flying

SAFETY JANUARY 1984

Winter Flying
Keep Your Warm
Fight Safely

AN INTERVIEW WITH THE INSPECTOR GENERAL

IFC IS BACK

■ The Instrument Flight Center (IFC) was reestablished at Randolph AFB, Texas, on 1 October 1983. The IFC will be the Air Force central focal point for all instrument flight-related matters. An initial cadre is in place at the Center and full operations will occur by 1 February 1984. When fully manned the IFC will have representatives from all operational commands with experience in the latest frontline combat and support aircraft.

The IFC will have three divisions with the following responsibilities. The Flight Directives Division will be responsible for AFM 51-37, Instrument Flying; AFR 60-16, General Flight Rules; AFR 60-19, Volumes I through IV, Pilots Annual Instrument Refresher Course; and AFR 60-27, Instrument Procedures. The Instrument Procedures Division will develop Air Force policy on AFM 55-9, Terminal Instrument Procedures (TERPs); act as the final review authority for USAF instrument procedures requiring waivers to TERPs criteria, and develop, for HQ USAF approval, the Air Force policy concerning the ICAO Standards and Recommended Practices and NATO TERPs. The FLIP Requirements Division will analyze and refine the Air Force position concerning DOD Flight Information Publications and coordinate with US Army, US Navy, and the Defense Mapping Agency representatives to ensure accurate, timely, and usable flight publications. In the future the Center plans to again publish monthly "IFC Approach" articles containing instrument-related information. Also, the ground work is being laid for an improved version of the Instrument Pilot Instructor School (IPIS).

Your help is needed for the IFC to accomplish its mission. If you have questions about instrument procedures, techniques, or recommendations for improving any aspect of instrument flying, the IFC needs to hear from you. Call at AUTOVON 487-5071, or write: USAF Instrument Flight Center, Randolph AFB, Texas 78150.

Editor's note: P.S. Welcome back — you were missed! ■

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flying

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

An Interview With The ★★★ Inspector General

CECILIA PREBLE
Assistant Editor

Lieutenant General Robert W. Bazley, the Inspector General of the Air Force, is a command pilot and navigator with more than 4,500 hours in a variety of aircraft. He assumed his present duties in July of 1983 coming from the position of vice commander in chief, USAFE. In this interview, conducted in late November, General Bazley gives his views on flying safety, readiness, and the direction Air Force flying safety is going.

■ **For the past 2 years, the USAF has set new records in reducing the Class A aircraft mishap rate. What do you see as the reason for this success?**

There are numerous reasons and it has been an evolutionary process over many years. First, we *hope* we're going to set a new record this year. We have a month to go but it looks very, very good. The improvement and progress in flying safety is overwhelming.

When I was a young fighter pilot the major accident rate was about 55 per 100,000 flying hours. We had about 2,000 fatal accidents a year and that was a tragic loss, in addition to the airplanes we lost; the people themselves were irreplaceable and you can't put a dollar figure on them.

Since then, which includes the beginning of the jet age, we've gone from 55 per 100,000 flying hours, down to what we did last year — 2.33. I thought we'd never get there. In fact, until recent years when we got down to a rate of 3, I thought we'd never get below 10.

But how has it happened? A whole litany of reasons: one, design of aircraft, their stability, and the way they fly. The new airplanes fly better, they're more sophisticated, more maintainable and they're a lot more capable.

We *think* safety. Our safety program starts with the concept of a new airplane and its design. Brig Gen Williams, the Director of Aerospace Safety, has his people involved in that process so that we follow a weapon system throughout its life.

Our safety program is essentially one of prevention. That's the only reason we have it, to preclude recurrence — striving to avoid the same dumb mistakes that kill people and destroy airplanes. But there are a lot of other factors.

One critical area is discipline. Probably the most disciplined people in the Air Force are the flyers. People sometimes look at pilots in terms of white silk scarves in the wind — as an undisciplined lot. Wrong! When they strap these modern airplanes on, they *have* to be disciplined. Their missions and weapons systems are very demanding. When they fly in the tactical world, they're relying on each other — second by second, minute by minute. Discipline and trust are essential.

Related to discipline, we've made great progress in standardization. When I was a young flyer, there were a lot of prima-donnas. I don't mean to berate those people. That was our environment — the way we were brought up — and we were all individualists. We need individualists in combat, but we've learned how to standardize without stifling. We're concentrating on the things relating to fighting and winning or readiness, versus showboat and macho kinds of things.

The training at all levels, both for the ground crews and support people, as well as the flyers themselves, has improved tremendously. Safety is involved in all the training now. So our lowered mishap rate is a function of all these things. The materials are better, the designs are better, and the people are better. The result is a marvelous safety record.

As the IG you are very concerned about how we in the Air Force maintain our capability to perform the mission. What do you see as flight safety's contribution to readiness?

An exciting element of where we are and what's happened, say over the last 35 years, is that along with this tremendous improvement in safety where we have saved lives and resources, we have also continued to improve the training of aircrews and ground crews, making it more realistic.

Again, going back to the early jet age, we really didn't train well for combat. Now we have Tactical Air Command's Red Flag and other exercises and programs where aircrews and the ground crews are exposed to a very demanding environment. We train them the way we expect them to have to fight.

There are other programs such as the air combat maneuvering instrumentation range, where we can put aircrews in mock battle in peacetime and train them in a realistic wartime atmosphere. After flight, our new technology enables us to perform accurate critiques and debriefings of just what happened, why they won or lost. It's a highly productive learning process for the aircrews which is going to pay off if they have to go to combat. They're flying the airplanes harder and better than we ever flew them and yet we've had this astounding safety record.

Now what does that mean to readiness? One, we're losing fewer planes and aircrews (and the second part of that *is* the most important) in peacetime than we ever have before. Today, training our modern aircrew members is such a lengthy and expensive process that they have become increasingly important resources, aside from the fact that they're human beings and irreplaceable. When you consider the weapons systems, the airplanes, with inflation raising the cost of materials and production, each individual airplane is so much more expensive. Yet our budget hasn't kept pace with inflation — or the increasing threat — so each airplane becomes more valuable to us. We need it for combat readiness. Our safety awareness has therefore enhanced readiness because we've saved and preserved our resources in case we need them for combat.

In the mid 50s we were destroying something like two aircraft *a day!* That was a terrible loss of resources. Quite often we lost the pilot because the egress systems weren't nearly as good as they are today. With him we lost all the training and experience we needed for the supervisors, flight leaders, those kinds of people.

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An Interview With The Inspector General

continued

Clearly, there's a direct correlation between successful safety programs and readiness.

In recent years mishap statistics have indicated that human error rather than equipment failure is the major cause of flight mishaps. What are your thoughts on how we can attack this problem?

As discussed earlier — in the past we experienced a great deal of material failure and insidious design problems. We had a lot of maintenance errors resulting in accidents. These problems are easier to handle than what happens between our ears with that computer that God gives us. With standardized procedures, advanced technology, improved training, experience and better products, we've almost eliminated materiel failure and design faults. Once in a while it crops up and then we have to come up with a safety modification because of an unexpected defect. But in relative terms we've really minimized mishaps caused by materiel and systems.

The human factor elements are a little harder to handle because we're all so different. I think although the data shows that human factors are a big part of our current safety problem, we have to understand that we've driven the human factors mishaps way down too. Going back to those rates in the 50s we see that a lot of those were human factors mishaps caused by inadequate training, discipline, and standardization. We've made those improvements. The rates are so small now that although the percentage of human factors is high, it's still a very small rate. I don't mean to rationalize it away. Our target should be zero, of course, and that is our objective, but the human factor is going to be the most difficult to solve.

We must also consider the stresses of our modern aircraft and flying missions. They're sophisticated, high performance, and demanding on the body, mentally and physically. We don't want our aircrews to be robots or machines. They're human beings, they have family, they have children, they have distractions; we want them to enjoy their lives — not just be dedicated to flying that airplane in combat. We don't want

We can't become complacent about this great success we're having in flying safety. It's a never ending problem and the supervisors, the commanders, the leaders, the technicians and flyers need to be constantly aware of it.

to, we *can't* control them as machines. We're going to have to live with a certain element of human factors. If a pilot has a bad night, perhaps doesn't feel well but is not sick enough to go to the doctor and as a result, he kills himself, the cause will be hard to identify after the accident, just as it was hard to detect on the part of the supervisor before the flight.

We need to improve education, and focus on teaching the flyers how important the issues are. They're bright people and hopefully they'll listen to that guidance. Much of this is a matter of personal commitment; *they* have to take the action. There are things technicians and supervisors can't see or feel and so much is left to the individual that we're sort of at their mercy.

This is not a way of rationalizing again, but these are the toughest kinds of safety problems to work, whether in the air on on the ground. There aren't any easy answers.

Are there any new developments in hardware or equipment which you believe can further improve our ability to accomplish the mission safely?

Yes, I think we'll continue to see improvements because we are involved in weapon system development, right up front from a safety aspect. The people who design our airplanes in the private sector as well as in Systems Command and the Aeronautical Systems Division, are very safety conscious and have safety professionals working with them. So we're always thinking in those terms.

With the newer aircraft, the tendency to repeat safety mistakes in development of weapons systems is minimal. However, with the advances in capability of some of our systems, we may have encountered new safety problems. For example, the F-16, designed to fly at 9 Gs, has put pilots in a whole new environment. In some cases, we're at the limit of what pilots can handle as to G load. So advances in technology and performance are going to give us some new safety problems. We don't know how to solve the G problem yet. Each individual has different levels of G tolerance. It's a little like hypoxia, some have different responses, some have different tolerances. But the G load is a new problem we're facing as new weapon systems are developed.

One technological development that promises to improve safety is the crash survivable flight data recorder, which is within the state of the art. It won't prevent the accident from happening but can provide information we need. It will enable us to look at what went wrong with the pilot or airplane to preclude a recurrence. We need that kind of device and we're working hard to get it into our new airplanes. Maybe we can't prevent the accident that moment, but we can prevent the same accident from occurring again.

We in the safety world need to convince senior leadership, the operators, and the users that the

crash recorder is an important investment. I personally think it is. We need to be able to articulate that and sell it as we develop programs for new airplanes. For example, the B-1B is going to be a very expensive airplane, per unit cost. The latest state of the art crash recorder is a very sophisticated device and relative to the cost of one airplane, it's very inexpensive. If we lose a B-1B, and statistics tell us that we will lose one someday, and we *have* a crash recorder on it and can really learn something from that mishap to preclude it happening to the second B-1B, the device for the whole fleet of airplanes would pay for itself, quickly. So that's a device we need, not just in the B-1B but in the other aircraft the Air Force buys and flys.

What are the flight safety issues on which commanders and aircrews should concentrate in 1984?

Human factors. Now we can't let up on any of the other areas either, but we should focus on human factors in the air and on the ground. Another area of concern is the result of the terrible retention problem we experienced a few years ago. We lost a lot of experience and talent. Now we have many young people out there, well trained and dedicated but relatively inexperienced. The young crew chiefs on the flight line or the munitions/weapons person can do something wrong safetywise that could easily jeopardize the airplane or the aircrew. So we back them up with constant vigilance, discipline, good procedures, good checklists, good directives and good training. The Air Force has a marvelous record of continual improvement in all those areas. I guess what I'm trying to say is we can't become complacent about this great success we're having. It's a never ending problem and the supervisors, the commanders, the leaders, the technicians and the flyers need to be constantly aware of it. Again, we should be pleased with what we've done and where we've come but not get too excited about our press clippings and become complacent. It's a constant problem, mainly centering on the human factors area, both on the ground and in the air.

What plans do you have for new initiatives for flight safety as the Inspector General?

The Air Force Inspection and Safety Center is working on a couple of things that could be exciting and very difficult. One specific area we're reviewing is our pilot selection process. We really don't have a structured process, a preselection screening process. How do we know that one applicant is more qualified to become an aircrew member than someone else? We haven't figured that out. Other air forces, other nations have done a lot of work on that. We're reviewing their findings. Whether we'll ever be successful or not and, if we *do* develop a different selection process, whether it'll be the right one and successful, is really hard to say, again because we're dealing with individual human beings. It's an interesting project but when or if it'll ever be completed, I don't know.

Is there anything you would like to add?

I think a lot of credit for our great success belongs to our whole Air Force team. Our success tells a lot about the nature of the Air Force; the support elements as well as the "quarterback" flying the airplane. It takes the whole Air Force to have that kind of flying safety success. As we've improved training and made it more realistic, as we've put more demands on both the ground and aircrews, it's absolutely astounding to me, I don't think that's an overuse of the word, that we've reached this point. But as we've had this great success, again I caution that we should be very pleased, and excited about it, but not relaxed. It's a never ending requirement that we be vigilant about safety, not only the commanders and the supervisors but everyone on the team. Safety is the responsibility of everyone who has anything to do with the airplane taking off, landing, and operating. We're talking about a lot of Air Force people when we talk about the operation of aircraft. If we have the success it appears we'll have in this calendar year, we're going to have a tough target in the future but it's a worthwhile target. That target should be zero. Continued vigiliance is the bottom line and with the kinds of people we have in the Air Force, I'm optimistic. ■

Winter Flying

"Be Prepared"

1LT PAUL CARSTENS
5021 TOS
Elmendorf AFB, AK

■ You can't deny it. The long days of summer have transitioned into the depths of winter. The leaves have fallen as has the snow, football is over, and the birds have all headed south. So then, the time is ripe to review cold weather procedures.

If you retain no other truth from these words, by all means remember this: Nothing that Mother Nature can muster will do you more harm than your lack of preflight preparation.

All phases of flight can be adversely affected by winter conditions but none can spoil a mission faster than a surprise destination weather condition or sudden need of a suitable alternate. Matters of particular concern during preflight planning should be enroute and destination weather, barriers, NOTAMs, RCR's, and Dash 1 guidance on cold weather ops.

You, as the pilot, must have a thorough understanding of weather conditions you may encounter. Your route of flight, cruising altitude, alternate or emergency airfields, or perhaps your go-no-go decision is dependent on this knowledge.

Destination weather may be more difficult for the weather people to predict in winter because snow lowers visibility more than rain and can be more dense in hidden pockets. In coastal areas, the phenomenon of cold fog can be very deceptive and can sweep over an airfield within minutes. Be pessimistic and plan good contingencies for adverse weather. Read on for more things to think about when planning a mission during winter.

During climb and cruise through clouds, icing accumulation can cause engine damage, reduce lift, increase weight, and raise the stall speed while narrowing the stall warning margin. The most positive way to prevent icing is to avoid clouds. If in the clouds, expedite your climb and get in the clear so the ice can sublimate.

Obtain current destination weather well before the descent is begun. Weather conditions lower than forecast reflect a trend not in your favor. If the weather is close to your minimums, review divert procedures and use a fuel optimizing letdown.

Plan your descent profile early with particular emphasis on preheating the wind screen. Ask about the RCR and barrier status. Confirm that you have correct landing data and if it could be a close call, decide *then* that you are going to engage a barrier or perform a minimum roll landing. Before take off, you should prepare mentally for the landing phase by reviewing Dash One procedures concerning

Winter Flying

continued

landing on a slick runway.

Be wary of crosswinds and low RCR's. Singularly they can be no sweat. In combination they can spell disaster. Reported RCR is an average of the entire runway length and may only be valid a certain distance from the runway centerline. As a general rule, when the crosswind component exceeds the RCR, caution should be exercised. Never try to bend rules established by the MAJCOM or flight manual concerning these situations. Continue to "fly" the aircraft onto the runway and throughout the landing roll, using flight controls to keep on centerline. Come to a very controllable taxi speed before attempting to turn off the runway.

Once the planning and briefing stage is completed, I recommend the flight step 10 to 15 minutes earlier than normal in order to make the scheduled take off time. Clothing requirements, warmup time during preflight, de-ice, and

slow taxi speeds are delays not encountered during warm weather.

Preflight precautions will pay large dividends in preparing your aircraft for flight. The canopy should be free of ice and frost, preferably removed by hot air. Be sure water is wiped away so that it does not refreeze on static ports or electrical connections. An easier and cooler start may result if the engine is preheated by placing a hot air hose in the intake.

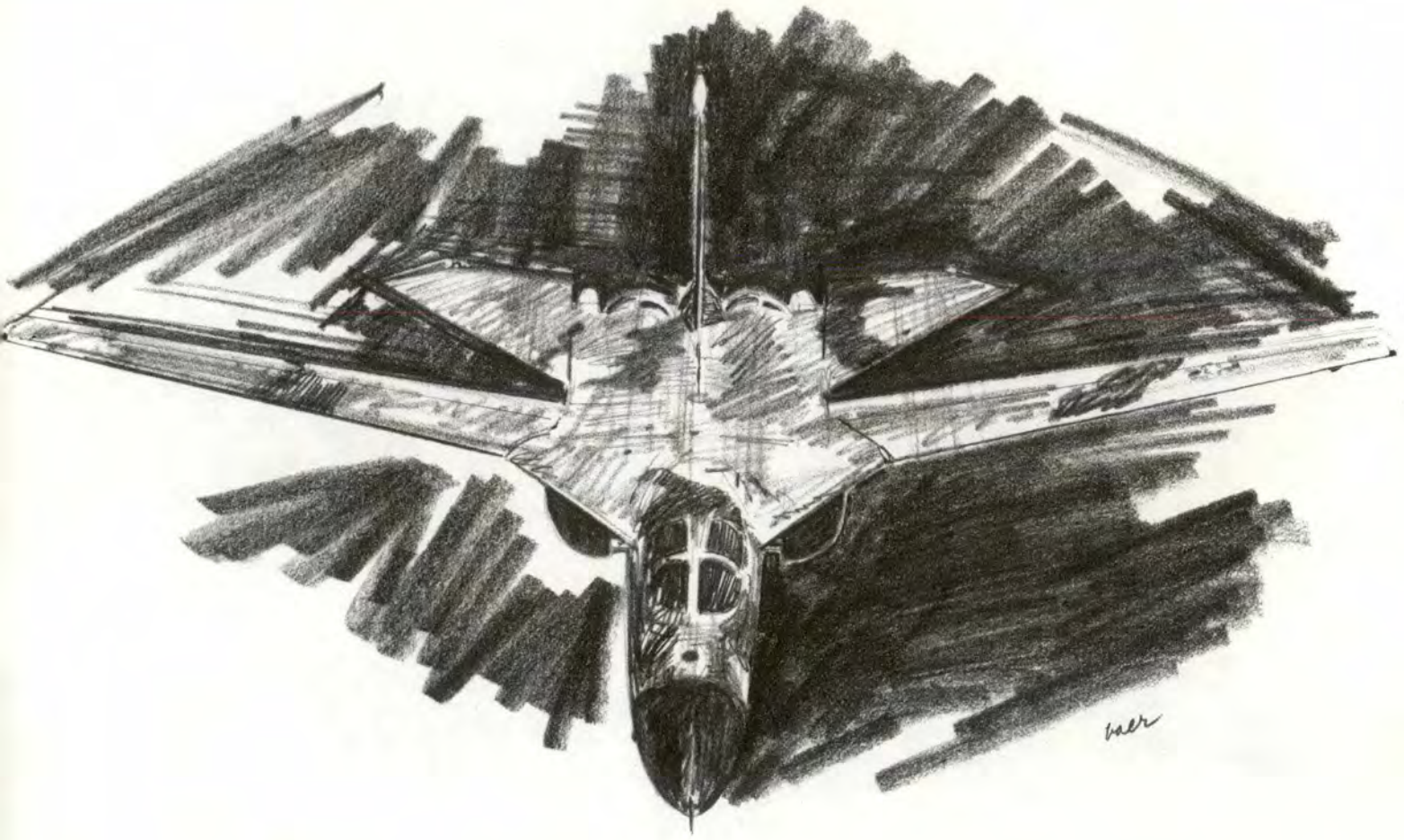
In addition to your regular preflight, check the landing gear shock struts and actuating cylinders for dirt and ice. If they are dirty, have them cleaned with a rag soaked in hydraulic fluid. This will prevent strut seal damage. Be on the lookout for leaks of any sort (cold air shrinks seals and "O" rings). Check to ensure the fuel tank vents and cockpit drains are free of ice or condensation. Never touch bare skin to cold metal; the skin may stick and have to be cut off. It can also accelerate frostbite. Also, use caution walking on slippery aircraft surfaces.

If de-ice is required, it should be performed after the walk around while you are strapped in ready to start. Brief the de-ice apparatus commander to stay downwind, remove all power from the aircraft, and make sure no fluid splashes onto the canopy as it is difficult to remove.

Consider the human element during preflight. Don't rush the preflight inspection because of the cold. Your aircraft needs the attention even more in winter. Be thorough but don't suffer. Have a portable heater or a crew van immediately available. Personally, I will only preflight one aircraft when it's extremely cold. It may be quite a while before I'm ready to tackle the spare.

Starting usually goes pretty well but watch for higher oil pressure and electrical output. The equipment is stiff and needs a chance to warm up to operate normally. Don't over pump your brakes or other hydraulic systems in the chocks as you may damage the seals. Taxiing can be very tricky. Always taxi very slow on packed snow or icy ramps. Remember that the ramps and taxiway RCR reported by Base Ops is an average and in some places you may be operating below minimum RCR's published in the flight manual. By all means, wherever you are, you should be able to shut down the engine(s) and safely coast to a stop if you feel yourself losing control. Never rely on your brakes to stop you. On the line-up check, your brakes may not hold during engine runup because of a slick runway, and a rolling takeoff should be anticipated.

Once you take off, you have committed yourself to operations in a rapidly changing and extremely unforgiving environment. The Boy Scout motto: "Be Prepared" is the best insurance you can have to the total success of the mission. – Photos courtesy of 21 TFW/PA. ■



THERE I WAS

■ There we were, Tonto, my trusty WSO, and I, 40 miles out of our east coast destination with 8,000 pounds of fuel remaining. A combination of our Aardvark's turbofan engines and a hefty tailwind had allowed us to come nonstop with gas to spare. Little did we realize that we would be grateful for every ounce of that gas before the night was through.

We had been delayed several hours on the ground with airplane problems and now had been airborne for over three and one-half hours. Both of us were near the end of our crew duty day and more than a little tired. No problem — one simple straight-in approach to go, put the airplane to bed, and we could retire to the bar. We had checked the weather several times enroute and the worst we heard was 1,000 scattered, 3,000 broken, light winds, rainshowers in the vicinity. The destination runway, at

Oh, drat, said I, or words to that effect, for I knew that the type of barrier at this base would not take a 176-knot Aardvark on an approach end engagement, even if I wanted to make a barrier engagement — which I didn't.

9,000 feet, was a little shorter than we were used to but was still ample — and we had plenty of gas.

The first of several unpleasant surprises came as we turned a long ILS final and began to configure for landing. The gear came down all right, but the slat indicator went to crosshatched and stayed there, indicating that our slats were neither up nor full down. I told approach control we would need to circle on final to sort things out. The slats wouldn't move in either direction, nor would the flaps move. In the dark I had no way to tell how far the slats had gone, but the airplane felt pretty clean so we decided to use the no slat, no flap procedure.

Tonto read us through the checklist and quickly figured an approach speed of 176 knots and a minimum landing roll of 2,600 feet — plenty of room for error. I declared an emergency with approach control, because that's what you do for a no-flap landing, and we turned back toward the final approach course. I hadn't done a night no-flap landing in a long time, but, I thought, it's no big deal for an ace pilot. So far, I considered our problem more of a minor inconvenience than a real emergency. I casually asked approach control to check the status of the departure end barrier in the extremely unlikely case that we would need it and got unpleasant surprise number two.

Oh, no, said approach, the departure end barrier is not up and it will take 30 minutes to get it up. The approach end barrier is up. Say your intentions. Oh, drat, said I, or words to that effect, for I knew that the type of barrier at this base would not take a 176-knot Aardvark on an approach end engagement even if I wanted to make a barrier engagement — which I didn't. But, no sweat, the winds are only 4 or 5 knots. We'll just land the other way. Mighty fine, agreed approach, and vectored us toward the other end of the runway. I didn't raise the gear because I figured I would just have to put them right back down in a few minutes. Besides, we still had plenty of gas, and I was getting busy.

The 1,000 scattered was more like broken to overcast, and it wasn't at 1,000 feet because we were at 1,000 feet and the bottoms were well below us. Flying in and out of clouds and picking up intermittent ground lights had considerably upset my internal gyros, and Tonto wasn't doing much better. Just flying the airplane was becoming a major chore. This, perhaps, explains why neither of us noticed that approach control, accustomed to handling slow movers, had turned us way too late, and we were badly overshooting the final approach course. I reached up and flicked the Instrument System Coupler to ILS and was greeted by a pair of colorful localizer and glideslope warning flags. Tonto quickly rechecked the frequency and assured me it was right. Oh, by the way, I said to approach, "has the ILS been switched to this runway?" There was a moment of silence. "The ILS will be up momentarily," said approach.

At 4 miles on final, the warning flags disappeared and the ILS showed us well right of course and high. I still hadn't seen anything resembling a runway. At about 700 feet we broke out of the ragged cloud bottoms and saw the runway 20 degrees off the nose and almost underneath us. Not even an ace pilot could salvage this one. We went missed approach with 3,500 pounds of fuel, and it suddenly occurred to me that this was turning into a *real* emergency. We would only get about two more shots at that runway before we would have to think about heading out to sea and spending the night in a cold, bobbing capsule trying to think up explanations.

We paid very close attention on the next approach and broke out of the weather in good position to land. In the last mile I dropped a little below the glideslope in order to get down in the first thousand feet of the runway. In the process the airspeed increased about 10 knots. We touched down slightly hot about 500 feet from the end. The little sideslip as we touched and the spray when the nosewheel came down told us that our surprises were not over. The runway was wet!

Now, if we still had lots of gas, a go-around might have been in order at this point to buy time to consider this new information. In none of our weather reports had anyone mentioned a wet runway. There was a nice long runway some 110 miles away that we had considered when this situation began but had rejected using the runway-at-hand theory. Had we known the runway-at-hand was wet, we might have made a different decision. But we were down now and didn't have lots of gas anymore. Besides, I had just spent 30 minutes trying to find this runway and wasn't about to let it go, even though our "ample" runway had been considerably eroded by events.

In the fine print on the no-flap landing roll chart a note tells us to add 200 feet to landing roll for each knot above computed landing

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THERE I WAS

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speed. Ten knots hot plus a 5 knot tailwind had bought us an additional 3,000 feet of landing roll. The fine print also refers us to the -1-1 to figure the landing roll correction for RCR. If either Tonto or I had remembered to bring a -1-1 on this trip we would have discovered that, considering our touchdown speed, our minimum landing roll on a wet runway was now 8,500 feet! On a 9,000-foot runway this leaves little margin for error. Finally, another note tells us that with hydroplaning the landing distance is increased by an "indeterminate amount."

We didn't have time to figure all of this out as we splashed onto the runway, but when Tonto started calling out speed and distance remaining we knew the answer wasn't good. At 3,000 feet to go and 130 knots we simultaneously concluded that the hook would be a good idea. We took the barrier at 70 knots and got our first pleasant surprise of the evening — everything worked as advertised. We came to a smooth stop 500 feet into the overrun.

As we sat there in the moist evening air thankful to have our skins intact and our pride only dented, the smoke from the brakes gently wafted into the mist. The rotating beacons from the crash trucks and the soft amber glow of the fuel low caution light added to the overall ambience of the scene as we made some mental notes of lessons learned:

- You can't get to an airfield with too much gas.
- People at other bases don't know the specific requirements of your airplane, especially in an emergency. What you consider a minor emergency at the home drome, because everyone knows what you need, may be a major problem elsewhere.
- The weatherman and ATC agencies always tell the truth — as they know it; but they don't always know the truth. Perhaps the "rain-showers in the vicinity" should have warned us, but it didn't. We *assumed* the runway was dry unless told otherwise and didn't ask. (Fortunately, we did ask about the departure end barrier. Score it a draw.)
- A night weather approach at a strange field coupled with any kind of aircraft problem is a *real* emergency.
- Murphy is alive and well and living on the east coast.

There is an addendum to Murphy's Law which is appropriate here known as O'Toole's Axiom. It states "Murphy was an optimist." ■

KEEP YOUR WARM

COLONEL CHARLES A. LEHMAN
10th Combat Support Group

■ The young lieutenant slumped exhausted in foot-deep snow at the base of a huge ponderosa pine. A biting wind whirled snowflakes around him, and milky grey clouds hid most of the night sky. He was cold. Less than a mile away the machine that brought him over the mountains lay half buried at the base of another big pine.

He shivered violently as he fumbled through his pockets for survival gear. A book of matches, a pocket knife, and his billfold weren't much comfort — nothing in the billfold but three dollars and a stack of credit cards. Over his left shoulder the lights of Gunnison, Colorado, winked only ten minutes away — but not on foot. Certainly not on his feet. His ankle was swelling and hurt like blazes. *No way out of here tonight*, he thought. *Ten lousy minutes from a town, and I freeze to death on some crummy mountain.*

Fortunately, his self pity was short lived and he began to think. He was near a road, but there was little chance of a passing car or snowmobile until morning. Dawn was nine hours away. "Damn, it's cold," he mumbled. He'd worked up a bit of a sweat hurrying away from the wreckage. That didn't help his situation either.

It was going to be a long night.

How did he get there? A crash landing in an aero club bird, a snowmobile with a broken belt, a shiny sports car with a snapped tie rod, an ejection from a flaming fighter? Makes no difference.

What he does in the next few hours will decide his whole future. He'll either be rescued with a fine bar story, or he'll lose his toes and some fingers — or they'll take him off that mountain in a rubber sack.

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KEEP YOUR WARM

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Anyone who flies, drives, hikes, hunts, skis or climbs can face a similar situation. You don't have to be caught in a blizzard at Minot to become a winter statistic — it can happen in Southern California.

Two enemies await the unwary as summer passes. Frostbite and hypothermia take their toll each year. Frostbite is simply the freezing of exposed flesh. When it's severe you *lose the flesh*. Hypothermia is a bit more complicated, but just as sneaky. It's usually called "exposure" in the news media. Anytime you travel into or over a cold area you're a potential victim for the "dangerous duo."

Frostbite occurs only at subfreezing temperatures and isn't usually fatal. Give it a chance, though, and it will take off your fingers, toes or

ears just as surely as a power mower — but a lot more slowly and with great quantities of extended pain.

On exposed flesh frostbite is easy to spot. Anytime you are outside in freezing weather you should check for it periodically. Look for waxy, white-looking skin. The area will feel numb, too, so you're not likely to feel it. If you spot one of these areas early, it probably will be just in the frostnip stage. Prompt action will limit your injury to something like a bad sunburn. If you don't catch it right away, it'll progress rapidly, and serious injury will result.

The treatment for frostnip or frostbite is rapid warming. If you can get inside, use warm water (a little over 100 degrees F). When that's not practical get the affected area against something warm. Frosted fingers can be warmed inside your coat or shirt, under the armpits. To warm toes without being a contortionist, place them against someone else's stomach — a real test of friendship. Cheeks, noses or ears are easy to warm by just covering them with the palm of your hand for a few minutes. Don't rub a frostbitten area or you'll really cause damage.

If all this sounds like a lot of bother, you're right, it is. Preventing frostbite is a lot easier. Frostbite is not normally an affliction of survival. It usually strikes when you're having fun — schussing down a long ski run on a cold day, speeding along on a snowmobile without a face mask, or ice fishing on a windy day. To prevent frostbite, keep your extremities covered and your circulation up.

Suppose you're about to start up the chair lift to the top of old Mount Break-a-Leg. It's 33 degrees in front of the lodge, and the sun is shining. You get off at the summit and notice the cold wind. The thermometer says 15 degrees, and a 30-knot wind is blowing off the peak. If you're smart you'll pull your cap down over your ears and don a mask. A couple of fast miles at that temperature can freeze your ears and cheeks.

After two great runs you notice your feet are a little cold, so you stop at the halfway hut for some hot coffee. After the next run your feet feel fine. Oh, oh — time to be suspicious. Pull off a boot. You'll

continued

KEEP YOUR WARM

continued

probably find some white spots on your toes or heels. Anytime your toes get cold, then seem to warm up for no reason, check 'em. They're probably getting numb, and that means frostbite.

Look out for wind. Moving air chills and freezes exposed skin much faster than still air. For example, suppose you jump on your snowmobile on a bright, comfortable 25-degree day. Skimming over the snow at 30 miles per hour your face, ears, and hands are chilled by an equivalent temperature of ten degrees below zero. You can get frostbite in minutes.

Yes, it's fairly easy to prevent frostbite — just cover up exposed areas, keep your feet warm and watch for numb or white spots.

But what about the real killer — hypothermia? When you see a news headline like "Stalled Motorist Dies of Exposure," you can bet he really lost a battle with hypothermia. That's a loss of body heat, down deep — where you live. Frostbite attacks extremities, but hypothermia chills your body core. It's a little more complicated than frostbite too.

Your body is really a furnace. It converts fuel (food) to heat and energy. You lose most of the heat to the air around you, and your thermostat is set at 98.6 degrees Fahrenheit. Lose too much heat, so the furnace can't keep up, and your temperature starts to drop. That's hypothermia. If your temperature falls about 20 degrees you've had it. The whole machine shuts off. That's when they haul you off in the black station wagon.

Hypothermia isn't something that happens to you while you're *enjoying* winter sports. BUT . . . if something prevents you from going inside to warm up, it can strike fast.

Suppose you're fishing on a southwestern lake in mid-December. About 4:00 p.m. a chilly wind comes up, so you start your motor and head for the dock. All at once your boat slams into a submerged stump and throws you out. The water feels like ice, but you're a good swimmer. So . . . no sweat, right? Wrong. Your boat's disabled, it's half a mile to shore and seven miles over cliffs and mountains to the marina.

While you're trying to swim to shore you're losing heat 200 times faster than you would in air at the same temperature. By the time you scramble up onto the bank you're exhausted and cold, a prime candidate for hypothermia.

Nighttime temperatures have been averaging in the low 40s. Your internal heater is in high gear trying to warm you. It's burning fuel (food) at a terrific rate — and you forgot to eat at noon. Your thermostat will shut off most of the blood flow to your hands and feet to save all possible heat for the boiler room — where you live. Your hands and feet will get very cold, and if the temperature should drop much below freezing they'll probably be frostbitten. You'll shiver uncontrollably as your body exercises involuntarily to speed up heat production. Unless you start conserving body heat, even the boiler room starts to cool off.

Until now your only symptoms have been shivering and a feeling of cold. But as your body core begins to cool, your shivering stops, your muscles get stiff, your coordination goes to pot, and you're completely

beat. The worst symptom, though, is that you just *don't care.* You're dying, and couldn't care less! You don't even want to help yourself. Before long you'll lose consciousness — and then. . . .

Grim picture isn't it? But there's no need to be beaten by hypothermia. Just knowing what it is will help you whip it. When you fly, hike, hunt, fish, snowmobile or drive around a sparsely populated area in winter, be ready for hypothermia. Follow these ten commandments:

1. *Let someone know where you are.* That might mean filing a flight plan, or simply telling your wife or roommate where you'll be going and when you'll be back. If you're late, at least someone will be concerned and know where to direct the searchers.

2. *Carry some signals.* Winter sports and flying can sometimes leave you stranded, so be ready to tell the world where you are. Miniature flares, railroad flares, signal mirrors, orange space blankets, or simply a waterproof container of matches that can start a good smoky campfire may get you out of danger before hypothermia becomes a problem.

3. *Eat regularly and well.* Stuff your pockets with goodies. You need body fuel at least as much as engine fuel. If you're going to carry a hot drink, why not make it a food, too. Steaming broth, hot instant breakfast, or hot chocolate do double duty. They warm your tummy and fuel the body furnace. Coffee or tea won't do that.

4. *No booze!* Even a hot toddy or buttered rum works against you. Alcohol short circuits the heat savings mechanisms of your system and causes increased blood flow just under the skin. You lose heat at a terrific rate with booze in your blood. You'll *feel* warm, though, even when you're dying from cold.

5. *Stay dry.* Look out for the water hazards in winter. A cold dunking or soaking may be more than your body heater can handle. Carry a lightweight plastic raincoat or poncho, and use it at the first appearance of rain or wet snow.

6. *Don't get overheated.* Sounds crazy doesn't it? But sweat is water, and if you get your clothes sweated up by too much vigorous exercise, they can lose 90% of their insulation. Picture yourself facing a night in the woods with only one-tenth of your clothes.

7. *Cover your head.* Your head has an amazing blood supply — so it's a great radiator. Your unprotected head can lose 75% of all the heat your body can produce on a cold day. Wear or carry a cap, toque or hood.

8. *Avoid wind.* Remember, you lose heat far quicker if the air around you is moving. At 40 degrees Fahrenheit with a 40-mile-per-hour wind, you lose heat as fast as you would on a 10-degree Fahrenheit, calm day.

9. *Find or make a shelter.* If you can't get home, *find* a home. Even if you just get under an overhanging rock, into a hollow log, or dig into the snow, you'll be saving heat. A good shelter should keep the wind off you and provide some insulation. Snow is hard to beat as an insulator.

10. *Warm up with a fire.* Obviously you don't want to try this with a snow shelter, or you'll be violating commandment five. A crackling fire in front of your log or bough lean-to serves three great needs — heat, light, and security. And don't underestimate security. When you're alone in the boonies, and unsure of the outcome, those dancing flames are a tremendous lift.

There you have it. Frostbite and hypothermia needn't take their toll each winter. Knowing what they are, plus a few simple rules on how to handle them can protect you.

But what about our lieutenant?

Just before dark he had scraped snow away from the base of a big, slab-sided rock, and built a fire of dry squaw wood (dead branches from standing trees). He pulled his stocking cap down over his ears and forehead, took off his jacket and boots to dry his sweater and socks before it got too cold. He ate the peanut butter and honey sandwich which had been crushed in his pocket since the day before. About 8:00 o'clock he redonned his coat and boots. During the night he catnapped between trips to gather firewood. The rock face reflected the heat from his fire and kept the wind off his back. He never really got cold.

As dawn approached he built up two more fires about 30 yards apart to form a triangle. He practiced reflecting sunlight with one of his plastic credit cards, noting that it wasn't a bad signal mirror.

When he heard the search plane he piled green pine boughs and snow on his fires. The resulting white smoke didn't contrast very well with the snowy terrain, but he figured the pilot would be suspicious of three smoke columns (an international distress signal). Standing in a small clearing, he flashed his credit card mirror at the little Cessna. It banked toward him and he saw a tin can with a long red streamer falling nearby. The note in the can said, "Ground party on the way — one hour." He hardly had time to clean up his "camp" before he heard the snowmobiles. Two happy rescuers shared their hot soup with him before putting a big down-filled parka on him and heading for town.

It hadn't been a bad night at all. He'd kept his head — done everything right.

Several reporters bombarded him with questions about exposure. "Son, you cheated death in those mountains. You sure kept your cool." The lieutenant smiled. "No way. I was pretty shook up — but I guess I did keep my WARM."

This timely article was originally published in the November 1973 Aerospace Safety *while the author was a lieutenant colonel assigned to the Directorate of Aerospace Safety at the Air Force Inspection and Safety Center.* ■

FIGHT SAFELY

AIR CDRE D.T. BRYANT
Commander, 1st Wing, RAF

One of the most often debated questions in safety is the relationship between safety and operations. This debate is not limited to the US Air Force. The following article by an RAF wing commander is a clear and accurate statement of the true meaning of flight safety and our responsibilities as aircrews. Every word rings true for the US Air Force, too.

■ I have never been able to generate much enthusiasm for "Flight Safety" per se. For me it has negative overtones which I have always found difficult to reconcile with the positive attitude needed in the application of air power. At heart I am, and always have been, a "Fight Safely" man. Don't be mislead; the difference is significant. I believe that aircraft should be flown to the limits of their performance and equipment, both academically and tactically, for as recent events reminded us that's where we will operate when the action starts. The problem is that to practice this safely is a remorselessly demanding challenge; one which in principle applies equally to all who wear an RAF aircrew brevet, albeit in practice some elements of our Group face a more stern test than others.

How are you all to rise to this challenge consistently, for nothing less will suffice, and to wrest the initiative back from the Flight Safety lobby? The short answer is to stop having "aircrew error" accidents. For only then will our service have the evidence on which confidently to reject those siren voices whispering "Do we really need to do it?; isn't it a bit risky?; we'll have time to brush up before the shooting starts," etc., etc. Every time this Group produces an aircrew error accident, and four pilots have killed themselves needlessly in my brief time in appointment, it becomes more difficult for operational imperative to be argued in an increasingly unfavorable en-

vironmental and economic climate. The answer is in your hands, but perhaps my experience can sign post a way, maybe the only way, to this achievement.

I should perhaps first take a leaf out of our deputy commander in chief's book and establish my credentials. I have a checkered accident history which includes a Hunter, a Meteor and a Gnat. The first two were attributed to technical failure but the latter was the direct result of my showing off. I therefore write not from the Olympian heights of my appointment, but as an aviator who has experienced self-induced professional humiliation. Those of you who have been similarly stupid will know the emotional scar this leaves. I've also had the good fortune to command at every rank from Flying Officer to Group captain, so I like to think I've been where it's at, even if that was some time ago.

So what has this hard-won experience taught me that I can pass on as helpful advice? First, let's reflect on what you have going for you. You are taught the requisite skills in the best training system in the world. You are shown how to apply those skills in a graduated challenge on your squadrons, learning from others as you progress. So all of you know what to do, what not to do, and what not to attempt if you are unsure. It is my perception that the only thing some of you appear to lack is the *self-discipline* to apply your skill and experience consistently.

If you think that a harsh judgment may I remind you that yours is an elite profession in which excuse has no place; indeed *self-criticism* is surely the second pillar upon which the "Fight Safely" philosophy rests. Behavioral scientists, statisticians, scapegoat supervisors, etc., and discreet cubicles where you can scribble unattributable confessions have no place in a harshly professional Fight Safely environment and therefore offer no potential for self-deception or for exercising the soft option. I am, for example, much saddened when I read CONDORs (Confidential Direct Occurrence Reports similar to "There I Was"), which tell me little except that the writer hasn't the strength of character even to conduct himself honestly at a routine de-brief.

What hope have we of ever achieving my ideal if you won't face up to the truth that your supervision is *your* problem, your behavior is *your* problem. There is no hiding place.

Our ability to fight a war tomorrow, and an airman above all other military animals cannot afford the luxury of contrary delusion, depends on training to "Fight Safely" in peace. The freedom to do so realistically will come only if and when you are able collectively to demonstrate far higher self-critical standards than have been apparent in the recent past, where lapses in self-discipline give senior commanders no choice but to be conservative. I am particularly well placed to prosecute a "Fight Safely" campaign, but I need a better track record from you if such an initiative is to succeed.

I know you can hack it . . . so how about some proof? Good luck . . . for we all need some of that, too. — Courtesy *Ostrich*, Autumn 83 ■

MAIL CALL

EDITOR:
FLYING SAFETY MAGAZINE
AFISC (SEDF)
NORTON AFB, CA. 92409

"Just A Slight Smell of Burning Rubber"

I have just finished reading an article in the September 1983 issue of *Flying Safety* magazine. The article title "Just A Slight Smell of Burning Rubber" brought up to me a disturbing fact I feel you might have missed.

A private pilot, or for that matter any pilot, who doesn't read his indicators and understand what they are displaying can only expect trouble. If the pilot had looked at his ammeter he would have realized the alternator was malfunctioning. The ammeter should have shown a constant discharge indicating battery operation. Had he realized that, he would have understood why the radio and ILS were intermittent and would have taken the appropriate action sooner, i.e., land the airplane.

As an aircraft maintenance officer and a private pilot I understand the importance of correctly understanding indications. More important is the need to monitor all instruments so when emergencies arise appropriate corrective action can be taken. Although we all make mistakes, those made in the air can be fatal.

FRANCIS X. FANUCCI, Capt, USAF
HQ PACAF/LGMMP
Hickam AFB, HI

"One Way Traffic Only"

Read your fine magazine every month when it filters down and am always interested in the "Ops Topics." Reference your item "One Way Traffic Only" in the October 1983 issue, we have had an RVR system here for several years but have never seen an RVR of 33. Ours drops in increments of 5 from 60 to 30, then increments of 2 until 06, then to zero.

Do the northern bases have a new system or did a "typo" slip by?

Glenn Decker
430 ABG
Dover AFB, DE

No, there isn't a new system for RVR's, just an editor's failing eyesight. The original message reported the RVR as R33 VR40. In preparing the Ops Topic the error crept in and was missed. Thanks for catching it for us.

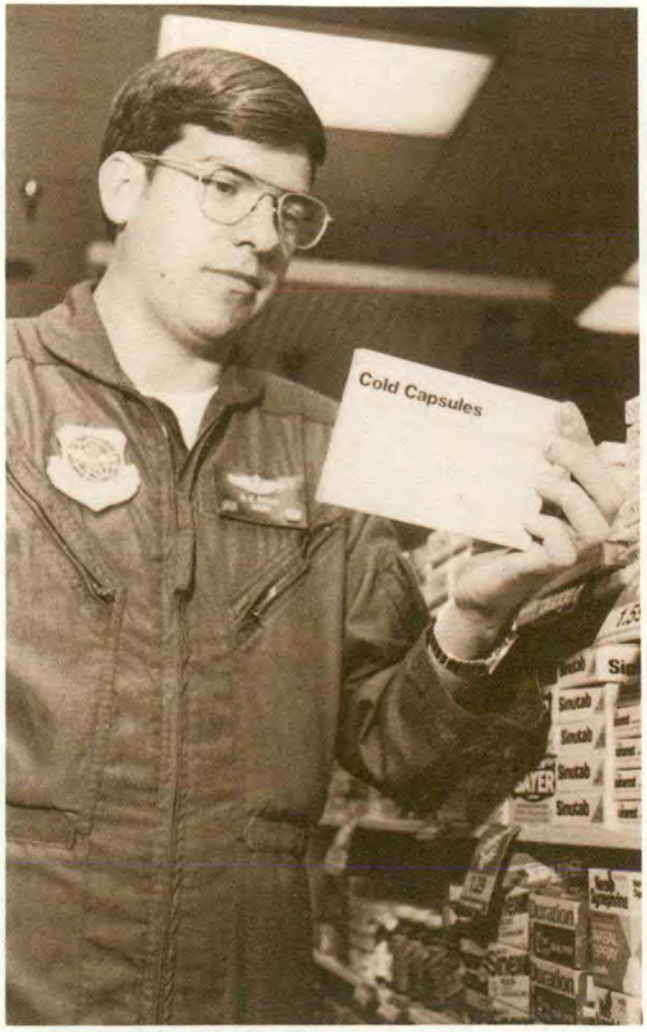
"Medicines and the Pilot"

I am concerned about Dr. Mohler's article "Medicines and the Pilot," *Flying Safety*, October 1983. While an excellent article for the general flying populace, I must emphasize *general* (as civil aviation), it must be remembered that this is an Air Force publication, read by thousands of crew members who are not operating under the guidelines of general aviation, but under the more stringent Air Force guidelines. This article could seriously compromise what we in Aerospace Physiology have taught for years and still is just as applicable today, "Don't self-medicate (Your back cover on same issue says it all) see your friendly flight surgeon and proceed accordingly." Even though the information is applicable to the civil side of the house, the illustrations and general slant were definitely toward military operations. This could be seriously misleading. For this reason an immediate disclaimer should be published to disallow the relevance of this to the military crew member, particularly the "Guidelines" chart on page 15. Air Force crew members must be made aware, in no uncertain terms, that this article does *not* represent the Air Force's position on the use of drugs.

The Air Force policy on drug use (prescription, over-the-counter, or otherwise) is very conservative, especially when compared to that of the civil aviation community, in its approach to the flying environment. This is not to say that all crew members are grounded each time they medicate. But rather, each and every case must be evaluated individually in light of the many factors involved, such as type and extent of the pathology, medications, etc. A decision of this nature can and should be made only by the flight surgeon.

Also, remember that the reason a crew member may be grounded, need not be for the medication, but rather for the pathology itself. Many times the pathological conditions may be more hazardous to safety of flight than the medicinals used to treat the condition. As for the book on drug half-life data, while it may be all right for the civil pilot, it is irrelevant to the military.

The bottom line is this, the article has limited value to military crew members and may do more harm than good when published without clear guidelines for its applicability or disclaimers. Aircrew members do not need charts or graphs or data books to determine what drugs to use or when they are safe to fly. They receive all the guidance they need from their flight medicine sections and the regulations governing the use of the sub-



stance. Crew members should be encouraged at all times to rely solely upon these sources for advice and guidance.

RONALD C. BAILEY, Capt, USAF, BSC
Chief, Aircrew Physiological Training
USAF Hospital, Ellsworth
Ellsworth AFB SD

More on "Medicines and the Pilot"

The "Medicine and the Pilot" article in the October 1983 *Flying Safety* magazine has caused confusion among fliers at some of our bases regarding flying and self medication. The article contains excellent information on the definition of what is a drug, mechanisms of action and metabolism, however the "Guidelines for Pilots" is quite misleading as it indicates various categories of medications with different levels of approval required for consumption.

It must be emphasized that these are FAA policies and this does not indicate a change in Air Force guidance regarding self medication which is found in AFR 160-12 and 161-33. Simply stated, Air Force policy states that aircrew members taking any medication will be temporarily disqualified from flying (grounded) until the drug is no longer required and all possible effects are dissipated. Fliers requiring chronic medications even with non-serious side effects will also be grounded pending approval (waiver) from appropriate higher headquarters. If significant side effects could occur, the flier will be permanently disqualified from flying as long as the medications are required.

The local flight surgeons are the best source of information regarding use of medications and flying. The golden rule to Air Force fliers is to take no drugs/over the counter preparations without seeking consultation.

RONALD S. GREEN, Col, USAF, MC, CFS
Chief, Aerospace Medicine Division
Randolph AFB TX

There has been no change in Air Force policy regarding self medication by crew members. The implication that Category I drugs are safe for flight is true only if approved by a USAF flight surgeon. The policy is clearly and unequivocally: don't self medicate. ■

OPS

Hot Windshield

■ An F-15 was scrambled for an early morning mission. The pilot turned on the windshield anti-ice to clear ice from the windshield. Then, he turned his attention to other cockpit duties forgetting about the anti-ice.

About 20 minutes into the flight the windshield hot caution light came on. The pilot immediately switched off the windshield anti-ice but not in time to prevent heat damage to the lower portion of the windshield.

The Hotline

ATC delays . . . go arounds . . . excessive vectoring . . . these are just a few of the Air Traffic Control annoyances that plague pilots. To provide a contact point for these and other problems, as well as allow constructive criticism and comments, the 2040th Communications Squadron at Cannon AFB has established an ATC hotline — a direct line between pilots and controllers.

By dialing 784-3311, ext 3307, pilots of military and civilian aircraft using Cannon AFB Air Traffic Control services may dial directly to a recorded telephone answering device located in the RAPCON. The pilots are asked to leave their name, telephone number, and situation or comment. The air traffic control staff will assign a controller to investigate the problem and report back to the pilot. Ideally, the same controller that worked the aircraft will be asked to answer the complaint or comment.

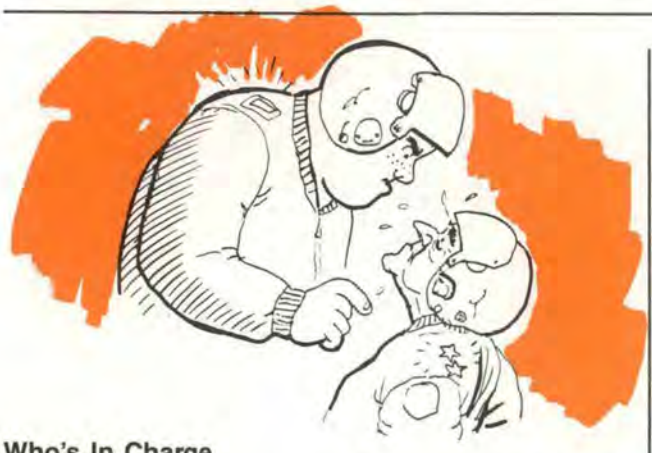
"The idea is to get pilots and controllers talking to each other," said Major Marian F. Fredericksen, Squadron Commander. "We want to be able to improve our services and avoid misunderstandings through more effective communication." — 2d Lt Salette A. Latas, Cannon AFB, NM.

I Thought It Was Safety Glass

■ While in a 3 to 4 G turn the canopy glass in an A-7 suddenly shattered. The suddenness of the failure caused a rapid decompression and momentarily disoriented the pilot. Fortunately, the pilot had his visor down when the glass failed, for a piece of the canopy struck the pilot, shattering his visor and visor housing.

■ A C-130 had just leveled at FL 220 when the pilot's aft window shattered, then 5 seconds later blew out causing a rapid decompression. The pilot's headset, gloves, engineer's checklist, part of the engineer's interphone cord and several enroute charts were lost through the window. The pilot started an immediate descent but had to delay donning his oxygen equipment until the copilot had donned his and could assume control of the aircraft. As a result, the pilot became mildly hypoxic before he could get his equipment on. Once on 0_2 his symptoms disappeared.

TOPICS



Who's In Charge (For IPs Only)

When I was a young captain, I had a hard job flying with headquarters personnel. A first lieutenant, who was my good buddy, and I flew as instructor pilots to check out senior officers in the aircraft. All the people we flew with outranked us and most of them had more time at the top of the proverbial loop than we had in the Air Force. Nevertheless, my buddy or I were always the aircraft commander on these checkout flights. We would often talk about our role as IPs and the importance of our responsibility for the safe conduct of the flights. Specifically, we made a pact we would never let rank influence our in-flight decisions or interfere with the performance of our IP duties. Lest you think we were unduly concerned with this aspect of flying, let's look at a mishap from yesteryear.

The mishap aircraft was on a range mission. The crew consisted of the first pilot, who was upgrading to mission capable status, and an instructor pilot. During RTB, an engine failed. An emergency was declared and the crew initiated a divert to a nearby airfield. The aircraft was destroyed on impact 4,000 feet beyond the runway at the divert field. Both crewmembers were fatalities. The bottom line was the first pilot flew in a landing pattern which was lower and tighter than normal. The FP unnecessarily elected to execute a go-around and did not jettison the external stores. A subsequent turn led to a stall and the aircraft impacted trees.

Final evaluation of the mishap cited the FP's authoritative and domineering behavior to be causal. The FP had, in the past, repeatedly interfered with his instructor pilots' attempts to perform their duties. It is quite likely the mishap IP's effectiveness during this serious emergency was adversely affected and the FP may even have refused to relinquish aircraft control or accept the IP's assistance. This mishap illustrates a valuable lesson even if the scenario is not the rule but an isolated exception.

As the IP, if the thought even goes through your mind in a critical flying decision as to what kind of shoulder insignia the other pilot is wearing — you are making a grave error. You may be flying with the supreme allied commander of the entire universe, but if you are the IP the aircraft is your own little universe and you are in charge.

Finding the Checkpoint

Two A-10s were on a LATN route to a planned target. One of the turn points was a tower 319 feet above ground level. In the vicinity of the tower (which he never saw) the pilot heard a muffled bang that seemed to come from the right wing. Looking at the wing the pilot noticed some damage, aborted the mission and made an uneventful recovery.

The flight lead had planned a 500 foot AGL LATN. About one minute out from the tower — at 500 feet AGL — the lead was unable to acquire the tower visually so he looked inside the cockpit to select the destination on the INS. He had programmed the INS on the ground but had not planned to use it in flight. He had some difficulty with the INS and so decided to reenter the

continued

OPS TOPICS

coordinates of the tower to aid in acquiring it visually.

The pilot did not inform the wingman that he would be concentrating inside the cockpit. While working with the INS the pilot allowed the aircraft to enter a descent. The wingman was not watching outside either because he had a master caution light for a Mode IV IFF malfunction. He did not inform lead that he would be looking inside.

About 15 seconds later when the wingman next checked on lead he realized tht the flight's altitude had decayed and saw lead passing abeam the tower. Just as he was about to advise led of the altitude, lead called called "knock it off" as a result of striking the tower guy wire.

Complacency

I've read about complacency so many times — happening to other people. Now it's my turn. Decending to land in VFR conditions, the approach controller cleared us to 5,000'. The copilot dialed 5000 in our altitude alerter (which was inoperative, by the way). During our descent we were both admiring the shoreline when I noticed I had passed right through 5,000' and was on my way through 4000. I immediately reversed our descent (which the controller also pointed out) and climbed back to altitude.

Contributing factors; a beautiful day, low level vectoring, the inoperative altitude alerter. Because the alerter in our other aircraft works, we have grown to expect to hear it.

I'm sure this type of event will happen again, but I will try to prevent it by paying more attention *inside* the cockpit on beautiful VFR days, and reminding myself and other crewmembers to be more conscious of desired vs actual altitude. Clearly pilot error.

— Courtesy ASRS *Callback*, July 1983.

Delayed Ejection Decision

An F-4E crew was scheduled to fly a DACT sortie. On a climbout they ascended through a thin cloud deck and noted its altitude at 6,000' MSL. During the ensuing engagement some 18 miles away, the pilot lost control of the aircraft beginning at an altitude of about 15,000' MSL. The pilot repeated recovery attempts until his aircraft has passed back through the same cloud deck, naturally assuming it represented 6,000 MSL. In fact, the cloud deck had an imperceptible down slope such that beneath the engagement area, it was only at 4,000' MSL.

A dual sequenced ejection was initiated from the rear seat at around 2,500' MSL (2,000' AGL) at a sink rate of about 450 FPS. The pilot's chute opened at something under 250' AGL. The WSO's chute had a malfunction which retarded its deployment somewhat, finally opening fully at about 70' AGL.

Shortly before the mishap engagement, the static pressure compensator had failed, allowing the altimeter to lag by up to 1,800 feet during the out-of-control descent, reinforcing the pilot's misperception that he still had some time left. Even if the pilot has regained control, he would have been heading nearly straight down, and another 5,000-7,000 feet would likely have been lost before turning the corner, zeroing out the sink rate, and regaining level flight.

These guys were exceptionally fortunate. There is more than one reason for those mandatory out-of-controll bail out altitudes. Respect them!

— Courtesy Life Sciences, *The USAF Safety Journal*, Jan. 83. ■

LOC Survey

MAJOR JOHN C. PLUTA
Directorate of Aerospace Safety

■ We now have interim results from the August 1983 G-Induced Loss of Consciousness (LOC) Survey we sent to TAF units flying high performance aircraft.

At the time this article was written — the first part of November — the Flight Safety Division at the Air Force Inspection and Safety Center (AFISC), had received 1,903 replies to the 6,400 anonymous surveys distributed. ATC was not included in the survey; however, LOC incidents are coming in from fighter pilots reporting past problems (as IPs) in ATC and also in somewhat lower performance aircraft (OV-10s, etc).

There were 227 LOC incidents reported for a 12 percent rate. Surprisingly, LOC incidents are occurring predominently in the 5-7 G region with several instances as low as 4 Gs. Even with all the publicity on LOC in recent months, we have had five LOC occurrences reported since June 1983. From the survey results, we have identified some factors most commonly associated with LOCs:

Rapid G onset.

Crewmember not flying the aircraft.

G suit hoses disconnected during flight and unnoticed by crewmember.

Fatigue.

Improper diet.

Crewmember mentally unprepared for G onset.

Lack of a readily available physical conditioning program (in squadrons).

Here are some situations typical of those being reported in the survey. Aircrew comments on cause and corrective action are included.

F-4. A student pulled 12 Gs to avoid a midair at 18,000'. He awoke at 15,000'.

F-15. The pilot pulled 6.5 Gs during ACM at 16,000'. He awoke at 14,000'. He'd had no food or drink that morning.

F-4. The front seater lost consciousness while IP pulled 5+ Gs during a sliceback at 15,000'. He attributed LOC to fatigue, poor diet, and the fact that the GIB was flying.

OV-10. When the pilot pulled 5.2 Gs during dive recovery he had an LOC and awoke 20° nose high, inverted. He blamed fatigue and lack of G suit.

F-4. The pilot pulled 4.5 - 5.5 Gs at 25,000' and woke up at 20,000'. He had just come off extended DNIF and his body was unprepared for Gs.

F-15. A GIB lost consciousness as front seat IP pulled 6.5 Gs at the merge. His G suit was disconnected.

A-10. The pilot pulled off his first 30° dive bomb pass at 2,000' AGL and increased his climb angle as he was passing 2,800'. When he regained consciousness, he was 30° nose high passing through 5,300' AGL. It took another 1,000' for him to sort out what had happened. VTR showed 4.5 Gs in 2 seconds. His G suit had disconnected; and he had not performed an M-1/L-1 maneuver because he assumed the G suit would handle it.

T-38. On the third flight of the day and no lunch the pilot made a 5 G break in the overhead pattern, lost consciousness, then awakened in convulsions and with temporary amnesia. He estimated loss of body control for 30 seconds and blamed fatigue, lack of food, and lack of M-1 for the LOC.

AT-38. When the student decided it was time to go from 1 G to 7 Gs, it caught the IP by surprise. He blamed slow inflation of his G suit for his LOC. Now he keeps his left hand on the G suit valve when a student flies air-to-air. He recommends every fighter squadron have immediate access to weight training devices, that the aircrew not skip meals, and that the Air Force procure faster inflating G suits.

F-16B. An IP had an LOC while demonstrating a 9 G turn to a student. He stated that "for 5 to 10 seconds I was incapable of conscious decisions or physical actions. I became disoriented and felt as if my head was swaying from side to side. I was alert enough to ask the student if he was OK, but if I had been single seat I could not have flown at that time."

F-15. On a 2v6 ACMI mission the pilot said that after trapping a bandit at his 6 o'clock it was time for a missile break. He did a 7 G slice and passing 110° of turn went out for *42 seconds* and lost 16,000 feet. Whoops!! He now recommends starting an M-1 maneuver early, wearing a tight G suit, keeping in shape, and easing off Gs at the onset of tunnel vision. He also recommends a partially inflated G suit under 1 G conditions.

T-38. On the back side of a loop, the pilot began to grey out at 4 to 4.5 Gs but continued pulling then suffered LOC. He recovered 10 to 15 ° nose low after losing 4,000 feet.

continued

LOC Survey continued

F-16. The pilot snatched 9 Gs, went to sleep and awakened as if at home in bed. He heard a voice calling over the radio and then realized he was in an aircraft. While he was unconscious, the aircraft went from 15,000 to 10,000 feet. His G suit was disconnected. The pilot had not flown in the 30 days preceding the incident. He recommends physical conditioning for increasing stamina under sustained moderate (4 to 7) G loads. This conditioning should be mandatory in the squadron and on duty time to ensure compliance.

One pilot admitted to two LOC episodes: The first in an A-37 when he experienced total LOC after pulling 6 Gs during recovery from an extremely low altitude weapons pass. Then, in an A-10 he lost consciousness during pull-off from a dry gun pass.

This is a quick breakdown of the LOC incidents reported.

F-15	44	A-37	6
F-4	42	F-111	6
F-16	34	F-106	3
T-38	17	F-5	2
A-10	13	T-33	3
OV-10	10	F-100	1

Aircrews made numerous comments on the surveys beyond merely talking about the LOC:

- "I've never been unconscious, but have been grey or blue on almost every mission." (F-15 pilot)
- "I'm a WSO — have never lost consciousness, but have lost sight, hearing, and some feeling."
- "I realize that this is a serious problem, but if you shoe clerks come up with another bogus rule that restricts our combat training effectiveness, I will personally dive bomb your facility with MK 82's." (F-4 pilot) (Despite this humorous statement, we have not and will not recommend anything that restricts our combat training effectiveness. We're on your side!)
- "I like the way you are conducting this survey. Your good intentions are very much appreciated by the flyers in the field."
- Have you ever had an LOC episode? "I can't remember."
- What are your thoughts on fatigue as related to LOC? "The amount of sustained G capability of the human body is directly proportional to the nearness of death." (F-15 pilot)
- "This must be a Communist plot to get the Air Force to go back to the family model aircraft." (F-15 pilot)
- "I have never lost consciousness, but have been totally blacked out and had severe muscle spasms following high G." (F-15 pilot)

Several pilots who had LOC occurrences in the rear seat stated their corrective action is to only fly single seat aircraft.

The USAF School of Aerospace Medicine at Brooks conducted centrifuge testing to determine the effects of LOC on physical and mental coordination. Some of the results from this testing and the LOC survey indicate that:

- During a rapid G onset, LOC can be achieved without the standard greyout/blackout phases associated with high G.
- The LOC will last approximately 9 to 23 seconds.
- Following an LOC, the pilot is in a state of confusion, disorientation, and apathy which lasts an additional 5 to 10 seconds.

Hopefully, this information has been interesting and informative, and maybe a few of the "nonbelievers" can see that an LOC can occur in aircraft other than the F-15/F-16, at Gs that we all normally encounter.

The interim results of the LOC survey indicate a much larger problem exists than was expected. As a result, actions have been taken to highlight the problem and provide aircrews better anti-G equipment. TAC/DOT developed a G-awareness program in the centrifuge to train IPs and F-15 and F-16 squadrons. Personnel from the Fighter/Trainer Branch, Flight Safety Division, AFISC, have been discussing interim results of this survey with TAC, the F-16 SPO, and the Life Support SPO. The increased emphasis on G-induced LOC has kept the pressure on to expedite the High Flow Ready Pressure Anti-G Valve Program and expedite a permanent solution to the anti-G suit disconnect problem.

The Life Sciences Division of AFISC published a preliminary article on our survey in their October 1983 quarterly Life Sciences Kit *(USAF Safety Journal)*, which is distributed to flying safety officers and flight surgeons.

The Fighter/Trainer Branch at AFISC is continuing to emphasize the seriousness of G-induced LOC. Thanks again for your support in the survey. Attached is a sample format for future LOCs — would you believe it's still anonymous. *Local safety officers,* have it reproduced and make it available to aircrews. *You aircrew members,* if you've had an LOC episode, make a copy of the form and drop it in the mail to: AFISC/SEFF, Nortion AFB CA 92409. If we don't continue to receive data on LOC incidents, senior Air Force leaders will think the problem has been solved and we won't have any ammunition to convince them to expend further effort on improving your equipment and your training. So, keep those "cards and letters" coming, it's great to hear from the field. ■

AFISC G-Induced Loss of Consciousness (LOC) Anonymous Survey

This survey has been developed to help AFISC continue to monitor the G-induced loss of consciousness problem. We are well aware that fighter pilots have been reluctant to report such problems out of fear of medical groundings. To assure you that you will remain anonymous, while providing us this data, we ask that you fill this form out at home (use additional paper to complete questions if desired) and drop it in your local mail box. Send to: AFISC/SEFF, Norton AFB CA 92409.

"Experience on the centrifuge at the USAF School of Aerospace Medicine has shown that amnesia (no recollection of LOC) due to high G is very common. Please provide any unusual experience(s) you have which might have been due to G-induced LOC. Please give as many details as you recall which lead you to suspect high G LOC."

---

1. What is your current MAJCOM? TAC ☐ USAFE ☐ PACAF ☐ AFSC ☐ OTHER _____
2. What is your current aircraft? _____
3. Since graduating from UPT/LIFT, have you ever had a G-Induced loss of consciousness (LOC) episode? YES ☐ NO ☐
4. If yes, please give a brief narrative of the circumstances and continue with the questions below: (provide type aircraft, approximate date of occurrence, starting and ending altitudes, max G, feelings while waking up such as confusion, disorientation, etc.) _____

   a. Have you ever had centrifuge training? YES ☐ NO ☐
   b. Was your aircraft equipped with the high flow ready pressure valve? YES ☐ NO ☐
   c. Were you wearing a G suit? YES ☐ NO ☐
   d. Was it working correctly? YES ☐ NO ☐
   e. Did you do an M-1/L-1 maneuver to assist in maintaining your G tolerance? YES ☐ NO ☐
   f. Did the LOC occur immediately after applying Gs? YES ☐ NO ☐
   g. If you answered yes to f above, give an estimate of your rate of G buildup and total Gs reached (i.e., 6G/sec to 7.5 Gs max)? _____
   h. If you answered no to f above, how long had you been holding the Gs _____ and what was the max G attained? _____
   i. To what do you attribute the LOC? _____
   j. As a result of this episode, describe if any, the changes in your flying techniques. _____

5. Are you actively pursuing a physical conditioning program? YES ☐ NO ☐
6. If you answered yes to 5 above, what were your conditioning programs before and after the LOC incident?

   Aerobic: Before ☐ After ☐ Weights: Before ☐ After ☐ Other (describe): Before _____ After _____

   Frequency: 2-3 times per week ☐ Once per week ☐ Less ☐

7. What is your age? _____ Weight? _____ Height? _____ Build? _____
8. If the current publicity over LOC episodes has changed the way you fly, please tell us what you do different now? _____
9. What are your thoughts on fatigue as related to LOC episodes? _____

10. Do you consider G-induced visual field contraction (grey-out, black-out) a problem even without LOC? YES ☐ NO ☐

If so, what problems occur? _____

11. Please provide any other comments you have regarding the G-induced LOC problem and its solution. _____

FOLD HERE

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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 Accident Prevention Program.

MAJOR

Christopher S. Long

31st Tactical Training
Homestead Air Force Base, Florida

■ On 26 January 1983, Major Long had completed several maneuvers on a transition sortie in an F-4D, when he saw the left fire light illuminate. He retarded the left throttle to idle and observed the left engine instruments fluctuating and utility hydraulic pressure drop to zero. He turned the aircraft towards Homestead AFB and shut down the engine. To further compound his problems, the master caution began to flash, the telelight panel stopped functioning, and the fuel gauge began to cycle continuously. Major Long declared an emergency, began a single-engine descent, and contacted the Supervisor of Flying (SOF) requesting a chase aircraft. Still over water at 55-60 miles from base the aircrew felt two thumps, but with no way to visually check the aircraft, Major Long thought the thumps were related to the left engine. Extensive fire damage to wire bundles in the left engine bay caused both 370 gallon external tanks to jettison. He set up for a long, straight-in approach and began slowing for emergency gear lowering. While descending, he slowed the aircraft below 300 KIAS and the aircraft began an uncommanded left roll. Major Long attempted recovery with flight controls, but the aircraft did not respond. He then unloaded the aircraft, accelerated above 300 KIAS, and recovered control. Without the utility hydraulics he blew the gear down above 5,000 feet due to the previous uncommanded roll. With the gear down, he flew final at 250 KIAS and touched down at 230 KIAS, intentionally, landing 2,000 feet down the runway past the approach end barrier. He actuated emergency brakes for directional control, lowered the tail hook, and successfully engaged the departure end BAK-12 at 150 KIAS, stopping the aircraft. Investigation revealed that an unusual failure mode of the afterburner fuel pump had caused the initial fire and loss of utility hydraulic pressure along with fire damage to the wire bundles and lower fuselage panels. The fuel fire also caused secondary fires from oil and hydraulic lines causing engine damage. The superior airmanship demonstrated by Major Long is successfully handling this emergency prevented possible loss of life and the loss of a valuable aircraft. WELL DONE! ■

CONGRATULATIONS air force on the ALL-TIME LOW MISHAP RATE