flying

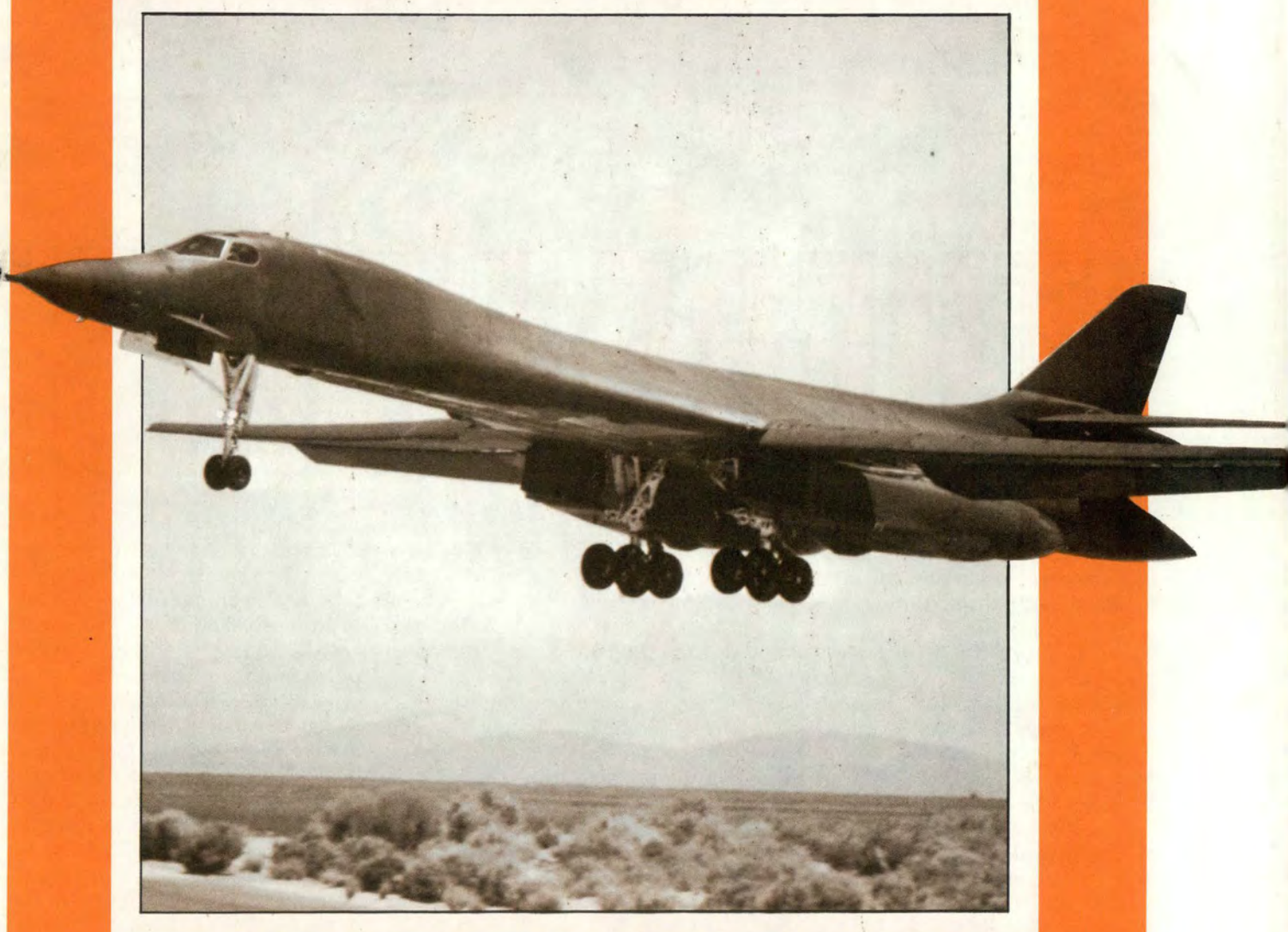
SAFETY JANUARY 1985

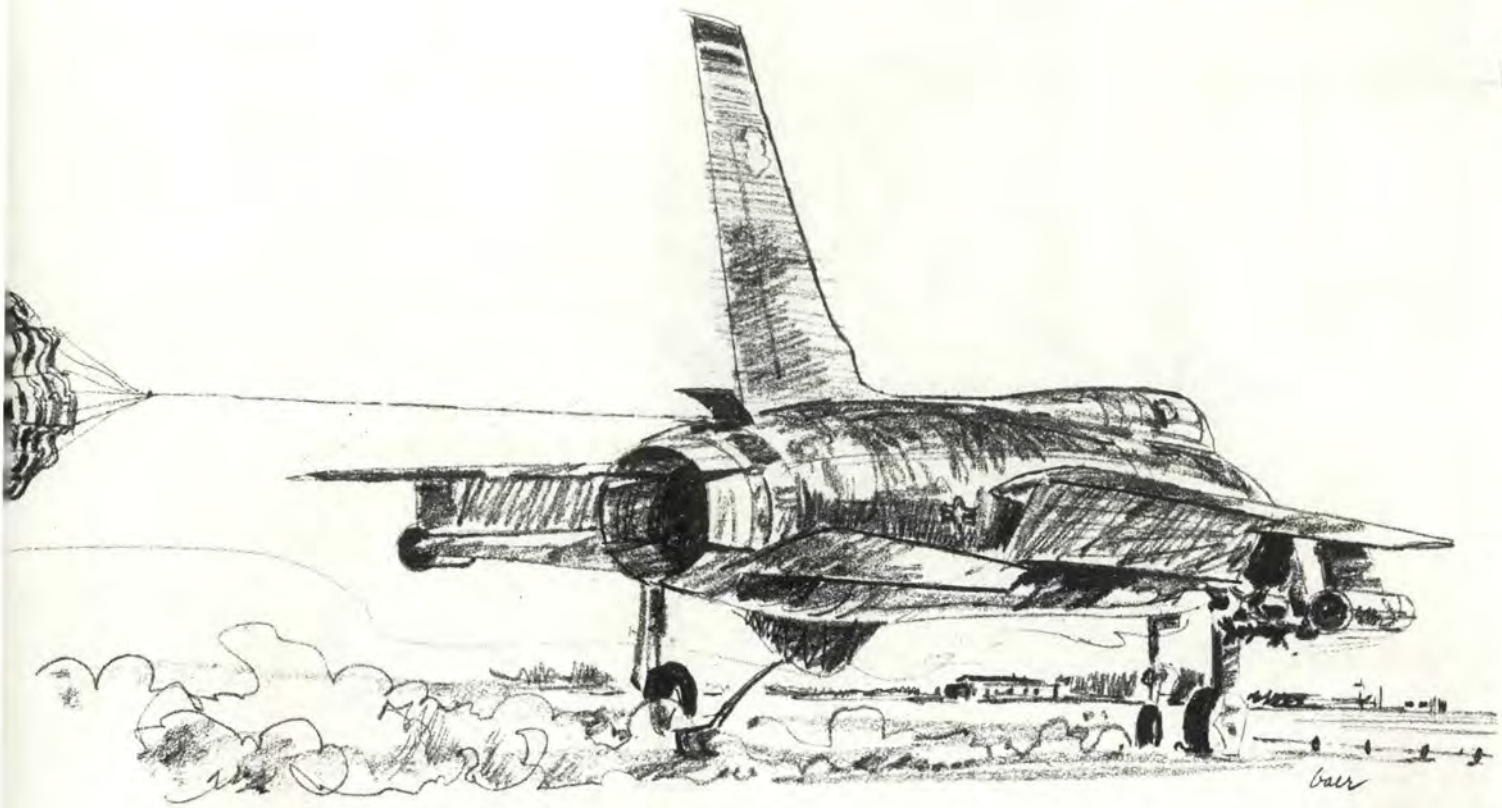
New Year's Resolutions

Midair Collisions — When, Why, How

It's Time To Get Out Of Here

Welcome Back To The Trenches





THERE I WAS

■ . . . thinking back over a long career, remembering for a change some of the dumb things I've done rather than the "brilliant."

I was an F-105 IP — a good one, if I say so myself. I briefed my flight of three students on our mission to Smokey Hill range; 30 minutes of range time, on and off, skip, rockets, dive and strafe, bang, bang, bang, like clockwork. Had it down pat, everything on time and by the book; desk brief, P.E., van to the line, and all four of us to our co-located Thuds. Quick, thorough preflight, step up the ladder, and shortly my finger wind-up and head-snap, which simultaneously popped the caps on four engine-starting smoke bombs on line one. Still going like clockwork, good cockpit checks; "Speedy Flight Check In," two, three, four. Taxi out, nice spacing, hands up for arming. . . .

"Sir, you have a hydraulic leak in the right wheel well. You'll have to get another bird."

Students stay put — quick taxi back for another airplane, only 30 minutes range time, and no make-up time later in the day. Quick run-around the new airplane. Looks good. Quick cockpit check, "McConnell Tower, speedy one, taxi."

Fast taxi, but still time to check the sight. Depress to 176± 2 mils, but pipper is not on the top of the pitot tube! The sight is OK, but the pitot tube has been bent to the left approximately 10 degrees! No sweat, should work OK; air goes in the pointy side, and the pointy side is only 10 degrees off straight ahead. I've seen students ham-foot the rudder worse than that! Don't want to lose four sorties to the range, students going to SEA. Four for the active, single-ship takeoffs. Doppler ground speed 50, 60, 70, 80 knots . . . airspeed indicator, zero! Abort! Dumb, dumb, dumb! (me to myself.) Dumb, dumb, dumb! (Squadron commander to me.)

Now, back to the brilliant things. . . . ■

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REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

NEW YEAR'S RESOLUTIONS

MAJOR JOHN E. RICHARDSON
Editor

■ Have you made your resolutions for 1985? If not, or even if you have, I would like you to consider adding one or two more.

For the past five years, the Air Force has been very successful in reducing the total numbers and rates of aircraft mishaps. As you can see from the table, the reductions have been significant. But now it's getting tougher.

At the time I write this (late November), the Air Force is on track for another record year. Of course, as you read this, you know how we did for 1984.

Despite my lack of total knowledge, I intend to press on fearlessly for, based on past performance, I suspect that the final result will not be much different than the figures shown in the table.

This leads to the resolutions I would like you to consider. Look at the table again. Notice that while the overall rate is going down and so is the percentage of logistics mishaps, the percentage of operations-related mishaps is actually going up.

The engineers and logisticians have done an excellent job. In fact, our new fighters enjoy a safety record undreamed of for their Century series predecessors. Clearly, the "fixers" are doing their part; now it's time for us "flyers" to get into the game.

The table gives us our first clues. As you can see, the numbers and categories of ops-related mishaps have stayed virtually constant since 1980. These are the areas we must affect if we are to enjoy any further success in mishap reduction.

So let's look at these categories by looking at some typical examples of the mishap type. Perhaps we can find some clues to help us avoid a similar mishap.

Loss of Control This traditionally is our biggest problem. Only once in the past four years has this category yielded first place in the standings.

You might think that air-to-air training would be the major contributor to the category. That is true for 1984, but for the total four year

Figure 1

	80	81	82	83	84
Loss of Control	20	13	8	11	13
Collision W/Gnd Off-Range	8	12	12	9	8
Collision W/Gnd Range	3	3	3	3	5
Midair	2	4	5	6	5
Lnd/Takeoff	4/1	4/2	4/1	3/0	4/1
Other	6	8	2	1	—
Total	44	46	35	33	36
Rate/100,000 hrs	2.57	2.44	2.33	1.73	1.77

period, air-to-air was a factor in less than half the mishaps.

Still, the potential in air-to-air is very great. Once the fight starts, it is too easy to forget and try for that little extra turning performance. The laws of physics are inevitable. Once you pass the limit, the results are always the same. The question then is whether there is sufficient altitude to recover.

■ An F-4 on a DACT mission was involved in the second engagement when it came under attack by one of the opponents. The pilot initiated a rapid pull-up and turn to defeat the attack. This maneuver caused a greater-than-expected pitch rate change, and the aircraft exceeded the stall angle of attack and departed controlled flight at about 11,000 feet AGL. The pilot moved the stick forward, breaking the stall.

Because the pilot was not familiar with the characteristics of his aircraft during departures or with the recovery procedures, he did not recognize the resultant negative G loading as evidence of a recovery and continued to hold full forward stick. The aircraft entered a negative G stall and then stabilized in a nose-low, yawing, oscillatory maneuver. The pilot continued to hold forward stick preventing recovery. With insufficient altitude remaining for recovery, the crew ejected at a speed of around 400 knots.

■ Two F-15s were scheduled for a 1V1 intercept mission. During an engagement, the attacking Eagle pilot attempted to transition from a right bank pursuit turn to a lag maneuver by decreasing right and aft stick. Through inertial coupling, the angle of attack and sideslip increased until the aircraft departed controlled flight.

The pilot failed to recognize the departure and used aft stick to try and raise the nose. This increased the AOA and sideslip, and the aircraft transitioned to a left spin. The pilot attempted a spin recovery but was unsuccessful and ejected at less than 1,000 feet AGL.

■ An F-5 was assigned as a single ship defender during an exercise. The F-5 initiated an attack against two F-15s. While engaging No 2, the F-5 pilot saw No 1 Eagle attacking from 11 o'clock low. The F-5 began a neutral then defensive engagement with No. 1.

As the Eagle pressed the attack, the F-5 made a hard right turn, then began a guns defense maneuver with an unload to 1 negative G and a plane change with rudder. This was followed by a maximum aft stick input to get the Eagle to overshoot. It was then that the F-5 began a yawing post stall gyration.

The F-5 pilot did not immediately recognize the PSG and tried to continue the turn. He then unloaded and applied full right rudder and aileron. The F-5 began a left yaw in a relatively flat position.

The pilot recognized the out-of-control situation but hesitated to apply antispin controls. After determining the direction of spin, the pilot began to apply recovery controls, but the aircraft had entered an erect flat spin, and the recovery was unsuccessful. The pilot ejected passing 10,000 feet MSL.

■ An F-4 pilot had not been ade-

continued

New Year's Resolutions continued

quately trained in advanced handling characteristics, particularly low airspeed, high angle of attack maneuvering. IPs within the unit did not take steps to ensure that training records and sorties identified and corrected these deficiencies.

The F-4 pilot flew a BFM sortie against an F-5 aggressor. The engagement terminated at the bottom of the maneuvering airspace in a high angle of attack, low airspeed right turn. The F-4 pilot attempted to roll out of the turn without unloading.

The aircraft failed to respond as expected, and the pilot misinterpreted this as an aircraft malfunction. The pilot increased control inputs which led to the departure of the aircraft at an altitude too low for recovery. The crew was able to eject without injury.

Notice a key element in these mishaps — in each case, the pilot failed to recognize the flight regime which would lead to a departure or failed to recognize the departure or the correct recovery.

All of these point to a lack of familiarity with the aircraft. I recognize that we don't go out to practice departures, but we can and should read the Dash One and the other manuals containing the information we need to make intelligent decisions in the air.

Some indepth discussions with other squadron pilots may give you a different insight on the problem. After the aircraft departs, it is too late to review the recovery procedure.

Another factor which has had considerable significance in the loss-of-control mishap experience is ACT with similar aircraft. Well over 50 percent of the Air Force loss-of-control mishaps in air-to-air occur when the aircraft are the same type.

There is no one answer to the problem, and similar ACT will continue to be a regular mission. But a resolution to be extra alert during "SACT" could be valuable insurance for 1985.

Of course, these are not the only factors in out-of-control mishaps. If I were to go back through the data, I could easily develop three or four more. But I'll leave it at just these for now. I don't want to overload the resolutions list, and I will need something to write about in future issues.

So, what does all this have to do with New Year's resolutions?

Well, all our mishaps for this discussion involved lack of knowledge. We are only human. Often we must see (sense) an error before we can correct it (design deficiency by the creator?) unless we already know the limit and stay short of it.

Therefore, I suggest that a good resolution would be to get back in the books. Now that football season is over, there should be a couple of hours free on Monday nights.

Collision With The Ground Loss of control is primarily a fighter problem, but the second largest category of mishaps includes all types, and the many-motors are very susceptible. Here we are dealing with a perfectly good aircraft and a crew which for some reason hits the ground.

In 1984, 66 percent of our mishaps were operations related. In 1985, we, as operators, have a chance to really affect the mishap rate — especially if we keep our New Year's resolutions.

■ Two B-52s took off for a low level mission. Sometime after takeoff, the crew of the lead aircraft discovered a radar malfunction which made their terrain-avoidance radar unusable. Despite this, they decided to press on with the mission using visual techniques while low level.

Witnesses observed the aircraft at terrain-avoidance altitudes in an area where the weather was marginal for visual flight and deteriorated to instrument conditions as you got closer to the mountains. The bomber entered IMC and struck an unseen ridgeline just right of centerline on the low level route.

■ An HH-53 crew was conducting night air refueling and low level navigation training. After air refueling was complete, the aircraft commander initiated a visual descent. The crew did not set the radar altimeters prior to descent, nor did they monitor the altitude sufficiently to prevent descent below minimum safe altitude. The helicopter struck the ground in a shallow descent, broke up, and caught fire.

■ Four F-16s were scheduled for a surface attack tactics mission. When No 4 aborted, No 3 assumed a chase position on the lead element. After entering the low level route, the flight encountered deteriorating weather.

The flight lead continued along the route while coordinating a weather abort. When the clearance was received, the flight began a turn, still in VMC, to exit the route. No 3 was still in a chase position and had not been directed to close formation. During the turn, No 3 lost visual and radar contact with the lead element. Being unaware of the flight parameters, No 3 entered an inadvertent descent in IMC conditions. The aircraft descended 3,800 feet, struck the ground, and was destroyed.

■ An F-111 was flying a low level range mission. Witnesses observed the aircraft making a 40-to-50-degree banked turn around a navigation point and just above a fog bank.

In the turn, the aircraft began a descent unnoticed by the crew. Whether the crew failed to notice the descent due to spatial disorientation or distraction is unknown. The aircraft struck the ground in IMC and was destroyed.

Four aircraft were destroyed as a result of descent into terrain in instrument conditions. These are only examples. The files are full of similar mishaps in all types of aircraft.

Once you have studied these files for awhile, you come to the conclusion that there are only two reasons why people hit the ground in perfectly good airplanes. They know exactly where they (the aircraft) are but don't know exactly where the ground is. OR, they know where the ground is but don't know exactly where they are.

Low level in lousy weather can be a killer, and sometimes the regs aren't as helpful as they might be. What do those 60-16 limits really mean? If you are not careful, you may actually set yourself up. A New Year's resolution about setting your personal limits and not trying to fly VFR low level in IMC might be a good idea.

The other categories in our table are pretty evenly divided, and the numbers are also fairly consistent for the entire period. The one that is most significant at the moment seems to be the midairs, because we are already up to the average number with two months left in the year. The real problem here is that most midairs involve members of the same flight.

■ Two F-5s launched on an ACT mission. During the first engagement, the attacker called a Fox 2 from 5 o'clock and 3,000 feet. The defender honored the shot call with a right break, pitch back, and roll over the top to cause the attacker to overshoot to his 9-10 o'clock. The attacking pilot lost sight of the other aircraft and began a hard right turn assuming that the defender was slicing down behind him.

In fact, the attacker turned directly into the path of the defender. Sun position and lack of accurate flightpath prediction by both crews led to a midair collision.

■ A flight of two F-15s was on a training mission while en route to the training area. Lead called for an Alpha check. While the wingman was working his problem, he directed his attention inside the cockpit and failed to notice the closure rate which had developed between his aircraft and Lead. The aircraft collided, and the wing aircraft was destroyed.

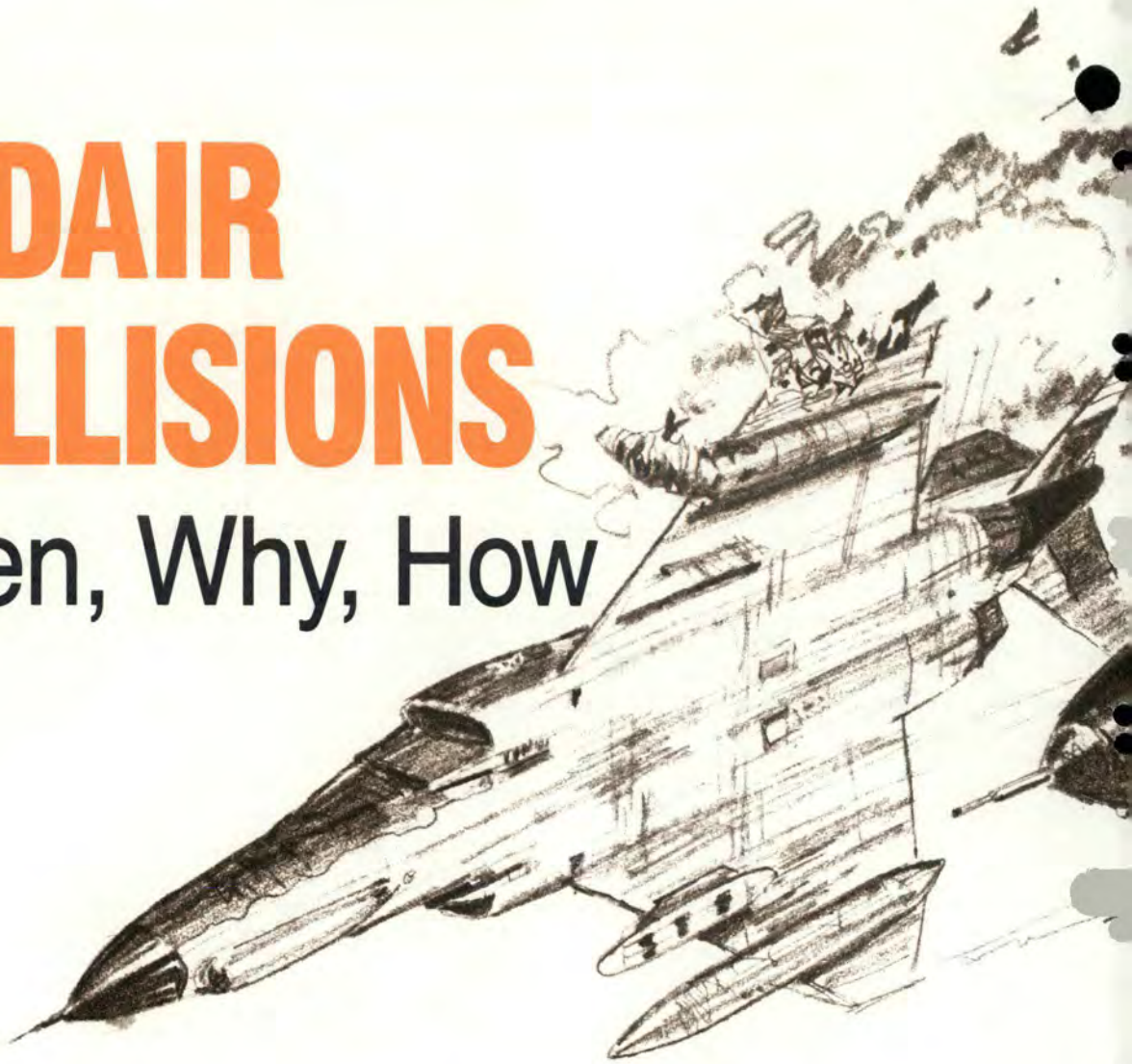
■ Four T-38s were on a standard four-ship formation training mission. During a tactical turning rejoin, the student pilot in No 4 got too close and too far forward on No 3. The IP in No 4 took no action to correct the situation. The IP in No 3 did not monitor his wingman's position and made an abrupt turn into 4 in an attempt to complete the rejoin. The No 4 IP, rather than overshoot to the outside, attempted to stay inside No 3's track. The two aircraft collided, and the crews were fatally injured.

When you talk about "see and avoid" in midair collision avoidance, most people think of clearing for the unknown aircraft transiting your area. How about a New Year's resolution to remember to "see and avoid" the members of our own flight as well.

So how about it? This year we have an even better chance at health, happiness, prosperity, and all those other good things we wished each other at the New Year's party. We also have a chance to really affect the aircraft mishap rate, especially if we all *keep* our resolutions. ■

MIDAIR COLLISIONS

When, Why, How



MAJOR R.J. STROUP
F-15 Flying Safety Program Manager
HQ PACAF

■ The mission was a 4V4 dissimilar air combat training (DACT) sortie. I had my flight all fired up to go out and kill (simulated) the adversaries wholesale and sustain no losses ourselves.

The mission progressed as planned until the end of our area time. The final engagement was complete; our plan was executed flawlessly. We had sustained no losses. All flight members were feeling very good, and I called for the flight to join up in a right-hand turn as briefed.

Forty-five seconds later, both myself and my wingmen were in our parachutes watching our two aircraft falling to the earth in fiery balls of disintegrating metal. What had happened? What had gone wrong? How could this happen to me?

The story related was fictional, but very similar circumstances have caused the same results. I know this has never happened to you, but whether you fly high performance aircraft or not, I bet at least one out of three pilots or navigators can relate a "there I was" or "you should have seen what this guy tried to do to me (us) today" story. If you can't, maybe you should take the helmet bag off your head.

In the next few paragraphs, I'd like to give you a little food for thought and some facts to focus on about midair collisions.

The "nums" for this article were based on the findings and causes as determined by formal mishap investigation boards of Headquarters Air Force Inspection and Safety Center final evaluation reports. Thirty-three of a total of thirty-eight midair collisions for all aircraft from 1978 to August 1984 were evaluated. The five mishaps not evaluated involved civilian aircraft.

Let's first take a look at when these mishaps occur. Obviously, they can occur any time, but they occur over twice as often during a less demanding phase of flight (i.e., rejoin, en route/cruise, formation, etc. [See Figure 1]). I can already see the . . . flags coming out, but it's true. Numerous rejoin accidents read like horror stories: The wingman positioned his aircraft forward and above the prescribed re-

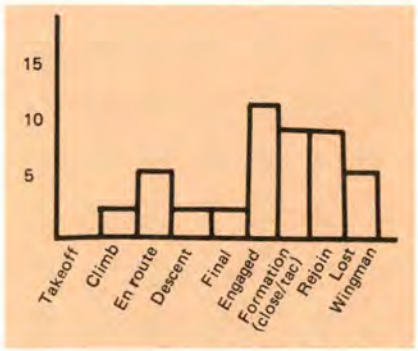


Figure 1.

join line and *failed* to take proper corrective action — results: Collision.

During a 90-degree turn, shortly after takeoff while in tactical formation, the Number 2 pilot *failed* to maintain separation from lead — results: Collision. These are just a few of the many apparently senseless mishaps.

What happened? Inattention by one or both flight members, overconfidence of the wingman in his abilities, or overconfidence by lead in his wingman's ability, or just a mental letdown by all flight members.

Any of these alone, or in conjunction with one another, could cause a midair. From the time you start your engines until the time they're shut down back in the chocks, you've got to be ready for anything. If you don't have any rules you use as guidelines, I'll give you three rules *I* live by: Never assume that the other guy sees you; never assume he'll get out of your way; and never assume he has total situational awareness, even during a rejoin. These not only apply in a benign environment, but also in the tactical swirling dervish.

The next area where there exists the possibility of the midair collision is when loss of visual contact procedures are used. This applies during lost wingman procedures and also during maneuvering engagements. Let's look at lost wingman procedures first.

When you're in the clouds is not the only time you may find yourself going lost wingman; however, this is where most people think of it. Losing visual contact can also occur during a rejoin at night (VMC), or when atmospheric conditions preclude you from maintaining sight or inhibit spatial orientation (i.e., sun, haze, ground, etc.).

The biggest cause for midair col-

continued

MIDAIR COLLISIONS

When, Why, How continued

lisions during this phase of flight is *not following prescribed directives.* The "one potato, two potato, he'll come back" theory just doesn't always work.

When a wingman loses sight of his leader, there are definite steps to follow whether during an engagement or in the clouds, and if executed properly, will most likely preclude a collision. Failing to execute lost wingman procedures in a timely manner (too many potatoes), failing to follow prescribed procedures (ROE), or attempting to rejoin too quickly after going lost wingman, are all causes that have been listed time and time again.

Basically, it boils down to flight discipline. If you can't see what you're flying off of, who you're attacking, or where your leader/wingman is during an engagement, it is very difficult, at best, to maintain the proper amount of situational awareness.

The bottom line is: Execute the proper procedure, follow the directives, and fly *your* own aircraft; but most importantly, leave yourself an out. Many pilots have gone lost wingman and found themselves in front of, on top of, and sometimes collided with their leader. Fly your aircraft and follow the procedures . . . they work!

The last area I would like to discuss is probably the one that most people think has the greatest potential for the midair collision, and that's the air-to-air arena, furball, or multibogey environment. Before I looked at all the facts, I would have thought that also, but it's just not true. I guess the "Big Sky Theory" works, but I prefer to think it's something else: Professionalism, aircrew discipline, and tactics. Luck, I would hope, has little to do with it.

There are probably a few reasons for this: Better visual lookout, better concentration during engagements, strict adherence to rules of engagement (ROE), and strong flight management — just to name a few. But still, approximately one-third of the midairs occurred during maneuvering engagements.

All but four were between the same flight members. Why? Let's take a look. Looking at Figure 2, we can see that supervision (direct and indirect), failure to see and avoid, and failure to follow directives are causes for the majority of mishaps, with ROE violations being a small portion.

There must be ways we can cut down on these types of mishaps. You've got to be at your best 100 percent of the time when flying. Letting down during any phase of flight could have disastrous results.

Supervision, both direct (flight lead/IP) and indirect (squadron supervisors), were listed as contributing to the mishap in 24 of 33 cases (Figure 2). Granted, the flight lead or operations officer cannot fly someone else's jet for them, but they can definitely provide in-flight guidance and assure that each mission is properly briefed and flown in accordance with directives and current regulations.

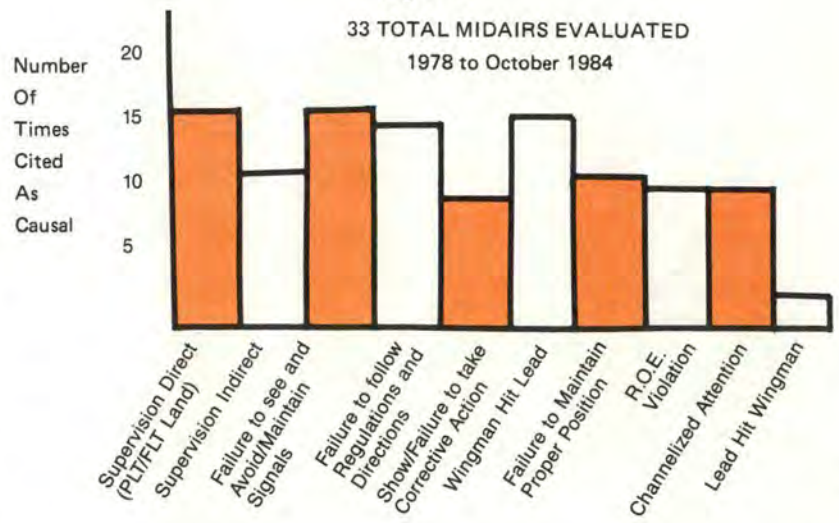
Whether you like it or not, you're being looked at all the time. The fact that you are not actively part of a flight does not relieve you of your responsibilities. Making sure that everyone is current, qualified, and physically fit for the mission is a big part of the successful and safe accomplishment of the flight's objectives. Pairing an inexperienced/weak leader with new or inexperienced wingmen is probably the quickest and easiest example to cite. If you think about it just a little, the possibilities are unlimited.

I would like to wrap this article up with a few one-liners that I've come up with through my own experiences, others experiences, and the facts obtained while researching this article. They apply to the man flying the machine, to the scheduler who placed him on the schedule, to his flight commander or operations supervisor who approved him for that mission, to the operations officer/squadron commander who has the ultimate responsibility for each aircrew member.

Hopefully, a little understanding and application may prevent a mishap from happening to you or someone you know, and that's what it's really all about — *Prevention.* So, here they are:

- Know and understand when, why, and how midair collisions can occur — *and be ready!*
- Ensure that the quality of training programs and the supervision of them is closely scrutinized.
- Emphasize situational awareness during all phases of flight and let nothing go unnoticed/uncorrected.
- Fly your aircraft and leave yourself an out.
- Know and understand the rules and follow them.

Figure 2.



It's Your Game

LT COL AL SCHNEIDER
Directorate of Aerospace Safety

■ First, two quick questions. One: Are you a family man or woman and still have little or no life insurance? And two: Would you let your children go camping overnight in the wilds, unchaperoned, without gear, and without the knowledge of how to use it?

If you answered yes to either question stop, there is no need to read any further! I don't think we can help you.

Life insurance can be defined in many ways; insurance providing for payment of a stipulated sum to a designated beneficiary upon the death of the insured is Webster's version. That's a cold statement that excludes the fact that one must pay a regular fee (premium) to bet against the come. The life insurance I'm talking about is free, involves a minimum amount of your time, and will improve your odds against the come. It's called life support training.

The Air Force has developed a core of dedicated individuals (egress, parachute, life support, and survival equipment specialists) to ensure that when your world begins turning "brown," you can escape from your jet. These "guys and gals" work long and hard hours and have compiled a fantastic record of providing for aircrew escape, survival, and rescue. On the other hand, WE, the aircrew members, haven't been holding up our half of this Air Force insurance policy.

Sitting here at the Inspection and Safety Center and reading mishap reports, I am continually amazed at the performance of some aircrews during post-ejection and the follow-on survival situation. Hold on you non-ejection troops, you are also included. The failure of aircrews to know how to use and operate *their* escape and survival equipment and to assist in *their* rescue really concerns those of us who are dedicated to your survival.

I know all MAJCOMs have established good life support training programs. I know their trainers are knowledgeable and dedicated. What I don't know is why performance is lacking when YOUR life is on the line. Yes, I concur. Ejection, or for that matter, any emergency escape is traumatic; but, your performance at this time must be flawless and timely. The Air Force, your family, and your friends demand it.

The bottom line is *the insurance is free.* You are already enrolled in the course, and it is your life. Life support training is as important as flying the jet — spend the time, get involved, and be ready to pass the exam — if it comes your way. ■

"It's Time To Get Out Of Here!"

■ "I'm on fire . . . XXXX! . . . (puff, puff) . . . I gotta get outta here. . . . MAYDAY! MAYDAY! MAYDAY! . . . (puff, gulp) . . . XXXX! . . . (Pull) . . . the canopy jettisons into a 450 knot headwind, the rocket lights, and the seat catapults up the rails leaving behind anything that isn't attached or snugly tucked away (elbows, ankles, feet). The pilot is blasted by the windstream, G forces blurring his vision, yet he methodically, instinctively begins applying procedures he's sure he'd never need.

As fighter pilots, we dutifully review our ejection procedures on a regular basis. We complain, moan, and often act uninterested in the whole ordeal, but deep down we listen and realize that this is "need to know" information. Ejections do happen, and not always to the "other guy," though most of us may not like to admit it.

The following *Flyboy* interviews are about ejections that happened, not to the "other guy," but to three active, breathing members of the Michigan ANG. Each story is somewhat different, but they all have a common thread of similarity — they survived by knowing and applying procedures that they hoped they'd never need.

The tough part was over, thought Capt Larry Pabin as he was returning from a night-bombing mission over Southeast Asia. Little did he know that his night had just begun.

Flyboy: Set the scene for us, the circumstances that led to your ejection on February 28, 1968.

Lt Col Pabin: I was at about 14,000 MSL in my A-6 when I collided with an F-8. The weather was marginal, tops at 10-12, with poor visibility above on a very dark night, no moon. GCI called traffic at 2 o'clock, which we couldn't see. The next thing I remember, there was a big light within feet of me. I pulled up and could not escape hitting the other aircraft. His wing clipped my tail. There was a big orange flash, and we immediately went uncontrolled. I tried to regain control of my aircraft which wasn't responding to my inputs. I told my right-seater to "eject," and he didn't respond. I reached for my face curtain to eject, but the G forces were so great that I couldn't raise my hands high enough to grab the ejection handle. I tried for the alternate ejection handle between my legs, but still the G forces prevented me from reaching the ejection handle. I again reached for the face curtain and this time was able to eject. The guy in the right seat ejected seconds after I did.

Flyboy: So there was no question about staying with the aircraft?

Lt Col Pabin: None.

Flyboy: Tell us about the ejection.

Lt Col Pabin: The main thing that sticks in my mind from the initial midair to the chute blossoming — my perception was that this was a long period of time. In reality, it was

"Even in the most mundane circumstances, you can end up using your ejection seat. I'd sure hate to do it again, but I wouldn't hesitate. Ejecting is a lot less painful than the alternative."

not a long period of time, but the stress made everything seem to move in slow motion.

Flyboy: We get paid to ask dumb questions so bear with us — were you scared?

Lt Col Pabin: Yes. I remember thinking after I pulled the D-ring and waiting for the chute to open that it wasn't going to work. I thought to myself, "I'm going to die, I just hope it doesn't hurt."

Flyboy: That reminds us of an air force training film on ejections where the female student pilot ejected on T/O and says, "it worked just like it is supposed to and it didn't hurt!" Would you agree with that?

Lt Col Pabin: (Smiles) Yes, pretty much, though I might not have phrased it quite that way.

Flyboy: Where did you land?

Lt Col Pabin: It was completely dark out and I wasn't sure if I was over land or water. I didn't know I was going into the water until I splashed down. When I hit the water, I hadn't deployed my flotation devices, so I went pretty deep.

Flyboy: Tell us about water survival.

Lt Col Pabin: Under water I pulled my flotation devices which brought me back to the surface, right in the middle of all my parachute lines. I was under stress . . . I was scared. I was trying to get away from my parachute, but I didn't do things step by step. I was trying to get away from my parachute while I was still connected to it. Finally, I had to tell myself, "Stop! Stop! Stop!, Settle down!" Once I acknowledged my fear, I was able to work through it, rather than against myself.

Flyboy: Let's back up for a moment. Do you feel you were adequately prepared, both mentally and physically for the possibility that you might be placed into an ejection situation?

Lt Col Pabin: Training wise — yes, but not frame-of-mind wise. I knew the procedures, but I never really thought it would happen to me. I never thought ejection would be all that difficult, but it is. It is a high stress situation. You know if something doesn't work that you are going to die.

Flyboy: Let's go back to your water survival.

Lt Col Pabin: Once I disconnected from my parachute, it took me awhile to get away from all the lines. I had my radio out and was talking on it but got no response. I'd probably been in the water about 25 minutes when I saw some planes in the area dropping flares. I was reluctant to deploy my life raft because it was just one more line I could get tangled. In retrospect, this was a mistake because I began to shiver — so much that I could hardly talk on the radio. Hypothermia was setting in and could have been a real problem if my rescue had been delayed.

"The No. 1 thing is the mental attitude that it can happen to you. You have to say to yourself, if I want to survive, I'm going to have to know the procedures and follow them."

Flyboy: How much time elapsed from ejection to being rescued?

Lt Col Pabin: About 45 minutes. When the helicopter entered the area, I used my flares and tracers from my pistol to mark my position. The rescue team complimented me on my use of these signaling devices. It was no piece-of-cake for the helicopter pilot either — no horizon, etc. When he spotted me and came over for the pickup, he almost landed on my head. I remember thinking, "Oh, XXXX. I made it through all this and now he's going to kill me."

Flyboy: Were you worried about being caught by the enemy?

Lt Col Pabin: Yes. As it turns out, I was five miles offshore from enemy territory and was quite concerned as I was falling in the parachute that I would land in the hands of the North Vietnamese.

Flyboy: What can you pass on to the rest of us in this business that will help us to make a timely decision to eject and survive an ejection?

Lt Col Pabin: The No 1 thing is the mental attitude that it *can* happen to you and that it is going to be stressful — it's going to be tough. You have to say to yourself, "If I want to survive, I'm going to have to know the procedures and follow them."

Flyboy: If you could highlight one mistake that you made that you would not want one of us to make, given a similar situation, what would that be?

Lt Col Pabin: I would say fighting my own fear and anxiety. You are going to be scared. Acknowledge that fear, and just tell yourself, "OK, I'm scared, but I can and will apply the procedures to survive." Take things one step at a time. Once I acknowledged my fear, things went OK.

On the 28th of April 1967, Capt Arthur P. Tesner was flying his RF-101 on a night out-and-back mission over Kentucky when he collided with a Bonanza, resulting in ejection.

Flyboy: Set up the scenario that led to your ejection; i.e., type aircraft, mission altitude, weather, etc.

Brig Gen Tesner: I was on a night out-and-back mission just prior to sunset in an RF-101. The weather was clear-and-a-million. I was at 21,000 feet on an IFR clearance, and the aircraft I collided with was on a VFR clearance at 20,500 (PCA started at 24,000 feet in those days). The controller I was talking to said there were no aircraft in my vicinity except some other RF-101s several miles in trail. In reviewing the tapes from that night, the VFR controller made two traffic calls to the Bonan-

continued

"It's Time To Get Out Of Here" continued

za — "Traffic 12 o'clock 15 miles, altitude unknown" and "Traffic 12 o'clock 6 miles, altitude unknown." How many times have you heard that same call? Most times the traffic turns out to be no factor, but it only takes once to spoil your day. Everytime you get those advisory calls, you should regard the traffic as a potential threat and stay heads up. Anyway, on this particular night, the traffic turned out to be at my altitude, resulting in a midair collision.

Flyboy: Did you see the other aircraft?

Brig Gen Tesner: Yes. I glanced down to my knee board, I looked up, and the wind screen was filled with a red-and-white Bonanza. I made an evasive jink to the left, felt a mild thump, and immediately went into an uncontrolled nose dive. I looked back over my left shoulder to see if I had in fact hit the other aircraft. About that time, I looked back into my cockpit, and my master caution was lit up, my three hydraulic systems were all reading zero, and the stick was not responding to my inputs. Passing through about 18,000 feet, I was in a fully developed spin and decided it was time to eject.

"I glanced down to my knee board, looked up, and the wind screen was filled with a red-and-white Bonanza. I made an evasive jink to the left, felt a mild thump, and immediately went into an uncontrolled nose dive."

Flyboy: So there was no question about staying with the aircraft?

Brig Gen Tesner: No. The aircraft was falling uncontrolled and not responding to my inputs.

Flyboy: Let's back up for a moment. What type of PE training did you have? Had you thought about what you would do if you were ever faced with this type of situation?

Brig Gen Tesner: Well, we were taught the 10,000 uncontrolled, 2,000 controlled rules for ejection; and we watched some films on ejection and discussed emergency situations, but not nearly to the extent we do today. We didn't do hanging harness or practice parachute landing falls. I guess the only time I really thought about ejection walking out to the airplane was what I would do during the T/O phase if my engine failed or something of that nature.

Flyboy: What was going through your mind as you pulled the ejection trigger?

Brig Gen Tesner: There was no hesitation. I'd made up my mind to go, assumed the proper position, and squeezed the triggers.

Flyboy: Tell us about the ejection.

Brig Gen Tesner: It was very violent. I can remember the canopy bow moving away from me as I went up the rails. I remember having a very firm grip on the ejection handles — so firm in fact that my fingernails were ripped and bleeding from the ejection. Very soon after getting into the windstream, my helmet and mask were completely blown off my head. I was separated from the seat and was tumbling violently and remember thinking, "Boy, I've got to stop this." I went into a spread-eagle position which immediately stopped the tumbling — I don't know why I went into the spread-eagle position, but it worked. Unfortunately, I was falling earthward in the faceup position. Anyway, I was falling and falling waiting for the chute to open and was really quite comfortable; a bit relieved that I'd made it this far. Well about this time the ground was beginning to look bigger and bigger, and I decided I'd better pull the D-ring myself. I was probably 6-7,000 feet AGL.

". . . I can remember the canopy bow moving away from me as I went up the rails. I remember having a very firm grip on the ejection handles — so firm that my fingernails were ripped and bleeding from the ejection.

Flyboy: So the automatic opening device didn't work?

Brig Gen Tesner: That's correct. The gold key which should have gone with the seat to activate the

"When the time comes to make that ejection decision, be prepared to move decisively with full knowledge that you are well-trained and mentally prepared for whatever comes your way." — **Brig Gen Tesner**

automatic opening device was still connected to my harness.

Flyboy: So, go ahead, what happened when you pulled the D-ring?

Brig Gen Tesner: When the parachute opened, it was a very violent experience. It didn't hurt; but it was violent.

Flyboy: Tell me about the landing.

Brig Gen Tesner: I was falling toward some water and pulled on the riser to steer toward land. I wasn't sure which riser to pull, but by trial and error I was able to steer toward land.

Flyboy: Were you hurt on landing?

Brig Gen Tesner: Not severely. I hurt my back, but my adrenalin was pumping so hard I didn't really feel much pain until hours later. I landed on the side of a hill and did a pretty good PLF; knees bent, feet together, even though I'd never practiced one. Once I landed, I tried to stand up to remove my harness, but I was so drained from the whole experience, I fell flat on my face.

Flyboy: How long after landing were you rescued?

"Training is the answer . . . When we do the harness and seat training — take it seriously. Don't assume ejections are something that only happen to the other guy."

Brig Gen Tesner: Within seconds there were several people around me, even though I was in a pretty isolated area of Kentucky. I was glad there was someone there to help. Even though I wasn't hurt, I was worn out emotionally. Ejection is a traumatic experience!

Flyboy: Fortunately there are only a small number of pilots who have been in an ejection situation. You have and lived to tell about it. What information can you pass on to the rest of us in this business that might aid us in making a timely decision to eject and surviving the ejection?

Brig Gen Tesner: Training is the answer to both your questions. When we do the hanging harness and seat training — take it seriously. Don't assume that ejections are something that only happen to the other guy. When it comes time to make that decision, be prepared to move decisively, with full knowledge that you are well-trained and mentally prepared for whatever comes your way. Ejections can and do happen — remember that when you go through the PE training.

Flyboy: General, you have approximately 4,500 flight hours and years of experience, what words of wisdom can you pass on about surviving in this business?

Brig Gen Tesner: Know what your limits are and live within them. Push yourself to improve and excel, but stay within your limits — don't let ego or self-confidence interfere with sound judgment. Know your limits and live within them.

"I looked over my right shoulder to check my wingman just as his aircraft collided with mine. His aircraft was in a slight left bank and his head was inside the cockpit . . ."

On February 9, 1979, Capt Dan Unger and Capt Bob Soberg departed Buckley ANGB en route to Selfridge. It was a perfect day for flying — cold crisp air, clear blue skies, two good jets, and two experienced pilots. Ten minutes after takeoff, Capt Soberg was dead, and Capt Unger was plummeting earthward in his burning F-100.

Flyboy: What circumstances led to your ejection?

Maj Unger: We were at FL 290; Bob was out in route formation. We had just passed over Hayes Center Tacan, and I reached down to dial the outbound course into the HSI. I glanced over my right shoulder to check my wingman just as his aircraft collided with mine. His aircraft was in a slight left bank and his head inside the cockpit, apparently looking at his clipboard.

Flyboy: So you don't think he ever knew what hit him?

Maj Unger: No, I really don't. It was just a matter of my not monitoring him for a period of time and him not watching me.

Flyboy: What happened after the collision?

Maj Unger: There was a loud impact sound. My aircraft pitched up and then went into about a 20-degree dive. I tried to fly the aircraft, but the stick was useless. My

continued

"It's Time To Get Out Of Here" continued

initial impression was that I was building airspeed rapidly and thought, "Oh, XXXX!? It's going to be a high speed ejection." I looked at my airspeed indicator, and it was reading between 150-200 knots. I remember thinking, and correctly so, that I was in a flat spin. About that time I realized, by looking in my mirror, that I was on fire. I looked over my right shoulder to confirm the fire and saw the flames and smoke. I rotated back around in my seat, assumed the proper position, and ejected.

Flyboy: Was there any question about staying with the aircraft?

Maj Unger: No. At first my natural reaction was to maintain aircraft control, but the second I saw the fire and smoke billowing out of the aircraft, I said "It's time to get out of here," and I ejected.

At first, my natural reaction was to maintain aircraft control, but the second I saw the fire and smoke billowing out of the aircraft, I said "It's time to get out of here!" and I ejected.

Flyboy: What was going through your mind as you squeezed the triggers?

Maj Unger: From the point of looking around and seeing the fire and suddenly coming to the realization that this is it — you're going to jump out of an airplane, it was almost like — I can't believe this is happening to me, but there was no hesitation.

Flyboy: Were you hurt on ejection?

Maj Unger: No. I got an instantaneous chute, which means I was below 14,000 MSL. All my equipment worked as advertised. I kept checking my body for injuries thinking I must be hurt — everybody gets hurt during ejection. As it turns out, I did get a compressed vertebrae and bruised my arm but didn't realize it at the time.

Flyboy: Did you feel adequately prepared for the possibility that you might someday be placed in an ejection situation?

Maj Unger: Well, bottom line to tell you how I performed versus what you're supposed to do on ejection — I was very satisfied. You can sit around your whole career and talk about what you'd do on ejection and never have to do it. If you think about it, you'll wonder; How will I perform? How will I really perform? Has my training been adequate? I'm happy to report that it was — though I think I applied more of the things I learned in pilot training rather than my "hun" training.

Flyboy: Was the ejection violent?

Maj Unger: No, not really. I had some marks on my legs from the harness straps, but I wasn't overwhelmed by the force of the ejection or parachute opening. I had plenty of time to go through my ejection checklist (i.e., check canopy, raise visor, discard mask, deploy or jettison seat kit, 4-line jettison, and prepare for landing). I lined myself up for landing into the wind. When I landed — I hit "feet-butt," almost instantaneously.

Flyboy: How long after landing were you rescued?

Maj Unger: Almost immediately.

Flyboy: What do you feel is the most important thing you learned from this experience that you can pass on to the rest of us?

Maj Unger: I think the biggest thing is that even under the most mundane circumstances, you can end up using the ejection seat. We do a lot of challenging things in the A-7, and you always think that if you are going to eject, it will be on some complex tactical mission. The thing that I learned out of this, coming back straight and level on a XC, you can't let your guard down. That's an unfortunate circumstance of this accident. It's almost ironic when you think about all the things we do with these aircraft, but you've got to be prepared to use the equipment whenever the need arises. It can happen at any time. I'd sure hate to do it again. It was pretty terrifying, but I wouldn't hesitate making the decision to eject if the time came. Ejecting is a lot less painful than the alternative in that situation.

Learning from other crewmembers experiences is a most valuable tool. *Flying Safety* is always interested in your stories.

The above interviews reprinted from Flyboy — Entertainment for Pilots, *Third Quarter, 1984.* ■

IFC APPROACH

By the USAF Instrument Flight Center, Randolph AFB, TX 78150-5001

Head Up II

MAJOR GARY GRIFFITH
USAF Instrument Flight Center
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■ As you recall, in our last article we discussed basic HUD setup, HUD use when encountering IMC conditions, and flying a penetration using the HUD. In this article, we offer a few more HUD techniques for use during instrument approaches and night operations. Most of these techniques come from USAFE Pamphlet 51-9 — *KEEP IN MIND, THESE ARE ONLY TECHNIQUES — NOT PROCEDURES.*

HUD capabilities vary between aircraft, and your MAJCOM or Dash-1 may specifically address HUD use when in IMC. Regardless of how much the HUD is used, a systematic cross-check "head down" must be maintained to confirm the validity of HUD information.

Precision Approaches

There are two distinct advantages of using the HUD during a precision approach: (1) More accurate heading information and (2) the capability of establishing and maintaining published descent gradient by use of velocity vector/fpm.

After establishing landing configuration and slowing to proper AOA, note the airspeed for the required AOA and then reference airspeed along with AOA throughout the approach. Cross-check the "head down" altimeter with that of the HUD.

To begin descent, set the velocity vector/fpm to the published descent gradient and then cross-check "head down" indications for proper performance. Make minor changes in pitch using the velocity vector/fpm. Cross-check the airspeed indicator with AOA and the velocity vector/fpm with VVI and ADI.

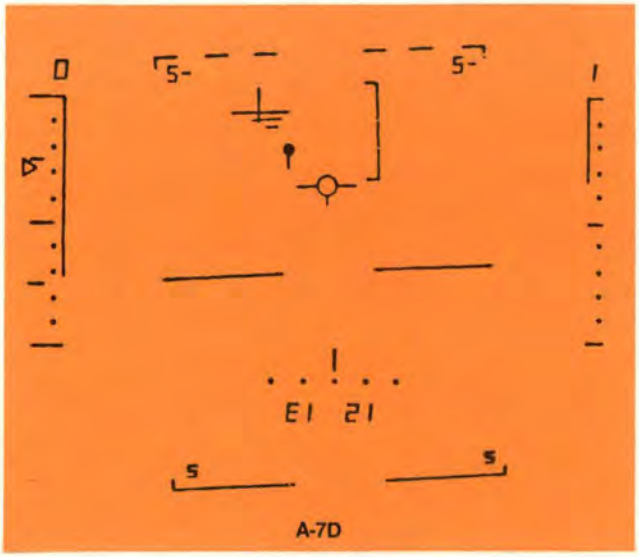
ILS approaches should be flown "head down" until established on final with more "head up" flying as you approach decision height. The flight director information in the HUD provides superb course and flight path guidance while keeping your "head up."

Nonprecision Approaches

The HUD should be used as the primary reference for pitch control (with cross-checks of its performance). Begin descent to MDA by placing the velocity vector/fpm approximately 3 degrees to 4 degrees nose down, then check VVI for proper descent rate.

Nonprecision approaches are designed to get you to the missed approach point/minimum descent altitude using normal descent rates. Do not rush the descent — you may develop a high sink rate and complicate the transition from IMC to VMC.

continued



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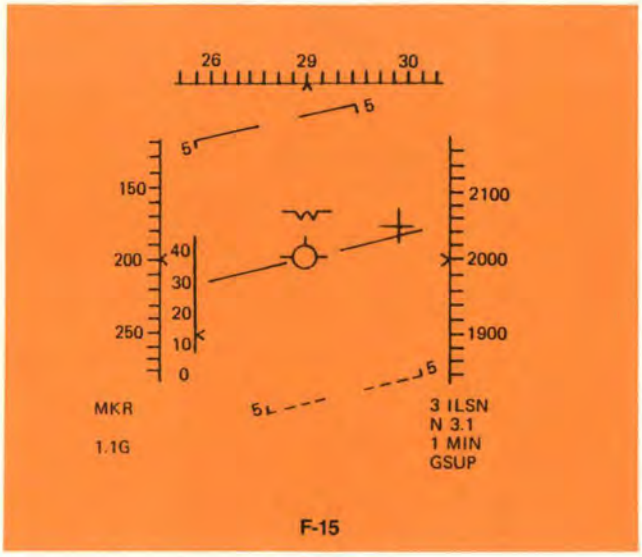

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upside down

IFC APPROACH — Head Up II continued

Depending on type HUD and aircraft you are flying, primary TACAN course guidance can be obtained either "head up" or "head down." Even in "head up" cases, we recommend you capture the final approach course "head down" first, then transition to the HUD.

For a localizer-only approach, course guidance information is available in the HUD. Make sure the localizer is "captured" and you are on a final before transitioning to the HUD.

An ASR approach is flown essentially the same as a PAR, but pitch change for descent to the MDA again should not normally exceed 4 degrees to 5 degrees nose down. Cross-check the velocity vector/fpm with the ADI and VVI. Expect a VVI indication between 1,000 and 1,500 feet per minute — depending on final approach true airspeed.

Transition To Land

This is an area where the HUD can be a very important aid to the approach and may spell the difference between missed approach and landing. As you begin to spend more time in the HUD during the final stages of the approach, *don't forget to continue to fly instruments.* If you channel all attention to the runway, AOA/airspeed and altitude control are likely to become sloppy and may place the aircraft in a position from which you cannot recover.

Continue the approach until close enough to land using normal visual references; and remember, it's the runway you have to land on, not the HUD. Look *through* the HUD, not at it, and make a normal visual landing.

Ensure the velocity vector/fpm is 2.5 degrees to 3.0 degrees nose down as you start the descent for landing, and that it is near the desired touchdown point. If you have less than this descent gradient, you probably started down before the VDP and will have a dragged-in final.

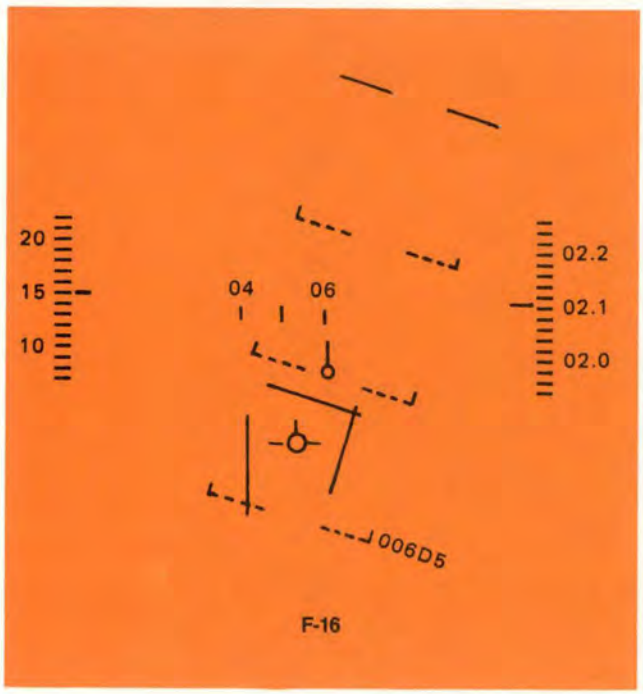
If you arrive at the MDA early and have the runway in sight, merely level off momentarily until the 2.5 degrees to 3.0 degrees nose low reference is over the desired touchdown point and continue descent to land.

Dos

- Know what to expect when you break out (lights, terrain, runway, layout, etc.)
- Know the position of your drift cutout/symbol stiffening switch.

Don'ts

- Forget to continue your instrument cross-check after you go visual.



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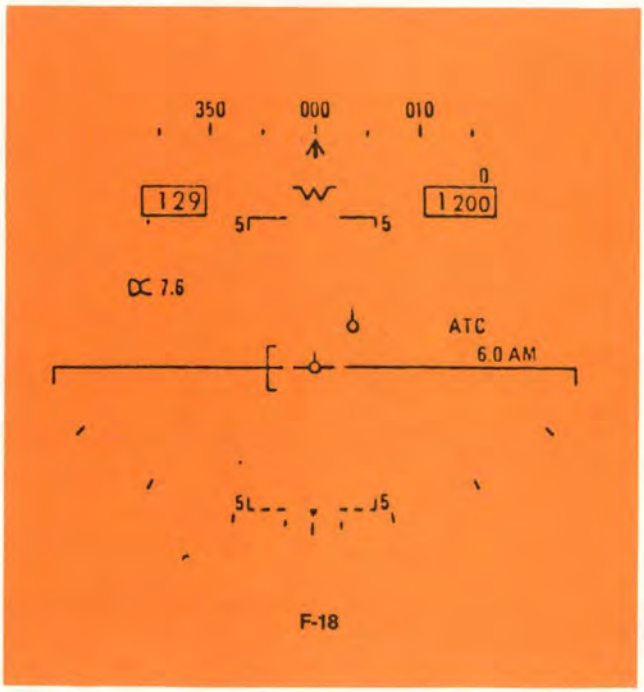


F-18

■ Forget to look at the runway when it comes time to land.

Missed Approach

Missed approach is similar to the instrument departure. Make sure you establish a positive rate of climb before raising the gear. Use caution when going to full power — this rapid acceleration can generate a false climbing sensation and lead to spatial disorientation.

Initial pitch attitude should be established "head down," then transition to the HUD for pitch. Use the HUD primarily for pitch control and level flight indications.

Altitude, airspeed, and course should be established "head down."

Night Operations

Regardless of weather conditions, reference to the flight instruments at night is paramount. Cockpit lighting should be as low as possible to see the instruments and HUD without having to stare at them. Flood lights should be off. If your HUD has a manual light intensity control, set it low to reduce glare and allow an easier HUD "look-through" for runway acquisition.

Conclusion

A properly functioning HUD is an invaluable aid to all-weather flying capability. Remember though, it is NOT a sole instrument flight reference; *It must be incorporated into your normal instrument cross-check.*

Once you have integrated the HUD into your instrument flying, turn it off occasionally and fly a few HUD-OFF approaches. This practice will retain and sharpen your skills at "head down" instrument flying for those rare occasions when the HUD isn't available.

If you use all of these techniques, that's good. If you also have other good techniques that you use, that's even better. The purpose of this HUD article, and the one last month, is to generate thought and discussion on proper use of HUD and HUD capabilities and limitations in instrument flying.

For questions or comments, contact the USAF IFC/FD, Randolph AFB TX 78148-5001 (Maj Griffith), or call AUTOVON 487-3077. ■

Welcome Back To The Trenches

FIRST LIEUTENANT MISHO A. PROTIC
25th Flying Training Squadron
Vance AFB, OK

So now you're an IP. Your superiors have recognized the true, golden nature of your hands and selected you to pass on your expertise to those less skilled. But there are pitfalls — even for "golden hams."

The mishap files at the Air Force Inspection and Safety Center are filled with reports which are classified: "Supervision — Direct. . . . The IP failed. . . ." Most of these failures can be attributed to one of the things mentioned in the following article. Although told from the UPT perspective, the points are equally valid in a fighter squadron or airlift wing. Being an IP is not just a job, it's a responsibility.

■ Now that you've returned from Pilot Instructor Training (PIT) all ready to conquer the Undergraduate Pilot Training (UPT) world (C'mon, hit me with your worst fledgling, and I'll give you back a pilot!"), I thought it would be a good time to pass on a few lessons that I've learned in my short — but educational — instructor pilot career. With any luck, my words may help to reduce the amount of knowledge you'll have to acquire the hard way, like I did. I've summarized my lessons in the following six points.

1. Don't equate assuming control of the aircraft with some instructional failure on your part. Even with the best instruction, students are going to make mistakes. I know the temptation is initially to let the student go "just a little farther," in the hope that the lightbulb over his helmet might finally illuminate. Remember, however, that the farther you let the student go, the closer you are getting to the limits of your own ability. As you approach this limit, any learning that occurs will not be worth the compromise of flight safety. If the student is missing the picture, it just might be time for another dazzling IP demo. By the way, if you speak with most older IPs, they'll tell you that nowadays they intervene more readily than when they were brandnew.

2. Watch out for your own complacency as you begin your third

class. By this time you've seen it all (or at least *I* thought so), you've made a few "saves" to enhance your self-image of infallibility, and you've perfected your instructional routine to the point where you are confident that you could teach a chimp how to fly. Be aware that your pilot time at this point coincides with an experience level that many experts identify as having the highest accident potential. Also, by this time you're becoming one of the "old heads" in the flight, and as such will probably be flying with more of the weaker students. The combination of this critical phase in your experience level and the increasing responsibilities of seniority demands that you devote more of your attention than ever to the mission you're flying. I've found that the best remedy for complacency is to *keep the job interesting* — by continually striving to upgrade your own proficiency and book knowledge, and maybe by even expanding your repertoire of techniques.

3. Keep your hands close to the stick and throttles and your feet resting lightly on the rudder pedals, at all times. I can remember a formation ride a while ago where I let complacency and a good student move my hands from the controls to my lap. All it took was one abrupt rollout from an echelon turn and my heart had reached my mouth before my hands reached the stick. Although no harm was done, one such lesson was enough for me. Besides, even if your student never needs rescuing, you can never know when materiel failure may occur.

4. Don't be lulled or intimidated by the "top sticks." Depending on which flight you're assigned to on your return to the UPT wing, you may have less than 75 hours more T-38 time than your student. And being brandnew, you'll probably be assigned the most competent flyers in the class. Regardless of how far beyond their peers they are, they are still in the role of student — and you are in the role of teacher and pilot-in-command. Having flown with countless students and many IPs of widely varying abilities, I have concluded that the best student cannot compare with the most junior IP; those intervening hours at PIT, with their greater requirement for command responsibility make a big difference. The "top stick" is still a long way from matching you in proficiency and air sense. So when things in the airplane start getting unusual, let your authority and superior judgment prevail — with no apologies or hesitation necessary.

5. Admit your mistakes to your student. We all make an occasional bad pattern. (I've mercifully forgotten how many hot no-flap touchdowns I've flown.) Both you and your student can learn from your mistake — if you call it what it is, and then debrief it. If you don't, Stanley might just accept your performance as the norm, when instead he should be striving for perfection. As IPs, our abilities are far enough ahead of our students that no loss of respect occurs when our demo doesn't work exactly as planned. A loss of respect, however, might occur because of our denial — either verbal or tacit — of what the student knows he just saw.

Keep in mind that, like it or not, you provide the example for many, many young officers. Students have an almost uncanny recollection of what you do, both in and out of the airplane. (Think about it — can't you recall minute details about the instructors that taught *you*?) Make your aeronautical and military conduct above reproach, and you'll never have to try to remember if you should worry about what you've done.

6. This last point is perhaps the most important. It is certainly the most difficult to achieve consistently. Just be confident in one thing: The Air Force wouldn't have entrusted you with such a valuable resource as its future pilots and leaders if they didn't know you were equal to the task. Good luck! ■

About The Author

First Lieutenant Protic is a T-38 Instructor Pilot in the 25th Flying Training Squadron. A 1980 graduate of Harvard University, he received his commission through USAF Officer Training School in 1981. He completed pilot training in 1982 at Vance AFB, Oklahoma, where he is currently assigned to the 71st Flying Training Wing.

HUMAN FACTORS HAPPENINGS

LIfe Sciences Division • Directorate of Aerospace Safety

Piece of Cake Perceptions and the Unforgivable Sin

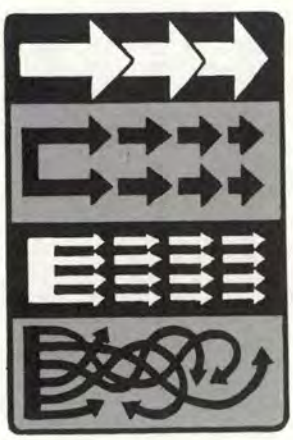
■ The crew's perception of a mission largely influences their attitude toward that mission. If the mission is perceived as interesting, demanding, or challenging, chances are good that the crew will prepare themselves accordingly. Proper personal/physical preparation, thorough mission planning, professional briefing, and alert and responsible execution comprise the norm. But if the perception is otherwise, the effect on crew attitude can produce some real horror stories.

In the hierarchy of embarrassing human errors to the professional aircrew member, errors of carelessness lists at the top. Carelessness connotes a lack of concern, of caring, of involvement, of professionalism, of assertiveness, and of control. Carelessness is the unforgivable sin.

All of those involved in the investigation, analysis, and prevention of aircraft mishaps, including of course, crewmembers and supervisors, should be aware of the effects of mission perception on crew attitude, and of crew attitude on planning. Piece-of-cake perceptions can lead to careless and complacent behavior.

The Other End of the Spectrum

Virtually everyone associated with the sciences of the human has concentrated on the "upper limit," i.e., how far can the human be loaded before failure — in terms of mission accomplishment — occurs? The common term for this limiting region is "task saturation."



We all know that if we give a person multiple tasks and decrease the time available to do them, the person will inevitably "fail." Try patting your head, rubbing your stomach, standing on your head, and talking to a sweet, young thing simultaneously — if you don't *physically* hurt yourself, she'll think you're a nut!

Better yet, climb into an A-10 cockpit on an ORI, make gun passes on an upsloping range with the sun in your eyes, and be on your third "hot turn" of the day.

Sounds like the scenario leading to a catastrophe? You bet!

We've pretty well learned how to overload an aircrew member after reviewing hundreds of mishap reports, studies, and analyses. Overload is a management problem solved by removing tasks or prioritizing mission elements.

Very little, however, has been done to really study the opposite aspect. With due respect — and a feeling of awe toward the psychologists who really understand why it happens, let's explore the other end of the human spectrum.

Why does a highly skilled, professionally trained, superbly disciplined pilot decide to do a low level "buzz-job" on a town and wind up in a smoking hole? What makes an old-hand flight leader do acrobatics at 1,000 AGL and "Scrape off" his wingman on the ground?

One approach leads to the "Theory of Unsaturated Time Usage."

There are *rare* times in a pilot's career where he has:

- An airplane
- Airspace
- Free time, and
- No mission commitments

These occur when:

- The preplanned mission is delayed (or cancelled).
- An on-time launch was required with "dead" time before mission events started.
- A radical mission change occurred, or
- We needed to "fly the time."

Picture yourself in a single-seater at Flight Level 220 when the Command Post calls with "Bar 22, your mission has been scrubbed. Fly out your time and land as scheduled." What's your first thought? Probably, "those idiots!" The second? "You know, I haven't done a XXXXXXXXXX for a long time."

Some people would decide to use the time practicing patterns, instruments, or basic flight maneuvers.

Some, however, have "filled" the time with a very normal human reaction — recreational flying.

The human tendency, given license, is to do a "fun" thing, generally unplanned or inadequately thought out as to the consequences. Your Granddad probably told you the old saw, "Idle hands are the Devil's tool." While we don't imply infernal involvement, too many instances of spur-of-the-moment, impulsive behavior do occur.

"Two IPs in the same aircraft are an accident waiting to happen." Right, if, as Annie Oakley sang in "Annie, Get Your Gun," *"Anything* you can do, I can do better! I can do *anything* better than you!" After all, there is no pressure to instruct. There is trust in the other's ability, and, above all, there is the chance to do "something we can't do with students."

Here are some examples: The interceptor pilot who doesn't have the preplanned target available and is told to "hold for 20 minutes." The bomber crew told to "orbit" until "we check with higher headquarters." The list could go on.

What's the answer? Well, there probably isn't any that will fit all situations, but the pilot needs a firm idea of alternatives. Provided with an accurate list of his weakest areas (those needing practice) and encouraged to practice them, a pilot's commonsense should prevail. To further encourage this, more tasking could be laid on to ensure some continuous mission involvement.

As supervisors, we need to minimize the nonloaded time available and be more directive as to mission elements accomplishment. As Granddad would say, "Never tempt the Devil."

Visual Illusions

Deception by Cloud Shadows Most pilots are well aware of the problems in height/distance perception in low contrast environments — such as western desert ranges on overcast days. The lack of shadows and loss of contrast can mask small hills and has been implicated in collision with the ground. On days in which the sky coverage is scattered to broken, the cloud shadows can produce certain illusory effects — flat terrain can begin to appear hilly. Hilly terrain will also appear hilly, but some of the hills may be masked by the mottling effect of cloud shadows.

An A-10 pilot who thought he was at 100 feet AGL dragged a wingtip through just such turtle-backed hilly terrain, under broken cloud sky conditions, with shadows mottling the terrain. He was looking ahead and never noticed the small rise. An additional factor: This pilot was from an east coast base and had not yet calibrated his eyes for western ranges. The height of vegetation also fooled him. He had assumed the sparse brush dotting the desert were two-to-four feet high. In reality, they were only six-to-ten inches high.

Deception by Blowing Fog Of all approaches, there are few challenges as tough as approaches to minimums through blowing fog. The combination of low stratus and blowing fog creates an indefinite ceiling and denies a breakout on continued descent.

Normally, fog is associated with still air, and the pilot must contend with a visibility problem. Blowing fog (known as advection fog) can present problems in addition to those of visibility. In the presence of crosswind, precise instrument flight becomes exceptionally demanding. If given rapid-fire heading changes, the pilot will tend to focus on the ADI, forgetting about VVI or airspeed. However, the pilot must avoid large attitude changes which affect vertical velocity, stay aware of conditions which can be encountered, and resist the temptation to go visual too soon. As they become available, he should begin to integrate visual cues into the cross-check during the later portions of the approach.

In a multiplace aircraft, responsibilities are usually divided. For example, one pilot stays on the gauges and the other pilot concentrates his attention outside, attempting to pick up visual cues. He must also monitor the altimeter for critical heights, such as decision height (DH). It is generally the responsibility of the second pilot to make the land/go-around call at DH.

During the precision approaches, he calls "land," above or at DH *if (1) the runway environment is in sight, and (2) the aircraft is in position for a normal landing.* If not, he calls "Go Around." It is vital that the second pilot actually have the runway environment in sight before calling "land." If all he sees are approach lights and fog, he can be fooled into thinking he is higher than actual, since almost anything degrading visibili-

continued

HUMAN FACTORS HAPPENINGS continued

ty will generate the false illusion of height or distance. Not only is it critical that the second pilot make the correct call, it is important that he be timely. If the second pilot's call is delayed, the first pilot may be misled into thinking he has more time and altitude than he actually has, jeopardizing all.

When told to "land," the pilot who is flying has a tendency to go completely visual and forget his gauges, especially the VVI. Depending upon factors such as his own visual acuity, contrast sensitivity, and accommodation vs that of the second pilot, he may require several seconds to see what the second pilot sees. He is likely to fall victim to false height illusions generated by approach lights in fog. If the approach lights angle uphill, he may think himself high. He is set up for a duck-under, unconsciously lowering the nose to get lower, where he expects to see better.

In the absence of good outside references, a two-to-three degree pitch change may go undetected. However, the effect of this attitude change is an unexpectedly high rate of descent. It is vital to control vertical velocity.

For example, at 130 knots groundspeed, one degree pitch change, 227 fpm, three degrees pitch down would add 681 fpm to your rate of descent. You can see it's important to keep your attitude under control and to stay aware of your vertical velocity.

For a more thorough discussion of Landing from Instrument Approaches, refer to AFM 51-37 Instrument Flying, (C2) Section G, 6-19, dated October 1982. These sections contain excellent up-to-date descriptions and discussions involving the transition from instrument to visual flight in various types of fog, rain, and snow, plus the visual illusions to be expected.

Super-Sticks and Invulnerability

Every now and then you hear about some famous aviator, some super-stick who kills himself through carelessness and complacency. Bevo Howard took off without checking his fuel. Paul Mantz clipped a knoll landing the "Phoenix." Bill Tallman pressed the weather and hit a mountain.

Even the World's Greatest Pilots need to be aware of their limitations. That is what is called "experience."

The Air Force has had its share of super-sticks who bought the farm, too, from FWS grads, to competition winners, to airshow pilots. The common denominator appears to be an accentuation of that perilous attitude, *invulnerability,* in which the rules/laws no longer apply (not even the laws of physics).

The psychodynamics generating this attitude are relatively simple and straightforward:

- Proper selection, training, preparation, and practice produce good performance.
- Consistent good performance produces a result that is predictable, and that result is success.
- A steady dose of success leads to an attitude of invulnerability.
- Invulnerability produces a tendency toward carelessness and complacency — to drop one's guard a bit and fail to exercise normal judgment and restraint.

There are probably few among us who are not susceptible to this age-old trap. Everybody loves a winner — the praise, the adulation, peer approval, public recognition — it's pretty heady stuff.

When people keep telling you you're good, pretty soon you begin to believe it. You think you're good, better than most, perhaps even the best. You may even begin to forget that you, too, have some limitations.

When you get to this stage, friend, you're at risk. The more wise among you will recognize the imbalance and back off a bit. For others, it may require a very close call. If they survive it, the "experience" stimulates the development of "good judgment." Unfortunately, not all survive.

No one is immune to "screwing up." It can happen to the super-stick as well as the W.D. Good hands have a lot less to do with it than good judgment. The wise average pilot, ever mindful of his limitations, is at less risk than the super-stick who believes he has none. ■

How Do You Spell R·E·L·I·E·F?

MAJOR BRITT MARLOWE, BSC
Directorate of Aerospace Safety

■ If you're a flight doc, flight safety officer, or a life support officer, you are undoubtedly familiar with the reporting of Class C physiological mishaps. You know how time-consuming these reports are, especially if you're shorthanded in the office. You guys work your "tush" off and another "ho-hum" ear or sinus block Class C physio report is a real "pain."

Is this you? . . . the Flight Doc: "Why do I have to do blood work or provide anthropometric data on a KC-135 rapid decompression where no physiologic symptoms, injuries, or postflight complications result?" . . . the Life Support Officer: "Why do I have to report on personal equipment that functioned as designed and didn't contribute to the mishap?" . . . the Flight Safety Officer: "How am I going to convince the Doc that this one is *really* a Class C Physio requiring a 711gA?" . . .

We routinely run interference on these questions . . . We're on your side!!

The Life Sciences Division is naturally interested in receiving accurate mishap reports of a quality useful for mishap prevention . . . our question on some of the reports received . . . "Who's the real crew chief?"

By reporting on extraneous information not pertinent to the mishap, your life becomes more difficult; and the quality of reporting is reduced, ultimately defeating our efforts . . . that of preventing mishaps . . . so far so good, huh? . . . so *how do you spell relief?*

IMC-2 to AFR 127-4, Investigating and Reporting US Air Force Mishaps, will provide specific guidance on reporting Class C Physiological Mishaps. You can appreciate this if you have ever had to research the regulation to determine if a specific local mishap is physiological in nature, or, even better, if you've tried to determine which sections on the 711gA to fill out . . . Well, we've put the "beef" in the burger!

Changing the regulation was necessary to improve reporting accuracy and to provide clear guidance concerning reporting responsibility, what to report, what types of reports, and report suspenses.

Briefly, here's what you can expect: (1) Mishaps will be classified into two reporting categories (abbreviated/standard). The amount of reportable information being a function of that category as identified by the regulation; (2) the local safety office will be OPR to insure 711gA accuracy, flight surgeon and life support officer coordination, and suspense dates are met; (3) we've eliminated reporting of extraneous information not pertinent to the mishap; (4) the flight surgeon must identify the role of physiological training in mishap recovery; (5) the life support officer must make appropriate comments; (6) we've eliminated the reporting on life support equipment unless it contributed to the mishap; (7) we've eliminated the 72-hour history on abbreviated reports unless pertinent to the mishap. (Otherwise, this requirement exists for standard reports.); (8) the flight surgeon must briefly comment in Section IX, 711gA, on items coded in Section III, 711gA, by line number; and (9) Section IX, 711gA must be typewritten.

These are the "chunkies;" check the IMC for other items on the 711gA which you no longer have to report.

We believe these changes will improve reporting by eliminating unnecessary information and establishing clear guidance for the safety office, flight surgeon, and life support officer.

You can expect additional relief in the future. We are in the process of developing a functional, one page form suitable for reporting all Class C physiological mishaps, eliminating the requirement for 711gA.

Relief comes in many packages . . . little ones that reduce gastric distress and big ones that improve lifestyle . . . We think we can accomplish both. ■

MAIL CALL

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

Some Notes On The Ejection Decision

On pages 13 and 14 of the Sep 84 issue, I read an account of an unfortunately fatal F-4E accident. (It was another presumed spatial disorientation/SA loss type where they ejected out of the envelope.)

The remarkable thing is that except for some altitudes and the fatal result, I thought I was reading about my own close call over a year ago. In my incident, the factors leading to entry into the clouds were very similar to the F-4E accident. Since I'm still quite alive, I can lend some credence to what can happen in the clouds on a typical accident scenario.

Once I'd lost sight of the attacking F-4 (due to entering the clouds), I caged my GIB eyes to the instruments (specifically, attitude and altimeter). In the space of a few seconds, the pilot rolled into a 90-degree left bank, pulled a lot of G, rolled 180 degrees (into a right bank), pulled another healthy amount of G, then rolled inverted. At this point I uncaged my tongue and said, "ROLL OUT!" He said, "YOU GOT IT." I quickly practiced another unusual attitude recovery as I'd done so many past simulator periods.

Was his response a flashback to his UPT days? Maybe. Did the same loss of situational awareness kill those two F-4E guys? Only God knows.

I'm really writing to pass along some advice to my fellow GIB's. Don't let the lack of formal USAF pilot training kill you. Treat every minute of stick time (actual or simulator) as if it were your last. Practice aerobatics until you are comfortable in *any* attitude. The rear end you save may include your own.

A Phantom GIB

Thanks for your very thought-provoking letter. Being a part of the crew means sharing the responsibility. You, as a GIB, must be ready to back the pilot up. Of course you don't have to necessarily wait till the pilot gives you the airplane. A few words about bank, attitude, and airspeed may be all he needs to get back in the cockpit and back in control.

Knock It Off, You're On Fire

Thank you for your fine presentation of my article. However, there is one error which I must call to your attention. In the inset describing the cooling of the F100 engine, the third paragraph states, "Although the fire is *now* self-sustaining. . . ." This is *not* correct. The sentence should read, "Although the fire is *not* self-sustaining, the hot molten titanium will take longer to cool below its combustion temperature."

I think you will agree that this error completely changes the meaning of the article. Therefore I would appreciate it if you would print a correction as I have indicated.

John H. Hill
Pratt & Whitney

Done! Sorry for the error.

A Winter's Tale

I read with interest the article "A Winter's Tale" by Major Richardson. It was well written and should serve as an example to pilots *and* operations people that small errors can grow into big ones. There is one question left open, however. Your illustrations show the aircraft departing the right side of the runway. The story indicated the aircraft departed the left. What direction did the aircraft actually go?

David L. Baker
McClellan AFB, CA

It went to the left. This was a case of poor crew coordination between writer and artist. (Our staff members do know right from left, honestly!)


The Professionals

One good measure of a professional aircrew is their ability to anticipate problems and prepare in advance to handle them. All too often, we in the flying safety business must document the errors and mistakes of aircrews. Therefore, it is always a pleasure to print a story about a crew that did it right.

The Professionals

While reading your Oct 84 issue, I noticed an error in the article by Capt Wills. He mentions that winds on the weather sheet, DD Form 175-1 are true. In fact, AFR 105-5, AWS Sup 1, Atch 1, para 2f and 4c specify that weather units will forecast magnetic winds for takeoffs or landings at their own airfield and true direction for remote briefings or recoveries at other airfields. In any case, magnetic winds (even when the difference is negligible) are always suffixed with an "M."

1st Lt Donna P. McNamara
Hickam AFB, HI

You are right about the way winds are reported on the 175-1. In fact, this is what Capt Wills received since the landing base, Thule, was not the home field. That was not completely clear in the article. Thank you for the reminder about the "M" suffix.

Shocking But True

Recent NASA research flights have provided a new insight into distribution of thunderstorm lightning. They showed that lightning also occurs in the clear air surrounding the top of thunderstorms.

Recent studies by NASA using information obtained from F-106 penetration and U-2 overflight of thunderstorms have confirmed that strong electrical fields exist in and above the tops of thunderstorms and that lightning activity can be quite extensive in these areas. Lightning channels longer than 1 km have been observed in the clear air around and above cloud tops. In addition, numerous weaker channels are common in thse regions. This means that just because an aircraft is outside of clouds and well above the freezing level, it isn't necessarily out of danger. Lightning can strike in these areas too.

Lt Col Gary E. O'Connor
Scott AFB, IL

Thank you for this very timely and interesting information. This further confirms the justification for thunderstorm avoidance rules.

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Do You Have A Story To Tell?

■ One of the ways we learn about flying safety is through the experiences of others. This is the purpose of the There I Was program. We ask you to tell us your experiences, those things which got your attention and taught you about flying.

A There I Was should be anonymous. We aren't interested in who you are. We are interested in what you have to say. We particularly want to hear those stories where the pilot did (or didn't) do something that set the situation up. Maybe by telling the story we can keep someone else from making the same mistake.

One caution — There I Was is not a replacement for the hazard or mishap reporting systems or a way to air your complaints. We are trying to share flying experiences and help improve flying safety.

So if you have a story (and what pilot doesn't have at least one), take a minute and jot it down on the form on the next page, then cut that page out and send it to the address on the back. ■

THERE I WAS...

Fold

AFISC/SE
NORTON AFB, CA 92409-7001

HQ AFISC/SE
"THERE I WAS"
NORTON AFB, CA 92409-7001

"EYES ONLY" for the DIRECTOR

Fold

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and professional

performance during

a hazardous situation

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significant contribution

to the

United States Air Force

Accident Prevention

Program.

CAPTAIN

LAWRENCE M. DANNER

388th Tactical Fighter Wing
Hill Air Force Base, Utah

■ On 13 January 1984, Captain Danner as pilot of an F-16 aircraft was making a weather penetration when the engine began a rapid series of stalls and the rpm began to decay. He retarded the throttle to idle, but the engine continued to stall, and the rpm decayed below idle. Then, while still in instrument meteorological conditions (IMC) and approximately 7,000 feet above the ground, Captain Danner shut down the engine, declared an emergency with Approach Control, and turned directly toward home base, which was 15 miles away. Based on the engine operating conditions at the time of the stall, his relatively low altitude, and his recent involvement in the investigation of an engine failure mishap, Captain Danner decided to immediately select the backup fuel control (BUC) for his airstart. While continuing to navigate toward the field in IMC, he switched the radio to guard to ensure simultaneous contact with the Tower, Approach Control, and the Supervisor of Flying. Captain Danner then applied his recent experience, plus the Dash One information to successfully complete his bona fide emergency BUC air-start, and subsequently recover the aircraft — something no one had ever accomplished, much less in IMC. Moments later, 10 miles from the base, Captain Danner's aircraft broke out of the weather, and he flew to a position from which to fly a straight-in, flameout approach and landing. Subsequent investigation revealed several significant discrepancies in the engine and primary fuel control. Captain Danner's exceptional presence of mind, quick reaction, and exemplary flying skills saved a valuable Air Force aircraft. WELL DONE!■

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SAFETY AWARDS

THE SECRETARY OF THE AIR FORCE
SAFETY AWARD
TACTICAL AIR COMMAND

Tactical Air Command's safety program management reflected strong command support, supervisory involvement, and professional adherence to safe operational procedures and standards, and was highly effective. The command experienced the fewest Class A aircraft mishaps and lowest mishap rate in the past 10 years and sustained a downward trend in rate for the sixth consecutive year. Class B mishaps were also lower than in 1983. These successes, compiled while flying more than 720,000 hours of realistic combat training missions in 18 different types of high-performance aircraft, exemplify the highest degree of professionalism among aircrew and support personnel. The command's accomplishments in ground and weapons safety were equally impressive. Ground fatalities were the lowest in the history of the command and explosives mishaps were more than 35 percent lower than the previous year.

AIR FORCE LOGISTICS COMMAND

The well-defined and effective mishap prevention program of the Air Force Logistics Command reflects strong command support and supervisory involvement. The results were some outstanding safety accomplishments. For the second consecutive year, the command did not have a Class A aircraft mishap, nor was there any Class B aircraft mishap in the past year. Particularly noteworthy were the command's contributions, together with those of all the flying major commands, in reducing logistics-caused mishaps to the lowest level in Air Force history during the past two years. Accomplishments in other safety disciplines were also impressive and further enhanced the command's safety record.

THE MAJOR GENERAL
BENJAMIN D. FOULOIS
MEMORIAL AWARD
AIR TRAINING COMMAND

The Air Training Command achieved an 0.4 Class A aircraft mishap rate, the lowest rate for all the large flying commands and equalled the lowest rate in the command's history. A rate below 0.9 mishaps per 100,000 flying hours for three consecutive years represents a sustained record of excellence. The number of Class A aircraft mishaps was reduced from five to three equaling the all-time low for the command. The command achieved this record while flying more than two-thirds of a million hours training future Air Force aircrews. The record is testimony to safe mission accomplishment, strong command support and leadership, and the highest degree of professionalism among instructor pilots, aircrews, maintenance personnel, and other members of the command.