

TAC ATTACK

AUGUST 1982



Angle of Attack



In August of 1912, 70 years ago, airplanes took part in Army maneuvers for the first time. Two Signal Corps planes, piloted by Lieutenants Milling and Foulis, flew in an exercise at Bridgeport, Connecticut. Since then, we've taken part in many Army and Air Force exercises. We've learned things we never would have learned without exercises, but we've paid a price in planes and crews lost.

One part of the increased risk in exercises is apparently due to increased task loading on the aircrew members. The article "Vigilance and Distraction" offers a view of the problem of trying to do too many things at once. The old advice to take things one at a time still seems to be sound. Although it's written from an A-10 pilot's perspective, the article provides food for thought for all of us.

Another article, "Situation Awareness: Bah! Humbug!" should stir more thought. The premise is that the term *situation awareness* is too vague to be useful in preventing mishaps. The real problem is more specific, and so are the solutions to the problem. How we train daily has a great deal to do with whether we have "situation awareness" problems during exercises.

Communication is another common problem during exercises. To help improve communications with Eagle drivers, we present the "Eagle Glossary," compiled by the first class of ADTAC F-106 drivers to go through F-15 conversion. It's facetious, but it points up the fact that to learn from each other we need to be talking the same language. We can't assume that all our listeners understand us. We should look for questions and be happy to answer them. Exercises give us a chance to find out what others do to support the mission, but only if we learn to communicate with each other.

Seventy years of exercises have shown both how valuable and how difficult they can be. Right now, if you aren't in an exercise, you're probably preparing for one. How you prepare today determines how you'll work in your next exercise. Prepare well.

Richard K. Ely
RICHARD K. ELY, Colonel, USAF
Chief of Safety



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MAJ JIM MACKIN
EDITOR

STAN HARDISON
ART EDITOR

MARTY DILLER
EDITORIAL ASSISTANT

SGT DAVID GARCIA
STAFF ARTIST

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TACRP 127-1

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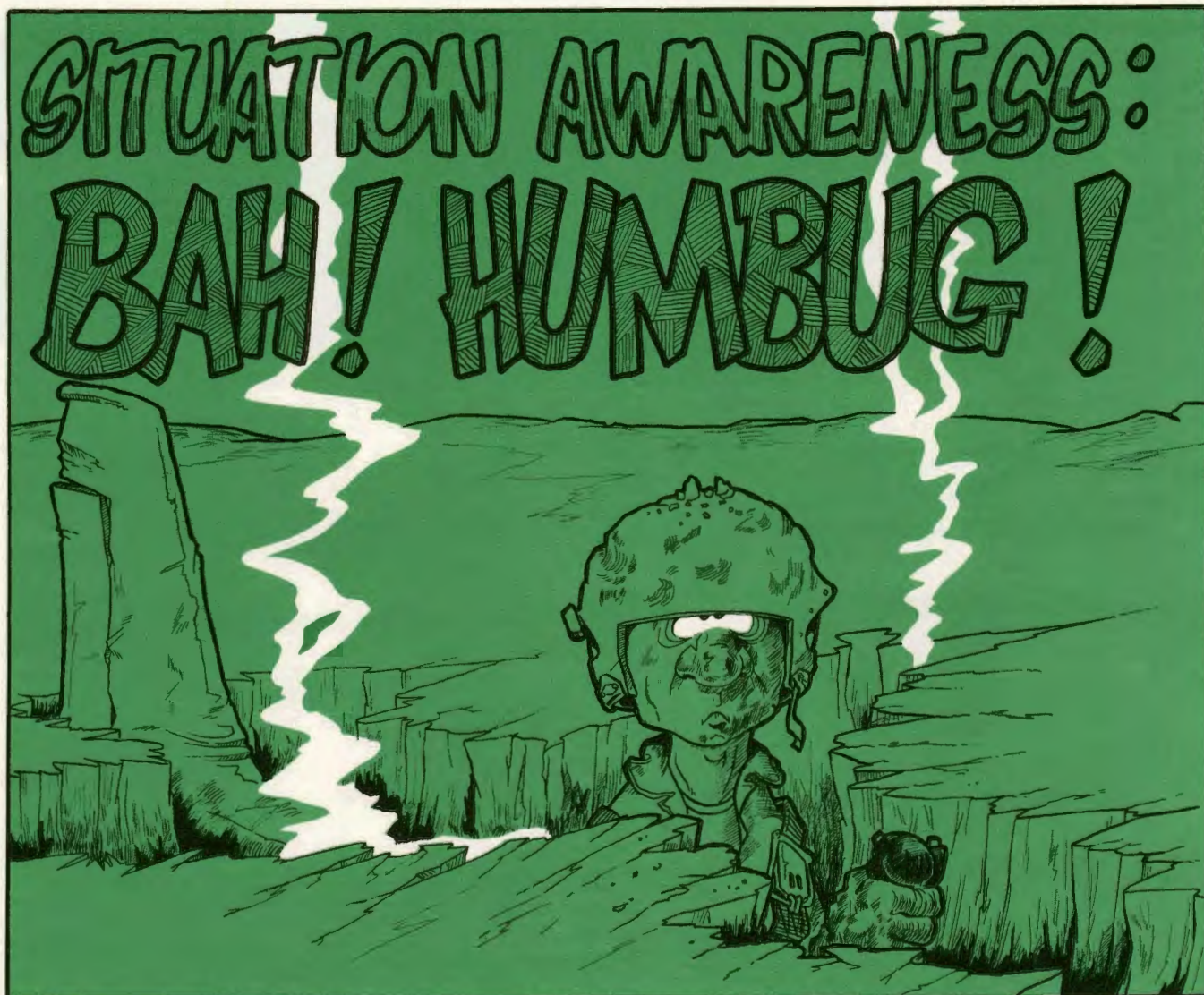
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VOLUME 22 NUMBER 8



By Maj Jim Mackin

"Situation awareness" is not a new cliché of the flying community, but it has become a favorite. And no wonder: we can blame almost anything on a lack of situation awareness. If a pilot flies into the ground, the cause is either a lack of situation awareness or suicide. After all, if he had known what was going to happen, he wouldn't have done what he did, unless he was trying to kill himself. Therefore, we could divide all operator-factor mishaps into two categories: lack of situation awareness or suspected suicide.

The trouble with *situation awareness* is that it's too abstract and general. That's what makes it so easy to use and yet so useless for preventing mishaps. If you're an instructor, how do you teach situation awareness to your students? Do you just tell

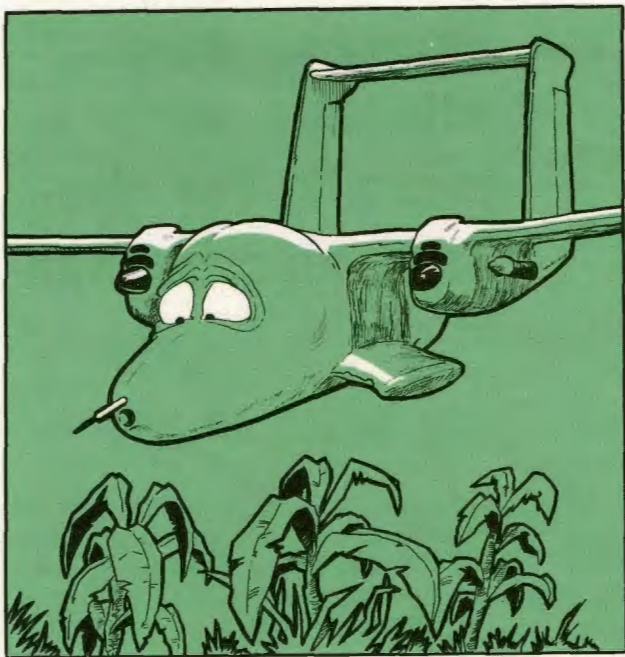
them to have it? Some briefing guides have situation awareness as a subject; how do you brief it?

The only way to deal with the problem is to be more specific and more concrete. What we're really talking about is a failure to see a danger, to recognize it as a danger, and to react correctly to the danger. We're talking about three separate problems, not one. Oddly enough, all three of these areas are related to experience.

It's true; even what we see is affected by what we know—our prior experiences. Think of the first time you flew an air-to-air mission: how hard it was to see the bogies until it was too late. As you flew more missions, you began to see the other airplanes sooner. You learned how to look, and you saw more.

The ability to organize and recognize what you see also improves with experience. The new FAC

has trouble spotting the friendly and enemy positions even when he sees the same things the experienced



FAC sees. Based on his prior knowledge, the experienced FAC organizes what he sees into a coherent whole. The experienced air-to-air pilot does the same kind of thing: he organizes rates of closure and angles into an estimate of the threat. He had to learn to do that.

As experience affects how we see and recognize a threat, it also affects how we react to it, especially if the correct reaction goes counter to our instincts. A good example is the need to pull into a threat when our instinct is to turn tail and get away from it. When we've been properly trained, the correct reaction becomes nearly instinctive.

Experience is the key to seeing, analyzing, and reacting properly. And experience is the product of training. We can't teach or brief "situation awareness"; but we can train pilots to see better, to analyze better, and to react better. We can do that safely if we do it one step at a time, making sure the pilot is handling the basics before we let him handle the more complicated problems. What we cannot do is throw a pilot into deep water to see if he can swim and then chalk the loss up to "a lack of situation awareness" when he sinks. If the pilot lacked "situation awareness," so did the flight commander who let him fly the mission, the scheduler who put him up for it, the operations officer who concurred, and the squadron commander who approved the schedule.

Instead of chasing "situation awareness," let's build a concrete training program. Let's teach pilots

how to look for a target or another airplane before we make them assess and maneuver against the threat. Let them practice at altitude.

Then let's teach them to analyze and set priorities before they react. Teach the pilots we're training to be conscious of the ground as a threat even when they're training at higher altitudes. At 10,000 feet the ground is a factor if aircraft control is lost. From there on down, the priority of the ground as a factor steadily increases. At very low level it becomes overwhelmingly important—more important than getting a good score against a plywood tank.



Finally, let's train to react according to our analysis of priorities. A maneuver that's appropriate at 5,000 feet might be deadly at 500 feet; if we've made the ground top priority, we won't use the wrong maneuver at the wrong time. We can't keep track of everything, so we have to concentrate on what's most important. That may mean at very low altitude that we can't react at all to other threats; we must concentrate on flying the aircraft without hitting anything.

We can survive without total "situation awareness"—we have to, we're never aware of everything—but we must learn to see, analyze, and respond to what's important. We learn to do that through supervised training. That's why every mishap caused by "lack of situation awareness" should be considered instead a failure in training or supervision. It was we trainers and supervisors who lacked awareness, not just the pilot. ➤

TIPS

God is too senior to be anyone's copilot.
— USN Weekly Summary

AUTOPILOT EXCITEMENT

Shortly after takeoff, the pilot of an F-4E noticed that the left engine oil pressure gage was out of limits. At 93 percent rpm, the oil pressure indicated 110 psi. At idle the pressure dropped to 85 psi, then crept up to 95 psi. The pilot set the throttle at 80 percent rpm; the oil pressure rose to 110 psi and stayed there, even when the pilot pulled the throttle back to idle. The pilot shut down the left engine to prevent damage to it. Then he held at 21,000 feet to reduce fuel until the airplane was light enough for landing.

While he was holding, the pilot decided to put the airplane on autopilot. When he engaged the autopilot, the airplane snap-rolled right. The pilot stopped the roll at 110 degrees of bank. Using aileron and rudder, he righted the airplane. The autopilot had not disengaged itself, so the pilot hit the paddle switch. The airplane abruptly pitched down about 10 degrees. With the automatic flight control system (AFCS) disengaged, the pilot flew the airplane in for a successful single-engine landing.

It turned out that the oil pressure problem was simply a broken ground wire on the pressure transmitter. The autopilot problem was due to the AFCS amplifier being out of adjustment. The AFCS problem would have been found during the pilot's preflight checks if he had done them according to the Dash One. But he hadn't checked the AFCS. In the air with one engine out is a heck of a place to be trying out a system that wasn't checked on the ground. Bet it got his attention, and he won't skip over the ground checks again.

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

GUESS WHAT'S MISSING

During preflight of an F-5E, the pilot noticed the landing gear handle was up and the landing gear reset switch was not reset. So he placed the gear handle down and reset the switch before starting engines. After start, he saw a red warning light in the gear handle. The pilot tried to get rid of the light by cycling the gear reset switch. He moved the switch out of Reset easily enough, but he couldn't move it back to Reset. He got a screwdriver from the crew chief and used it as a lever to force the switch into Reset. When the switch finally moved into Reset, the nose gear retracted.



It shouldn't have happened that way. With the gear handle down, the gear shouldn't move when the reset switch is cycled. The reset switch removes and replaces the hydraulic pressure, but the over-center lock should hold the gear in place. However, just to be sure, the F-5E Dash One warns not to reset the switch without the gear handle down *and the gear pins in*. What do you suppose was lacking in this incident?

SIMULATED SINGLE ENGINE

While starting the left engine of an F-4, the pilot saw the rpm jump from zero to 15 percent. He shut down. After a couple of minutes, he tried again; this time the indications were normal. He taxied out and took off on the planned air-to-air training mission.

Everything went well until after the second engagement. As he was climbing with the throttles in the middle of the afterburner range, the pilot noticed that the rpm indicator for the left engine showed 30 percent and was decreasing. He immediately pulled the left throttle to idle and pressed the ignition button. The rpm read 5 percent. The pilot then stopcocked the left engine and tried an airstart. The rpm climbed to 30 percent but then dropped again. Fearing engine damage, the pilot shut the engine down. He made a successful single-engine landing.

It was unnecessary. He had shut down a good engine. The only problem was a bad rpm gage. The pilot never confirmed the flameout by crosschecking the other engine instruments or asking his backseater. The backseater just assumed the pilot was right, so he dug out the checklist and helped with the airstart. The backseater didn't check his own rpm gage during the airstart attempts.

Guess it's a good thing the right gage didn't fail too—they might have jumped out.

WHO AM I?

By Capt Clarence J. Romero, Jr.
186 TRG, Mississippi ANG

Can you guess who I am?
You can see me all around,
sometimes green, sometimes with water,
in some parts brown.
You use me every day to get around.
I can be very soft
or very hard.
Tactically speaking, you use me all the time,
though I am unforgiving when you meet me
unexpectedly.
Some have gotten away with it
but usually I win.
My P_k is close to 100 percent,
better than AAA and SAMs.
Now do you know who I am?
I am the *ground*.

WHY TAXI?

On landing roll in an F-16B, the pilot saw the anti-skid caution light come on. The pilot released brakes and cycled the antiskid switch, which reset the anti-skid light. The rest of the rollout seemed to be normal.

After clearing the runway, the pilot noticed that the right brake seemed to be dragging. The instructor in the back seat tried taxiing, and he confirmed that the airplane seemed to be pulling to the right. They had their flight leader look over the wheel and tire; he didn't see anything abnormal. The crew taxied back toward their parking place. On the way, the airplane kept pulling to the right, but nosewheel steering easily corrected the pull.

When they got back to their parking place, the aircrew found that the ground crew didn't exactly welcome them with open arms. As a matter of fact, the ground crew tried to run them off. The crew chief had seen smoke coming from the right wheel, so he directed them out of the parking area. The aircrew took the hint that they weren't wanted there; the IP called ground control and asked for a fire truck to meet them in the alternate hot brake area. Just as they pulled into the area, their right tire went flat. When the fire truck showed up, the pilot shut down the engine.



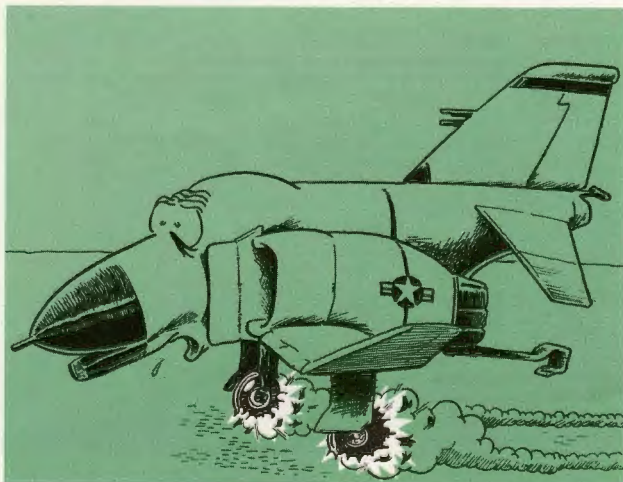
Fortunately, the wheel didn't catch fire. It's amazing that an aircrew in an airplane with a history of brake fires would even consider taxiing with a dragging brake. Come to think of it, we've never heard of a dragging brake getting better from taxiing; so why would anyone in any airplane want to taxi with a brake dragging?

TAC TIPS

FEELING BAD ABOUT THE ANTISKID

An F-4 pilot, who was coming due for an instrument check, was scheduled for a practice check with a squadron instructor pilot (IP). At the end of their mission, when the aircrew returned to the base for a full-stop landing, they were told by tower that the left runway was closed and the right runway was partly blocked by an airplane on the left side of the runway with blown tires. Tower asked the F-4 crew to land on the right side of the right runway. The pilot and the IP agreed to do that. They also decided not to deploy the drag chute on landing because of a strong crosswind from the right.

The F-4 touched down 700 feet past the runway threshold at 150 knots. The pilot checked the brakes at about 120 knots. When the pilot didn't notice any braking action, the IP tried braking from the rear cockpit; they still couldn't feel any braking. So the pilot released brakes and turned off the anti-skid, then tried the brakes again. They still didn't feel any braking action. The pilot lowered the tailhook. At about 100 knots, the IP told the pilot that he was pulling the emergency brake handle. The right main tire failed shortly afterwards, followed quickly by the left main tire. The hook caught the departure-end arresting cable, and the airplane stopped.



The pilot isn't sure whether or not he had his feet on the brakes when the IP pulled the emergency brake handle. From the looks of the skid marks, he probably was on the brakes. The skid marks showed that the airplane was in an incipient skid up to the point where the emergency brake was pulled.

There's a lesson here on crew coordination, of course. Both crewmembers must be off the brakes when the emergency brake handle is pulled. But there's another lesson involved. The aircrew assumed they could *feel* braking at 120 knots. When they didn't feel it, they turned off the antiskid. They still didn't feel braking, even though they were in an incipient skid at 100 knots. Since they couldn't feel the braking action at 100 knots, we doubt that they could have felt it at 120 knots. It makes you wonder whether there was anything wrong with the antiskid when they turned it off.

EVERYONE TALKS ABOUT THE WEATHER, BUT ...

Have you ever received a weather briefing for your destination only to find the forecast has changed when you arrive? Chances are the original forecast had been amended after your initial briefing and you didn't get the word reflecting the changing weather conditions. AFR 60-16, *General Flight Rules*, requires the pilot to get enough weather information to decide what flight rules apply, whether the destination is suitable, and whether a given aerodrome would be a suitable alternate. The pilot gets this information during the initial preflight weather briefing, but he or she should update weather frequently for changing conditions that could affect the planned flight. Checking weather is particularly important during multistop flights. When the en route or final destination weather is marginal or deteriorating, a timely update could enable the pilot to alter the flight to allow safe completion of the mission.

Sources of en route and destination weather information are numerous. The best source is the over-the-counter briefing in the base weather station from an Air Weather Service forecaster. In flight, you should contact the base weather station forecaster via pilot-to-metro service (PMSV) and take advantage of the weather radar information available. Other in-flight weather information sources include automatic terminal information system (ATIS), the air route traffic control centers, flight service stations, and VOR/NDB. Details on all these sources are available in AFM 51-12, *Weather for Aircrews*; various FLIPS; and, of course, from your local weather station people. The point is, these sources are readily and easily available; use them frequently.

—3d Weather Squadron (MAC)
Shaw AFB, South Carolina



Aircrew of Distinction

On 28 April 1982, 1st Lt Wesley A. Miller and Capt Fred A. Shirley were flying air combat tactics in an F-4E. A ground abort had caused them to take off 40 minutes after their leader. When they entered their operating area, they contacted their flight leader on the radio and were directed to the orbit point for an intercept. Lieutenant Miller started a climbing right turn and selected full afterburner. The crew heard a loud explosion from the rear of the airplane. The aircraft immediately began a series of violent pitch, yaw, and roll maneuvers, resulting in inverted flight. From the inverted position, the airplane pitched up again, pinning the aircrew to the canopies with more than five negative Gs. Lieutenant Miller pulled the throttles out of afterburner, hit the emergency quick release lever, and brought the airplane back to wings-level flight. When he had the airplane back under control, Lieutenant Miller noticed that the left engine Fire and Overheat lights were lit, as was the Overheat light on the right engine. Lieutenant Miller shut down the left engine and advised their flight leader of the situation.

As they turned toward base, Lieutenant Miller and Captain Shirley prepared for a possible ejection. The Overheat light on the left engine went out just as their leader joined up with them. The flight leader radioed that he could see a small flame in the rear part of the airplane; he suggested they climb and consider ejecting. Then, suddenly, the right Overheat light went out, and the right Fire light came on. The aircrew was unable to maintain radio contact on any frequency, so they selected Guard channel, gaining slight improvement. While they were headed toward the controlled bailout area near their home field, the Fire light on the right engine went out. Their flight leader was able to get through to them on the radio that they were cleared to land. Since the right engine indications were now normal and the hydraulic pressure was good, Lieutenant Miller and Captain Shirley decided to try once to land the aircraft. Lieutenant Miller maneuvered into position for a steep, fast, straight-in approach, using a low thrust setting. Lowering the gear, flaps, and hook, the crew completed the single-engine and arrested-landing checklists, then discussed their ground egress options. Lieutenant Miller flew the approach precisely, touching down at 200 knots on the runway centerline short of the arresting gear. Just as the airplane touched down, the tail end burst into flames.



1Lt Wesley A. Miller
339 TFS, 347 TFW
Moody AFB, GA



Capt Fred A. Shirley
339 TFS, 347 TFW
Moody AFB, GA

When the aircraft hooked the cable of the arresting gear, the flames rapidly moved forward on the fuselage, stopping just behind the rear seat. From his chase position, their leader informed them of the fire and told them to get out of the airplane. Lieutenant Miller shut down the right engine and joined Captain Shirley in a quick exit of the airplane.

The difficult decisions made by Lieutenant Miller and Captain Shirley, together with their superior airmanship and crew coordination, prevented the loss of a valuable aircraft and averted possible loss of life. They have earned the title Aircrew of Distinction.

EAGLE



Glossary

A compilation of expressive and definitive terms and phrases necessary to the employment of the F-15

The first ADTAC F-106 to F-15 conversion class to go through the 555 TFTS and TX course had several problems. Chief among them was the language barrier. The effort to fully integrate air defense into the TAC community continues, and resolution of this conflict is essential. To that end, Class 81PTL has written the "Eagle Glossary." This listing is designed to correct a deficiency in the present F-15 training program and aid in the development of combat-ready Eagle drivers.

• • • •

You're/He's/I'm/Out of There/Here: The act of departing a location or a failure of the rational thought process. NOTE: Should be accompanied by a cutting motion by the open hand moved horizontally past the

neck. When I lost tally at the merge, I was out of there.

I'm a Dot: To be in the process of departing a location; to become very small as the process of departing proceeds. *My kitchen pass ran out an hour ago—I'm a dot.*

Shack: Synonymous with perfect, great, you got it, right-on. Student: "You mean if I lose sight, I lose the fight?" IP: "Shack!" NOTE: Should be accompanied by touching one's nose with one's index finger.

I Want To Be/ I Could Have Been/ I'm Going To Be Somebody: An expression of desire to become omnipotent or imminently successful. *With 50 knots, I could have been somebody.* NOTE: This word somebody is pronounced SUM-BAWD'-EE.

the map case—went auto-guns, got a lock, thumbed the button, and gave Big White the lead on the right. But Big White went—ptewy—dumb flood. I was out of there!

The Bitch: An affectionate reference to the F-15 voice warning system. "Warning, AMAD fire; warning, engine fire-right; warning, engine fire-left; warning, bingo fuel; warning, fuel low, etc."

Let MCAIR Fly It: The unofficial emergency procedure used in reaction to a loss of coordinated/controlled flight, i.e., auto roll, spin, departures, zero air-speed, unusual attitudes, tail slides, etc. Meaning: Get your hormel off the stick.

Hormel: A term of admiration used by instructors when referring to a student's hands—Hormel being a very high quality ham.

Charisma: 25 December.

Ostentatious: The capital of Texas.

Woo-Woo-Woooso: The source of S.A. in the F-4, usually found in the large map case behind the front cockpit.

The Electric Jet: F-16.

Zipper: F-104.

Thunder Rhino: F-4.

Get the Tally and BFM 'em to Death: A synopsis of 2v1 F-15 tactics contained in TACM 3-1.

Post Hole: An offensive two-ship formation where the aircraft are stacked one directly above the other, usually with extreme vertical separation.

BFM/P-Sub-S Never Killed Anybody: A typical statement by an instructor who has just been embarrassed by a student who knows the *nums*.

Stuff: The result of a turn reversal or poorly timed unloaded extension—a zero aspect Fox 2. *When the Thunder Rhino tried to extend, I stuffed him with a Papa—Shack!*

Mort/Morted/Designated Mort: To kill, be killed, or be designated to be killed. *That Hormel-handed mullet was tumbleweed at engine start, but we knew before the briefing that he was the designated Mort.*

My Fun-Meter is Pegged: A facetious phrase used to indicate an unwillingness to continue. *When the A-7 called his second tracking shot on me, my fun-meter pegged and we knocked it off.*

You Smell Like a High-Drag: Definition unknown; phrase used by an unmentionable on his knees in the stag bar on a Tuesday night.

Ptewy: The symbolic act of spitting, used to show contempt. *Nice—ptewy—lookout, you're out of there.*

Tango: Formerly *tango uniform*; connotative of a state of severe mental constipation/confusion or the complete failure of an aircraft subsystem. *My HUD went tango.*

Lipwinder: Colloquial for the AIM-9L, referring to that weapon's capability to track a front aspect target. *I shot him in the face with a lipwinder.*

Shoot Him in the Lips: A statement advocating the employment of weapons on a front aspect target; weapon to be so employed is generally the lipwinder.

The Beak: (A) The nose, usually descriptive of a 180-degree aspect-angle target with a 180-degree heading-crossing angle—nose to nose. *We passed beak to beak.* Also, (B) used to describe an angry, irritated, or frustrated emotional state. *Your fox two after the knock-it-off really gave me the beak.* NOTE: Any device which serves to increase the apparent length of the nose can be used as a silent reminder to others that you have *the beak*.

S.A.: An abbreviation of *situational awareness*—the highly regarded ability to recognize, analyze, and properly react to the various and constantly changing factors encountered in the air-to-air arena. Usually assessed by instructors as being poor or non-existent in most students. *Your S.A. was in the map case with the cover closed.*

I/He Passed the Clue Bird Beak to Beak: A rapid, catastrophic movement of S.A. from the normal glare shield position to the map case, sometimes followed by a loud noise in the cockpit as the cover slams shut. NOTE: *Clue Bird* and S.A. are synonymous—rapidity of the loss of S.A. denoted by *beak to beak*.

Nums: Numbers. *You've got to know the nums if you want to be somebody.*

Big White: Colloquial for the AIM-7F. *My VSD went tango, passed the clue bird beak to beak—S.A. in*

WEAPONS WORDS

AN ELEMENT TOO MANY

The F-4E had flown a gunnery sortie which included two hot strafe passes. After the airplane landed, the gun crew installed the electrical safety pin, and the aircraft taxied back to the chocks. In the parking area, the gun crew later tried to install the hold-back tool in the clearing cam without success. That's when the crew noticed that the breech bolts were not cleared. They tried manually rotating the gun to clear the cam, but they couldn't. So the crew ended up taking the gun out of the airplane and tearing it down.

First, they found that an unfired round had been punctured by the entrance unit shaft assembly and had spilled propellant into the entrance unit and drum assembly. When they looked at the 11 unfired rounds from the clearing cycle of the first pass, they found damage on the cases. The damage indicated that periodic intermittent binding had occurred in the conveyor element assembly as it exited the unload unit. The expended cases from the second firing burst also showed periodic binding. Every third or fourth round would have severe damage to the casing neck, but it would be followed by relatively undamaged rounds.

Oddly enough, during the teardown the crew ended up with 99 conveyor elements instead of the 98 called for in the tech order. When they looked at the conveyor element assembly, they found abnormal wear on the element guide tabs, indicating that binding or bunching had taken place while the conveyor was moving. When the investigators checked with the logistics center, they found out that, sure enough, using too many elements in the conveyor



system will cause binding because the system won't maintain the correct tension. In this case, as the unload unit received the rounds from the gun, the binding and bunching of the elements gradually damaged the unload unit's front element guide until the elements were only intermittently caught. The resulting momentary stop in motion caused the unload sprocket to hit the neck of the brass cases. As the element sprocket tried to push the elements through the bind, it broke one blade tip and bent three others.

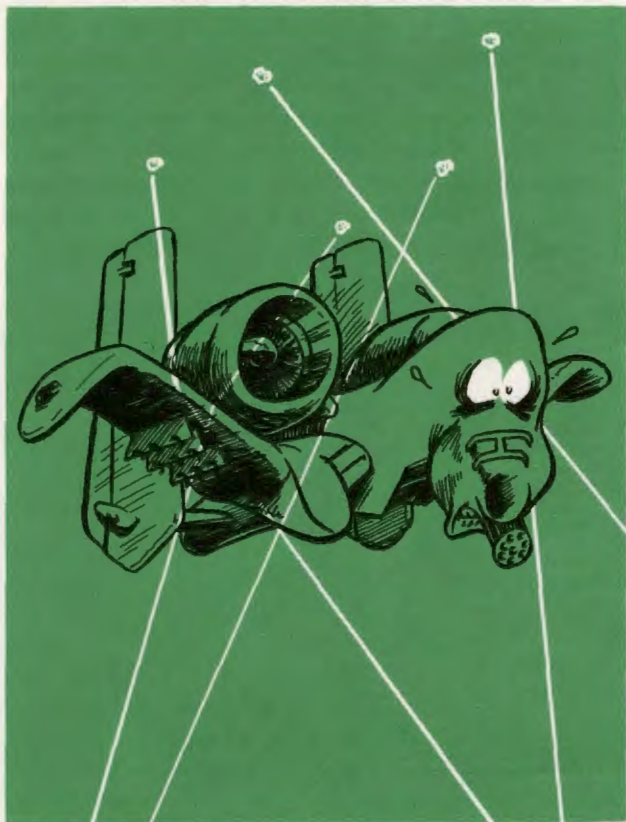
So the jam was traced to the extra element, but where did it come from? Two weeks earlier, the gun had received its annual inspection. When it was put back together, the shop workers used 99 elements instead of 98. The workers didn't carefully follow the tech order, and their supervisors didn't insure that the tech order was followed. That's how most of these incidents get started.

RESTRICTED TO RICOCHETS

Two A-10s were flying a joint mission with Army helicopters on an Army range. The flight had briefed to attack a strafe target, two 55-gallon barrels placed near a road intersection just for this mission. The planned attack was low-angle strafe with cease fire at 3,000 to 2,500 feet from the target. Range restrictions required a straight-ahead "bump up" attack and a straight-ahead pull off to avoid the Army helicopters.

The flight leader pulled off dry on his first two passes because he didn't see the target until it was too late. On his third pass the pilot saw the drums late in his attack. He pushed over and fired a one-second burst; the rounds hit long and walked back toward the target. The pilot figured that his bullets hit long because he was in too close, maybe as close as 1,500 feet. He made four more strafe passes, spotting the target earlier and ceasing fire at 2,500 feet. Then he returned to the Army field which they were operating from.

After the flight, damage to the aircraft was discovered. The wing leading edges had several small holes near pylon stations 1 and 11. The left inboard flap had a small hole near the trailing edge. The number 6 pylon had a two-inch hole and a six-inch scrape on the right side, and both slats were dented. In three of the holes, small rocks were found. Apparently, the airplane had flown through gravel debris kicked up by bullet impacts.



Several factors contributed to the ricochet damage. The range restrictions, which forced the pilot to fly a straight-ahead bump-up attack instead of an angle-off pop up, made seeing the target more difficult. The planned target presented only a 3- by 4-foot frontal area, which not only made seeing the target difficult but also led the pilot to misjudge his

range to the target. The attacks were flown into the sun on a hazy day, making it even more difficult to see. Finally, the range restriction of a straight-ahead pull off (to avoid pointing the A-10's guns at Army helicopters holding 2 kilometers away) forced the airplane to fly through its own ricochets.

When we're working on a range belonging to another service, we can't expect them to know all our safety considerations. It's up to us to ensure that we don't accept requirements that compromise flying safety. On top of that, we need to take target size into account when planning our attacks. Consciously or unconsciously, we use relative target size to judge our distance from the target. If one foot equals one mil at a thousand feet, then at 3,000 feet this target would have been one mil by one and a third mils on the combining glass. That's not the size most of us are used to seeing at 3,000 feet, so our tendency is to close in and make the target look bigger.

The problem isn't confined to targets on other services' ranges. On some of our own ranges, targets are not full size. Some plywood mockups are three-quarter size or less. If you don't plan for that, they also can entice you in closer. And the results can be much worse than damage from ricocheting gravel.

THE CARTRIDGE CAPER

An A-7 returned home from a cross-country mission, which it had flown with fuel tanks installed on stations 3 and 6. The airplane was scheduled for a local sortie to the gunnery range, so a tank removal crew was dispatched to the airplane. The crew removed the tanks but not the impulse cartridges. Then a weapons load crew was sent to the aircraft to configure it for its scheduled mission. They loaded triple ejector racks on stations 3 and 6. Then they applied power to test the stations. When they flipped the test switch, the cartridges on both stations fired. Fortunately, little damage was done, and no one was injured.

Notice that it took two separate oversights to cause this incident. The crew chief in charge of the tank removal didn't follow his tech order, which said to insure the cartridges were removed before doing any maintenance on the airplane. And the weapons load crew chief didn't follow his tech order by making sure the cartridges were removed before applying power to the aircraft for testing. Besides the crew chiefs, any of the members of their crews might also have prevented the incident. As usual, it took more than one person to set up the mishap.

weapons words

IMPATIENCE

A technician was told to check out three AIM-9 guidance control systems (GCSs). The first unit failed the turbo test three times in a row, apparently due to an air leak. It was set aside and the other two were checked out. After the others checked OK, the first GCS was put back on the AN/ASM-447 test stand for one last test. Again the technician detected an air leak. While removing the pressure plug, the technician noticed that the entire pressure tube was loose.

At this point the technician looked for a maintenance stand to hold the GCS, but both maintenance cradles were occupied. The airman decided to try to tighten the pressure tube with the GCS still on the test set. To gain access to the tube, the technician removed the rear retaining ring. Then, while trying to tighten the tube, the airman lost control of the GCS as it tipped forward. The IR dome hit the light source and the drive assembly shoulder bolt, shattering the dome.

It looks like the real cause of the broken IR dome was impatience. The airman just couldn't wait until the proper maintenance stand was available. How often do we all do the same kind of thing? Have you ever used the wrong tool because it was handy and the right tool wasn't? Every time we do that, we're flirting with a mishap. Impatience and safety are incompatible.

BUT IT LOOKED LIKE THE TARGET

A flight of two F-4s flew a low-level ingress to a pop-up attack on the gunnery range. The target was a built-up area with huts. The flight leader popped up, saw a group of huts that looked like the target, rolled in on them, and dropped six BDU-33 practice bombs. His wingman went through dry because he was out of position. The flight didn't have time for the wingman to reattack, so they returned home.

When they got home, they were met by a welcoming committee. The range had called, saying that the flight had attacked a manned support facility on the range and had wounded one person. Fortunately, the injury was minor. Still, everyone was very displeased.

When they planned the mission, the aircrews had added 15 degrees of east variation instead of subtracting it when figuring the magnetic heading for the run-in. That error put them 7 miles off course at the popup point. But even that wouldn't have put them where they were. They had also used the wrong initial point (IP) for the ingress. The IP they used put them an additional 8 miles off course in the same direction. When they popped up, grossly off course, they just happened to find a manned area similar to the planned target. So the leader went ahead and dropped.

Because the airplanes involved were two-seaters, four aircrew members had the opportunity to alter this sequence of events. All four of them either agreed with or didn't check the run-in heading. All four of them had to agree that they were over the right IP. Either all four made the same series of mistakes, or some of them weren't paying attention, or, perhaps, somebody was suspicious but didn't say anything. From planning to execution, the mission needed nothing more than a call to "Knock it off!"



TAC Safety Awards

Crew Chief Safety Award

SSGT EARL B. DRASHER is this month's winner of the Tactical Air Command Crew Chief Safety Award. Sergeant Drasher is a crew chief with Detachment 1, 49th Fighter Interceptor Squadron, Loring Air Force Base, Maine.

Recently, Sergeant Drasher assumed duties as crew chief for an F-106A on alert. The airplane was airborne when he came on duty. When it returned, Sergeant Drasher noticed something strange in the way the airplane's left tire was turning during taxi. He questioned the pilot about how the airplane taxied, but the pilot hadn't noticed anything unusual. Convinced still that something just wasn't right with the wheel, Sergeant Drasher started inspecting the aircraft's landing gear. He lifted up the torque arms on the left landing gear and found that they moved about 1/4 inch upward. Subsequent teardown of the upper arm attachment showed that both fore and aft sleeves were missing. Had this gone unnoticed, the torque arm attachment bolt would have failed; then the wheel and tire could swivel free, causing landing gear strut failure or collapse.



SSgt Earl B. Drasher

Sergeant Drasher consistently performs his duties well. His perceptive observation and persistence on this occasion prevented an aircraft mishap and possible injury to the pilot. He has set a fine example and earned the Tactical Air Command Crew Chief Safety Award.

Individual Safety Award

A1C SAMUEL L. DICKERSON is this month's winner of the Tactical Air Command Individual Safety Award. Airman Dickerson is a weapons load crew member with the 21st Aircraft Maintenance Unit, 35th Aircraft Generation Squadron, 35th Tactical Fighter Wing, George Air Force Base, California.

Airman Dickerson is a weapons specialist who has been trained for cross utilization as a basic 3-level crew chief on the F-4E. At the time of this incident, with just three months experience, he was substituting for an end-of-runway crew member. While checking an F-4 before takeoff, he smelled something unusual and heard air hissing loudly near the left auxiliary air door. Airman Dickerson checked further and found that the panel was hot. He passed the word to the aircrew and they shut down the engines. Investigation showed that the left bleed-air duct stove pipe had completely blown apart, tearing two large holes in the aircraft skin immediately below #5 and #6 fuel cells. During the engine start and taxi, the aircrew had seen no indication of the problem because the fire warning light did not illuminate. Had the aircraft been permitted to take



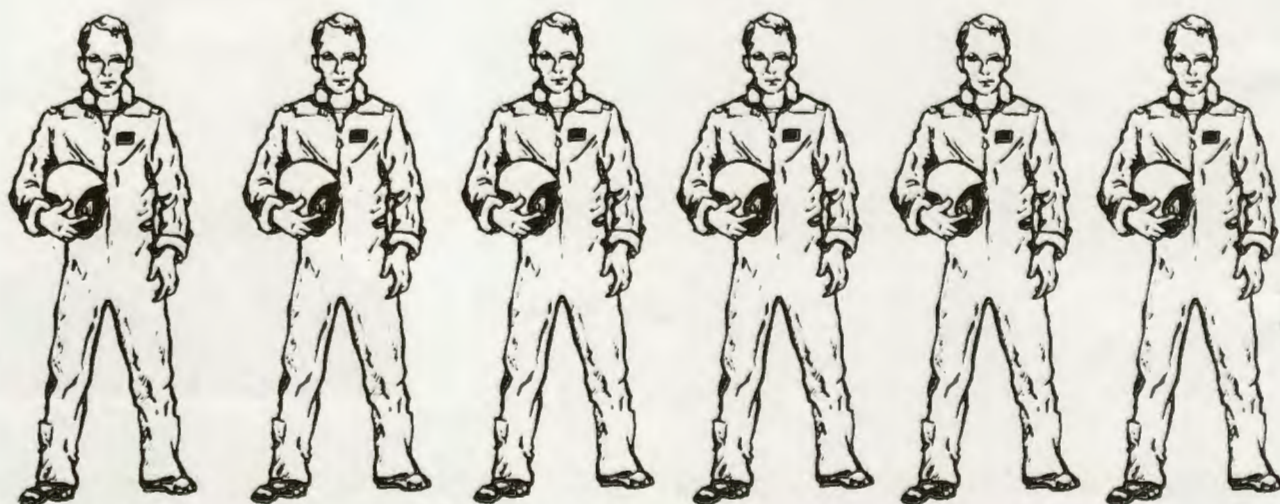
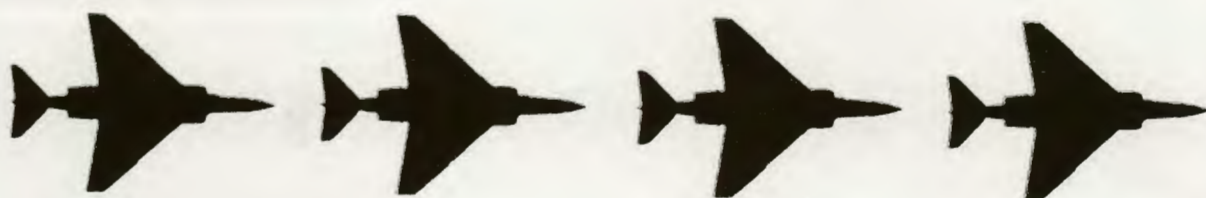
A1C Samuel L. Dickerson

off, a fire during flight would most likely have occurred.

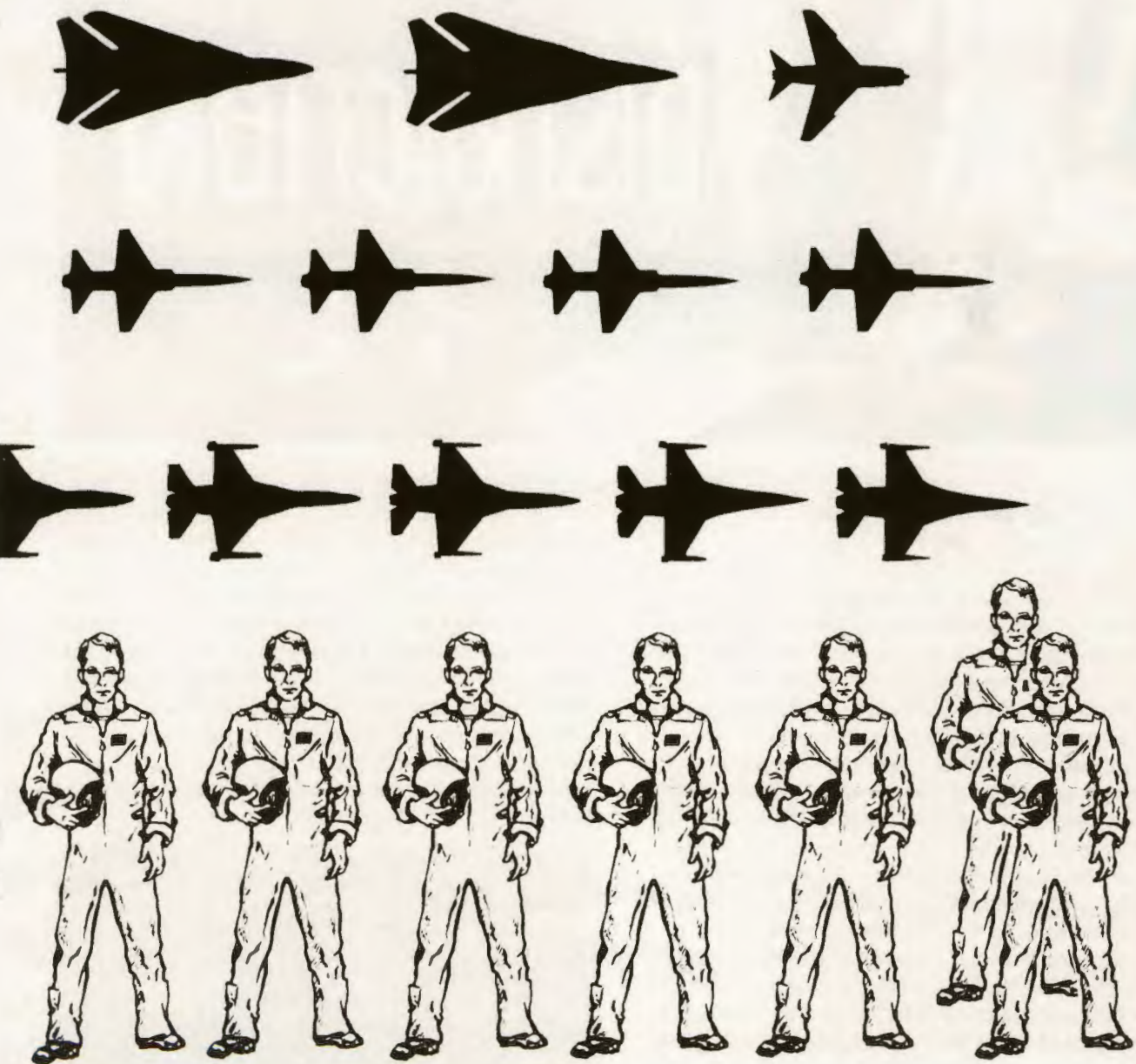
By his attentive and careful performance of his duties despite his limited experience, Airman Dickerson prevented possible loss of an aircraft and its crew. He has earned the Tactical Air Command Individual Safety Award.

OUR TAC AND TAC-GAINED LOSS

JANUARY — JUNE 1982



PILOTS IN THE AIR





**By Maj Gary M. Goebel
355 TTW**

In 1975 I was flying Buccaneers with the R.A.F. and went on a squadron exchange with a French Jaguar squadron. It was an excellent exchange. The French squadron was very hospitable, but it was quite noticeable that one of our chief hosts during the daytime hours never appeared at any of the evening functions. Subtle questioning finally determined that in the evenings he had to return to jail. Sometime previously he had been detailed to fly with his squadron commander and when taxiing out dropped his checklist on the floor. While he attempted to retrieve it, his commander stopped; the sharp end of one aircraft went up the blunt end of the other.

I have reflected on this particular incident many times subsequently, first as an illustration of the different approaches of different air forces to problem resolution, and lately as an illustration of a more pervasive problem applying to all phases of aircraft operation.

In the incident mentioned, *distraction* from the

primary task at hand, aircraft taxi, was the culprit. This incident is simply one example of the general problem of distraction during aircraft operation when there is a critical primary task to do, such as maintaining control of the aircraft while taxiing or flying. The problem occurs when the primary critical task either demands full attention at all times or when it can be left for only a limited length of time to perform secondary tasks. These secondary tasks range from postponable actions to emergencies requiring immediate action.

Do we have a problem? From a 12th Air Force message, dated October 1981:

Dividing attention between activity outside the cockpit and attention to positioning switches and checking information in the cockpit is among the most basic of fighter pilot skills. Yet we continue to lose aircrews and aircraft to midair collisions in formation and collision with the ground. As examples we had a midair collision between two F-15s during routine UHF channel change. . . . We had another F-15 collision during a routine check on inertial position. . . . An A-7 collided with the ground on downwind leg of the gunnery pattern—most probably while the pilot was checking bomb computer data.

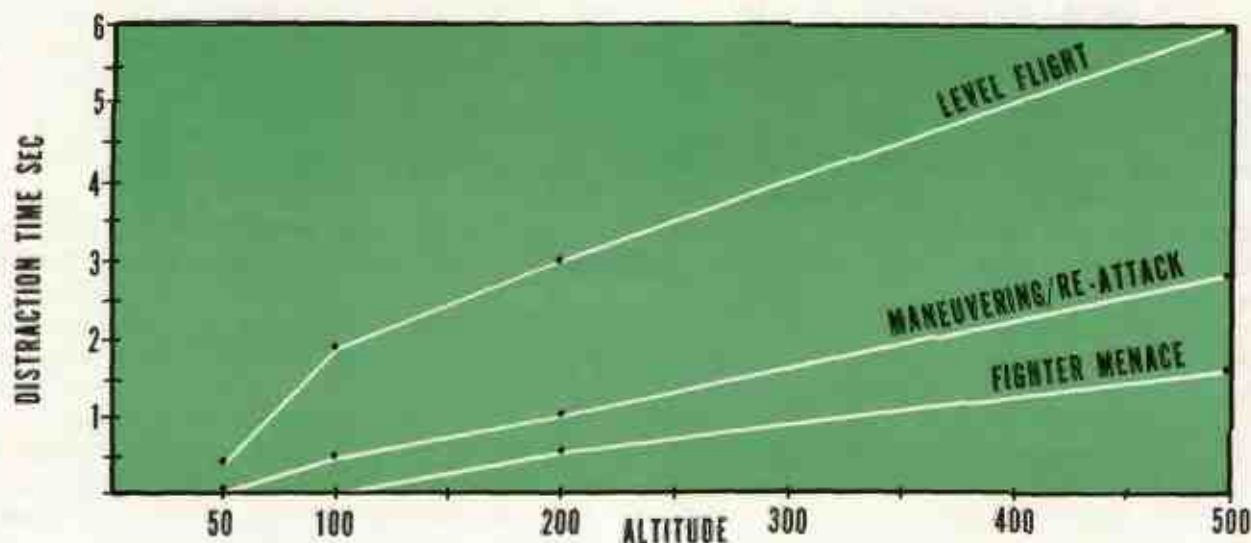
I gave a questionnaire to some experienced A-10 instructor pilots. It wasn't an all-embracing study by any means, but it was sufficient to highlight certain points. I asked the question, "Have you been in a situation where you felt distracted in the cockpit to the point of endangering yourself, and could the distraction have been postponed?" Of the 13 pilots, 9 said they had been distracted, and 8 said it could have been postponed.

The problem is a continuing one. In its simplest form it can be described as a distraction from vigilance. The *vigil* maintained is attention to some important primary task, the *distraction* is some brief secondary task, which may or may not be critical. While the problem exists in multicrewed aircraft, indeed in industry as well, it is epitomized in the single-seat aircraft; and that is the primary consideration of this article.

In an effort to somehow quantify the amount of distraction being considered, my questionnaire asked the pilots what they thought would be the longest time in any one interval they could be distracted without endangering themselves. Three situations—level navigating, maneuvering to acquire a target or to reattack, and turning hard to defend against another fighter—were examined at different altitudes. The following graph shows a plot of the average estimates of allowable distraction time given by these pilots:

Generally speaking, I was surprised at the consistency of the estimations. Keep in mind that the time values listed are not rates of descent nor measured time to collision with the ground, but are rather the amount of distraction time pilots felt was available before a dangerous situation developed, based on their own experience. The general feeling was that at high altitudes in level flight almost any length secondary task could be performed with no danger. Obviously, different pilots have different actual tolerances for distraction; hopefully, those estimating more distraction time available are indeed the ones who can react more quickly or are less susceptible to distractions. At any rate, we can use the information from the pilots' estimates to refine the problem: we are concerned with handling a primary monitoring task (vigilance) that tolerates only short distractions, from six seconds down to zero, during critical phases of flight.

Is there a particular type of person or personality trait that aids in the solution of this problem? A search of human-factors literature in this area indicates that, at least at the present time, there is no indication at all that any particular type of personality or person is better able to handle a monitoring task, or better able to resist distraction. According to H. J. Jerison, in a report for the Air Force, "No selection procedures for the discovery of vigilant types for monitoring assignments can be envisaged at this time."



VIGILANCE AND DISTRACTION

What are the physiological limits relating to the problem? One of the original studies on vigilance done by Mackworth seems applicable to flight under the zero-distraction-allowable condition. The study was a measure of an observer's ability to detect a short-term signal presentation and of the deterioration of ability to see that signal over time. The suggested maximum length of watch from this study was 30 minutes. I can substantiate the values from personal experience. I flew the F-111 in Southeast Asia. In hostile territory we ran low altitude on terrain-following autopilot. The monitoring task was complex; and, effectively, zero distraction was allowable. The normal length of time at low altitudes was about 30-45 minutes. That was the maximum most of the squadron pilots could stand. This experience, together with Mackworth's studies, suggests that we limit high-concentration, zero-distraction flying tasks to approximately 30-minutes duration.

Not many studies relate to the secondary tasking area, and little research has been done on allowable distraction time and the best way to use it. But what there is shows that even a simple secondary task may create a problem. In the *Biology of Work*, E. G. Edholm mentions the distracting effects of subsidiary tasks: "Even though two tasks might be separately simple, and carried out effectively, when they were combined there was not only a deterioration in the performance of both tasks, but such combined work could prove to be extremely stressful and exhausting." On the other hand, if the secondary task is mental, like recalling or problem solving, the results seem to show no decrease in performance of either the vigilance task or the mental task when the two are combined.

The fact that simple recall apparently does not adversely affect the vigilance task suggests a policy that encourages memorizing rather than reading. For required checklist procedures and emergency

procedures, part of the answer to distraction may be more memorization of useful aircraft information and procedures and less reliance on reading them during critical phases of flight.

How can we train a pilot to handle distractions and carry out his primary task? The first step, as I have indicated, is to determine the allowable distraction time during various phases of flight. The next step is to actually measure various distraction times on common tasks performed by pilots. The following are *hypothetical* examples:

- Read a meaningful phrase of emergency checklist—6 seconds
- Acquire a required point from a map—5 seconds
- Acquire a required altitude from approach plate—3 seconds
- Manual frequency change—2 seconds
- IFF change—1 second
- Weapon switch change (per switch)—.5 second

When these values are associated with a graph of allowable distraction time, some immediate values will stand out. It will become clear which secondary tasks should not even be considered in the various phases of flight. This information should be mandatory reading for newcomers to the aircraft.

From this data, the individual pilot must develop a "strategy" for performing secondary cockpit tasks and build a habit pattern based on this strategy. Moving only a single switch at a time, then going back to the primary task is one very good suggestion. Carefully placing personal equipment and publications is an essential part of the strategy as well. Finally, the knowledge of when to postpone and the will power to do it must be ingrained. A simulator mission devoted to this concept would be excellent training. The whole program should be aimed at teaching the pilot where and how to perform the secondary cockpit tasks.

Our look at the problem of distraction points out certain steps toward its resolution. We must transfer hard-earned knowledge from experienced pilots to our newcomers. Individual pilot strategy should be developed and validated during simulator or cockpit procedural training. Although more research needs to be done in the area, current results suggest that, at least in single-seat aircraft, procedures should be memorized for critical phases of flight. Finally, zero-distraction tasking should be limited to 30 minutes per sortie.

WHAT WE CAN DO ABOUT

VIGILANCE *and* DISTRACTION

What we can do about vigilance and distraction

By Maj Jim Mackin

Major Gary Goebel's article on the problem of distraction during critical phases of flight may raise more questions than it answers, but those questions need to be addressed by all of us. Although we don't know precisely our allowable distraction times, we do know they become very brief in critical phases of flight; we can plan for that. For instance, we can do most of the secondary tasks at higher altitudes where we have more time. As instructors and flight leaders, we can avoid demanding that our wingmen perform secondary tasks when they already have their hands full with their primary tasks. When we are mobileers and SOFs, we can remember not to lay more tasks on a pilot who's trying to deal with an emergency.

The principle also has a corollary: When we're in a critical phase of flight and we encounter an emergency, we still can't do both tasks; so we have to either change our phase of flight or else endure the emergency. In peacetime we can normally change our phase of flight. Our first reaction should be a knock-it-off, followed by a climb if we're at low altitude. We have then expanded our "allowable distraction time" for dealing with the emergency. In some circumstances we can't always change our phase of flight. In combat an enemy probably won't be willing to knock it off; then our choice is to handle the worst threat first—and to pray. In some peacetime circumstances, good judgment may also dictate that we continue in the critical phase of flight

and just endure the emergency. For example, imagine that you have just broken out of the weather at minimums on an instrument approach. You're lined up on the runway to land when you see a Fire light. What'll you do? Most of us would probably concentrate on the landing and then deal with the fire after we're on the ground. What won't work is continuing the approach and trying to deal with the fire at the same time.

Our traditional basic steps for handling any emergency can be used to apply the lessons of Major Goebel's article if we understand them properly. First, we maintain aircraft control—our vigilance task; then, we analyze the situation. Our mental task of problem solving should not degrade our ability to control the airplane, according to Major Goebel. Next, we take proper action, either to get out of the critical phase of flight we're in and deal with the emergency or, perhaps, to stay in the critical phase and concentrate on it for the time being. Finally, if we haven't ejected, we'll want to land as soon as we can. Once we've committed ourselves to land, we are again in a critical vigilance situation; the checklist reading and switch flipping should be done by that time.

Major Goebel is right: more research should be done on vigilance and distraction. But, in the meantime, we can use what we do know about the problem and apply our knowledge with common sense to our day-to-day supervising and flight planning. ➤



WHY WE INSIST ON HELMETS

An airman bought a brand new motorcycle. He also bought a helmet, a bit begrudgingly because it was required on base. He rode his new motorcycle over to a friend's house off base, but he didn't wear his helmet because the state he was in didn't require it. After showing off his new bike, he left his friend's house and headed for the base. This time he put his helmet on because the Air Force requires that helmets be worn on base. As he rode toward the base on a two-lane road, he was suddenly confronted with a car coming at him head-on in his lane. To avoid the car, he left the road. Doing about 25 mph, he drove through a driveway into a concrete drainage ditch. The airman was thrown off the bike, flying through the air a short distance, his head striking some unknown object. The helmet did its job and protected his head: the helmet was banged up, but his head wasn't.

That's why the Air Force insists that motorcyclists wear helmets on base. Once in a while, we get lucky and protect someone off base who's coming to or leaving the base. It's too bad the habit doesn't carry over so that our cyclists wear their helmets all the time. We'd have a lot more success stories like this one.

THE FLAMING HOT DOG ROAST

A sergeant was home visiting his relatives and friends. Just before he headed back to his duty station, he and his friends decided to have a hot dog roast. The sergeant stacked some wood and started a fire. He wasn't satisfied with the way the fire was burning, so he decided to use some gasoline to get the fire to burn better. He put the gas in a coffee can and began pouring it around the burning wood. Just then, a gust of wind blew some of the gas onto his left arm and shoulder, and it immediately caught fire.



He reached up with his other hand to pat out the flames, but that hand held the coffee can full of gasoline. He spilled more gas onto his upper left shoulder and chest, increasing the fire. The sergeant yelled for help, dropped to the ground, and put out the flames by rolling. That saved him, although he suffered first and second degree burns over his upper body.

In a crisis we often react instinctively—and wrongly. The sergeant's reflex reaction of reaching

over with the other hand was understandable. What wasn't understandable was pouring gasoline on the fire in the first place. We expect reflex reactions to be unthinking. The sergeant's problem came when his nonreflex action beforehand was also unthinking. The fact that he was more than 700 miles from his duty station on a 72-hour pass may have had something to do with his thinking and reflexes.

SEATBELT SAVE

A sergeant was driving her car on a heavily traveled four-lane street. She was doing the speed limit in a 45 mph zone, driving in the left lane slightly behind a truck in the right lane. The truck signaled and began a right turn onto a side street. Another truck was waiting at a stop sign on the side street. When the driver of the second truck saw the first truck turning, he pulled out across both lanes. He didn't see the sergeant's car behind the truck, and she couldn't see him until it was too late. Her car slammed into the side of the truck, spun 90 degrees, and stopped.

The car was totaled; but the sergeant received only minor injuries—bruises on her forehead and the bridge of her nose. She had been wearing her seatbelt and shoulder harness. The sergeant has no doubt that the seatbelt saved her life.

ROOM TO LIVE, IF...

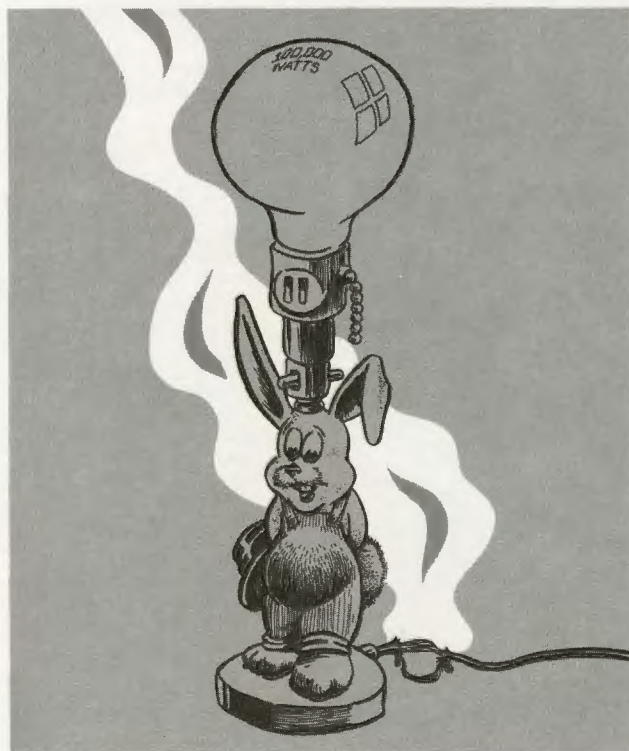
A staff sergeant was towing another car with his van on a gravel road that was narrow and winding. The van started to go off the roadway on the left side; the towed vehicle drifted to the right, hit a rock, and snapped the tow chain. Then the van went completely off the left side of the road and rolled over. The driver was partially ejected as the van rolled two and a quarter times. Death was instantaneous. Seat belts were available, but the driver hadn't used them. The front seat area was intact with *room to live* if he'd been strapped in.

ELECTRICITY, FRIEND OR FOE?

Electricity is so common that we take it for granted. It's hard to believe that electricity's use has been widespread only in the 20th century. Electricity has proven to be a safe and effective form of energy when used carefully, but it's a powerful hazard when it's used or installed wrong.

The National Bureau of Standards reports that the quality of connections at fixtures, switches, and receptacles is extremely important. In testing electrical connections, researchers found that loose connections became so hot that the wire and the screw that held it began to glow red.

The bureau also studied "over-lamping," which is putting a higher wattage bulb in a lamp that's rated for lower wattage. The higher watt bulb draws more current through the line and raises the temperature of the wires. The heat may deteriorate the insulation on the wiring, leaving bare wires which can cause shock or fire.



Circuit breakers and fuses are intended to protect electrical circuits from too much current. They can only do their job if they're used correctly. A 20-amp fuse cannot protect a 15-amp circuit. Some people cure a chronic fuse-blowing problem by increasing the amperage of the fuse. What they are really doing is allowing excessive current to flow in a circuit whose wiring wasn't built to handle it. If you have a fuse that blows often, have an electrician check the circuit to solve the root problem. Don't try to fix the problem by using a higher amp fuse.

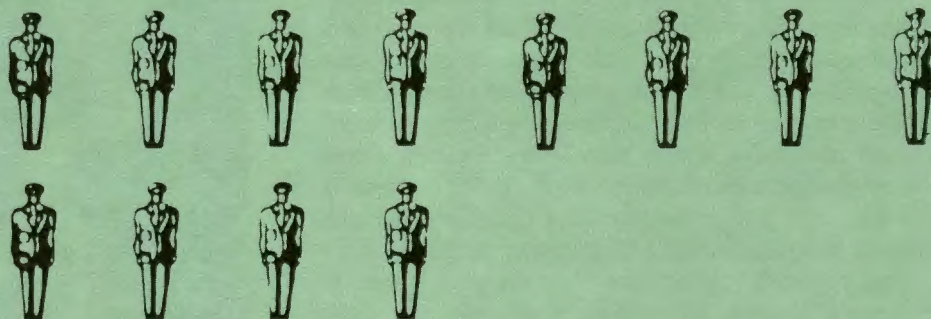
Don't overlamp, don't overfuse, and don't overload receptacles. If a switch or receptacle feels warm to the touch or if you smell burning, call a qualified electrician. Keep electricity your servant, not your enemy.

Our TAC Losses on the Ground

JANUARY - JUNE 1982

OFF DUTY MISHAPS:

Automobiles



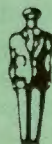
Motorcycles



Fire in qtrs



Drowning



ON DUTY MISHAPS:

Industrial



LAND AS SOON AS POSSIBLE

The F-4 was on a low-level mission when the right Fire light lit up. The pilot pulled the throttle to idle, and the light went out. But the system failed to self-test, so the pilot shut down the right engine.

The airplane was about 40 miles from an airfield with a 9,000-foot runway; it was 180 miles from home. The aircrew decided to fly all the way home. They thought they might need arresting gear, since the checklist warns to anticipate failure of the utility hydraulic system; and the closer field didn't have arresting gear. They contacted the supervisor of flying (SOF) when they were 100 miles out from their home field. The SOF sent another F-4 to join with the emergency airplane and escort it until it landed. The chase airplane joined up in the approach pattern.

When the aircrew of the emergency F-4 lowered the landing gear and flaps, the Wheels light began flashing. The aircrew in the chase airplane noticed that the paint on the emergency F-4's right fuselage had become discolored in an area above the trailing edge flap. The Wheels light went out, but 30 seconds later it began flashing again. The fuel quantity indications became erratic; and the Fuel Low Level light came on, even though an estimated 4,000 pounds of fuel remained. The pilot felt mild transients in the stick. The transients disappeared when the stability-augmentation system was turned off. The SOF told the crew to engage the approach-end arresting gear.

About three miles out on final, the crew in the chase aircraft noticed the emergency F-4 now had a hole in the area of the fuselage that had been discolored. But the emergency airplane landed and hooked the cable without any further problems. Once they stopped, the aircrew shut down and climbed out of the airplane.

The problem had been caused by an improperly installed bleed-air clamp. The bad clamp allowed an end cap to come off, which directed hot bleed air into the forward engine bay on the right engine. The end cap came off with enough force to make a hole in the lining of the engine bay. Then when the throttle was pulled to idle, the change in air flow through the engine bay and in bleed-air pressure dislodged the end cap. It traveled up and around the engine, breaking the fire loop on its way. That's why the fire warning system quit working.

So, this aircrew flew 180 miles with hot bleed air pouring into the area between the aircraft skin and the engine bay liner. Eventually the hot air burned a hole in the side of the airplane. They were lucky that was all it did.

The aircrew involved had little experience in the F-4, yet their concern about the possibility of utility hydraulic failure was justified. Utility failure with an engine out is a very serious emergency. And an engine bay fire will often burn through hydraulic lines. So the aircrew should have mentally prepared themselves for utility failure. But does that mean they should have flown an extra 140 miles to make sure they had arresting gear?

It seems to us that the answer lies in the meaning of the Dash One's directions to "land as soon as possible." That means to land on the nearest *suitable* runway. Since the utility system was still working, the nearby runway was suitable, though not ideal. By not landing, they increased the potential for utility failure, since the hot air had more time to cause damage.

As they headed for the divert field, they should, of course, have remained alert to the possibility of utility failure. If it happened, they might want to reconsider and turn for home; a field without arresting gear may no longer be suitable. But until the utility pressure actually failed, landing as soon as possible meant landing at the nearby field.

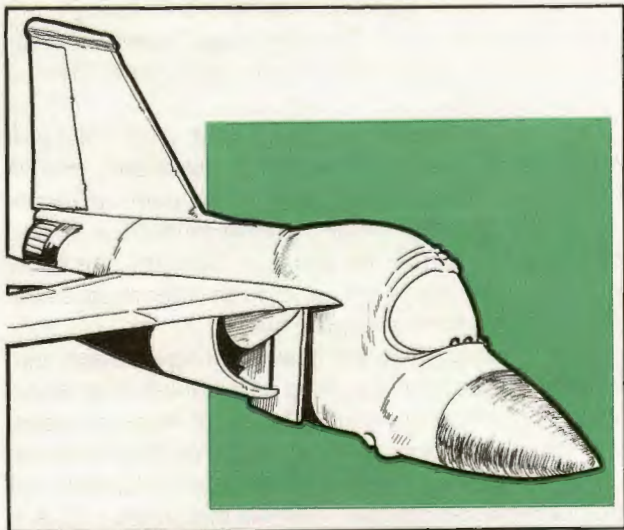
Our point is that we must distinguish between what *might happen* and what *has actually happened*. While preparing ourselves for what might happen, we make our moment-to-moment decisions based on what has happened. If the situation changes, our decision should change—but not until then. ➤

chock talk

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

F-111 PITCHES NOSE DOWN

As their F-111 broke ground, the aircrew saw the caution light for the stall inhibitor system (SIS) light up. When they tried to raise the landing gear, the gear warning light came on. The aircrew corrected the gear problem by the checklist, dumped fuel, and entered the landing pattern. About two miles out on final approach, the pilot put in left rudder and right wing low to counter a 20-knot crosswind. One second later, the airplane's nose pitched down. The pilot



was able to counter the pitchover with full back stick and afterburner. They landed without any other problems.

A little more than a week earlier, the panel on which the right alpha (angle-of-attack) probe is mounted was removed for painting. The avionics specialist who disconnected the three cannon plugs for the alpha probe did not write an entry in the aircraft forms about the plugs needing to be reconnected. When the panel was reinstalled, the cannon plugs were not connected.

If the alpha probe's leads are disconnected, the SIS computer receives a pseudosignal of zero volts from that probe, equating to 25 degrees angle of attack. When the airplane took off, the SIS activated. The computer compared the right probe reading to the left probe reading; since they didn't match up, the computer turned on the SIS caution light.

That alone was no problem, as long as the airplane was in coordinated flight. But if the computer senses more than seven degrees of sideslip, it will accept the higher angle of attack as the true one. When the pilot put in rudder for the crosswind, the sideslip exceeded seven degrees; the computer looked at the 25-degree angle-of-attack reading and commanded the flight controls to pitch the nose down hard. The computer was trying to protect the airplane against a stall.

We can't blame the computer for trying to do its job. If the avionics specialist had done his or her job of writing up the connections, there wouldn't have been a problem.

JAM NUT DOESN'T JAM

After flying in his T-33 for 25 minutes, the pilot noticed that he wasn't able to get full right aileron. He turned left with no problem; but when he returned to the right, he couldn't get full aileron authority. As the pilot rolled out wings level, he felt the wings rock, and he saw the right tip tank fall off the airplane. The airplane abruptly rolled into more than 90 degrees of left bank. The pilot immediately hit the autodrop switch, which jettisoned the left tank. He righted the airplane, returned to base, and landed uneventfully.

On the ground, maintenance workers looked things over and found that the jam nut on the hook for the right tip tank had backed off about a quarter of an inch. The jam nut backing off allowed the hook nut to also back off, and the tank moved. The movement of the tank interfered with the right aileron and

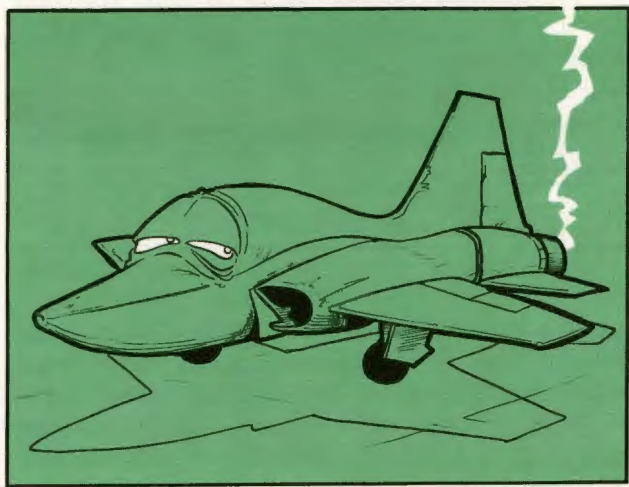
eventually forced the hook open, so the tank fell off.

The jam nut is supposed to self-lock, but this one was worn and wouldn't lock. The tech order requires that a new jam nut be installed whenever tip tanks are uploaded. However, the maintenance workers in this unit hadn't been replacing the jam nuts. The other T-33s in the unit were inspected, and 10 out of 12 jam nuts were found to be either defective or the wrong type.

Do you suppose that the tech order knew what it was talking about? Of course, that doesn't do any good if no one pays attention.

CND ENGINE FLAMEOUT

During maintenance run of a T-38's engines on the sound suppressor, the left engine flamed out when the front cockpit throttle was pulled to idle. The write-up was cleared as a "could not duplicate." In the next nine days the airplane flew seven sorties with no engine problems. On the tenth day, the left engine flamed out when the pilot pulled the throttle to idle during the engine runup before takeoff.



The troops who worked on the airplane when it first flamed out overlooked a few items. Numbered air force regulations and local operating instructions both required impounding an airplane that had an engine flameout in the air or on the ground. The aircraft compressor stall/flameout checklist calls for a throttle rig check. But the airplane wasn't impounded, and the throttle rigging wasn't checked.

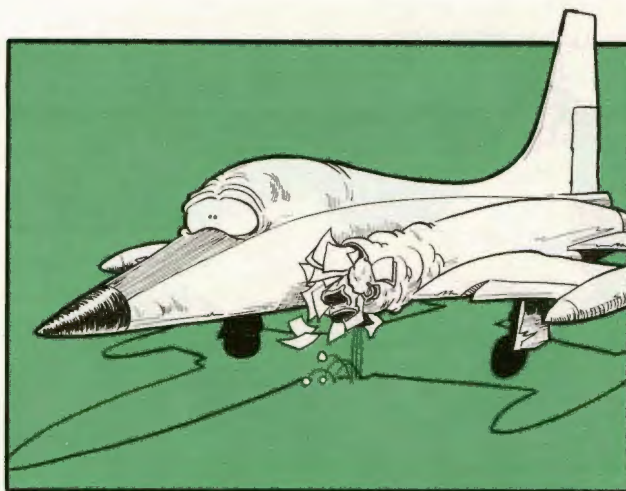
After the second flameout, the throttle rigging was found out of tolerance. We were simply fortunate that the engine didn't flame out in the air during one of those seven sorties.

BETTER LATE THAN NEVER

An F-5E was scheduled for a cross-country flight with an air-to-air mission en route. The ammo cans were removed, and the pilot's baggage was stowed in the left gun bay. During the removal of the lower left gun bay door, the wrist pin on the forward sliding latch broke. The weapons-loading expeditor entered the discrepancy in the Form 781 as a red diagonal. The 781 and a spare can of oil were also stored in the left gun bay. The crew chief then locked the lower gun bay door by driving the forward sliding latch home with a screwdriver.

Later, during the air-to-air mission, as the pilot accelerated through the speed of sound, the left gun bay door unlatched and fell from the airplane. The pilot knocked off his attack and slowed to 300 knots. As he did he noticed that the left engine had flamed out. Suspecting foreign-object damage, the pilot chose not to restart the engine. He landed at a nearby emergency field.

The pilot was right; there was foreign-object damage. The engine had eaten the 781 forms, a helmet bag, a pair of safety glasses, a can of racquetballs, and a pair of gym shorts. The pilot was irate: he'd



also lost his racquetball court reservation by diverting, and reservations are hard to come by.

The problem with the sliding latches on the F-5E gun bay doors was identified several years ago. It's caused by the common practice of using the latches as leverage points or handles when removing the doors. Eventually the latches bend or break. In February 1980, the *F-5 Technical Digest* recommended inspecting the latches and their hinge points for damage. The *Digest* also recommended locally manufacturing a special tool to aid in the removal of the

Chock Talk

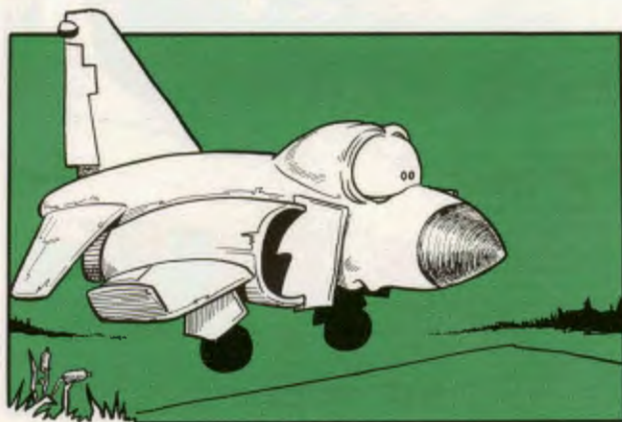
lower gun bay door.

This unit did just that. They inspected all the latches and manufactured the special tool. They took that action right after this incident—two years after it was suggested. Better late than never, we guess, as long as we don't lose our shorts.

BOLT JAMS FLIGHT CONTROLS

After doing a series of rolling maneuvers to the left, the F-4D rolled straight and level. The pilot in the backseat, who was flying the airplane, found that he couldn't move the control stick to the right. The pilot in front took control of the airplane, but he had the same problem. The stick would move left of center but not right.

By using rudder, the aircrew got the airplane headed toward their home base. They lowered the landing gear and performed a controllability check. The stick seemed to be operating normally then. The aircrew flew a straight-in approach and landed with no further difficulties.



Maintenance troubleshooters found a 10-32 bolt under the seat in the front cockpit. It was near the aft torque tube and bearing support collar. The bolt had imprints on its threads indicating that it had been jammed between hard objects. The bolt was placed underneath the right side of the tube and collar, perpendicular to the tube with the head outside and the threads underneath. When the stick was moved to the right, the bolt was drawn under and became jammed between the floorboard and the bottom rivet on the bearing support collar. The stick would then

move freely to the left but would bind when moved right.

The bolt apparently rolled under the collar when the aircrew was doing the series of rolling maneuvers to the left. When the stick was returned to neutral, the bolt became wedged underneath. After the gear was lowered, the bolt was somehow dislodged, freeing the stick. But the situation could have been much worse. The investigators discovered that if the bolt had slipped under the collar while the stick was displaced further left, the stick could not have been returned to neutral. The aircraft would have continued rolling left—out of control.

The obvious question is, Where did the bolt come from? No one knows. All we know is that inspections for foreign objects in the cockpit had not been properly documented. That might mean they weren't done. We also know that foreign-object inspections were not being regularly done on through-flight inspections because of confusion over the requirement.

This incident reminds us that there are two sides to FOD prevention. The first is to keep foreign objects out of sensitive areas. The second is to find the foreign objects that slip by our first defense and to remove them before they cause damage. We can't afford to let up in either area if we're going to prevent FOD.

SAVE MONEY THROUGH CORE

By Capt Silas C. Christian
23 TFW/MAQ

Until recently, many items and pieces of equipment were thrown away because the source maintenance recoverability code indicated disposal. But now we have a program called CORE, combat oriented repair evaluation. This program is designed to get the most for our money and improve our wartime capability. Under CORE we evaluate the possibility of locally repairing components that are usually disposed of or sent to depot for repair. If you think it can be fixed locally instead of being disposed of or sent back to depot, submit a CORE suggestion on an AFTO Form 135. In the past, when people asked to authorize repair of an item at the local installation, they were often met with an unresponsive system. The CORE program intends to reverse such actions and practices. The purpose of CORE is to get simple repair and reconditioning of materials authorized at base level, keeping in mind whatever we do at home station we must be able to pack away quickly and conveniently and take with us to a combat area.

Short Shots



Wash Day. Do-it-yourself dry-cleaning is dangerous. Spot cleaning clothes with agents such as gasoline before putting them in the washer may be setting the stage for a violent explosion. Even when rinsed thoroughly before washing the clothes can release enough fumes to reach the machine's motor, triggering a blast.

Emergencies in Restaurants or Theaters. When entering a restaurant or theater, check out the location of the exits, and in case of an emergency, plan to use a different exit from the one you entered. Panicked people usually try to leave a building the same way they entered. In an emergency situation, that causes a backup at the exit and loss of precious time.

Conferences. Many hotels and motels set up for conferences by converting large rooms to smaller rooms using partitions. If there aren't two exits in each partitioned area, think twice before entering it. In case of an emergency, having another exit could save your life.

Kitchen Grease Fires. The best tactic for a kitchen grease fire is to smother it. Remain calm and quickly decide if you can put the fire out; if not, call the fire department. (Is the number posted?) Don't pick up the pan—leave it where it is. Grab a lid, cookie

sheet, cutting board, or another pan and ease it over the fire from the side—not the top. Grease fires in a pan are contained; moving the pan spreads the fire. Don't use water, flour, or cereal; baking soda might not be effective. Don't turn on the exhaust fan.

Orphanmakers? Child car seats have proven so effective they've picked up the nickname *orphan-makers*. Why? Because the child survives the crash when her or his parents don't—if they didn't fasten their seatbelts. Let's all survive: Make it click.

Aerosol Cans May Explode. Most aerosol cans carry this warning, "Keep at room temperature—exposure to heat or prolonged exposure to direct sun may cause bursting." Think about the summer heat. Are there any aerosol cans in the trunk of your car? inside your car? on the dashboard? How about your closed-up camper or boat? On the beach, where's the bug spray? When you're on the job, where do you put that spray can of lubricant, paint, cleaner, or solvent?

How to Prevent Food Poisoning. Keep everything that comes in contact with food clean, especially your hands. Keep hot foods hot and cold foods cold. Refrigerate leftovers promptly. Thaw frozen foods either in the refrigerator or under cold water. When vacuum-packed meat is opened, use it within 3-5 days. Don't buy leaking, bulging, or dented containers and don't taste food that has a peculiar odor or that spurts when the container is opened.

Mull over These Facts. Last year, 71 Air Force drivers were killed in automobile crashes in their private vehicles. Of those 71, 66 were not wearing seatbelts, and 37 involved alcohol. Does that tell you something?

Toy Box Hazard. Any storage box used as a toy box with a lid that opens vertically and falls freely is a potential hazard to small children. Toy boxes that have lid supports are also dangerous. The lid could fall on the child's head causing death or serious head injury. Your best choices are a toy box without a lid, a toy box with a lightweight lid, or one with sliding doors or panels.

It's Not the Fall, It's the Sudden Stop. Without a seatbelt, being in an automobile crash at only 30 mph is the equivalent to falling from a third-floor window.

LETTERS

Dear Editor

The article "Spring Mind-Cleaning" in the May issue recommends extinguishing kitchen grease fires with flour. Flour can explode, spreading the fire and causing serious injury.

Walter E. Hisaw, SSgt, USAF
Electronic Warfare Systems Specialist
Eglin AFB, FL

Dear Sergeant Hisaw

Thank you for correcting our error.

ED

• • •

Dear Editor

I am taking you up on *TAC Attack's* policy of accepting contributions, comments, and criticism. My comments are criticism, and they are directed towards the article "Shot in the Foot," page 19 of the May 82 issue. There is no Air Force regulation or TAC supplement which requires an armed guard for 10 or more weapons. An armed attendant is only required when 15 or more *high-risk* weapons (such as M-16s) are involved (AFR 125-37, para 6-4b) or when an arms storage room is being opened or taken off alarm (AFR 125-37, TAC Supp 1, para 6-9a). The article is accompanied by a neat Sgt David Garcia graphic of a cop who has just smoked a hole through his foot. Give us a break; this is one firearms mishap which didn't involve security police. I know, "photos and artwork are representative and not necessarily of the aircraft or equipment involved."

I'm not being petty about this article, I have two points to make. First, this unfortunate individual was a victim of himself, not of some regulatory requirement. Second, the article references a requirement that doesn't exist. In my opinion, we should never dilute the individual's personal responsibility for safe handling of firearms, starting with "treat every firearm as

though it is loaded."

I've enjoyed and used *TAC Attack* for years. With the exception of this article, keep up the good work. Thanks for listening.

Stanley L. Busboom, Capt, USAF
Chief, Law Enforcement Branch
Office of the Chief of Security Police, HQ TAC

Dear Editor

As an avid reader of your fine magazine, I read your stories and gain many insights in regard to safety. However, as a security policeman, I object to your depiction of a security police specialist on page 19 who had apparently shot himself. He is easily identified by his badge and the beret. The article itself clearly identifies the subject as a small arms instructor, not connected with the security police career field.

While we do shoot ourselves in the foot occasionally, we did not do it in this instance; please credit the CAT-M people with this one.

J.W. Jegg, CMSgt, USAF
Security Police Manager
325 SPSq, Tyndall AFB, FL

Dear Captain Busboom and Chief Jegg

You are both right in saying that the person involved was not in the security police. Our illustrator was misled by the phrase "security guard" in the story, and he took it to mean security police specialist. We apologize to the security police force.

As to the question whether or not an armed guard is required, Captain Busboom is correct: the guard was not required to be armed. The latest version of AFR 125-37 (6 May 82) does not require armed guards for low-risk weapons, which include handguns. If more than 15 weapons are involved, two personnel from the using agency must continuously remain with the weapons until they are returned to an authorized storage area; but even then, the two attendants need not be armed. The instructor in this case checked out 30 pistols, so he was required by the regulation to have help in attending to the weapons. He was not required to be armed, at least not by Air Force regulations.

When high- or medium-risk weapons are involved, two attendants are required, only one of whom needs to be armed. So, even in that case, it wouldn't be necessary for the instructor who was doing the demonstrating to be armed. The other attendant could carry the loaded weapon. That agrees with the conclusion of our article: the instructor and the armed guard (when required) should be two separate people.

ED

TAC TALLY



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

TAC		
JUN	THRU JUN	
	1982	1981
3	20	19
2	11	10
2	17	22
2	15	17

ANG		
JUN	THRU JUN	
	1982	1981
0	4	3
0	2	2
0	4	0
0	3	0

AFR		
JUN	THRU JUN	
	1982	1981
0	0	0
0	0	0
0	0	0
0	0	0

TAC's TOP 5 thru JUNE '82



TAC FTR/RECCE	
class A mishap-free months	
45	1 TFW
32	49 TFW
31	355 TTW
22	347 TFW
19	354 TFW

TAC AIR DEFENSE	
class A mishap-free months	
113	57 FIS
66	5 FIS
63	48 FIS
22	318 FIS
13	87 FIS

TAC-GAINED FTR/RECCE		
class A mishap-free months		
122	188 TFG	(ANG)
114	138 TFG	(ANG)
113	917 TFG	(AFR)
110	116 TFW	(ANG)
100	434 TFW	(AFR)

TAC-GAINED AIR DEFENSE	
class A mishap-free months	
100	102 FIW
96	177 FIG
62	125 FIG
45	119 FIG & 142 FIG
35	144 FIW

TAC/GAINED Other Units		
class A mishap-free months		
155	182 TASG	(ANG)
148	193 ECG	(ANG)
143	26 ADS	
139	110 TASG	(ANG)
135	USAFTAWC	

CLASS A MISHAP COMPARISON RATE

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

TAC	1982	7.8	5.7	5.9	5.2	5.9	5.7						
	1981	4.0	3.0	3.2	5.6	6.0	5.9						
ANG	1982	0.0	2.7	3.2	3.4	3.6	2.9						
	1981	9.3	4.8	4.6	3.3	2.6	2.2						
AFR	1982	0.0	0.0	0.0	0.0	0.0	0.0						
	1981	0.0	0.0	0.0	0.0	0.0	0.0						

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

FLEAGLE



OH FOOT!
DROPPED FEATHER.



OH WELL, WHAT'S THE
PROCEDURE IN A MESS
LIKE THIS?



DRAINED, DRAPED, DROPPED.
DROPPED FLANGE, DROPPED FREIGHT,
AH! DROPPED FEATHER.



FUMPH!

TRYING T'DO TWO THINGS AT
ONCE CAN GET YOU IN LOTS
OF TROUBLE.

FER FLEAGLE,
TRYING T'DO ONE THING AT
ONCE GETS HIM IN
TROUBLE.

