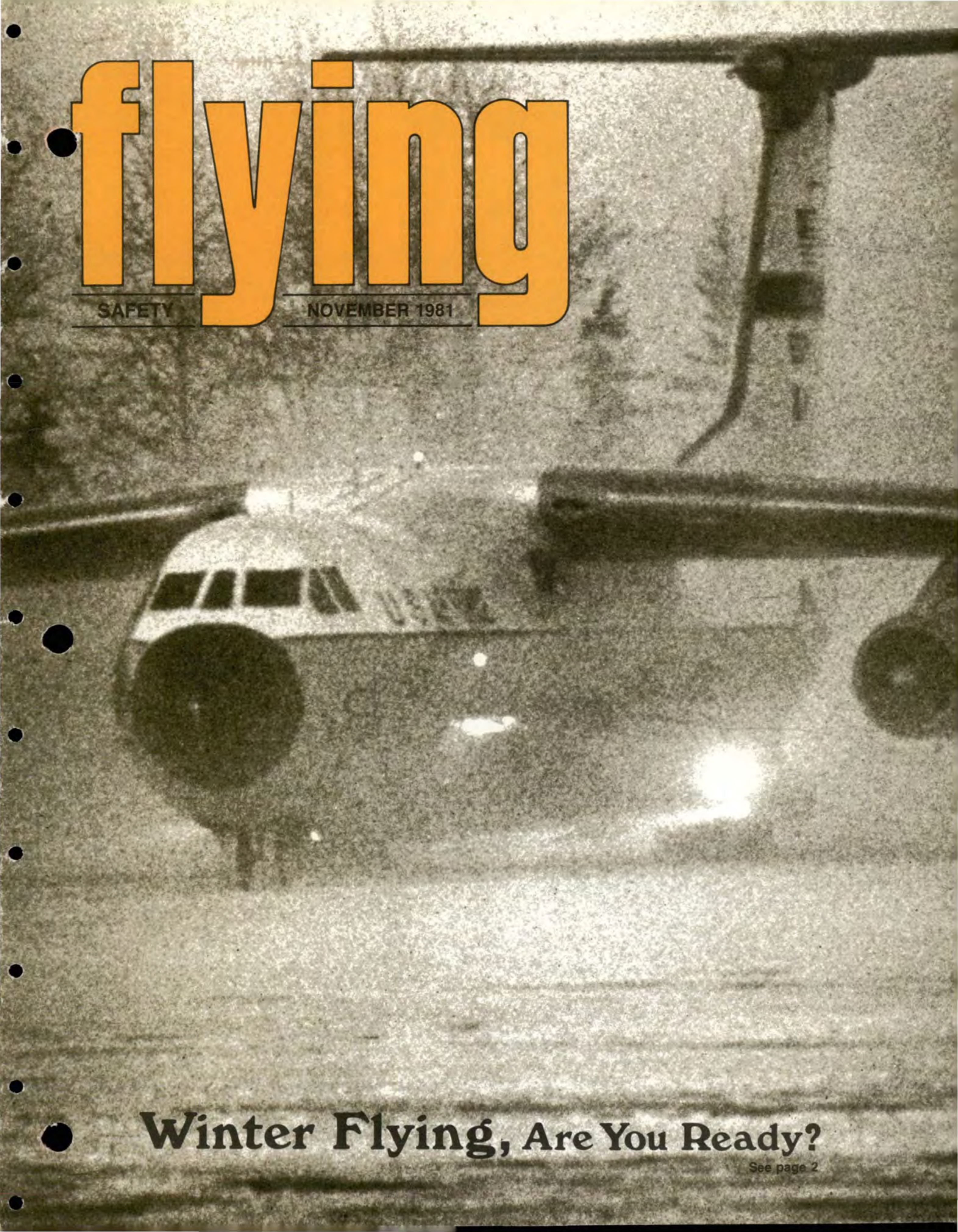
flying

SAFETY
NOVEMBER 1981



Winter Flying, Are You Ready?

See page 2

THERE I WAS . . .

■ As my C-130 lifted off from Sicily LZ at Ft. Bragg on a nice, hot June day, I pulled the nose up to maintain my assault takeoff attitude. At approximately 50 feet in the air, my seat slid back to the full aft position! As the seat went back so did I and so did the yoke. This brought the nose up to a critically high angle. To make matters worse, I'd had my hand on the throttles so they came back with the rest and the power rolled back on all four engines.

By the time the copilot realized what had happened and had taken control of the aircraft the airspeed was decreasing rapidly below 100 knots.

Lucky we had a bionic "E" (E model with Dash 15 engines) and so had enough power to keep flying when a regular E might not have made it.

Some techniques remembered after the fact:

- The copilot always backs up throttles on takeoff and landing.
- At the same time, the engineer wedges his left foot behind the pilot's seat to keep it from rolling back.

We have had other similar experiences reported. I personally have had one. Probably many other flyers have also – some who aren't around to tell about it. Readers take heed and ensure that the seat is locked in the detent.

Thanks for sharing. ■

Brig Gen Leland K. Lukens
Director of Aerospace Safety

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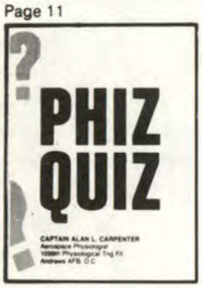

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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WINTER FLYING

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

Every year at this time safety magazines are full of warnings about the hazards of winter flying operations. Flying Safety *has carried technical articles on everything from hypothermia to wing surface roughness.*

The technical knowledge is available. But sometimes we fail to appreciate the true significance of the problem. So in this article we will review some recent history and, hopefully, get a better picture of the problem.

■ Marginal weather during the approach has been the biggest contributor to winter mishaps. This is not new or astounding information by itself, but there are some lessons in just how quickly things can go sour on an approach.

A large aircraft was making a PAR to an overseas base. The weather was right at minimums, but the pilot was not having much difficulty with the approach. After decision height, as the pilot attempted to transition to visual contact for landing, he began to lose visual references. A fog bank had moved in to obscure the first 2,000 feet of the runway.

The pilot did not immediately recognize the seriousness of the problem and, while trying to maintain visual contact, allowed the rate of descent to increase. The copilot also looking outside didn't notice the excessive descent rate either. The pilot, realizing that landing was impossible, attempted a missed approach. Unfortunately, the rate of descent was so high that before the aircraft could transition to a climb it smashed into the overrun. At this point, some other unfortunate circumstances combined to seriously compound the aircrew's problem.

Due to some errors in the snow removal plan, the overruns were clogged with ice and snow. The impact of the aircraft threw ice and snow against the airframe and into the left engine. The pieces of ice ingested by the left engine caused considerable damage and a loss of the engine. The aircraft bounced back into the air, then touched down again. The pilot did not realize that the left engine had failed and selected reverse thrust on both engines. The resulting asymmetrical reversal caused the aircraft to depart the runway.

Low ceilings and problems with snow removal also caused problems for a fighter. After a cross-country mission the single seater returned to the base for an approach. The weather was not nearly as good as forecast and was deteriorating rapidly. The first two aircraft in the flight penetrated and landed successfully. By the time nr three came down ILS final, the weather was down to 300 feet and one mile. Witnesses on the ground saw the aircraft break out well left of course and bank sharply right and then left to regain centerline. This maneuver was not totally successful.

The aircraft touched down in deep snow on a portion of the runway near the edge, which had not been cleared. (There was a 125 foot wide area in the center of the runway which was clear.) The force the impact and the deep snow caused the nose gear to shear. The aircraft was destroyed.

Finally, in the low vis approach category a large four-engine type was making an approach to an outlying base. The weather was right at minimums. The winds were gusty, and blowing snow and darkness combined to make the approach a sporty one. Once the pilot acquired the approach lights at decision height he concentrated on maintaining visual contact. As he descended below the glide slope, his job was made much more difficult by the snow piled around the lights. Neither he nor the copilot noticed the altitude or descent rate until the gear struck the approach lights in the overrun. The aircraft crashed on the runway and slid off into the snow.

The lessons in these three mishaps are the same. In each case, the pilots were so busy trying to maintain visual contact in marginal weather that they forgot to monitor their descent. The lack of visual clues provided no warning of the impending short, hard landings. While it would not have helped the fighter jock, for the multi-place aircraft there was one glaring deficiency in technique which could have prevented these mishaps. When the pilot transitioned to outside references, the copilot should have shifted to monitoring rate of descent and airspeed/altitude inside the cockpit.

For airfield managers, SOF's, and other supervisors, the existence of the hazardous snow conditions on the field in each of these cases was known. Yet, for some reason, the conditions persisted. Whether it was because of contractual difficulty, logistic complications, or natural phenomena is unimportant. What is important is that no one realized the true seriousness of the hazard. The snow was not the sole cause of any of these mishaps, but in each case it seriously complicated the pilot's task and was a major factor in the damage in two. Snow removal procedures should be reviewed annually at every base where snow is a problem.

When civilian pilots discuss icing and winter, they are usually thinking of airframe ice. True, this has caused many crashes and fatalities, but recent Air Force experience has been with engine ice, not airframe. Within one year, a helicopter and a fighter each lost power and crashed in circumstances which point directly to inlet icing as a contributor.

Of course, we all know that flight in icing conditions is hazardous. But what about preflight? The fighter crew arrived on time to preflight for a night departure. It was snowing during the walkaround, and the aircraft was swept clean of snow before engine start. The engines were started and, after some other delays, the aircraft started its takeoff roll. As the AC rotated the aircraft for lift-off, there was a loud bang and flame shot forward from the right engine. The takeoff was aborted, and after things cooled down, maintenance found severe FOD damage to the right engine typical of that caused by ice ingestion. When the maintenance inspectors checked the left intake they found a piece of ice 3 feet long, 4 inches wide and 1 inch thick. Apparently the ice in the intakes was missed by both maintenance and aircrew on preflight.

Ice on takeoff also caused a bomber some problems. As in the previous case, it was dark and snowy, takeoff was delayed for

continued

WINTER FLYING

maintenance problems. Everything appeared normal to rotation, then an engine chugged and stalled. Subsequent inspection discovered ice damage to IGV's and compressor section.

Icing isn't the only problem on preflight. The aircraft was preflighted by maintenance as a spare. When it wasn't used, the pitot covers were reinstalled, but no annotation was made in the aircraft forms. The aircraft was scheduled for a flight the next day. Since it was within 24-hours the maintenance preflight was not reaccomplished. The flight mechanic arrived early in the morning and quickly did his preflight in the dark and the rain.

The crew arrived late and did an "accelerated" preflight. No one noticed the pitot covers. During the takeoff roll, both pilots realized that the airspeed indicators were not working and initiated an abort. The aircraft hydroplaned on the wet runway. When the pilot saw he could not stop on the runway he turned off onto the grass, coming to rest some 300 feet off to the side of the runway.

Visual illusions and spatial disorientation take their toll of aircraft year round, but in winter snow can mask other familiar features and insidiously set up a pilot for a collision with the ground.

An F-4 was part of a flight of three on a low level, air-to-ground mission. After the aircraft departed the IP, the nr two aircraft saw it impact some three miles past the IP. The snow-covered ground had masked terrain features. Thus, when the crew tried to maintain altitude using outside references only, they failed to notice a descent until the aircraft hit a ridgeline.

Another fighter was nr four in a flight to the range. The weather on the low level route deteriorated. Lead called for an abort and started a climb. In the climb, the flight entered the weather. The pilot of nr four became disoriented and went lost wingman. Unfortunately, he did not transition properly to instruments but merely fixated on the attitude indicator. The airspeed decayed until the aircraft stalled and departed controlled flight. The pilot was not able to recover and ejected.

The mishap we just mentioned emphasizes another serious problem. Every year scores of general aviation pilots crash trying to maintain VFR in instrument conditions. You wouldn't think this would be a problem for the Air Force pilots but just like their cousins, Air Force pilots, particularly fighter pilots flying low level, can get suckered into dangerous situations.

While on a low level route, a flight of four encountered bad weather. Flight lead had not briefed weather deviation procedures. Number four had not studied the route and had no idea what the emergency terrain clearance altitude was. As lead maneuvered to avoid weather, nr four became separated. Then he failed to tell lead and attempted to climb out of the route. Because he was unaware of the high terrain, he failed to use sufficient rate of climb and crashed into the side of a hill.

Sometimes aircrews set themselves up for a problem. A flight of two got a little too aggressive during DACT, ended up low on fuel, and elected not to take an IFR clearance and to avoid sequencing delays. The flight had great difficulty finding a hole in the undercast, and fuel became critical. The flight finally started down, but the weather got worse. In an attempt to maintain VFR, the lead made an aggressive maneuver which disoriented both pilots and they entered nose-low attitudes from which the pilots could not recover.

Flying in winter can be very enjoyable. The beauty of the snow-covered mountains on a bright, clear day cannot be described — it must be experienced. The good far outweighs the bad, and knowledge of the problems you can encounter is the best prevention technique. Every mishap discussed in this article contained elements which, if the pilot had been aware of the problem, could have been prevented.

Enjoy flying. There is nothing better. But be conscious of the problems, and you'll be able to enjoy it much better and longer.

Beat the System...Completely

COLONEL GRANT B. McNAUGHTON, MC Directorate of Aerospace Safety

■ Both the MA-5/6 and HBU-2 series lap belts have demonstrated problems requiring manual override.

A The MA-5/6, used in ATC T-37's and T-38's has demonstrated these three deficiencies:

1. Belt can be hooked-up without the gold key (automatic parachute arming lanyard anchor).
2. Belt can be opened inadvertently by catching something on the manual release lever such as a sleeve, comm cord or personal leads.
3. Belt may not open automatically during ejection due to failure of the piston to release the swivel link. In the first two instances, the gold key is free and the automatic feature of the parachute is lost. In the last instance, the automatic feature of the parachute is also lost as soon as the belt is manually opened.

B The HBU-2 series lap belt, used in the A-37, F-5, F-100, F-101, F-102, non-Martin Baker F-104's, F-105, F-106, T-33 and non-ATC T-37's and T-38's has demonstrated these two deficiencies:

1. Belt may not open automatically during ejection, usually due to friction binding of the buckle latching mechanism (belt latch) and the male belt link. The belt must be opened manually by rotating the manual release handle on the top of the buckle. Repeated attempts may be required.
2. Belt may open normally during ejection but due to a design deficiency, the buckle top may strike something on the left side of

the seat (leg brace or ejection hand grip) which rotates the manual release handle sufficiently to release the gold key. Should the gold key be released before its lanyard arms the parachute, the automatic feature of the parachute will be lost. If time permits all the above problems involving either the MA-5/6 or the HBU-2 series lap belts can be overcome by manually opening the lap belt AND pulling the parachute ripcord.

Something you should realize regarding ejections is that they are often traumatic — if not physically, at least emotionally, for a short while. Unless you are exceptionally cool and mentally prepared, you will quite likely be startled, dazed, groggy, confused and disoriented, and tend to hang onto the ejection hand grips. This initial "shock" may last for several seconds or longer.

Should your belt fail to open, tumbling will add to your confusion and disorientation. Unless you have mentally rehearsed this, it may take several seconds before you realize that you are still in the seat and that you are not supposed to still be in the seat. Normal human reaction time is usually not fast enough to beat the system if it works properly; however, since you cannot be sure that it will work properly, you need to make the effort to beat it in order to save a few precious seconds. Look at the manual release handle to be sure you are looking at the right thing, and open it by twisting it, jiggling, turning, shaking or otherwise manipulating it to gain release. Be persistent because it may tend to hang-up. Kick free of the seat. Should your parachute not open, that, too, may not be immediately apparent. Tumbling and spinning may add to your confusion and disorientation. If below 14,500 MSL, look at the parachute ripcord handle and pull it all the way out with one or both hands. If you know you are above 14,500 MSL, pull the automatic parachute arming lanyard ball (Red Apple), instead.

Because of the startle reaction and confusion during an ejection, don't plan on being able to think through the rest of the procedure at the time. What you should do is practice the full emergency procedure until it becomes automatic, then mentally rehearse it before takeoff:

1. Eject.
2. Open the lap belt and kick free of the seat.
3. Pull the ripcord.

Even if free from the seat and below 14,500 MSL, pull the ripcord anyway. That's the only way to ensure you Beat the System — Completely. ■

Don't Let Your Airplane Overload Your

- ☐ Abilities
- ☐ System capabilities
- ☐ Self-imposed limitations
- ☐ All of the above

MAJOR ARTHUR P. MEIKEL, III
Directorate of Aerospace Safety

■ There have been several mishaps this year in which the investigation board cited task saturation as a cause of the crash. I mention the phrase "task saturation" at the risk of losing the entire reading audience. Everyone thinks he knows what it is and how to overcome it, so the normal pilot's "OFF" flag comes out and he flips the page. This type of thinking is wrong. Pilots can't afford task saturation. A task saturated pilot is the famous accident looking for a place to happen. It can be and has been fatal this year.

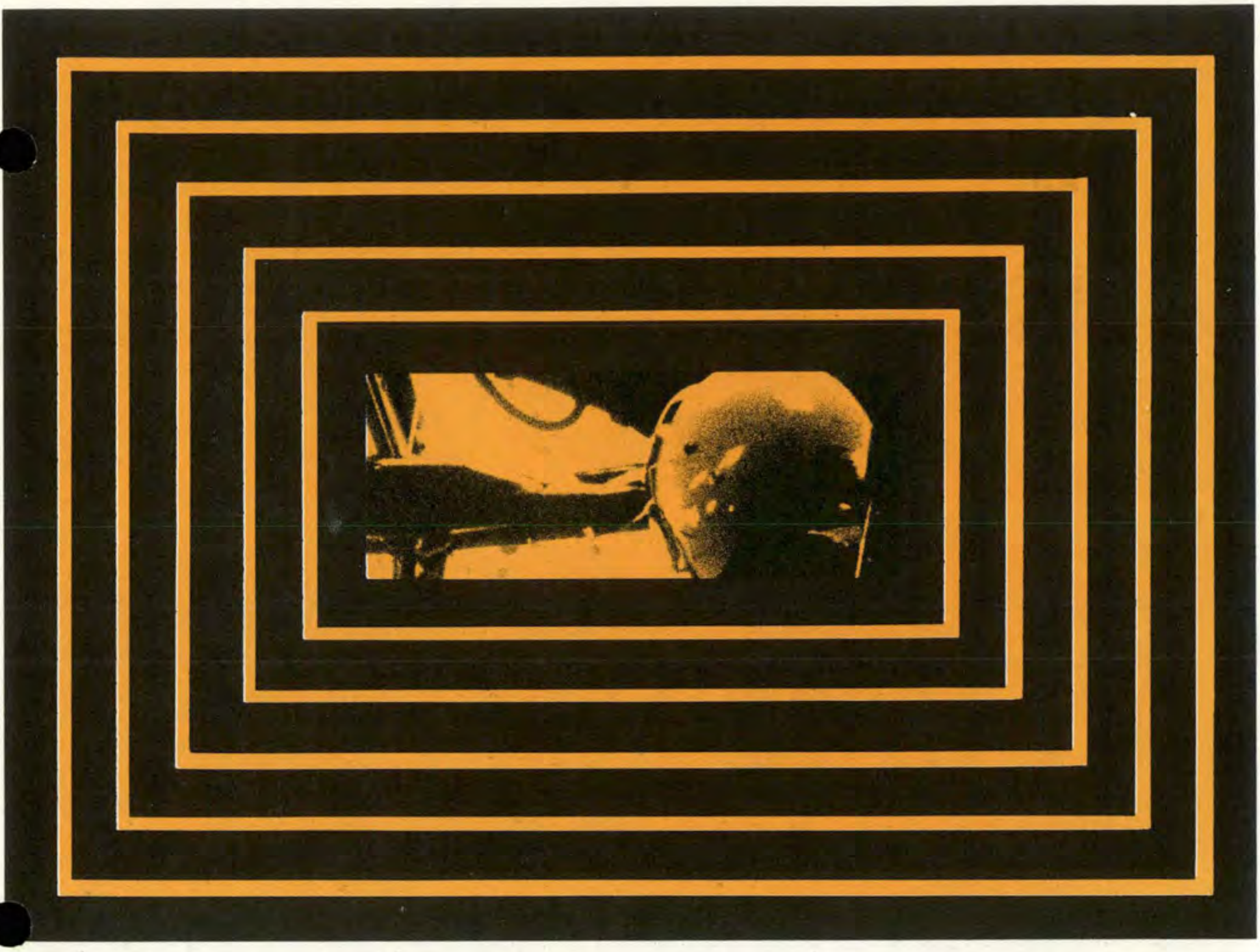
What is task saturation? Let's call it too much to do at one time. Right away the average pilot pictures at least one engine on fire, a low fuel state, IFR conditions and multiple system failures. Right! That is task over-saturation but there are lots of other kinds, too. What over-saturates you depends on a lot of things, for example, experience level. It takes a lot less for someone with little experience to be overwhelmed than those who have been through it all before. Also, someone who has outlined his priorities ahead of time and organized his crew, in a heavy, is in a lot better position to deal with more stressful situations.

A close relative of task over-saturation is direction of attention. The heavy driver who is talking to the flight steward or who is overly concerned with the exact sweetness of his coffee, doesn't have much attention left over to spread among all the things he should be paying attention to. The fighter pilot who is trying to manage fuel, arm switches, and view his map may also be just too busy to clear his flight path at a critical time. It takes all you have all the time.

The solutions are many and simple. They take time and effort. They take place on the ground.

■ Slow down. Pace the mission to match your abilities and experience level. Raise your personal low-level attitude, raise your instrument minimums, stay away from the edges of your envelopes, plan more time between action points or do more planning and study before you fly.

■ Speed up your actions. In a critical situation, there may be no time to fumble for a switch, interpret a gauge or search for a checklist. Take the initiative to get some cockpit or simulator time to speed your motor reflexes, and train your eyes. Highlight your checklist. Further speed can be gained by checklist familiarization and adopting rules of thumb. This



"crew coordination for one" will help you keep up with the aircraft.

■ Improve crew coordination.

Improve your crew coordination by specific assignment of duties during specific circumstances. Talk through planned actions which are beyond Dash One requirements. It's a frightening experience to see both pilots in a cockpit trying to solve an electrical system problem with no one flying the machine. If there were two or more emergencies in that cockpit, there is no telling what would happen. An emergency situation is not the time to ad lib.

■ Set up your priorities. Sometimes in a tight situation you can't do everything. Of course, flying the aircraft is first; however, what you do next can be prioritized by significance. Placing yourself mentally in all sorts of tight spots will speed and prioritize your actions, e.g., if you are on short final in the weather, get vertigo and lose lead, what do you do? Go missed approach? Do you have the gas? Lost wingman procedures? Fly the altitude indicator and continue the approach? Raise the handles? Which? The situations and solutions are endless. The comfort of your living room is much more forgiving than the flight environment. Knowing which checklist to accomplish first (better known as getting your sierra together) and setting up your priorities is a pilot function done on the ground, in the classroom, in the operations shack, or in the alert facility. If you haven't thought out your priorities before you get into a tight situation, you may transition from pilot to a passenger in a projectile.

Task saturation is not acceptable in aviation when it is possible to avoid it. Slowing the pace of the mission, speeding up your actions, improving crew coordination and establishing priorities can all be accomplished on the ground. By these actions, you may be able to turn a task saturated experience into manageable one. These ground actions are individually accomplished. They are dependent on your mission, aircraft, and most importantly, your ability.

One of the most important things you, as a crewmember, can do for yourself is match up your real abilities with the system's capabilities. Establish self-imposed limitations and work to expand them. Avoid getting behind your personal power curve — which mishap investigation boards call "task saturation." ■

Hazards Of LOW LEVEL Flying--part 1

COLONEL GRANT B. McNAUGHTON, MC
Directorate of Aerospace Safety

■ The requirement to fly low level has imposed significant demands on the pilot and reduced considerably his margin for error. The low level arena is a treacherous environment, and since the Vietnam war ended, it has claimed over 150 aircraft and 350 personnel. The facets of this treachery are several. They include anomalies of perception, attention, judgment, knowledge, and discipline. Part I will discuss anomalies of perception or vision.

Vision, the most important of our perceptual senses in flying, is not completely foolproof. Its failures stem from non-perception, height/distance misestimations, and focus-trapping, all of which tend to get us closer to the ground than realized. In addition, some recent research indicates that the apparent size of images can change as a function of the distance to which the eye is focused. Vision can also be impaired by sun glare and by high G, and misperceptions may result from aircraft design. The bottom line on perception is that you can't always trust it — it can sucker you lower than you think. For details read on.

Non-perception Failure to see an object which blends into its background due to similarity of texture, coloring, and lack of contrast. Such foreground masking is enhanced by lighting conditions which reduce or eliminate shadows, as with a high sun angle, beneath an overcast, or in haze. Terrain with insidious elevation changes is particularly deceiving. Rolling forest and desert with their subtle upslopes and propensity for disguising high ground are big players in collisions with the ground. Desert camouflages its obstructions masterfully; desert ranges have already claimed three crewmembers this year. The pilots in those instances most likely did not perceive elevated terrain which blended into the background.

Camouflaging applies not only to the ground and ground objects, but to vegetation and man-made structures as well. The hazard of leafless deciduous or dead trees jutting above the foliage which masks them is well known. Power lines and high towers are a constant threat and have claimed two aircraft and damaged a third this year, killing three crewmembers.

Height (and distance) Misestimation Ability to gauge height/distance is not a natural endowment. It must be learned, and it must be relearned every time a guy checks out an unfamiliar area. Height/distance estimation involves one or more of the following factors: Perspective, definition, and motion related sensations.

Perspective, a function of size constancy, is the gauging of distance by the relative size of some object of known dimension. Confusing the size of the "known" object(s) by which perspective is gained creates a dangerous trap. For example, pilots accustomed to flying over ranges with tall trees or large rocks may be suckered down too low over ranges peppered with short trees and pebbles. A low sun angle can produce long shadows from sparsely populated short trees and create the same trap. Switching from a range where the brush is several feet high to a range where it is only one foot high requires a quick recalibration of the visual system.

The type of terrain influences perspective: The less the perspective, the less the ability to gauge height. Height estimation may be impossible over relatively flat and featureless terrain such as water, snow, dry lake bed, or desert.

A recent perspective misjudgment nearly nailed one of our crewmembers. As the helicopter in which he was a passenger was hovering in for a landing, this steely-eyed saw what he thought was a "dixie cup" bouncing along the runway; he unstrapped and prepared to jump out. In fact, the "dixie cup" was a king-sized Kentucky Fried Chicken carton and the chopper was still 30 feet in the air!

Definition Fine definition of clarity conveys closeness, whereas anything which fuzzies definition conveys a false impression of distance (or height), such as haze, dust, fog, twilight, blowing snow or drizzle. Low level and poor visibility constitute an unhealthy combination.

Motion Related Sensations There are several which can provide limited cues to height, terrain proximity or impending collision.

Motion Parallax, the relative motion of near objects to those distant, is a function of ground speed as well as height. It's a useful height gauge as long as the terrain surface presents some definition. Watch out over calm water, dry lakebed, or snow.

Peripheral visual speed blur results from a combination of speed and terrain proximity which exceeds the fixating capacity of the eyes. Occasionally, a rearward flick of the eyes (pursuit or sacchadic eye movement) will fixate an object for an instant amid the blur, causing a "stop action" or "stroboscopic flash" sensation. These sensations mean that you're low, probably below 30-50 feet.

Engulfment sensation, or a sensation of being swallowed up may occur over certain types of terrain, especially water or dry lakebed, under combinations of enough sink rate to register as such in the peripheral visual fields, and close promimity to the surface. It means you're just about there.

Focus-trapping Each of us has a relaxed accommodation distance known as the dark focus, the distance to which our eyes accommodate or focus if not looking at something other than empty sky, night, or weather. For the emmetrope (guy with "normal" or 20/20 vision), this distance averages about three feet. For the myope (Mr. Magoo types) it is shorter, and for the hyperopes (eagle eyed peepers) it's longer — in fact may be extremely long.

One important consequence of relatively short, dark focal distances is focus-trapping. Any visual stimulus which coincides with the dark focus traps the focus and degrades acuity beyond. You can check this on yourselves with a window screen. Take something you can read at 30 feet and place it about 20 feet beyond the screen. Move backwards from the screen and note whether it tends to go out of focus at a certain distance, and if moving farther backwards, tends to bring it back into focus. If so, that out-of-focus distance is a rough measure of your own dark focus. Should it coincide with the distance between your eye and your windscreen, anticipate that any visual stimulus on the windscreen such as dirt, moisture, gun-gas residue, oil smear, crazing, sunglare, reflection or bug-splatter may trap your focus and degrade your visual acuity for objects beyond the windscreen.

Size inconstancy Another consequence of the dark focus is apparent changes in the size of images. More experimental work needs to be done in this area, but preliminary indications are that when one accommodates far, images enlarge, and when one accommodates near, they shrink. The apparent size change can be as much as a factor of 1.5 in persons with a long, dark focal length. One practical aspect of this phenomenon is that if you accommodate near, either due to focus-trapping or looking at a HUD, objects beyond may shrink somewhat and thus appear farther away than they really are. (Even though the HUD is collimated to infinity, your eye does not necessarily focus at infinity. It may focus only on the surface of the HUD). If things appear smaller, you tend to fly closer. Hardly a year goes by in which some guy on an ordnance pass fails to go unscorable at 12. Could size shrinkage be a factor?

Sunglare and the resulting after-image can impair visual acuity for several seconds — long enough to set up an accident.

G induced visual impairment Positive G's sufficient to produce peripheral visual field contraction also begin to degrade central visual acuity. This was implicated in a recent F-15 crash. Negative G exceeding minus 5 may rupture enough small blood vessels in the eyes to cause temporary blindness. We've had one victim this year, now back flying.

Aircraft design The nose of the aircraft provides the pilot an important reference by which to gauge attitude or to detect subtle changes in attitude, both in pitch and in yaw (just ask any HUN or THUD driver, if you can still find one). Though it is a thing of beauty in all other respects, the A-10, with its rather abbreviated proboscis, denies the pilot this reference, permitting inadvertent undesirable attitudes. This misperception has been implicated in several A-10 mishaps.

Once a visual misperception lures an unwary pilot closer to the ground than he intends to be, or than he perceives himself to be, he is a set-up for a ground-kill. All it takes is a moment's inattention to the velocity vector, although it can also happen to the guy who is perfectly attentive to his flight path.

Vision is the most important sensory input you have, and yet, in the low level arena, you can't trust it 100 percent. That's one good reason for those minimum altitudes. Recognize that it is easier to get lower than you think and recalibrate your judgment accordingly. ■

MY IP

MAJOR GORDON N. GOLDEN
Directorate of Aerospace Safety

■ I'll call him Marty. Marty was my T-38 IP. I sat at his table for six months of my UPT year. I liked him. In my eyes, he was what I wanted to be as a pilot. Professional, good at what he did, with a stability and wisdom beyond his years. He was, after all, only a first lieutenant. That was 11 years ago.

Last week I was working on a special project that required going back through some formal mishap investigations for additional data. There it was, the name sounded familiar, and when I checked the pilot's history, it was him.

I'm sorry to say that I'm no stranger to people I know dying in aircraft mishaps. An IP in my UPT T-37 flight was killed by a bird strike after takeoff one day when we were all beginning to solo. Two of my UPT classmates died in crashes within three years after graduating. Another classmate is a quadriplegic as a result of an aircraft mishap. An ex-squadron mate was killed in a mishap two years ago and another was seriously injured last year when he barely got out of his airplane when the engine failed on takeoff.

That's six shots all pretty close to home in 11½ years of flying, and half of them were pure operator factor. But none of them ever shook my confidence in my abilities as a pilot until I read Marty's name. This man taught me to fly! He was good, and he wouldn't ever do anything "dumb." He flew into the ground looking for the target on a low-angle delivery. If it could happen to Marty, it could happen to me.

I guess that shows how subtle some of the dangers of flying airplanes can be. The recovery altitude on Marty's last pass was double what he was used to, no sweat. But the target was a tough one, a tank among some heavy pine trees. Because Mary had overshot his turn to final in the pop when he couldn't find the target, he was flying an arcing path towards the target area. Due to the arcing final, the WSO could also see the target area. The only problem was nobody watched for the release altitude.

So many of the operator factor mishaps we see have attention anomalies involved, which simply means nobody was flying the aircraft when the mishap occurred. These "anomalies" vary from channelized attention as in Marty's case where everybody is looking for the target to distraction when a pilot sees another aircraft cross his path unexpectedly on a low level.

The point is, someone has to be flying the airplane all the time. In a fighter with one pilot, flying fast and low, the point is really brought home due to the increased workload and the reduced margin for error. The flight parameters are such that even a momentary loss of situational awareness does not give the aircrew a chance to recover or get out.

What am I saying? Fly scared? No, but don't ever get too comfortable in that airplane no matter how good you are or how many times you've done it before. ■

PHIZ QUIZ

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1099th Physiological Tng Flt
Andrews AFB, D.C.

■ *Hey, have you got a few minutes? Here's an easy and fun way to double-check your recall for aerospace Physiology "Phiz." Try your hand at correctly answering the following questions. No, if you get a 100 percent we're not gonna let you sit and read the Wall Street Journal next time you come for refresher training, but you'll probably feel better about unofficially refreshing your memory for "tomorrow's" emergency. Let's do it!*

■ You are cruising at 43,000 feet and begin to notice a clicking sound in your ears and then you hear a loud explosion. The crew-member next to you immediately slumps forward while debris blows aftward violently with accompanied fogging. Your most immediate need is to:

a. Get help for the crew-member next to you.
b. Perform an immediate valsalva.
c. Get on oxygen.
d. Find out what has happened to the aircraft oxygen system.

Response The clicking sound or feeling in your ears is the slow expansion and expulsion of air from your middle ear, an indication that you're losing pressurization. This may be your only clue prior to an upcoming rapid decompression. The loud explosion and blowing debris, of course, confirm that a rapid decompression has occurred. Why the individual next to you has slumped over is not directly clear. Performing a valsalva following a rapid decompression serves no useful function. Yes, it's true you want to help the fellow next to you and you may want to do some trouble-shooting to find out what caused the decompression, but without getting on oxygen immediately, you're not going to last longer than about 7-10 seconds. If you don't get on oxygen first, you will be of no use to yourself or anyone else with you. Your correct response was c.

2 After getting on oxygen following a rapid decompression at 35,000 feet, you and the crew are forced to fly at FL 280 for about an hour to save fuel. During that time, even though you were safely on oxygen preventing hypoxia, a fellow crew-member begins to complain of shoulder pain. Shortly afterwards, the individual claims to be seeing flickering lights and feels unusually fatigued. It is safest to assume that he or she is:

a. Suffering with hypoxia symptoms.
b. Experiencing hyperventilation symptoms.
c. Experiencing the effects of hypoglycemia.
d. Suffering with decompression sickness.

Response Twenty-five thousand feet is the accepted threshold for decompression sickness or "aviation bends," although some cases have occurred at lower altitudes. While breathing 100 percent oxygen can act to wash

continued

Phiz Quiz

continued

some nitrogen out of our body tissues, decompression sickness is still a threat when flying unpressurized at or near 25,000 feet MSL. Shoulder pain is consistent with the normal symptoms of classical "bends" (pains in the joints). Seeing flickering lights and experiencing unexplained fatigue are characteristics of neurological disorders of decompression sickness. Although any number of causes could be suggested, the scenario for decompression sickness has been established. Declare an emergency, immobilize the crewmember and the affected body locations, continue 100 percent oxygen via a thoroughly checked out oxygen system, elevate the legs 20-30° (i.e., treat for potential shock) and begin descent ASAP. With decompression sickness, the condition of your crewmember can deteriorate rapidly with no warning. Your correct response was d.

3 The violent coriolis illusion may occur whenever one semicircular canal of the inner ear is set into motion after another canal has already been set into motion. This dangerous tumbling-like sensation is most likely to occur:

a. When you roll out following a sustained turn under (IMC).
b. While accelerating following a touch-and-go in low visibility conditions.
c. Above sloping cloud layers.
d. By suddenly moving your head while in a sustained turn.

Response The sort of illusion you could expect to experience when you roll out of a sustained turn in the "soup" might be the sensation of turning in the opposite direction even though you're straight and level. Acceleration following a touch-and-go in low visibility conditions can result in the illusion of the aircraft pitching upward. Your unsafe reflex response might be to nose it over to decrease the feeling of a high angle of attack while in fact you're actually flying it into the ground. Above sloping cloud layers is your cue to be on guard for illusions of incorrect horizontal cues. You could let a 30° downward sloping cloud layer convince you that you were flying straight and level right up until ground impact. When you suddenly move your head during a sustained turn, you effectively slush the fluid of your inner ear through all semicircular canals inducing the sorts of impulses your body would experience during a tumbling fall. This could happen whenever you suddenly move your head. By moving your eyes in the desired direction first before you move your head, you can sometimes override the confusing coriolis stimulus of the inner ear. Your correct response was d.

4 Dehydration is a significant contributor to the day-to-day fatigue aircrew members suffer. Which of the following factors are sources of dehydration?

a. Urine and bowel movements, sweating, and "evaporative" insensible perspiration.
b. Low water intake, coffee drinking, and alcohol consumption.
c. Aircraft pressurization systems and breathing aviators' oxygen.
d. All of the above.

Response The human body is 75-80 percent water and is continually faced with the problem of water loss. Urine and bowel movements account for a loss of up to a quart of water a day, sweating in extreme heat can cause the unbelievable loss of up to 4 quarts per hour, and the insensible perspiration or "evaporative water loss" can be intensified under dry conditions such as that found in extreme cold or high altitude flying environments. Most of us don't drink enough plain old water; we'd rather be sipping a soft drink, iced tea, Koolaid, Gatorade, etc., all of which have varying amounts of sugar which can actually complicate water absorption. Strong coffee and alcohol can both have the effect of causing a net loss of water from your body. Some aircraft pressurization systems characteristically provide extremely dry cabin air and, of course, you must lose water to the aviators' oxygen you breathe since your body has to humidify it first (aviators' oxygen is practically waterfree to prevent line freeze-up at altitude). All in all you need to be drinking more water, more often. Your correct response was d.

5 Regular aerobic exercise improves cardiovascular efficiency, aids in weight control, and results in an "improved outlook" on life. All of the following statements are also true except:

a. Aerobic exercise may favorably alter blood chemistry resulting in possibly reduced risk of heart disease.
b. Walking is an effective form of aerobic exercise.
c. Walking, jogging, or running a mile requires about the same number of calories.
d. Walking is not an effective form of aerobic exercise.

Response Regular aerobic exercise has been shown to alter the bloodfat ratios or so-called High Density/Low Density Lipoprotein levels (HDL/LDL ratios) by raising the HDL level towards that characteristic of healthy populations of people unafflicted with heart disease. A good, brisk walk for half an hour or so accomplishes a good basic level of daily aerobic exercise (the heart rate should be elevated to 130-140 beats per minute). Running or jogging burns more calories per hour than walking simply because you go farther; that is, if you run a mile in six minutes instead of walk one in 25 minutes, you're completed sooner. Whether you walk, jog, or run, it still requires about 100 calories per mile. It would require a 35-mile run to burn up one pound of fat; thus, the best means of weight control, unfortunately, remains to just eat less. Your correct response is d which is a false statement. ■

About The Author

Captain Carpenter is an Aerospace Physiologist in the 1099th Physiological Training Flight at Andrews AFB. He graduated from the University of California at Berkeley with a Bachelor of Science degree in Bioenergetics.

X-COUNTRY NOTES

MAJOR WILLIAM R. REVELS
Directorate of Aerospace Safety

■ Rex has been on the road again with a new project officer doing the snooping and prying into transient services. There was a break in visits during personnel changeover and a tour at the Flying Safety Officer's Course, but I'm now on the job full time.

There have been several calls and letters lately from people with complaints about this, that, or the other at Rex bases. Most of the beefs are a product of not notifying the arrival base, or not reading the IFR Supplement.

Most Rex Riley bases come under a state of siege on Friday nights, because cross-country flyers know where the best service is. During these peak periods, transient alert personnel must produce a max effort to handle DV's, provide quick turns, and bed down RON aircraft. If the IFR Supplement states, "Two hour delay during peak periods" then you can count on a two-hour delay on Friday night. To reduce the impact of peak periods *call ahead.* If possible, pick up the phone before leaving the departure base. In any case, be sure to give a pre-arrival call at least 30 minutes prior to landing. Fill out a services critique sheet. Critiques let the right people know where the problems are.

Many quality bases are pressed beyond capabilities during peak periods and need cooperation from the aircrew. Good service comes from a close working relationship between the host base and the flight crew.

Letters to Rex

A couple of incidents surfaced recently through correspondence to Rex Riley.

At Base X a pilot landed for an RON and discussed aircraft refueling with transient alert. He was assured the refueling was well within the capabilities of personnel on the line, and shortly departed for the VOQ. Unfortunately, a shift change took place after his departure, and a non-qualified crew attempted to refuel the aircraft without appropriate tech data. No damage resulted. But there is considerable potential for disaster anytime someone tries to "wing it."

If this incident triggers a doubt among TA supervisors, why not work up an "If you're not sure, call me" briefing for the troops.

Another incident took place at Base Y involving improper drag chute installation in an F-105. An incorrect shackle (P/N 57F331866-1) was mistakenly installed during chute replacement. When the F-105 landed, the drag chute did not deploy due to a jammed linkage. The incident drag chute should have had a smaller shackle (P/N 57F141065-1G) installed, which would have prevented jamming. Transient alert folks should watch out for the large shackle — they should not be used for any F-105 aircraft currently in service.

Help Your Friendly Fire Department

Rex recently received a call from the McChord AFB, Washington, Fire department requesting assistance with their firefighter familiarization program. They would like an opportunity to become familiar with some of the "different" birds which transit McChord. They would like to talk with aircrews about emergency extraction, safety pin locations, potential hazards, or anything the aircrew feels is important. In other words, what would you want a person to know when pulling your unconscious body from a burning aircraft. If you can spare a few minutes after parking, pass the word to Base Ops prior to landing, and the Fire Department will be waiting.

I suspect other bases may also be interested in first-hand training on unfamiliar aircraft. Why not make such an offer a standard part of your normal call to Base Ops — especially if you're flying something new, old, or exotic? If the bad day comes, a firefighter who has first-hand experience along with a

checklist may make a big difference.

Don't Hang Your Hat on The Yellow Line

On a recent stopover, Rex found aircraft parked too close to the taxi line on a very crowded ramp. This was probably due to the fact that the lines were originally set up for fighters, and these were transports. The ramp was also poorly lighted for night operations. The conditions were pretty close to optimum for a taxi accident. Taxi lines are great, but they'll never replace "big eyes" and lots of them.

Howard AFB, Panama, and George AFB, California, are new additions to the Rex list. Both bases have the "can-do" spirit with facilities to match.

Howard AFB may be a bit off the beaten path for many, but the activity I saw there shows a lot of people know the way south. The ramp is large, but sometimes crowded. Excellent coordination between ground control and transient alert makes parking a safe operation. Base Ops, customs, and transient alert keep the "hassles" down for either a quick-turn or stopover. Most transients are billeted off base, but responsive transportation makes the process painless. Once in town, the benefits are great. "Try it, you'll like it."

Howard AFB has an active Rex Riley committee which analyzes aircrew critiques and assigns a "fix it" agency for each problem. Their efforts have made Howard a fine stopping place on the Pacific end of the Panama Canal.

George AFB provides excellent services if you're headed for the high California desert. George also has a crowded ramp, but is well managed by transient alert personnel. All personnel work closely to ensure the crews' needs are met for either quick turns or overnighters. Both on-base and off-base quarters are available, and transients are well served at either. The billeting office is presently being remodeled, so have patience for a few weeks. The results will be well worth it. All the George people are crew-oriented and hard-working. Keep them informed, and they'll go out of the way to help.

Randolph AFB, Texas, is always a good stopping place and continues to be well used by transients. Base Ops and transient alert work well together and are masters of the quick turn.

For comments or suggestions, call AUTOVON 876-2113 or write Rex Riley, AFISC/SEDAK, Norton AFB CA 92409. ■

THE

REX RILEY
Transient Services Award

LORING AFB	Limestone, ME
McCLELLAN AFB	Sacramento, CA
MAXWELL AFB	Montgomery, AL
SCOTT AFB	Belleville, IL
McCHORD AFB	Tacoma, WA
MYRTLE BEACH AFB	Myrtle Beach, SC
MATHER AFB	Sacramento, CA
LAJES FIELD	Azores
SHEPPARD AFB	Wichita Falls, TX
MARCH AFB	Riverside, CA
GRISSOM AFB	Peru, IN
CANNON AFB	Clovis, NM
RANDOLPH AFB	San Antonio, TX
ROBINS AFB	Warner Robins, GA
HILL AFB	Ogden, UT
YOKOTA AB	Japan
SEYMOUR JOHNSON AFB	Goldsboro, NC
KADENA AB	Okinawa
ELMENDORF AFB	Anchorage, AK
SHAW AFB	Sumter, SC
LITTLE ROCK AFB	Jacksonville, AR
OFFUTT AFB	Omaha, NE
BARKSDALE AFB	Shreveport, LA
KIRTLAND AFB	Albuquerque, NM
BUCKLEY ANG BASE	Aurora, CO
RAF MILDENHALL	UK
WRIGHT-PATTERSON AFB	Fairborn, OH
POPE AFB	Fayetteville, NC
TINKER AFB	Oklahoma City, OK
DOVER AFB	Dover, DE
GRIFFISS AFB	Rome, NY
KI SAWYER AFB	Gwinn, MI
REESE AFB	Lubbock, TX
VANCE AFB	Enid, OK
LAUGHLIN AFB	Del Rio, TX
FAIRCHILD AFB	Spokane, WA
MINOT AFB	Minot, ND
VANDENBERG AFB	Lompoc, CA
ANDREWS AFB	Camp Springs, MD
PLATTSBURGH AFB	Plattsburgh, NY
MACDILL AFB	Tampa, FL
COLUMBUS AFB	Columbus, MS
PATRICK AFB	Cocoa Beach, FL
ALTUS AFB	Altus, OK
WURTSMITH AFB	Oscoda, MI
WILLIAMS AFB	Chandler, AZ
WESTOVER AFB	Chicopee Falls, MA
McGUIRE AFB	Wrightstown, NJ
EGLIN AFB	Valpariso, FL
RAF BENTWATERS	UK
RAF UPPER HEYFORD	UK
ANDERSEN AFB	Guam
HOLLOMAN AFB	Alamogordo, NM
DYESS AFB	Abilene, TX
AVIANO AB	Italy
BITBURG AB	Germany
KEESLER AFB	Biloxi, MS
HOWARD AFB	Panama
GEORGE AFB	California

UNEXPECTED

■ The following article, "Crashing the Gate," from the August 1981 *ASRS *Callback* summarizes a problem which can have extremely serious consequences although the article uses civilian examples. The Air Force is not immune. A recent HATR tells of a controller who after clearing a flight of fighters for takeoff, turned to see an aircraft in the flare, opposite direction, unannounced. Fortunately, the controller was able to stop the flight of fighters before anything more serious occurred.

Every one of the problems mentioned could have happened to an Air Force aircraft — even a fighter. Not only pilots are at fault. A couple of the examples are controller problems. But one thing is clear. Approach Control has no responsibility to remind a pilot again to contact tower once they have initially directed the frequency change to tower.

"Unannounced arrivals on the runways under their jurisdiction seldom receive a cheerful welcome from tower controllers; now and then hackles are raised and salty remarks ensue. The frequency of reports to ASRS confessing these pilot misdemeanors — all inadvertently committed and all caused by distractions that interrupted routine procedures — has been increasing. Time to take stock, pilots. Variations on the theme are many; the usual situation involves failure to switch radios from approach to Tower frequency for one reason or another.

■ ". . . copilot was flying; I was working the radios. Approach Control cleared us for ILS. At 1,500 feet we encounterd a birdstrike. Evidently I did not change over to Tower, as the birdstrike distracted me . . . The first time we recognized that we had landed without a clearance was when Ground Control said, "The Tower says you are cleared to land." It is obvious that as captain I should have made sure we were cleared to land, but I also think that Approach should have said something to us. . . .

"Now that would be nice, but it just isn't very often practical. Approach controllers are busy with their own fish to fry, are not necessarily — or even usually — located in the same area as the tower people, and do not monitor Tower radio traffic. Once they have shipped you to Tower, their active concern with you is ended. Some reporters complain that Tower could have let Approach know that you hadn't checked in, but that is asking a lot, too. The local controllers have their own responsibilities — takeoff releases, landing traffic — and are not concerned with you until you make that vital call as you pass the final fix — usually the outer marker.

■ "I (First Officer) was flying. The right windshield heat failed en route and the windshield started frosting up on my side . . . We were cleared for a visual approach to the right runway, to follow a wide-body landing on the left. After turning final it was apparent that my windshield was too frosted for me to land, so I asked the captain to take over. At almost the exact moment he did so we flew through vortices from the wide-body, requiring full control deflection to maintain control of the airplane. I then diverted my attention to cleaning the windshield and monitoring the balance of my approach, and forgot that my function of flying versus radio work had been switched with the captain. We landed while still on approach frequency. . . .

■ ". . . thunderstorms in the area and we had been cleared for the

*Aviation Safety Reporting System

GUESTS

approach with a turn to intercept and an altitude to descend to. We were told to contact Tower at the outer marker. I was flying the approach and monitoring the radar scope and failed to notice that my copilot had not changed to Tower frequency. After landing, we noticed that we were still on Approach frequency. At this time we changed to Tower to ask about taxi routing to the terminal. The answer we got back was: Since we did not bother to get a landing clearance, why bother now? We apologized and did not get a response . . . both pilots were concentrating on the approach and the weather and overlooked the Tower contact over the O.M. . . . Approach Control did not try to give us a call . . . to remind us to call Tower again.

■ "Gear, slats, and spoilers were used to accelerate descent for closer turn-in from a 10,000 foot downwind. The gear seemed excessively noisy, so the First Officer tried looking through the peek hole to ensure that the nose gear doors were closed. Captain was flying and responded to the "cleared for approach call the Tower at the Outer Marker." Checklists were completed and reviewed, but with the gear already down the normal clue to switch to Tower did not exist . . . a safe landing was made without talking to the Tower.

"Get the idea? Uninvited guests are not greeted with joyous cries, even if they have come to the right address. Here's a slight variation: First Officer flying, Captain twiddling the radio knobs. Clearance received at the last minute prevented violation.

■ "Unable to contact Tower until moments before touchdown. 118.35 dialed in instead of 118.20. Frequency was obscured by landing data card and the error was noted by Second Officer. Tower was contacted just before touchdown . . .

"And one more example of a late invitation, this time not the fault of the arriving guests:

■ " . . . Approach advised us two or three times (once after passing Outer Marker) to stay with him for traffic advisories. He had cleared us for a visual approach to follow another large aircraft. We were subsequently cleared to land on the Approach frequency but it wasn't until we were almost at flare height above the runway. This caused no problems, but may have inconvenienced the Tower controller and I feel it is not good operating procedure for flight crews to be asked to switch frequencies late in an approach to land. We switched to Tower frequency, made the landing, and during the roll-out the Tower called us and asked if we were on his frequency.

"A pretty full menu of distractions during those busy last few minutes: Birdstrikes, fogged-up windshields, T-storms, data cards in the way, troublesome gear doors. Sometimes traffic evasion and speed instructions so occupy the crews that they just forget.

■ " . . . At the Outer Marker we lowered landing gear and made a normal stabilized approach and landing. The approach controller never told us to contact the Tower. After landing, I (First Officer) asked for clearance to cross. Approach controller said, 'I don't know; why don't you ask Ground?' "

" 'Landing Clearance' should be, perhaps — and with some airlines is — a 'Before Landing' checklist item." (For AF units, too.) ■

FLIGHT SAFETY CROSSFEED

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

■ There are all sorts of cliches about experience being the best teacher and also on the value of learning from the mistakes of others. That is all perfectly true. Unfortunately, before we can learn we must have access to the experience. That is the purpose of this article.

There is a vast store of experience accumulated in the mishap files at AFISC. The stories of these mishaps contain information which can be useful to anyone who flies. In most cases, the situations in which these crews found themselves will be repeated. Perhaps, therefore, if you know of their experience you will be better prepared to cope with your problem.

These mishaps are factual and presented with a minimum of editorial comment. You should draw from the facts what you need.

Press On — Regardless

▪ The fighter was nr three in a four-ship night, intercept training mission. The first intercept went smoothly. Then with nr three in the lead, the second element began maneuvering for the second intercept. Shortly after this, nr three radioed that the aircraft was in a pitch-up. The WSO ejected successfully, but the pilot was never found.

Analysis of the facts of the mishap point to a failure of both main and standby attitude indicators. The WSO remembers the pilot commenting on the attitude problems prior to the pitch-up. Since the aircraft was not recovered, we don't know why the main and standby attitude indicating systems failed. Nor do we know why the pilot decided to continue a night IMC intercept on the backup system. Apparently, when that system failed the pilot lost control of the aircraft, and without a working attitude indicator could not recover.

▪ A bomber was on a routine training mission. While cruising to the low level entry, the aircraft began to vibrate severely. The crew determined that nr seven engine had failed and was causing the vibration. Later, during the recovery, the IP in the right seat saw nr seven fall away from the aircraft. After that, the landing was relatively uneventful and the investigation started.

It seems that there had been trouble with nr seven engine for over a month. There had been numerous instances of torching and at least one overtemp that was not reported. On the morning of the flight, the crew experienced two overtemps and torching on nr seven but continued with the mission without having maintenance inspect the engine. The overtemperatures damaged the first stage turbine and during flight a turbine blade failed, initiating the damage sequence.

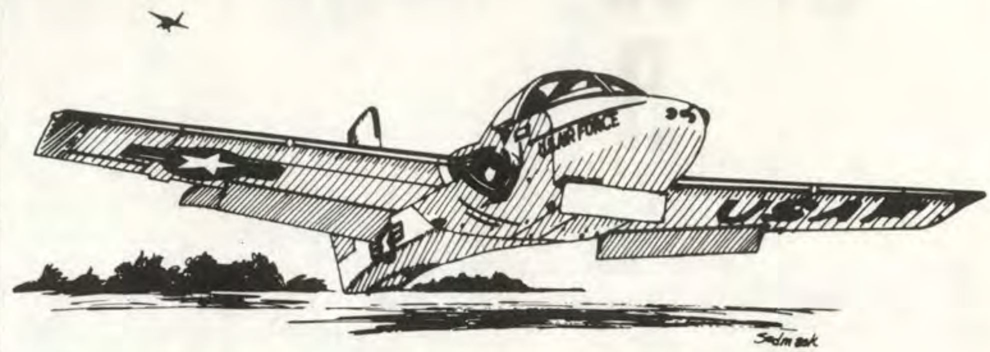
▪ Everything was going well until the F-111 crew decided to go home early due to deteriorating weather and practice approaches. On their second approach, the SOF told the crew to full stop for weather. The pilot had difficulty with the approach not only due to inadequate training in high AOA flight characteristics but also because the landing light was inoperative, something the pilot knew *before* takeoff. Because of the fog, blowing snow, and lack of landing lights the pilot could not adequately judge his descent rate and, due to a misunderstanding of the proper procedures, included a flight control input which led to a porpoise and failure of the nose gear.

Crew Coordination

■ After about 40 minutes of flight, a component of the aircraft's stab aug system malfunctioned. The aircraft yawed left suddenly and tried to roll. The IP in the front seat took control and started a diversion to a nearby base. Believing that the left roll was caused by an aileron malfunction, the IP did not investigate further. During the descent for a controllability check the student pilot in the rear seat misinterpreted a shake of the stick as a nonverbal transfer of aircraft control. Despite properly operating intercockpit communications, he did not question the signal but began attempting to fly the aircraft. His inputs were opposing those of the IP who had not transferred control and was still trying to fly the aircraft. After a few minutes of this intercockpit battle, the IP decided that the aircraft was effectively out of control and directed ejection. Both pilots ejected safely.

■ An F-111 had to abort low level due to weather. After returning to the departure base, the crew entered holding. The AC was advised to hold at max endurance airspeed, so he engaged the autopilot and reduced power to slow to 250 knots. The pilot and WSO then became preoccupied with other cockpit duties and failed to monitor the airspeed. The aircraft slowed to 210 knots and began to buffet and lose altitude. The pilot added power and rapidly increased backstick and thus angle of attack beyond max allowable. The WSO did not question the excessive AOA and the aircraft departed controlled flight. ■

Gear Check, BEEP BEEP BEEP



■ Everything was going well. The two pilots in their T-37 arrived in the pattern at a civilian field and had made six uneventful touch and go's. Then tower cleared the aircraft, without request, for a right closed pattern and instructed "Keep it in tight."

Once on downwind, the T-37 crew was advised that they were nr two to follow a civilian twin turbo prop (a Merlin). The T-37 crew spotted the civilian aircraft on its final approach and were cleared to land behind it with additional traffic behind them. The T-37 was at midfield on downwind, but had inadequate spacing on the nr one aircraft.

Rather than break out and reenter, the T-37 pilot slowed the aircraft to below minimum downwind airspeed to gain pattern spacing. Both crewmembers were concerned about pattern spacing, and neither remembered hearing the gear warning horn. As the aircraft slowed, the AC selected 50 percent flaps and extended his pattern behind the Merlin. This produced a complication since spacing on aircraft nr three was reduced.

The T-37 AC had the options to break out and reenter, extend farther to land behind nr three or, as he elected, roll off the perch in a tight, high power final turn. The pilot dropped the speed brakes and made a gear down call to tower. As the Merlin touched down, the T-37 was on extended final, power up at 110 knots.

As the Merlin cleared the runway, the T-37 was in position to land, and the pilot began a flare. As he retarded the throttle the AC realized the gear was still up. At the same time, the copilot heard the gear horn and commanded a go around.

The pilot applied full power and started the go, but both pilots heard and felt a scraping noise as the aircraft accelerated. The aircraft became airborne and after controllability checks, made an uneventful landing, this time with the gear down.

Part of the problem was that among pilots in this unit it was common practice to vary the sequence of configuring for landing even from pattern-to-pattern. This prevented the formation of a habit pattern for configuration and set up the crew for the gear-up landing once their attention was diverted by the traffic congestion.

As an additional note, the pilot made a gear check call without checking the gear and, because of the high power settings, the standard warnings were negated. ■

On the other hand

■ This story is about a flightcrew that didn't forget to call for landing clearance.

They did, however, forget one other little thing and consequently encountered an outstanding welcoming committee on landing. Because the circumstances in this adventure are sufficiently unique to enable identification of participants, we have asked, and been graciously granted, the chief protagonist's permission to print his report.

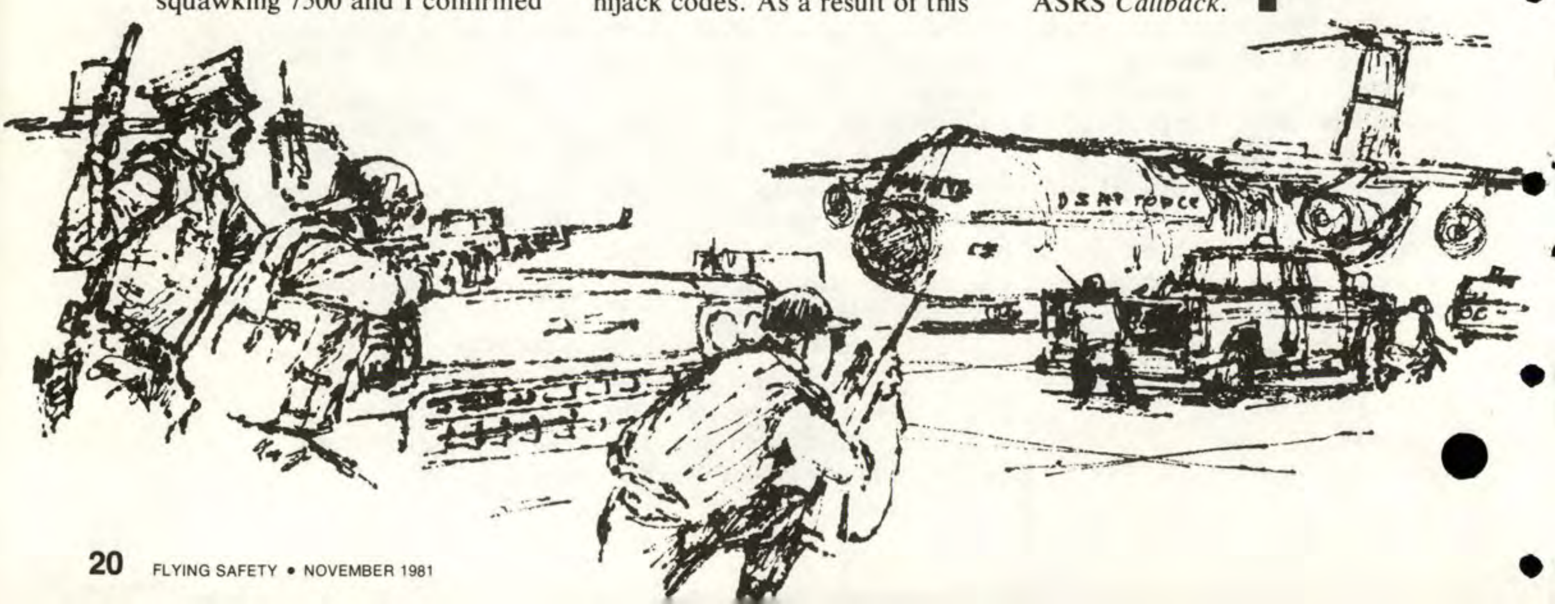
Reporting over XYZ (last point before entering USA), the foreign controller asked us to contact the American center ahead on 125.65, squawking 7500. We acknowledged and complied. The consequence of 7500 went unnoticed until landing, when it became quite obvious.

This doesn't tell the whole story, so we contacted the flight crew. This is what the reporting captain told us:

Center asked me to confirm squawking 7500 and I confirmed without it reminding me that that was the hijack code. The approach was curious in that we received sort of special handling. There didn't seem to be anybody else on the frequency and everything went very smoothly. Tower asked us to roll out all the way to the end of the long runway, which seemed odd. It was only when I taxied off the runway and was surrounded by a phalanx of vehicles and the whole world was there to greet us and someone asked if I knew the meaning of Code 7500 that it dawned on me what had happened. It was then difficult to convince the authorities that the flight was in no way abnormal. Unfortunately, in the papers the next day they correctly spelled my name. . . .

Our reporter also told us that he had been vaguely aware of a hijack code, but is now keenly aware of it. His company made a survey of its pilots and found a large percentage had forgotten the emergency and hijack codes. As a result of this incident, that company is recirculating the information to refresh the memories of all the pilots. Exciting while it lasted — police cars, airport vehicles, FBI, Border Patrol, M-16 carbines, sirens, lights, customs people . . . We recommend our foreign controller friends do a little memory refreshing too. The good book says, "Code 7500 will never be assigned by air traffic control without prior notification from the pilot that his aircraft is being subjected to unlawful interference."

That pilot selected a hot code (unintentionally). You can do it unintentionally too if you're not keenly aware. "When you twiddle the little knob in response to a code-change request, the machinery may pass through another assigned code — or more importantly — an emergency code during the cycling operation. This may activate an alarm . . . "
— Adapted from August 1981 ASRS *Callback*. ■



Smoke and Fumes

LT COL JACK L. STOTTS
Directorate of Aerospace Safety

■ MIL-L-7808 oil which is used in numerous aircraft jet engines gives off fumes which are potentially injurious when heated to 450 degrees C (850 degrees F). Among the fumes' vapors are highly toxic formaldehyde, acrolein, and formic acid. All three irritate the eyes and cause discomfort to the respiratory system. This may explain a possible source of previously unidentified cockpit fumes in several recent physiological incidents.

Fumes from 7807 oil can get into the cockpit through the air-conditioning system as a result of bearing failure or through faulty seals. Timely corrective action on the part of crewmembers to minimize the effect is a necessity. Dash-1 procedures call for 100 percent oxygen followed by various procedures depending on weapon system, ranging from immediate descent through turning off unessential electrical equipment and dumping cabin pressure to jettisoning the canopy.

The point to remember is that when you select 100 percent oxygen the odor may not immediately disappear, due to an accumulation of the odorous material in the oxygen system regulator and delivery hoses. A way to blow out this accumulation is to go to test momentarily while allowing the flow to escape from the mask then going to 100 percent. The short burst of oxygen while in test should remove the build-up and reduce the amount of time it takes to begin to get non-odorous 100 percent oxygen. Give the oxygen system a chance. Some crews have stated that upon selecting 100 percent, the odor remained, so they went back to normal oxygen. That defeats the purpose of the emergency procedure.

Another way to reduce the concentration of the odorous fumes is to remove as much of the offending air from the cockpit as feasible. Shutting down the pressurization system and removing the contaminated air will reduce exposure. Going dump or ram will reduce the total parts per million of the alien odor materials and reduce exposure. The bottom line is, follow your checklist procedure and allow the procedure to work. Blowing out the system by going test should aid in rapidly removing the potential harmful substance from the oxygen system. ■

Mail Call

FUEL CONTAMINATION

■ The article "Guard Against Fuel Contamination" in the August 1981 issue of *Flying Safety* brought to mind a problem related to me by an old bush pilot from the southwest a few years ago. This gentleman owned a Bonanza, and up to the time of the incident had experienced no problems. Suddenly, he experienced symptoms of fuel supply insufficiency while flying at approximately 5,000 feet. He hastily searched out a location for an emergency landing, but by the time he was down to 2,000 feet, the problem vanished and full power was resumed.

Nevertheless, he rapidly found an airport and landed and checked in for service to whatever the cause of the mishap might be. "Everything" was checked, carburetors, fuel lines, etc., and no discrepancies were revealed, so off he went again. But on takeoff he experienced a sudden engine misfire, which again rapidly corrected itself, but the pilot made a quick and safe landing back at the field. Once more a check was made, and this time an inspection of the fuel tank luckily revealed the cause.

Would you believe that there was a small lizard sloshing around in the tank? The pilot remembered then a few hours back when he had refueled at a small backwater field and the hose nozzle, he remembered, had been left lying close to the ground. The cave of the nozzle must have seemed to be an ideal haven for the lizard. It almost caused quite a calamity for that bush pilot. Moral — watch those nozzles. ■

OPS topics

Inadvertent Ejections

■ An old problem has once again come back to haunt us. Recently at a southern base, an F-4 backseater was inadvertently ejected as he selected the open position of his canopy. The culprit in this one was found to be a radar film can which had become lodged in the seat mounted initiator area. Our last incident of this type occurred in 1973, and it was during that time frame that a lot of publicity was given to the hazards of FOD in the F-4 cockpit. Over the last few years, publicity has begun to wane. This may be due to our wrongfully assuming that all are well aware of the problem and are conscientiously picking up all the items either dropped or forgotten in the aircraft. This most recent incident reconfirms the need to stay on this one. Our long, dry spell in FOD-caused inadvertent F-4 ejections may well have allowed us to become complacent. Cockpit FOD is still with us — all must help in minimizing its hazard. A reminder to our life support people, maintenance personnel, and aircrews is definitely in order. — *Lt Col Jack L. Stotts, Directorate of Aerospace Safety.*

Avoidance Vectors

A UH-1 was on an IFR flight plan in and out of IMC. Approach Control advised of traffic at one mile away.

The civilian aircraft was on a VFR flight plan and was not in radio or official radar contact with the Approach Control despite IMC conditions. The helicopter pilots' only other option if they had not seen the traffic was to request an avoidance vector.

A Slight Modification

A flight of two-F-4s was scheduled to drop live MK-82 Snakeyes. During preflight, the weapons load crew and the aircrew attempted to reroute the fin release wire to ensure fuze arming and a high drag configuration regardless of the position of the arm nose/tail switch when the bombs were released. The wires were not routed as specified by T.O. When the bombs were released, those on the outboard shoulder of the TERs opened instantly, damaging the wing tanks on both airplanes.

Over G's

Over G's are on the rise again! The F-4 will dig in in the transonic range and the G's will increase dramatically. In one case, the loading instantaneously increased from 5 to 8.5 G's! In another, top loading was 9 G's. An over G can happen very quickly. And it isn't just the F-4 that is susceptible. No matter how hard the fight, keep the G limits in mind. Training isn't very cost effective if we bend or break the airplane in the process.

Slip N' Slide

A flight of two F-106's was deploying to a forward base. The forecast for their destination included an RCR of IR 16P. Therefore, the pilots carefully briefed recovery procedures. Part of the briefing included a discussion of the actions necessary in the event of an emergency on landing. On reaching their destination and after landing, the second F-106 experienced drag chute failure.

Wing FOD

An F-111 AC was on a transition sortie. After completing a maneuver which required the wings to be swept aft, the AC tried to sweep the wings forward again. As he tried to move the sweep handle forward it jammed and would not move forward of 32 degrees.

The IP took control of the aircraft and the AC started troubleshooting. After effort and conferences with experts on the ground, the AC was able to force the handle to approximately the 28-degree point. Because the wings were still aft of 26 degrees the flaps and slats would not extend, so the IP made a no-flat/no-slat landing.

Once things settled down, maintenance found a turnlock fastener jammed in between the wing sweep handle and the wing sweep track. Once it was removed, the wing sweep handle and wing sweep operation worked perfectly.

F-15C Guard Reception

There appears to be a quirk in the F-15C regarding guard receiver volume. If a pilot selects either UHF 1 or UHF 2 with the guard receiver selector switch, the volume control of the selected radio controls the volume of the guard receiver as well as the main receiver.

Thus, if a pilot follows the fairly standard practice of having UHF 2 at a lower volume and coupling the guard receiver to UHF 2 (first detent on guard receiver selector switch), guard receiver volume may be set too low.

The consequences of such a condition were shown in a recent mishap. If the guard volume had been at a normal level, a gear-up landing might have been prevented.

Post Strike Bomb Damage

The RF-4 was fragged for a mission on three targets, one of which included post strike BDA of a live ordnance delivery by a flight of F-4s. The mission was carefully coordinated and deconflicted. The recce was assigned a TOT one minute after the last F-4's. Everything was going fine, but as the RF-4 crew started their run-in they realized that they would be 20 seconds early.

They modified their run-in and while on a "downwind" saw smoke and dust rising from the target. Then the RF-4 started a turning pop-up to cross the target at 2,200 feet AGL and transmitted a call on the strike frequency that recce was coming in.

Just as the RF-4 was crossing the target, the pilot saw an F-4 pass below the aircraft and almost immediately felt the concussion of a bomb explosion. The RF-4 WSO noted the time as 45 seconds past the assigned RF-4 TOT. After recovery, an inspection uncovered bomb fragment damage to the left variramp and left intake.

Relaxing Your Way to a Midair

A flight surgeon was a passenger in a dual-controlled aircraft. He states that all went well during the brief, taxi, and takeoff. Once established on course, the pilot leaned back, relaxed, and lit a cigarette. The second pilot opened a soft drink and started to eat his box lunch. When the radio chatter quieted, the two pilots began discussing their families, children, school problems, and other related subjects.

For long periods, the flight surgeon states, "I felt as though I was the only one looking for other traffic."

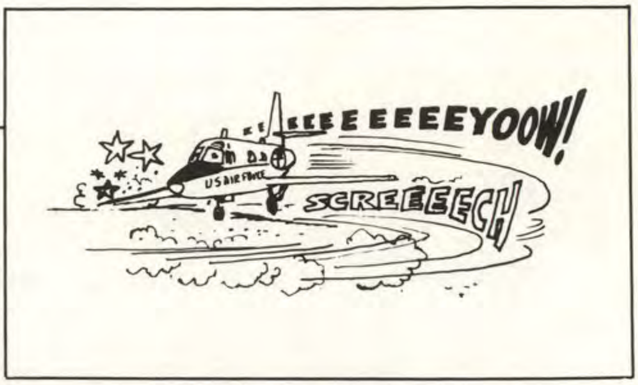
Does this have a familiar ring? It wouldn't happen on any flight in your squadron or unit, would it? It sounds awfully familiar, especially considering the number of near-midairs that are reported. It's called *complacency*. — Courtesy of U.S. Navy *Weekly Summary*.

continued

OPS topics continued

Pop Pop Fizz Fizz

While in a nose-high scissors at FL 290 and 155 kts the AT-38 pilot realized that the left throttle was not at full AB. Without thinking about the nose-high, low airspeed condition the pilot pushed the throttle full forward. The left engine popped and flamed out. The only engine envelope available in the T-38 Dash 1 is for 1 G level flight. Any G loading or maneuvering further reduces this envelope. Since the aircraft's airspeed and altitude placed it outside the 1 G envelope, it was definitely outside due to maneuvering and, consequently, flamed out when the throttle was moved.



A "Quick" Turn

As the CT-39 slowed to 45 knots on landing roll, the copilot engaged the nose wheel steering. The aircraft immediately veered violently to the left. The AC immediately applied brakes to prevent the aircraft from leaving the runway. This was successful but, in the process, the aircraft turned 180 degrees damaging the nose wheel, main landing gear and the right wing tip.

The exact cause of the mishap could not be determined. There were no apparent malfunctions. However, such hardovers have happened before and in many different airplanes. In the CT-39 there is a caution which notes that nose wheel steering should not be engaged above taxi speed and rudder pedals must be neutral. Sounds like good advice.

Maintain Control?

While enroute home from a cross-country, the T-bird pilot discovered that the flight control stick could be rotated about its vertical axis. After landing, investigators found that while the stick could be rotated it could not be pulled out of the control yoke sleeve due to a wire bundle inside the stick.

The reason the stick could be rotated was that at some time the stick grip was installed on the stick with the stick retaining bolt holes 90° out of phase. So, when the stick was inserted into the yoke sleeve, it rested on top of the retaining bolt.

The investigation of maintenance records could not uncover just when the stick was improperly installed, but numerous maintenance and aircrews had inspected/operated the aircraft without discovering the problem.

Another control problem: a C-130 was on a day training mission, the first flight since the aileron boost pump was changed. The aircrew expected some left aileron to be required on takeoff because they had about 5,500 pounds of fuel in the right aux tank and more in the left. After takeoff when fuel was transferred and balanced, the aircraft still required 30° of left yoke for straight and level flight. The crew realized they had a flight control problem. The subsequent investigation revealed that the new boost pack was faulty and, because it is not required by the Flight Manual, the crew did not check for aileron alignment during preflight. ■

How To Stage A Blown Tire Mishap

■ When an F-4E returned to base for landing, the runway was wet and the gusty winds produced a crosswind component of 12 knots. The pilot flew the approach 10 knots above computed final approach speed to compensate for the crosswind.

The aircraft touched down within the first 500 feet of the runway in a wings level crab at 10 knots above planned speed. The pilot deployed the drug chute, positioned the stick forward and left against the crosswind, then began hard braking.

Shortly after that, the crew heard two "pops" and began blown tire emergency procedures. The aircraft began an uncontrollable skid and departed the runway, collapsing the right main gear and finally coming to rest in soft dirt just off the runway some 4,000 feet after touchdown.

The investigators of this mishap found all the classic factors which contribute to a blown tire. It had been raining all night, and in the hour prior to landing over one-third of an inch had fallen. The runway was a combination of concrete landing areas connected to porous friction surface after about 1,500 feet. The landing zones were heavily coated with rubber deposits. The pilot flew a higher speed on approach to compensate for gusty winds, but then did not transition to onspeed before landing.

The design limitations of the Mark III antiskid system also were players in this scenario. The system begins to operate when the wheels are turning faster than 15-20 knots. Below that, speed braking is directly proportional to pedal deflection. There is no antiskid protection. Since the system uses wheel rotation speed to determine the need for antiskid, in a hydroplaning situation the system can be fooled. As wheels slow to below protection speed, the system cuts out. The other protection feature is at touchdown. The system prevents braking (even if commanded) until three seconds after weight is sensed on the right main gear or the wheels spin up to 50 knots.

In this case, the aircraft touches down on a wet rubber-covered runway at almost the ideal hydroplaning speed. Then, due to hydroplaning, either the wheels never came up to a speed which triggered the antiskid, or after the hydroplaning started, wheel speed decayed to below protection speed, fooling the system and having the system cut out. This meant that when the aircraft commander initiated heavy braking he had no antiskid protection. The wheels stopped and, as the aircraft crossed onto the porous friction surface, the stationary tires wore through and failed. After the tires failed, improper responses to the emergency made the runway departure inevitable. ■

TRIPLE R

MAJOR FRED HAGGARD
6510th Test Wing
Edwards AFB, CA

■ Once air forces began protecting combat aircraft assets in hardened shelters, the most effective way to prevent aircraft from operating was to destroy essential runways and taxiways. There has been much attention devoted to developing munitions capable of destroying a runway's usefulness.

For every offense there is a defense. In this case it is Rapid Runway Repair — Triple R. The concept of Triple R is to rapidly evaluate damage to an airfield, repair the damage, and be able to launch tactical aircraft as soon as possible after the attack. The Air Force has been involved in research and development of Triple R capabilities for five years. New technologies and procedures have been discovered. But before they can be used, they must be tested.

The testing of Triple R capabilities has been an on-going program. The aircraft side of it, known as HAVE BOUNCE is designed to ensure that contingency or repaired surfaces can be safely used by aircraft for launch or recovery. The Air Force Engineering and Services Center, Wright Aeronautical Labs and the Air Force Flight Test Center have been conducting tests since 1978 using F-4s, C-141s, and C-130s. In the future, tests are planned for A-10s, F-15s, and F-16s.

By 1980, the test program had progressed to the point where a full field test of interim repair procedures could be considered. To conduct the test the agencies involved selected an isolated location in South Carolina. Previous tests had always used simulated damage. Now, for the first time, the test would demonstrate repair capability in an operational environment and, more important, the ability of an F-4 to operate over an actual repair.

As mentioned before, previous tests had been conducted over simulated repairs. These tests involved both AM-2 runway repair mats fixed to a runway surface to simulate large craters and small unrepaired craters or spalls. These tests had shown that the F-4 could operate from repaired fields but there appeared to be definite limits. Now the operations would be confirmed in a realistic environment.

Below left. The C-130 test was completely successful. Below center. The test instrumented F-4 crosses a large repaired crater at 140 knots on takeoff roll. All the tests, takeoff and landing, were successful. Below right. C-141s have successfully operated over repairs at Edwards AFB, CA.

Above left. Once a runway has been hit, the repair starts with a careful evaluation of the damage. Above center. Where possible, much of the hole in the runway is filled by pushing the debris back into the hole. Then, additional specialized repair is done. Above right. The repair is finished and a rubber/fabric FOD cover is installed ready for the test.

North Field, South Carolina, was selected so that for the first time the damage would be caused by actual explosive charges. The tests were conducted as a part of an Air Force Engineering Services Center base recovery after attack exercise. The charges were exploded as a part of a simulated air field attack. The resulting craters were approximately 20 and 35 feet in diameter. They were spaced 500 feet apart and, for the purpose of the test, both were located on one side of the runway.

After Disaster Preparedness, EOD, and Civil Engineering personnel assessed the damage, prepared the repair plan, and cleared the simulated dud munitions, then the actual repair work was accomplished. Once the repairs were complete, the F-4 operational tests were conducted.

The F-4 was an Air Force Flight Test Center (AFFTC) F-4E specially instrumented to measure loads encountered while operating over the repairs. The aircraft was manned by myself as flight test pilot, and Captain Dave Lenzi, flight test engineer.

The aircraft was prepared for the test at Shaw AFB, South Carolina, and obtained inert MK-82 munitions from Seymour Johnson AFB, North Carolina. Operations between these two bases had to be conducted with the landing gear fixed down due to the special instrumentation installed on the aircraft. This made for unusual operating conditions for the F-4.

After the F-4 was completely instrumented, it was flown to Seymour Johnson AFB to pick up the munitions and then flown to North Field, South Carolina. Initial landings were made on the undamaged half of the runway. The first runs over the repairs were made at constant taxi speeds between 20 and 80 knots to verify predicted loads. When the predictions were verified, a series of takeoffs were accomplished so that the repairs were encountered at desired speeds during acceleration for takeoff.

All takeoffs were made with the F-4 loaded to approximately 53,000 pounds. All the runs were uneventful from the pilot point of view. Running over the repairs was very similar to running over a barrier cable in intensity, but for a slightly longer period.

Following the takeoff tests, the munitions were downloaded, and landing tests were conducted at representative landing weights. These tests consisted of touch and go landing encountering the repairs at certain speeds and full stop landings using the drag chute to decelerate across the repairs. The reaction of the aircraft to the repairs was even milder at the lower gross weights than at the takeoff weights.

A C-130 from Pope AFB, North Carolina, conducted operations over the repairs similar to the F-4 with identical results. The C-130s were exposed to much more severe conditions during operations on dirt strips during the Vietnam conflict.

The North Field tests showed conclusively that the capability to repair bomb damaged runways exists, that the repairs can be made in a timely fashion, and that F-4s can operate over the repairs without structural damage. ■

CAPTAIN
William Murphy

CAPTAIN
CLYDE Ayer

CAPTAIN
Myron Williams

SERGEANT
Jerry Williams

305th Air Refueling Wing
Grissom Air Force Base, Indiana

■ On 14 February 1981 Captain Murphy's aircraft was number three in a ce 11 of KC-135s ferrying F-4Js to California. Approximately 950 miles from coast-in, one of the F-4s lost oil pressure and shut down the starboard engine. The single engine F-4 could not maintain altitude or airspeed. Captain Murphy immediately diverted his aircraft from the cell, cleared the consolidated track system, and initiated an emergency descent to FL 150 to accompany the crippled F-4. McClellan Airways was notified of the emergency and an HC-130 was launched to intercept the new cell. Since the single engine F-4J could not maintain airspeed and take on fuel, Captain Murphy tried a toboggan refueling. This was also unsatisfactory because the drogue became extremely unstable. By this time the F-4 was getting low on fuel. Captain Murphy directed the F-4 to the contact position at air refueling airpseed and as he started to take fuel, the tanker crew reduced the airspeed to just under 250 KIAS. Using this technique, the F-4 was able to onload fuel. Three air refuelings were accomplished in this manner. Captain Murphy's crew also conducted a perfect overwater intercept rendezvous with the HC-130 so a rescue aircraft was available if needed. Because of their outstanding judgment and knowledge in reacting to the F-4 emergency, Captain Murphy's crew clearly averted the loss of a valuable aircraft and crew. WELL DONE! ■

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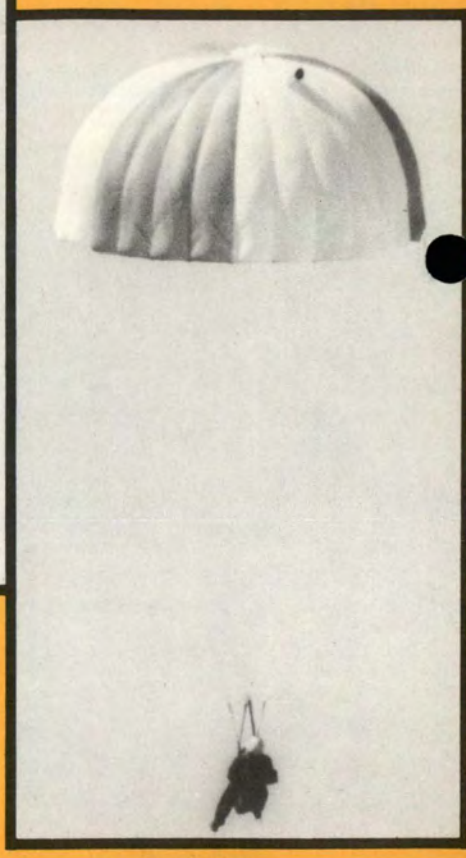
Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Accident Prevention Program.

CAPTAIN
James F. Burho

33d Tactical Fighter Wing
Eglin Air Force Base, Florida

■ On 19 March 1981 Captain Burho was flying a functional check flight (FCF) on an F-15A aircraft. During checks of the autopilot, the F-15 began to oscillate slightly in pitch. During a subsequent check of the pitch CAS the aircraft pitched up violently, requiring a large forward stick input to regain control and reengage the pitch CAS. As the pitch oscillations continued, Captain Burho noted fluctuation in the pitch ratio gauge and selected emergency, but the pitch oscillations continued. He then terminated the FCF and began an RTB, calling another FCF flight to join him as a chase. As Captain Burho slowed to 250 KIAS the oscillations increased to five degrees and became increasingly difficult to control or damp. He attempted to reset the pitch ratio switch, but this worsened the oscillations so he decided to leave it in emergency. When the gear and flaps were lowered for a controllability check, the pitch oscillations increased again. He determined the F-15 was absolutely uncontrollable below 230 KIAS. The flaps were raised and he decided to make a practice approach at 250 KIAS (approximately 13 units AOA) to Runway 30 at Eglin AFB. Encountering extreme difficulty with pitch control, Captain Burho increased his approach speed to 270 KIAS on the second attempt but when he slowed slightly approaching the threshold the F-15 pitched up then down violently and he went around, using full afterburner. A third approach was flown verifying the requirement for a minimum 260-265 KIAS approach speed. On the fourth approach Captain Burho landed the aircraft at 260 KIAS, fighting oscillations all the time, in a nearly three-point attitude. On the runway, he had to counteract drift caused by gusting crosswinds and managed to slow the F-15 to 130-140 KIAS prior to engaging the departure end BAK-12. Captain Burho's superb airmanship and determination saved a valuable aircraft and averted the possibility of serious injury or loss of life. WELL DONE! ■

BEAT THE



SYSTEM