flying

SAFETY

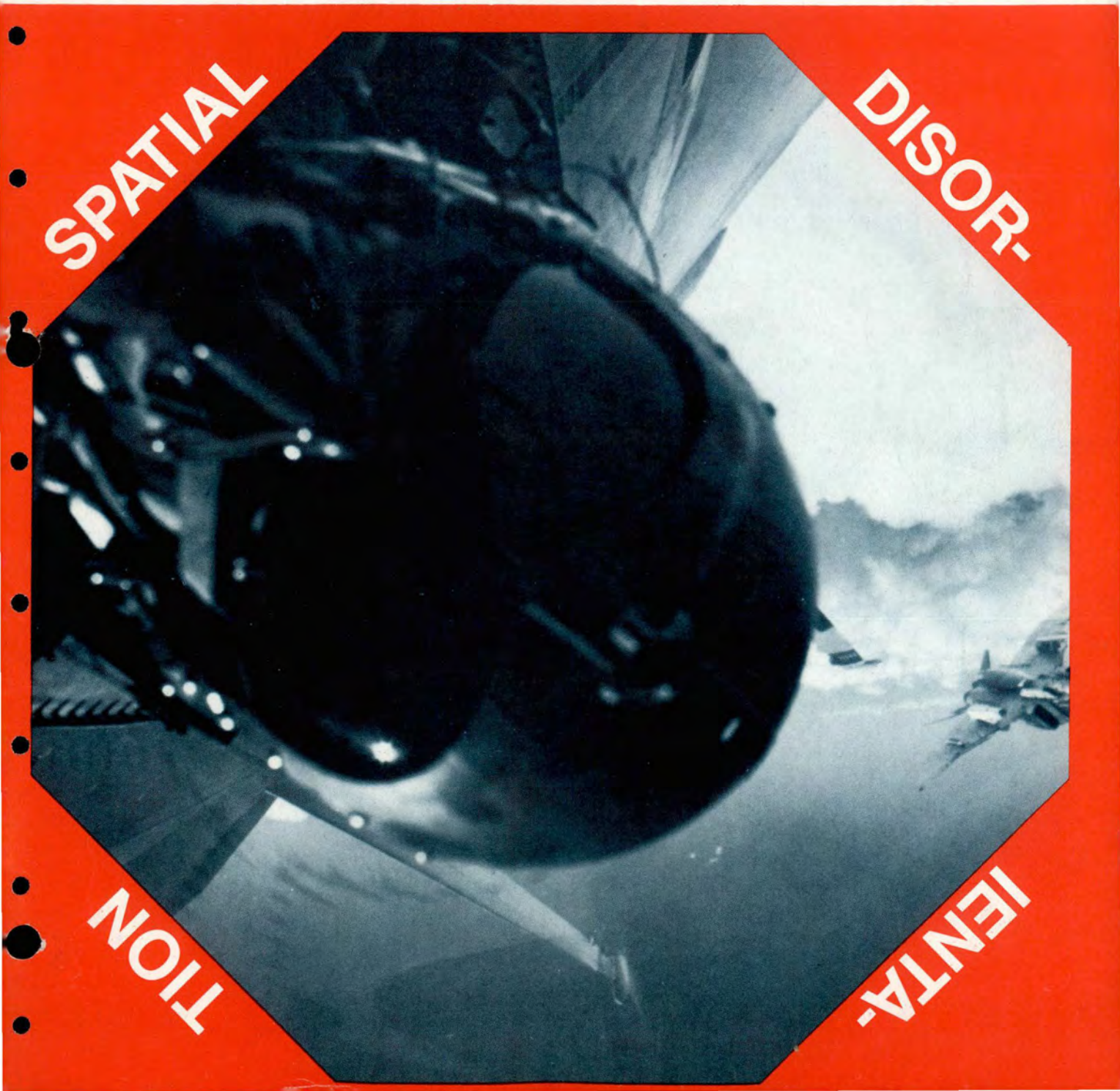
OCTOBER 1989

A Little Help From Above

Tips From the Old Crow

Airdrop Way Down Under

VFR in IMC · The Risks Can Be Costly



A MESSAGE FROM THE DIRECTOR OF AEROSPACE SAFETY

■ Congratulations to all Air Force personnel on a job well done! I salute each of you for the key role you played in making this past year one of our most successful. During the 1980's, our mishaps have continued to decline. Your individual and combined efforts have made this possible.

You have accomplished a great deal through your leadership, your splendid teamwork, and your innovative safety programs. Today, our flying missions are more complex, our weapon systems are much more sophisticated, and the demands on your time often taxing. You must continue to ensure your focus is on the mission at hand ... enhancing our combat capability through realistic training, but doing so in a safe manner.

We've made good progress in reducing mission risk, but we still have a long way to go. One of the biggest threats we face in peacetime is complacency. No matter how good a stick you have become, complacency may well be the "big gun" that gets you. Our safety files are filled with stories of great pilots who miscalculated or overextended their capabilities in pressing to complete a mission or impress someone. We must stop these "dumb" mishaps. We need smart aviators and hard-working support specialists to keep meeting the challenges that will carry us into the 21st century.

This issue of *Flying Safety* features one of our age-old and still growing problems — instrument flying and spatial disorientation (SDO). New areas in SDO, such as the G-excess illusion, are being studied with encouraging signs. The solution is often clear — thorough mission planning, knowing your own limits, knowing the capabilities of your machine, and trusting your instruments.

As we approach the 1990's, I ask for your continued enthusiasm and support and challenge you to make FY90 the most effective year in the Air Force's history — mission accomplished with a great safety record ... it's clearly up to you. ■

JAMES M. JOHNSTON III
Brigadier General, USAF
Director of Aerospace Safety

UNITED STATES AIR FORCE

flying

SAFETY MAGAZINE

AIR FORCE SPECIAL PUBLICATION 127-2 | OCTOBER 1989 | VOLUME 45, NUMBER 10

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SAFETY FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, OSAF

PURPOSE — *Flying Safety* is published monthly to promote aircraft mishap prevention. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony, and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in mishap stories are fictitious. The contents of this magazine are nondirective and should not be construed as regulations, technical orders, or directives unless so stated. **SUBSCRIPTIONS** — For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. **REPRINTS** — Air Force organizations may reprint articles from *Flying Safety* without further authorization. Non-Air Force organizations must advise the Editor of the intended use of the material prior to reprinting. Such action will ensure complete accuracy of material amended in light of most recent developments. **DISTRIBUTION** — One copy for each six aircrew members. One copy for each 12 aircrew support and maintenance personnel. Air Force units must contact their base PDO to establish or change requirements. AFSP 127-2 is entered as a publication at the Second-Class rate (USPS No. 586-410) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403 and additional entries.

SPATIAL DISORIEN

LT COLONEL KENT D. KOSHKO
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Cases

■ Incredible!! It felt like we were air refueling in a 90-degree bank! We had been IFR and bouncing around in our sleek B-52 for about 30 minutes, and my mind was beginning to play spatial disorientation (SDO) tricks on me that I could not shake. I knew we couldn't possibly maintain that unusual aircraft attitude, but I had developed a terrible case of the leans. I kept telling myself not to worry and to just stay in the contact position. I fought the feeling and continued refueling.

After another 15 minutes of refueling, we came out of the clouds, and I was relieved to have my gyros back in sync with the rest of me. That incredible experience had a significant effect on my attitude about vertigo and combating the uneasy feeling of not being in control of my environment.

The onset of SDO can be subtle and comes in many forms from the simple leans to target fixation, flicker vertigo, or visual illusions. In any case, it is definitely a state of mind. The experience can become tiring or even debilitating if you don't combat the feeling.

On another B-52 mission, after we had been tossing around in the clouds for about 20 minutes during air refueling, I experienced a similar feeling of vertigo. This time while in the contact position, it felt as if we were in a totally vertical, nose-down position. I remembered the sensation from the earlier flight, but I still couldn't shake the uncomfortable feeling that had developed. Like the first flight, once I could see the horizon, my normal references returned, and I flew the rest of the mission without a problem.

During each sortie, I remembered the instructor's guidance during training at the altitude chamber. When you start developing the symptoms of vertigo, trust your instruments and your leader. I did, but it was a very uneasy ride.

In flight, the danger of SDO arises when vision of the outside world is cut off. Blind flying without reference to instruments is impossible.

In simulator and airborne experiments of SDO at altitude, it took a minimum of 10,000 feet for pilots to recover.

SDO can be very tiring because it puts extra burdens on our mind. It takes strict discipline, such as crosschecking your instruments and fly-

ATION Cases, Causes, and Cures

ing off them as your primary reference, to overcome a potentially dangerous situation.

Fighters When flying fighters, the potential for vertigo is increased. Disorientation may go unrecognized, especially when you are busy, pressed, stressed, preoccupied, or distracted. Some fighters fly so smoothly that sensory cues like buffet, wind and engine noise, and aircraft feel (stick, rudder, trim, and throttle feedback) are almost nonexistent.

These diminished indicators of orientation can give you a false feeling of security, and as a result, slow descent and roll rates (in the absence of good visual cues) are not adequately sensed by your internal gyros. Distraction during any phase of flight, coupled with the lack of visual cues in an airplane that doesn't "talk" to you, produces conditions that are perfect for an unrecognized disorientation mishap.

According to flight surgeons on mishap investigation boards, from 1980 to 1988, SDO has been a definite or suspected contributor to 69 Air Force Class A mishaps (figure 1). These mishaps occurred in 20 different aircraft types (figure 2). In 1989, two Class A flight mishaps have been attributed to pilots experiencing spatial disorientation.

Three Types of SDO Incapacitating disorientation can occur when your internal gyros are so badly tumbled that recovery is impossible and your only choice is ejection. Departure from controlled flight is where the aircraft executes several uncommanded rolls or severe post-stall gyrations in the absence of good visual cues (IFR or night). Luckily, this type of disorientation is fairly rare.

continued

Figure 1

SPATIAL DISORIENTATION MISHAPS

SDO - Definite or Suspected Contributor to the Mishap

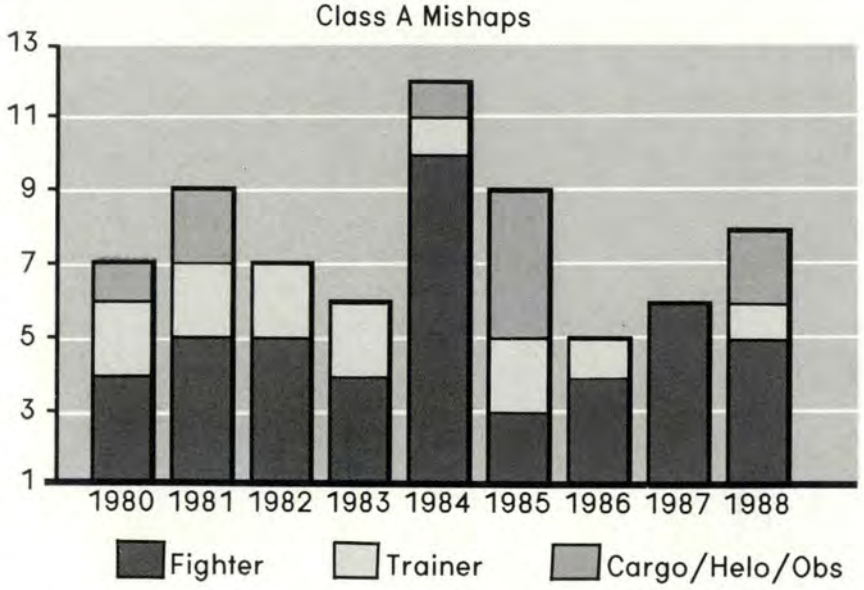
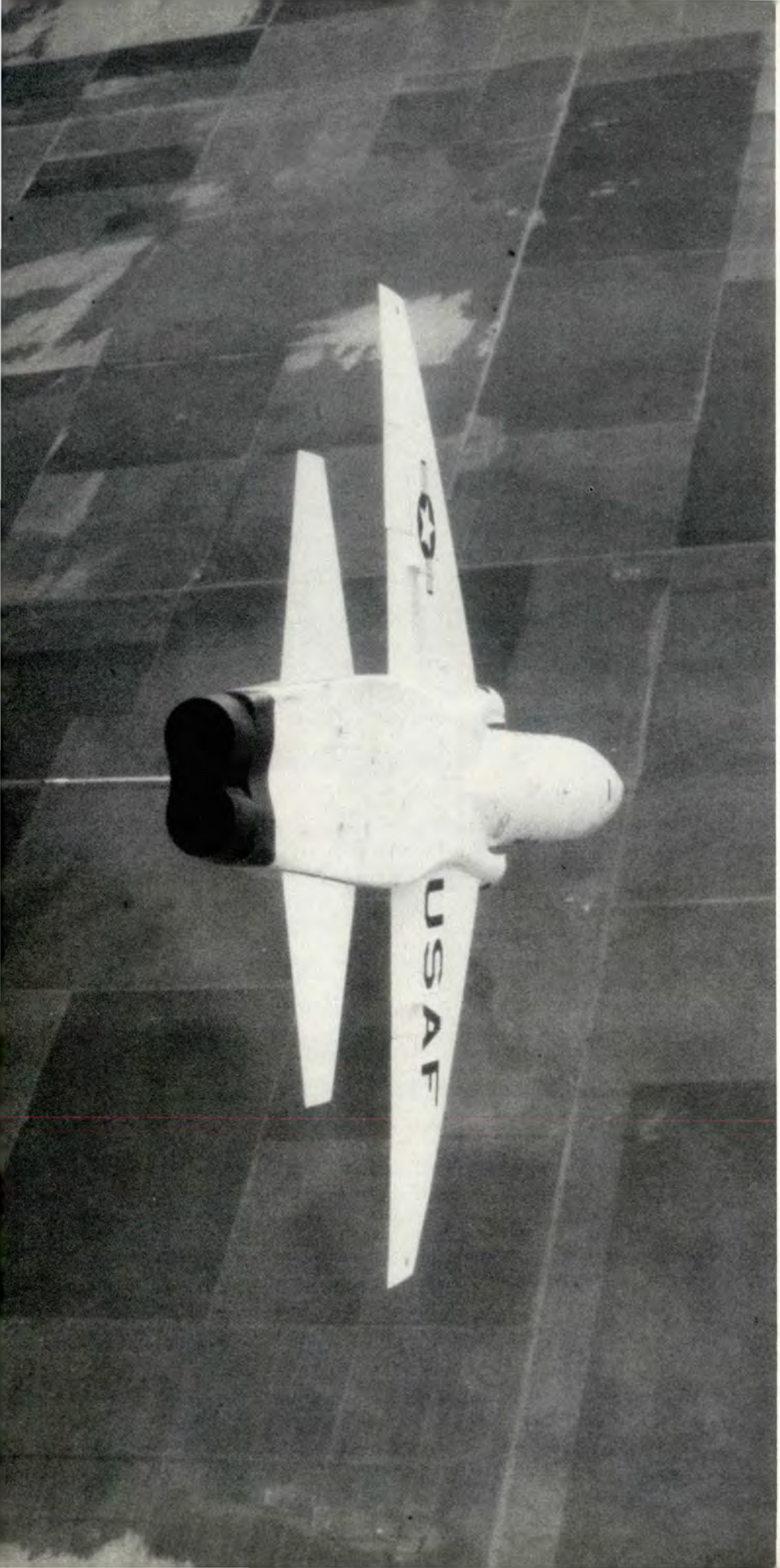


Figure 2
Spatial Disorientation Mishaps
1980 - 1988

Aircraft Type	1980	1981	1982	1983	1984	1985	1986	1987	1988	Totals By Type
A-7	•		•		•	•				4
A-10		•			••			••	•	6
OA-10									•	1
C-130						•				1
C-135		•				•				2
F-101	•									1
F-111				•	•					2
F-4	•	•••	•			•	•	•••		10
RF-4									•	1
F-5							•			1
F-15	•	•		••	•••		•	•		9
F-16			•••	•	•••	•	•		•••	12
H-3						•				1
H-53		•			•					2
O-2						•				1
OV-10	•									1
OA-37									•	1
T-37	••	•	•	•	•				•	7
T-38		•	•	•			•			4
T-33						••				2
Yr Totals	7	9	7	6	12	9	5	6	8	69

The data above shows Class A Flight Mishaps where the investigating flight surgeon found spatial disorientation as a definite or suspected contributor to the mishap.



SPATIA

Cases, Causes,

Recognized disorientation occurs frequently but is usually brief because the sensory conflict is ordinarily resolved by correct interpretation of a visual cue (instrument cross-check). These first two types of SDO have one thing in common — the pilot knows it.

A primary concern of the Tactical Air Forces is **unrecognized** SDO. This is the most common type in Class A mishaps, and its elimination has the highest potential for mishap reduction.

Causes

Visual Processing of Information
Foveal and ambient are the two modes of visual processing. Foveal (focal) mode generally operates independently from the ambient mode. It is used to identify targets, read instruments, displays, and the HUD and, essentially, provides your brain with information.

The ambient (peripheral) mode is extremely responsive to anything that resembles a line — true or false horizon. It distinguishes movement relative to your environment (attitude, airspeed, altitude estimation) as well as your surroundings — terrain texture. The ambient mode provides a means of maintaining overall orientation in space without "thinking" about it. It is a result of a subconscious level of awareness keeping track of various sensory inputs including peripheral visual, tactile, G-forces, hearing, and vestibular inputs to keep us oriented with respect to the horizon.

Information transmission rates are quite different for each mode, foveal being slower than ambient because it requires active thought. Although faster, the ambient mode is most easily deceived when the visual component (peripheral vision) is diminished, such as at night or in the weather. Some fighter aircraft may not provide the pilot with adequate cues to alert the remain-

DISORIENTATION

and Cures continued

ing components of the ambient mode to an unusual attitude. Unless the pilot overrides the ambient mode by transitioning to basic flight instruments (foveal mode), disorientation may go unrecognized.

Anticipation Being aware of the flight conditions you are about to fly in is a good start. You should also adjust your cockpit lighting to reduce unnecessary glare, and air/ground check the autopilot in advance. Know the pitch and roll limits of your autopilot. These procedures may assist you in recovery from disorientation, should it become necessary.

Aircrew training should focus on mission demands, flight conditions, and aircraft feedback characteristics that could set you up for an unrecognized SDO mishap. Training should include as a minimum:

- Visual processing of flight information.
- Factors that upset instrument cross-checks like distraction, preoccupation, task saturation, instrument lighting that is too dim, and fixation (cockpit illusions, canopy glare, and flares).
- Disorientation stress and how it degrades performance.
- Identification of disorientation "traps" (avionics, displays, and switches) and specific cockpit design problems for each aircraft.
- Psychophysiological factors that influence your ability to cope with disorientation like sleep deprivation, poor diet, and fatigue.
- Environmental factors conducive to unrecognized disorientation like night ground attack missions, flight over water, weather formation, black hole, and milk bowl approaches.
- Developing a highly disciplined instrument cross-check should be routinely practiced to obtain and maintain event proficiency.

Cures

If single seat at night and disoriented, get on the instruments first! Then adjust the cockpit lighting so you can instantly read your instruments. Keep in mind that head movement can add to your disorientation and too much light can create distracting canopy glare. Get out of the ambient visual mode by leaning forward and concentrating on your instruments, not your HUD. Fly straight and level for 30-60 seconds and concentrate on your ADI to settle your gyros. Use of the autopilot may be helpful. Cross-check all your gauges and avoid fixation on any one thing.

When flying formation, avoid excessive head movements. "Sneak a peek" at your gauges using your eyes only. If the wingman is disoriented he needs to tell his leader. Lead should then communicate attitude information at regular intervals (see WELL DONE AWARD, page 29, this issue). Avoid abrupt accelerations and execute turns and rollouts smoothly and gently. Any unexpected attitude changes can disorient the wingman. Get to VMC, if possible. This will allow your wingman to look around. Remember, the lost wingman procedures are to ensure aircraft spacing, not to recover a disoriented wingman.

Force yourself to direct your attention to your cross-check. Anticipate — have a plan and be able to execute it. If disoriented, and you are out of control, **eject.** The jet is going to hit the ground, with or without you.

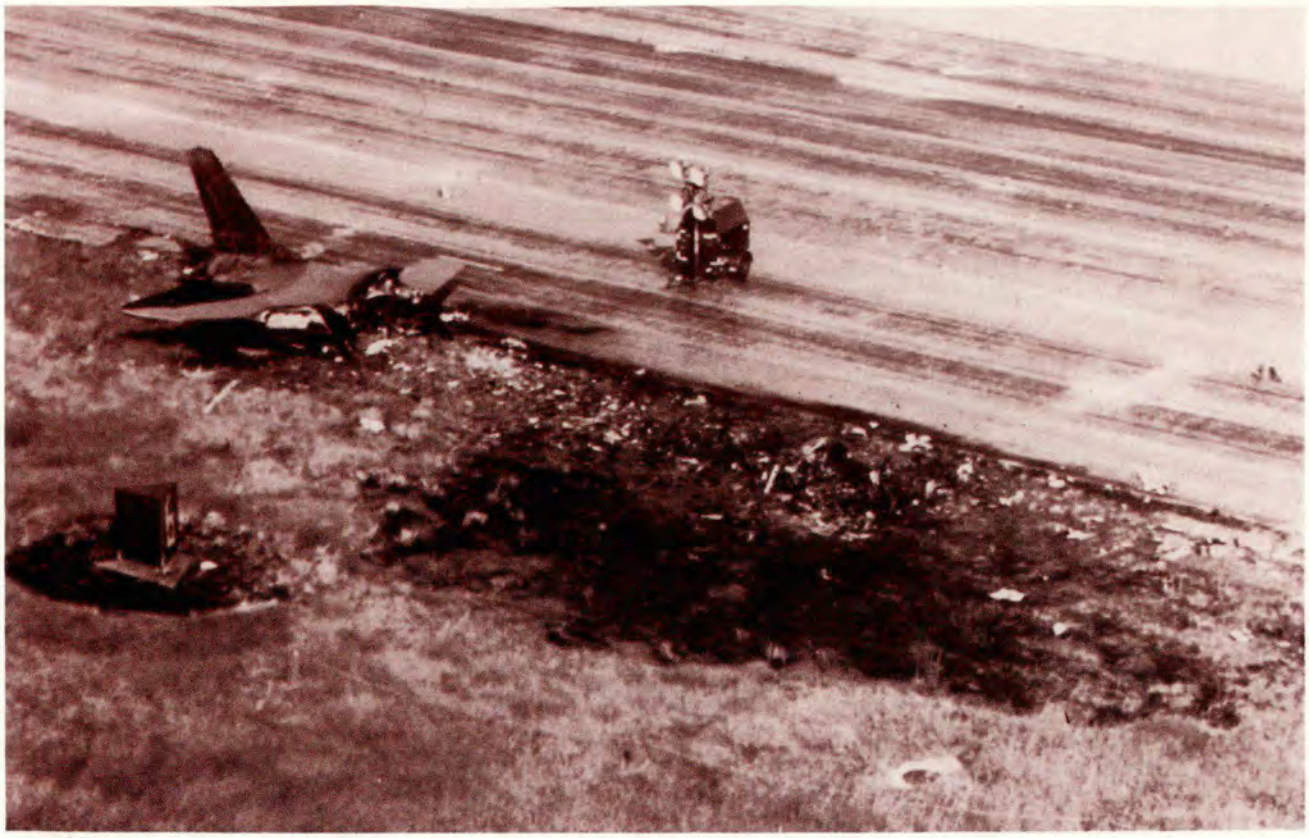
Instrument flight is a complex skill. It requires time and conscious attention to decode the ADI and other gauges while actively supporting inputs by the ambient mode. Thirty to sixty seconds of instrument cross-check to settle your gyros can seem like 5 minutes when you're disoriented. This is partly because of the work required to process information while in the foveal mode and partly due to the "time expansion" caused by the body's normal stress response. Instrument procedures can be easily interrupted by factors such as distraction, fixation, or task saturation. When this occurs, you stop your cross-check and subconsciously process information that is unreliable (ambient mode).

Attention and concentration are the key elements of a good instrument cross-check. It takes practice to obtain and maintain necessary event proficiency.

We have all read many stories about pilots who have become disoriented in flight, but until it happens to you, you don't fully appreciate the problem or the difficulty of the solution. ■

A primary concern of the TAF is unrecognized SDO. This is the most common type in Class A mishaps, and its elimination has the highest potential for mishap reduction.

Future issues of *Flying Safety* will continue to discuss the age-old problem of spatial disorientation. Let us hear from you so we can share your stories.



THIS COULD HAPPEN TO YOU!

■ An F-16 training mission suddenly turned into an emergency situation that nearly became fatal. Study your aircraft systems thoroughly. You never know how complicated an emergency scenario may become.

The Mishap

The mishap pilot (MP) was scheduled as no. 4 on a four-ship to support a surface attack tactics (SAT) sortie. All flight members, with the exception of no. 2, were instructor pilots. Preflight through takeoff was normal.

Approximately 5 minutes after takeoff, while attempting to maintain tactical formation, no. 4 pilot noted the throttle met resistance at the midrange point. But from midrange to idle, there was almost no resistance. He also found he was unable to reduce engine RPM below 80 percent although the throttle was moved to the idle position.

After analyzing this, he did not increase throttle inputs any further because he was concerned he would not be able to further reduce RPM. He declared an emergency and began his return to base (RTB) with no. 3 in chase.

His engine instruments confirmed normal operations at 81 percent. During RTB, he climbed to 14,000 feet and established contact with the SOF.

Arriving with 4,000 pounds of fuel, he began an overhead orbit and planned to start the approach with 2,000 pounds. He accomplished portions of the abnormal engine response checklist, turned off the engine electronic control (EEC) with no response noted, and unsuccessfully attempted a transfer to the engine backup control (BUC).

Meanwhile, the SOF made contact with the General Dynamics engineers, who advised him to try another attempt to transfer to BUC, this time advancing the throttle, if possible. Before the BUC transfer was attempted, the jet fuel starter (JFS) and emergency power unit (EPU) were confirmed running on bleed air.

Unfortunately, the MP did not ensure the EPU would operate on hydrazine. The lack of this piece of information set up the situation where the MP attempted to land without enough hydraulic pressure for a safe landing. This time a successful BUC transfer occurred when the throttle was advanced and the RPM stabilized at 81 percent. However, he still could not reduce engine RPM with the throttle, so the engine was left in BUC for the remainder of the flight.

The SOF and General Dynamics engineers recommended shutting down the engine at low key. The aircraft was configured for landing, and he began his approach from high key (7,000 feet) approximately 55 minutes after takeoff.

At this time, the EPU had been

operating approximately 15 minutes in the bleed air mode. At low key, the throttle was placed to cutoff. Noting no response, he placed the fuel master switch to off. He then noted the fuel flow coming down, and the engine flamed out shortly thereafter.

He continued the approach until a few feet above the runway where he experienced some mild rolling as the nose pitched over. Although he attempted to counter, the nose continued to lower, and the aircraft touched down approximately 3,000 feet down the runway hard enough to activate the weight-on-wheels switches. Airspeed at touchdown was approximately 180 knots. The aircraft bounced back into the air and shortly thereafter pitched up excessively.

The pilot could not make the nose come down. With the pitch angle increasing to 45 to 50 degrees as indicated by ground witnesses, the pilot successfully ejected at 220 feet above the runway. The aircraft continued to climb another 200 feet, then started down, reducing pitch attitude and impacting slightly nose low. The aircraft traveled approximately 3,000 feet from initial touchdown to where it crashed. Fortunately, the pilot landed on the runway 1,000 feet short of the burning aircraft. He only suffered a minor abrasion to his right knee. The aircraft was destroyed.

The Cause

This mishap was caused by the following logistics factors:

- Technical order data provided inadequate emphasis for properly installing throttle cable alignment wedges at a fuselage station.
- A transistor in a circuit card failed due to an inherent failure mechanism or because of moisture in the EPU controller.

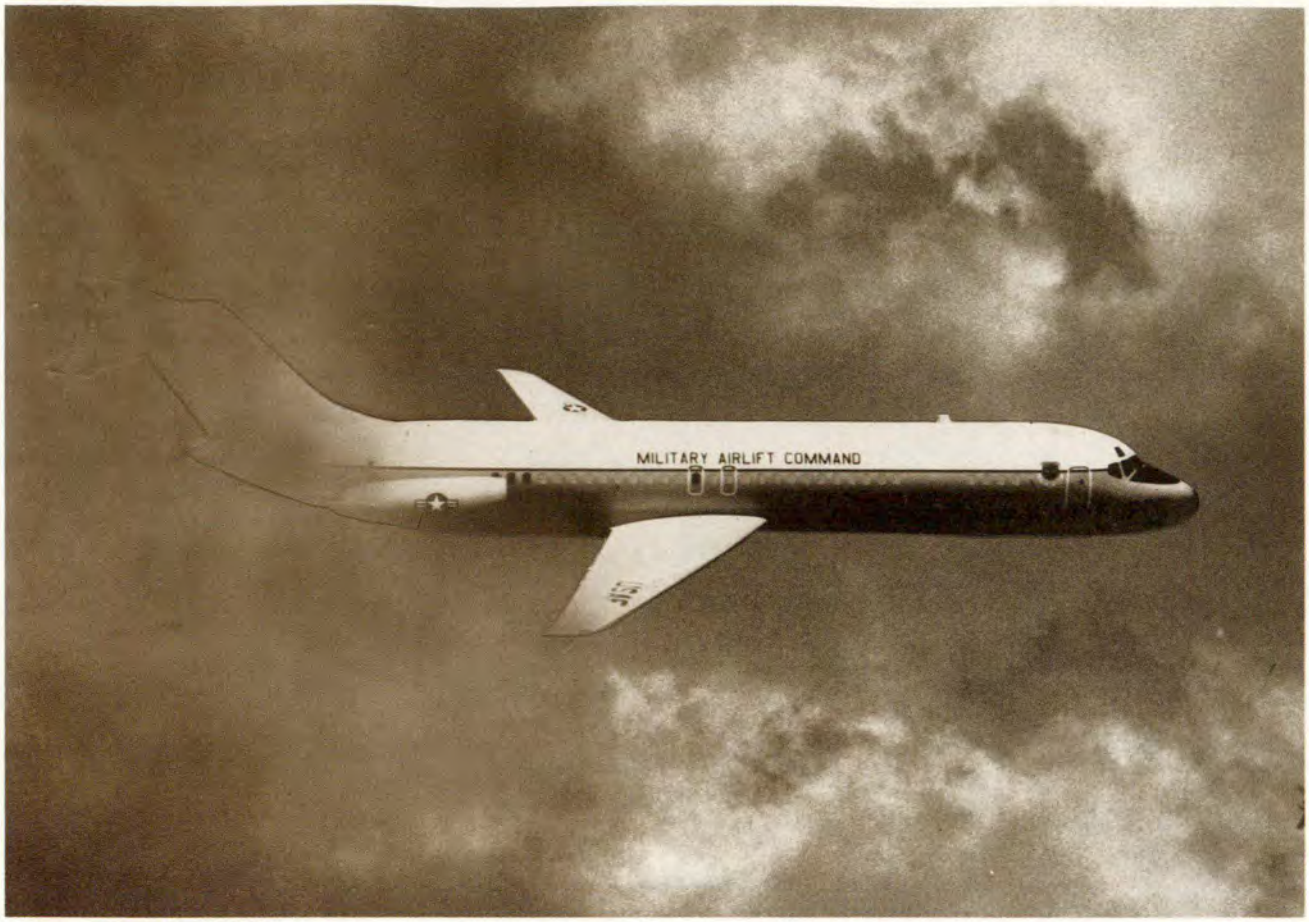
The Recommendations

The investigating board recommended a change to the appropriate technical order placing adequate emphasis on proper orientation of the throttle cable alignment. An operational supplement to the TO to correct throttle cable alignment procedure was issued. Also, all throttle cables misaligned as the result of improper wedge installation were removed.

The Lesson

Advanced technologies in complex weapon systems continue to challenge our brightest logistics and operations specialists. From this mishap, we learned a valuable lesson that will save future aircraft and pilots.

For every flight, crewmembers must be well prepared for the mission and a variety of emergency situations. Study your aircraft systems thoroughly. You never know how complicated an emergency scenario may become. Always fly the aircraft first. And remember to consider the advice of the experts on the ground who can help guide you through emergencies. ■



A LITTLE HELP FROM ABOVE

LT COLONEL DOUGLAS HAYDON
Directorate of Aerospace Safety

■ Have you ever had one of those days when everything goes wrong? You know — the morning the alarm doesn't work and you oversleep. Then, as you try to sip your coffee while you're driving to work, you spill it all over yourself and have to go back home and get a clean pair of pants. And finally, to cap it all off, you press a little too hard on the accelerator to make up for lost time. No problem — until you hear a siren, notice a rotating red light in the rear view mirror, look down, and the speedometer shows 75 mph.

When trouble comes, it seems to come in bunches. It's like someone is out to get you. If that happens when you are flying, you can be in water over your head before you know it. Well, it did happen to me one evening flying an Air Evac mission in my C-9A. I was doing everything right, but almost everything turned out wrong. Let me share the story of a flight that was a chain of disasters.

An Unexpected Phone Call

It was a warm Tuesday afternoon. I had been standing Air Evac alert at home at Scott AFB, Illinois. It was great duty — home with the family, a little work in the garden, a few chores around the house, a little siesta before dinner. The siesta was to keep me well rested in case I was alerted — at least, that's what I told the wife and kids. To top the day off, we barbecued some chicken and watched a little TV. At 0800 the next morning, I would be finished with the alert and had 2 days off before I flew again. We hit the hay about 2245, looking forward to a good night's sleep.

The next thing I remember was my wife telling me to answer the telephone. I could hear the ringing but thought it was a dream. I looked at my new digital clock. It read 0101. It finally dawned on me, as I reached for the phone, that I was still on alert. Sure enough, I was being alerted for an urgent mission from Casper, Wyoming, to Kelly AFB, Texas. Most of the time when we got alerted, it was for something pretty serious. This was no exception. The duty officer told me to report to the squadron ASAP. He said a family of six had been severely burned. As I jumped out of bed, I told Priscilla, my wife, what the call was about, got dressed, and headed for the squadron.

When I got there, a lot of people were scrambling around doing all sorts of things. Launching an Air

Evac Urgent was like a Chinese fire drill, but this one was quite hectic. The front end cockpit duties, as always, were straightforward. We checked the weather, flight plan, ran the checklist — we were ready to start engines. The back end was a different story. We ended up taking five doctors, five nurses, and four technicians with us and more medical equipment than you could shake a stick at. On most urgent flights, we took one doctor, or a nurse, and maybe two techs. After 30 minutes of shuffling equipment, people, and supplies around, we blasted off for Casper.

Getting the Message

En route, we got the full story on the patients we were about to pick up. A mom, dad, and four kids had been out on the range branding cattle that day. Late in the evening, they all had gathered around the butane burner, probably to keep warm, or maybe to cook their dinner. Well, you guessed it, the butane burner blew up and severely injured all six. It must have been like watching a bomb explode right in front of you. Our plan was to rendezvous with two helicopters, bringing in the injured folks from a local hospital, transfer them to our jet, and take them to the Burn Center at Brooks Medical Center in San Antonio, Texas.

After we landed at Casper, it was only a few minutes until we heard the helicopters arriving. As the medical technicians transferred the patients from the helicopter to our plane, the copilot and I checked the fuel and the weather. The weatherman told us we would be facing some isolated thunderstorms, but we should be able to circumnavigate them. The fuel quantity was close but well within legal guidelines. I thought about splashing on a few thousand pounds, but we would probably have to delay because the fuel suppliers had shut down for the night.

The medical folks were just about ready to press. The back end of our C-9A looked like a full-fledged hospital. There were IV tubes, wires to heart monitors, oxygen hoses, and stuff I had never seen before — all of it with one purpose: To keep those six people alive so we could get them to the Burn Center in San Antonio.

And Suddenly . . .

On takeoff, the chain of near disasters started. Unlike our trip from Scott AFB to Casper, the pressurization was surging and causing everyone problems. We used the manual system, which wasn't very smooth, but at least it worked. The Medical Crew Director let those of us up front know the fluctuations in pressure weren't doing her patients any good, as if we hadn't figured that out. Just about the time we got a handle on the pressurization system, thunderstorms started popping up all over the place. I thought thunderstorms were supposed to be dissipating at 4 o'clock in the morning, but these weren't. They just filled the sky — most of them in the direction we wanted to go.

For the next hour or so, we zigged, zagged, dodged, and did anything else we could think of to avoid the thunderbumpers. We were fortunate up until now — most of the flight had been in VMC. We could look out the window and see the buildups. Not so anymore. We entered the cirrus. It was thick — in fact, so thick we started to build up ice. I told the copilot to turn on the anti-ice, which he did. Not only did the pressurization start going haywire again, but the cockpit lights started flickering.

I recalled, from my pilot training days, if you do something and you don't like the result, put it back the way you found it. So we turned off the anti-ice, but that didn't correct anything. It made things worse. I noticed the only thing on the radar was a test pattern. The copilot was trying to fix the pressurization to little avail. The cockpit lights were now blinking on and off. Things didn't look that great but, unbeknownst to me, were due to get worse.

I called ATC for a little help to avoid the heaviest cells. We were now about 200 miles from Kelly. I knew someone was out to get me when ATC told us all the airports in the San Antonio area, including Kelly, were below minimums due to heavy thunderstorms. Also, he said ATC couldn't do much to help me through the thunderstorms.

The copilot was still trying to correct the pressurization and the electrical problems. I was flying the jet, doing some quick fuel computations, and looking for a good alternate. I asked the doctor in charge to come to the flight deck and told him we might have to divert to another base due to bad weather and low fuel. That's when he dropped the bomb on me. He told me if we didn't get these people to the Burn Center in San Antonio, the mother and one of the boys would most likely be dead within 2 hours.

As the doc left the cockpit, I turned to the copilot and suggested a recap of our situation. Thunderstorms were all around and at the field. In fact, the field was closed. No weather radar. Squirrelly pressurization at FL310. No cockpit lights. We were now flying by flashlight to see the instruments. Some ice buildup on the wings, and who knows how much ice on the tail — the anti-ice system was completely inop. Low fuel — we could hold for less than 10 minutes before we hit bingo fuel, and that was only enough fuel to fly to our alternate and land. No holding fuel. We had used up most of our holding reserves maneuvering around the thunderstorms. And finally, six very sick people, two of whom might die if we didn't make it to an airfield near San Antonio.

We Need a Little Help

Just about the time we were finishing our assessment of the situation and establishing ourselves in a holding pattern at FL310, came the icing on the cake. The pressurization quit completely — it wasn't a rapid decompression, but the cabin started climbing at 2,500 feet-per-minute. At that point, I remember taking a deep breath, closing my eyes, offering up a short prayer, and telling the copilot we needed a little help from above. He wholeheartedly agreed. I called out the bold print emergency procedure for the loss of pressurization. "Oxygen on 100 percent, throttles idle, speed

continued

A Little Help From Above continued

brakes extended." I knew we were descending into more thunderstorms, with little fuel, to a field that was below minimums, using a flashlight to see the ADI and airspeed indicator, with six really sick people onboard — we were in deep kimchi. I called Houston Center and declared an emergency. However, that little pause must have done some good, because when Houston answered my emergency call, they told me Kelly was now 300 and ¾ and improving rapidly.

I checked with the medical people on how our patients were doing. All were surprisingly well. Actually the cabin had reached only about 21,000 feet before we had descended through the altitude. After the center handed us off to approach control, we got a few suggested headings to avoid the heavy buildups. I was doing my best to dodge the heavy lightning areas when we broke out of the clouds at 9,000 feet!

It seemed as though things were starting to come together. It's a great feeling when you can look outside and see where you're going. It's also nice to know that you are not going to fly into the mouth of some mammoth thunderstorm.

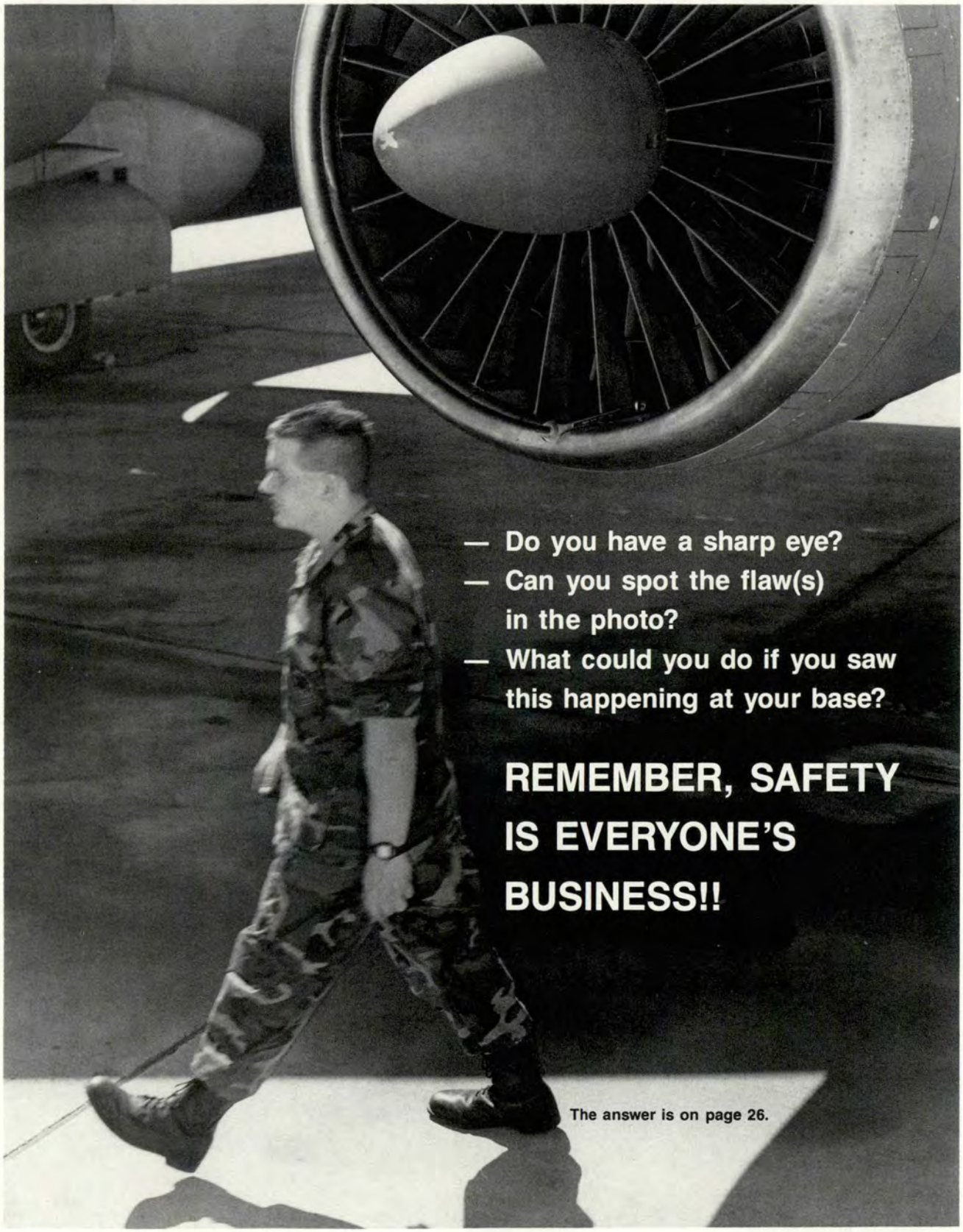
As we continued our descent, we knew our jet still wasn't pure. The cockpit lights were out, but we were managing with the flashlight. The ice that had formed on the wings was now gone. We had at least 20 minutes of fuel remaining, assuming the gauges were right. But we were 20 miles from the field, on a straight-in ILS, and the weather was now VFR. I could almost make out the runway. As I flew the last 20 miles, I reflected back on what had happened the last 2 hours or so. I really didn't do anything wrong, but things just didn't go right. Then it dawned on me. This was how mishaps happen — not just one single misfortune, but several things going wrong that finally lead to a smoking hole in the ground. I had learned a good lesson on how to avoid the Grim Reaper and how to keep the odds in my favor. When we touched down, I could almost hear a silent cheer from all on board, including myself. It was a good feeling to be back on old terra firma. We had possibly saved the lives of six people and learned to always plan for emergencies.

Epilogue

About 5 or 6 weeks later, I was flying another Air Evac mission through Kelly AFB when a young man came out to look at our airplane. It wasn't unusual for kids to come out and want a tour of our jet. So I showed him around, explaining the different dials, gauges, and switches in the cockpit. Most young men are interested only in the cockpit and what pilots do up there. As we started to leave, the boy asked if he could take a look at the back end. Today, the only things back there were seats and one row of litters. I was happy to show him. While we were walking to the rear of the plane, the boy told me a short story about how he and his Mom, Dad, two brothers, and sister had ridden on an airplane like this one after they were burned on a cattle ranch in Wyoming. As the boy was walking away, I finally got enough courage to ask him how his family was doing. He replied, "It's been tough, but we're all getting better."

I was happy to show the young boy our jet. He really wanted to see the back end. Then he told me a story where he and his family had ridden on an airplane like this. "It's been tough, but we're all getting better."

WHAT'S WRONG IN THIS PHOTO?



The answer is on page 26.

Tips From The Old Crow

This feature is adapted from a regular column in the Oklahoma Pilots' Association *General Aviation Newsletter*, December 1988. The Old Crow's thinking and observations are right on the mark and make worthwhile reading.

SUCH A SHAME AND SUCH A LOSS

■ Last night was Central Oklahoma's first winter storm this season. The Old Crow could almost smell a mishap in the air. Seems like it never fails. This morning's Sunday *Oklahoman* headline read: "Two Die in Crash of Small Plane at Will Rogers" (Sunday, November 20, 1988).

The aircraft was a Beech Bonanza, and the time of the crash was about 2015, which in mid-November is several hours after dark.

Such a pity — two of our fellow aviators and a beautiful airplane all gone. With them goes another black eye working against the fight for public acceptance of general aviation as a viable transportation option for normal people (as opposed to death-defying daredevils).

Naturally, the verdict of what happened is far from being discovered and, as all of you know, the "verdict" that we receive is many times purely speculation.

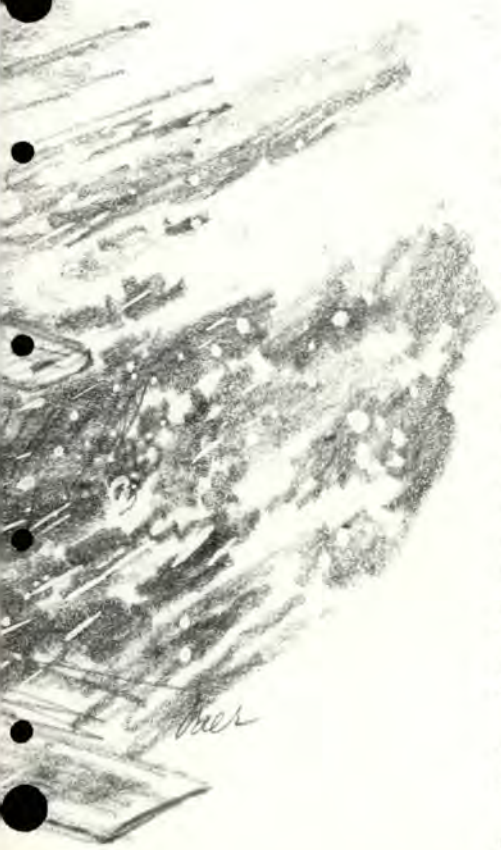
The paper said it was thought the mishap was not related to the weather. The Old Crow believes the contrary. Weather at the time of the crash last night was measured ceiling 300 feet (Crow's best guess), sleet and snow, with a temperature of about 32 degrees at the surface. How can they say the weather wasn't a factor?

Even a polished instrument pilot in a sophisticated airplane with all the whistles would call such conditions a definite handful. The several categories of challenges the pilots would be contending with include the obvious icing possibility in a plane that is neither equipped nor certified for such conditions. However, Crow submits that the simple possibility of icing created an additional workload for the pilot to contend with (that is, constant check-

ing of the leading edges with a flashlight).

Another category of "extra challenges" would include the IFR departure after dark from an airport without radar service. Although this category is sort of related to the weather (that is, no need for a difficult IFR departure if conditions are "clear and a zillion"), it really is something quite separate indeed. Flying an established set of route instructions is, without a question, much more difficult than departure under the loose VFR procedures. This, coupled with the fact the tower would not be able to vector the plane back to the field, is quite a challenge.

Additional factors might include pilot fatigue. It was known the pilot had attended the OU-Nebraska game — a fatiguing event, indeed. The entire game was played in rain and sleet. Simply sitting at Owen Field was a truly fatiguing ordeal. (Crow knows, having been there as well.) By 2000, surely this pilot was worn out.



One more factor Crow would like to mention relates to the FAR for legal IFR currency. No real exhaustive analysis will be offered here. Let's summarize with two rhetorical questions: Is a pilot really a safe IFR operator if he or she meets only the legal minimum? And who polices IFR currency, anyway?

Okay, let's add the high workload requirements to a failed system or two and possibly also toss in a pilot who may be "legally current" but may be just a bit rusty. Maybe his IFR recurrency check was 179 days old. Let's add in the fact that he's had a really long day.

Should this guy, who is without question within the regs, depart into the given conditions? Negative!

Is the scenario this old geezer is painting the way it was for our fate-stricken subject twosome? Who can say? Not the Old Crow. Probably no one for a while. Maybe no one ever.

With this horrible occurrence fresh in mind, Crow regretfully mounts his old and somewhat worn-out soapbox with a message about winter flying directed toward his beloved OPA members.

Let's all realize the factors involved in flying this time of year. Lower ceilings, shorter days, the continuing possibility of icing, the condition and capability of our equipment, and last and most important, our own ability to perform if something goes wrong (maybe if a couple of things go wrong at the same time).

How current are you? Do you really have to be there tonight? Is that flickering panel light really just a loose wire? Was that miss on your runup just a rich mixture? Just because you're legally current, can you really fly a non-gyro approach? Will those year-old batteries in your flashlight really last long enough to get you down? Are you really as cool as you think you are? Does that person in the right seat understand all of this?

For heaven's sake, fly the OPA way — safe — current — cool. Nothing is ever really that important.

With special love, sympathy, and compassion for the family and friends of our lost Bonanza crew.

The Old Crow

Editor's Note: The National Transportation Safety Board (NTSB) has completed its investigation.

The pilot was briefed on flight conditions and told to expect IFR with thunderstorms and occasional moderate rime icing during the climb. During the climbout, the pilot radioed ATC he was having trouble with his vacuum powered instruments and was disoriented. ATC then cleared him for altitudes he could use and began providing no-gyro vectors.

A weather check revealed there were no airports with VFR conditions within 100 miles. The pilot elected to divert for an ILS runway 17R approach to the Will Rogers World Airport.

As the flight continued, the pilot reported he was starting to "pick up a little ice" and was having trouble climbing. With ATC assistance, he made an ILS approach but was too high to make a normal landing. He was told to climb and turn right for a missed approach, but the aircraft turned left and crashed near the center of the airport with the gear down and flaps retracted.

The gear collapsed on impact. The aircraft slid 300 feet and stopped on runway 17L. Although the aircraft burned, pieces of thick ice were found on the left wing. The aircraft was not equipped for flight into known icing conditions.

There were 16 findings relating to this unfortunate mishap. They included improper planning and decision making by the pilot, his encounter with icing conditions, followed by in-flight instrument failure and spatial disorientation. It was a recipe that contained all the essential ingredients for disaster. ■

ATTENTION AEROCLUB PILOTS: *Think Flying Safety!* Winter type weather is quickly approaching. Make sure you are fully prepared for your flight and avoid potentially dangerous situations. Learn a lesson from this mishap. — **Ed.**

AIRDROP WAY DOWN UNDER

Anytime, anywhere, the Military Airlift Command's C-141B Starlifter proves it can get the toughest jobs done safely!

Photo courtesy of MSgt Jose Lopez, Jr., 1352 AVS

PEGGY E. HODGE
Assistant Editor

It's an exciting and rewarding experience to be involved with a humanitarian relief mission. This was what a very select group of people from the National Science Foundation, U.S. Air Force, Army, and Navy, and New Zealand Air Force performed when they successfully and safely accomplished the challenging mission to McMurdo Sound and South Pole stations. Their story is one of professionalism, camaraderie, and fellowship. *Flying Safety* is proud to have been a part of this mission, and we want to share their story with you. —Ed.

■ After months of preparation, the "Polar 89" C-141 and KC-10 teams were ready ... ready for what they referred to as "the most exciting mission of their career" ... ready for airdrop ... way down under.

The Request

Ten years ago, the Naval Support Force Antarctica requested the Military Airlift Command (MAC) and the Army Liaison Team explore the feasibility of conducting a midwinter airdrop mission to Antarctica. The mission would require a parachute drop of mail, essential repair parts, general supplies, and perishable foods.

Prior to midwinter airdrop, there had never been any physical contact with the outside world for those "marooned." The scientists and others who winter over received no resupply or mail from mid-February until mid-October each year when the coming of the Antarctic spring allows the clearing for runways.

HQ MAC planners now schedule two back-to-back airdrop missions during the month of June when a full moon provides maximum visibility. A C-141B and a KC-10 stage out of Christchurch, New Zealand, to prepare for, and conduct, midwinter airdrop. The 62 MAW from McChord AFB, Washington, and the 63 MAW from Norton AFB, California, today, share this 14-day mission which carries them approximately 27,000 miles — a distance greater than once around the world.

This year, HQ MAC permitted me to "tag along" with a 62 MAW crew to experience, firsthand, what this mission involves and how it is accomplished. As I watched this crew consider the South Pole's severe, rapidly changing weather patterns, review the various supplies the scientists required, and determine just the right amount of fuel, I knew

this was no ordinary mission. Its purpose was unique, and the risks would be challenging.

The Purpose

Midwinter airdrop demonstrates the U.S.'s capability to provide emergency supplies. This mission challenges our aircrews and aircraft to safely perform required airdrops in extreme weather conditions. It improves morale by providing mail and fresh vegetables to scientists and other support people at McMurdo and South Pole stations. Midwinter airdrop is a pivotal and exciting event in their 8-month isolation. The C-141's airdrop of supplies, food, and mail is virtually their *only resource* for these vital commodities.

For the aircrew and riggers, this midwinter airdrop is equally important. This would not be a practice airdrop. It would be the real thing requiring extensive planning, preparation, and well-trained, experienced crewmembers. It is a requirement to have been on a previous midwinter mission to participate. Selection is an honor and an opportunity. These aircrew are afforded a professional challenge and experience we all can learn from.

The Challenge

Midwinter airdrop presents some complications for the riggers, aircraft, and aircrew. The Antarctic winter conditions complicate this mission. The temperatures on these drops have ranged anywhere from +50 degrees Fahrenheit at Christchurch to −40 degrees Fahrenheit at McMurdo to −105 degrees Fahrenheit at the South Pole. That is a drop of 155 degrees in just 8 flying hours. This kind of cold and temperature variance does present some very serious, life-threatening problems.

For the riggers, packing and rigging the supplies is a complex operation. The drop items are shipped to Christchurch, New Zealand, where they are unpacked, inventoried, and repacked for airdrop. As the items arrive, CWO Bennie Manning, U.S. Army, who has supervised this operation for the polar bases since 1983, must decide how

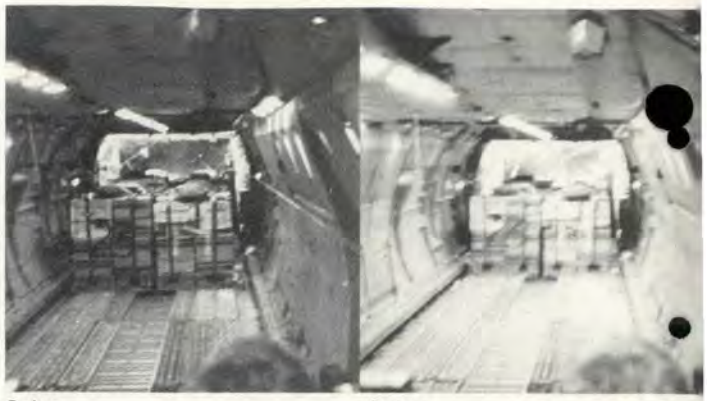
continued

Delicate items such as eggs and light bulbs must be carefully packaged to ensure their safe arrival in Antarctica.

Fresh fruit and vegetables are eagerly awaited items by those stationed at the South Pole.

Reprint Courtesy Air Force Times. Copyright by Times Journal Pub. Co. Springfield, Virginia

The flight to McMurdo Sound and the South Pole carries the aircrews approximately 27,000 miles — a distance greater than once around the world.



Going . . . Going . . .

DOWN UNDER

continued

to safely pack each item. This requires on-the-spot expertise to merge rigging procedures and aircraft configuration into a safe and workable airdrop system.

Each item is first carefully packaged to avoid breakage. It is then rigged in cargo slings and must be packed to a specific size to allow exit from the paratroop doors. This is critical due to the extreme cold temperatures which prohibit opening the aircraft petal doors over the South Pole.

CWO Manning is very proud of his teams and their supply survivability rate of 98 percent.

For the aircraft, the first launch involves an airdrop of 40 tons of cargo and 4½ tons of mail to McMurdo Sound and the South Pole. The airdrop at McMurdo Sound is a standard container delivery system (CDS) airdrop from the rear of the aircraft. The loadmasters have installed tracks of skate rollers permitting them to empty the McMurdo bundles within seconds. The normal rollers that come with the C-141 are *not* used because of the size of the containers and the distance between the rollers on the -141. The aircraft must be reconfigured to allow for the size of the container.

The excitement and tension in the cargo compartment of the C-141 mounts as the loadmasters and riggers await the green light — their signal to unload these containers at McMurdo. The pilots' and navs' accuracy pinpointing the drop zone, the loadmasters' expert configuration of the aircraft, and the riggers' successful packing and rigging of the supplies got this mission off to a great start.

The excitement increases as we anticipate the South Pole drop just 2 flying hours away. These 2 hours are a busy time for the loadmasters and riggers as they reconfigure the aircraft to allow the exit of the bundles through the paratroop doors. This drop is a little more difficult.

It is only an 8-second drop zone where the aircraft commander, Major William Burt, makes four passes over the Pole, which allow two teams of three men to push the cargo bundles out the paratroop doors. The thrill of success as these bundles leave the aircraft can be seen in the loadmasters' hearty "thumbs up" signal — everything had gone

Going . . .

Gone

Bundles leaving the aircraft over McMurdo Sound create quite a stir.

Photos courtesy of Capt Richard Williamson, 452 AREFW

The KC-10A Extender, Strategic Air Command's advanced tanker, provided enough fuel for the C-141B to safely and successfully complete the mission.

well!

As I mentioned, the bundles for the South Pole must be a specific size to allow exit from the paratroop doors, vice over the ramp and through the petal doors. It is so much colder at the Pole than at McMurdo, MAC directed the crew not to open the ramp and petal doors of the C-141 at the Pole. An attempt to open these doors would be very difficult as the extreme temperatures increase the likelihood of their freezing shut. Even if the doors were to be opened, there is a greater risk in *not* getting them closed.

Another challenge for the aircraft involved the flaps. Should the flaps stick at McMurdo, "Polar 89" could still make it back to a runway in the far southern New Zealand city of Dunedin. The last of three aerial refuelings from the KC-10 tanker ensured enough fuel for their return.

However, a flap malfunction over the Pole would render "Polar 89" unable to leave the ice pack and would mean an emergency landing at McMurdo Sound. This could mean serious damage to the aircraft, possible injury to the aircrew, and an unplanned 2-4 month Antarctic TDY for the crew. It was no wonder I could "feel" the seriousness in Major Burt's voice when referring to the possibility of the "flaps freezing."

For the Aircrew The aircrew must be equipped and ready for this extreme cold also. Preparation for these temperatures begins *even prior* to departure. All crewmembers must attend briefings where the emphasis is on safety. Special attention is directed to the significance of checklist discipline, hypoxia symptoms, and cold weather dangers. There are more briefings as launch days grow closer.

The windchill and drop altitude of approximately 10,000 feet affect the loadmasters the most at the Pole. With the windchill temperature this year measuring –170 degrees Fahrenheit, I could easily understand SMSgt Michael L. Wright, Chief Loadmaster, when he expressed concern for the safety of the other loadmasters. While the cargo doors are open, the loadmasters near the paratroop doors must be tethered. Loadmasters and riggers are required to wear full arctic survival gear to guard against oxygen starvation and fatigue.

The navigators on "Polar 89" must also prepare for this task. Their ground-based navigational aids are

continued

It is so cold at the Pole the C-141's ramp and petal doors must not be opened! The containers are built to a specific size allowing exit out the paratroop doors.

Photo Courtesy of Fred Jones, 1352 AVS

There is a 2,000-meter drop zone the crew must hit. The full moon and the strobes connected to selected bundles help those on the ground recover these vital supplies.

DOWN UNDER

continued

practically useless because of the harsh weather. Consequently, the three navigators used grid navigation ... an artificial latitude-longitude system to traverse the polar region. They relied on the C-141's two inertial navigation system computers and radar to find the drop zones.

In spite of the challenges, risks, and complications for everyone involved with the airdrops, Midwinter '89 was a great success! And to all those people who anxiously awaited the lights of the C-141 flying over with mail from home, a fresh apple, or that essential computer part, the success of this mission would not ever be forgotten.

The Principles

Midwinter Airdrop 1989 depended on the professionalism of many — a team who, for 10 years, has depended on tried and proven safety principles, adhering to those procedures that have been successful. These procedures are offered here as a reminder to all of us to follow the necessary elements required to fly a successful mission.

- The prebrief was essential. All crewmembers were made aware of the mission profile's potential problems. One mission stopper could cause a catastrophe. With information from the mission prebrief, the crews could watch out for, and avoid, all shortcomings that could cause a malfunction.
- Safety and success was a team effort! Each crewmember was responsible for many tasks throughout the mission. The proper execution of these tasks demanded constant vigilance, cross-checking, and sharing of information. Every crewmember had to remain aware of where the aircraft was going and what it was doing. This all added up to a requirement for effective crew coordination. The teams' personal safety and mission success depended on it.
- Checklist discipline was emphasized. It provided an assurance of continuity and completeness. Time and time again, the checklist was an effective tool in protecting equipment from damage, ensuring a successful drop, and protecting people from injury or death.
- The debrief made the mission's lessons learned very clear. Reviewing those problem areas the teams encountered and how they might be solved next year was important. New procedures and recommendations would be invaluable to ensure another successful mission next June.

Midwinter Airdrop 1989

The Midwinter Airdrop 1989 teams departed Christchurch, New Zealand, on 23 June 1989. Their mission was, indeed, challenging ... it was a success ... it was completed safely ... and it was more ... it was a proud and happy crew who had demonstrated MAC's ongoing capability to resupply forces anywhere in the world, under the most adverse conditions. Good show! ■

FLIGHT LEADER

"As The World Turns Too Quickly"

LT COLONEL KENT D. KOSHKO
Editor

■ Suddenly my mind was foggy and I knew we were **out of control!**

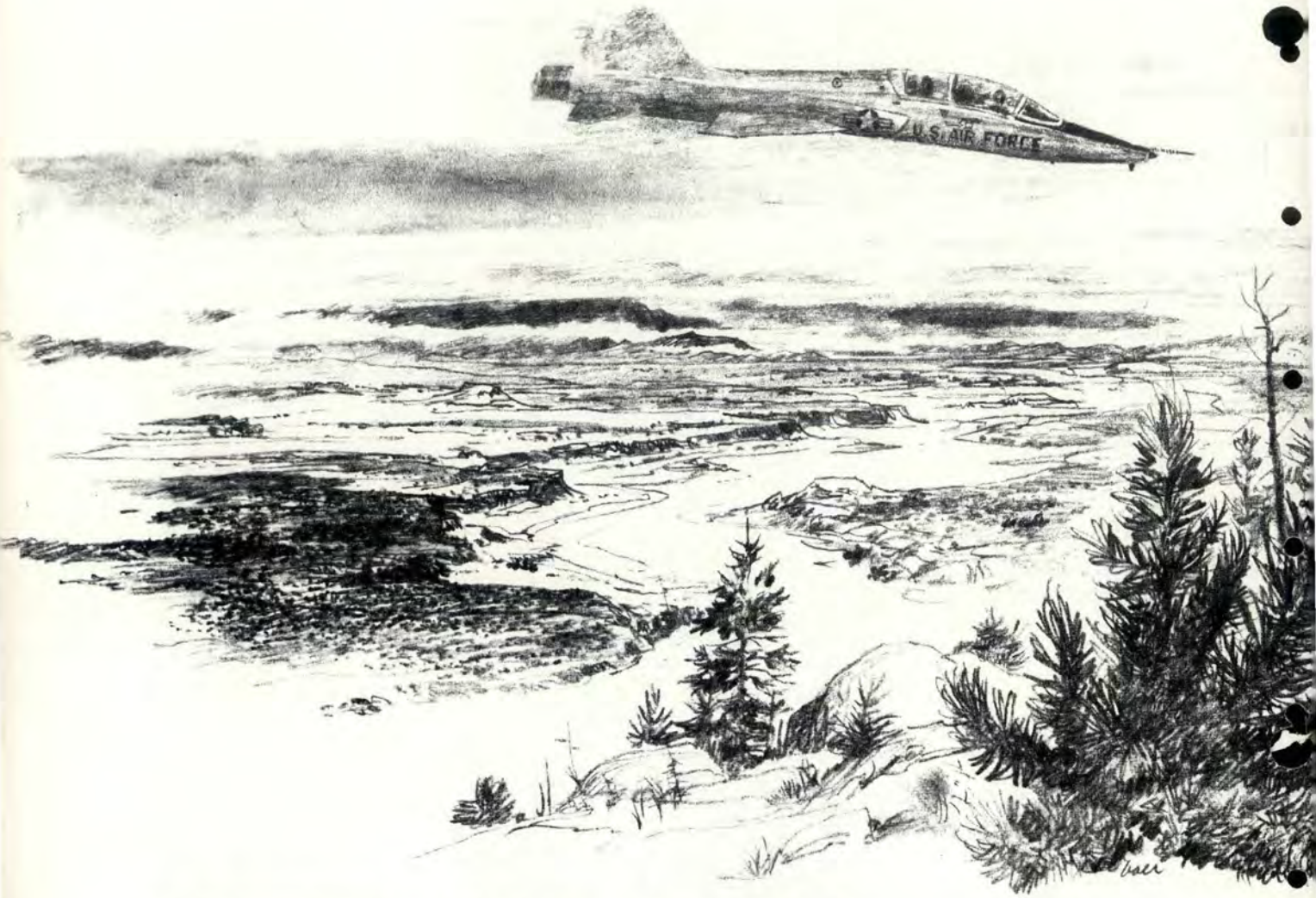
I had long heard horror stories about crewmembers who had experienced bad cases of vertigo and the close calls that had developed. But somehow I never thought it would happen to me. I had always associated developing spatial disorientation as a result of flying in IFR conditions for a long time and after being tossed about in the clouds. It never dawned on me it could occur in clear, VFR conditions until that fateful day when I found the world turning too quickly.

We were practicing touch-and-go landings in a B-52H on a bright, clear day. I was flying as the instructor pilot in the right seat and performing copilot duties. We lifted off after our fifth approach and started to climb to traffic pattern altitude. As the instructor, I looked down to read my checklist which I conveniently placed on the right circuit breaker panel. After completing a few items, I looked up quickly, swinging my head to the left.

Just then, I saw the aircraft go into a severe left-hand yaw. I took control of the aircraft, pushing hard on the right rudder pedal to straighten out the big beast, and asked what had happened! No reply by the crew. Impatiently, I asked again. The horizon was spinning quickly to the left, and my mind knew we were in trouble! I scanned the instrument panel for any obvious engine malfunctions . . . for it felt like nos. 1 and 2 engines had just flamed out. The aircraft commander asked me what was the matter. Ignoring him for the moment, I radioed for an immediate downwind clearance while we continued to look at the problem. The tower approved my request.

Back inside the jet, I was frantically trying to resolve our immediate problem. As my inner ear caught up to the rest of me and my eyes quit tumbling, I realized I had just experienced a classic case of vertigo or Coriolis illusion, just like we had all seen demonstrated in the Barney chair. This false sense of turning caused by my rapid head movement was reinforced by a terrible visual illusion that had convinced my mind we were out of control. Embarrassed, but quite relieved, I told the crew what had happened to me. Oh, what a relief it was to know we were going to live and fly again another day.

The lesson I learned was the one we had heard many times before by instrument instructors and seen demonstrated at every altitude chamber refresher course — no sudden head movements while flying . . . and remember to **TRUST** your instruments. The experience was scary, but a valuable one I will never forget. ■



VFR IN IMC

. . . The Risks Can Be Costly

Accomplishing the mission means doing so by the rules. Bending the flying regs by sneaking in where you shouldn't is often very risky.

MAJOR WALLACE W. COATES
Directorate of Aerospace Safety

Training Trouble

■ When weather forced cancellation of a planned training sortie, a new T-38 IP and his student elected to try their luck on a low-level navigation sortie. Following an all-too-quick mission planning session and brief, they took off and entered a local low-level military training route. Entry and the first leg of the route went well. They were on time and on course.

As they turned to the second leg of the route, it became apparent that low clouds would make things more interesting. They were faced with aborting the route or pressing on in hopes of maintaining visual

contact with the terrain. When outside references deteriorated, they began a shallow descent in an attempt to remain below the clouds. They probably saw the ground and had a split second to realize their error before the T-38 disintegrated in a ball of fire as it smashed through the trees and into the steep, rocky slope of a mountain masked by the low clouds.

Lost Wingman

A flight of five A-10s operating VFR in marginal weather conditions was forced to make several altitude and heading changes to maintain visual meteorological conditions (VMC). When lead was finally unable to avoid the weather, he called for the formation to close, but before no. 5 could join, the flight entered the clouds. No. 5 went lost wingman. As he maneuvered in an attempt to regain visual contact with the rest of the flight, he apparently lost situational awareness and descended 1,700 feet below the minimum obstruction clearance altitude. He was last seen behind and below the rest of the formation. Ground impact occurred 600 feet below the top of the mountain.

Rejoin Wreck

An F-16 pilot lost visual contact with lead shortly after takeoff on a VFR departure. As he attempted to obtain a radar lock on, he lost situational awareness and deviated from the planned departure track. Another flight member provided rejoin directions and the pilot was able to establish radar contact. He was then above a broken cloud deck and felt he needed to descend for the rejoin. Believing he was over open water, he descended through a break in the undercast while continuing to monitor his radar. He saw the ridge line in time to avoid impact with all but the trees.

Common Factor

The common factor in these three mishaps is the mishap pilot's attempt to accomplish a VFR operation in instrument meteorological conditions (IMC). In the last 10 years, there have been over 20 USAF mishaps where pilots were either unable to avoid the terrain or maintain aircraft control while attempting to operate VFR in IMC. The third example above is unique in that it was the only one of more than 20 mishaps that was nonfatal.

Instrument Flying

A review of aircraft mishaps related to instrument flight shows Air Force pilots, in general, are exceptionally good instrument pilots — when they use their instruments.

Basic instrument skills are not the problem — *application is!* On the gauges, in the weather, the typical USAF pilot does a great job controlling the aircraft. Let secondary tasks distract him or her from the instruments, and the potential for disaster elevates significantly. If he or she fools themself into believing they can disregard the instruments and maintain situational awareness using marginal or nonexistent outside references, they have taken a big step toward immortalization in the AFISC data base of aircraft mishap statistics.

Collision With the Ground

Aircraft hit the ground in IMC because the pilot either loses track of where the ground is, loses track of where he or she is, or is so totally disoriented they lose track of where everything is.

Situational Awareness

In unrestricted VMC, situational awareness with respect to the terrain is a relatively simple process —

continued

VFR IN IMC . . . The Risks Can Be Costly

continued

look outside, see where you're going, and don't hit anything. Enter IMC, and the terrain that was such a real and obvious threat in VMC seems to become far less threatening. "Out of sight, out of mind," so to speak.

For a pilot who has just unexpectedly lost outside visual reference and is futilely attempting to regain visual contact with either the terrain or other flight members, the importance of a good instrument crosscheck and the significance of minimum obstruction clearance altitude can be easily overlooked.

Disorientation

In unrestricted VMC, our secondary visual input (essentially our peripheral vision) provides an almost subconscious situational orientation which makes aircraft attitude awareness almost too easy. If the secondary visual input is removed, erroneous vestibular (seat-of-the-pants) inputs can override the pilot's orientation process in seconds. Unless the pilot reinforces this orientation processs by crosschecking flight instruments, they are set up for type I disorientation (they're screwed up but don't know it). The consequences of this type of disorientation are usually not conducive to good health.

What's the Solution?

Well, for one, don't attempt VFR flight operations in the IMC. Besides being against the rules, it's really dumb and can be very costly!

This obvious solution may sound shallow when faced with the argument that IMC conditions are not always easily avoided when flying high speed at low altitude. But put some effort into it.

Avoiding IMC during a VFR operation begins with preflight planning. Before the mission, get the latest possible weather forecast. Listen to what the weather briefer is trying to tell you about cloud coverage and visibility. He or she should provide you with information on local, en route, and destination ceilings and visibility. Get specific information on low altitude operating areas such as military training routes, ranges, low altitude tactical navigation training areas, etc. Be suspicious of forecast low ceilings especially in mountainous terrain where valleys may be clear while mountaintops are obscured by clouds.

Have a plan if unexpected IMC conditions are encountered. Study the terrain features for the entire mission and determine minimum en route altitudes (MEA) that will ensure obstacle clearance. Regulations vary by command and aircraft type, but most require annotating maps for low-level routes with MEAs. Pay attention to these, since they may save your life!

Make sure all flight members understand lost wingman procedures and low level route abort procedures. Cover minimum safe altitudes for local VFR operations and what actions are to be taken if IMC conditions are encountered during any planned VFR maneuvering.

Don't press into obvious IMC conditions. If weather becomes a problem, abort VFR operations early and/or obtain an IFR clearance. If you're operating IFR, don't cancel until it's clear that you will be able to maintain VMC.

Your first priority is to maintain aircraft control. If your efforts at avoiding IMC are unsuccessful, remember what I said about application of basic instrument skills. *Get your head inside the cockpit and fly instruments.* Don't fool yourself into believing your seat-of-the-pants instincts are correct and any moment you'll break out into the clear. Discontinue the VFR operation and put some altitude between you and mother earth.

The whole point of reviewing MEAs during mission planning is to know where you'll have to be to avoid the terrain if you can't see it. Get there, or higher! There is a corollary to Big Sky Theory called Big Ground Theory. No need to go into the details. Let's just say your odds of survival are much greater in the sky.

If you're lost wingman, stay lost wingman until you and the rest of the flight are in VMC and will remain clear long enough to accomplish a safe rejoin.

After you have safe clearance from the ground, and other flight members if you have gone lost wingman and cannot safely rejoin them, comply with AFR 60-16, General Flight Rules, and get an IFR clearance. This will help ensure separation from other IFR traffic.

The Bottom Line

Don't press on with VFR operations if it isn't VMC. *Don't gamble your life on your luck.* The best option is to go home. Then you'll be able to come back and try it another day when you can see what's going on. ■

Editor's Note: Remember, proper map annotation may save your life! Consult MAJCOM Reg 55-125, Preparation of Mission Planning Materials (Tactical Aircraft), and appropriate guidance in 55 series regulations.

Enter the Classic Dumb Humor Caption Contest Thing

OK, so you guys are good! Time after time, you've come up with great, real live "dumb" captions. So, here's another one. See if you can beat our resident humor caption geniuses here at AFISC and win the legendary little prize to hold and cherish forever.

Write your captions on a slip of paper and tape it on a photocopy of this page. DO NOT SEND US THE MAGAZINE PAGE. Use "balloon" captions for each person in the photo or use a caption under the entire page. You may also submit your captions on a plain piece of paper. Entries will be judged by a panel of experts on dumb humor in January 1990. All decisions are relatively final.

Send your entries to: **"Dumb Caption Contest Thing" • *Flying Safety* Magazine • HQ AFISC/SEPP • Norton AFB, CA 92409-7001.**

Once Again, Thanks For Your Support!

We once again learned that many of you were able to beat us at writing "dumb captions." Our panel of experts had fun selecting the top captions. After much deliberation, they chose the winner — our congratulations to Chuck Woodside. Your prize is in the mail!

AND THE WINNER IS:

Chuck Woodside

SA-ALC/LGMW
Kelly AFB, Texas

Honorable Mentions

1. **I know they briefed "light farming activity near the low level route," but I still can't believe it!!**
   MSgt Gerald Meurs, 27 AGS/CCQT, Cannon AFB, New Mexico
2. **Retirement flyby for the light brigade.**
   Mr Richard O. Durrenberg, 22 AF/LGMW — Avionics, Travis AFB, California
3. **Do they call this a cluster, a gaggle, a flock, a bunch, or what?**
   Major Don Thomas, AFISC/SEPX, Norton AFB, California
4. **Flight leader to flight, Okay you guys, one more pass and we'll have seen the drive-in movie completely!**
   MSgt Alan B. Crank, 33 AGS/MAAML/WSS, Eglin AFB, Florida
5. **Are you sure this video we rented is Bombers B-52?**
   TSgt Al Drabnis, 141 AREFG (NJANG), McGuire AFB, New Jersey.

MAINTENANCE MATTERS

F-5 Unsecured Boattail

■ To perform maintenance training for F-5 crew chiefs, maintenance people removed the boattail (aft section) and placed it unsecured on a dolly located to the right rear of the aircraft. About an hour later, after returning from a flight, an F-15 turned into its parking spot. As the exhaust of the Eagle turned towards the F-5 parking area, the boattail was blown off the maintenance dolly. Not only were the boattail and both horizontal stabs damaged, but so were the F-5's right wing trailing edge panel and Aero-3B.

What was it that contributed to the boattail coming off its dolly, costing the Air Force $58,000?

The F-5 tech data requires that the boattail, when removed, be secured on a dolly with two V-bolts and a securing strap. The dolly used in this mishap had only one V-bolt and no securing strap, allowing for the unsecure condition.

Keep this costly mishap in mind as you look around your own flight line. Recently, at two separate bases, AIM-7 and AIM-9 missiles were blown off their respective trailers by aircraft taxiing in the ICT (integrated combat turnaround) areas. A few years ago at one of our European bases, a vehicle was overturned by the exhaust of a taxiing jet fighter.

The key to any successful mishap prevention program is identifying known or potential hazards — and taking adequate corrective action. Take a look around and consider the unlocked or unsecured portable cranes and maintenance stands. Or how about those unsecured aircraft panels and parts or unlocked canopies (either not fully opened to the locked position or without canopy safety struts installed)? From the first predawn launch until the last aircraft down from night flying has been tucked in, everyone on the flight line needs to ensure things are secured from the exhaust blast of taxiing aircraft.

As a final note, it should also be noted inclement weather, such as gusty winds, can cause things to go "bump in the night" (or day!). Regardless of the prevailing conditions, which includes the aircraft parking plan, it's up to all of us to prevent objects from being tossed around and needlessly damaged.

ATTENTION MAINTAINERS!

Defective Self-Locking Nuts

Several units have reported that a self-locking nut used on the C-130 wheel assembly has failed in an "explosive" manner while being torqued, as well as after assembly, sometimes bursting apart. Twelve of these nuts (PN GYN 167, NSN 5310-01-035-1734) are used to hold the two halves of the Herc's brake assemblies together. One unit reported eight failures of this piece of hardware. According to a service bulletin issued by the manufacturer of the C-130 wheel, "The nut is an older design and has been cracking at assembly and after installation."

While both the new and old design have the same part and national stock number, the physical appearance is different. The new design has an exaggerated self-locking collar (see figure). All units should check to see if you have this item in stock.

Flashlight Foul-Up

The A-10 was on a fourship bombing mission. After a bomb run, the pilot retarded the throttles in order to complete a rejoin. When the pilot attempted to advance the throttles, the right throttle would not advance above 85 percent.

next page

SAFETY HOT LINE

876-SAFE

The Directorate of Aerospace Safety has established a "Safety Hot Line." If you have a safety concern you think the Director of Aerospace Safety should know about, call this AUTOVON number (876-7233) and leave a message. The Director of Aerospace Safety or a member of his staff will personally review and answer each call.

MAINTENANCE MATTERS

An emergncy was declared, and the pilot and flight lead returned to base, setting up a holding pattern to burn down fuel. However, when a rain shower was reported approaching the field, the pilot, with the consent of the SOF, elected to land with the remaining fuel. The SOF read the Dash 1 procedures for a stuck throttle, single-engine landing, and single go-around.

Speed was controlled on final by using the left throttle and modulating the speed brakes. The aircraft landed slightly heavy at 160 knots, 800 to 1,000 feet down the runway. The pilot applied the brakes, using both the normal and emergency systems. The plane did not slow as anticipated. Since he assumed he pulled the throttles to idle, he directed his attention to the brake system. His attention was increasingly channelized on how to handle a brake failure situation.

The jet departed the runway at the overrun and crashed through the perimeter fence. It continued through a corn field, shearing off both main and nose gears. The gun dug into the mud and was torn from the aircraft. The pilot jettisoned the canopy. After the aircraft finally came to a stop, the pilot egressed, fortunately, uninjured.

The investigation team determined the main cause of the mishap was a flashlight that had become jammed in the aircraft throttle, preventing the pilot from advancing the right throttle above 85 percent. Further investigation revealed the flashlight came from the launch crew chief's tool box.

This aircraft was lost simply because a maintainer failed to follow tool control procedures. Had the crew chief inventoried his tool box after he completed the maintenance, the pilot could have been notified and the mission aborted before takeoff.

Failed IPI

During takeoff, as the flaps and slats were raised, the F-111 crew felt moderate vibrations. The vibrations increased in intensity as the flaps and slats were fully retracted. The crew dumped fuel and performed a controllability check. As the flaps and slats were lowered for landing, the vibrations diminished. During the straight-in approach, the controls became extremely mushy, but the crew managed to make an uneventful landing.

The cause of the problem turned out to be the no. 2 pivot pylon which was cocked at about 70 degrees. Investigation revealed the technicians had problems installing the pylon during the last phase inspection. The investigating team had the pylon removed and found the spline teeth were lined up tooth-to-tooth instead of being meshed. They also found the support collar was installed upside down, and the ring nut threads were stripped. The team concluded the cause of the mishap was the failure of maintenance people to follow tech data when installing the pivot pylon.

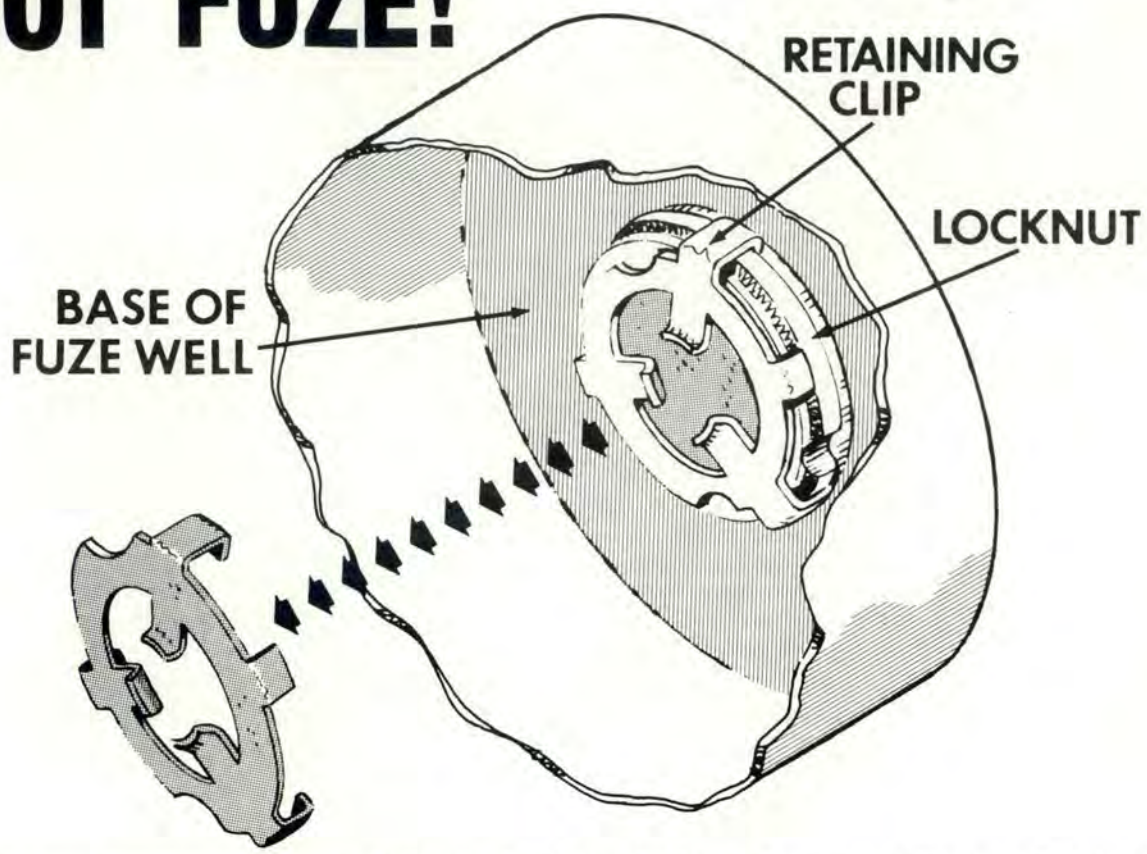
Further investigation revealed that in spite of the failure to follow tech data, the mishap still should have been prevented. It seems prior to this mishap, the maintenance supervisor directed an in-process inspection (IPI) be performed during all pivot pylon installations. The IPI was required as a result of an F-111 crash that occurred because the pivot pylon was also cocked, causing the aircraft to go into an uncommanded roll.

The mishap investigation revealed the IPI was not documented in the forms, and if it was performed as the immediate supervisor stated, it was done improperly.

An IPI is an inspection performed during the assembly of a component or subsystem to ensure the work performed is of high quality and in accordance with technical directives. Many technicians consider the IPI a symbol of supervison's lack of confidence in their technical ability or integrity. Nothing could be farther from the truth. The IPI provides a second pair of eyes and one last look before a critical maintenance task is signed off. The fact is the IPI should be considered insurance for both the specialist and the supervisor.

Getting back to our mishap — had the supervisor performed the inspection and done it correctly, the incident would have been prevented, the maintenance team saved some unwanted notoriety, and the supervisor's integrity preserved. ■

HOT FUZE!



SMSGT DENNY T. MAULDIN
Directorate of Aerospace Safety

■ During a pre-use inspection of a GBU-24 bomb, it was noticed the forward adapter was improperly aligned. A munitions maintenance crew was dispatched to realign the adapter, which required removal of the FMU 81/B fuze. The crew chief read the tech order while one worker held the battery firing device (BFD) lanyard and another worker began to remove the fuze.

During the operation, the worker removing the fuze noticed it became increasingly harder to remove, which prompted the crew chief to give it a try. When the fuze finally came loose, they noticed the BFD had fired. During removal of the FMU 81/B fuze, the BFD was caught by the fuze well nut retaining clip, which actuated the BFD.

Every good ammo troop knows what a fuze well nut retaining clip is. It's that little brass-looking washer-like "doohickey" you pop out of fuze wells with a screwdriver before you build a guided bomb. Or do you? This is the second time in the last year this problem has occurred with the FMU 81/B fuze. And in the first incident, the safe pin wormed its way through a slot in the safety clip to the extended position, which indicates a fully armed fuze!

Change 2 to TO 11A-1-63, Rapid Assembly of Munitions, now mandates removal of the fuze well nut retaining clip when using the FMU 81/B fuze. That regulation covers GBU 10s and GBU 12s. But when building GBU 24s, the ammo troop is referred to TO 11A1-77, Storage and Maintenance of General Purpose 2,000 Pound MK 84 Bombs, for a visual inspection of the MK 84 bomb before assembly.

Table 5-1 of the tech order calls for removal of the troublesome little clip, but Table 5-2, the inspection table for combat/simulated combat situations, doesn't mention anything about the removal of this clip. Since FMU 81/B procedures aren't in the MK 84 TO, and there's no mention of removing the fuze well nut retaining clip in the GBU 24 TO, what we have is the missing link in the chain of events that can lead to mishaps.

Until our tech data changes, the bottom line is — when fuzing bombs with the FMU 81/B fuze, **make sure the fuze well nut retaining clip is removed before you insert the fuze!** If you have any doubt about whether you remembered to remove the clip or not, just feel the fuze with your bare hand when you remove it. The thermal battery from a fired BFD warms the fuze to the point where there's no doubt that the fuze is "HOT!" ■

WHAT'S WRONG IN THIS PHOTO? Answer From Page 11

When this airman does a tool kit inventory, he should notice the wrench he left in the TF33's intake is missing. A tool box inventory after each maintenance task is a safeguard against complacency and a good way to minimize FOD. It is also required by AFR 66-33, Foreign Object Prevention Program.

■ I just finished reading your article about the need for safety around liquid oxygen. I couldn't agree more that LOX can be deadly and that everyone must treat it appropriately. However, I do take exception to a couple of things you said:

a. ". . . a thorn in the side of logistics folks." That statement communicates to me much of the problem maintenance and operations people have talking to each other. If logistics people think doing their job is ". . . a thorn in the side" we have serious problems. Working with LOX requires care and attention to detail, but it is not ". . . a thorn in the side."

b. "Without LOX, sortie generation quickly stops." First, this isn't true. Oxygen is only needed at high altitude *and* when cabin pressurization doesn't work. In combat, a high percentage of our sorties would still go, even without LOX. I have flown in Europe for many years. Most sorties here are flown at low and medium altitudes, and could actually be flown wearing a boom mike instead of an oxygen mask. Second, "sortie generation" isn't the reason for maintenance — flying is. A better wording would have been "Without LOX, flying stops," except it isn't true except for high-altitude missions.

Lt Col Gary Dikkers, Commander
4th Air Support Operations Center
Eschbornerland Strasse 139
Building 2519
D-6000 Frankfurt 90

Editor's Note: Any comments? ■

THE FOD-FATHER

Strikes Again at the Evil FOD Monster and his FOD MOB

Send us your accounts of the nefarious works of the FOD Monster and tips on how to foil him!

CMSGT ROBERT T. HOLRITZ
Technical Editor

■ Fasteners are by far the greatest source of foreign objects. In a large number of FOD incidents involving fasteners, the main cause has been the installation of the wrong fasteners. Consider this recent, but classic, example.

During a postflight inspection after a seemingly uneventful flight, the Weasel's crew chief noted a screw was missing from panel 6R. Because this panel is just forward of the no. 2 intake, the crew chief performed an inspection of the no. 2 intake and found damage to several of the fourth stage blades. The engine was removed and sent to the prop shop where it was top halved. Engine specialists found extensive damage throughout the entire compressor section. The compressor was returned to depot for major repairs.

Investigation revealed panel 6R had been removed and reinstalled to facilitate maintenance on the day prior to the mishap. They also found the nut plate the screw fell out of was worn and should have been replaced. But the team determined the major cause of the FOD was because the specialist had unknowingly installed a screw that was too short.

The investigating team determined the individual who reinstalled the panel was not properly trained. Although the task was signed off in his training records, the specialist was not aware of the requirements of TO 1F-4G-2-2, para 6-12 (Ground Handling and Airframe Maintenance). This paragraph contains specific procedures to be followed when installing screws forward of intake ducts.

This is a classic example of how failure to follow tech data can be dangerous and expensive. The cost to repair the J-79 engine — $71,000. ■

UNITED STATES AIR FORCE

Well Done Award

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.

CAPTAIN
Bradley C. Hood

1ST LIEUTENANT*
Ajrn R. Paulson

18th Tactical Fighter Wing
Kadena AB, Japan

■ While rejoining a four-ship formation that was participating in a large force exercise, Captain Hood found the right throttle of his RF-4C would not retard beyond the afterburner detent. Despite numerous efforts to free the locked throttle, Captain Hood and 1st Lieutenant Paulson elected to shut down the right engine to facilitate reasonable landing speeds.

They flew back to Kadena AB for a single-engine ILS approach. Weather had deteriorated to a 500-foot ceiling with 2 miles visibility. During the initial approach, the ILS failed without any cockpit warning. The system finally displayed failure indications, and Captain Hood transitioned to a PAR. During the transition, he selected military (100%) power on the operating engine to ensure the aircraft did not slow below appropriate single-engine approach speed.

When Captain Hood attempted to reduce power on the left engine, he discovered the throttle was locked at military power and could not be reduced. Due to the close proximity to the airfield and the increasing speed, Captain Hood elected to abort the approach and accomplished a single-engine missed approach.

Captain Hood and Lieutenant Paulson coordinated with all appropriate agencies and discussed the possibility of ejection if a high power single-engine approach-end barrier landing was unsuccessful. Considering all their options, the crew decided to fly the single-engine approach, using the speed brake to control approach speeds. Captain Hood flew a flawless PAR approach culminating in an approach-end arrestment and engine shutdown with the engine master switch.

Captain Hood and Lieutenant Paulson's quick thinking and outstanding crew coordination, coupled with exemplary airmanship, resulted in the safe recovery of an irreplaceable combat aircraft. WELL DONE! ■

* Lieutenant Paulson has since been promoted to captain and is wearing this rank in photo.

☆U.S. GOVERNMENT PRINTING OFFICE: 1989 — 679-051/80020

UNITED STATES AIR FORCE

Well Done Award

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.

MAJOR

Edward T. Schantz

49th Tactical Fighter Wing
Holloman AFB, New Mexico

■ Major Schantz averted the loss of an F-15 and possible loss of life while leading a four-ship mission on a partially moonlit night with no discernible horizon. As the formation entered the working area, Major Schantz cleared nos. 3 and 4 to their prebriefed point. While Major Schantz navigated to his point, he cleared his wingman from route to trail position. As his wingman moved back, Major Schantz observed the no. 2 aircraft's nose pitchup, then roll rapidly to the left. He then directed his wingman to recover.

As Major Schantz continued to monitor his wingman, he noted the aircraft roll inverted and the nose begin to fall through the horizon. Convinced his wingman was unaware of his aircraft's attitude, Major Schantz made a hard left descending turn to rejoin him. As no. 2 was entering his second barrel roll, the distance between the two aircraft began to increase. Because it was difficult to fly his own aircraft and keep his wingman in sight, Major Schantz used his aircraft radar to maintain awareness of where his wingman was and his altitude.

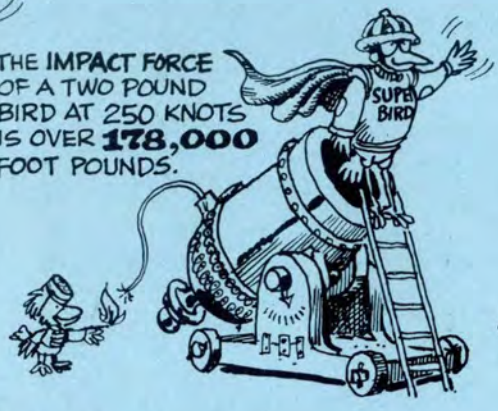
Major Schantz directed his wingman to "get on instruments" and recover. He queried the wingman on his attitude, airspeed, and altitude. No. 2 stated he was severely disoriented and that in his recovery attempt, he had stagnated an engine. Major Schantz, convinced his wingman was back in control, assisted him with an airstart, directed a heading and channel change, and declared an emergency. He then coordinated a recovery back to their home field.

While on recovery, no. 2 informed Major Schantz that whenever he attempted to look outside the aircraft, he became severely disoriented. Major Schantz continued to talk to him and call out flight parameters while guiding him through the recovery and ILS approach to a successful full-stop landing.

Major Schantz's diligence, quick thinking, and extraordinary flying ability under extreme pressure prevented the loss of a valuable combat aircraft and pilot. WELL DONE! ■

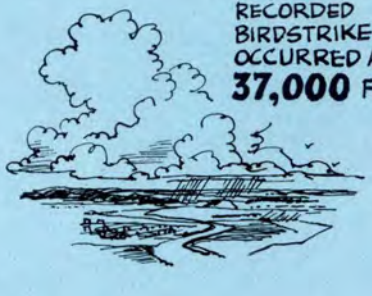
FEATHERY FACTS FOR FLYERS

IN 1988 THERE WERE 3,346 REPORTED BIRDSTRIKES!



THE IMPACT FORCE OF A TWO POUND BIRD AT 250 KNOTS IS OVER **178,000** FOOT POUNDS.

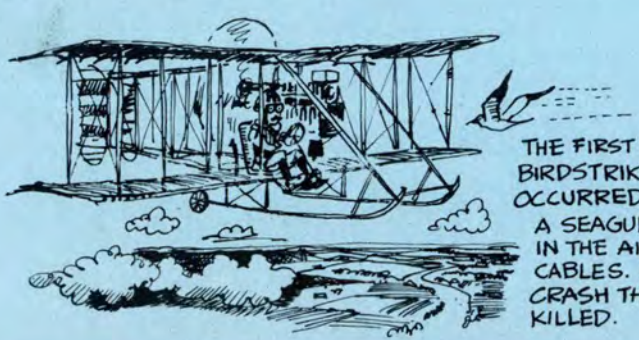
THE HIGHEST RECORDED BIRDSTRIKE OCCURRED AT **37,000** FT.



SEVERAL AIR FORCE BASES ARE BUILT IN THE CENTER OF BIRD BREEDING OR NESTING GROUNDS OR ON MAJOR MIGRATORY ROUTES.

½ TO 1 **BILLION** BIRDS MIGRATE THROUGH CONUS EACH YEAR.

SINCE 1980 **TEN** AIRCRAFT HAVE BEEN DESTROYED BY BIRDSTRIKES



THE FIRST RECORDED BIRDSTRIKE MISHAP OCCURRED IN 1910. A SEAGULL GOT CAUGHT IN THE AIRCRAFT CONTROL CABLES. IN THE RESULTING CRASH THE PILOT WAS KILLED.

FLYERS, Remember to use your visors and avoid feathery fly routes when possible.