flying SAFETY

Stress and Maintainers

The Giant Hand Phenomenon

Ready for Takeoff? ... NOT!

Stressing Performance

JUNE 1993

HUMAN FACTORS

THERE I WAS

CAPT STEVE RUSIN

I am a fighter pilot currently "cooling my jets" as an Air Liaison Officer with the 4th Air Support Operations Group in USAFE. Besides providing me with a very large dose of "Air Force Appreciation," my tour here has given me time to reflect on my previous 8 years of flying in the T-38 and RF-4C. I hope my "lesson learned" can be of use to you.

■ I logged over 1,300 hours in the T-38 during my tour as a first assignment instructor pilot at Williams AFB, Arizona. Being an IP was a rewarding experience, and, on more than one occasion, it turned out the teacher was the one learning a lesson. One particular sortie stands out in my mind as a prime example of how, even on the simplest of missions, complacency can come very close to ruining your entire day.

We were flying out of Mather AFB on the third leg of a four-sortie, student cross-country mission. My student had a mere four rides left before graduation which only added to my false sense of security.

I did not get to fully enjoy the standard JOC-night good time at the O'Club due to a persistent cough and feeling like I was running a fever. In fact, I spent the greater part of the night hacking away and trying in vain to sleep off a severe chest cold.

The next morning we were dismayed to find thick fog had rolled in, and the visibility was down to about 50 yards. The day dragged on, and by the middle of the afternoon, the fog finally lifted. Due to the delay, we had to change our itiner-

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SPECIAL FEATURES

REGULAR FEATURES

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ary and one-hop back to Williams in order to make it home before field closing time.

By this time, I was really feeling very worn out and was quite relieved we had only one sortie left to fly. Start, taxi, and takeoff were uneventful, and we were soon established on the standard instrument departure. At this point, things got very interesting.

We were cleared to 10,000 feet, and departure control gave us a frequency change as we were climbing through 7,000 feet. About this time, I started coughing and dropped my mask to spit out some of the thick goo I was painfully extracting from my chest.

As fate would have it, my fledgling front seater botched the frequency change and was preoccupied with contacting the previous controller in an attempt to sort things out. I looked up and saw the altimeter rapidly winding through 9,999 feet and initiated the standard IP response to the situation — assume aircraft control and fix things NOW!

The throttles came back to idle, speed brakes bit into the wind, and the stick went rapidly forward. Our orbital trajectory came to a very sudden plateau at about 10,200 feet, and I muttered some obscenity about paying attention and told my student to take back control of the aircraft. Unfortunately, he frantically replied, "I can't. I'm stuck!" I was amazed to see him awkwardly pinned up against the top of the front canopy.

Since we were flying "only" a mundane, high altitude navigation mission, my student had neglected to securely tighten his lap belt. The sudden input of negative G's had raised him and the seat survival kit up and forward about 3 inches, so they now were lodged on the front edge of the seat tray. Additionally, I discovered the survival kit was interfering with the control stick, and I had only about a half-inch of back stick motion available.

I rapidly formulated a recovery plan and had the student safe up his ejection seat before he attempted to unstrap and get things put back into order. The last thing I needed was for him to accidentally grab a wrong handle and leave me there flying solo. The restricted amount of stick travel did not become a problem, and within about 10 minutes, my student was snugly strapped back in and flying us back home.

All in all, the episode could have turned out a whole lot worse but, nevertheless, I took home some very big lessons as I walked away from the jet that day. First of all, flying sick is flying stupid. If you're not feeling well enough to stay ahead of the jet, then you certainly shouldn't be sitting in one. All too often we forget "get-home-itis" can quickly turn into a terminal illness.

Secondly, an ejection seat is a very serious piece of equipment. No matter how innocuous you imagine the mission to be, the fact remains your only ticket out of many bad situations rests with that seat. You're just decreasing your own probability of survival if you don't strap in properly on every sortie.

Finally, you need to keep a sense of perspective when confronted with the fact you're going to bust through an altitude restriction. Pulling the wings off an aircraft with nothing but blue sky in sight to avoid being an "administrative" conflict with an airliner 2 miles away probably isn't the brightest idea in the world. Then again, there isn't too much debate as to the need for zero tolerance when it comes to flying at low altitude in marginal weather.

It all boils down to maintaining situational awareness and not letting your guard down by allowing complacency to pay an unwelcome visit to your cockpit. ■

"Nav... ready for takeoff?" NOT!

CAPT KEVIN "SLIM" WHITMAN
USAF Academy, Colorado

■ How many times have you "misspoken," intentionally or not, when you said those four little words? Sure, you've done all the checklists, all your equipment is functioning, and your box lunch is history, but are you really **ready for takeoff?**

It was February several years ago, and we were enjoying the springtime weather (30 to 40 degrees below zero) while on temporary duty to the Alaskan Tanker Task Force at Eielson AFB, Fairbanks. (I had to wait until the statute of limitations ran out to protect the guilty before writing this article). We were pulling a strip alert sortie to support the Cobra Ball should it launch and need a refueling from our KC-135A aerial gas station. We had already flown once on strip alert just the week before to refuel it somewhere off the Alaskan coast.

The day prior we had preflighted our aircraft and "cocked" it on alert. It was fueled up, the water had been drained, all switches were positioned correctly, and the necessary ground equipment was prepositioned so all we had to do at the jet was crank engines, taxi, and takeoff.

We were pulling a strip alert sortie to support the Cobra Ball should it launch and need a refueling from our KC-135A aerial gas station.

About midmorning, we decided to make a grocery run to the commissary in the alert truck. The pilot and copilot were already back in the truck with their purchases. I was heading out the door with mine. The boom was waiting for the total to ring up so she could write a check for hers when a voice on the radio said those fateful words, "For Alert 1, for Alert 1, report to command post ..." Boom was just starting to write out her check when I grabbed her arm to hustle her to the truck.

"But, Nav, just a few seconds more and ..."

"Come on, Boom! Now! We'll get your groceries later!" (They may be still sitting at the checkout counter. I don't know that we ever went back for them.)

At the command post, the pilots went for the weather briefing while I picked up my container of classified missions. A short time later, we arrived at the aircraft. At least we arrived at the spot where it was supposed to be — the place where we had left it the day before. Maintenance had switched jets on us for some reason, and the one in its place

continued

What would you do if you found out your flight plan was missing just as your aircraft commander was planning to take off?

"Nav... ready for takeoff?" NOT! continued

was still being pumped with fuel, so we couldn't even climb aboard immediately to do another preflight.

When fueling was completed, Boom and I loaded our gear (groceries included) while the pilot did the walkaround and the copilot started their checklists. The pilot discovered the water drain handle was frozen and couldn't tell whether it was in the open or closed position. He had maintenance thaw it out so we'd have an idea whether the water had been drained or if we were carrying a 1-ton block of ice in the tank.

Meanwhile, we all rushed through the Power Off, Power On checklists and checked out essential systems. While the inertial navigation system (INS) aligned, I set all the various codes into the IFF/SIF and Mode 4 — who needs the headache of explaining to the commander why the Air Force needlessly scrambled fighters to intercept you on your ADIZ penetration upon your return? The pilot went down to check the water drain handle position which was open after all.

When he returned, we continued with the Before Starting Engines checklist. The INS finally warmed up and aligned just prior to finishing the Starting Engines checklist. I switched it to the NAV position. Pilot called Ready to Taxi checklist complete. Throttles forward, brakes checked. Hey, we're on our way in record time — only 10 minutes late for takeoff — but we still have to taxi to the hammerhead. I hope no one forgot anything critical.

I looked my navigation systems over one more time, then unlocked the box containing various classified missions. I found the chart. The mission code we received translated to the same mission profile we'd flown last week. This should be simple. Now where's the flight plan? It should be with the chart. There it is. No, it's not the right one. It's got to be here. I put it with the chart. Sarge replaced the ones I used last week with new ones. He handed them to me. I put them in here together. Maybe the flight plan got stuck in the bottom. (I dumped the container.) No, nada, nothing.

Sarge must have given me the wrong flight plan. He couldn't have. I had checked the chart to be sure it was the correct one. Surely I had checked the flight plan, too. Hadn't I? Nope, we were in a hurry to go downtown for dinner, so I had **assumed** the flight plan went with the chart. Now what?

Let's see what my options are. I can't call up command post to read me the flight plan — it's classified. We don't have time to wait 10 minutes longer for someone to race out here and bring us the correct one. We're coming up on the hold line, finishing the Before Takeoff checklist. I have about 12 seconds to decide whether to bother the pilots with these "minor" details. Should I tell them, or keep it to myself? I have a good chart and a booklet telling me frequencies, codes, and other important mission information. I think I remember the altitudes for the ADIZ penetration. At least, I have narrowed it down to two possibilities. Which was it last week?

"Nav, pilot. Ready for takeoff?"

A brief pause — it seemed like hours.

"Nav, pilot. You awake back there?"

"Roger, pilot. Is the nav ready for takeoff."

Okay, so I misspoke — I wasn't really sure. But if I had told him

Being *totally* prepared for a flight begins long before you arrive at the aircraft. Take extra time to check over *all* mission paperwork!

about the missing flight plan and he had decided to go anyway, he might have been distracted enough to make a mistake.

Gear up. "Nav, pilot. I'd like a flight plan up here."

Another lengthy pause for meditation on my part.

"That makes two of us, pilot. I'd like one back here, too."

"Say what?"

I checked to ensure the crash ax was still fastened in its strap. Good, I was still between it and the pilot. Then I briefly explained the situation and waited while a lengthy, one-sided discussion followed containing comment about my low IQ and my spurious family lineage. (I hope it was on interphone and not over UHF.) Next, I explained what I was going to do.

"Okay, I messed up. But, look, we have a good chart. I know (most of) the altitudes we have to fly. I have blank forms for flight planning. And we know the air refueling control time. I'll just mission-plan it in the air. After all, we have several hours to do it. 'Co' can compute a fuel log. Whatever is left over is our maximum offload. All we need to do now is make up for the 15-minute late takeoff which, by the way, is impossible with this 200-knot headwind. Co, call command post and tell them we'll be 30 minutes late to the air refueling control point. They can contact our receiver."

I guess that sounded reasonable to him because that's what we did. I alternated between mission planning and navigational tasks. Co did the fuel log. We even made up some of the lost time as the winds subsided at altitude. Offload complete, we headed for home and ate half-frozen pizza in flight for lunch. (Sure glad we had just come from the commissary.) I even guessed the right altitude to penetrate the ADIZ — at least, we didn't see any fighters intercepting us, and no one called later.

Back on the ground, I returned the used classified materials to Sarge. While the door was locked, we had a quiet heart-to-heart chat (no, no one got hurt) about the importance of ensuring he gave the correct mission plans and charts to crewmembers, and insisting the navigators doublecheck them before leaving the room.

He thanked me for pointing out the problem and for getting the job done in spite of **our** oversight. Then, he casually mentioned that had we missed this refueling, the president would have been briefed and we would have all been given bus tickets home, or possibly, tickets on a dog sled. Either way, it would have been a long, cold ride back to Arkansas.

No, I don't blame Sarge. If I had taken just 2 minutes to check the new materials he had given me, my pilot would have a little more hair left on his head and all of mine would still be brown. I learned a little about mission preparation that flight, and although I'm done flying now, hopefully some of you can benefit from this experience.

Being totally prepared for a flight begins long before you arrive at the aircraft. On mission planning day, do you take an extra 5 minutes to check over **all** the mission paperwork? Has anything changed? If so, have you made the changes on every copy? Do you have all the mission materials? Do you have all of your equipment? Is it in good working order? Has the boom ordered the flight lunches? The list could go on into infinity.

Finally, the next time you complete the Before Takeoff checklist, take another look around the cockpit. Have you or your crew forgotten anything you might live (or not) to regret? Are you really, **really** ready for takeoff? ■

CMSGT ROBERT T. HOLRITZ
Technical Editor

THE BIRD FROM SAC

■ Any experienced supervisor will tell you good communications are absolutely necessary to effective management. When communications break down, for whatever reason, things tend to go to hell quickly. I learned this lesson the hard way more than 20 years ago.

In August 1973, the bombing of Cambodia was officially ended. For the Air Force folks stationed at Takhli Royal Thai Air Base, the priorities changed from making war to those akin to any stateside base. Accordingly, the wing commander decided to conduct a series of readiness exercises.

One morning I was at the end of the runway overseeing a team arming an F-111 when there was an excited voice on the radio. "Attention, all radios this net," it said. "There is an aircraft hijacking in progress. **This is an exercise.**" Of course, it was an exercise. How the hell could anyone steal an F-111? The thing was hard enough for an experienced pilot to fly, much less some commie hijacker!

The voice over the radio belonged to SSgt Robin Roberts, a good friend. "Mike-4 control," the voice called. That was my call sign. It sounded to me like Robby was calling the shots on this exercise, and he intended to get me involved.

When I answered the call, Robby returned in a very serious and authoritative voice. "Proceed to taxiway 2 and block any aircraft with your truck. Repeat. Don't let any aircraft get past taxiway 2." "Roger that," I answered, in an equally somber tone.

In a flash, I picked up my loadcrew and proceeded to block taxiway 2. For what seemed like a very long time, nothing happened. But after a few minutes, I noticed a KC-135, which was deployed from a SAC base, was cranking engines. It was the only non-F-111 aircraft on base. "Part of the exercise," I thought. I reported to Robby. "Control Mike 4, there's a KC out here cranking up. Is SAC in on this exercise?" "**Don't let any aircraft pass!**

He was emphatic. He sounded on the verge of panic.

A few more minutes passed, and the crew chief yanked the chocks from the tanker. Unbelievably, it began to taxi to taxiway 2. "Robby," I said, "it's taxiing." "Just don't let it pass," he replied.

Up to now, I was only mildly impressed. A blue staff car came down the ramp at a pretty good clip, turned onto the taxiway, and pulled up to my van. It was driven by a full bird. "Sarge," he said, "move the van. I've got a tanker coming this way."

Now I was really impressed. Talk about realism! I was now almost convinced the colonel was in on the exercise and sent to try and fake me out. But just to be sure, I called Robby. "Robby," I said, "there is a full colonel out here, and he wants me to let the tanker pass. Robby's reply came almost instantly. "Don't let any aircraft pass. Repeat — no aircraft."

The colonel heard the transmission. "Look," he said, "this is an alert tanker. It's got to fly." I couldn't believe it. This colonel was almost pleading with me to let his jet by.

By now, the tanker had almost made it to the taxiway. I had only a few seconds to make one more call to Robby. "Robby, I'm going to bail out of this truck!" In a flash, I apologized to the frustrated officer and directed the loadcrew to get out of the truck. Then I shut the engine off, pulled out the keys, bailed out, and ran to a grassy area near the taxiway.

It wasn't until the colonel followed me to the grassy spot that I began to suspect something was not exactly right. The colonel got out of his car, slammed the door, and yelled some obscenities. As he came closer, I could see the veins in his temples were about ready to explode. "This man is not acting," I thought. Then it happened. Over the radio, in an almost tranquil voice, Robby said, "It's okay let the tanker by."

Needless to say, I made a run to the van and moved it out of the tanker's path. I didn't wait for the colonel to thank me. In fact, I thought he was probably on his way to the emergency room, suffering from some kind of stroke or massive heart attack.

As soon as I caught my breath, I notified Robby the tanker had passed. "Yeah, Bob," he replied. "By the way, the wing commander wants to see you ASAP."

Suddenly, my palms were sweaty. What had Robby gotten me into? I was not one of the wing king's favorite NCOs. He always suspected (and for good reason) I was the one who always chocked his staff car when he parked it on the ramp while flying. When he returned from his flight, he never noticed the chocks and, in front of everyone on the line, he would drive over the chocks. He had no sense of humor.

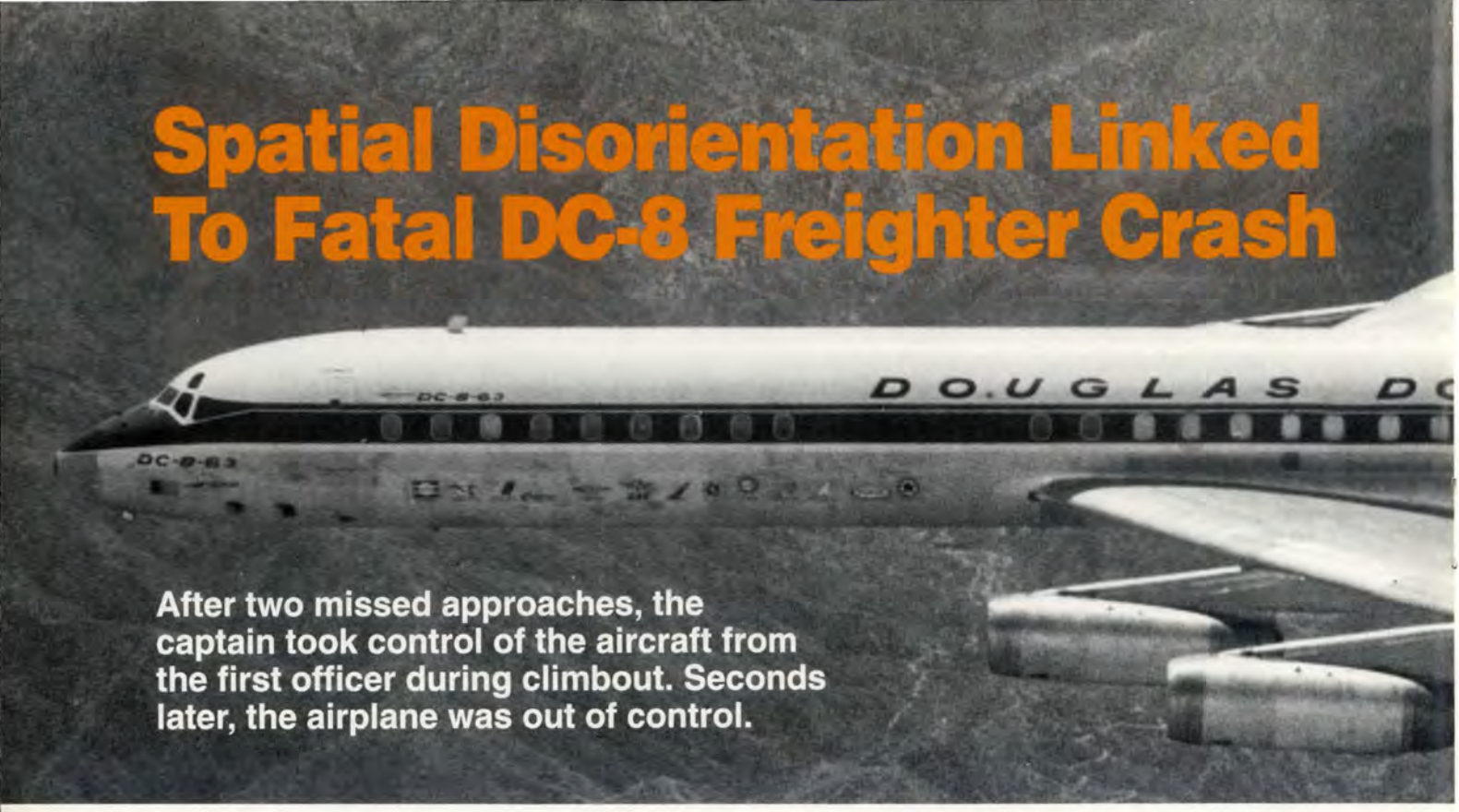
When I arrived at the control room, I was surprised to see the irate colonel from the taxiway talking with the wing commander. It was amazing. This officer, who only 5 minutes before was a raving madman, actually had a slight grin on his face. The wing king, true to his form, had no expression.

It was, as it turned out, a breakdown in communications between the two colonels. The bird from SAC apologized to me and Robby.

I learned a lesson on how important effective communications are in accomplishing a unit's mission. I was lucky. Some people learn this at the cost of a mishap or at the detriment of a career.

The Air Force's safety program is nothing without effective communication. We should remember the lessons of good and bad communications from everything we do, and apply the good lessons to making each mission safer. "I thought you were going to do it" is a sad epitaph for anyone. ■

Spatial Disorientation Linked To Fatal DC-8 Freighter Crash



After two missed approaches, the captain took control of the aircraft from the first officer during climbout. Seconds later, the airplane was out of control.

EDITORIAL STAFF REPORT
Flight Safety Foundation Accident Prevention, Vol 50, No 3

Accident Sequence

■ The McDonnell Douglas DC-8-63 freighter was on its second missed approach to Toledo (Ohio) Express Airport when it entered a steep bank and pitched nose down. The aircraft crashed about 26 seconds later 3 miles northwest of the airport.

The crash, which killed the three-man flightcrew and a passenger, occurred at 0326 Eastern Standard Time (EST) during instrument meteorological conditions.

Flight 805 originated in Portland, Oregon, at 2145 EST bound for Seattle, Washington. The flight, operating under 14 Code of U.S. Federal Aviation Regulations (FAR) Part 121, unloaded and loaded freight and departed Seattle for Toledo at 2320 EST.

The airplane was vectored for an instrument landing system (ILS) approach to runway 07 and advised that Level 1 and Level 2 precipitation echoes were along the final approach course to Toledo. Radar depiction of the intensity of precipitation is measured in six levels: Level 1 (weak), Level 2 (moderate), Level 3 (strong), Level 4 (very strong), Level 5 (intense), and Level 6 (extreme).

The first officer was the pilot flying during the approaches and during the final moments of the flight.

Probable Cause

A National Transportation Safety Board (NTSB) investigation report concluded the probable cause of the mishap was the "failure of the flight crew to properly recognize or recover in a timely manner from an unusual aircraft attitude" (see sidebar).

The NTSB said the unusual attitude could have resulted from spatial disorientation experienced by the captain (who took control of the aircraft during climbout from the second missed approach), caused by either physiological factors or a failed attitude director indicator. The NTSB said safety issues related to the crash included unusual attitude-recovery training for flightcrews, crew fatigue, and cockpit resource management (CRM).

"The captain assumed control of the airplane ... but apparently became spatially disoriented ... and he inadvertently allowed an unusual attitude to develop with bank angles up to 80 degrees and (downward) pitch angles to 25 degrees," the NTSB said.

The NTSB report added: "The captain transferred control of the airplane to the first officer when the airplane was nose low and in a left bank angle. However, there may have been a short period of time when neither pilot was in control.

"The first officer assumed control and began leveling the wings and raising the nose of the airplane, but impact with the ground occurred before the unusual attitude recovery was completed. The operability of the captain's attitude indicator at the time control was lost is uncertain. Witness marks on the one attitude director indicator ball that was found could have indicated an incorrect position at impact, but the evidence was inconclusive. Based on the performance of the airplane during the recovery, the first officer's attitude director indicator was operating properly (as was another independently powered standby artificial horizon)."

At 0324:46, the first officer advised the air traffic controller at Toledo that the airplane was executing a second missed approach, and the flight was directed to climb and maintain 3,000 feet. At 0325, the captain called for climb power, and a

Photo Courtesy of McDonnell Douglas

sound similar to that of a slight power reduction was recorded on the cockpit voice recorder (CVR). About 30 seconds later, the tower controller directed the flightcrew to turn left to a heading of 300 degrees.

Flight simulation studies conducted by the NTSB indicated a rapid loss of altitude and an increase in airspeed "as the airplane dove to impact in about 26 seconds. The crash occurred at an airspeed in excess of 300 knots."

The Crew

The captain, 59, was hired in October 1990. At the time of the mishap, company records indicated he had logged a total of 16,382 flying hours. Of these, 2,382 were in the DC-8.

"U.S. Federal Aviation Administration (FAA) records indicate the captain failed his first attempt at a DC-8 type rating on October 23, 1986. The unsatisfactory maneuvers were three-engine ILS, no flap approach, nondirectional beacon (NDB) approach, and a 50 percent power approach. The FAA inspector noted on the forms 'not with the aircraft' and 'train to proficiency.'"

After receiving additional training, the captain passed the rating check ride on November 5, 1986. "Interviews revealed his peers regarded him as a very good pilot," the NTSB said.

The flight engineer, 57, was also hired in 1989. Records indicate he had logged a total of 21,697 flying hours, of which 7,697 were in the DC-8.

Records indicated the captain and first officer had been paired on 23 previous trip sequences. The captain and flight engineer had been paired on 20 previous trip sequences.

Weather

Surface weather conditions at the time of the crash were reported as measured ceiling 400 feet overcast, visibility 2 miles, moderate rain, fog, and winds of 090 degrees at 13 knots.

(On the second missed approach, Toledo tower reported winds of 100 degrees at 10 knots. The crew of Flight 805 told the tower they were experiencing 35-knot winds of 180 degrees on the final approach course, requiring a significant crab angle to stay on course.)

The NTSB said that although low ceilings and visibilities were present at the time of the crash, existing conditions "did not preclude a successful approach."

It added: "Therefore, weather cannot be considered causal in this mishap, although the adverse crosswind was probably the precipitating event which caused the two missed approaches."

A low-level wind-shear alert system (LLWAS) was operating at Toledo at the time of the mishap. No LLWAS alarms were recorded from 0300 to 0340, the NTSB said.

Crew Performance

The report reviewed in detail the crew's performance during the two missed approaches.

During the initial descent into the Toledo area, the captain was "coaching" the first officer on when to start down to the initial approach fix crossing altitude and when to increase the flap setting, the report said.

"The CVR indicates that on the first approach attempt, the first officer slowed the airplane too much for its ... configuration. He never achieved the flap/speed combination desired by the captain, and he should have been capable of maintaining the appropriate speed. He also failed to intercept either the localizer or the glideslope on the first attempted approach."

continued

"According to the controller, the attempt to capture and maintain the localizer has begun 23 miles from the outer marker. The airplane was about 15 miles from the marker when the captain prompted the first officer with 'there's the glideslope.' During the next 2 minutes, they ran the landing checklist, but the nearly constant comments from the captain about airspeed, configuration, and the glideslope (which the first officer apparently never captured) failed to achieve the desired results, and they performed the first missed approach."

The events during the first missed approach, the NTSB said, suggested "poor airmanship on the part of the first officer ... that he was overloaded by the sequence of events and was not achieving proper control of the airplane.

"It is obvious the captain was frustrated with the first officer's performance when he commented '... still don't have enough flaps for this speed ... add power ... you're not on the glidepath ... bring it up to the glidepath.' He then added, 'You're not even on the (expletive) localizer at all.' Finally, he had to remind the first officer to raise the landing gear during the go-around.

The NTSB noted that on the second approach, the first officer's performance should have improved because he was aware of the approach conditions and could better prepare for the strong crosswinds.

"Once again, however, he was unable to complete the approach. The captain talked the first officer through the amount of crab required. With increased coaching, the first officer apparently intercepted the localizer and the glideslope. Despite specific admonitions, ' ... don't get slow because you got plenty of wind down here to help you,' they began receiving GPWS, glideslope and sinkrate warnings. After six GPWS warnings, the captain stated, 'Push the power and get back up to the glidepath.' Four seconds later he advised, "Okay, now take it back off ... stay with it.' The first officer responded by reducing power about 3 seconds later, but 2 seconds later the captain announced, 'Oh (expletive), I got it' in a frustrated or disgusted tone of voice. The first officer was unable to properly fly the airplane in an operation ... for which he was trained."

Crew Fatigue

The mishap flight was the second leg of a two-trip sequence from Portland to Seattle to Toledo. The crew was scheduled to fly the reverse route the next day. The first leg began with a duty time of 0300 (local time in Portland) after a week of rest. Nevertheless, the NTSB said it was "unable to determine conclusively the crew was 'well rested' in the traditional sense."

"If their week off duty was spent in normal awake-sleep cycles, they could have been adversely affected by fatigue at the time of the mishap because their return to duty placed them in abnormal, reversed sleep-wake cycles. Moreover, the mishap occurred on the second day of this disrupted sleep cycle during the early morning hours, a time of day associated with diminished capacity to function effectively because of circadian rhythms."

While acknowledging conditions were conducive to producing fatigue and increasing susceptibility to disorientation, the NTSB said evidence was not sufficient to conclude crew fatigue "adversely affected pilot performance in this mishap."

Spatial Disorientation

"There is no question the captain became gravely concerned about something 1 minute and 22 seconds after assuming airplane control (probably for the first time since landing in Portland the previous day) on the second missed approach," stated the NTSB.

The report said the CVR transcript suggested the captain's comments ("what's the matter?") reflected a state of perplexity or confusion rather than recognition of a mechanical problem.

The flight data recorder (FDR) indicated the pilot began a slow, sustained left turn about 0324:50. Beginning about 0325:00, the sound of a power reduction was heard on the CVR, and the airplane was approaching its assigned altitude.

"However, at 0325:10, the FDR still showed the airplane ascending through 2,800 feet at a rate of 2,400 feet per minute. At 0325:31, the FDR

showed the airplane's altitude peaked at 211 feet above the assigned altitude of 3,000 feet. It is probable the captain then realized he had overshot his assigned altitude and proceeded to push the nose over during the decelerating turn to regain 3,000 feet."

About 5 seconds later, shortly after the first officer acknowledged the turn to 300 degrees, the FDR showed the turn rate increased dramatically. Simulations, the NTSB said, showed the bank angle then steepened to about 25 degrees when the captain said the words "What's the matter?" A flightpath study indicated 8 seconds after exceeding 30-degrees bank angle, the airplane was passing through about 60-degrees left bank at a 14-degree descent angle, the report said.

"This combination of steady, sustained turning, acceleration-to-deceleration changeover, and abrupt ascent to descent transition, at night with no visible horizon or outside references, is especially conducive to spatial disorientation," the NTSB said.

Aeromedical studies show deceleration while turning can produce the sensation of turning in the opposite direction. "Had the captain ... incorrectly believed he was rolling out of his turn to the left (the opposite direction), he might have increased the bank angle to the left to compensate."

Conclusions

The NTSB concluded the first officer's response to the captain's release of control was immediate and correct in execution. However, it said the accident underscored the need for further improvement in unusual attitude recovery and CRM training.

"Airline pilots are not periodically trained to recover from unusual attitudes as are military pilots or civilian acrobatic pilots," the NTSB said. "The presumption is that an airline pilot should avoid an unusual attitude and will never have a need to recover from one."

The report said the mishap highlighted the need for "active crew coordination and interaction to avoid having the flying pilot exceed flight limitations such as airspeed, pitch, and bank angles. The circumstances further emphasize the importance of timely action in challenging or correcting fellow crewmembers."

The first officer could have been more aggressive in challenging the captain as the bank angles increased, the NTSB said.

"Because 30 degrees is the steepest bank angle used in normal transport flying, the captain's continued roll into a steeper bank should have alerted the first officer that he needed to challenge the captain's performance," the report said. "The mishap might have been prevented if the first officer had corrected or challenged the captain's overbank in the 10 seconds between the first signal of trouble and the captain's transfer of control statement."

But the report noted the first officer's poor performance during the preceding approaches may have made him hesitant to speak up and alert the captain to the deviation or to intervene to correct it.

The first officer may also have been affected by the CRM environment in the cockpit just prior to the mishap, the NTSB said.

"The last 30 minutes of the flight were more representative of an instructor/student than a teamwork situation. Cockpit conversation and interaction were one-sided, in that the captain was dominating the conversation and making all the decisions concerning the flight until the first officer assumed control of the airplane after the loss of control."

The NTSB said a more aggressive control input may also have averted disaster.

"A larger, more rapid aileron input would have leveled the wings faster; and a more aggressive pullout could have been within the operating envelope of the aircraft. Even if he had exceeded the approved G-load for the DC-8, a large safety margin existed to preclude structural failure. Obviously, this situation called for extremely quick and aggressive control inputs." ■

Cockpit Voice Recording of Flight 805's Intracockpit Communication

During the 30 seconds before impact, the CVR recorded the following:

0325:31.3	Sounds similar to simultaneous altitude and trim alert.
0325:38.9	Captain: (expletives) ... what's the matter?
0325:43.4	Captain: what the (expletive)'s the matter here?
0325:47.9	Unknown: *harry.*
0325:48.4	Captain: *you got it?*
0325:49.5	First Officer: *I got it.*
0325:52.0	Sound similar to altitude-alert warning.
0325:55.0	Sound similar to sink-rate warning.
0325:55.5	Flight Engineer: *pull up.*
0325:55.6	GPWS pull-up warning.
0325:57.3	Flight Engineer: *pull up.*
0325:57.7	GPWS pull-up warning.
0325:58.1	Captain: up, up, up, up.
0325:59.1	First Officer: *I can't.*
0325:59.7	GPWS pull-up warning.
0326:00.5	Captain: *up, up.*
0326:00.8	Sound of Impact.

Source: *U.S. National Transportation Safety Board*

FATIGUE and

CAPTAIN JOHN S. CLARK, JR.
Luke AFB, Arizona

■ Have you ever seen a deer caught in your headlights? The blank stare, mental dullness, and indecisiveness not only accurately describe the deer on a highway at night, but also a flier suffering from either fatigue or five shots of Jeremiah Weed. Fatigue is no friend of the flier. Your eyes fixate resulting in functional nearsightedness, your reaction time and ability to make decisions decrease, and you're more susceptible to spatial disorientation.

Acute Fatigue

Each of us is susceptible to acute fatigue even if you've had a good night's sleep. Acute fatigue is the normal fatigue one experiences between sleep cycles. If you awaken at 0600, run, pull morning SOF, write a few gradesheets, and then fly a late afternoon sortie, you could experience some symptoms of acute fatigue. For example, you omit a minor checklist item or forget lead briefed a formation takeoff until shocked back to reality by a sharp head nod. "The brakes stuck."

Now, what if you maintain your normal routine but you're flying a surface attack night sortie. You arise at 0600, run, mow the lawn, pull afternoon SOF, and finally brief at 1800. Fifteen hours after being ripped from Cindy Crawford's arms, you're hitting the IP on a night sortie. Clearly, you're at greater risk due to acute fatigue.

Cumulative Fatigue

Cumulative fatigue occurs when a person doesn't receive enough sleep to recover from acute fatigue. The tired feeling is less intense, but the symptoms are as severe. A few years ago, an F-4 crew stepped to fly a DACT mission. During preflight, everyone missed the fact the wind fold was unlocked. This is indicated by a red pin extending from the top of the wing. Upon takeoff, the wing folded, resulting in a loss of lift and a roll to the right. The pilot's ejection was unsuccessful.

Was cumulative fatigue a factor in this mishap? The pilot averaged 5 to 6 hours of sleep each night after an 11- to 12-hour duty day. At home, he worked on his master's degree, ACSC, or mission planning. The day of the mishap he slept through his alarm, was late for the flight brief, and missed several checklist items. Undoubtedly, the warning signs were present.

Circadian Rhythm

Fatigue can also result from disrupting your circadian rhythm. Your body's internal clock is set for a 24- to 25-hour day. When you disrupt this sleep cycle, by flying across time zones or working the late shift, your body adapts at a rate of 1 hour per day. During this adaptation period, you experience fatigue. If you want to make a shift worker miserable, mess with his clock by altering his schedule frequently from days to nights. "Hey, Bones, can you turn to

a 1000 brief tomorrow morning and then fly the following night?"

Recently, a pilot deploying to Europe at O'dark-30 released brakes on an instrument trail departure. Shortly after takeoff, something went terribly wrong. He entered the weather, lost SA on the aircraft in front, became spatially disoriented, and entered an unusual attitude from which he never recovered.

Tips to Fight Fatigue

Importantly, we can minimize the risks associated with fatigue by taking several steps. First, we need to admit night flying is more demanding and exhausting than the equivalent daytime sortie. Second, we must recognize the more fatigued a flier is, the more likely will be involvement in a mishap. Third, we must proactively address the fatigue factor by implementing the following items.

Supervisors

- Adapt to a night schedule gradually. The week prior to nights should be a late morning and late afternoon schedule.
- Strive to maintain an 8-hour flying window, with the goal of each flier landing no later than 10 hours after arriving at work, and no later than 14 hours after waking up.
- Ensure base facilities are adequately serving the night fliers. Dental appointments at 0800 are considered duty for the purposes of crew rest.
- Ensure fliers are not switched to and from nights without adequate time to adapt.
- Monitor your people for signs of fatigue. Mental fatigue often produces a lack of motivation, irritability, lack of energy, and an inability to concentrate.
- Communicate a squadron policy stressing it is more mature and responsible to cancel a sortie when you are feeling subpar than to risk a mishap in the name of mission accomplishment.

Individual Aircrew

- Reduce your susceptibility to fatigue by maintaining a physical fitness program, eating properly, and most importantly, getting enough sleep.
- Limit alcohol consumption. A flier usually suffers mental fatigue. This is countered with rapid eye movement (REM) sleep. Alcohol inhibits the REM sleep cycle, causing the person to feel mentally dull even after 8 hours of sleep.
- Don't arrive earlier than necessary for a night sortie.
- Adapt to a night schedule. Set a firm go-to-bed and wake time, and don't vary from this schedule — even on weekends.
- Explain to your family you're not a worthless slug for sleeping past 0800.
- Step up to the responsibility of quality-checking your own flight schedule, and know when to say "STOP" so you don't end up like that deer caught in the headlights. ■

the FLIER

SPATIAL

LT KENNETH R. SLATER
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■ One day I was talking to a fellow pilot, and he told me of a strange experience he had while on his navigational checkride. The entire ride is flown from the back seat of a T-38 under the "hood." (The hood is a device used in Air Force Undergraduate Pilot Training to totally enclose a student pilot so he has no outside references and must fly completely on instruments.)

The lieutenant was executing a practice missed approach climbout which included a 4,000-foot climb along with a 90-degree right-hand turn. He said he rolled the aircraft into a right bank and pulled the jet up into a steep climb while still under the hood. As he attempted to level the aircraft off at his assigned altitude, he had a little difficulty. He said it took both hands to push the stick forward and arrest the climb.

As soon as the lieutenant took his left hand off the stick and put it back on the throttle, he started to climb. His altitude kept varying about 200 feet as he would alternate controlling the stick with one and two hands. He was a little befuddled at his inability to maintain altitude with just his right hand. This went on for about 30 seconds, and he asked if the instructor pilot in the front seat had his hands on the controls. The instructor said he wasn't on the controls, and asked him if he was "all right."

The lieutenant realized he was a little spatially disoriented, and upon telling the instructor this, he was allowed to pull back the hood and look outside. As soon as he did this, his problems were corrected, and he was immediately able to fly the jet and go back under the hood.

What happened to the lieutenant was a classical spatial disorientation case which led to the bizarre giant hand phenomenon of spatial disorientation. Spatial disorientation (SD), resulting in the loss of spatial awareness, occurs as a cause or as a major contributing factor in more Air Force Class A fatal aircraft mishaps than anything else. The giant hand phenomenon is just one of many manifestations of SD.

DISORIENTATION and the GIANT HAND PHENOMENON

To understand SD better, an understanding of the sensory systems involved is needed. The most dominant sensory system a pilot uses for orientation is vision. However, in weather conditions which dictate the use of instruments to fly the aircraft, a pilot is unable to use vision and outside references.

Almost equally important are the organs located in the inner ear — the organs of balance known as the vestibular system. "The primary purpose of the vestibular system is to provide angular and linear acceleration information to stabilize the eyes when motion of the head and body would otherwise result in blurred vision." *Each ear has two sensory organs — the semicircular canals and the otolith organ.

One last sensory system to discuss is the somatosensory system which is important to equilibrium. Complex sensory end-organs are buried in many body structures and respond to pressure and stretching in the skin, joints, and muscles. Information from these sensory organs is carried to the cerebral sensory cortex. Furthermore, because of connections to the cerebellum, somatosensory information is integrated with other orientation information and is used to confirm vestibular and visual inputs.

The seemingly simple task of maintaining balance while walking would be next to impossible to do if we had to consciously think about shifting our weight and balance as we walked or ran. Amazing as our sensory systems are, vestibular and somatosensory information is not always reliable in flight when visual cues to the outside world are not available. Even on a clear day, SD can arise in the presence of extreme linear and angular accelerations associated with tactical maneuvering of fighter-type aircraft.

Vestibular SD is sometimes called vertigo. When the head is turned in the opposite direction from which the aircraft is turning, a cross-coupling effect is placed on the semicircular canals. They are now registering acceleration in two different directions or planes, and this can be extremely confusing. Without visual input (namely, a horizon), severe vertigo can arise.

Other forms are the leans (a person's body leans in the direction of a turn *after* the aircraft has been returned to wings-level flight), the G-excess effect (pilots think they are rotating onto their back in the presence of a large linear acceleration), the graveyard spin or spiral, and nystagmus (during and after violent maneuvering, the eyes oscillate as the vestibulo-ocular system is unable to keep up with violent changes in angular acceleration).

All these different kinds of SD can be classified into one of three types as described by A. Bellenkes:

■ **Type I (unrecognized SD)** occurs when a pilot loses situational awareness and is completely unaware of it. The aircraft may be climbing, turning, or descending, and in the case of the latter, the pilot may fly the aircraft into the ground or sea completely unaware of a problem until it's too late. This is the most dangerous type of SD.

■ **Type II (recognized SD)** involves loss of situational awareness in reference to the earth's surface. The pilot recognizes his loss of situational awareness due to the vestibular disorientation. Recognition then occurs through visual and/or instrumental references and provides an opportunity for intervention and reorientation.

■ **Type III (overwhelming SD)** is

continued

GIANT HAND

continued

the most extreme form of SD. The aviator is cognizant of the disorientation; yet, due to physical or mental incapacitation, is unable to maintain or regain control of the aircraft. The aircraft may be controllable, but the effects of SD may be so disabling the pilot cannot process any data. It is this breakdown that renders the pilot incapable of controlling the aircraft.

As stated earlier, the giant hand illusion (GH) is a form of SD. It was first documented by Dr P. A. King, a qualified fighter pilot and flight surgeon, in 1959. He experienced the phenomenon during a night instrument flight when, making a climbing left-hand turn, he bent his head down and to the right to find a radio switch.

Upon doing this, he experienced violent vertigo, and when he tried to return to wings-level flight, he experienced extreme control stiffness. Even by using both hands and both knees, he could not move the stick to the right. He said, "It felt as if a giant hand was thrusting the stick to the left." There was nothing mechanically wrong with Dr King's aircraft at this time.

So why wouldn't the stick move to the right? The reason was his subconscious wouldn't let him! It may sound unbelievable, but the basis of the giant hand phenomenon is conflict between the conscious and the subconscious for control of the aircraft. In essence, Dr King was isometrically and unknowingly resisting his conscious intention to move the stick to the right. This incident is one of the more drastic forms of the giant hand illusion because a pilot thinks the stick is jammed or stuck and will try to use extreme force in an effort to free the controls.

GH can arise from any of the previously described illusions or spatial disorientations. The GH phenomenon is a type II disorientation which transitions into a type III disorientation. A pilot recognizes an unusual attitude, tries to correct it, but cannot. As a result, pilots may suspect failure of the aircraft's control system. Such was the case of an F-5 pilot in Germany a few years ago.

The pilot was lead aircraft of a two-ship formation. While in a descending turn, the lead pilot turned his head to check on his wingman, and his aircraft began a gentle left roll. He attempted to recover the aircraft, but each time he did so, the aircraft resumed the original left bank. Believing failure of the aircraft's control system, he broke his wingman out of formation and ejected. The investigation of the wreckage showed no signs of control system failure and concluded the pilot had suffered from the giant hand phenomenon.

Pilots who have experienced this phenomenon have caught themselves gripping the stick too tightly, thus controlling by arm movement. Once they transition to finger and wrist control, the aircraft responds appropriately, and resolution of the disorientation conflict begins. Dr King discovered this fact and was able to regain control of his aircraft by using only his fingertips. However, the sensation returned when he again grasped the stick with his entire hand.

To better understand why the use of fingertip control may resolve the GH phenomenon, a closer look at the neurophysiological mechanisms involved is needed. At first, GH was thought to be related to the disproportionate amount of cortical area allotted to control of the hand versus that for the fingers. Because GH seems to be accompanied by vestibular SD, and GH seems to be a conflict between the conscious and subconscious, it leads to the theory that it is the arm and shoulder muscles which are receiving the conflicting inputs.

The arm is one of the mechanisms by which we subconsciously control our orientation through postural reflexes. By using fingers for control, a person "bypasses" the influence of the subconscious or postural motor reflexes.

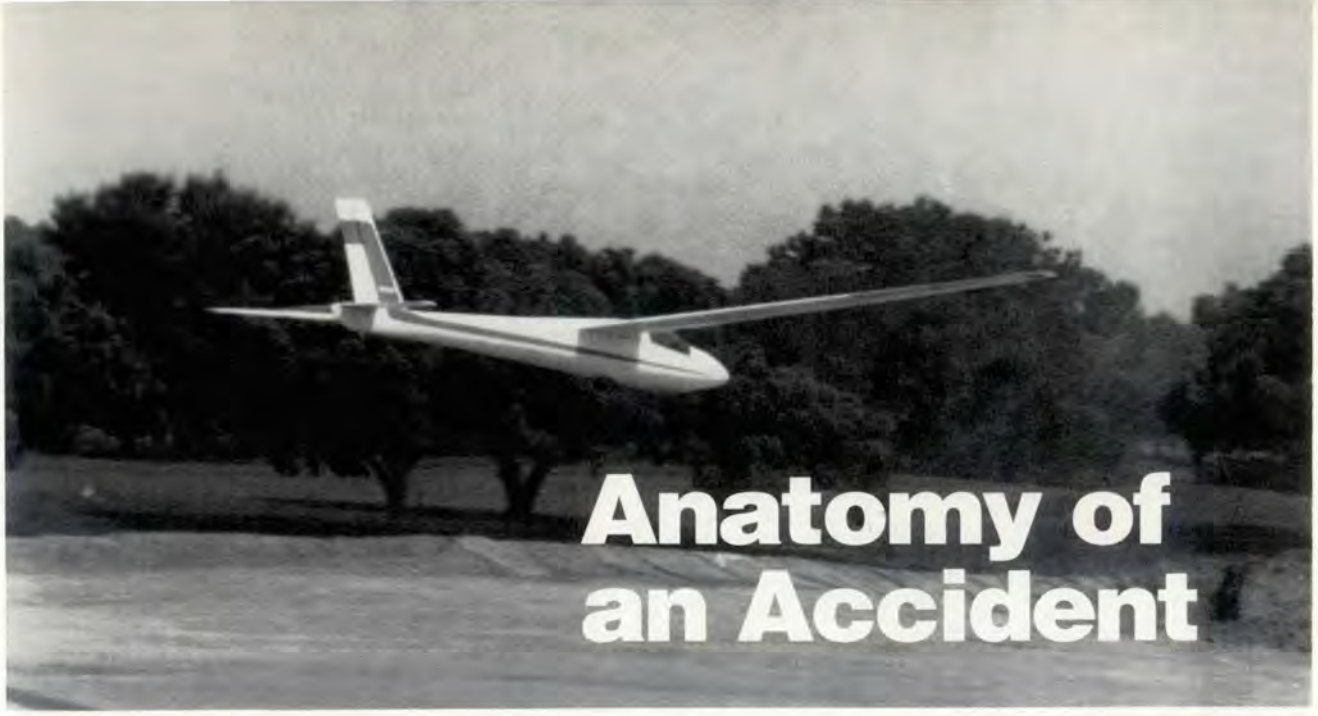
What can be done to protect pilots from this very confusing and possibly deadly phenomenon? Well, as stated earlier, using only the fingers and thumb has worked in one documented case. Tests have been done at the USAF School of Aerospace Medicine at Brooks AFB in San Antonio, Texas, but the results were inconclusive. This test involved *visually* creating SD in a simulator and trying to induce the GH phenomenon to test the effectiveness of the thumb and index fingers in overcoming GH.

There are also engineering efforts underway to help solve the SD problem in general. For instance, the peripheral vision is the part of vision that dominates orientation percepts. The idea of using gyroscopically aligned lasers to provide an artificial horizon has been studied. The laser beam is projected along the canopy rails in a cockpit, and as the aircraft banks and pitches, the gyros keep the laser beam aligned with the horizon. This concept works well but has not found favor with pilots who note the lines appear to wash out the actual horizon.

A system being tested now and showing promise is the Pilot Activated Recovery System or PARS. If a pilot becomes disoriented and feels in danger of ground impact, a switch on the stick or throttle can be hit, and the PARS will immediately recover the aircraft to a 5- to 10-degree nose-up, wings-level climb. The system will fly the plane in a safe attitude until the pilot can take over the controls. This system, however, does nothing for a pilot experiencing Type I (unrecognized) SD.

Still, nothing in today's technology can match the human brain, and until the day when the "perfect" computer is built, pilots will always be reluctant to blindly and totally trust a computer to fly their airplane. Knowledge is still probably the most powerful weapon we have in combating SD. Knowledge is obtained through experience or training and education.

Speaking as a pilot, I'd much rather get my knowledge of GH through training and education than actually experience the phenomenon in flight. The more informed and the better pilots understand SD and its manifestations, the better prepared we are to correctly handle a spatial disorientation situation when one arises. ■



Anatomy of an Accident

SOARING SAFETY FOUNDATION

■ People on the ground were horrified to see the sailplane on tow pitching wildly right after takeoff. One raced for the radio, realizing the elevator control was not connected and hoping he could assist the pilot with advice on how to control the sailplane with the flaps.

It appeared the pilot was following the advice being given, but, for some reason, the pilot could not maintain control. Via radio, he announced his concern and he was resigned to his fate. He died on impact as the sailplane crashed into the ground.

There may be more to the report than is immediately obvious. However, it so clearly illustrates accidents are not the result of just one factor but are "built" through a series of mistakes or poor judgments over a period of time.

Mistake No. 1: The elevator control was not connected.

We will probably never be able to correctly determine why the elevator connection was not secure, but there are several possibilities.

- It was never connected.
- It came loose during ground handling.
- It came loose during the takeoff roll.

If it was never connected, what influenced the failure to do so? Was the pilot interrupted during the buildup phase? Did he feel hurried? Did he just forget?

If it came loose during ground handling, could it have been discovered with a positive control check prior to connecting the tow rope?

If it came loose during the takeoff roll, is there any way the pilot could have recognized it prior to liftoff?

The Soaring Safety Foundation has continuously promoted the "sterile" approach to putting the sailplane together — you must allow no interruptions, even if it means being rude to those who persist in attempting to converse with you. Further, after completing the hookups, recheck each one, ensure safety pins are installed where possible, and perform a positive control check. The disconnected control might have been caught at that time.

Bouncing across the dirt or taxiway edges can certainly cause a control fitting to come off, especially if it was not completely connected to begin with.

This is another reason a positive control check on the line is recommended. It is perhaps the final opportunity to discover improper control responses prior to attaching the rope or cable. It certainly is to the pilot's advantage to make the check prior to takeoff!

If all these things are done, and the control becomes disconnected during the tow (for whatever reason), we are looking at one of those statistically small cases of mechanical failure, or just bad luck. Remembering what Bill Russell, the great Boston Celtics star said, "The more I practice, the luckier I get."

The Operator's Handbook for the sailplane involved here contains specific directions on controlling the aircraft with flaps alone, but we don't get a chance to practice this very often.

Mistake No. 2: in addition to the above, a clear case of "RESIGNATION" is read in the accident report. The pilot decided there was nothing else he could do; he was doomed to his fate.

The Soaring Safety Foundation has led the movement to expose sailplane pilots to judgment training, from which could be gleaned the hazardous thought called RESIGNATION: "I have done everything I know how to do, so my fate is in someone else's hands." The antidote to this hazardous thought is "I CAN MAKE A DIFFERENCE."

If the above paragraph describes something you have not heard before, ask your instructor about the Pilot Decision Making material available from the Soaring Society of America, the FAA, and other sources. ■

One Link in The Mishap Chain?

DR THOMAS P. AZAR, CHAPLAIN, CAPTAIN
97 AMW/HC Altus AFB, Oklahoma

Editor's note: Divorce, like death, has a profound impact on those involved. Such impact can easily affect the performance and safety of Air Force members. Dr Azar's following article explains not only why divorce has such an impact, but offers ways to effectively deal with the trauma of divorce. Hopefully, it will provide another tool to help you, or someone you know, prevent divorce from becoming the first link in a mishap chain.

Case Study

Bill and his wife, Mary, have been married for 7 years. They have a 4-year-old daughter. Since Mary took the early out and has been staying home, Bill has grown angry at her for minor differences like her personal habits, cleanliness, and weight.

To compensate himself, he started going to the club after work for several hours with other maintainers. He told them he needed to live without his boring wife breathing down his neck. He wanted to be more independent.

Mary didn't want to further upset Bill. She did more things with her daughter and started selling cosmetics. Finally, she asked Bill about his absence and irregular hours.

She wanted him to be at home more so they could do more as a family. He got angry and pushed her. He forbade her to talk to anyone about what he did, or their marriage problems, because it would affect his career and "her" security.

He took a second job at night "for the money." Mary became suspicious. One night she watched Bill after work. She saw him leaving early with another woman. When she confronted him about it, he hit her. When she said she was going to get marital help, he threatened her with divorce. Mary talked with the First Sergeant and chaplain. She asked Bill if he would come for counseling. He refused and moved into the dorm. A week later, he asked for a divorce.

■ Everyone faces situations where they lose someone or something they love or respect. Divorce can be an "unfair" loss.

Mary and Bill are experiencing a variety of emotions and deep pain. The stages of a divorce parallel the stages of grief. By understanding grief, one can better understand divorce and be better able to deal with it.

Divorce is the gradual breakdown in respect, communication, and love between two individuals. It leads to the eventual dissolution of their

union. Divorce is the death of one's mate, and one needs to grieve that loss.

Grief is the pain felt at the loss of someone one loves. It is a necessary human response to a loss in one's life. Because of the traumatic impact of divorce, professionals underscore the importance of a healthy understanding and expression of what one is feeling and thinking. This pivotal process has repercussions on job performance.

Grief is a natural response which alleviates stress and gives one a handle on the psychosocial and behavioral changes impacting on an individual. Grief and its stages act as a safety device to allow and control the ventilation of the pain which accompanies loss. When Mary understood this and did not deny the process, it helped her deal with her emotions and readjust.

Mary did not want to lose Bill. But when it became inevitable, she needed to be guided through the grief process and toward acceptance. To avoid the process would result in an unhealthy and future state of intrapersonal and interpersonal problems. Moreover, divorce impacts the entire family constellation — spouses, children, relatives, and in-laws.

Bill and Mary were not communicating about changes they were both experiencing. To be open to each other, to be willing to learn, and to have a selfless attitude would leave room for differences. Otherwise, bitterness, control, and separation distort the relationship.

One has to learn to "accept" differences, incorporating them into the whole fabric of the relationship. Otherwise, the fabric will rip. Furthermore, it is precisely the attitude of "acceptance" or "nonacceptance" of the unwanted demand for a divorce which allows or prevents one from going through the grief process.

Mary

How did Mary work through the divorce process in light of the grief stages?

SHOCK AND DENIAL — "I want to run and hide. I can't believe it is happening to me. I never should have separated from the Air Force."

ANGER (revenge factor) — "I won't let him see our child. I am going to drag him over the financial coals. I wasted all those years for another woman."

GUILT — "I failed my daughter, parents, and God. Why was I so blind and stupid to not wake up to what was going on behind my back?"

DEPRESSION — She felt totally worthless, betrayed, full of self-pity and blame. "I can't trust men. I can never love again."

LONELINESS — She withdrew from friends. She was unsociable, ashamed, and noncommunicative.

ACCEPTANCE — "I still can't believe it. It hurts so bad. I need a support group. I have to weather the storm and start to plan for the future: employment, education, housing, and money."

Bill

Bill's nonacceptance of marital problems caused him to quickly remarry. He rejected the process. Unfortunately, his unresolved status spilled over into his workplace. (It continues to plague individuals who avoid the grieving process.) These issues were carried to the next relationship. Bill could not get rid of his depression and loneliness because he was full of denial and anger. Denial prevents recovery.

It was hard for Bill to heal the pain or replace the person. He could not say goodbye to the person he loved and shared intimate moments with, had children and spent work and leisure time with. There are no winners in a divorce.

His loss greatly affected his work performance. He covered up his

continued

Because of the traumatic impact of divorce, professionals underscore the importance of a healthy understanding and expression of what one is feeling and thinking.

grief. He had a difficult time listening to his superiors. He became critical of TOs and job procedures. Unfortunately, his peers intentionally avoided his invitations to go out after work because of his overly negative comments and attitude. At one point, he felt so alone he wanted to ask Mary out, but his unresolved anger prevented him.

Solution

Most often, intrapersonal problems will swell and lead to interpersonal problems. These lead to marital instability and divorce. Being open and accepting objective support is the beginning of a changed mind. Col Richard Salsbury, Vice Commander, 97th Air Mobility Wing, Altus AFB, Oklahoma, accurately states, "A commander needs to know his people and the support assets available to get his people help."

A positive change in thinking and behavior will allow one to accept the pain of loss, move through the grief stages, and accept the divorce. Acceptance helps to redefine your life. You can return to work able to carry out your duties. On the other hand, an unchanged mind, like Bill's, will not accept counseling or accept the causes of marital problems and divorce and will continue to have difficulties at work.

Mary went through the necessary "labor pains" of grief at the loss of the other. Ultimately, her changed mind accepted the divorce and was open to new and healthy possibilities in the future.

Role of the Counselor

It is the support and guidance of a professional counselor or chaplain which can give one the

1. Objective and unprejudiced opinion of a concerned third party,
2. Realistic assessment of self and marriage and the impact of divorce on job performance,
3. Affirmation that coming for counseling is itself a step toward recovery leading to growth and openness, and
4. Guide one to go through the stages of grief and release all the unhealthy elements — anger, guilt, loneliness, and depression.

Furthermore, a counselor will encourage and support individuals by listening to the painful story and also providing insights from others' experiences.

Your Future

Learning from past mistakes and regrets can lead to openness and trust — the healthy building blocks for a strong future relationship. ■

Marital instability and divorce most often lead to disturbance for young children.

Stress and the Aircraft Maintainer

LT COL RICHARD D. POWER
416 LG/CD Griffiss AFB NY

LT COL JOYCE TETERS
Chief AF Aviation Psychologist

■ "If it's in the air, we put it there." This is a common battle cry of aircraft maintainers throughout the world's air forces. This phrase has a lot of truth to it, and it comes as a stark reality once you begin to dissect the impact maintainers have on the safety of an aircraft or weapon.

As maintenance commanders and supervisors, we ask the world of our maintenance force. We take young men and women directly out of high school. In a matter of months, our training produces an apprentice technician. We teach systems and how to repair them when broken. However, we don't do a good job in identifying our people who are having problems or who are about to "break" themselves.

Why do people begin to unravel? Usually it comes back to a common denominator called stress. It would be simple to say stress is "blah, blah, blah," then open the book of life and take care of the problem. If your unit and people fall in this category (or even worse, if supervisors treat each problem the same), then we have a problem — a big problem.

In today's Air Force, there are a lot of stress inducers. The Air Force is "right sizing." So, "Do I have a job tomorrow?" becomes a major life stressor. No matter how much we inform our people, these changes cause stress. Why? Because of uncertainty. I'm not going to solve all the problems of the Air Force, at least not in this article, but we can make some inroads to what stress is and how to spot its more common traits and what to do.

Stress comes in many forms. What is stressful to one person isn't to another. What is not stressful to you today may be tomorrow. Stress can come upon us slowly. We don't realize the effects of stress, and it can hit suddenly with devastating results.

It isn't often one stress situation makes the whole problem. I call this "added stress" baggage. We pick it up in the morning when we awaken. We face additional baggage throughout every day. Each person you ask will give you an example of stress: work, supervisor, peers, children, finances, sex, alcohol, roommate, spouse, in-laws, the car, etc, etc. If stress is so common, why talk about it?

Why? Because stress hurts. It can make emotional wrecks of people and those around them. Stress can destroy assets: cars, weapons, aircraft, parts. Stress kills.

Stressors can cause a person to act in many ways. Some of the more typical traits of stress follow; but remember, this list is not complete and never will be. Here are the most common.

■ Watch for the person demonstrating temperamental behavior (where there was none before), who is argumentative, or who is projecting blame on others rather than accepting responsibility.

■ Look for the person displaying too much emotionalism in situations which appear to be trivial.

■ Look also for a lack of attention and forgetfulness leading up to missed steps in technical data.

■ Listen carefully to people who complain about not sleeping or who have been restless.

Now, you've identified someone with these traits, and you've begun to talk. You find out there is a problem. Where do you go for help? In the Air Force, we have an infrastructure laced with help. The focal point for making things happen is the unit commander. From there, the folks at Family Support, Mental Health, Chaplain, Red Cross, Social Actions, and many more are available to help in just about any situation.

Remember, stress is here. As supervisors and caring human beings, we need to be aware of its signs and the effects it has on our people and ourselves. Let someone know if you have a problem. If your people have a problem, get them started toward the appropriate help. ■

STRESSING PERFORMANCE

DR THOMAS P. AZAR, CHAPLAIN, CAPTAIN
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Stress is a potential psychological problem crewmembers must be able to deal with effectively. It can affect our inner strength and cause potential problems in the cockpit. Hopefully, the following article will shed some light on the subject. — Ed.

■ Fred was a top performer who was going over the edge. He came to work complaining about headaches, upset stomach, and fatigue. He drank 6 to 8 cups of soda and coffee a day. At lunch, rather than eat a healthy meal or exercise, he had one of his coworkers bring back some fast food.

His work performance began to suffer. He wasn't the energetic, proactive, and focused IP he used to be. Fortunately, several of his coworkers encouraged him to get some help. They were concerned about the way he handled stress. Why?

Stress is a very well-documented factor in pilot and maintainer distraction resulting in poor decision making during the critical phases of duty performance.

How did Fred (and others like him) build up stress levels, and how did they get control of them?

Stress is the external pressure an individual feels from expected and unexpected events. Stress affects our physical, mental, emotional, familial, occupational, and social well-being.

The way we respond to pressure can be either constructive or destructive. Learning to anticipate and work though this outside pressure allows one to maintain a healthy and stable sense of equilibrium.

How aircrews and maintainers respond to this pressure has a definite impact on their duties. What was bothering Fred? What were the identifiable causes, symptoms, and solutions of stress? How did they impact on Fred's job safety?

I first met him on a TDY. Several of his peers were concerned about his negative attitude and performance on- and off-station. At first, we reviewed his relationships and daily schedule at home and work. Fred tried to paint a picture of someone who had it all together. When challenged, he told me of all the broken good habits. He did not realize how they had slowly slipped away.

Fred became extremely tense on the job. Unresolved stress makes one distressed. Life was controlling him. Work and promotion boards were overpowering him. Without an outlet, the strain can cause ill health. He thought this stress came with the territory. Fred needed to refocus his responsibilities. Before he could do that, he needed to try to discover the causes.

Desert Shield, Desert Storm, the reduction in forces, and the merger of commands increased his anxiety

levels. His work environment was stressful — training, exercises, drawdown, competitiveness, doing more with less, upgrades, and check flights to name a few. Some unexpected factors were an in-flight emergency, TDYs, failing a test, and getting along with the different values and attitudes of coworkers.

At home, stress comes from changes within the family — birth of a child, injury, financial problems, in-laws, child development, death, and divorce. If these occur in close succession over a short period of time, they can heighten anxiety levels and offset normal equilibrium.

Like most people, Fred mixed his problems from home and work. An unexpected TDY, coupled with complications in his wife's pregnancy and his mother-in-law's extended visit, began to rapidly increase tension levels.

When the expected and unexpected forces merge on an unprepared individual, they cause distress — physically, emotionally, and psychologically. When stressful events enter into our lives, if they are not recognized and dealt with, they get carried over into other areas. Many health problems are rooted in stress.

Fred's diet and sleep were the first symptoms. The tone and subject matter of his conversation, his 35-10, study habits, and preflight checks suffered.

Stress is unavoidable, but we can learn to manage the pressures which challenge us. We get so busy we become blind to their subtle penetrations. Therefore, it is good to have a friend, counselor, or family member who can point out changes in us. If we are aware of upcoming complications, it would be wise to talk with a professional.

Fred's participation in the counseling process made him realize failure to deal with stress results in higher levels of anxiety which can lead to depression.

Fred took a higher interest in life. He began to revamp his daily schedule. Moreover, he brought his wife in so they could discuss problems and support each other.

He took advantage of an exercise program, went home for lunch, took breaks during the day, and used a calendar to plan and manage time better. He began to take a day off in the month to camp or fish or just take it easy. Relaxation, healthy eating, and good conversation became new guidelines at home and work. He avoided a physical and mental short circuit.

Other suggestions to help keep stress under control are:

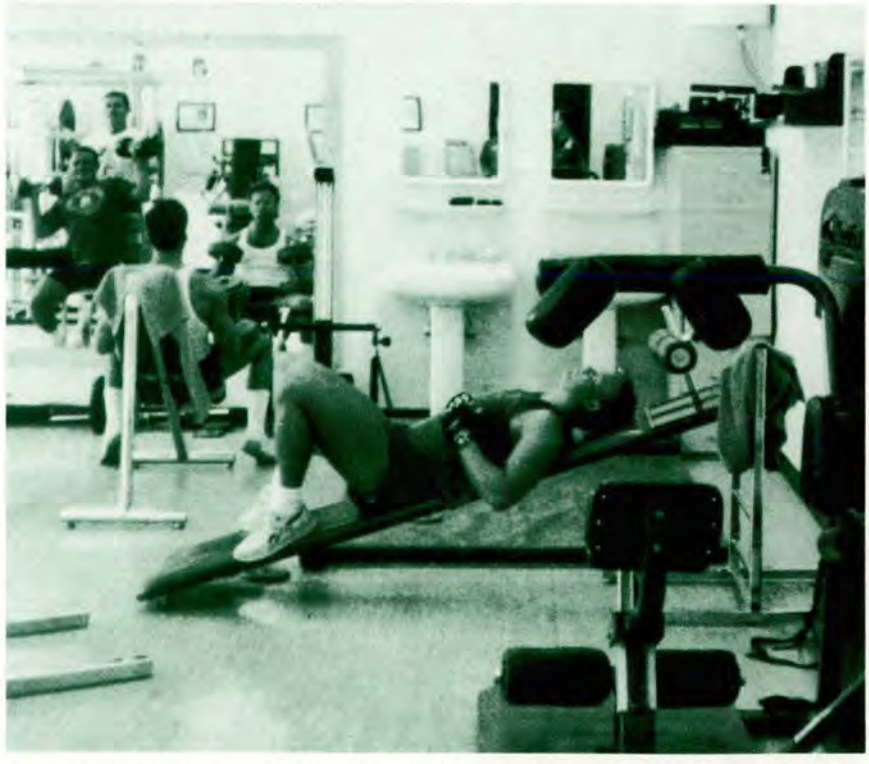
■ Weed out stressful patterns. Try developing a healthy approach to time management, family, exercise, and relaxation time. Start a hobby or go out with friends.

■ Know what stresses come with the responsibilities of work and home. Rehearse expected and unexpected future events with a family member or friend. Find ways to turn struggles into stepping stones for enjoying life.

■ Avoid any kind of caffeine, drugs, and alcohol. These only compound problems and can have a greater negative effect on our daily responsibilities and lifestyle.

■ If you see a coworker who demonstrates stressful behavior, do not hesitate to tell him or her of your concern and ask them if they would like to talk about it. If it is serious, refer them to a medical doctor or chaplain. ■

Free time, some fun, a hobby ... all help to relieve stress.



A good exercise program will not only keep us fit, but it will help in reducing our stress level.

CROSS-

■ This will most likely be the last Cross-Country Notes I write from Norton AFB. In July, the Safety Agency will be activated at its new home at Kirtland AFB, in Albuquerque, New Mexico. I expect it will take a few months to make the transition and get settled into our new digs.

In the process of moving, several key staff members will be moving on to other jobs in the Air Force, and I will be bringing new people up to speed on the Rex Riley Program. I plan to take this opportunity to do a comprehensive evaluation of the program, see what it has accomplished over the past several years, and define some future goals.

I would greatly appreciate any feedback from readers and participants who have comments on the effectiveness of the Rex Riley program or ways it could be improved.

My new address at Kirtland will be **AFSA/SEFB, 9750 Ave G, Suite 277A, Kirtland AFB NM 87117-5000, Attn: Rex Riley. DSN 246-0677; FAX: 246-5661.**

Honorably Retired

Norton AFB CA. Norton AFB has served honorably as home base for Rex Riley and the Air Force Safety Agency since the 1950s. As the base prepares to cease airfield operations by 30 Jun, they have implemented an Official Business Only status and have cut back significantly on the services they can provide to our aircrews.

Therefore, it is with a great deal of pride and more than a few shed tears that I retire Norton AFB from the Rex Riley Bases list. Norton has always provided outstanding service to aircrews, whether here on business (a major staging area for Desert Storm) or just to sample some of the southern California climate.

Retaining the Award

Yokota AB JA. Yokota AB provided excellent service during two recent back-to-back stops recently. Prime Knight service by billeting was great, and Rex and his crew were put in very nice contract quarters 30 minutes from the base. Crew transportation was always on time and took the crew wherever they needed to go.

The base ops flight planning facility was a little cramped but clean and usable. Yokota has started a renovation project to move the flight planning room nearer to the dispatch desk, which will be a great improvement. Rex's stay in Japan was helped by beautifully clear weather in the Kanto Plain which provided outstanding pictures of Mt Fuji both on departure and arrival.

Elmendorf AFB AK. Elmendorf AFB continues to shine when it comes to providing outstanding aircrew services. Everyone from the block-in crew to the weather forecaster goes out of their way to insure everything is taken care of to the aircrew's satisfaction. The crew bus driver even extended his shift until Rex and his crew were safely deposited at contract quarters downtown, although he could have exchanged with a new driver coming on shift.

COUNTRY NOTES

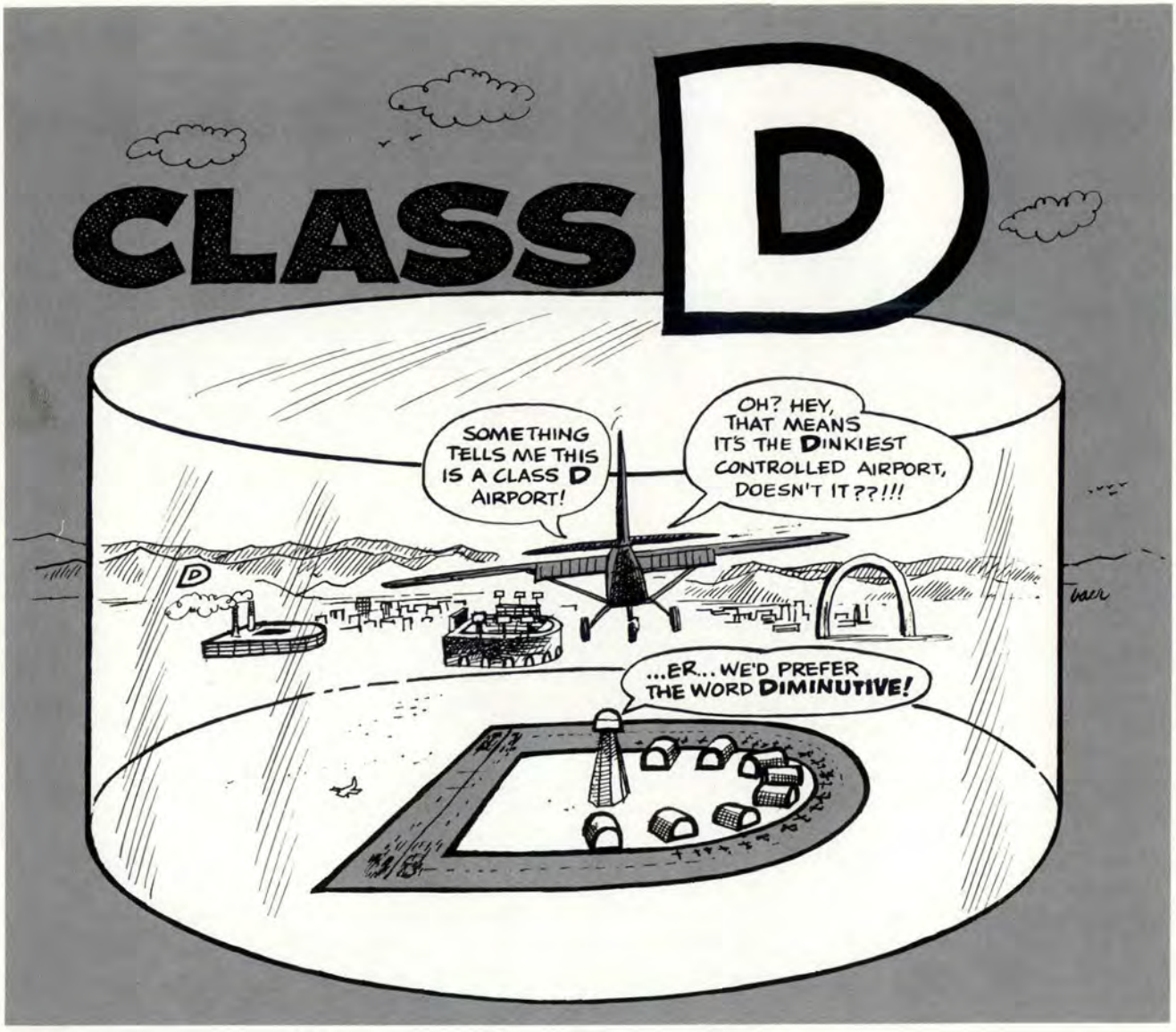
Holloman AFB NM. Rex stopped at Holloman AFB on a short RON and wished he could have stayed longer. The service and facilities were outstanding. Four out of eight areas were rated outstanding. The base ops and weather facilities were state-of-the-art with knowledgeable professionals working behind the desks.

Quarters on base were flawless with many extra amenities, even HBO on cable. Transportation provided Rex with a U-drive van, which was very convenient for eating and getting back and forth to the jet. With a little prior coordination, you will get red carpet treatment by the professionals at Holloman.

Langley AFB VA. Rex transited Langley AFB in his T-38 and found they have an excellent transient crew services program. He was very impressed by their transient alert personnel and crew transportation, giving both of them an outstanding rating. Prime Knight service by billeting was excellent, and rooms were ready on arrival with no check-in delay.

Congratulations also go to **Eglin AFB FL** and **Hickam AFB HI** for retaining the Rex Riley Transient Services Award during recent visits by Rex. ■

Loring AFB	ME	Dover AFB	DE	Howard AFB	PM	Travis AFB	CA
McClellan AFB	CA	Griffiss AFB	NY	Peterson AFB	CO	Tinker AFB	OK
Maxwell AFB	AL	K I Sawyer AFB	MI	Moody AFB	GA	Charleston AFB	SC
Scott AFB	IL	Reese AFB	TX	RAF Lakenheath	UK	McGuire AFB	NJ
McChord AFB	WA	Vance AFB	OK	Zaragoza AB	SP	Incirlik AB	TK
Mather AFB	CA	Laughlin AFB	TX	Torrejon AB	SP	Selfridge ANGB	MI
Lajes Field	PO	Minot AFB	ND	Bergstrom AFB	TX	Nellis AFB	NV
Sheppard AFB	TX	Vandenberg AFB	CA	Davis-Monthan AFB	AZ	Hill AFB	UT
March AFB	CA	Andrews AFB	MD	Hahn AB	GE	Osan AB	KOR
Grissom AFB	IN	Plattsburgh AFB	NY	Kunsan AB	KOR	Kadena AB	JA
Cannon AFB	NM	MacDill AFB	FL	Ramstein AB	GE	Ellsworth AFB	SD
Randolph AFB	TX	Columbus AFB	MS	Johnston Atoll	JQ	Yokota AB	JA
Robins AFB	GA	Patrick AFB	FL	Wake Island	WQ	McConnell AFB	KS
Seymour Johnson AFB	NC	Westover AFB	MA	RAF Alconbury	UK	Homestead AFB	FL
Elmendorf AFB	AK	Eglin AFB	FL	Hurlburt Field	FL	Tyndall AFB	FL
Shaw AFB	SC	RAF Bentwaters	UK	Carswell AFB	TX	Rhein Main AB	GE
Little Rock AFB	AR	RAF Upper Heyford	UK	Altus AFB	OK	Misawa AB	JA
Offutt AFB	NE	Andersen AFB	GU	Grand Forks AFB	ND	Edwards AFB	CA
Kirtland AFB	NM	Holloman AFB	NM	Fairchild AFB	WA	Langley AFB	VA
Buckley ANGB	CO	Dyess AFB	TX	Mountain Home AFB	ID	Luke AFB	AZ
RAF Mildenhall	UK	Aviano AB	IT	Barksdale AFB	LA		
Wright-Patterson AFB	OH	Bitburg AB	GE	Hickam AFB	HI		
Pope AFB	NC	Keesler AFB	MS	Kelly AFB	TX		



Dropping Into D

LT COL ROY A. POOLE
Editor

■ After all the complications associated with Class B and Class C airspace, it's nice to know dropping into Class D airspace requires little more than a working radio.

Class D airspace is the new name for old-fashioned Airport Traffic Areas (ATAs). ATAs used to be 5 statute miles from the airport and rise to 3,000 feet AGL — *but forget all that*. Class D airspace will look like an ATA on the charts but the tops will be indicated clearly. Normally, the top will be 2,500 feet AGL, and the number on the chart will be converted to MSL altitudes for convenience.

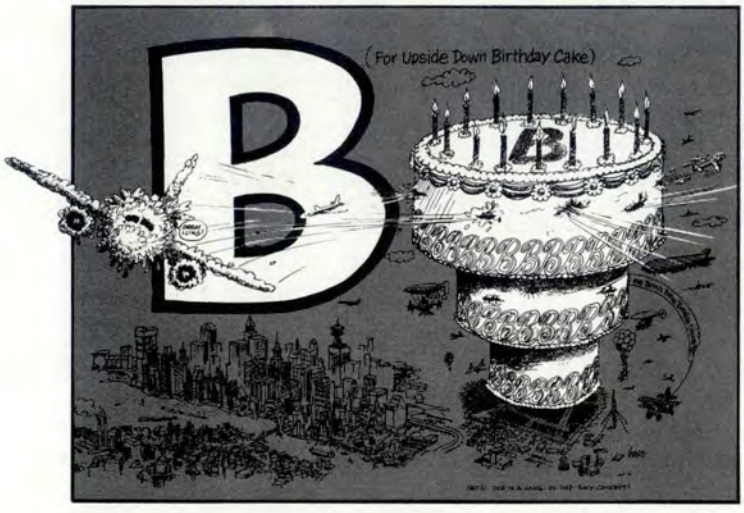
Class D airspace may have a few extensions associated with instrument approach procedures. If you see a "shelf" depicted, expect an operating airfield (without a tower) lies underneath the boundaries of the Class D airspace. Looking at the chart, any extensions which touch part of the ground will be depicted in blue segmented lines. Extensions which are placed above the ground to accommodate nearby airfields will be depicted in magenta segmented lines.

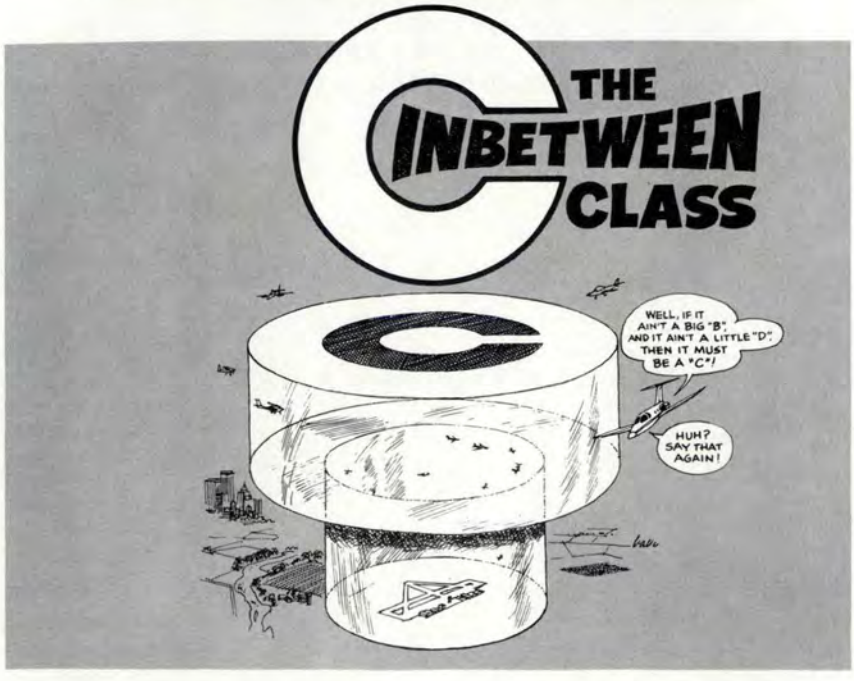
To enter Class D airspace, you first need to slow down below 200 knots if you're within 4 miles of the central airport. You also need to establish radio contact with the primary airport tower.

Finally, you must keep your head on a swivel. You can expect to see many aircraft operating VFR. Although most of them will be talking with the tower, there's still the possibility some are going to nontower airfields or have accidentally strayed into the Class D airspace.

Dropping into Class D airspace is about as simple as calling up tower and requesting a downwind entry. Don't try to make it difficult. ■

OUR STORY CONTINUES ...





CAPTAIN

Paul H. McGillicuddy

493d Tactical Fighter Squadron

FIRST LIEUTENANT

Steven C. Ernst

493d Tactical Fighter Squadron

■ Capt Paul McGillicuddy, F-111F Pilot, and 1 Lt Steven Ernst, F-111F Weapon Systems Officer, were leading a two-ship formation during a squadron weapons training deployment. Shortly after range entry, in the base turn, a 9-pound turkey vulture impacted the right front windscreen. The bird penetrated the windscreen and struck Lt Ernst in the upper body. Capt McGillicuddy immediately rolled wings level and initiated a climb. Lt Ernst, partially blinded from the impact and unable to communicate with Capt McGillicuddy, placed his hand on the ejection handle in accordance with their crew brief bird strike procedures. Then also as prebriefed, Capt McGillicuddy grasped Lt Ernst's wrist to let him know that he was in control of the aircraft.

At this point, Capt McGillicuddy began to assess the seriousness of the situation. Damage to the right side of the cockpit was severe. The right windscreen was shattered and the glare shield, along with a multitude of right cockpit instruments, was destroyed. His wingman reported the damage was limited to the windscreen. Lt Ernst, who was covered with blood and bird remains, certainly needed medical attention. As the landing gear was lowered, Lt Ernst noted the main gear was not indicating down and locked. Capt McGillicuddy then maneuvered to downwind where the crew determined the main gear bulb was burned out and replaced it. A flawless landing under adverse conditions insured Lt Ernst was transported to the hospital as soon as possible for treatment of his injuries.

Capt McGillicuddy's and 1Lt Ernst's superior airmanship and prompt, accurate assessment of a potentially catastrophic emergency resulted in the successful recovery of a valuable Air Force aircraft.

WELL DONE! ■

*U.S. GOVERNMENT PRINTING OFFICE 1993-679-016/60010

UNITED STATES AIR FORCE

Well Done Award

STAFF SERGEANT

Bobby J. Bishop, Jr.

512th Fighter Squadron

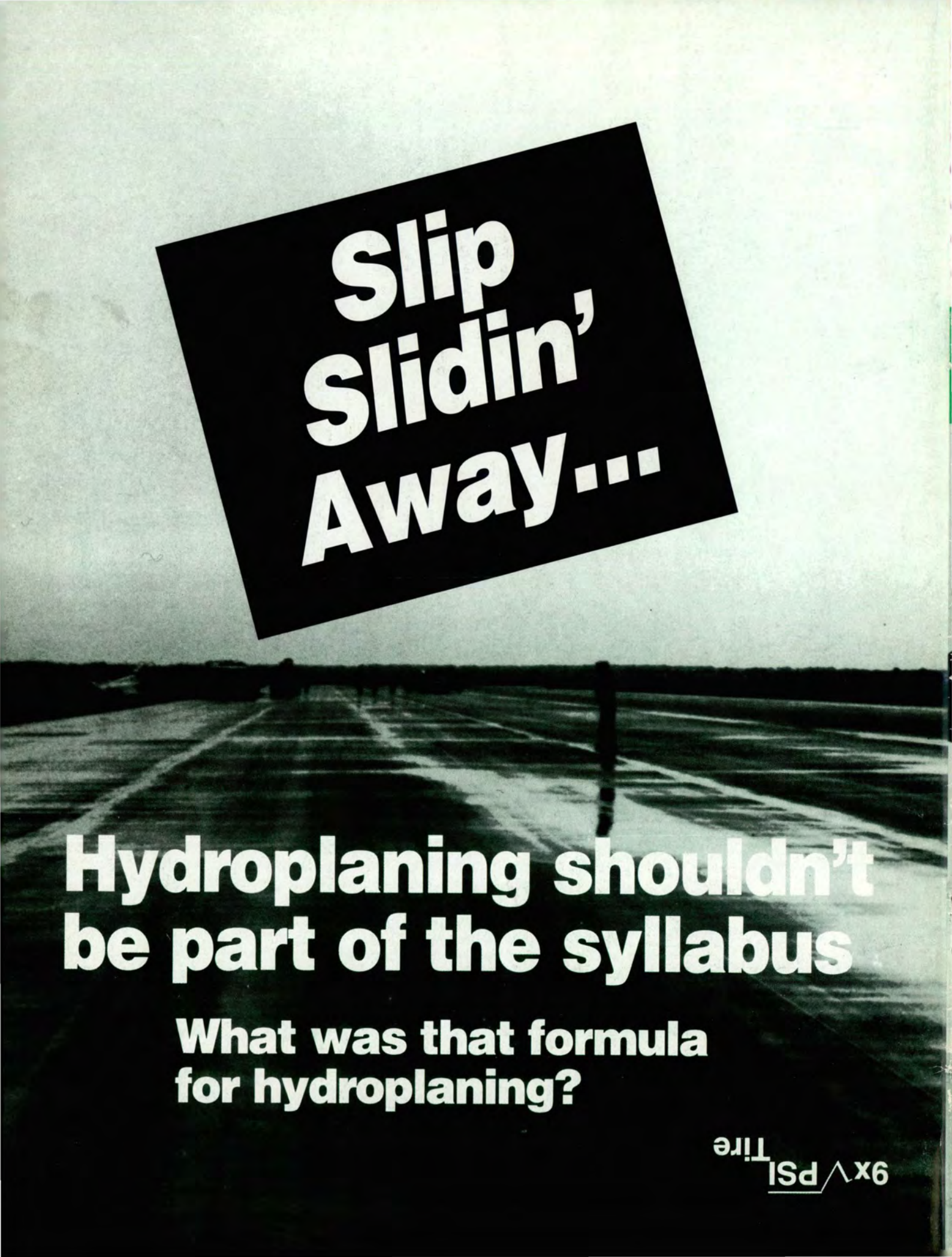
■ SSgt Bishop was deployed to Incirlik Air Base, Turkey, in support of Operation Provide Comfort. While helping install an engine, he was notified of a fire involving a running aircraft with no one in the cockpit. Analyzing the situation, he quickly assembled the necessary tools and drove to the mishap aircraft shelter. Upon arriving, he found a running aircraft with no pilot or ground personnel present.

Without hesitation, he ran into the shelter and proceeded directly to the fuel shutoff valve access door. He quickly dropped the door and closed the valve to flame out the engine. Once assured the engine was shut down, he assessed the fire situation. Finding the fire extinguished, he proceeded to the cockpit and, after noting the position of the switch, turned off the aircraft battery. He directed the line supervisor to notify safety and remained at the aircraft to ensure no switches were tampered with before safety personnel arrived to investigate the incident.

The selfless actions of SSgt Bishop directly averted a more serious mishap involving a valuable tactical asset and its associated live munitions.

WELL DONE! ■

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Mishap Prevention Program.


Slip
Slidin'
Away...
Hydroplaning shouldn't
be part of the syllabus.
What was that formula
for hydroplaning?
9x√PSI Tire