# TAC ATTACK

DON'T MESS WITH MOTHER NATURE ...Pg 12

MAY





READINESS IS OUR PROFESSION

# GENERAL W. L. CREECH

LT GENERAL THOMAS H. McMULLEN VICE COMMANDER

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#### TACRP 127-1

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Authority to publish this periodical automatically expires on 22 Apr 1982 unless its continuance is authorized by the approving authority prior to that date.

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 5

# Angle of Attack

# **Heading Back Outdoors**

With the arrival of warmer weather, our fancies turn to (among other things) more outdoor activities. One thing to remember: we aren't in the same shape we were in at the end of last summer. Why do you think professional teams have spring training and summer camp?

It isn't just our muscles that are out of shape—it's also our minds. The first few times out, we find ourselves forgetting things. We need to refresh our good habit patterns.

We also don't have the timing we had at the end of last season. Our minds and reflexes need practice in

order to synchronize. We need to exercise them at slower speeds to get our timing back.

Finally, we need to find out what's new this year. Better techniques and equipment come out; rules change. For example, did you know that this year the Coast Guard requires you to carry visual distress signals on your boat? Not knowing the new rules could cost you \$500 in fines. That's no way to start the season.

So let's have fun, but be smart about it. Check for changes, start out slowly, and soon we'll be as good as ever.

Richard K. El

RICHARD K. ELY, Colonel, USAF Chief of Safety

By Major John L. Cantrell HQ TAC/XPFI

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In a not-so-far-off land there once existed the Kingdom of Meteorological Phenomena. A great variety of strange and wondrous creatures inhabited this kingdom; however, the most fearsome was the overgrown, unruly breed of cumulus tomcats that pervaded the back alleys. These enigmatic felines were truly unpredictable. Not seen for months at a time, they would suddenly pounce upon a poor, unwary traveler, wreaking great havoc upon his carriage, comfort, and personal well being.

The largest and most malevolent alley tom was known throughout the kingdom as Tommy, the Rat Widowmaker or, as called by his associates, TRW. His stormy disposition was renowned. He ruled his expansive domain—which became known as T-Storm Alley—with an iron paw, and woeful was the pitiful passerby who wandered into his grasp.

Also living in this same kingdom was a phalanx of intrepid city rats, a group of fun loving vagabonds

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who traveled the alleys extensively. These rats knew well of TRW and his friends. But because they needed to travel through T-Storm Alley, the rat community established an alley watch to advise travelers of the alleycats' whereabouts. This watch became known as the Alley Tomcat Cautioner (ATC).

Dashing, Daring, Reckless Rat (D2R2) also resided in the alleys of the city. D2R2 was of the old school and had earlier lived along the banks of the river with a group known as River Rats. The River



Rats were generally considered more worldly than their urban counterparts because they had survived many dangers not known to the city rats. They had been fired upon by marauding indigenous gunmen (MIGs) and had faced extreme environmental hazards such as sand and mud slides (SAMS).



Because of—or in spite of—his River Rat experience, D2R2 held general disdain for the precautions taken by the city rats against what D2R2 considered mere tabbies. When D2R2 felt that he needed to cross T-Storm Alley, he would do so regardless of the advice offered by the ATC.

One dark and foggy night D2R2 was returning from a social engagement at Rita Rat's. D2R2 was



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### THE PARABLE OF D2 R2

in the hurry-up mode because of a scheduled briefing he had to attend early the following morning. So he decided to take the shortcut through T-Storm Alley.

The ATC rat was on duty as D2R2 approached. "How goes it tonight, Chappie?" D2R2 asked ATC.

"Not good, D2R2. The tomcats' whereabouts are obscured by weather and darkness. I think TR has retired for the evening and you know how nasty he can be if he's disturbed while embedded. If I were you, I would take an alternate route."

"Baloney!" retorted D2R2. "I need to get on home and this is the fastest way. I'm not worried about TR possibly being embedded. I used to live on the river where we had real problems." With that, D2R2 launched up the alley.

The path grew darker as the clouds obscured the stars and the moon. The fog thickened. D2R2's built-in Rat's Alleycat Detection and Ranging (RADAR) system was not working at peak efficiency



because of his overindulgence in bubblies at Rita Rat's. As D2R2 picked his way along, he was able to see and avoid several playful cumulus kittens, called baby bumpers. This should have alerted him that TR or one of his comrades was probably also in the area.

But D2R2 pushed ahead through a particularly dark patch of fog. In the dazzling strobe of a lightning flash D2R2 first saw the awesome TRW, in midair, leaping towards him. D2R2 attempted to turn and escape but was too slow. TR had D2R2 in his claws and was tossing the rat about like a toy before D2R2 had taken a step.

Alerted by ATC, the city rats searched the alley in the pale light of morning, but were unable to find any trace of D2R2. Rita Rat was despondent for days, but she was finally able to find some solace in the company of a new companion. D2R2 was neither seen nor heard from again.

Moral: The wise rat never underestimates any threat, be it MIGs, SAMs, or TRWs.



# Aircrew of Distinction

Capt Keith A. Lewis, weapons system officer, and 1st Lt Gary A. Frith, aircraft commander, were flying an F-4E on a single ship, low-level navigation mission. At 500 feet above the ground and 480 knots airspeed, they struck a large turkey vulture which shattered the right windscreen. Bird remains exploded into the cockpit, destroying several engine instruments. Lieutenant Frith's mask was dislodged from his face, and his visor was shattered. He received facial lacerations and a corneal abrasion on his right eye. As they had briefed ahead of time, Captain Lewis immediately took control of the aircraft, climbed to a safe altitude, and decelerated. Unable to communicate with the pilot or determine his condition, Captain Lewis turned the aircraft towards home base and began emergency coordination with the supervisor of flying and approach control. He asked for a chase aircraft to join up with them. Lieutenant Frith, aware that Captain Lewis had control of the aircraft, tried to clear his vision and reconnect his mask. He then checked front cockpit damage and attempted to establish intercockpit communication. Only after Captain Lewis slowed the aircraft to 220 knots were the two men able to communicate with each other. Lieutenant Frith then took control of the aircraft. Captain Lewis continued to make all radio calls due to the noise in the front cockpit. Bird remains also almost totally obstructed vision through the windscreen and canopy. The chase aircraft joined with them and helped line them up with the runway. Captain Lewis reviewed the checklist and briefed Lieutenant Frith who flew a flawless wing approach. They landed and successfully engaged the approach-end arresting cable.

The professional competence, airmanship, and superior crew coordination displayed by Lieutenant Frith and Captain Lewis prevented a more serious mishap and possible loss of life. They have earned the title of Tactical Air Command Aircrew of Distinction.



Capt Keith A. Lewis 68 TFS/347 TFW



1st Lt Gary A. Frith 68 TFS/347 TFW

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Make your ear attentive to wisdom, Incline your heart to understanding.

-PROVERBS 2:2

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

#### SOUTHPAW'S SNARE

A pilot overseas discovered that the F-15 has a special trap for the left-handed. He had diverted because of weather. At 14 miles out on final approach to his divert field, he reached up and lowered the landing gear handle. Besides the gear coming down, the centerline pylon and tank jettisoned off the aircraft.

The pilot was left-handed. Approach control had just given him a frequency change, and he wrote it down. When he reached for the gear handle, pencil still in hand, the pencil hit the jettison button.

Now on that one, Murphy outdid himself.



#### POOR FORM(s)

The old "forms in the nosewheel" trick has shown up in about every fighter we've owned. Guess it was just a matter of time until the F-15 joined in.

This Eagle was on a cross-country flight. Two minutes after takeoff from the base where he'd stayed overnight, the pilot noticed a red warning light in the landing gear handle. He slowed down and recycled the handle. The light went out, so he continued his climb. When he leveled off at 30,000 feet, he felt a thump. Even though his engine instruments showed everything normal, he decided to return to the base he had just left. He landed without any problems.

Afterwards, when he and some maintenance troops looked the plane over, they found a large part of the binder for the aircraft's Form 781 lodged against the front of the fan of the number one engine. Another small part of the form's plastic cover was wedged in the left main landing gear door. When they investigated further, they found considerable damage to the fan module and the high compressor section of the engine core.

An all too familiar chain of events led to the damage. First, transient maintenance placed the forms in the nosewheel well after servicing the aircraft. Second, the pilot left them there. Third, the F-15 has one and only one place from which the forms can fall out and enter an engine. That place, of course, is the nosewheel well.

The transient alert troops showed poor technique in stowing the forms in the nosewheel well. But the person responsible for reviewing the forms and securing them is the pilot. That's fair; after all, he has the most to lose.

#### THE HEAD-ON GUN SHOT

By the rules of engagement, the A-10 can take a head-on gun shot during air-to-air maneuvers; no other aircraft can—in peacetime. Some of the hog drivers who've tried that shot have come back with their eyes watered. It isn't something you can take lightly.

Say you're in an A-10 hassling with an F-15. You turn to meet him head on. He continues for a headon missile shot which is okay by the rules. Now you are both responsible for breaking off the attack far enough out to ensure safe separation of your aircraft (500 feet minimum). So, how far out will you break off your attack? When should you take your simulated gun shot in order to break off in time?

If he's at 500 knots and you're at 300 knots, that's 800 knots of closure, or 1,350 feet per second. It'll take 1 1/2 seconds to roll and pull enough to gain 500 feet of separation. Add a second for reaction time, and you have 2 1/2 seconds, which equates to 3,400 feet. That's where you have to break off your attack. Your simulated gun shot will probably be at least 1 second long. That means opening fire at 4,700 feet out. Of course, your pipper placement had to occur prior to that. If you spent a second moving the pipper before shooting, you'd better have begun at 6,000 feet, at least.

Let's run it through in our minds. At a mile out we move the pipper onto him, then we squeeze the trigger for 1 second. Next, we come off the trigger and roll right and pull. We miss by 500 feet.



Now think about what happens if you misjudge your distance out; after all, you're only eyeballing it. Think also about what happens if you haven't planned your breakoff maneuver, and your reaction time increases over a second. Think about it now, on the ground. You won't have time in the air.



#### SPEEDBRAKE GETS THE REBOUND

An F-16 returned to land on a wet runway in light rain. The pilot flew it to an on-speed touchdown 500 feet from the approach end. He used aerodynamic braking, holding the nose up to increase drag. As he crossed the arresting cable, he felt and heard a sharp thud. Postflight checks revealed a 3-inch crack on the bottom of the right speed brake leaf.

The culprit wasn't hard to find. The approach-end arresting cable had F-16 paint on it. The cable could be raised by hand about 12 inches; that's normal for cables under tension. On the other hand, during aerodynamic braking, the F-16's lower speedbrake leaf is 7 inches above the runway. That's about the length of a hand. At speeds around 100 knots, the arresting cable is very likely to rebound into the speedbrake.

So, it looks like you have to choose between speed brakes and aerobraking until you get across the cable in your F-16. That's the problem with sports models: they're built so close to the ground.

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# TAC TIPS

#### HOW NOT TO CHASE

Two A-37s had just taken off on a tactics mission. The pilot in number 2 wasn't able to raise the gear handle. He climbed, kept his airspeed down, and called for number 1 to check him over.

Number 1 joined up on number 2 in fingertip position on the right side to look at number 2's nose gear. He didn't see any problems from there, so he moved into close trail to get a little different perspective. He still couldn't see anything. He moved forward underneath his wingman to get a better look. While number 1 was looking at number 2's nose gear, his airplane began drifting up. When he saw that he was closing, he tried to turn away, but it was too late. Number 1's right pylon tanks hit the front of number 2's left tip tank, and the right side of number 1's horizontal stabilizer hit the rear of the tip tank. They separated; each declared an emergency and did a controllability check. Another A-37 from their unit gave them each a close-but not too close-lookover. Both of them landed without further problems.

It's easy to let our desire to help override our good sense. Directly underneath the wingman in close formation is no place to chase. When we look up, we tend to drift up. Don't try to get as close a look at the gear as you do on a preflight. The price of that kind of look is too high.





#### FUEL GAGE OR FOOL GAGE ?

If we were flying O-2s, we'd raise our bingo fuel after reading this report:

The O-2 took off with 100 gallons of fuel on board. After 4.3 hours, the rear engine quit even though both main fuel gages showed 10 gallons remaining. The pilot switched the rear engine to feed from the left main tank and restarted it. He smartly headed for home. Just as he arrived over his home field and began a descent, both engines quit. The pilot tried every possible combination of switch settings, boost pumps, and emergency cross feed until he finally restarted the engines in the main tank position. The engines coughed and sputtered during the descent. The rear engine died on final approach, and the front engine quit during the landing rollout.

In the chocks, the main fuel gages still showed 4 gallons remaining on the left and 7 gallons remaining on the right. The maintenance troops drained the tanks of every last drop of fuel, and the gages still showed 4 gallons on the left and 7 gallons on the right. So they changed the probes and recalibrated according to the tech data. When they drained the tanks again to check the low side reading, the gages showed 3 gallons on the left and 4 gallons on the right. They repeated the entire recalibration exactly according to the tech order and still came up with the gages showing 3 to 4 gallons when the tanks were empty.

That may seem insignificant, only 3 or 4 gallons: but when your minimum fuel reserve is 6 gallons in each tank, the error means half of the reserve fuel may not be there. That's why we'd raise our bingo fuel.

# TAC Safety Awards



SSgt Robert A. Marion

#### CREW CHIEF SAFETY AWARD

SSot Robert A. Marion, 31st Aircraft Generation Squadron, 308th Aircraft Maintenance Unit, 31st Tactical Fighter Wing, Homestead Air Force Base, Florida, is this month's recipient of the Tactical Air Command Crew Chief Safety Award. Sergeant Marion recently discovered a defect in an F-4 he was launching which could have led to the loss of the airplane and possibly its aircrew if the problem had gone undetected. During preflight, he found a discolored paint area on the bottom of the right wing. Suspecting an electrical malfunction in that area, he ran an electrical system check which revealed no problems. After the aircrew arrived and started engines, Sergeant Marion rechecked the discolored area. He found that the area became excessively hot when the flaps were lowered. Suspecting a boundary layer control (BLC) problem, he notified the aircrew, who had no cockpit indications of a problem. The aircrew concurred with aborting the flight. A panel was removed and the ruptured BLC duct was found. Later tests also showed structural damage in the wing caused by the 500°F air in the BLC system. Sergeant Marion has since submitted a suggestion which would provide cockpit warning of this type of problem. He is well deserving of the TAC Crew Chief Safety Award.



SSgt Donald D. Cameron

# INDIVIDUAL SAFETY AWARD

SSgt Donald D. Cameron, 552d Aircraft Generation Squadron, 552d Airborne Warning and Control Wing, Tinker Air Force Base, Oklahoma, is this month's recipient of the Tactical Air Command Individual Safety Award. Sergeant Cameron, an electrical systems technician, identified and corrected a serious electrical problem on an EC-135K. The aircraft was scheduled for inspection and replacement of the external power circuit breaker. While inspecting it, Sergeant Cameron noticed a wire that showed signs of overheating. He troubleshot the system to find the cause of the overheating. His trouble shooting revealed that two circuit breakers had been left out of the system during a previous TCTO modification of the system. The purpose of the two missing circuit breakers was to protect the external power circuit from overloading when external power is applied. Further investigation revealed that 307 C-135 type aircraft in the Air Force and the Air National Guard had the same serious problem. It is likely that Sergeant Cameron prevented a major mishap. His alertness and professionalism qualify him for the TAC Individual Safety Award.

By Major Jim Mackin Editor AIR FORCE

We are again entering that time when Mother Nature increases her stormtroopers in the field. Her thunderstorms feed on the heat provided by the summer sun. A well fed thunderstorm is a terror to any pilot with enough sense or experience to recognize danger. Some of our hairiest experiences in Southeast Asia were provided by Mother Nature. That's because we'd press our luck with her in order to get the job done.

# DON'T MESS WITH MOTHER NATURE

Mother Nature can be a formidable foe, and thunderstorms are her front line troopers. We ought to know what we're getting into before we decide to tangle.

A thunderstorm has power. The amount of heat energy released by a thunderstorm as it precipitates a half inch of rain over a square mile is 17 trillion calories. The Hiroshima atomic bomb released 20 trillion calories. The updrafts and downdrafts in a thunderstorm can build tremendous force. Drafts may reach speeds of 15,000 feet per minute. Aircraft that entered a thunderstorm have been displaced as much as 6,000 feet up and 8,000 feet down. The average thunderstorm can outperform most of our aircraft. For instance, a T-38 in military power at 20,000 feet and Mach 0.8 is capable of an instantaneous rate of climb of 5,700 feet per minute. A mature thunderstorm could eat it like a grape.

Those up and downdrafts also cause turbulence and gusts. The turbulence in a thunderstorm will turn you every which way but loose. The storm lets you know who's boss, and it's difficult to hold your aircraft's attitude (your own attitude will have long since been changed). Where the downdraft hits the ground it spreads out and causes surface gusts. The worst of these is the so-called first gust. It can get up to 100 knots in the extreme, and it precedes the storm by as much as 10 miles. Sometimes the gust isn't obvious on the surface, but the wind speed changes dramatically only 150 feet above the surface.

I learned about first gusts when I blundered through one in an A-10. I was trying to lead a formation landing, and we were racing the bad weather to the field. Approach control gave us a close-in base turn to avoid the weather. When we turned final for a precision radar approach, it looked like we had it made. The field was in front of us in the sunshine, and the bad weather was behind us. My wingman was tucked in nicely. On short final, about 300 feet in the air, we hit the windshear. Instantly, we lost airspeed and started sinking. I pushed up the throttle, closed the speedbrakes, and signaled my wingman to push it up. He stayed on my wing as I went around. Fortunately, I'd been carrying an extra 10 knots of airspeed so my wingman would be more comfortable. That comfort margin may have been our safety margin. It wasn't until after we landed (out of single-ship approaches) that the surface wind started to gust and swap directions.

Believe me, you don't have to be in the thunderstorm for it to threaten you. In addition to the first gust, hail can reach you in the clear air as far as 10





miles downwind. Severe turbulence can occur in the clear air around the storm and in the anvil as far as 30 miles downwind.

And of course, there's lightning. That's what makes a thunderstorm thunder. If you fly near a thunderstorm, you can expect lightning strikes. Normally, when lightning strikes an aircraft, damage is slight. But there are occasions that'll get your attention, like this one:

The F-4 pilot was making a left turn descending through 6,500 feet in the weather at night. He noticed static electricity building on the pitot tube. Something flashed off the left wing. Suddenly the whole world seemed to light up with an intense flash of light. The airplane was jolted sharply. Both fire lights lit. The pilot began a climb out of the weather using his tachometer, angle-of-attack gage, and attitude indicator; he had lost the UHF radio, heading indicators, INS, and airspeed indicator. After he got on top, he found a break in the clouds and descended through it. He sighted his field and lowered gear and flaps. The aircraft yawed and rolled to the left, but he controlled it. The aircraft was difficult to turn to the left. Both fire warning lights were still lit, and smoke was coming from both sides of the cockpit. The pilot dumped pressure and got rid of some of the smoke. At three miles on final, all the lights and instruments went out. He turned on the floodlights. Although he told his backseater to be ready to eject at any time, he continued the approach using thrust setting, attitude, and feel as his references. He landed and engaged the approach-end barrier.

That crew doesn't look lightly at the effects of lightning. And we haven't even mentioned the atleast-theoretical possibility of fuel ignition by lightning.

These stormtroopers of Mother Nature's have much more armament. Icing can cut you down in a hurry. It increases your weight at the same time it decreases your lift. Precipitation static can wipe out your communications. And if the thunderstorm gets tired of playing with you, it can finish you off with a tornado. Tornadoes can extend as high as 35,000 feet inside the spawning thunderstorm.

So you see, a thunderstorm is a formidable foe. Personally, I've given up hassling with them. I go out of my way to avoid them. And if I find myself in a situation where I'm not sure whether I can avoid them, I'll turn tail and run home. I know when I'm overmatched.

## Another saga of Ben and Martha... BEN LEARNS MORE ABOUT DINGS



By TSgt Dave Tresize 23 TFW/SEG

Ben joined me on the patio at my house with a six pack of "Old Suds," \$1.49 a case. Leave it to Ben to get the really good stuff.

I wasn't sure I was prepared for it, but it appeared as though he had something on his mind and was determined to talk about it.

He explained that a friend of his worked in AGS and they had been raked over the coals because of some minor little dings on an ejection seat, and he didn't think it was any big deal about those dents and dings, and he wanted me to explain to him why it was such a big deal. I sighed and marveled at his ability to construct such a sentence with obvious ease.

The fact is that someone had not followed the proper procedures in checking the seat travel while it was in the "aero bird." After all, it does clearly state in the tech data to check on the belt buckle before moving the seat, I explained.

This didn't impress Ben as being worth making an issue out of a few dents, so I tried another direction on him. I told him that the guy who didn't use tech data on a job like the ejection seat wasn't too apt to use it on another job either. Ben came back with "El Toro Poo Poo," and I knew what that was Spanish for. His theory was that the guy obviously knew the job on the seat well enough not to need the tech data.

My turn. "El Toro Poo Poo," ole buddy. Tech data gets used all the time. This business with the seat is just a case of no tech data and carelessness.

The word carelessness caused Ben to get a little ballistic. Fact is, he launched into a speech that lasted all the way through a can of "Old Suds." I could see it was time to get this thing down to a little more personal level.

I quickly reminded Ben of the "little" ding he made when be threw hot water on his frosty windshield back in January and the fact it was no big deal when the pot he threw busted up Martha's flowers. Ben said he didn't want to talk about it.

I reminded Ben of his carelessness when the wires of my brand new, never-before-been-used combination timing light, battery charger, and dwell meter caught in the fan blades of his Chevy and got busted up and the pieces landed on what was left of Martha's flowers. He just blinked.

I was rolling now. I reminded him of the car door he pushed into the new Caddy (another blink). And remember how mad you got when you were moving in and the movers got a little careless and dropped your TV. And how about all those instructions you threw in the corner and never even looked at.

Ben held up his hand for silence and conceded that maybe the guy should have used the tech data, and probably was a little careless in not making sure the buckle was clear, and they probably should have been chewed out a little, but he honestly believed things were out of hand a little.

I asked him to put himself into a pilot's position. How would you like to fly that plane knowing that some guy who was a little careless about moving that buckle might have been a little careless in putting in the thing-a-ma-jigs that make the seat leave the bird in a have-to situation?

Ben commented on how a can or two of "Old Suds" always did make him see things a little clearer. I gritted my teeth and thought maybe counting to 1,000 would be better than just to 10.

# -Sopwith 7F 1 Snipe







#### TRAPPED

We remember when the most popular reason for not wearing seat belts was fear of being trapped inside the car. A recent motor vehicle fatality shows instead that you can be trapped by not wearing a seat belt.

In this case, an airman was riding with a civilian friend. The driver lost control of the car, and it rolled into a 6-foot deep drainage ditch. The airman, not wearing his seat belt, was thrown part way out of the car and pinned between the driver's door and the side of the ditch. He suffocated.

Avoiding being trapped is a reason to wear a seat belt, rather than a reason not to wear one. You have to be conscious and mobile to escape from a car that's on fire or sinking in water. If you let yourself get tossed around in an auto mishap, you're likely to be unconscious or immobilized by injury. Don't rely on being thrown free of the car by chance. Wear your seat belts and shoulder harnesses; then you'll be able to unbuckle and leave the trap.

#### FUMES FLARE UP

During a walk-through inspection of the corrosion control area, the unit's safety NCO noticed sawdust and debris on the floor of the mezzanine. The mezzanine, accessible only by fixed ladder from the ground floor, was the atmospheric equipment area and was separately maintained and ventilated. The debris resulted from civil engineering work in the area. The corrosion control NCOIC scheduled cleanup, and one of his workers volunteered for the job. After sweeping down the area, the worker found grease stains on the floor near the boiler. Desiring to do a good job, he decided to scrub it up. He put about a guart of methyl ethyl ketone (MEK) in an open plastic bucket and began scrubbing the stains with a brush. As he scrubbed, the MEK fumes reached the boiler's pilot light, ignited and exploded. The worker scrambled back down the ladder and suffered only minor abrasions. The damage was small.



We got off with a cheap lesson. MEK is effective and safe when used in the controlled environment provided in corrosion control. But anywhere else, especially near an open flame, it can be lethal.

#### FUMES, AGAIN

This time some troops were given the job of preparing a farm tractor for a local "top wheels" contest. They pulled the greasy, grimy tractor into a two bay garage and closed the doors. In trying to clean it, they first used PD-680. Then they sprayed it with ether from an aerosol can of starting fluid. When neither of those worked well enough, they tried gasoline. Every now and then, one of the workers would try to open a garage door to air out the place, but the others would say it was too cold, so they kept the door closed. After removing the grease, they touched up the paint using aerosol spray cans. By the end of this detail, several workers were complaining of nausea and dizziness; but they got the job done.



The next day, the same crew met in the same garage. The smell of gas and ether was still in the air. During the meeting, one of the workers began to breathe erratically. An ambulance was called and took him to the hospital. What first appeared to be a heart attack turned out to be hyperventilation. Another worker came down with similar symptoms and was treated for inhalation of toxic vapors.

Again we got off lightly. The whole place could have been torched off by a spark. Even without a fire, the workers could have suffered eye damage and chemical burns. It's worth our time to get the correct chemical for the job and then to use that chemical properly.

#### THE BENZENE CONNECTION

Since we're discussing vapors, let's consider benzene. Benzene is found everywhere as a component in our fuels. It is in greater concentration in gasoline than in jet fuel, but they both have enough to be dangerous. Benzene is volatile, which means it vaporizes easily. A confined area containing fuel is bound to be full of benzene vapors.

If you inhale high concentrations of benzene, it may at first stimulate your central nervous system. You might feel excited or giddy. But that feeling will be followed by a period of depression. You could feel tired and dizzy. Then your chest feels tight, and you become breathless. You could pass out. Convulsions and tremors occur. Finally, death may result from respiratory paralysis or circulatory collapse.

Of course, benzene is also flammable and explosive. In addition, you can suffer from long term exposure to much lower concentrations of benzene. To protect yourself, don't keep any fuel in a confined area. If you work with benzene, ensure you have the protection specified in AFOSH 161-7. If you should find someone who has breathed in large amounts of fuel vapors, get the exposed person to fresh air immediately. Summon medical help; and if breathing stops, apply artificial respiration.

Know all the fuels around you for what they are dangerous poisons. Treat those poisons with respect, and you'll be able to use them safely.



TAC ATTACK



By Mr. Mike Byers

Imagine, if you will, a small farm in the rural South. The dusty, red clay road, shaded by Spanish moss hung trees, is as quiet as a temperance hall on the day Prohibition was repealed. From behind the barn, Ol' Shep, the resident chicken-stealing hound, lopes out and flops down in the middle of the road to enjoy an ill-gotten feast of one of the farmer's Rhode Island Reds. Ol' Shep is happily munching away when, over the hill at 80 miles per hour, comes Jimmy Bob Watson in a loaded cement truck. Ol' Shep looks up from his lunch with the canine equivalent of "?" only to find a rusty bumper 2 feet from the end of his snout.

OK, let's hit the stop-action button here, with Jimmy Bob's Diamond Rea (Jimmy Bob is a traditionalist) about 300 microseconds from impact. Now, we'll take this imaginary film around the country and show it to, oh, maybe a million people and ask them what they think the result of this

encounter will be. Chances are very few people will say: "A black hole appears, swallows Jimmy Bob and the truck; and Ol' Shep spits out the chicken feathers." Most people will say: "Ol' Shep gets mashed" or something like this. If we were to pursue this rather dubious research further and ask why Ol' Shep gets mashed, we would probably get some different answers. A physics professor might say: "Because the vehicle is of such a mass, and traveling at such a rate. Ol' Shep can neither survive the impact nor escape." Jimmy Bob himself might say: "Cause there ain't no dawg stronger than this here seement truck." Both statements are essentially correct and it is apparent that most people, even though they may have never heard of  $F=\frac{1}{2}MV^{2}$ have a reasonable, working knowledge of the laws of physics. After all, this knowledge is needed to survive the hazards of everyday life. Those who fail to gain it or continually refuse to apply it will probably not survive for long. Like Ol' Shep, they will eventually meet their cement trucks.

Now, let us consider Major Froggwicke-Marsden, soon to be late of the Royal Flying Corps, over the Western Front in his Sopwith Camel. The good Major, in an excess of high spirits after a successful meeting with Leutnant von Schwinelich (definitely late of the Fliegertruppen), decides to try an outside snap roll. The Camel's upper wing spar does what you might imagine;



and the Major, albeit in a more spectacular and expensive manner than Ol' Shep, also gets mashed. There is no doubt that the laws of Mr. Newton's mechanical universe, and violations thereof, led to both accidents. These laws are not subject to debate by lawmakers, interpretations by judges, or evasions by scofflaws. Ignorance of the law is no excuse, and the physical world's attitude toward human (or canine) desires is neatly summed up in a line from a song: "You can ride to hell or glory, makes no never mind to me" ("The Highland Light," by Norman Blake). A good case can be made for the idea that ignorance of physical law is the cause of all death, since it can be seen that if one has the answer to every question in every situation, a successful outcome can be assured. This may sound good but, in reality, becomes impractical as situations become more complex. Would information on impact equations have saved OI' Shep, even in the unlikely (in view of his henhouse depradations) event of his owner making the effort to educate him? Very doubtful, and it is just as doubtful that Major Froggwicke-Marsden would still be around to bore the old boys at the club with his war stories if his CO had demanded that he learn stress analysis. In short, we can say that pure knowledge, while helpful, will not totally give us the desired results, e.g., not getting mashed.

Since we can't legislate safety and it is impractical to gain enough pure knowledge of the physical world to successfully deal with the complex situations in which we find ourselves, a different approach must be developed if we are to survive. This becomes particularly important if we plan to survive while blasting through the sky at high velocity in large chunks of metal, performing complicated tasks. Someone once said something to the effect that, "The air, like the sea, is not inherently dangerous but is unforgiving of any carelessness, incapacity, or neglect." This is errant nonsense! The sky and the sea (or for that matter, the land) are downright dangerous, and attempting to breathe water, fly without an airplane, or sleep on a Los Angeles freeway will demonstrate this fact. An unprotected human simply cannot survive for very long in our complex environment. To take this a step further, even the finest physical protection won't help much if you don't have the knowledge to use this protection within its limits.

What safety regulations, rules, and procedures can do is provide a way of effectively dealing with complex situations, without requiring superhuman knowledge or apparent violation of physical laws (commonly known as "luck"). Granted, many regulations, etc., appear to be complex but, in comparison to the quantity of pure knowledge required to give the same results, are guite simple. Safety rules (good ones, at least) are simply a way to reflect the real physical world in usable data that can be applied to actual events. These rules will continue to grow in complexity as technology advances. The challenge is to develop rules and procedures that allow effective use of technology, reflect the real world, and are usable and understandable. We can be assured that the universe will not change in at least one respect: It will mash a fighter pilot and a chicken stealing hound with perfect impartiality. The trick is to stay out of the road. >



#### QUICK FIX MAINTENANCE

This story has nothing to do with Air Force maintenance, but it's a lesson in how not to run an airline:

An Air Force flight safety officer was a passenger on a local airlines overseas. About 25 minutes after takeoff, he noticed the cowling on an engine on the right side come loose and eventually separate from the aircraft. Apparently the pilot declared an emergency because the airplane was met by fire trucks when it landed. Airline personnel said that they had parts and a mechanic on the way to fix the engine. The airplane spent about three hours on the ground. The mechanic wrapped the engine with aluminum colored tape, and with that "fix" the airplane took off again. Our flight safety officer figured the tape bundle would come off at takeoff; and, in fact, it did begin coming off at takeoff and completely separated in 5 minutes. Wires, pneumatic lines, and such were exposed to the airstream. The passengers became concerned; one of them tried to get into the cockpit but was stopped by the stewardesses. The captain calmed them down. They flew to their next scheduled destination where the pilot made another excellent emergency landing. Our flight safety officer got off the airplane at that stop. As he left, he heard the PA system announce the loading of passengers for the continuation of that flight.

One thing we can say for "quick-fix" maintenance: It keeps your pilots proficient in emergency landings. ... incidents and incidentals with a maintenance slant.

#### BAD WEATHER SAVES THE DAY

A runway sweeper in another command was working late at night. At 0200 hours in the morning, it ran out of gas. The driver left the sweeper where it was, 100 feet off of center line in the middle of the runway touchdown area, and walked in to a nearby fire station. He called his squadron to be picked up. When he arrived at the squadron, he left a note on his supervisor's desk saying that the sweeper was on the runway out of gas; then he went home. Nobody else knew about it.



At about the same time, the command post received a radio call from an aircraft with an emergency. The crew was looking for a place to land. The stage was set for a major mishap: the emergency aircraft was large and would probably collide with the sweeper just after touchdown. Fortunately, weather intervened. Poor weather was forecast at this base for the next hour, so the emergency aircraft landed elsewhere. At dawn, the sweeper was found during the early morning runway check. Chalk up one save for the weatherman.

#### AW SHUCKS, FOD

At the end of the runway, the weapons specialist was arming the SUU-20 on an F-111 when he noticed a fuel leak. Fuel appeared to be leaking from the leading edge of the wing between the SUU-20 and the engine blow-in doors. The blow-in doors are actually air inlets that draw extra air into the engine during ground operations and low speed flight. The weapons specialist sent his partner to get the APG crew chief to examine the leak. As the weapons specialist was pointing out the leak to the crew chief, the MAU-12 pin stowed in his jacket was sucked through the middle blow-in door and into the engine. It caused over \$60,000 in damage to the engine.

The reason the pin was stowed in the weapons specialist's jacket was because he didn't have a pin bag. He and his partner only had one bag between the two of them, even though they separated to opposite sides of the airplane when they pulled the pins. His partner was carrying the pin bag and was going to come around to his side of the airplane to get the rest of the pins. But when the first troop spotted the fuel leak, that plan was changed. He had temporarily stowed the pins inside his jacket and zipped it up with the pin's streamer hanging outside when he went forward. As he raised his arm to point out the leak, the streamer with pin attached was sucked through the blow-in door.

Sixty thousand dollars can buy a lot of pin bags. If the weapons specialist had carried one, he'd have gotten an "atta boy" for spotting the fuel leak instead of an "aw shucks" for clanking up the engine.





#### FEED THE COMPUTER

The computer at the Air Force Inspection and Safety Center has a nifty new capability. It's called "auto trending." The computer compares Category I Materiel Deficiency Reports (MDRs) with mishap reports and spots dangerous trends. When it discovers an increasing failure rate, the computer flags it and calls it to the attention of the center's analysts. The flight safety project officers get the word and pass it on to the people who can do something about it, the users and suppliers. If the system works as planned, we should be able to prevent some mishaps caused by materiel failure instead of reacting to the mishaps afterward.

The success of the program depends on what's fed in to the computer. That's where all of us can help. Let's make sure we submit Category I MDRs when they're called for.

A Category I MDR should be sent in for any emergency condition that presents, or has the clear potential to present, an unacceptable hazard. If the materiel problem caused a mishap, obviously it calls for a Category I MDR. The problem comes when we try to decide what has or doesn't have clear potential to create a mishap. Another command, for example, recently lost an airplane due to engine compressor disk failure. The investigators learned that there had been 18 disk failures prior to the mishap; five had been reported as Category I MDRs. Of the rest, eight were reported as Category II MDRs, and five were apparently not reported at all. Even with auto trending, the safety center wouldn't have known that the trend was increasing. The computer currently can't track Category II MDRs, and it certainly can't track reports that aren, t submitted.

We can help prevent a repeat of this kind of mishap. Let's submit Category I MDRs when, in our best judgment, the problem could cause a hazard. The computer can't give out good information unless we put good information into it.



#### OOOPS, WRONG BUTTON

The F-105 pilot was doing his cockpit check just before engine start when he unintentionally hit the emergency jettison button. That blew all the external stores off the airplane. Fortunately, the drop tanks were empty.

The pilot was trying to hit the test button for the landing gear's warning system. The test button is about an inch to the right of the emergency jettison button. The pilot said he normally looks at the button when he presses it, but this time he broke his habit pattern and looked at the gear warning lights instead. He must have been surprised at the results.



This incident shows us a couple of classic cause factors: a cockpit design deficiency and a broken habit pattern. In the short term, we can't do much to correct design errors. Every piece of equipment has design problems, and we can't change that overnight. But we have to learn what they are so we can compensate for them. Then we have to pay special attention when we are dealing with the problem area.

Broken habit patterns are a constant problem (although some habit patterns deserve to be

broken). Often it's caused by a momentary interruption in our concentration. Our mind gets out of sync with our actions. We need to stop and resynchronize before we go on. In this case, the pilot normally looked at the button while he pressed it, and then he would look at the gear lights to see that they worked. But his mind skipped a step and got out of sync with his hand. Now, let's be honest: Hasn't that happened to all of us? Most of us just caught ourselves in time, before the results were so dramatic. The only preventive is concentrating on what we're doing when we're doing it.

#### **POOR TIMING**

The automatic loader for the A-10's 30-mm gun is one impressive piece of equipment. It's really a help in loading when it's used correctly. But, like all of our equipment, sometime and somewhere, someone is going to skip one of the steps in his procedures; and then it won't work so well.

Sure enough, a weapons load crew in a unit new to the A-10 was uploading 30-mm ammo when the loader head jammed. Two rounds came apart and scattered gunpowder on the ramp. The GAU-8 ammo chute on the A-10 was damaged and so was the automatic loader.

It seems that before you upload, you're supposed to align the timing of the loader head and the aircraft's access unit. The access unit has a timing pin which engages a hole in the drive gear. If you align it and insert the pin, it'll stay aligned. If you don't, it'll probably jam.

In this case, the loader had jammed twice during loading before it jammed hard enough to cause damage. The loader was trying to tell them something, but no one listened.

#### TROUBLESOME TROUBLESHOOTING

Nothing seems to be harder to track down than undisciplined electrons. A few years ago, the F-4 suffered from problems with the potting compound. Electrons headed in one direction would cut across the bad potting compound and take off in another direction entirely. In one of those birds, every movement of an electrical switch was an adventure. Then trying to duplicate the problem to track down the fault could turn into a career's work.

Nowadays, we can run into the same kind of problem with wires chafing. It can be a trouble-

shooter's nightmare. Take the case of the missing fuel tank, for example:

The F-4 was flying in a 2-G left turn when the aircrew felt a mild thump. A short time later, they noticed the light which indicates a centerline tank is aboard had gone out. (Uh-oh!) They decided to go home and make a precautionary landing. Sure enough, when they shut down in the chocks, they found the centerline tank was AWOL. Make that desertion, since the flight was over the ocean and chances of finding the tank were nil.

The investigators checked the bird over with the proverbial fine-tooth comb. Everything checked out. The aircrew said that they hadn't used any armament switches during the flight, but the investigators bench checked the station select panel anyway. It checked good. They took out the fuel control panel and checked it for shorts across the terminals of the external stores emergency release switch. It also bench checked good. All the armament panels and switches were inspected, but nothing abnormal showed up. The wire bundle in the liquid oxygen compartment was pulled and tested; it was okay. They checked the aircraft's maintenance history for weapons problems but found none.

Then the investigators tried a new tack: they flew the airplane with a modified cart tester in the centerline station. They flew it six times, each time pulling different circuit breakers hoping to identify the source of power that caused the tank to jettison. No luck. On each sortie, they found a cart firing voltage when the airplane was pulling 2 G's. They ran a GWM-4 check and found some faults. They ended up pulling the left engine. In the left bay, they found a wire bundle with two wires chafing against a metal bolt. The bolt was for a clamp on the oil line vent, and the clamp was about an inch above its correct position. The wires involved allowed electrons to wander between the special weapons centerline arm circuit and the centerline emergency jettison circuit. And we all know what wandering electrons can do.

This persistent troubleshooting led to a commandwide inspection of F-4s for that type problem. To us, it seems like an impressive bit of sleuthing.

#### **BDU BREAKOUT**

It started with a trailer full of BDU-33 practice bombs. It ended with 36 of them rolling around on the ramp. One of them went off, firing the spotting charge. The rest of them stayed safe and were eventually policed up.

The load crew overseas had finished loading their last airplane and were making a tight 180degree turn to head back to the munitions holding area. That's when the BDUs broke loose. They were supposed to be held in place by the storage bins on the trailer, but those bins had been made locally for an earlier model of the bomb. That model was loaded nose first which kept the weight close to the center. The later model BDU has a nose striker plate which prevented loading nose first. The bins also weren't inclined enough to resist centrifugal force in the turn. The investigators found that a speed of 10 mph was enough to dislodge the bombs in a hard turn. The speed limits were 15 mph on the ramp and 5 mph when operating near aircraft. They probably shouldn't have gone over 5 mph, but they may have misunderstood the limits.

Terms like "near" or "in the vicinity of" aircraft may not always be clear to us, but we should play it safe if we're not sure. We also have to be very careful when we begin using equipment a little differently than before; in this case, for a slightly changed bomb, the equipment was unsatisfactory. We should check it out before we assume it'll work.

TAC ATTACK

# HELP US-HELP YOU

Every two years, we run a how-goes-it survey of our readers. The idea is to keep in touch and get your opinions. Since you are the audience we want to reach, you should take the time to answer the survey.

We know how short of time you are, but squeeze out a few extra minutes to tell us how to do our job better. If the only ones who give their opinions are people setting behind desks like ours, we may wander off course without knowing it. You can keep us on track.

There's another thing you can do to help us: write. We rely on your articles. Don't think you have to be a great writer; just communicate your message. Send it to us, and we'll take care of the rest that's our job. But we need you to provide us with fresh ideas.

So, answer the survey card and mail it to us. Then take some more time to write us about that idea you've been carrying around in your head for a while, the idea that'll help others do their job better. You can make us a better magazine; help us help you.

HARNISON

#### Reader Response Form HOW WOULD YOU RATE THE FOLLOWING TAC ATTACK MATERIAL?

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JOB AND RANK:

#### Reader Response Form HOW WOULD YOU RATE THE FOLLOWING TAC ATTACK MATERIAL?

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# An Instrument Pilot's Ten Commandments

1. Seat thyself well upon thy fifth vertebra; leaving not thy fingerprints on the controls, and chewing not on thy fingernails.

2. Know thy instruments; for they are the true and appointed prophets.

3. Follow the indications of thy instruments; and verily the airplane will follow along, even as the tail follows the sheep.

4. Do not stick out thy neck a foot; stay within the confines of thy ability, and thou shalt live to a happy old age.

5. Know the appointed words and approved methods; so that if thy neck drapeth out, thou shalt be able even unto thyself to place same in its proper place, upon thy shoulders.

6. Follow thy radio beam; for its ways are the happy ways and will lead to the promised land-ing. 7. Listen carefully; yea verily, to the signal impinging on thy eardrum, for sometimes they seem to have the tongues of snakes, and will cross up thy orientation, to the sad state to where thou must ask Heaven Herself for guidance.

8. Assume not, neither shalt thou guess that thy position is such; but prove to thine own satisfaction that such is the case.

9. Boast not, neither brag; for surely Old Devil Overcast shalt write such words in his book, and thou shalt, some day, be called for an accounting. 10. Trust not thy seat (of thy pants), but follow thy instruments. Read and truly interpret the word as given from thine instrument board, know that the responsibility lies not with the hand that rocks the control column, but in and with the mind that directs the hand, and thou shalt be blessed with a long and happy life.

Reprinted from "Lessons That Live," as told by Army Air Force pilots. Date and location of publication unknown.





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#### Dear Editor,

The March 1981 TAC ATTACK Aircrew of Distinction award raises some significant concerns. That report summarizes an F-16 control loss with pitch up and roll to inverted out of control flight in night IFR conditions. The pilot is stated to have recovered in a valley surrounded by mountains.

Captain Kopren must be commended on his successful recovery. As such we have bestowed upon him a "right stuff" commendation. If he had "recovered" into one of the surrounding mountains we would have also been the first to give a "delta sierra" award for delaying the decision to eject.

There are a large number of aircrew deaths each year because of the late decision to eject. Descending under 10,000 out of control calls for a mandatory ejection. It is the opinion of this flight surgeon that he should have punched out. The next aircrew attempting to duplicate this feat will probably not be so lucky.

Hugh S. Moseley, M.D. Lt Col, OR ANG, MC, FS

#### Dear Dr. Moseley,

We don't encourage staying with an uncontrollable aircraft below 10,000 feet, either. All of the flight manuals recommend against it and so do we. For brevity's sake, we eliminated some of the details of Captain Kopren's incident. When he was inverted in the weather, he was well above 10,000 feet; and he was in a dangerous posture to eject. When he reached 10,000 feet, he was upright, the aircraft was responding to him, and he broke out of the weather. His continued descent into the valley was controlled. It seems to us that Captain Kopren's intelligent decision in a situation conducive to panic earned him the award. ED

#### Dear Editor,

. Lt Col Peck's letter reminds me of the old story about an Air Force and a Navy jock discussing the aerodynamics of flight and specifically the use of (a) the stick to control airspeed and (b) the throttle to control altitude or vice versa. The Air Force chap was sure it was vice versa, and, since he possessed a twoplace aircraft, he offered a demonstration to prove his point. They proceeded to the ramp, hopped into the aircraft, and taxied to the runway. In position on the runway, he began to pump the stick fore and aft with the throttle in idle. When the Navy type asked him what in the world he was doing, his acid reply was that he was attempting to get up enough airspeed for the aircraft to fly.

#### Dear Anonymous,

That's a good story; but, of course, it doesn't really answer the question. Most of the time we don't care what the real answer is because we use both controls to get what we want. If we want to climb, we add thrust and pull back on the stick; if we want to descend, we pull off some thrust and push forward on the stick. Where it makes a difference is those times when we can't do both simultaneously; such as when the engine quits or when the throttle is so far back it'll take all day to accelerate the engine. Those are the times we need to know our aerodynamics, especially if we happen to be in the "region of reversed command." Anytime we are below (L/D) max airspeed we are in that region, and most of us fly our approaches at airspeeds less than(L/D) max. It's the backside of the thrust curve because the slower the airspeed, the more thrust required. If the thrust isn't there, we sink when we slow down. In most of our airplanes, if we have the power at a low setting and we pull back on the stick, we are going to increase our rate of descent. If we pull back on the stick and push up the throttle, we're going to increase our rate of descent until the engine catches up with the throttle. And that's worth knowing. Ed

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