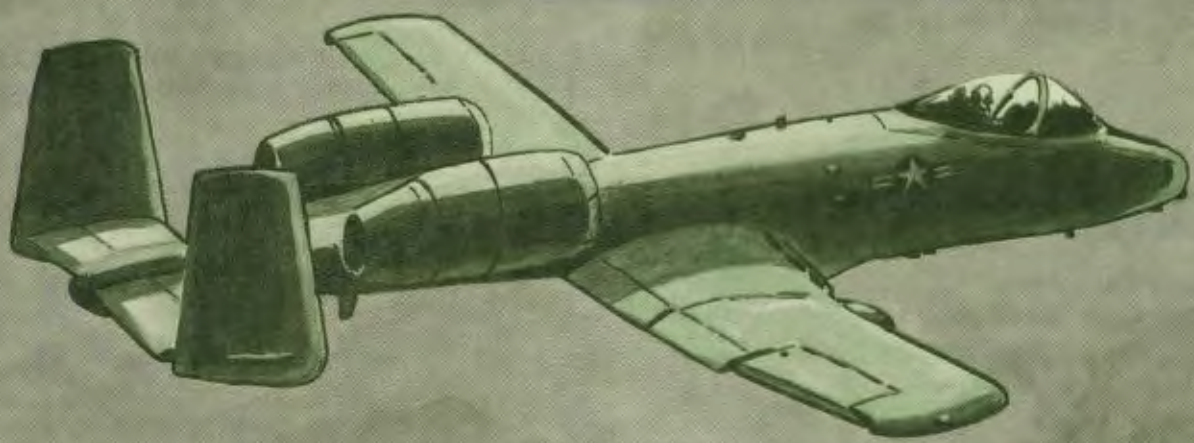


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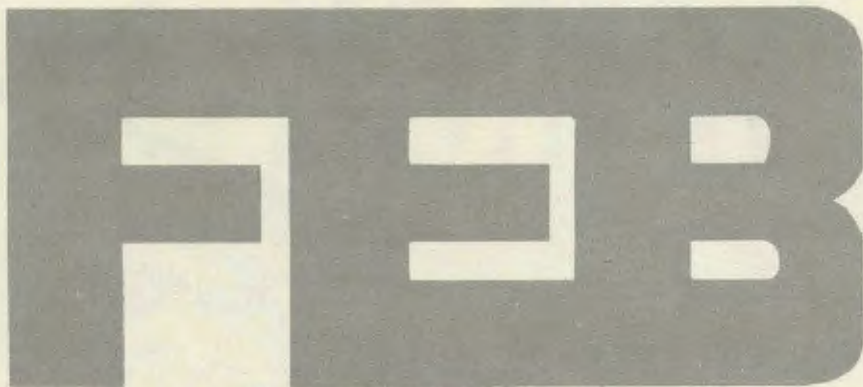
# TAC ATTACK

FEBRUARY 1981



THE A-10 FLY  
BY WIRE ...Pg 22





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

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**VOLUME 21 NUMBER 2**



# Angle of Attack



## Well Done

In calendar year 1979, TAC units experienced 35 Class A mishaps and 26 aircrew fatalities. Our Class A mishap rate was 6.2 per 100,000 flying hours. In 1980, we experienced 30 Class A mishaps and 18 aircrew fatalities. Our 1980 rate was 5.0. Five of our 1980 mishaps came from ADTAC units, whose 1979 losses were not accountable to TAC. So, our improvement in Class A mishaps is even better than raw numbers alone might indicate.

The decrease in fatalities also signals a favorable trend. In 1979, our ejection success rate was only 64%. In 1980, the percentage was up to 82%. Our aircrews have hopefully gotten the message to get out of the aircraft before they're out of the safe ejection envelope.

When we examine operational causes, the areas where we exercise direct control, a decrease is also evident. In 1979 66% of our mishaps were due to operational causes; while in 1980 the number dropped to 50%. This drop was largely due to a 64% decrease in collision-with-the-ground mishaps from 11 in 1979 to 4 in 1980. Until last year, this had been our primary operational "cause" factor.

The fact we have made these reductions indicates we can do better. Too often we unconsciously feel we're doing the best we can and we're never going to get better. This attitude can keep us from giving mishap prevention our best efforts. The safety record of 1980 proves we can reduce mishaps; we can save lives and equipment. With your continued hard work and dedication we can improve on 1980's performance.

Let's use the trend we established in the first year of the 1980s as a starting point for continued improvements in safety. We can do it.

*Richard K. Ely*

RICHARD K. ELY, Colonel, USAF  
Chief of Safety



# THE MYTH OF SAFETY



By Major Pete Ablor  
Editor

Jason, a character of mythology, was the son of Aeson. When Jason's father was driven from the throne by Pelias, Jason was rescued and brought up by the centaur Chiron. After Jason grew to manhood, he demanded restitution of his father's kingdom, a request which Pelias promised to satisfy if Jason would bring him the Golden Fleece.

Jason then built his famous ship and christened it *Argo*. He assembled a crew, set sail to Colchis where the fleece was held, and, after several trials of strength and heroism, returned with the Golden Fleece. The kingdom was once more restored. Years after this and many other heroic exploits, Jason came to an inglorious end when he was killed by a beam which fell from his ship.

Since that day, the question has burned in men's minds, "Could a good safety program have saved him?"

\*\*\*\*\*

Anyone in the Air Force today foolish enough to question safety is likely to be viewed as a heretic who also hates baseball, hotdogs, apple pie, and motherhood. (We try to omit brand names in the magazine—that's why I left out *Chevrolet* from that automobile commercial excerpt). But that is my intent in this, my nearly final article for TAC ATTACK (Do I hear cheering and sighs of relief?) The Jasons in the Air Force spend literally countless hours in the never ending crusade to grasp the Golden Fleece of Safety. Many of those hours are wasted because we fail to define our final objective properly.



Everyone knows the first step in solving a problem is to define the actual problem. But safety is not a tangible commodity. Safety is a state of being or a condition of the environment free from hurt, injury, or loss. It could be successfully argued that being dead is the safest condition — it's certainly free from further hurt, injury, or loss. Yes, I agree that's a totally absurd argument — but it also points up the absurdity of looking at safety as a final goal in itself. Since safety is such a difficult commodity to package and sell, it is surrounded by a sacred aura. We treat safety like the Golden Fleece to keep anyone from questioning it. This very treatment results in safety becoming a goal to be pursued. From every level of command, we are urged to fly safe, drive safe, play safe, and ultimately—to pursue safety safely! So why aren't we doing such a good job?

In the three years and a few months I've been here at HQ TAC, our active TAC units alone have lost 67 aircrewmembers and destroyed 103 aircraft! Numerous other on and off duty mishaps have injured or killed many more military and civilian personnel. No matter how you look at it, that represents a staggering loss of people and equipment.

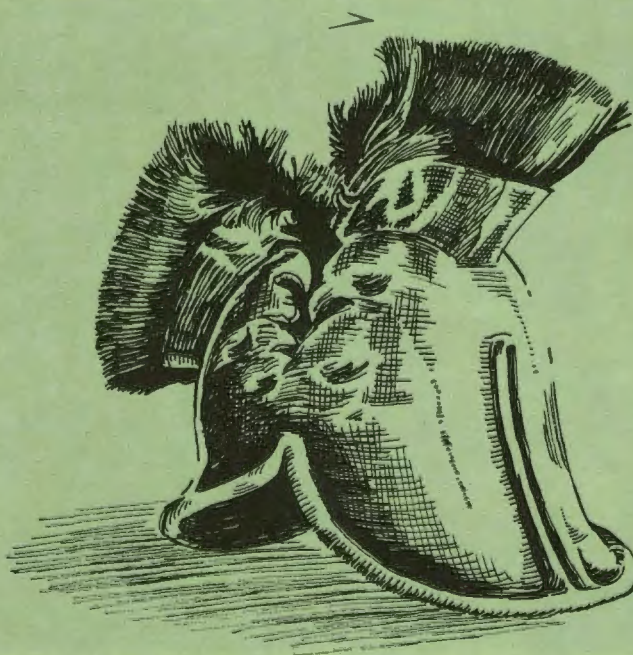
For those of you out there who are shaking your head, beating your breast, and wondering why safety couldn't prevent some of those mishaps, I'm telling you you're looking at the problem totally backwards. Safety is not the only office responsible for mishap prevention. Too many commanders, supervisors, and workers view mishap prevention as the sole property of safety. But, how many aircraft do the safety people prepare for flight? How many parts do they design, manufacture, procure, or install on the aircraft? How many sorties do they fly? How many people in the AGS, EMS, Civil Engineering Squadron, Supply Section, or CBPO do the safety people supervise?

I hope you understand my point. Without the cooperation of many other people, the safety troop can only be marginally effective in preventing mishaps. And safety people may themselves lose sight of the real goal. Safety is not meetings, posters, filling the inspection squares, dotting the i's and crossing all the t's. It is helping people realize what the final goal really is and how to reach it.

What is the final goal? It's really rather simple—for everyone to do their job correctly, effectively. The Air Force mission depends on every component, every MAJCOM, every wing, every squadron, and every person doing the job. If you don't do your job, the system is going to suffer. A minor error might only result in the delay of a piece of paperwork. A major mistake—the missassembly of an aircraft component—can cost us an aircrew and their airplane.

The concept of safety as we use it today is almost mythical. We use safety as a crutch which prevents us from attacking the real problems—the problems emerging from poor component design and manufacture, lack of supervision, nonuse of tech data, neglect, breaches of discipline, etc. If the individual and the supervisor don't do their jobs, major mistakes are going to continue to cost us good people and valuable machinery. The condition of being safe always has been and always will be one of the certain by-products of doing the job correctly.

Don't rely on a myth to prevent your mishaps. The Golden Fleece doesn't exist—at least as far as the Air Force is concerned. The safety office can provide the tools and lessons for our education in mishap prevention. It's up to you—the commanders, supervisors, and operators—to use them. Remember, Jason may only have been a character of mythology, but, as far as he was concerned, the beam which killed him was stark reality.





# Who Owns TAC ATTACK?

By Major Pete Abler  
Editor

Over the years, I've begged, pleaded, cajoled, and done a number of things to secure material for TAC ATTACK. When none of these things worked, I wrote many articles myself. As I'm sure you realize, some of the articles were good, while others didn't quite hit their target.

As I've stated before, this is your magazine. It belongs to you, the readers. Although it is published by the Office of Safety at HQ TAC, we try to keep the magazine oriented at the operational level. The magazine tries to educate and keep us all aware of the hazards encountered in our jobs and our daily living.

You are the best source of ideas for new articles and areas of emphasis. Not only are you the best source of ideas, you're the ones who can best tell your story. I would like to think I have a pretty broad knowledge of TAC's operations, and the other people assigned to safety add to our expertise, but we don't have first-hand knowledge of every aircraft and weapon in TAC's inventory. We simply don't have the practical knowledge to write many articles which should be covered in

TAC ATTACK. If you think a particular subject ought to receive coverage in TAC ATTACK, why don't you write about it?

We publish the majority of the articles we receive. That's a testimony to the quality of articles submitted. So if you submit a timely, well-planned article, you'll see it in print. Not only that, you will also have a chance to win a Fleagle T-Shirt. The best article published each month wins a completely rustproof, bullet-resistant T-shirt emblazoned with Stan Hardison's famous bird. Now that ain't bad!

To the many folks who submitted articles the past 3 1/2 years and made my job much easier—my eternal thanks. To all you potential authors, Major Jim Mackin, the new editor, could use the same kind of assistance I received. Why not submit an article and make his job a bit easier? At the same time, your reading will be varied and more enjoyable. After all, no one wants to read material from the same author all the time.

If you have any questions or want some further information, call us at Autovon 432-2937/3373. If you can't call, write us at TAC/SEPR, Langley AFB, VA 23065.

We're looking forward to hearing from you.



# Aircrew of Distinction

524 TFFS/27 TFW  
Cannon AFB, NM

On 28 August 1980 Major Rowland H. Worrell and Captain John A. Osborn were flying an F-111D on a student instructor pilot upgrade sortie. During a climb 9,000 - 10,000 feet MSL, both crewmembers heard an explosion followed by severe aircraft vibrations. The crew checked instruments, noting the left engine RPM was decreasing. The left throttle was retarded to idle and then to the cut off position. Upon engine shut-down the left engine fire push button was depressed to isolate all fuel and hydraulic lines to the malfunctioning engine. The left engine fire warning light illuminated and the crew completed emergency procedures for engine fire. The light remained on approximately five seconds. At the same time, the external glow dimmed and disappeared. They continued climbing and the crew confirmed there were no indications of a continuing fire. Major Worrell declared an emergency while Captain Osborn completed necessary checklist items. A single engine recovery was begun. In an effort to reduce the vibrations, the aircrew decreased the airspeed, but intensity of the vibrations increased. Airspeed was increased to 310 KIAS, but encountered left yaw causing full right ball deflection. Right rudder was applied and the wing sweep changed to 16 degrees with no effect on the yaw or vibration. The crew elected a single engine landing and planned on a long straight-in approach. Once confirmed, the vibration intensity began decreasing and ceased at 180 KIAS. A single engine landing was then performed. After clearing the runway the right engine was shut down and the crew egressed. Investigation revealed severe internal engine damage. The left engine had separated from its afterburner. Lines and accessories associated with the engine had been broken or damaged. Shrapnel had ruptured the aft fuel and saddle tanks. Shrapnel sparks had ignited the fuel vapor in the aft tank, causing the fuel vent tank in the vertical stabilizer to explode.



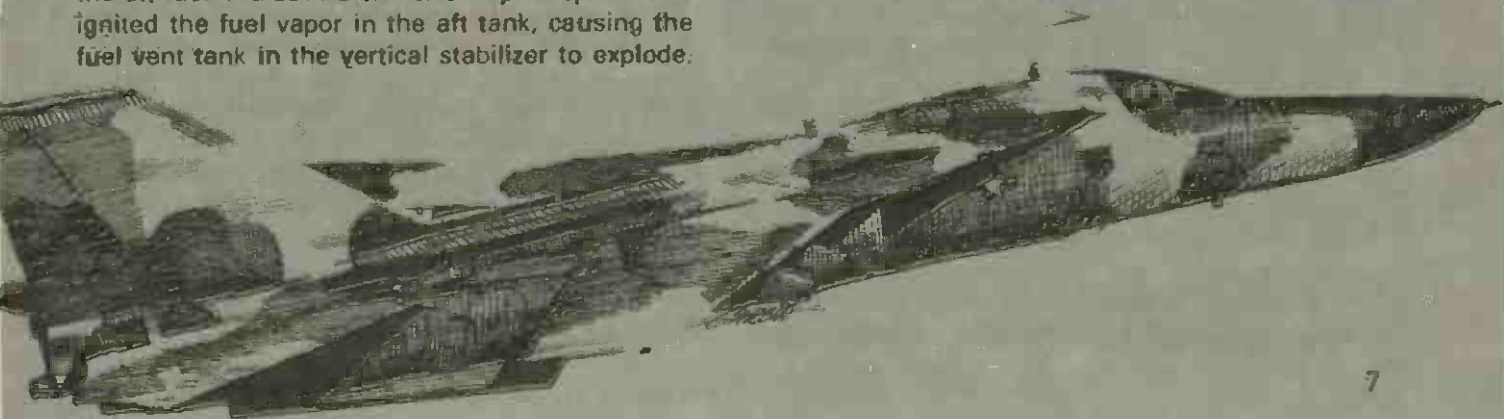
Major Rowland H. Worrell



Captain John A. Osborn

The explosion tore away 1/3 of the stabilizer from the aircraft.

The calm, knowledgeable way in which Major Worrell and Captain Osborn handled this serious emergency qualified them as the Tactical Air Command Aircrew of Distinction.





# TIPS

Example is the school of mankind, and they will learn at no other.

EDMUND BURKE

## You Won't Believe This One

This story just can't be true; somebody must have made it up. Judge for yourself:

In an overseas command, an F-4 diverted into a naval air station. After landing, the pilot asked the ground crew to refuel only the internal tanks. When the aircrew preflighted for the trip home, they noticed there was fuel in all three external tanks, which should have been empty. After power was applied, the front seater noted the

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

departure end arresting gear. A later check of the feed tank found no fuel remaining.

The message goes on to explain that the refuel /defuel switch had not been positioned to refuel because the Navy's transient alert personnel expect the aircrew to position all the required switches. When they refueled, they filled the external and internal wing tanks but left the fuselage tanks empty, except for the 800 lbs remaining.

Whoever wrote this phony message must think we're really gullible, trying to get us to believe the aircrew would really take off with only 500 lbs of gas in the fuselage tanks. Come on now. In full afterburner, 500 lbs is 30 seconds worth of fuel, and no pilot is going to try taking off with that. Certainly, no WSO would agree to trying it. Somebody is pulling our leg—or are they?



fuel gauge reading 800 lbs on the tape over 5200 lbs on the counter. He started engines and taxied.

By the time they did their lineup check, fuel was down to 500 over 4800. They talked it over and (this is the part we don't believe) decided to take off anyhow, figuring that after they were airborne they could get fuel out of the external tanks. So they lit the afterburners and rolled. At about 130 knots they felt a marked decrease in thrust and aborted, successfully engaging the

## Stoned On A "Whiskey" Compass

The FAC was flying a day combat mission profile in his Duck. Things were going normally until he noticed fluid leaking from his magnetic compass and dripping onto the cabin floor. He immediately detected a strange odor, and within five minutes he began to feel light-headed and nauseous. He declared an emergency and landed. His symptoms disappeared within an hour of leaving the airplane. They're still analyzing the stuff, but, in the meantime, we wouldn't recommend drinking the "whiskey" in your compass.



## One In A Million

By Capt Hap Tucker  
56 TFW/SEF

ONE IN A MILLION . . . unless it happens to you, then it's a hundred percent.

You pull off the target in your F-4 and the right engine compressor stalls. The stall continues so you stopcock the right engine and get a good relight. But you can't advance the RPM above idle without loud banging noises. The EGT is at 600°C and why is the Master Caution on again? The left utility pump has failed. Is this a sim ride or something? You were winning all the money till now. Let's see, you're headed towards home, VFR, no sweat.

"That's right, Approach Control, we're an IFE requesting a straight in PAR to . . ."

Getting awful hazy out there. Can't see but two or three miles. What happened to that clear and a million? Checklist is complete; SOF is up your frequency. Now if that EGT climbs, you could be in a single engine/possible utility hydraulic failure quicker than you'd like.

"GCA this is HAP 01, I'm an emergency full stop."

"Roger, HAP 01, continue standard recovery. Will you be taking the barrier?"

"Negative."

Where's the field? You should be able to see it by now.

Vis isn't good. What's wrong with your heading system? That can't be right. Why isn't GCA giving you vectors?

"GCA this is HAP 01, are you going to give us a GCA?"

What happened? Compound emergencies and weather will gang up if they can. All three aircraft malfunctions were mechanical but unrelated. They just happened to fail around the same time in the same airplane. The weather went from good to bad. GCA never got the PAR request from Approach Control. That doesn't happen too often, only once during this flight. The pilot assumed GCA was planning to give him a PAR (he had requested that from Center and Approach Control already, and his PAR request on GCA freq was cut out). GCA assumed the pilot was going to shoot the TACAN final, or a visual straight in. Not bad assumptions, just wrong. The heading system could have failed sooner, and he would be on number two's wing. But it waited

until now. A few radio transmissions cut out, a rushed "so-so" PAR. No landing clearance.

We can't fix the weather, but the SOF can help keep us advised on what it really is. As airplane drivers, we can be sure GCA really knows what we want as early as possible. If GCA got our request for a PAR from Approach Control, then GCA should transmit "expect vectors for PAR." If it doesn't look or sound right, ask about it early — before the rush.



## Wake Turbulence? No Tanks

The four Thuds were in a dissimilar hassle with two Eagles. The number three Thud saw his chance for a high angle off shot on one of the F-15s, so he began to close. At about 4,000 feet the F-15 turned hard into the Thud, and they passed at a high aspect angle about 1,000 feet apart. As he passed the F-15, the Thud driver felt a "severe jolt" from the F-15's wake turbulence which pulled off the Thud's left 450 gallon tank and tossed it into the ocean. The G-meter showed 5G on the positive side and was pegged on the negative side. Before hitting the turbulence he was holding about 2G's.

The severity of wake turbulence is a function of the lift being generated. An F-15 can generate a lot of lift in a hurry, especially if he thinks you're about to get a valid shot. So can another F-105, apparently. Just as we were writing this, an F-105 lost his right wing tank and training missile by flying through his wingman's wake.



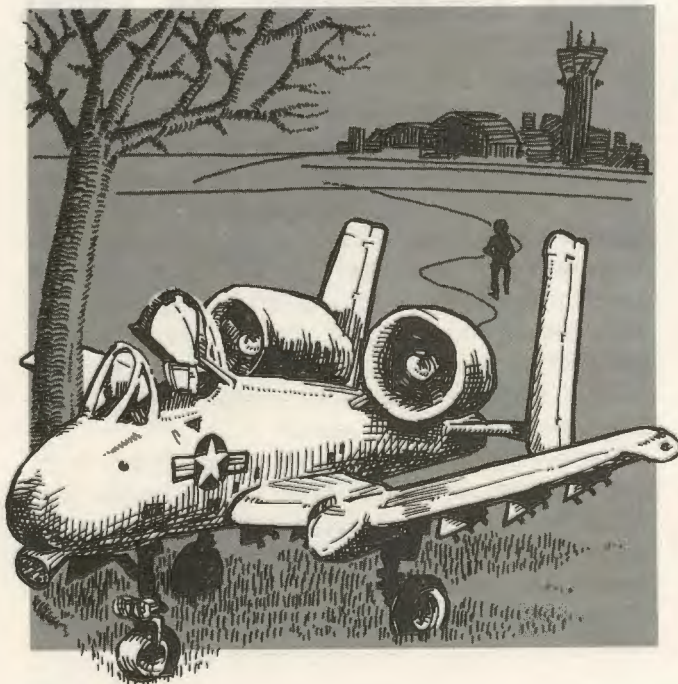
# TAC TIPS

## Trying To Be Helpful

The part-time hog herder was riding his beast down the taxiway when he came upon a slight turn. That's when he discovered he was riding and not guiding; he had neither brakes nor steering available. When the taxiway turned, he continued straight ahead, shutting down his engines as he coasted toward a line of trees. The hog found a spot it liked and nestled down around a tree, making the pilot walk the rest of the way.

As he recollected this experience, the pilot mentioned that he normally pulls the engine start, engine igniter, and APU circuit breakers prior to shutdown—often during taxi. He did this to save the crew chief having to do it during postflight. Well, this time he had pulled the wrong row of circuit breakers. Among the circuit breakers he did pull was the landing gear circuit breaker. Unbeknownst to most of us, pulling the landing gear circuit breaker fails the normal brakes and nose wheel steering. Emergency brakes should have worked, if he had pulled the handle.

By the way, pulling the APU control circuit breaker takes away your motoring capability in case of a fire on shutdown. At any rate, this attempt to help save the crew chief a few seconds ended up costing 183 maintenance manhours to repair the damage.



## Differing Opinions

Another command has a program where its heavy aircraft pilots fly a Tweety Bird now and then so they'll remember what flying is really like. So these two young co-pilots were out in a Tweet together and the guy in the left seat was shooting a GCA to a touch-and-go. He touched down 10 knots fast with a late flare and bounced back into the air; that's when it got interesting.

For some unknown reason he then raised the gear—in the bounce at 80 knots with the power at idle and the speed brake extended. This got the attention of his compatriot in the right seat who pushed the throttles up to mil power and retracted the speed brake. Unfortunately, it takes 11 seconds to accelerate from idle to mil thrust in this aircraft. The right seater thought about lowering the gear when he noticed the airplane in a constantly increasing pitch attitude with air-speed down to 70 knots. The right seater put both hands on the stick and pushed forward; the left seater kept pulling back on the stick. As each pilot maintained opposite stick pressure, the Tweet gave up and struck the runway in a stall. They slid to a stop and egressed.

Now we hope they didn't let this one little disagreement ruin a beautiful friendship.





# TAC SAFETY AWARDS

## Crew Chief Safety Award



A1C Pamela K. Smith

Airman First Class Pamela K. Smith, 33d Aircraft Generation Squadron, 33d Tactical Fighter Wing, Eglin Air Force Base, Florida, is the recipient of the Tactical Air Command Crew Chief Safety Award for February 1981. During Operation Coronet Eagle, she was assigned as the Primary Crew Chief for her aircraft. In twenty-one flying days her aircraft flew 71 safe effective sorties. Working very diligently to have the "high flyer" aircraft of Coronet Eagle, A1C Smith did not hesitate to report the minor discrepancies she found on her aircraft. Her integrity and strict compliance with safety precautions qualifies her for the Crew Chief Safety Award.

## Individual Safety Award

Senior Airman Michael Hadden, 35th Equipment Maintenance Squadron, 35th Tactical Fighter Wing, George Air Force Base, California, is the recipient of the Tactical Air Command Individual Safety Award for February 1981. While approaching a tank that was pressurized for a functional checkout, he noticed an unusual sound. He quickly determined the tank had been over-pressurized and immediately disconnected the air source and bled the over-pressure, thus avoiding a possible accident. His dedication has enabled him to increase the safety consciousness of newly assigned personnel and qualifies him for the Individual Safety Award.



SrA Michael Hadden



# The Real





# Threat

By Col James Rider  
388 TFW/DO

**O**n your next combat mission, you can expect to be met by a mixed combination of fighter interceptors, missiles, and anti-aircraft guns. All of these threats will be directed by accurate ground and airborne radar systems, and only the most highly skilled and well trained crews could possibly penetrate these sophisticated enemy defenses. So, what's new? You think about this everytime you prepare for, brief, conduct, and debrief a tactical mission. Knowing and countering the threat, successfully completing the mission, and returning safely make up the name of the game.

In the Tactical Air Command today, we have the most realistic training program, short of actual combat, that I have seen in more than 25 years of flying fighters. Yet not all phases of the mission are always completed: not everyone we send out on a mission returns safely. The crew has not defeated the threat if they and their jet are a smoking hole.

During the war in Southeast Asia, we had a very high aircraft damaged/destroyed rate when operations were conducted below 4500 feet AGL. The reason quite simply was that every Son-of-a-Bolshevik out there had a weapon, small as it may have been, and he fired it at every passing US aircraft. In that case (and I realize it probably won't apply in the next conflict), a simple solution was to stay above the area where ground fire became the highest threat.

Obviously, as we rip over the enemy terrain at 500 KTS in today's projected threat environment, the priority threat at any instant may very well be different than it was ten miles and slightly over one minute ago. We have to react fast to what's around us; at the same time, we must think more than 10 miles ahead of our jet, exercise good visual lookout, check RHAW, monitor aircraft systems, and do the whole gamut of tasks associated with successfully accomplishing the assigned mission.

Consider the way we train to be able to really do this job. There are those who feel the only way

is to fly as close to the ground as they can get, hoping not to be detected. Others plan and fly profiles that use different heights above the ground, direct and/or indirect terrain masking, based on the highest threat in that segment of the mission. In reality, as surely as there are going to be times in combat that you must fly at 100 feet or less to survive, there are times that you should be at 1,000 or even 10,000 feet. Let's look at a hypothetical mission where you ingress through an area protected by fighters, transition into a rolling terrain area populated by mobile SAMs, and finally, hit a target protected by short range SAMs and AAA: a tough but typical scenario.

Take the mission apart and look at the pieces. The first threat is GCI controlled fighters. You would like to make it difficult for them to find and intercept you and at the same time limit the area of visual lookout required for you or your wingie to detect them. If your choice is to fly near the ground, you have to cover only a hemisphere of airspace. Stay high enough that your shadows won't make it easy for the enemy to find you and low enough that he can't slip up from below. To have good visual lookout behind your 3-9 o'clock line as well as staying away from your shadows, an altitude around 1,000 feet AGL seems to best fit the circumstances. If attacked by a fighter, detection probability is high, you have maneuvering room to counter the attack, and the age-old option of unload and push it up is still there. Here is the rub: in combat or in training, once you have decided to counter an airborne threat by going like blazes very close to the ground, you have just changed the threat pattern. The closer to the ground you are, the less time you can afford looking for the other threats. Your eggs are all in one basket, and that peek behind to see if he is catching up could easily be your last.

When you finally commit to as low as you can go, the most serious threat is the rocks! In training, it's the only real threat. It's not simulated; you hit it and you're dead as surely as if you were



## THE REAL THREAT



gunned by a MIG or a SAM. The difference is that the enemy never fired a shot.

But, on with the scenario: as you continue your mission into the SAM defended areas, the air threat decreases. I'm fairly confident their aerial hunters are not too interested in becoming a target for one of their own underpaid conscripts (although some capability for simultaneous engagement probably exists). Now your primary threat is a combination of radar detection, medium to long range SAMs, and the ground; in this area you may need to fly lower. Depending on how much terrain masking is available, you will probably need to be in the 300 to 500 foot range. That gives you less lookout behind the 3-9 o'clock line, but plenty of time to look and plan ahead and monitor RHAW, and still some room to maneuver. If needed, you can still take it down, but again, once you have made your move down, the rocks become the big threat.

The final run into and out of the target areas is

tough, and here is where you earn your pay. Defenses may be intense, but, if your only option is to run in at high speed in the weeds, the greatest real threat may be Old Mother Earth. The other things distract you from watching this real threat. You make your pop, put the bombs on target, and hang your backside out to all these other threats and then get back down in the weeds. While you're descending into the ground threat environment, the enemy is doing his best to get your attention at a time when even a minor distraction can give him a cheap kill.

The enemy threats are many, mobile, and good; but they are not perfect. The ultimate threat of high speed contact with the ground is almost perfect, but it's controlled by you, the highly trained, steely eyed fighter pilot. The ground won't "jump up and hit you in the face" if you keep your perspective and priorities straight when you fly close to the earth in an environment that's always high threat. ➤





## *Birds of Freedom*

Listen, over all the noise in your street  
The approach can be heard, it's an Air Force  
squad,  
My engines roar out their circular beat,  
While bouncing vibrations from sky to ground  
Look, I am here! now there  
Swifter than any bird known

Freedom is the fate of the master of the air  
And surely, I do not stand alone

Remember, my fathers were of a stouter breed  
But they carried their names clean and proud  
As I tear through the skies a new form  
I will screech their names clear and loud

Do not fear my friends, my Brothers are here  
Each different yet as strong as I  
They watch over you while listening to me  
Of this ultimate fight in the sky

Sleep well my friend, with your children tucked  
tight,

Knowing we are here and here we will stay  
Secure that we will guard you all through the  
night

As well as through the next day

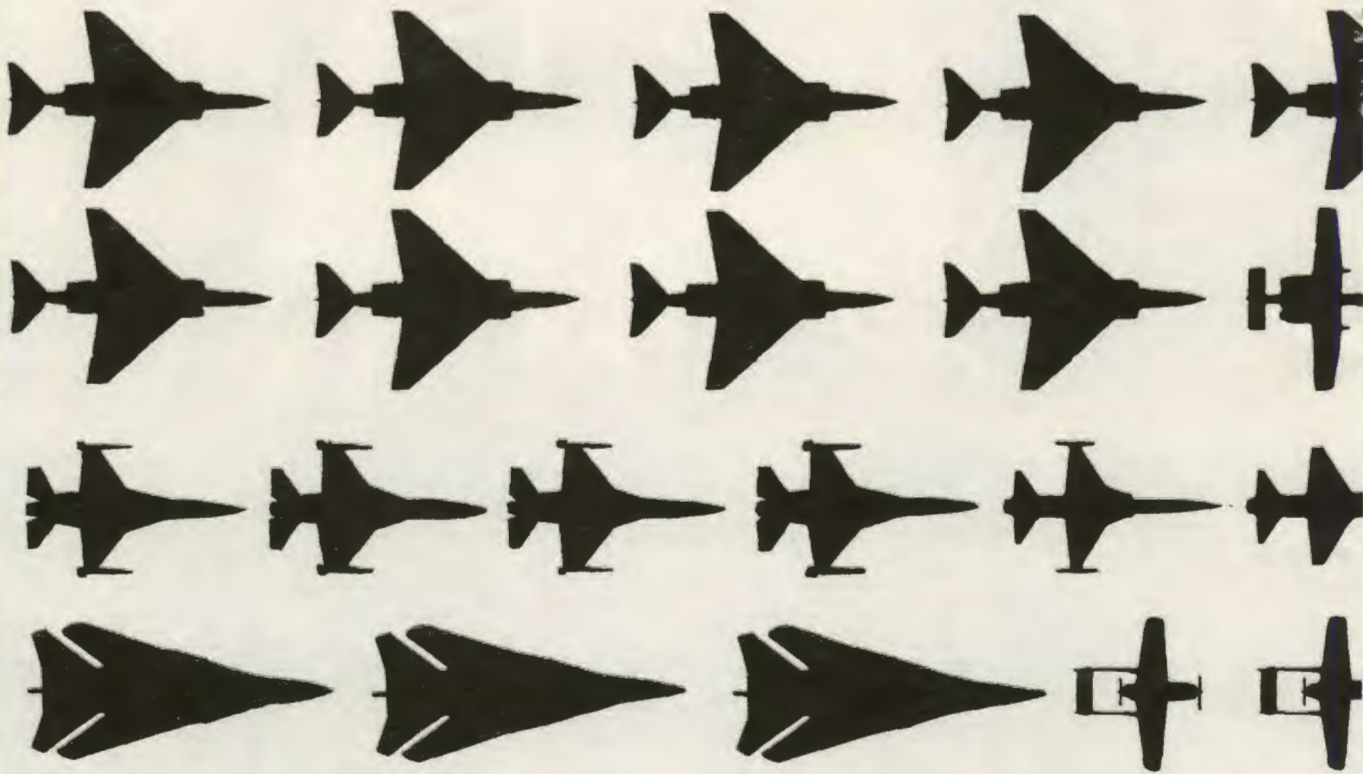
Hold on! Before you cover your ears  
And curse our thunder's cry

Pray that we will live many more years  
You pray birds of freedom we'll die

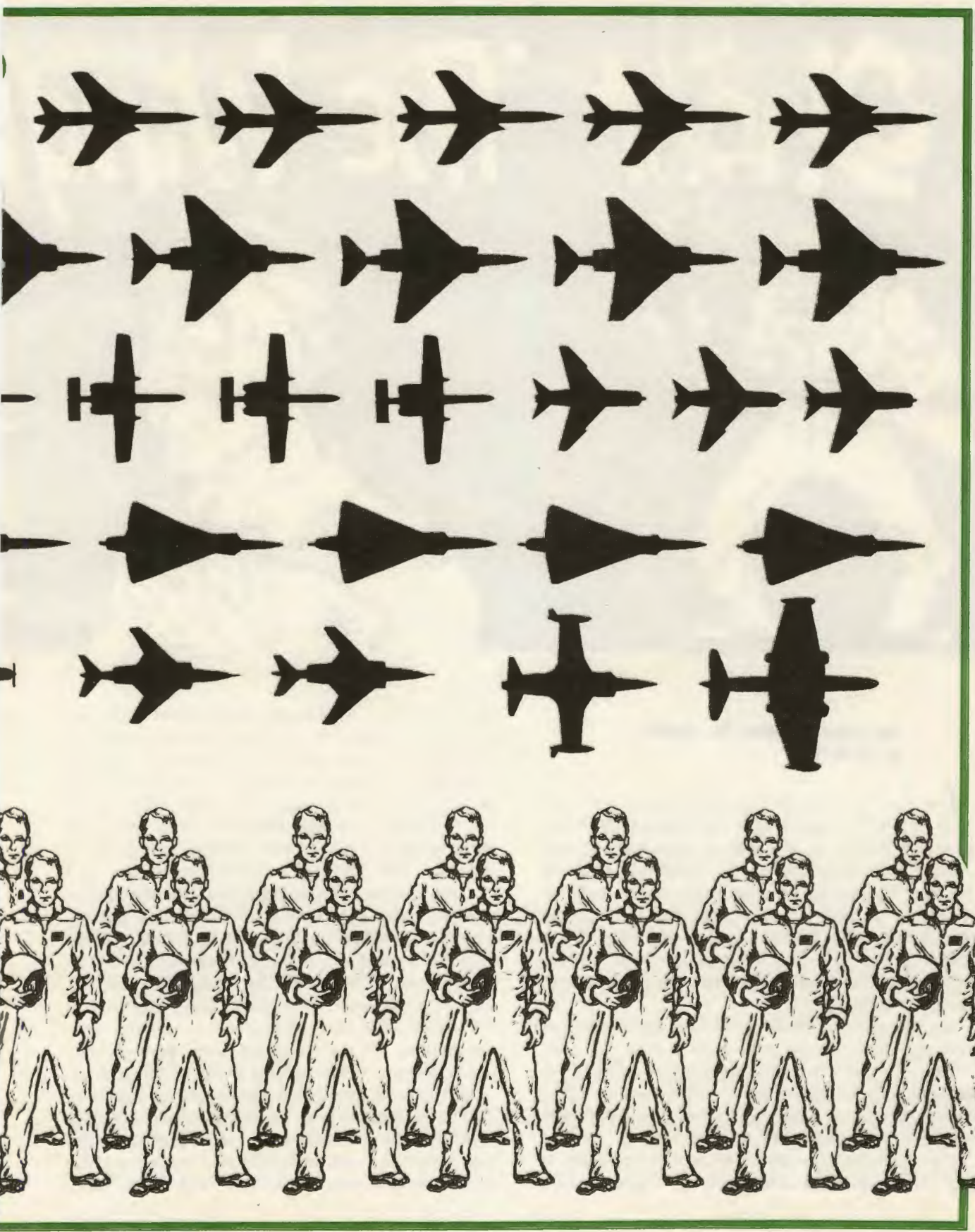
By SSgt Edward E. Kitzel Jr.  
23rd Component Replac Squadron



# TAC AND TAC-GAINED (ANG & AFR) LOSSES JAN-DEC 1980









# Shoot The Wingman



**By Capt Charles M. Quillin  
4 TFW/SEF**

The F-4 is a tandem-seated fighter with the pilot in front naturally, and the weapons systems operator (WSO) in the rear. Once seated in the aircraft the only means of communication is through the intercom. Now two people, even in the same airplane, may or may not be thinking about the same thing at any given time. So a statement by one may mean something entirely different to the other depending on the situation as each perceives it.

My GIB (Guy in Back) and I have spent enough time together to have a fair idea of how the other thinks, or doesn't think. But there have been a number of occasions when what he said (perfectly logical to him) and what I heard (made sense to me too) were not the same.

For example: We were making our first pass at the bombing range one morning. I was working

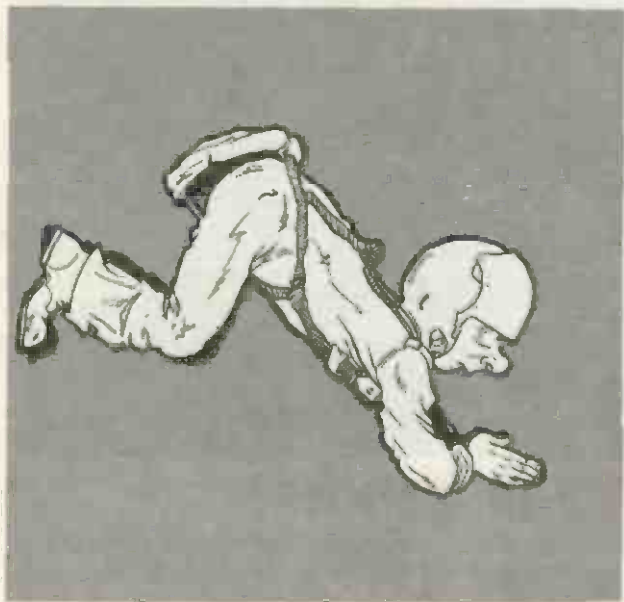
especially hard as we were trying some new tactics and I needed to get good bomb scores to complete a checkride. He was going to monitor the engine instruments while I concentrated on getting good bombs. Just as I was rolling in on the first pass and was about to get a shack for sure, he said "I don't know whether to stay in or get out." Now that sounded serious to me, so I aborted the pass and quickly scanned the instruments to see just how bad things had gotten. Everything looked normal. He had been sitting back there, perfectly relaxed, debating whether to make a career out of the Air Force or not. It was my checkride, not his, and the thing foremost in his mind was not related at all to the task demanding all my concentration. Nonetheless, his statement made perfect sense to both of us.

He did it to me again about two weeks later. This time we were in an air-to-air engagement and I was on the defensive, i.e., about to get my brains gunned out. My WSO was monitoring the F-5 trapped at our six o'clock; and I was doing



# Wingman First

my best to max perform the airplane, maximum Gs, corner velocity, and all that, when he shouted from the back. "Get out of the plane! Get out of the plane!" Right then I used up a bunch of that



finite number of heartbeats allocated to each of us. Thinking that we had enough altitude to delay ejection until I at least knew what was so catastrophically wrong with the plane, I "knocked off" the engagement and leveled the plane. He immediately asked why I had given up so easily. He had simply meant to maneuver out of the plane of attack to deny the F-5 a tracking gun shot.

Another such incident happened during a live air-to-air missile firing. There were to be two flights of two F-4s and a drone as the target. This was my first live missile firing, and I was a little apprehensive from the beginning. Plus I didn't have all that much faith in the other three F-4s radars' ability to distinguish the drone from anyone else. Just as the drone was supposed to be entering the area, I heard broadcast in the clear "We'll shoot the wingman first." Now I knew the drone didn't have a wingman but my lead

did me! There went a few more off my quota of heartbeats. Further explanation revealed that since I, the wingman, was in the best position to get a shot, I would be allowed to shoot first. Again the statement made perfect sense to both the mission commander and me. But I still didn't like his choice of words.

During a new low level route I asked my WSO, "We turn left 20° at the next turn point, don't we?" "Right!" was the response from the back and he should have known, he had the map. We hit the turn point, I banked hard right, and my GIB went ballistic. He started screaming something about us "just talking" about the upcoming left turn. Right? Correct? Oh well.

There is a serious side to this communication problem, and it could very well have contributed to a recent tragedy. Following an aborted takeoff in which the aircraft ran off the runway and caught fire, the WSO ejected both crew members as the pilot was performing a ground egress. He was unfastened from the seat and his parachute.

I think this all means that if our only means of communication is the words we say and hear, it is very important to be talking about the same thing. At least it has made my WSO and me think before we talk and, hopefully, what we say is what we meant the other to hear. ➤

Although this article is written from the pilot's point of view, I'm sure many WSOs have been equally rattled by their pilots and so on. It really boils down to having your stuff together so when you open your mouth what you intend to say is what actually comes out—and what the other guy understands is what you intend, if you haven't talked together on the ground—extensively, it isn't always going to work in the air.

Ed



# chock talk

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

## DÉJÀ VU

Remember the one where the crew chief pulled the hydraulic cart into the striker plate on a BDU-33 practice bomb (TAC ATTACK, October 1980)? The bomb functioned as designed, and the crew chief was struck in the chest by a small piece of metal. Fortunately, he escaped injury.

A month after that issue reached the squadrons, it happened again. This time the crew chief was done in by his assistant who pulled the hydraulic filler and pressurization unit into the striker plate on the BDU. When the bomb functioned, the crew chief was struck in the face by the expelling charge. He suffered first degree burns to his face and corneal burns to both eyes.

Now that we've printed the story twice, want to bet whether or not there are still ten percent out there who haven't gotten the word?

## You Write The Ending

Two outboard external fuel tanks were uploaded on an airplane that already had a centerline tank installed. The load crew came out to do a jettison check on the outboard tanks.

Load crew member 4 checked stations 1, 2, and 3 for carts. Load crew member 3 removed cart liners from the two outboard stations. Load crew member 2 did not check any stations but went directly to the cockpit. The load crew chief

then did his walkaround without a checklist, forgetting to check the centerline station for carts.

About this time, the weapons expediter stopped by to tell the load crew chief to make it a 30-day jettison check, which includes outboard and centerline stations. So the crew chief told crew member 2 in the cockpit to set up his switches for the 30-day check. Crew member 3 hooked up the meter leads to the right outboard station and the crew chief told number 2 to press the "push to jettison" switch.

What do you suppose happened next? Finish the story.



## 35-10 Violation?

The weapons troop was helping the crew chief recover his F-15. As he passed about three feet behind the left intake, his baseball style cap was pulled from his head and swallowed by the left engine. We are hoping that the damage was limited to the fan module.

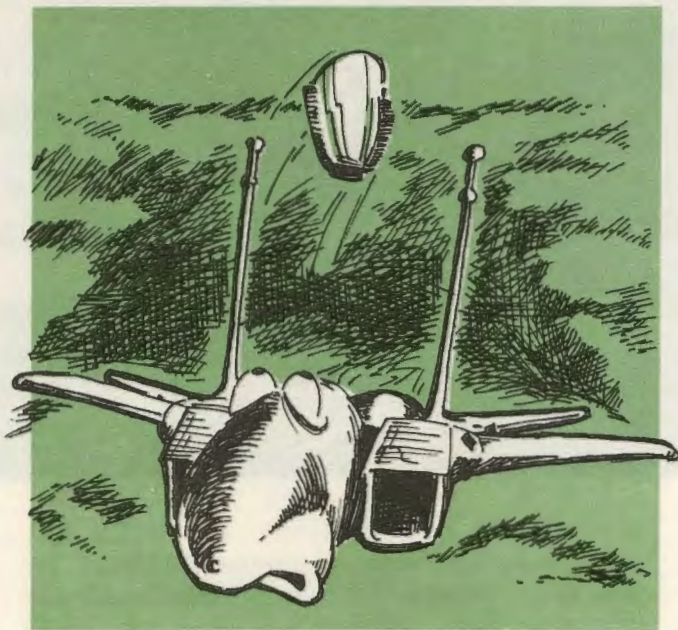




Our copy of AFR 35-10 says that headgear will not be worn "when prohibited by major commanders on their flight lines." TAC directs installation commanders to specify no-hat areas. One of the guidelines for no-hat areas in the TAC supplement to AFR 35-10 is the "flight line—all areas in which aircraft are present or are normally encountered . . ." 35-10 covers more than just haircuts; it could even save us some engines.

## Bald Eagle

An F-15 in another command was redeploying. They loaded equipment bay 5 with aircraft 780 gear and personal equipment, but the maximum height of the cargo was well below the canopy rails. The canopy operated normally when it was lowered and the canopy handle was placed in the forward locked position; the pilot confirmed that the canopy unlocked light went out. Shortly after takeoff the canopy departed the aircraft. The pilot recovered the aircraft without further incident.



What they think happened is that the cargo partially deflected the canopy locking bellcrank and prevented the overcenter lock from engaging. When that happens, the canopy can appear to be down and locked and the warning light will go out; however, the forces of cockpit pressurization and lift acting on the canopy at flying speed are enough to blow the canopy without the overcenter lock. They recommended shielding for the locking bellcrank area and tighter restrictions on equipment loaded in bay 5.



## The Not-So-Painless Drill

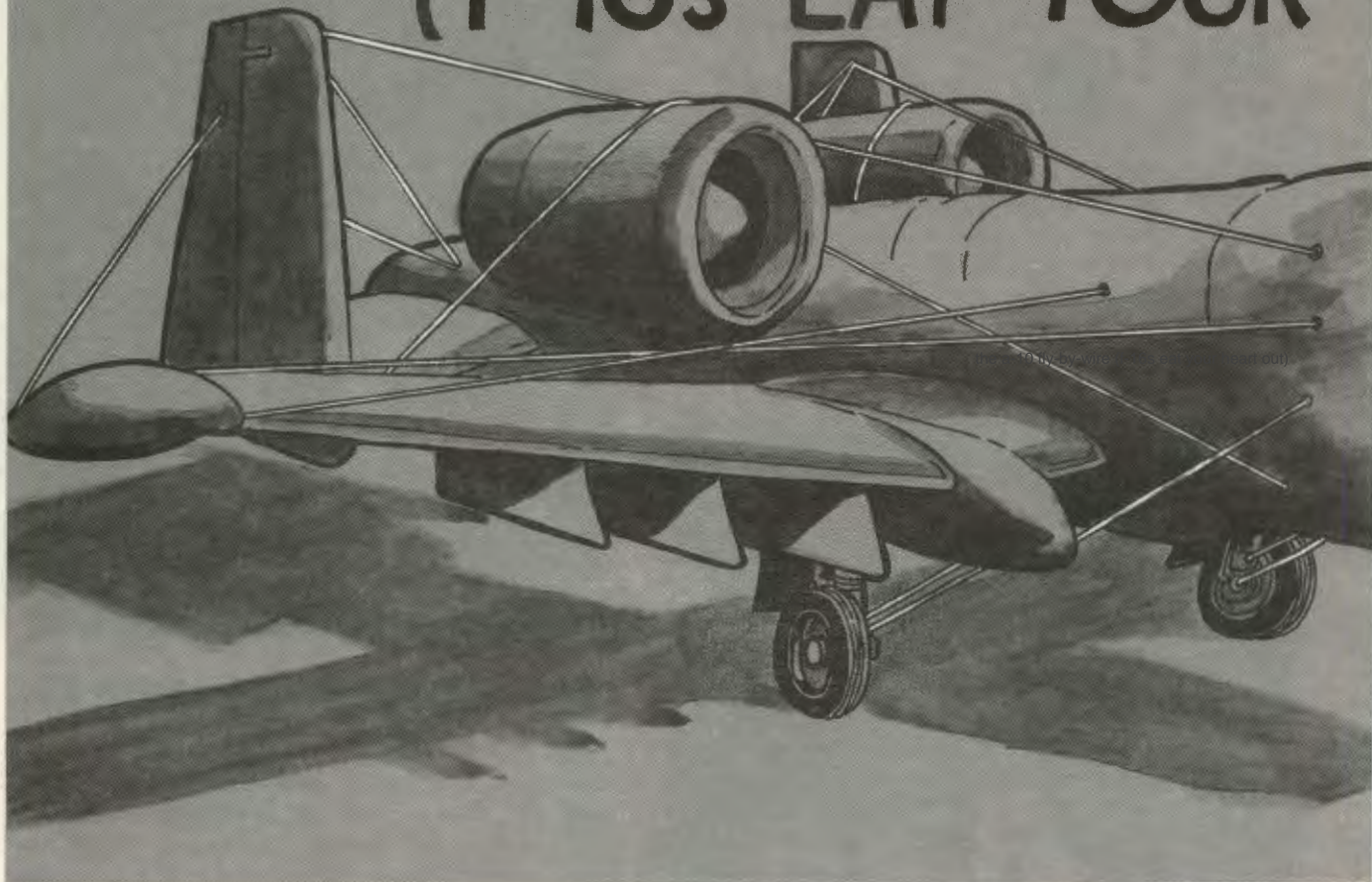
Our overseas brethren experienced an eye-opening gear problem with an F-4. After trying both the normal and emergency systems, the pilot couldn't get the left main gear down. He ended up sliding home safely on the left wing tank and two good gear.

The investigators found a defective gear handle switch which had failed sometime during the flight. No problem; that's why they put the emergency pneumatic system on the plane. Unfortunately, the pneumatic system only blew down the right main gear and the nose gear. The left main gear didn't budge.

When they looked closely into the left wheel well, they found a quarter-inch hole in the emergency pneumatic line. Directly above the hole was a jo-bolt which had recently been replaced. It seems likely that the hole was put in the pneumatic line when the old jo-bolt was drilled out. Reminds us of a dentist we once knew: he'd drill till he struck oil.



# THE A-10 FLY-BY- (F-16s EAT YOUR



**By Capt Joe Lutz  
A-10 Acceptance Pilot**

**Y**es! The Warthog does fly by wire! Not computer circuit electrical wire, rather steel wire cables—pushing and pulling bell cranks, push rods, actuator linkages, and other assorted spare parts. No magic computer directs the flight controls here, only big boots and strong, deft hands control the A-10. (More on those boots and hands later.) By now most of you Warthog drivers have guessed that we are discussing the Manual Re-

version Flight Control System, or MRFCs for short. The flight manual discusses MRFCs in great detail, so we're not going to rehash systems knowledge here. However, few of us have ever actually used MRFCs; thus it remains a mysterious, black and yellow striped subsystem—a system which, like red guarded switches, you don't touch unless you must. So when you must use it, you'll have to learn through on-the-job training, while you also compensate for the malfunctions which necessitated its use in the first place. With that in mind, let's look from a pilot's viewpoint at flying in manual reversion.

Okay, so you throw the switch to manual reversion; the Warthog is going to react with a pitch



# WIRED HEART OUT)



change during a short transition period. Which way will your Hog pitch? The answer depends on your power setting, CG, elevator trim setting, and of course, airspeed. Expect a 1G pitch-up when trimmed for level flight at 180 KIAS with both engines set to maintain your airspeed. At 280 KIAS and trimmed up, you pitch up more sharply, 2G's or more, but the onset is delayed slightly. If however, your transition to MRFCS is because both engines flamed out, expect a pitch down. The pitch changes here aren't violent, but they do require that the pilot fly the airplane (remember those boots and hands). Yes, the Warthog still flies like an airplane, even during the transition into manual reversion, except you don't use ailerons during this transition. If you need roll control, use the rudders for the four seconds it takes to complete the transition. Ailerons float up, tab shifters unlock, and caution lights illuminate, signaling transition completed. You now own a real fly-by-wire machine with direct movement of the flight controls using the stick without hydraulic assistance. Just like the power steering on your



**CAPT JOE LUTZ  
IS THIS MONTH'S  
FLEAGLE T-SHIRT WINNER**

car when the engine stops, the controls stiffen from lack of power assistance. Unlike your car however, the stick forces increase with airspeed as the air loads build. Ever wonder why you move small aileron tabs instead of the whole aileron? Try holding a sheet of plywood broadside to moderate winds, and you begin to appreciate the kind of loads we're discussing. At landing speeds of 145 KIAS, the Warthog behaves and feels very much like the T-41 (a Cessna 172); while at 300 KIAS stick forces are more like the B-57 (heavy). This is where those boots and hands must get smart and pick the best airspeed for the situation. There are ways to relieve stick forces other than just holding on and letting the Hog have its way.

Let's look at pitch control, since it's the first force noticed in transition. How do you relieve 50 pounds of back pressure? Use the trim button, but carefully and in controlled, short bursts so as to avoid trim overshoots. Elevator trim in manual is effective and can relieve reasonably large stick forces, which you need if you're pulling out of a dive at 390 KIAS with as much as 86 pounds of back pressure per G in the recovery. One thing you absolutely don't want to do in the dive recovery is pull the power to idle. You'll add about 40 pounds to the stick forces needed. As mentioned earlier, slower airspeeds reduce stick force and so do lower altitudes.

How about roll control? No trim is available to help here. In fact, loss of hydraulics removes the normal aileron trim which compensates for the natural rolling tendency of the wing. This means that in MRFCS you can expect the Warthog to be in an untrimmed roll condition with as much as 25 pounds of roll stick force at 300 KIAS at 15,000 feet MSL. However, descending to 5,000 feet MSL will reduce the 25 pounds to about 8 pounds. In addition to lower altitudes, the use of asymmetric thrust and lower airspeeds (260 KIAS or less) will reduce the roll force even more. Roll rates are reduced somewhat, but plenty of authority is available to maneuver. Asymmetric external stores, however, will reduce roll rates even more, especially stores like an ALQ 119



## THE A-10 FLY BY WIRE

pod. In these cases you must maintain a higher airspeed for roll control.

Rudders: no trim is available, but lower air speeds, asymmetric thrust, and a small bank will all help. As for pedal forces, they are higher than the stick forces. When you use the rudders, you are really throwing a big surface broadside to the wind.

At this point, those boots and hands are nearing the decision point—ejection or landing. Warthog drivers have a dandy seat, and its survival rate is well known by the average jock. Manual reversion landings, on the other hand, are less well known. The Warthog has made several full MRFCS landings, single-engine MRFCS landings, and even 45 degree dive bomb MRFCS range work, with no mishaps. Points to consider are crosswinds, runway, aircraft external configurations, and your own limitations, such as experience and proficiency.

Crosswinds are important anytime, but in MRFCS you are up against the max control authority available. In gusty winds look for another place to land, or even eject for that matter, if it comes down to that. Attempts at landing in gusty winds are a last resort! Crosswinds 20 knots or less are acceptable, but the less crosswind the better. Twenty knots of crosswind will produce about ten degrees of aircraft crab, which is the max crab desirable at touchdown

due to the side loads on the landing gear. It'll take 130 pounds of rudder pedal force to reduce the crab to about five degrees, or 180 pounds of rudder force to eliminate all crab. In addition to rudders, you may need lots of aileron for a heavy wing condition. Stores loaded on outboard pylons reduce roll rate drastically, which may be acceptable for flight out of the FEBA; but it's not for landing where you'll need to correct for low altitude turbulent air during approach. Your approach will put you in the rough air longer, since a flat approach is desired to reduce the touchdown flare. Use minimal flaring because the elevator effectiveness is reduced in ground effect, making it difficult to keep the nose up.

Before starting your approach, however, consider that concrete slab. Is it long enough for emergency brakes? Is it wide enough to permit directional control after landing with crosswinds? If you can't answer yes to the above questions, consider looking elsewhere to land. Remember, with emergency brakes and no speed brakes your landing roll will be longer; but more importantly, you have no nose wheel steering for directional control. Use the rudders to keep your Hog in the trough; they work quite well for control in conjunction with differential brakes. Differential brakes are limited, however, by the accumulator charge, so don't use it up all at once. Remember, above 70 KIAS your rudders are most effective.

All right, the last word: a pilot must know his limitations. Experience, proficiency, and ability are all key factors when using the MRFCS. Understand what the flight manual has to say, then corner an FCF pilot or jock with experience in MRFCS and hear what his experience has been with the system. After all, the weapon system is only as effective as its pilot; and the pilot is only effective if he understands his machine. ➤



**Capt Lutz told TAC ATTACK that the Air Force detachment at Fairchild Republic would like to discuss any questions about A-10 systems with their fellow Hog herders. They may be reached by calling Ft Ritchie, MD, AV 988-1300, and asking the operator for local number 733-3600, then ask for extension 2843.**



# ACCLIMATIZATION

or

# How To Boil a Frog!



By CWO2 Don L. Camacho, USN  
HC-3 Maintenance Control Officer  
NAS North Island, CA

THERE are generally three basic methods for boiling a frog. Several variations to the methods are possible, but for the purpose of this writing, only the three basic methods will be considered.

**THE FIRST METHOD.** Get a large pot and fill it with tap water. Set the frog in the pot. Because tap water is usually much cooler than the air he is used to, El Frogo jumps out of the pot.

**THE SECOND METHOD.** Get a large pot and fill it with tap water. Place the pot on a stove and bring the water to a boil. Next, get your green friend and place him in the pot. Because the water is at 212°F (100°C), the frog will jump out of the pot (wouldn't you?).

**THE THIRD METHOD.** Get a large pot and fill with tap water. Next, place the pot on the stove—with the burner off! (This method is highly technical in nature, so please pay strict attention. Don't hesitate to read this section more than once to ensure you fully understand the concept.) Allow the water to stand for whatever period of time it needs to reach room temperature. Then, set the frog in the pot!

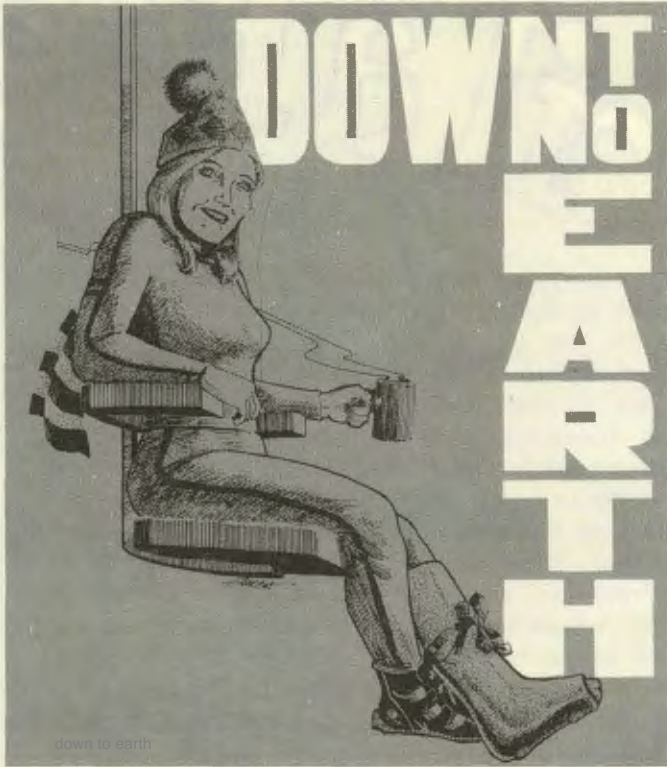
Our Ranidae friend, being somewhat of an amphibian, seems content to stay in the pot—it could even be said that he is really very happy to be where he is. He is lackadaisical, complacent, and acclimatized. By acclimatized I mean that there is little or no temperature difference between his past environment and the new one he now finds himself in. If there is any temperature change, it goes unnoticed; he adapts to his new environment.

Now, ever so slightly (in degrees), start the burner. Mr. Frog is still happy, and is swimming around having lots of fun. Again, ever so slightly (in degrees), raise the burner's temperature. The frog will remain acclimatized because the temperature is rising so slowly he doesn't notice any change. This slow process of raising the temperature (in degrees) is continued until the temperature reaches 100°C and the frog is boiled. He never realized his predicament because he had slowly acclimatized (had adapted to his environment).

Now I would like to draw a parallel between the frog and ourselves. We, in our everyday lives, acclimatize easily, much easier than the frog can. Some acclimatizing is good, but some is just the opposite and can get us in hot water. For instance, we take shortcuts (degrees), drive to beat the clock (degrees), hate to be inconvenienced with safety equipment (degrees), over extend ourselves (degrees), and don't always use proper maintenance procedures—just to name a few (degrees). For just a moment—STOP—and review your own work habits. Are YOU being acclimatized (like the frog) and don't realize it? Ribit, Ribit, Ribit . . .

Reprinted from Fall 1980 MECH.





## CLOTHING FIRES

In cold weather the fire hazards around the house usually increase. Space heaters, fireplaces, and wood burning stoves provide heat but they may also be a source of unwanted ignition when they contact flammable fabrics. The U.S. Consumer Product Safety Commission estimates that each year there are thousands of deaths and injuries from burns associated with flammable fabrics.

Fire is especially dangerous to the young because they do not know how to respond appropriately. Teach your children about the dangers of fire and tell them what to do if their clothing does catch fire. Tell them never to run. They should not remain standing but should drop to the floor immediately and roll to smother the flames.

You can help prevent clothing fires by buying flame retardant clothing for your children. Safer sleepwear should be available up through size 14, and some stores have other articles of children's clothing made with flame retardant fabric. Recently there have been some "success stories" in which flame retardant sleepwear has saved a child from what would have been severe burns if the child had been wearing flammable sleepwear.

These cases show the effectiveness of the new flame retardant fabrics. But "flame retardant" does not mean "flame proof," and precautions still need to be taken to avoid fires.

## OUR OUTLAND TROPHY NOMINEE

A mechanic was using an overhead hoist to lift an engine. In his left hand he held the pendant control box for the hoist, and as the hook descended he reached out to guide it. When he touched the hook, he was unable to release it due to electric shock. His grip was frozen to the hook until one of his co-workers saw what had happened and threw a cross-body block into him, knocking him clear. Outside of bruises from the well executed block, he suffered no injury.

When they took apart the control box, they found a screw had come loose and lodged between the "hot" lead and the metal case. The control box was not grounded; at least it wasn't until the mechanic touched the hook. Then he became the ground wire.



The unit inspected twenty-five other hoists and eight of them were not properly grounded.

Have you checked your electrical equipment for grounding lately? If not, how are your buddies at blocking and tackling? A missed block could cost you the game.



## SAFETY MESSAGE

safety message

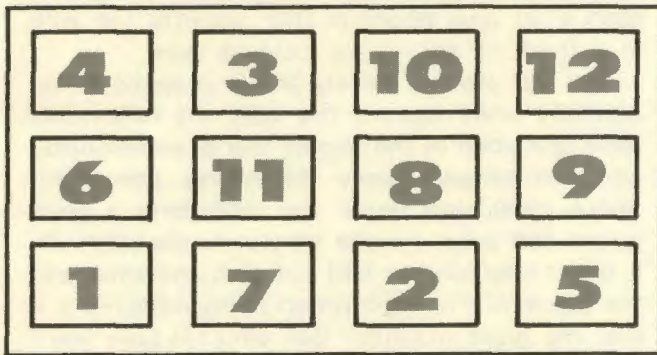
Even though my typewriter is an old model, it works quite well except for one of the keys.

I have wished many times that it worked perfectly. There are 48 keys that function well enough, but just one key not working makes the difference.

Sometimes it seems to me that a safety program is something like my typewriter—not all the keys people are working properly.

You may say yourself, "I am only one person, I won't make or break a safety program." But it does make a difference because a safety program to be effective, needs the cooperation of every person related to that program.

So the next time you think you are only one person and that your efforts are not needed, remember my typewriter and say to yourself, "I'm a key person in our safety program and needed very much."



### HOW QUICK ON THE DRAWING ARE YOU ?

National Safety Council

If you think you are able to react quickly to emergency situations, try this simple test. Touch each square in numerical order as fast as you can. Have a friend time you.

If you're average, you finished in about six seconds. If it took more than ten seconds, it could mean trouble for you as a driver.

If you repeat the test several times, you'll notice you can better your time; until you may be able to complete it in three seconds or less.

The safety lesson to be learned from the test is there can be as many objects as these 12 squares competing for your attention every minute that you are behind the wheel. A good driver will check out these threats in the order of their importance.

When threatening conditions crowd in on you, it is well to be prepared. Train your eyes to sort out every traffic conflict. You'll be a safe driver.

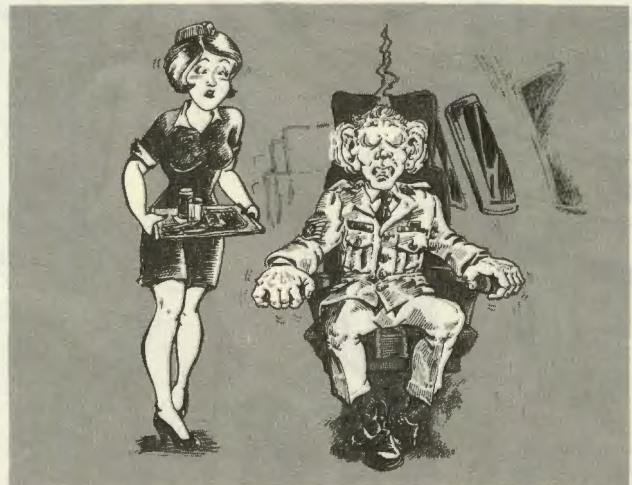
### WARMING UP THE CAR

Another problem can arise in cold weather. If you like to warm up your car, don't do it in a closed garage. Carbon monoxide poisoning is insidious. Most cars don't need a prolonged warm-up; you just need to get the oil circulating. Don't leave the garage door closed while you run it, and don't even think about adjusting your carburetor or doing other types of engine-running maintenance in a closed garage.

### EQUAL TREATMENT FOR PASSENGERS

Physiological problems aren't restricted to air-crews; passengers are subject to the effects of pressure changes as well. A sergeant overseas found that the laws of nature don't discriminate.

Before departing, the sergeant was warned by his physician against attempting air travel. He disregarded the warning and probably got to feeling smug about it halfway through the trip, since he had no problems during the climb or cruise. Then the airplane began its descent. Due to his illness, his ears were unable to adjust to the increasing outside pressure. The pain was excruciating until he lost consciousness about five minutes before landing. He was revived with smelling salts and taken to the base hospital where they treated him for pressurization sickness (barotrauma).



Maybe the doc knew what he was talking about after all—something about "Valsalva" and "Eustachian tubes."



# REFLECTIONS OF A NEW YEAR

## (the further adventures of Ben and Martha)

By TSgt Dave Tresize  
23TFW/SEG

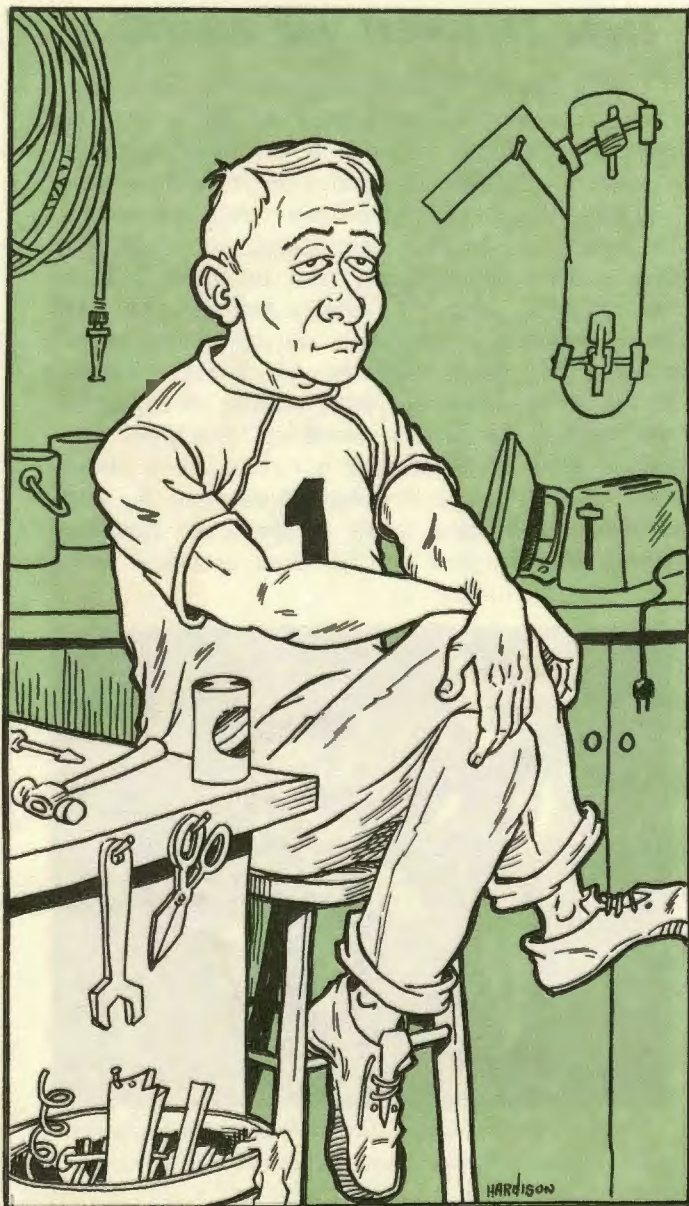
Finding me sitting in my workshop on New Year's Day with a far away look in my eye is not one of those things that bothers my wife very much. After all, she's seen the same look in several different workshops for the past dozen years now. It's time to reflect upon all which was not done the year past and firmly resolve to accomplish it all plus whatever little projects the wife may think of during the coming year.

As I sat staring meekly at the projects to do carefully lined against the wall, my reflections were disturbed by the mighty roar of an obviously ailin six-banger Chevy. Mumbling something about idiots and noise and disturbing a guy's peace and quiet, I made my way to the sidewalk. It didn't take long to find out who and what was the cause of the interruption of my reflections. It was my good neighbor Ben who I'm sure you'll remember from our earlier adventures.

Ole Ben was apparently fixing his car again. Seems like he put a lot of miles on a car that spends so much time broke. Anyway, as I gazed into his garage I was greeted by great clouds of greyish black smoke. Everything I'd ever heard about carbon monoxide came into my mind with the speed of light and clear as a bell. It also occurred to me at just about the same time that, with the kind of gas mileage Ben claimed that Chevy got, it obviously can run on just about pure air; therefore, carbon monoxide could not possibly be a problem.

Being an adventuresome sort, I opened the door and went in. Great clouds of smoke were released into the atmosphere.

Over a cold beer, Ben outlined the vast wealth of knowledge he had accumulated doing his own car repairs, just what was wrong this time (timing), and that he couldn't afford to take it down to





Charlie's Finest, Kind, One-Hundred-Per-Cent-Guaranteed Auto Repair and Pancake House to get it fixed.

The golden opportunity to try out the brand new combination timing light, dwell meter, and battery charger Santa Claus brought me had arrived. As I raced for my workshop, Ben gunned the engine a couple of times and belched clouds of exhaust into the once again closed-up garage and reasoned that my combination whatchacallit was probably a little more accurate than his piece of wire and 12 volt bulb anyway.

Once again I left the door open as I returned. Ben was leaning against the car muttering about a headache and upset stomach. He snatched my new machine from my hands, threw the instructions into the corner with a bunch of other instructions and started hooking up wires. A cool breeze came into the now clear-aired garage, so Ben shut the door again. As Ben played with the timing and said something about getting his glasses checked on account of things looking a

little blurry, I went around and opened the door one more time.

I came back around just in time to see one of the wires on my brand-new-never-before-been-used whatchacallit catch in the fan blade. Normally it would have just cut a wire, but this time it jerked the whole shootin' match into the fan. As Ben and I ducked for cover, the pieces of my whatchacallit (a) punctured the car's radiator, (b) bent the fan blades, (c) knocked off the distributor cap, and (d) landed all over Martha's flowers, which had been put in the garage after the hot water-windshield-frosty AM incident. With tears in my eyes, I gathered up the pieces hoping the warranty covered things like this; Martha screamed about Ben killing her flowers again; and Ben muttered something about having a sick headache and going to lay down for a while. It's amazing how a closed up area and carbon monoxide can cause things you never dreamed of. Yes sir, 1981 is gonna be one of those years.





## **This Will Make You Feel Better**

If you sometimes  
get discouraged,  
consider this fellow:  
He dropped out  
of grade school.  
Ran a country store.  
Went broke.  
Took 15 years  
to pay off  
his bills.  
Took a wife.  
Unhappy marriage.  
Ran for House.  
Lost twice.  
Ran for Senate.  
Lost twice.  
Delivered speech  
that became  
a classic.  
Audience indifferent.  
Attacked daily  
by the press  
and despised  
by half the country.  
Despite all this,  
imagine  
how many people  
all over the world  
have been  
inspired  
by this awkward,  
rumples,  
brooding man  
who signed his name  
simply,  
A. Lincoln.



# TAC TALLY



|                      |   |
|----------------------|---|
| CLASS A MISHAPS      | ▶ |
| AIRCREW FATALITIES   | ▶ |
| TOTAL EJECTIONS      | ▶ |
| SUCCESSFUL EJECTIONS | ▶ |

| TAC |      |      |
|-----|------|------|
| DEC | THRU | DEC  |
|     | 1980 | 1979 |
| 2   | 30   | 35   |
| 0   | 18   | 26   |
| 4   | 34   | 36   |
| 4   | 28   | 23   |

| ANG |      |      |
|-----|------|------|
| DEC | THRU | DEC  |
|     | 1980 | 1979 |
| 0   | 12   | 8    |
| 0   | 10   | 6    |
| 0   | 10   | 4    |
| 0   | 7    | 2    |

| AFR |      |      |
|-----|------|------|
| DEC | THRU | DEC  |
|     | 1980 | 1979 |
| 0   | 3    | 3    |
| 0   | 1    | 2    |
| 0   | 2    | 3    |
| 0   | 2    | 1    |

## TAC'S TOP 5 thru DECEMBER '80



| TAC FTR/RECCE              |        |
|----------------------------|--------|
| class A mishap free months |        |
| 34                         | 33 TFW |
| 27                         | 1 TFW  |
| 26                         | 31 TFW |
| 19                         | 67 TRW |
| 17                         | 58 TTW |

| TAC AIR DEFENSE            |        |
|----------------------------|--------|
| class A mishap free months |        |
| 109                        | 84 FIS |
| 95                         | 57 FIS |
| 48                         | 5 FIS  |
| 45                         | 48 FIS |
| 26                         | 49 FIS |

| TAC GAINED FTR/RECCE       |                   |       |
|----------------------------|-------------------|-------|
| class A mishap free months |                   |       |
| 104                        | 188 TFG           | (ANG) |
| 96                         | 138 TFG           | (ANG) |
| 95                         | 917 TFG           | (AFR) |
| 92                         | 116 TFW (128 TFS) | (ANG) |
| 82                         | 434 TFW           | (AFR) |

| TAC GAINED AIR DEFENSE     |         |       |
|----------------------------|---------|-------|
| class A mishap free months |         |       |
| 101                        | 191 FIG | (ANG) |
| 82                         | 102 FIW | (ANG) |
| 78                         | 177 FIG | (ANG) |
| 44                         | 125 FIG | (ANG) |
| 27                         | 119 FIG | (ANG) |

| TAC/GAINED Other Units     |          |       |
|----------------------------|----------|-------|
| class A mishap free months |          |       |
| 137                        | 182 TASG | (ANG) |
| 130                        | 193 TEWG | (ANG) |
| 121                        | 110 TASG | (ANG) |
| 117                        | USAFTAWC | (TAC) |
| 113                        | 919 SOG  | (AFR) |

## CLASS A MISHAP COMPARISON RATE 79/80

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

| TAC | 1979 | 6.9 | 7.0  | 5.9  | 6.6  | 7.4  | 6.2  | 7.2  | 7.1 | 7.8 | 7.3 | 6.8 | 6.3 |
|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|-----|-----|
|     | 1980 | 2.0 | 4.0  | 5.2  | 4.4  | 4.7  | 5.2  | 5.3  | 5.2 | 4.8 | 5.1 | 5.0 | 5.0 |
| ANG | 1979 | 0.0 | 11.4 | 9.0  | 9.7  | 7.6  | 6.2  | 5.4  | 4.6 | 4.1 | 4.1 | 4.2 | 3.9 |
|     | 1980 | 5.0 | 7.6  | 6.6  | 7.1  | 6.5  | 6.2  | 5.8  | 5.1 | 5.0 | 5.0 | 5.0 | 4.5 |
| AFR | 1979 | 0.0 | 0.0  | 19.9 | 23.1 | 17.0 | 13.4 | 11.6 | 9.9 | 8.7 | 7.8 | 7.1 | 6.6 |
|     | 1980 | 0.0 | 0.0  | 0.0  | 0.0  | 0.0  | 4.5  | 3.7  | 6.5 | 8.9 | 7.9 | 7.3 | 6.7 |

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



