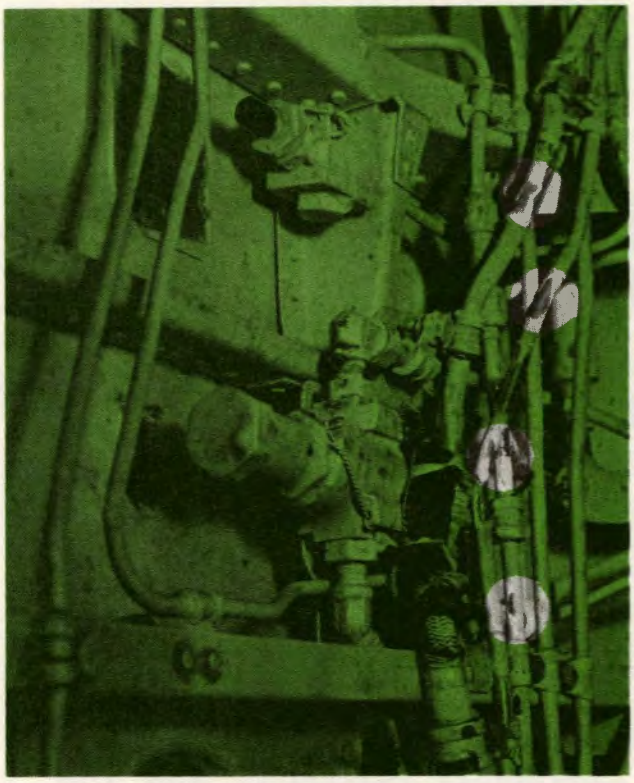


2.

traction, the nose gear actuator pulls the nose gear up and slightly to the right as the gear enters the wheel well. This should provide the necessary clearance (fractions of inches), if proper installation of the manifold was accomplished during the TCTO kit installation. If, however, the clearance is not sufficient, you will see the signs of contact on the manifold surface. This should cue you to check up in the nose wheel well. Check the left side in the mid section area and you will find the brake control filter assembly. There are two bolt heads which extend from the top of the brake control filter assembly. These bolts may be causing the trouble. Signs of chafing may also be found in the area surrounding the filter assembly (Photo 3). The manifold assembly occupies this area when the nose gear is retracted.

The depth of nicks, scratches, or gouges we are talking about is measured in thousandths of inches, but they will be clearly visible when present. Although there may be no chafing or rubbing during installation

3.



checks, any amount of vibration during later gear retractions could cause chafing or hammering in the area of the brake control filter assembly.

The importance of early detection is obvious. If left undetected, this continual rubbing could result in a broken hydraulic line to the brake filter. This would result in the eventual failure of the utility hydraulic system. If you find any of these warning signs, call it to the attention of the crew chief and line supervisor. Have the mentioned area thoroughly inspected prior to flight.

Now for the good news: The new system operates entirely on 28 volt D.C. power supplied from the right main 28 volt DC bus. During situations when the left generator is out with the bus-tie open, the right generator will supply power to the right transformer rectifier. Power is then directed to the right main 28 volt DC bus to power the nose wheel steering. Although we now will have nose wheel steering under the left-generator-out-bus-tie-open situation, it is probably still a smart idea to take the barrier. At the present time, no formal guidance on the electrics portion of TCTO 1154 is in print for aircrews. Operational supplements will continue to expand information on nose wheel steering system operation and section III emergency procedures affected by incorporation of TCTO 1154. In the meantime, let your systems knowledge, experience, common sense, and the individual situation determine your exact course of action.

# WEAPONS WORDS

## EXPLOSIVES COLLECTING FOR FUN AND PROFIT

**By Capt Kenneth D. Pesola**
**HQ TAC Explosives Safety**

Stolen military explosives were directly involved in the serious injury of a boy a couple of years ago. While playing on base, the youth found and picked up a 40mm high explosive grenade. The device detonated in his hand.

Then there was the firearms dealer who was indicted for conspiring to transport stolen ammunition across state lines. Another time, the FBI uncovered more than 15,000 pounds of weapons and ammunition stolen from military stockpiles. Five years ago, a sheriff's department discovered tons of weapons, ammunition, poison gas, napalm, grenades, and other military-procured ordnance. The stolen military equipment could have effectively armed a 200-man military company.

Not all munitions are pilfered for profit. Most ordnance illegally acquired from the Air Force becomes a "war souvenir." It's also unfortunately true that youthful curiosity has needlessly added to the death and injury toll. Civil War cannonballs and rifle ammunition are still frequently being found by children and by avid adult memorabilia collectors. Did you know that 1860 vintage cannon ammo contains up to 15 pounds of chemically unstable black powder? The inadvertent detonation of one of these devices could cause an explosion of original-design intensity and result in death and injury to exposed family and friends.

Here are some facts worth thinking about:

- Explosives can detonate at a velocity of almost 25,000 feet per second. An even higher velocity is obtained when the device is encased, such as a round of 20mm ammunition.
- Explosives such as blasting caps, ammunition, and firecrackers if exploded accidentally can and often do lead to the loss of an eye or limb.
- Black powder, used primarily in Civil War ordnance, firecrackers, and as a propellant, can be so sensitive that the friction created by handling can cause it to detonate.
- Blasting caps can be exploded by the static electricity created by a radio, or even the touch of an ungrounded person.
- Federal and state laws prohibit the sale of blasting caps and black powder, or the storing of these items. These laws also strictly forbid the possession of explosive or incendiary ordnance. Violations are punishable by fines up to $10,000 and ten years imprisonment.

Remember that explosives were designed to destroy. It's tragic that so often this effect occurs inadvertently to friend instead of foe.

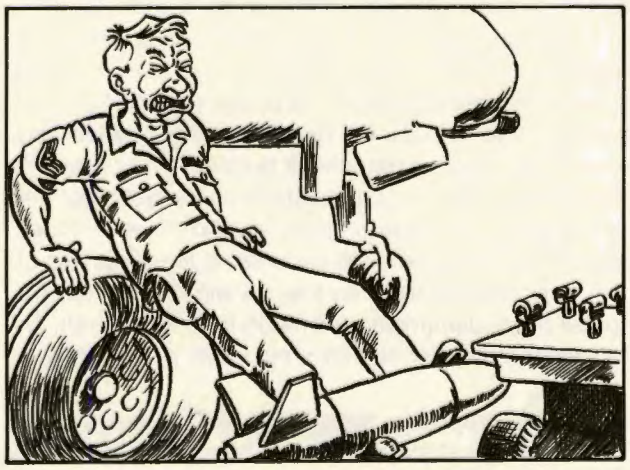
## EJECTOR FOOT COSTS A FOOT

The F-4 flew a normal weapons sortie, carrying six inert 500-pound bombs. Everything went well, and the airplane was scheduled to carry the same load the next time it flew. After the first mission, a weapons load crew did the required postflight inspection of the MER. They removed, cleaned, and reinstalled the ejector feet, pistons, and breeches. However, during reassembly, one of the ejector feet was put together wrong. Its locking collar was installed 90 degrees out of locking position, which caused the whole assembly to protrude about half an inch below the bomb rack. This meant there wasn't enough clearance to properly lock a store on the ejector rack.

Before the next flight, a different load crew came out to upload six more inert MK-82 bombs. As the load crew chief checked the aircraft safety devices, the number two crewmember did the centerline rack preparation. While preparing the rack, he failed to notice the unlocked ejector assembly. So they began loading.

The number three crewmember drove the MJ-1 bomb lift truck. The number two man held the aft end of the bomb by the fins to help stabilize it and guide it into the ejector rack. The crew chief, using the bomb lift's hydraulic table controls, made the final adjustments to align the bomb in the rack. But on that particular bomb station they ran into trouble; they couldn't get the bomb up into the rack. The crew chief finally managed to get the aft lug into the rack; then he increased the hydraulic pressure to force the front end up into the rack.

Between the force of the bomb lift coming up and the resistance of the protruding ejector foot, something had to give way. It was the bomb. It began to slide off the bomb lift table. The load crew chief tried to hold the bomb on the table; no way. The 500-pound bomb overpowered him, and as he scrambled to get out of the way, it fell and crushed his foot.

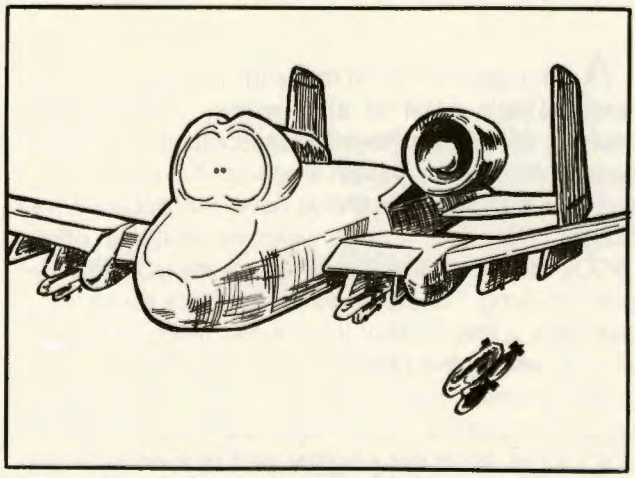


The injury could have been prevented by several people. The first load crew could have installed it correctly, the crewmember who prepared the rack could have noticed the error, or the crew chief could have stopped loading to see what was wrong. Any one of them could have prevented it—but none of them did.

## AN ERROR IN LOGIC

Weapons release circuits have supposedly gotten smarter. They now have built-in logic which tells them what kind of store is on a given station and how to release it. That way, the airplane knows when it has a rack of bombs on a station instead of a single bomb; otherwise, it might release the whole rack like a single bomb. But the systems logic is like human logic: if it gets the wrong information, it comes up with the wrong answer.

An A-10 recently went to the bombing range with four bomb racks, each holding three BDU-33 bombs. It came back with three bomb racks and no bombs. The airplane had dropped one bomb, as it should have, on each of the first nine passes. On the tenth pass, it



dropped a whole bomb rack with three bombs on it. Probably didn't get a very good score since a rack of three bombs doesn't have ballistics like a single bomb.

It turned out that a wire had become disconnected in that station. That wire's job was to let the release system know it had a rack of bombs on that station, not a single bomb. With the wire broken, the system never got the word. Thinking there was just a bomb on the station, it released the whole thing.

It makes you think, doesn't it? A missing bit of information ruins the logic of the whole system. Don't you wonder what effect it has on our system when we don't provide the right information?

**By Capt Richard A. Henry**
**Instructor Weapons System Officer**
**USAF Interceptor Weapons School**

A lot of people look at my wings and call me a navigator. That's a bit of a misnomer. These days I couldn't complete a celestial precomp if my life depended on it; but I can plan a pop-up, run an intercept, and do a hundred other things never mentioned in Nav School. You see, I'm a weapons systems officer (WSO), an F-4 backseater, and I like my job. After five years of flying "Double Ugly" I figure it's about time I give back a little of what the F-4 has given me. That's why I'm writing this article.

My purpose is to put the job of the WSO into a proper perspective. Let me begin by telling you what a WSO is not. He is not a fighter pilot or even an assistant fighter pilot. What a WSO is, is a fighter pilot's assistant. A good GIB (guy in back) is worth his weight in aircrew aids; a bad GIB is a poor trade for JP-4.

Having called a GIB an assistant, inferring that he is something less than a fighter pilot and thereby infuriating 99% of the "pitters" reading this article, let me forge ahead, explain "what the captain really means," and, I hope, redeem myself in the eyes of that half of the F-4 community.

Although not a fighter pilot, a Weapons System Officer is still a highly challenged and indispensable part of the F-4 weapons system. The effective employment of an F-4 in each of its varied missions demands two highly capable crewmembers, not just one. A WSO must, while flying at very low altitude, be able to navigate his aircraft to a target hundreds of miles away. En route to the target, he must keep track of other members of his flight, checking their "sixes" as well as his own. He must recognize and direct reaction to any number of enemy threats along the way. Once in the target area, he must help his frontseater to locate the target and to position their aircraft so they can safely and effectively perform any one of a half dozen weapons deliveries. Leaving the target area and heading back home, he may be called upon to keep tabs on a "furball" while his nose gunner screams for a quick stab-out lockon and hard-maneuvers "Double Ugly."

To do his job, a good backseater must know far more about the front seat of an F-4 than a good frontseater needs to know about the rear cockpit. He must be able to back up his AC on the position and function of every switch, circuit breaker, and control in the front seat. He must understand every system of the F-4 to assist in "analyzing the situation" when those systems fail. And, he must understand the principles of high performance flight so that he will know when his frontseater is demanding too much from the aircraft, either against Mother Nature's elements or Uncle Ho's nephews.

There is one more remarkable thing about a good GIB: he is a product of UNT, a program not geared to

# ". . . THAT STILL, SMALL VOICE"

turning out capable crewmembers of high performance, fighter aircraft. Fighter lead-in training and RTU add polish to the rough edges, but even they often fall short. Much of what a WSO learns he learns the hard way, through many hours of self-study and many embarrassing questions and even more embarrassing mistakes. A GIB must have thick skin because he'll take his share of hits before he finally "arrives." And "arrive" he will; the day will come when he commands respect without demanding it.

And that brings me to my final and most important point in this article: a good GIB must be very careful how, when, or where he demands anything. More to the point, he must be a fairly decent psychologist. He must be capable of effectively communicating with another human being who has, by necessity, an abnormally large ego—a self-confidence that enables him to perform tasks that any human being with a normal ego would consider impossible even before attempted. I don't mean to infer that fighter pilots are egomaniacs; I simply believe that if "faint heart never won fair maid," it stands even less chance of conquering an F-4.

Armed with extensive expertise, a good GIB must be able to communicate essential information at the right time and in the right way to gain the desired result, the safe yet effective conduct of the mission. He must be able to assist his AC without alienating him. He must be able to tactfully hold in check a fighter pilot's ego when that ego is about to push twenty tons of F-4 beyond the limits of aircraft or aircrew. He must be able to influence his AC to choose discretion over valor when valor approaches that thin line separating it from stupidity. He must help his frontseater avoid tripping over a fighter pilot's ego at 500 knots, a *faux pas* that is not only socially unacceptable, but can also be noisy as hell. In short, a good GIB must ride four feet behind a fighter pilot and through the magic of the HOT MIC be ". . . that still, small voice" of reason and sanity in a high speed, frightening world.

# TAC & TAC GAINED LOSSE
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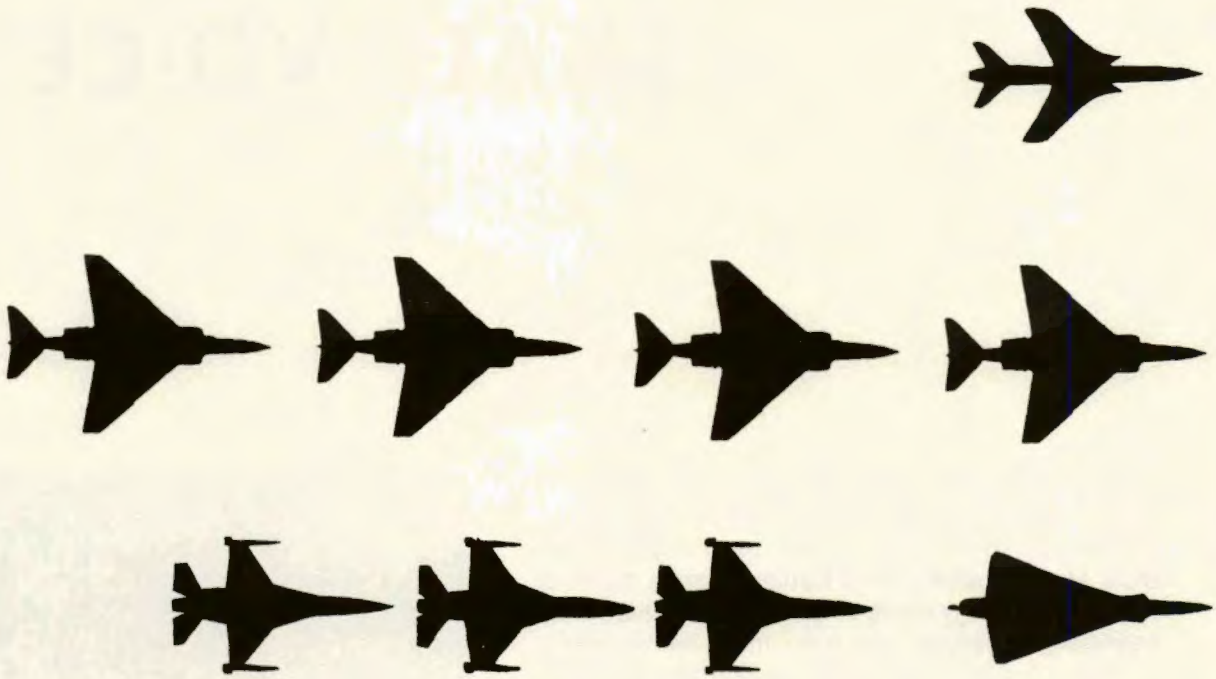

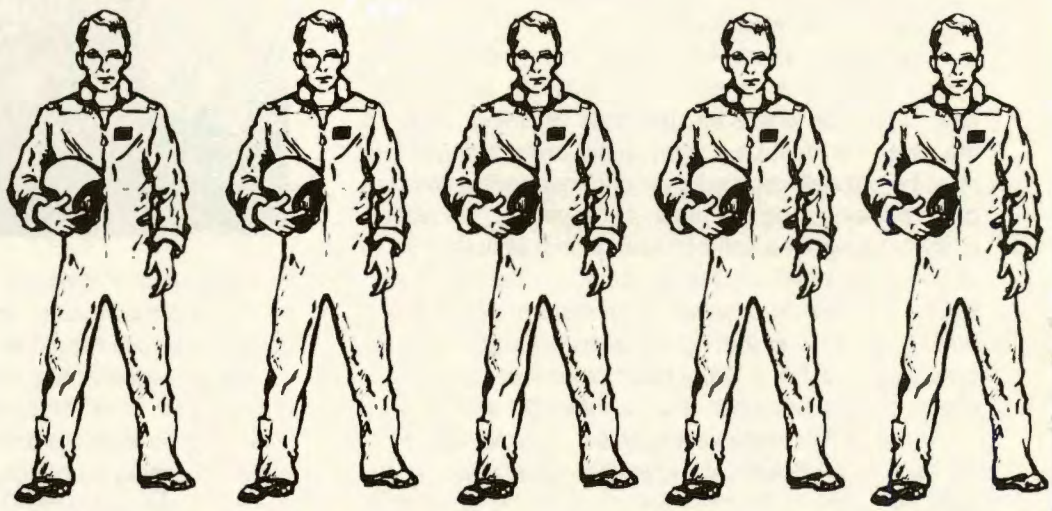

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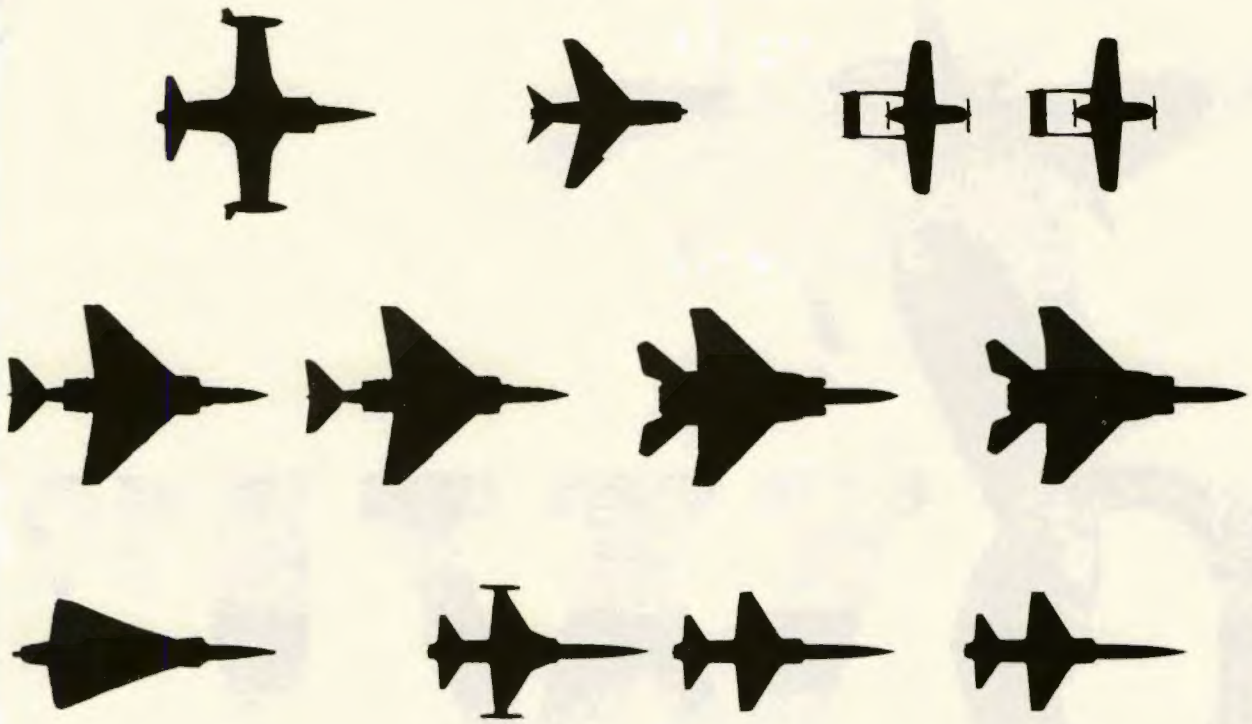
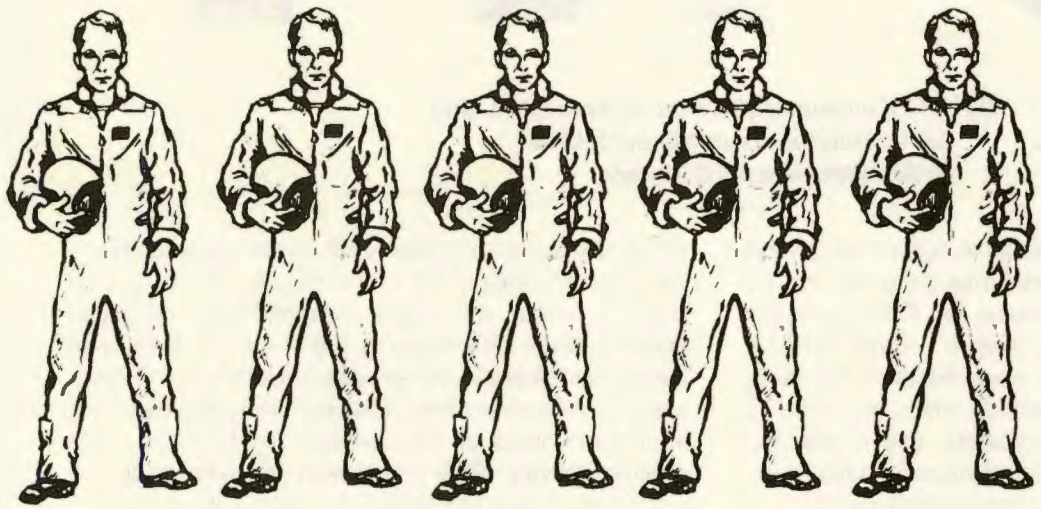




# THE F-15 SAYS "OW!"

**By J. F. Kunzelman, Technical Specialist, and
J. T. Johnston, Loads Branch Chief
McDonnell Aircraft Company**

It's unlikely that the "G" meter in fighter aircraft will ever be replaced, but there are better things on the horizon. In the not too distant future, the F-15 Eagle will have an "Overload Warning System" (OWS) aboard. This new system will audibly warn the pilot that he is approaching the aircraft structural limits, tell him if a structural limit has been exceeded, and inform the ground crew afterward what component was overloaded and how severely. No more guess work!

Notice, we used the word "overload" in lieu of "over-G." This is important since for any given G level, the loads imposed on the aircraft structure can vary drastically depending upon such factors as Mach Number, aircraft configuration, and degree of lateral stick input. Ironically, while data compiled from the Signal Data Recorder (SDR) tells us that the F-15 airframe is being overloaded in certain regions of the flight envelope, reserve structural capability exists throughout a large percentage of the envelope which is not being used effectively. SDR information also verifies that a significant number of over-G conditions are not being reported, most likely because they cannot be recognized. A typical case involves training with a centerline tank aboard (heavy aircraft), initial engagement at

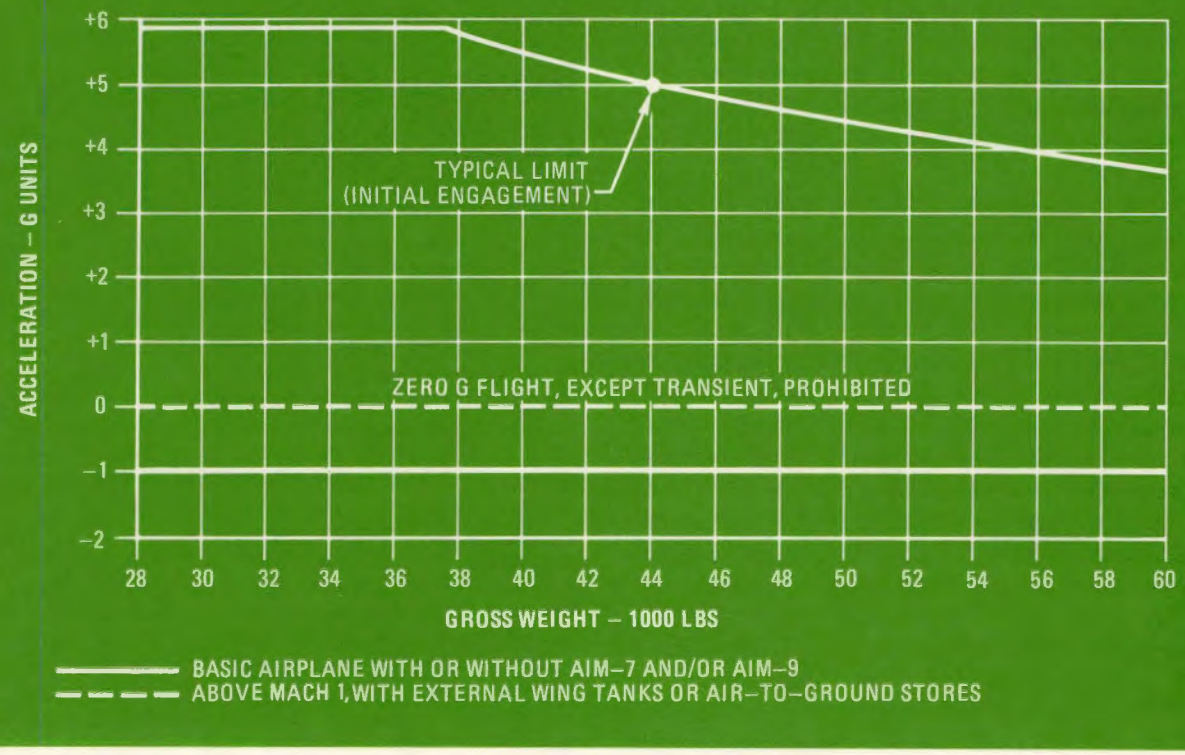
transonic speed around 15,000 feet, yank and bank for an AIM-9 shot. DASH ONE limits under these conditions for unsymmetrical maneuvers are around 5.0 G (Figure 1). Training close to home is partly responsible, but we've yet to see a 5.0 G writeup regardless of the cause.

For those skeptics who dislike new gadgets in the aircraft and think the OWS is a quick fix to stop abuse of the aircraft, it should be noted that as far back as 1969 studies were conducted for the US Air Force to show the F-15 load factor capability throughout the flight envelope based on various criteria. Most of you are familiar with the varying F-4 aircraft load factor handbook limits which range from 6.0 to 8.5. The F-15 was designed to 7.33 G at the critical speed and altitude within the flight envelope. As a result, reserve capability in terms of higher G limits is available elsewhere. Based on results of a thorough test program, it is now time to unleash the Eagle and let it fly to these known capabilities. The OWS is designed to provide the capability to the pilot while at the same time providing protection for the airframe.

Conceived as a means of addressing both the operational and maintainability aspects of the over-G problem, OWS is designed to provide a system that monitors all parameters (Mach, altitude, roll rate, lateral stick displacement, normal load factor, external stores loading, and total fuel quantity) necessary to continuously determine aircraft structural overload conditions. It will then provide timely alerting to the pilot of an impending overload situation through the use of an Aural Tone Generation System.

The core of the OWS is the Central Computer and the new Programmable Signal Data Processor (PSDP). This new PSDP will gather additional information from such equipment as the Roll/Yaw and Pitch Computer, Fuel Quantity Indicator, and Armament Control Set, and transmit this data to the Central Computer. The Central Computer, with its existing information (speed, altitude, etc.) and reprogrammed aerodynamic and inertial data for computing forces acting on the aircraft, will continuously and in real time (20 times a second) generate the aircraft structural loading state. If a loading condition exceeds the 85 percent level, a message is sent to the PSDP to turn on the warning tone. An upper G limit of 9.0 has been included to protect the large mass items (engines, AMAD, etc.) from being overloaded.

**FIGURE 1 – ACCELERATION LIMITS (UNSYMMETRICAL MANEUVERS)**



# THE F-15 SAYS "OW!"

McDonnell funded the OWS program and started hardware development of the OWS back in 1978. MCAIR test pilots evaluated the system and pressed for further development. When data from F-15 operational units made it apparent that a warning system was needed, a prototype was available which could be tested. The USAF funded a test program for evaluation under simulated combat conditions at Nellis AFB. This allowed the system to be tested in the environment necessary to optimize the warning system.

The OWS is patterned with both the pilot and ground crew in mind. For the pilot, there will be no new switches or gadgets. The warning tones have been set to limits which will give ample warning but not become a nuisance. There are no mechanical limits in the system, so if the need arises you can ham-fist it till your socks fall down.

For the ground crew, overload inspection will be much more simplified. There will be no need to go to a T.O. to see if the aircraft was really overloaded. There will be no need to inspect the entire aircraft if only a portion of the structure, such as the tail surface or wing pylon, was overloaded. There will be no need to do a teardown of the aircraft if the aircraft was overloaded by a few percent. A readout on the Air Navigation Multiple Indicator (ANMI) will tell you directly what, where, and how much must be inspected. We'll still show the Gs too, but the nitty-gritty will be displayed in percent of allowable load, and T.O. inspections will be related accordingly. One hundred percent, that's the limit regardless of the Gs.

For those of you who think this new system will bring on a rash of overload inspections, relax—in over 100 hours of flying at Nellis to the expanded envelope with the system installed, not a single overload was encountered.

The OWS will be installed on all production USAF F-15C models serial number 80-0033 and up, and F-15D models serial number 80-0056 and up. Retrofit will be on all F-15A/B models, F-15C models serial numbers 78-0468 through 80-0032, and F-15D models 80-0561 through 80-0056. As yet no TCTO numbers have been assigned. As the finishing touches are put on the system and we progress toward production deliveries late in 1981, more details about this airframe-saving system will be passed along to you.

—Reprinted from McDonnell Aircraft Company *Product Support Digest*


***Laboratory test simulation of OWS digital display system on ANMI. Although data can be called up by pilot, primary use of cockpit instrument is to inform maintenance personnel what to inspect and to what degree components have been overloaded in flight. Data comes from Central Computer. First column shows load factors (Nz) associated with percentages of overload (OVL) in second column. (Decimal points are omitted in first column—103 indicates 10.3 load factor.) Remaining six columns are the components monitored by OWS—fuselage, wing, left tail, external stores, and conformal tank. Single digit numerical values are approximations of degree of component overloads—numeral 1 indicates overload between 100 and 109%; 2 is between 110 and 119%, etc. Incidentally, we sincerely hope the Eagle pilot never sees overload numbers as high as our laboratory simulation indicates; the overload warning tone/voice system would have alerted him long before numbers like these would show up!***

CMSgt Lloyd C. Martindale

Sgt Thadrick M. Heaney

# INDIVIDUAL SAFETY AWARD

CMSgt Lloyd C. Martindale is this month's winner of the Tactical Air Command Individual Safety Award. Sergeant Martindale is the munitions area supervisor for the 124th Tactical Reconnaissance Group, Idaho Air National Guard. He has been instrumental in munitions safety since he joined the unit in 1949.

Over the years, his section has won weapons loading competitions in their division at Air Defense Command competition and at William Tell competition. During ORIs and TAC Evals, Sergeant Martindale's section has achieved outstanding ratings on three mass loads and four munitions turnarounds. His section has twice received Missile Safety Awards. Sergeant Martindale's section hosted a T.O. conference on T.O. 1F-102A-16-2, prepared a revised draft, and proofed the procedures which ultimately became T.O. 1F-102A-33-3-2. His professional dedication has continued to the present time. His unit received outstanding ratings in ground safety in 1980, and his area earned another outstanding rating in the 1981 quality control area inspection.

Sergeant Martindale provides an impressive example of effective and safe mission accomplishment. He is worthy of the TAC Individual Safety Award.

# CREW CHIEF SAFETY AWARD

Sgt Thadrick M. Heaney is this month's winner of the Tactical Air Command Crew Chief Safety Award. Sergeant Heaney is an EC-135 flight mechanic with the 1st Equipment Maintenance Squadron, 1st Tactical Fighter Wing, Langley AFB, Virginia. He was selected for his efforts during a recent deployment of the 6th Airborne Command and Control Squadron supporting the Commander-in-Chief, Atlantic (CINCLANT).

Shortly after takeoff on the deployment, a leak from the air refueling door's hydraulic system vented fluid into the cockpit. Sergeant Heaney repaired the malfunction while airborne, enabling the aircraft to continue the mission safely. During a sortie at the deployed location, the number 2 water pump failed on takeoff; Sergeant Heaney changed the pump. Later, on the redeployment home, the number 3 engine suffered from an oil problem and the engine pressure ratio (EPR) was out of limits; almost simultaneously, the right hydraulic system failed because of a broken line on the number 4 engine. Sergeant Heaney coordinated emergency procedures with the aircraft commander, who made an emergency landing at a divert base. On the ground, Sergeant Heaney worked for 23 hours in snow and freezing rain to repair the aircraft. The aircraft then was able to return to Langley AFB without incident.

Sergeant Heaney has shown a can-do attitude balanced by a proper regard for safety. He has earned the TAC Crew Chief Safety Award.

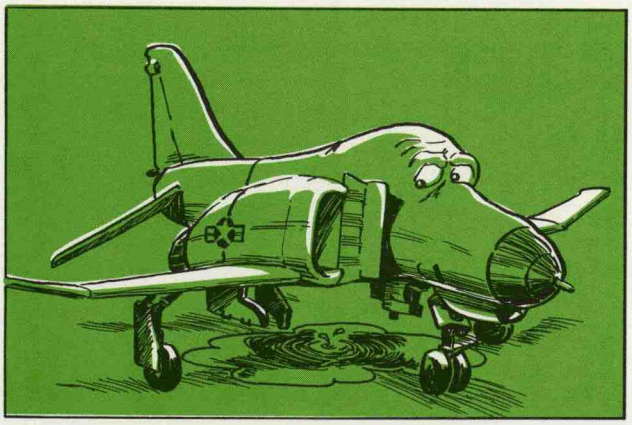
# chock talk

Chock talk

*...incidents and incidentals with a maintenance slant.*

## LEAKS AND FORMS

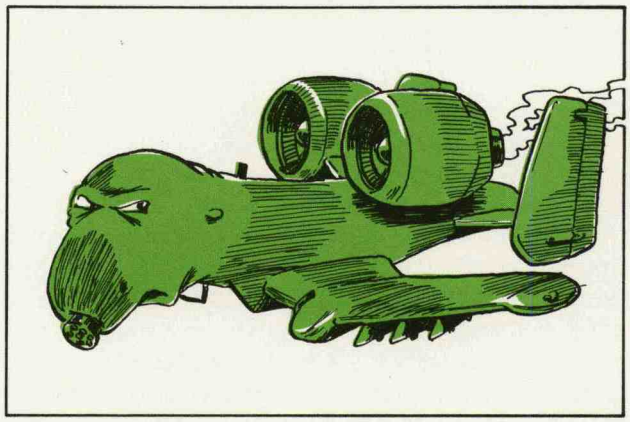
An F-4 overseas was written up for an inspection of the low pressure fuel filters to see if they were contaminated by fuel cell foam. An engine specialist removed the filters and had them inspected by the fuel shop. Afterward, he reinstalled the filters. The 781 writeup was then signed off by a 7-level fuel specialist, who thought he was clearing the inspection of the filters; actually, the block he signed off cleared the installation of filters and V-band clamps. The fuel specialist wasn't qualified to inspect installation. After installation of the filters and V-band clamps, the engine specialist should have run a leak check; but he didn't, and he didn't write in the forms that it needed an ops check. The aircraft was put back on the line since it didn't have any open writeups.



Before it was scheduled to fly, the aircraft showed a hydraulic leak. To check hydraulics, they ran the number 2 engine. Fuel began leaking from the area of the low pressure fuel filter as soon as the throttle was brought forward. They aborted the start and discovered that the V-band clamp was improperly installed. They corrected the V-clamp and fixed the hydraulic problem. The aircraft was then scheduled to fly.

An aircrew came out, preflighted, and started the number 2 engine without any problems. But when they brought the number 1 throttle forward, fuel began to run out of the aux air doors onto the ramp. The crew chief told the aircrew to shut down and get out of the airplane. They did. It turned out that the V-clamp had been incorrectly installed on the number 1 engine also.

It was fortunate that the fuel leaked on start. Sometimes, when the clamps are installed wrong, they hold together for a while, but then give out at the worst possible moment.

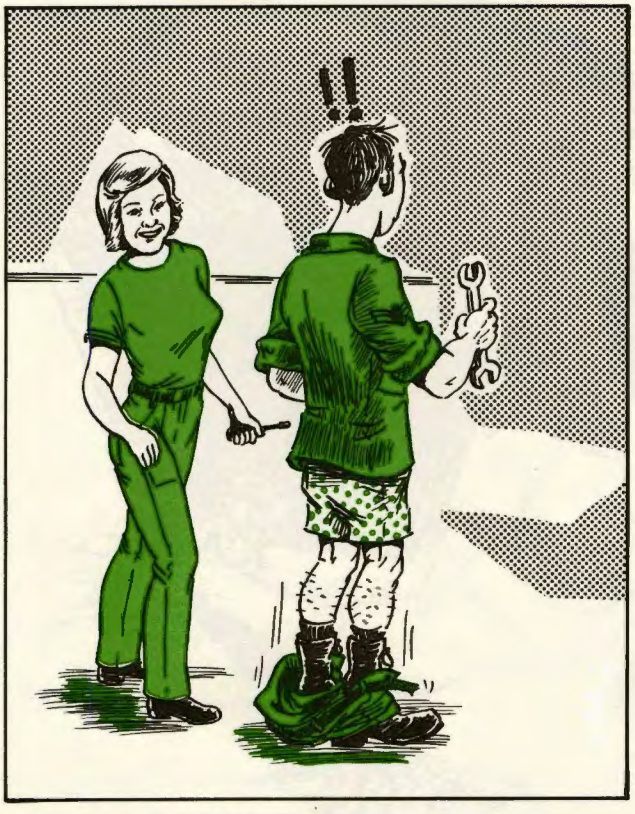


## ANOTHER PAPERWORK PROBLEM

The left engine of an A-10 flamed out following a strafe pass. The pilot brought the airplane home safely on one engine. He didn't restart it because he couldn't be sure it hadn't suffered overheat damage.

The pilot had strafed in high rate of fire. High rate of fire used to be prohibited in the A-10; but since a recent TCTO for auto ignition during strafe, the pilots were allowed to use high rate. Unfortunately, this airplane hadn't yet been modified; more unfortunately, the outstanding TCTO status was not in the forms, so the pilot didn't know he was still restricted to low rate.

It was just a paperwork error, a minor oversight. But what if he had been on a low altitude strafe pass and both engines had flamed out?



## FOD AT THE CONTROLS

During an air combat training mission, the F-4's control stick suddenly jammed. The pilot was able to break it loose after a few minutes. He canceled the remainder of the mission and landed safely out of a straight-in approach. The aircraft was impounded for investigation.

The investigators found an AIM-7 missile's umbilical cable cover at the bottom of the bellcrank of the stabilator controls. The cover had marks on it indicating it had been wedged in the area and then forcibly broken loose. Apparently, at some time, the umbilical cover had come loose and lodged in the right forward missile cavity near the stabilator bellcrank. The umbilical cover was then replaced without a thorough search to discover where it had gone. Somebody must have assumed it had fallen off the airplane. During the hard maneuvering of the air-to-air engagement, the cover got wedged in the bellcrank.

That solved the problem. It was FOD in the bellcrank. By the way, as they were checking out the system, they found all kinds of FOD in the cockpits and stabilator area: nuts, screws, washers, a military belt buckle—that's right, a belt buckle. You'd think you'd notice your belt buckle was missing, say when your pants fell down.

## MORE FOD

During routine maintenance on an RF-4, a piece of safety wire fell into the aircraft's empennage. To get the safety wire out, the maintenance troops had to remove a panel (65R). When they looked inside, they found not only a small piece of safety wire, but a crew chief's headset and microphone assembly. The headset was lying near the arresting hook actuator arm.

They learned that the headset and microphone belonged to another maintenance unit which had done work on the empennage 3 weeks earlier. At that time, two airmen ran operational checks of the aircraft pitch trim motor. They had checked out headsets and a ground cord from the tool crib to protect their ears from noise on the flightline. After they finished the check, one of the airmen told the other that he was going back in and he'd leave his headset and the ground cord on the ramp under the aircraft. The other airman buttoned up the trim motor cover. When he was ready to leave, he could only find one headset and the ground cord. He searched the area around the aircraft, but couldn't find the other headset. He gave up looking, *assuming* that his workmate must have taken it in with him.

This airman then went to the tool crib and turned in his equipment. The tool crib NCO asked where the other headset was; the airman answered that his workmate had it and would probably turn it in later. The tool crib NCO then went off shift without telling any supervisory personnel about the missing headset, but he did mention it to his replacement.

Two days later, the tool crib NCO noticed that the headset was still missing. He notified his supervisors who put lost tool procedures into effect. However, no aircraft panels were removed in the search, and the airman's working partner was never even asked if he knew what had happened to the headset. The searchers didn't find the headset; they *assumed* it had been stolen.

The series of assumptions and the failure to really apply lost tool procedures resulted in the airplane flying repeatedly with FOD in its tail section. But notice how this chain of events was broken before it became a mishap. The maintenance workers that found the headset were more conscientious about a small piece of safety wire than the original workers had been about a whole headset. Those contrasting attitudes show us what safety is really all about.

# Controller Fatigue and Flying Safety


**Editor's note: This article primarily deals with weapons controller fatigue as it degrades flying safety.**

**By Capt Pamela Sexton**
**Chief, Combined Operations Center**
**554th Range Group**

If you are an aircrew member, your flying duty is limited by a strict crew rest regulation. Air traffic controllers and combat controllers are required to have crew rest as well. But weapons controllers? Well, that's another story—only controllers on AWACS are required to have crew rest.

So how does this affect you as an aircrew member? Whom do you suppose that fatigued controller is controlling? Controller fatigue is more the aircrew's problem than the controller's. The worst that can happen to a tired controller is a vertical nosedive into the PPI scope for a quick forty winks descent into combat snooze. What's the worst that can happen to you?

One of the early symptoms of fatigue may be the most dangerous, turning the pilot in the wrong direction. Confusion in direction occurs because the ability to distinguish right hand from left hand is an intellectual process which is affected by fatigue.

Next, the fatigue brings on "controller mouth," which is also called "Porky-pigging."


This affliction livens up many a mission. Following that, irritability sets in. The controller gets impatient, and pilots get snapped at.

Several missions later, the controller get the *dideyes:* "*Did I* run 15 missions or 5?" or "*Did I* say the right altitude?" Everything begins to run together until the controller can't remember if this mission is with Zebra or Spats flight.


Finally comes the *trance:* The controller sees, hears, and understands, but doesn't do. As a symptom of hypoxia, pilots can suffer from this; but it can also be brought on by sheer fatigue.


If it sounds like I'm saying not to trust GCI, that's wrong. Just be alert to the danger. Controllers are human and make errors. But if a controller makes frequent transmission errors, constantly corrects calls, stutters, or snaps at you, maybe you have a controller who's so dog tired that he or she can't think straight.

# Ode To An Unknown Pilot

**Author Unknown**

Alone at night in the hangar, the weary aircraft chat.
And they talk about the weather, what's new, and this and that.
But a subject near and dear—of which they're never shy,
Is to talk about the pilots with whom they have to fly.

Their opinions are divided on respective merits and skills.
Each one has her favorite of whom she'll hear no ills.
But no matter how they differ on the one they think the best,
Their opinions are united on the one they all detest.

Their complaints, they run the gamut, from sore feet to aching backs.
(They're common aircraft ailments caused by inconsiderate hacks.)
So alone at night in the hangar, this ancient group does scheme,
Of ways they can eliminate that detestably bad dream.

Each has tried her own thing, each in her own small way;
To disconcert the upstart, to drive the wart away.
To eradicate the blemish, the stain that will not fade.
To rectify the error that pilot training made.

Now sterner things are called for, as hints do not suffice.
The group has reached agreement in a spirit of sacrifice.
The tribe is all important, the individual not quite so.
It's to the benefit of all, that only one should go.

So now they've chosen to draw lots, to see who'll take the plunge.
Tis hard on the one selected—but HIM they must expunge.
And that's what has me worried, for he never flies alone,
And I may be up there with him when the ancients point the bone.

Now you may think this is fable, a tale, tall, not true,
And that there's nothing said herein that could apply to you.
But sometime, stand at midnight, outside the hangar door.
And if you hear what I have heard, you'll never go back for more.

—Courtesy of RNZAF *Flight Safety Insight*

# TOO LATE

**By SSgt Timothy C. Brockway**
**56 TFW Base Life Support**

Captain Gofast and Master Sergeant Burnem were in the wing life support office reading the accident board's final report. The captain noticed that the veins on the sergeant's temples were puffing out, a sign that meant his feelings would soon break loose.

As Sergeant Burnem finished reading, he slammed the report on his desk. "What good is it?" he said under his breath. "We train and train and train." He shook his head and made a clucking sound, then pulled open a desk drawer. The captain recognized the file he brought out as the egress training roster.

"Hey Sarge, you already told the board I was current."

Burnem didn't pay any attention. He leafed through the sheets until he found what he was looking for, "Uh-huh, Captain Gofast, last given egress and hanging harness on—" He shook his head again. "One month before the accident. Cap'n, what were you thinking of?"

"I wanted to get the beast back in control. And I had it too, just before—" The captain stopped in mid-sentence as he remembered the rush of relief that flooded over him when he felt the spin break. Then the sight of trees in front of him! That's when he pulled the ejection handle, he recalled. Noise, darkness; then quiet and warmth.

"So much for 'zero-zero' seats, huh Sarge?" the captain snorted.

But again the sergeant wasn't listening. He was reading the report once more, this time out loud: "Mishap pilot was apparently in an uncontrolled spin and was attempting to regain control prior to ejection at extreme low altitude. Witnesses said they thought he was 'putting on an airshow.' "

The captain grimaced.

" . . . pilot ejected prior to aircraft impacting ground. Aircraft was destroyed. . . . Mishap pilot sustained fatal injuries caused by seat failure. Failure attributed to out-of-envelope ejection; i.e., high rate of descent and low altitude. Flight surgeon's autopsy summary attached."

Sergeant Burnem took a pencil out of an old coffee cup and scribbled a memo. It read, "We must stress to all future students that 'zero-zero' doesn't mean that the seat is limitless." He tapped the pencil on the desk a few times and then wrote some more, "Also, stress situation awareness and decision to eject. We have charts on ejection vectors, let's use them!"

"A day late and a dollar short, eh Cap'n?" he said absently. He looked up at the clock and noticed he was late for a meeting. He gathered up his hat and briefcase and left the office. The captain remained.

For the first time he noticed how quiet the room was. He turned to leave when his eye caught something on the wall. It was a modest plaque with a solemn inscription:

**May the epitaph never read,**
**"He didn't know."**

The captain stepped back and studied this for a few seconds—then passed through the wall like a shadow.


## Protecting Our Children

In 1978, Tennessee began requiring the use of safety seats for children under the age of four riding in cars. The result? A 50 percent reduction in major injuries and deaths of small children in 1978, and a 75 percent reduction in 1979. Before the law, the child seat usage rate in the state was only 9.2 percent; by the end of 1979, the rate was 18.7 percent.

Automobile crashes are the leading cause of death for American children. In a typical year, over 600 children under 5 years old will be killed and 48,000 more will be injured in auto crashes.

Knowing that, why does it take a law to get us to protect our children?

## Saws and Safety Guards

A part-time supervisor in a wood hobby shop was helping a customer who was trying to make a lengthwise groove in a two-by-four. They were using a table saw with dado blades to make the cut. The supervisor figured they couldn't get the job done with the saw's safety guard in the way, so he removed it. Then the supervisor placed the piece of wood on the rotating blade to make the groove. As the blade was finishing the cut, it suddenly propelled the wood backward; the supervisor's left hand slipped off the fence and the wood into the blade. He lost his fourth finger and part of his third finger.

If he had been properly trained, he'd have known that there was a special expandable guard available for the job he wanted to do. We shouldn't have to cut without a safety guard; if we do, it means we probably aren't using the tool right.

## The X-rayted Electrician

Overseas, two airmen were assigned to do a nondestructive inspection (NDI) of an F-4E using X-rays. When they arrived at the airplane they set up their equipment and began to clear the area. There were two other troops in the area. The NDI specialists told them they'd have to leave and then asked them if there was anyone in the cockpit. One of the two troops said, "No." Those two left, and the NDI specialists got ready to work. First, one of them walked around the aircraft and beat on the side, hollering, "Is anyone here?" Then they began x-raying, without actually looking in the cockpit.

They'd been at it a while when a third man suddenly stood up in the cockpit. He was an electrician and had been working in the cockpit for about an hour. The NDI specialists told him to report to the hospital where environmental health experts ran tests to estimate the amount of radiation he had received. Fortunately, his exposure was well below the level expected to cause health problems.

One peek into the cockpit beforehand would have saved an awful lot of worry. You just can't take someone else's word for it when it's your job to make sure.

## Ohm's Shocking Law

When we are electrically shocked, the injury we suffer depends primarily on the amount of current that flows through our body and how long it flows. According to Ohm's law, the current in amperes is equal to the voltage divided by the resistance. So the danger increases with an increase in voltage, and it also increases with a decrease in resistance.

The human body has an average resistance of 500 ohms to current passing from one extremity to another, say from hand to foot. That amount of resistance is pretty much fixed, but contact resistance, where the body touches the current source and the ground, can vary greatly. Contact resistance for a dry hand on a pipe is about 1,000 ohms; resistance of a foot immersed in water is only 100 ohms. The body's total resistance (or impedance) is the internal resistance of 500 ohms plus the contact resistance.

With any given voltage, the higher the resistance, the lower the current flow, and the less injury. For instance, with 120 volt current passing through the body from dry hand to dry hand, the amperage would be about 48 milliamperes (thousandths of an ampere). Contact resistance for each hand is 1,000 ohms and the body's resistance is 500 ohms for a total of 2,500 ohms. Dividing 120 volts by 2,500 ohms gives a current flow of .048 amperes. That is just below the danger level of 50 milliamps which may result in cardiac arrest according to AFOSH standards.

If that same voltage went from wet hand to wet hand, the current flow would be much greater. With a lower resistance of about 500 ohms for each hand, the total resistance would drop to 1,500 ohms. Now, 120 volts will produce 80 milliamps of current—well above the danger threshold.

Most of us know that household current can do us in when it's combined with water, but we don't realize that we can be hurt by much lower amperage. A current flow as low as 10 milliamps can cause us to lose muscular control so we can't let go of the source. Then the current flow over an extended period of time can cause injury. So we should treat all sources of electricity with respect—and resistance.

## The Truck Driver's Nightmare

A 10-ton tractor overseas was hauling a trailer full of liquid nitrogen between bases. The driver and an assistant were in the cab as they traveled through mountainous terrain on a two-lane asphalt highway. They weaved their way through a series of S-curves on three steep downgrades and then came up over the crest of another downgrade. At the crest, they were doing about 20 miles an hour in fifth gear low. As they started down the 10 percent incline, the driver attempted to use the trailer brakes to hold down the speed during the descent; that's the normal procedure. The trailer brakes, however, had no effect. He tried them several times, to no avail. Then he tried the footbrakes, which gave only a slight braking effect. After he pumped the brakes four or five times, the low air pressure flag came into view, indicating loss of air pressure for the brakes. The RPM was too high to downshift; all they had left were the emergency brakes. The driver tried the emergency brakes while his assistant pulled the tractor-trailer parking knob. Neither system had any appreciable effect. The driver gave up on the brakes and concentrated on steering the vehicle through the upcoming curves, while hoping to find a safe area in which to stop the vehicle. He brought it through the first curve and almost made it through the second.

As they came around the second curve, the trailer started to roll, taking the tractor with it. The tractor separated from the trailer as they rolled, coming to rest on the passenger's side. The trailer rolled to a stop about twelve feet away.

The runaway truck on a mountain road is an overworked theme in fiction; but when it's fact, it's terrifying. In this case, the way this driver and his passenger handled this nightmare-come-true was truly impressive. They went through all the appropriate emergency procedures; unfortunately, none of them worked. What did work and work well, were their seatbelts. Being professionals, they both wore their belts; and they both walked away uninjured.

# Extract From the Records of The Royal Flying Corps

# December 1917

## RESUME OF ACCIDENTS

*Avoidable Accidents*

1. There were 6 avoidable accidents:

a. The pilot of a Shorthorn with over 7 hours experience, seriously damaged the undercarriage on landing. He had failed to land at as fast a speed as possible, as recommended in the Aviation Pocket Handbook.

b. A B.E.2 stalled and crashed during an artillery exercise. The pilot had been struck on the head by the semaphore of his observer who was signalling to the gunners.

c. Another pilot in a B.E.2 failed to get airborne. By error of judgement he was attempting to fly at midday instead of during the recommended best lift periods, i.e., just after dawn and just before sunset.

d. A Longhorn pilot lost control and crashed in a bog near Chipping Sodbury. An error of skill on the part of the pilot in not being able to control a machine with a wide speed band of 10 m.p.h. between top speed and stalling speed.

e. Whilst low flying in a Shorthorn, the pilot crashed into the top deck of a horse-drawn bus, near Stonehenge.

f. A B.E.2 pilot was seen to be attempting a *banked* turn at a *constant* height before he crashed. A grave error by an experienced aviator.

*Unavoidable Accidents*

2. There were 29 unavoidable accidents:

a. The top wing of a Camel fell off due to fatigue failure of the flying wires. A successful emergency landing was carried out.

b. Sixteen B.E.2's and 9 Shorthorns had complete engine failures. A marked improvement over November's figures.

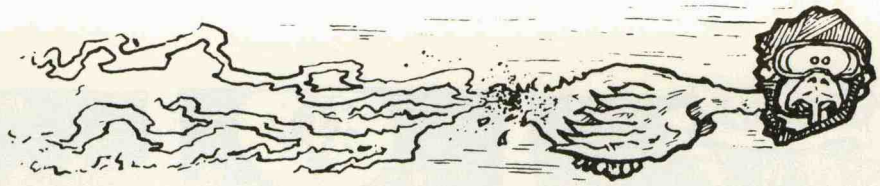
c. Pigeons destroyed a Camel and two Longhorns after mid-air strikes.

*Cost of Accidents.*

Accidents during the last three months of 1917 cost £317.10.6—money down the drain and sufficient to buy *new gaiters* and *spurs* for each and every pilot and observer in the Service.

—Courtesy of Wing Commander Jeremy G. Saye,
RAF-USAF Exchange Officer, HQ TAC

# TAC TALLY



| | TAC | | | ANG | | | AFR | | |
|---|---|---|---|---|---|---|---|---|---|
| | JUN | THRU JUN | | JUN | THRU JUN | | JUN | THRU JUN | |
| | | 1981 | 1980 | | 1981 | 1980 | | 1981 | 1980 |
| CLASS A MISHAPS | 3 | 19 | 16 | 0 | 3 | 8 | 0 | 0 | 1 |
| AIRCREW FATALITIES | 0 | 10 | 10 | 0 | 2 | 7 | 0 | 0 | 0 |
| TOTAL EJECTIONS | 4 | 18 | 15 | 0 | 0 | 7 | 0 | 0 | 1 |
| SUCCESSFUL EJECTIONS | 4 | 17 | 12 | 0 | 0 | 4 | 0 | 0 | 1 |

## TAC'S TOP 5 thru JUNE '81

| TAC FTR/RECCE | |
|---|---|
| class A mishap free months | |
| 40 | 33 TFW |
| 33 | 1 TFW |
| 32 | 31 TTW |
| 23 | 58 TTW |
| 20 | 49 TFW |

| TAC AIR DEFENSE | |
|---|---|
| class A mishap free months | |
| 115 | 84 FITS |
| 101 | 57 FIS |
| 54 | 5 FIS |
| 51 | 48 FIS |
| 10 | 318 FIS |

| TAC GAINED FTR/RECCE | | |
|---|---|---|
| class A mishap free months | | |
| 110 | 188 TFG | (ANG) |
| 102 | 138 TFG | (ANG) |
| 101 | 917 TFG | (AFR) |
| 98 | 116 TFW | (ANG) |
| 88 | 434 TFW | (AFR) |

| TAC GAINED AIR DEFENSE | | |
|---|---|---|
| class A mishap free months | | |
| 107 | 191 FIG | (ANG) |
| 88 | 102 FIW | (ANG) |
| 84 | 177 FIG | (ANG) |
| 50 | 125 FIG | (ANG) |
| 33 | 119 FIG & 142 FIG | (ANG) |

| TAC/GAINED Other Units | | |
|---|---|---|
| class A mishap free months | | |
| 143 | 182 TASG | (ANG) |
| 136 | 193 ECG | (ANG) |
| 131 | 26 ADS & 4787 ABGp | |
| 127 | 110 TASG | (ANG) |
| 123 | USAFTAWC | |

## CLASS A MISHAP COMPARISON RATE 81/80

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

| | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TAC | 1981 | 4.0 | 3.0 | 3.2 | 5.6 | 6.0 | 5.9 | | | | | | |
| | 1980 | 2.0 | 4.0 | 5.2 | 4.4 | 4.7 | 5.2 | | | | | | |
| ANG | 1981 | 9.3 | 4.8 | 4.6 | 3.3 | 2.6 | 2.2 | | | | | | |
| | 1980 | 5.0 | 7.6 | 6.6 | 7.1 | 6.5 | 6.1 | | | | | | |
| AFR | 1981 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | |
| | 1980 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | | | | | | |

☆U.S. GOVERNMENT PRINTING OFFICE: 1981—735-019/3


FLEAGLE
WOOSH!
?
©RICHMOND SYNDICATE, 1981
I AIN'T SURE, GRIFF, BUT I THINK IT'S SOME KINDA RITUAL TO CELEBRATE DOG DAYS.
IT SURE DO MAKE A MESS.
HARDIGON