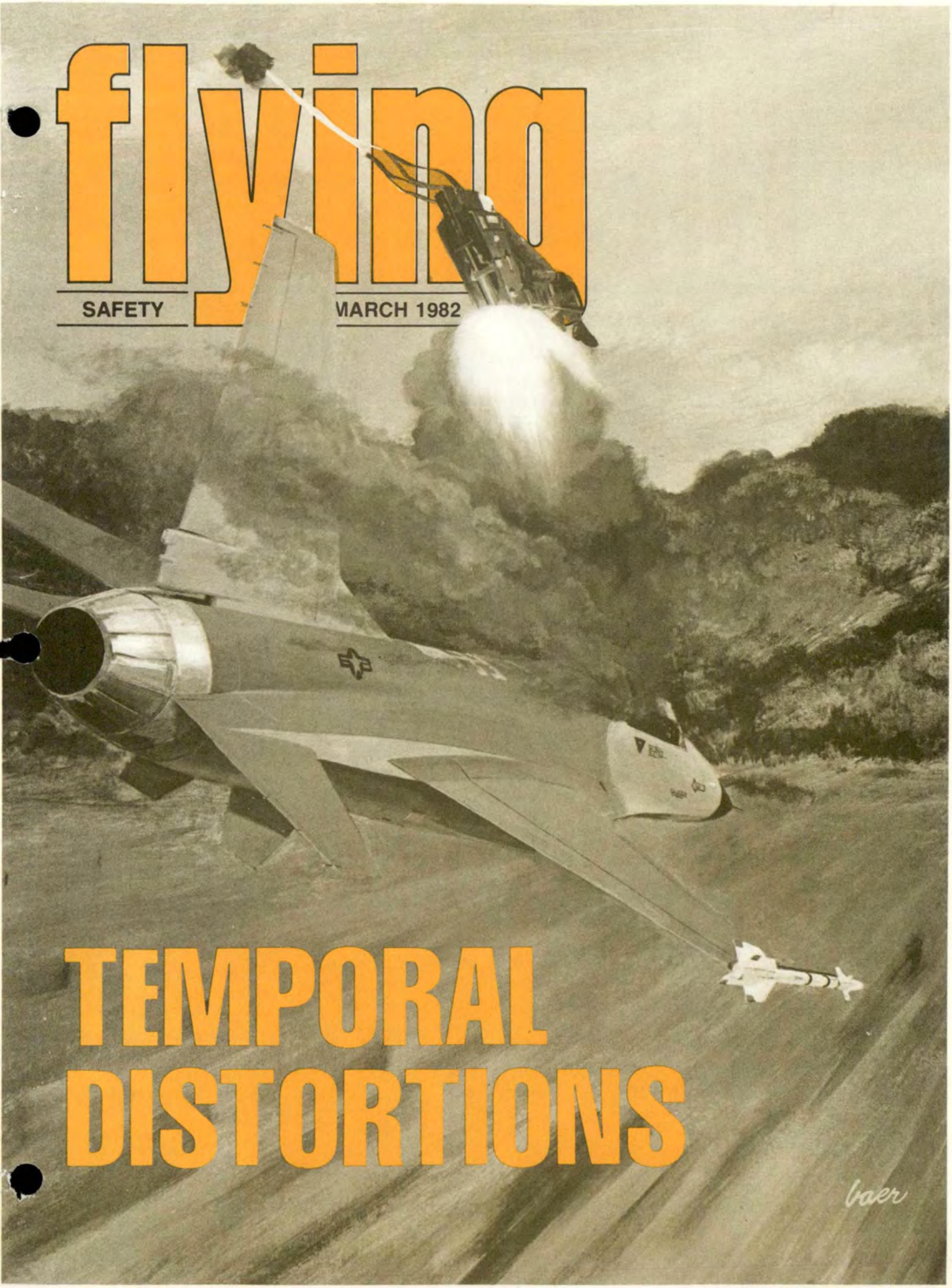
flying

SAFETY

MARCH 1982



TEMPORAL DISTORTIONS

THERE I WAS

■ We were in a hurry. The aircraft was ready for pickup from the contractor at the depot, and the Air Traffic Control system had a very small launch window for us. If we missed the window, it would be at least another eight hours before ATC would give us another IFR clearance. We rushed through the Dash One preflight on our KC-135, started engines, picked up the clearance, and taxied.

We had a fairly light fuel load, only 60,000 lbs., but the aircraft was carrying water. Tower cleared us on to the active. Before takeoff checklist — push the throttles up, set takeoff EPR, 60 knots, nr 3 isn't taking water, 90 knots, ABORT! Throttles idle, speedbrakes 60 degrees, brakes apply, turn off the runway. The tower tells us if we can make it to the active runway without delay ATC will still accept us.

No one wants another eight hours here at the depot. So we taxi quickly! Recompute takeoff data for a dry takeoff (remember, we are quite light). We reach the active, receive takeoff clearance and take the runway. Before takeoff checklist, again. Set takeoff EPR, 60 knots, 90 knots — everything looks good. Rotate! Gear up! EPR on numbers two and three is rolling back! What's happening? EPR on numbers one and four is now rolling back? What is going on? Crash landing after takeoff checklist goes through our minds.

In desperation, I push the throttles to the firewall, and the engines respond. We are barely flying, but the KC-135 is beginning to accelerate. All cockpit instruments register normal. We continue to climb. Needless to say, the crew is trying to figure out what happened. And then the light goes on.

Remember the ABORT? We ran the boldprint, but in our rush to make good a quick takeoff, we did not accomplish the entire abort checklist. The water pumps were left on. On the dry takeoff we set the engine EPR to a dry setting, but the engines were giving us a wet thrust. The EPR rollback? Merely the water running out. When setting a dry EPR on the gages and getting wet thrust and the water runs out, the EPR remaining is less than the KC-135 requires to fly. What if I hadn't, in desperation, pushed the throttles to the firewall? We would probably be reading about this in the Class "A" mishap file.

What more can be said about completing checklists? Thanks for sharing.

We were nr one in a two-ship of F-4s making a tactical attack on a simulated airfield. We had a TOT to make, and we took off late. We hit our jump off point on time and proceeded with our low level ingress.

We sighted the target early and decided to make a level pass. We dropped our bombs, made a hard right turn off the target and as I was *looking over my shoulder* to see nr two, I heard my front seater scream "Oh, . . ." I then realized we had rolled inverted and were descending from 100 feet. We pulled out using rudder to roll the airplane.

It turned out that our right wing had trapped fuel internally, and the heavy wing caused the roll to continue through 90° of bank. If we had done a rig check, we might have known about the heavy wing.

Appreciate your sharing this experience with us. We strongly suspect loss of two high performance fighters last year due to exactly the same circumstances. Low altitude, high speed, looking back! We all can and should learn from this one. Thanks. ■

Brig Gen Leland K. Lukens
Director of Aerospace Safety

UNITED STATES AIR FORCE **flying** SAFETY MAGAZINE

AIR FORCE RECURRING PUBLICATION 127-2 — MARCH 1982 — VOLUME 38 NUMBER 3

AFRP 127-2
Entered as a publication at the Second-Class rate (USPS No. 586-410) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403

page 6

page 8

page 18

SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

SUBSCRIPTION — FLYING SAFETY is published monthly to promote aircraft mishap prevention. It is available on subscription for $21.00 per year domestic; $26.25 foreign; $2.50 per copy, domestic; $3.15 per copy, foreign, through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Changes in subscription mailings should be sent to the above address. No back copies of the magazine can be furnished. Use of funds for printing the publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. Facts, testimony and conclusions of aircraft mishaps printed herein may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payments can be made for manuscripts submitted for publication in the FLYING SAFETY Magazine. Contributions are welcome as are comments and criticism. Address all correspondence and, Postmaster: send address changes to Editor, FLYING SAFETY magazine, Air Force Inspection and Safety Center, Norton Air Force Base, California 92409. The Editor reserves the right to make any editorial change in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from FLYING SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will ensure complete accuracy of material amended in light of most recent developments. The contents of this magazine are non-directive and should not be construed as regulations, technical orders or directives unless so stated. Authority to publish this periodical automatically expires on 30 Oct 1982, unless its continuance is authorized by the approving authority prior to that date. Distribution: 1 copy for every 3.0 aircrew and aircrew support personnel.

HOW COULD IT HAPPEN?

MAJOR JOHN E. RICHARDSON
Directorate of Aerospace Safety

■ How could it happen? He was a good pilot. He wouldn't do anything stupid. How could he have let the aircraft get away from him like that?

Almost every crewmember in the Air Force has asked similar questions upon hearing that a friend or squadron pilot was involved in a mishap.

These are questions that safety investigators ask, too. There are no easy answers, but after years of reviewing mishap investigations here is one hypothetical situation which could help explain some "unexplained" mishaps.

A flight of A-7s was scheduled for a range mission in preparation for an upcoming gunnery competition. Both aircraft and aircrews were in tip-top shape.

It was a beautiful, clear day as the flight lined up for the formation takeoff. Checks complete, a head nod, and the two fighters rolled down the runway, lifted off, and climbed into the bright morning sky.

The weather was perfectly clear as the flight completed the planned low level route and checked in with the range officer. All weapons checks complete, the flight took spacing and, once cleared onto the range, began the events scheduled.

On the first pass for a LAB delivery as nr 2 pulled off, the range officer transmitted a foul call for busting minimum altitude. Number two was a bit unhappy with the call, for it had been a good bomb (3 meters), but he pulled up onto downwind and set up for the next LAB pass. But things just weren't going very well, because this bomb was too long (25 meters at 12 o'clock).

The pilot airscored his second pass as he pulled up onto crosswind. By now, he was a bit frustrated. He knew that he was better than this, so he determined to do better on the next two passes which were to be low angle low delivery (LALD). Preoccupied with his rather poor showing, the pilot turned onto downwind 2,000 feet below the normal LALD downwind altitude.

He then began to make a series of data entries into the weapons delivery computer. These were the corrections for the first pass foul and the second non-qualifying bomb. To do this, he had to shift hands to free his right hand to operate the computer. While holding the stick with his left hand (an unnatural position for a fighter pilot), the pilot induced a slight right roll and nose down moment. This movement was enhanced by the pilot's shifting to the right to reduce glare on the computer display.

The pilot was so wrapped up in correcting his bombing patterns that he paid no attention to flying the aircraft. A shepherd not far from the crash site saw the A-7 in a stable descent, about 20 degrees nose low, with about 10 degrees of right bank. He watched the aircraft disappear behind a low hill and then saw a flash and a column of black smoke.

The investigators found that from the downwind position of the aircraft with only *eight seconds* of concentration on updating the computer, and lack of attention the flight path by the pilot, the aircraft could be placed in a position from which the pilot could not recover. At the last second the pilot sensed something was wrong and made a last ditch, unsuccessful effort to avoid impact.

The pilot was a competent professional and had been selected to represent the squadron in an upcoming gunnery competition. We hear a lot these days about stress and aircraft mishaps. It sometimes seems that the first questions asked after a mishap are not: "What happened?" but rather, "Are you having trouble at home?"

There is a lot of evidence to support the role of such stress in mishaps, but there are also much more immediate and pertinent stresses on a pilot. The A-7 pilot in this article is a perfect example. Is he under stress? You bet! Any pilot worth his wings would be. Those two bad bombs have supplante everything else in his conscious

mind and all he can think about is: "I can't let there be a third one." So, the details of flying the aircraft are relegated to the automatic reflex system while the pilot concentrates on making sure the computer is correct.

This is "target fixation" of a slightly different sort but just as deadly. What sets it up is that will to succeed. We all have it to a certain extent and fighter pilots have an extra big measure of it. The only problem is that sometimes the growth of the "fangs" takes blood away from the brain and we get into a situation like the one above.

One more point. This pilot was not a weak stick. He was a good, aggressive jock. A weaker pilot probably would not have gotten into the same jam. This is the kind of accident reserved for the pilot about whom everyone says "it couldn't happen."

Could it happen to you? Of course it could. It happened to a lot of good pilots in 1981. So the next time you start to feel the need to press a bit, mentally step back and "check six." It may be that you are overlooking some very important details — like flying the airplane and avoiding the ground. ■

ASRS ALERT BULLETIN

■ The NASA Aviation Safety Reporting System (ASRS) is a system for gathering information on matters affecting aviation safety. When the data collected indicate a potential problem, the staff of NASA — Ames Research Center publish an Alert Bulletin.

Alert Bulletins are based on reports submitted to ASRS. The information may be amplified by further contact with the individual who submitted it, but the information provided by the reporter is not investigated further. Such information may or may not be correct in any or all respects. It represents the perception of a specific individual who may or may not understand all of the factors involved in a given problem.

When possible solutions to problems are cited, they are suggestions made by reporters and not recommendations provided by ASRS or NASA.

Considering the above statements, the following ASRS Alert Bulletin is provided for your information.

"Various points in U.S. air-space — reports submitted to ASRS since August 3, 1981 indicate that many pilots (particularly those operating multi-engine high performance aircraft) in the non-air carrier groups including, typically, pilots from the business flying, air taxi, and military segments, have increased their utilization of the airspace between 12,500 and 18,000 feet MSL for VFR flight, thus avoiding possible delays associated with IFR clearances as required in the positive control airspace above 18,000 feet. While this practice, as intended, does indeed minimize delays and decrease ATC system workload, it appears to have brought increased exposure to potentially hazardous conflicts between the VFR aircraft and IFR traffic descending from or climbing to the higher controlled airspace. In some cases the potential conflicts involve VFR versus IFR traffic in cruise at the altitudes mentioned; frequently the VFR aircraft are not in communication with ATC. In view of the difficulties attendant on reliance on the see-and-avoid concept at the speeds customary in this altitude region, and the possibilities of altimeter differences and discrepancies, reporters suggest the need for (1) notification to all potential users of that airspace of the increased presence of the high-speed VFR traffic and (2) re-emphasis of FAR's and proper procedures applicable to the use of the 12,500 to 18,000 feet air-space segment, especially with regard to the use of Mode C transponder equipment." ■

— Courtesy NASA ASRS "CALLBACK."

SING OUT, CO!

CAPTAIN WILLIAM S. ROHDE
1st Special Operations Wing
Hurlburt Field, Florida

■ A first lieutenant was assigned to our unit recently, young, but fresh from overseas experience. On one of his first flights he was teamed with an 0-6, former squadron commander and now on the wing commander's staff. Just prior to entering the pattern, the colonel said that he'd like a couple of touch-and-go's before quitting for the day. Our surprised but undaunted lieutenant ably followed through on a flawless "crash and dash," but on the next downwind said, "I could be wrong, sir, but don't we need an IP on board to do touch-and-go landings?" The colonel thought for a moment and replied: "You know, I believe you're right — let's full stop this one." A quick look in the reg book was worth a beer and a war story to the lieutenant and everyone else in the bar! It seems that the colonel had been flying with IPs for so long he had forgotten about that rule. No harm was done, and the incident was soon forgotten.

One of the problems encountered in multi-place aircraft is the occasional reluctance of the copilot (or back-seater) to point out errors. If we examine this phenomenon closely, we should be able to determine some of the reasons people act this way, and perhaps learn how to prevent future occurrences.

The first factor to consider is the superior/subordinate relationship. The copilot is usually junior to the aircraft commander (AC) in either age, rank, or total experience (strike one for our new lieutenant). Even if not junior, then he/she probably has less time in this type aircraft. This subordination is not limited to copilots, either. For years people in the Air Force have (mis) treated navigators as second-class citizens (didja hear the one about the WSO who . . .). Whether real or perceived, this attitude may inhibit the guy-in-back from criticizing a questionable decision made by the guy who signed for the machine ("after all, he gets paid for making decisions"). Both situations involve the risk that an unsafe action or operation may pass by without comment.

Another place to find reluctant copilots/GIBs is among the new guys in a unit (strike two for our lieutenant). Whether they are experienced in this type weapon system or not, they may tend to hold back criticism. If inexperienced, they may be unsure of their systems knowledge, or of the local flying regulations. Even if they are experienced, they aren't familiar with the "local" rules and procedures. Basically, new people are still learning from what they observe, even long after being officially "checked out."

One other factor, which may not be so readily apparent, arises when the AC appears easily offended. An AC who is irritable, whether by personality or due to a transient condition (such as a domestic problem) will inhibit criticism. This inhibiting effect can be felt even if the question is valid and offered in a constructive, friendly way.

Lastly, there's what might be called the "Chicken Syndrome." Whether the AC is irritable or not, whether the copilot is a new guy or not, whether he's technically correct or not, and whether the suggestion is sensible or not, he may hold back to avoid gaining a reputation as a "chicken." Everyone has basic needs, one of which is the need to be accepted by one's peer group. Sometimes logical, safe decisions (weather abort?) are perceived to be unpopular among a group as fiercely competitive as professional aircrews. This environment will stifle free and open discussion of what is prudent and safe and what is not, and it must be eliminated. This leads to the first recommendation:

- An atmosphere of open discussion must exist whenever a safety-related topic is concerned. These topics can include strategy, tactics, training methods or even some in-flight decisions. Of course the mission comes first, but the preservation of personnel and material resources is definitely a part of mission accomplishment. We must all understand that in peacetime, and even more so in actual combat operations, we and our aircraft are scarce, valuable resources. A bent, burnt F-16 lying on the ground along an ingress route represents millions of dollars not doing us any good (not to mention the expertise and experience of the pilot/fatality inside it). Luckily, in our example, the lieutenant felt that he could speak up without recrimination, and did so.

Even if enthusiastic discussions about safety are common in the squadron, one show-off or guy who can't take a little criticism could blow the whole thing for an inexperienced or new guy.

- Exercise maturity when it comes to air discipline. Some would call it self-discipline, but I say act as if your *age* was 40, not your IQ. At least try to demonstrate judgment commensurate with your responsibility. The Air Force has entrusted you with an aircraft worth thousands/millions of dollars. There's no need to show the new guy "how it's done," and just because that kid is asking "Are we supposed to be doing this?" doesn't mean he's out to harrass you, maybe he just wants to make it to the next Happy Hour in one piece.

Concerning the superior/subordinate relationship, I can only offer an illustrative story. The old-head AC was briefing his still-wet-behind-the-ears copilot on the day's flight. Just before strapping in, he said, "Sometime today I'm going to make a deliberate mistake. See if you can catch it, and when you do, sing out right away." Of course he didn't intentionally make a mistake, but if he did err, as we humans are wont to do, that copilot wouldn't hesitate one second to bring it to his attention. Why? Because it was expected of him, all in the interest of safer flying. You might even be able to adapt this principle or some variation of it to your aircrew briefings. One very competent pilot I know constantly jokes about errors he has made in the past. Although this technique has its obvious drawbacks, it does at least keep people from becoming complacent when flying with him. It also exposes young troops to mistakes they haven't even thought of yet.

Flying may never be completely safe, as long as air machines continue to exceed 0 feet AGL. But with a little common sense, good judgment and an open mind, we can all help to accomplish the mission and preserve the Air Force's number one resource — US. ■

FLYING SAFETY WEEK

■ By now, you should know that May 17-21 will be Flying Safety Week in the Air Force. You should also be aware that the majority of activities will be at the unit level and *unit generated* where possible.

Knowing this, your next question probably should be: What do I do now? And, how do I go about setting up a special Flying Safety Week program? Each MAJCOM will be sending out guidance for their units. Nothing in this article is intended to supplant or conflict with those directions. What we are doing here is passing on some ideas and suggestions which others have used in the past. Each unit can use these ideas as a starting point to tailor their program to their own needs.

Special emphasis flying safety programs are not new. Most commands have conducted them at one time or another. It is a tradition in Navy aviation units to start the New Year with a "Safety Standdown" day. This special emphasis day is held just after the Christmas holidays and before cranking up for the new year of operations in an effort to refocus everyone's attention on the importance of preventing mishaps in flying operations. That is what the Air Force's Flying Safety Week is all about.

Over the years, we've learned some things about safety days and weeks. The first is that preparing for Flying Safety Week is not a one-person job. Yes, the flying safety officer is the safety expert and will have a leading role. But the FSO is like the conductor of an orchestra.

No matter how good the conductor, without musicians there can be no concert. The experts in operations and the experts in maintenance have to apply their talents and their perspectives to the underlying theme — find innovative ways to prevent aircraft mishaps.

If you are the project officer for your unit's program, the way to get started is: talk to the experts. In operations these include the ops officer, stan-eval representative, IPs, and crewmembers. What do they see as problems to be addressed? What do they think will be interesting and worthwhile?

Don't be afraid to be different! Tailor your program to your unit. Just because you know another unit is doing something does not mean that you can or should do the same thing. But you should contact other units on your base and also other units with your type of aircraft. By crossfeeding your ideas, you can help each other.

Don't neglect the people in your own wing. There are often very experienced people sitting behind desks in wing staff jobs. Get them to help tap that resource of knowledge and experience.

Don't forget those support agencies which directly contribute to flying operations. Involve the fire department, weather detachment, air traffic controllers, life support, flight surgeon, civil engineers (barriers, airfield construction, etc.). They all have valuable inputs.

Here is a list of activities which other units have used. Don't feel that these are the only possibilities.

- Opening remarks by commanders/supervisors.
- Review of mishaps in unit or in like aircraft.
- Survey or questionnaire on:
  - (√) Aircrew discipline.
  - (√) Suspected problems.
  - (√) Known hazards which are "lived with."
  - (√) Human factors/unnecessary stresses.
  - (√) "Cutting corners" which compromise safety.
  - (√) Additional duty-induced fatigue/crew rest violations.
- Special review of delayed discrepancies by aircrew and maintenance personnel.
- Participation in maintenance preflight by aircrew members.
- Mock aircraft mishap to exercise crash response.
- FOD walk/ramp and taxiway inspection.
- Crosstalk with Aero Club on traffic patterns and midair potential.
- Unit-wide "safety hunt" to uncover and correct hazards.
- Review of emergency/crash vehicle response and procedures.
- Review of training value versus increased risk during:
  - (√) Low level operations.
  - (√) Deployments and exercises.
- Emphasis on instructor participation in ground training.
- Evaluation of nutrition available to aircrews during exercises.
- Interaction with host nation aircrew.
- Briefings from manufacturer's representative.
- Safety Week Seminars on specific problem areas and specific operations like diversion or night low level.
- Guest speakers from:
  - (√) Approach Control and/or Tower.
  - (√) Weather.
  - (√) Flight Surgeon.
  - (√) Other flying units on base.
  - (√) Local civil flying clubs-fixed base operators.
  - (√) Higher headquarters.
- Special supervisory review of:
  - (√) Launch/recovery procedures.
  - (√) Quick-turn procedures.
  - (√) Crash recovery capability.
  - (√) Exercise safety.
  - (√) Ops/maintenance crosstalk.
  - (√) Sortie generation/on-time takeoff pressures.

Finally, don't try to fill every minute and, more important, mix activities to include action as well as just sitting listening to lectures. Flying Safety Week can be a valuable mishap prevention tool if we all cooperate and contribute. ■

TEMPORAL and the ejection decision

Here's a new approach to explain why some ejection mishaps occur and how they can be avoided.

DISTORTIONS

LT COL DOUGLAS M. CARSON • Directorate of Aerospace Safety

■ In 1949 a second lieutenant took off from a western base as number two in a two-ship flight of bright, new fighter aircraft. Shortly after takeoff, he informed the pilot of the lead aircraft that he had lost aileron boost pressure and was experiencing control stick vibrations.

His leader leveled the flight at 11,000 feet, headed to some rugged 4,500-foot mountains to the North and instructed him to drop his external fuel tanks. The lieutenant actuated the salvo switch, but only the left tank jettisoned. The aircraft went into an immediate roll to the right. He was able to stop the roll by using both hands and his right leg on the stick. When he moved his left hand to trim the ailerons, the aircraft rolled inverted, made a split-S and two complete rolls, and ended up in a vertical dive. He recognized a complete control loss at the same time his flight leader told him to bail out.

The aircraft was in a rolling vertical dive at 1,000 feet above the terrain when the pilot ejected. He described what happened next. "I put my feet in the foot rests on the seat and pulled both seat handles at the same time. The seat worked perfectly, and I was thrown clear of the ship with no injuries. However, I was still tumbling through the air when I released the seat and pulled the rip cord at the same time. Somehow the seat fouled up in the shroud lines of my parachute and came to rest on my head. I tried to get the seat off but could not do so before I hit the ground. I landed about 40 feet from the burning wreckage of the ship with the seat still resting on my head."

He also lost his helmet, oxygen mask, wristwatch, dog tags, and even his boots. Nevertheless, he survived and became the first U.S. Air Force crewmember to use an ejection seat to escape from an aircraft in trouble.

Later that year, another pilot made a successful ejection and joined the select group of airmen who used an escape system to abandon an aircraft. That brought the total ejection attempts in 1949 to two. The number of successful ejections was also two. This gave the Air Force an ejection survival rate of 100 percent; a rate which was never equaled again.

From that first ejection in 1949 to the end of 1981, this select group of airmen totaled 4,700, excluding combat ejections. Of these 3,845, or 82 percent, were successful. That's not really too bad considering the capabilities of the early escape systems.

Unfortunately, if we look at the ejection survival rate for the last five years, we see a less optimistic picture. The overall survival rate was 75 percent. In 1975, the ejection survival rate was 91 percent. In 1980 it had declined to 69 percent.

This decline has continued despite the fact that our automatic escape systems have undergone constant improvement since their inception. Single-motion initiation, rocket catapults, automatic-opening lap belts, man/seat separators, seat stabilization devices, ballistically deployed parachutes, and automatic opening survival kits are just some of the improvements which were designed to increase crewmembers' chances of survival.

The first question that arises is: Why is our ejection survival rate declining when our escape systems are continually improving?

Accident analysis has revealed that the majority of the fatalities were not due to mechanical malfunctions but were the direct result of delayed ejection attempts. If the assumption is made that every crewmember who attempted to eject was actually trying to save his life, this raises another question: Why did one out of every five guys wait too long?

Since out-of-the-envelope ejection attempts usually result in fatalities, the safety investigation boards haven't been able to ask any of those airmen why they failed to make timely escape decisions. Using their best judgment and expertise, board members can only speculate on what deceased crewmembers perceived during the last few seconds of their lives. The single major explanation which has emerged from mishap reports is something called "loss of situational awareness."

This doesn't mean a crewmember is disoriented. He knows what's going on, but he becomes preoccupied with a problem and isn't totally aware of how rapidly the situation is deteriorating. Loss of situational awareness is a general term which can partially explain

TEMPORAL DISTORTIONS

continued

what has happened, but in my opinion, it doesn't explain why it happened. Why do so many highly trained aviators lose situational awareness in critical emergencies, and what can we do about it? To answer this question we have to take a look at what happens to an individual who is under stress.

It would probably be the understatement of the 20th Century to say that an aviator who is suddenly faced with an ejection decision has been placed in a condition of acute stress. Most discussions of stress deal with the long-term effects — high blood pressure, ulcers, heart attacks, etc. Let's take a look at what happens to the body in the short-term (acute) phase.

In the course of evolution, animals have developed an amazing mechanism to defend themselves against all kinds of assaults. This defense mechanism is the "fight or flight" response, an involuntary alarm reaction to conditions of acute stress.

When the brain perceives a threat (stress), it reacts by exciting the hypothalamus. The hypothalamus, in turn, stimulates the pituitary glands to inject adrenocortiotrophic hormone (ACTH) into the blood. ACTH signals the adrenals to immediately secrete two substances — cortisone and adrenalin. Cortisone's effects are generally of a long-term nature, but adrenalin has immediate effects.

The emergency discharge of adrenalin (a stimulant) increases the pulse rate and blood pressure. Perspiration increases. Sugar levels of the blood are raised to provide additional energy. The muscles tighten in preparation for immediate use, physical strength is dramatically increased, and the threshold of pain raised. The body is now prepared to fight or flee.

The discharge of hormones also triggers the entire nervous system which becomes alarmed in preparation for combat. This brings us to the little discussed phenomenon I call TEMPORAL DISTORTIONS, which is the key subject of this whole article.

Before we go any farther, let's get a working definition of this term. *A temporal distortion is a temporary false perception which slows the apparent passage of time.* When an individual experiences a temporal distortion, time expands and events appear to happen in slow motion. This can occur automatically under conditions of acute stress, but it can also be artificially induced by certain drugs such as marijuana.

The exact physiological process is not precisely understood, probably because little, if any, research has been conducted to investigate this phenomenon. It seems that the brain instantly becomes intensely alert, increases its efficiency, and begins to process information at an accelerated rate. Regardless of the actual physiological process, the phenomenon is real, and the result is that time appears to slow down. This is part of a remarkable defense mechanism which has evolved over millions of years. It has obviously been successful in the environment in which it evolved, by virtue of the fact that we're here today. (Individuals which inherited this characteristic survived.) Unfortunately, this survival characteristic which has proved to be so successful in our natural environment may be *the principal cause* of delayed ejection attempts which are directly responsible for the USAF's tragic 20 percent ejection fatality rate.

The following examples of successful ejections can help show how often temporal distortions occur under acute stress and how dramatic the change in time perception can be. A hypothetical case will then illustrate how a temporal distortion can kill.

These examples contain the actual comments made by the surviving crewmembers. Bear in mind that since temporal distortions had not been recognized by the USAF, comments about this phenomenon were unsolicited — they were provided by individuals who felt the subject was important

continued on page 26

THE CARE AND FEEDING OF THE MIDDLE MARKER

■ Your basic "Mil Spec 6SJ7 type MA1A Beacon, Marker, Middle" has been the subject of intense controversy and heated discussion during the past several months. We all agree on the weight, specific gravity, wave propagation pattern and color; however, we can't seem to come to grips with just what it is that the pilot does when coming within vertical proximity of one! After several weeks of research, countless phone calls, and several periods of intense meditation, we came to a consensus and offer the following.

Our problem started with a simple question: "Can I use the middle marker (MM) to identify the missed approach point (MAP) on a localizer approach? On the surface it seemed like an appropriate place to interject the standard old IPIS answer — "it depends." On closer examination, however, the question became more valid. Current guidance in AFM 51-37, Chapter 6, Section F — Final Approach, paragraph 6-16a(2)(b) states that: "Timing is required when the final approach does not terminate at a published fix, as is usually the case with VOR, ADF, and localizer."

From that statement it is logical to draw the conclusion that timing is *not* required if the final approach *does* terminate at a published fix. This begged the question "Is the middle marker a published fix?" Yes, it is! So it appeared as though our answer had to be "yes," the middle marker is suitable for use in identifying the MAP and a LOC only approach. The "prudent pilots" were still uncomfortable with that answer as there is no way to operationally check the aircraft's marker beacon receiver. More research, more phone calls!!!

Chapter 2 of FLIP General Planning defines the middle marker as a marker beacon that defines a point along the glide slope of an ILS normally located at or near the point of decision height (ILS Category 1). Thus, the MMs primary purpose is to alert you that you are at or near the DH for the precision approach portion of the ILS approach. Guidance is in the field that allows middle markers to be decommissioned anywhere MAJCOMs see fit — rationale: There are no pilot actions based upon the middle marker. The fact remains that on some localizer approaches the MM can be an accurate means of identifying the MAP if the MM and MAP are collocated.

In summary, first ensure that the MM and the MAP for the LOC approach coincide by checking the mileage from FAF to MM against the mileage from FAF to MAP on the timing block. As you can't perform an operational check of your marker beacon system, do not plan to use the MM as the only way to identify the MAP. For planning purposes, rely on DME, if available, or timing. However, if the MM is received while executing the approach and other indications look about right, you may consider yourself at the MAP and take appropriate action. The use of the MM under these conditions can provide a valuable back up and we feel that it is consistent with the philosophy of using all available means/aids in maintaining position orientation. Look for this technique to be addressed in the forthcoming Change 2 to AFM 51-37.

If there are any subjects you would like to see concerning instrument flying let us know at AUTOVON 487-5834.

Fly safe — keep it "ON COURSE." ■

Captains (Aircraft Commanders, too) **& CoPilots:**

JOINT RESPONSIBILITY

Transfer of control within the cockpit of a multi-place aircraft is a common occurrence in Air Force operations. The problem comes when the pilot not flying fails to assume the duties relinquished by the other pilot. Aircraft commanders or, as in the situation described below, captains are especially susceptible to this error. Transferring control doesn't mean abandoning all duties, you are still part of the "crew" in the most complete sense of the word.

■ The normal progression of life in aviation is to first fly as a copilot and then as a captain after demonstrating proper skill and prudence in the copilot's position. The public's perception of the two pilot roles is that the captain flies the aircraft, and the copilot assists by operating the radios, reading instruments, looking for other aircraft and, occasionally, flying the aircraft. In actual practice, the copilot's task is a bit more complex. The copilot does serve as a backup, who can take the place of the captain if the situation requires. He also is there, however, to broaden the captain's perception of events by monitoring aircraft performance for any problems that otherwise might have been overlooked.

A common practice is for a captain and copilot to alternate flying the aircraft on successive segments of a trip. This is a good practice, but it can lead to problems if the cockpit crew does not keep in mind the change in roles that must take place when control of the aircraft is exchanged. The following account illustrates the point.

A four-engine jet aircraft was inbound for landing at a large international airport. After five hours flying, the crew prepared for the descent and landing by obtaining the weather for the destination airport. It was poor. Runway visual range (RVR) was holding at about 1,200 feet in fog, so the nighttime approach required a heavier workload than usual. In conformance with the airline's policy, each crewmember had a set of approach charts which he reviewed as the captain briefed his intentions for the approach. The copilot had flown the aircraft to this point, and he was told that he would fly the approach. The briefing was thorough and professional.

A descent was made from cruise altitude, and the aircraft was vectored in preparation for a turn onto final approach. At this time, the air traffic controller directed it to a different runway with lower minimums. The change was made because of worsening runway visual range (RVR) in the touchdown zone. The captain, copilot and engineer changed approach charts and briefed the new approach.

The copilot "hand flew" the aircraft onto the final approach course and, over the outer marker, pulled the throttles back to begin the descent. At this point, the landing gear warning horn sounded. It came as a surprise but accounted for the fact that the copilot was having difficulty in attempting to slow the aircraft. After a quick check of the aircraft's condition, the captain reached over and lowered the landing gear and then read through the checklist as the fog rolled by the windows.

Through the initial part of the descent, the captain had watched his instruments, but, as the aircraft neared the ground, he began to watch outside for lights. The copilot continued to fly the approach, while the engineer watched. Neither detected any increase in the descent rate.

With approximately 300 feet left to go and the sink rate passing the 1,000 foot per minute mark, the ground proximity warning system (GPWS) sounded its "WHOOP, WHOOP, PULL UP!!" alert. The captain's reaction was to reach forward and inhibit the GPWS, but his hand stopped halfway to the button when he saw the runway approach lights leap up through the fog. Instead, he grabbed the throttles and shoved them forward, while his other hand jerked back the control column. Although the copilot appeared to be baffled, the

captain gave the aircraft back to him. The copilot attempted to fly the aircraft through the missed approach but permitted it to begin descending again. The GPWS went off again, and the captain took control and retained it. The approach was then reflown by the captain to a routine landing.

It would be easy to place the full blame for the incident on the copilot and his faulty instrument scan and aircraft awareness, but there were three people involved. The engineer had a limited view of the pilots' gauges, so he may not have known what was occurring, but the captain should have.

A highly skilled captain sat in his seat and did not provide his copilot with the backup and callouts he would have demanded of the copilot had he been flying the aircraft. The first sign of possible trouble was the copilot's failure to lower the landing gear, the second the unnoticed high sink rate, the third the non-acceptance of the GPWS alert and the fourth the non-recognition of the descent rate during the missed approach.

There was still another sign. The signal for the attendants to take their seats was never given by the flight crew, and one was injured when thrown against a seat during the abrupt pull up.

A captain always has command of the aircraft. When he gives control to the copilot, he owes him and everyone else involved the duty of assuming the copilot's responsibilities. — Adapted from FSF *Accident Prevention Bulletin*, *Sep 1981*. ■

VFR Traffic Pattern Operations

■ Traffic around the island Navy air base was extremely heavy due to the multi-service/command exercise underway. Approach was late descending our Starlifter into the terminal area. They vectored us to a base leg, then sent us to Tower, which cleared us for a visual approach. (TACAN IAP was used for backup.) In the turn to final at 4 NM and 1,800 feet AGL descending, we saw a two-ship of fighters turning a VFR initial below us. Following our defensive pull-up, the fighters split out in front, we coolly called "Fox 2," then continued the approach and landed.

Both flights were under Tower control; we were cleared to land, and the fighters had just called "five mile initial." The fighters were legal at their normal VFR traffic pattern altitude, 1,500 feet AGL. The Starlifter was legal on a controlled, constant descent, base to final turn. Why, then, were we all that close to being legally dead? Unless published locally, fighter VFR traffic pattern altitudes and airspeeds will vary with type airplane and service, but are generally above 1,000 feet AGL and 300 KIAS (A-10s excepted). C-141 visual approach guidance is "800 feet AGL minimum on base" and "600 feet AGL minimum during turn to final," with downwind and base commonly flown at approximately 1,000 feet AGL. Tower's guidance is based on local procedures, experience, and judgment. In this case, the controller's experience led him to expect us to be below the fighters, because it usually happens that way. My future "usual" visual approach will have my heavy hauler below 1,000 feet AGL at the turn to final, regardless of distance out.

Visual approach proficiency is essential for operation in the ever increasing size and frequency of mass gaggle exercises. Having a plan of action, and heads up, see and avoid, are still the best insurance.

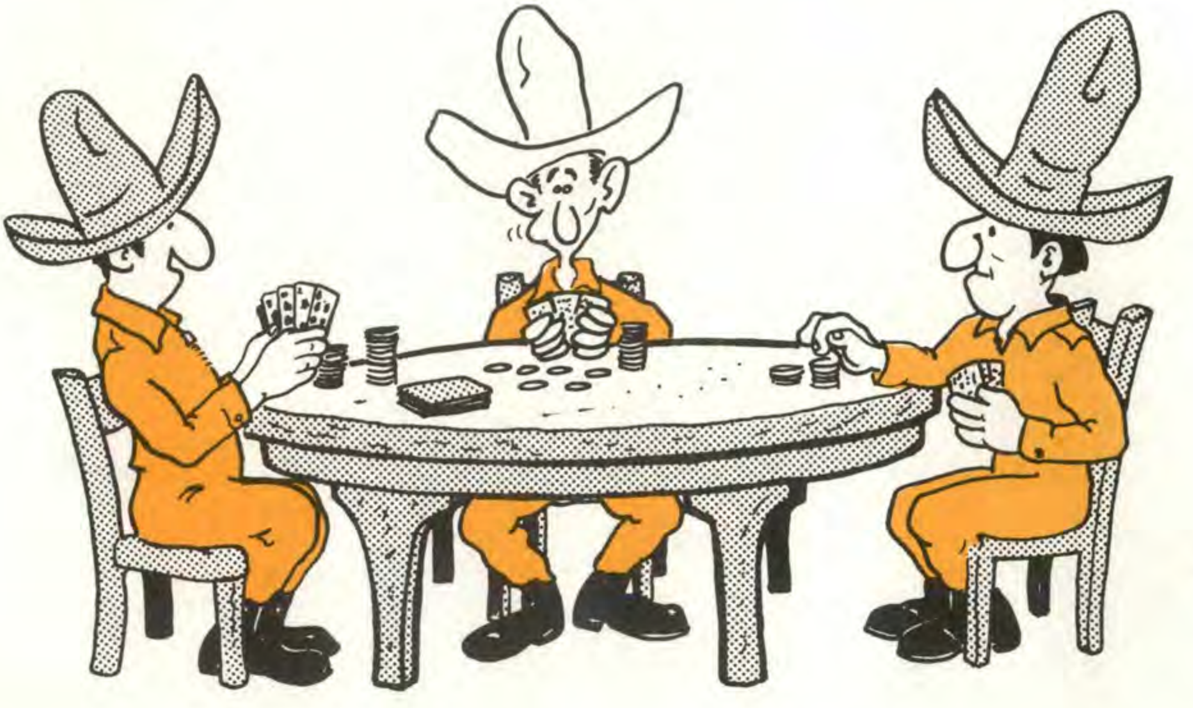
P.S. Next time, don't forget to tell the Tower your altitude *as well. – Editor.* ■

CORRECTION

■ There was an error in the article "Boom-Boom-Bash" on page 12 of our February 1982 issue. The flying hours figure for 1980 should have been 3.16 million not 3.6 million hours. ■

RULES OF THE GAME

LT COL ARTHUR M. SIMS
Directorate of Inspection



■ When I first started pilot training my brother, a sage military aviator, gave me a concise, accurate set of parameters designed to ensure longevity in my aviation career. Basically, a simple set of rules, easy to remember — harder to practice — but ones that, when properly applied, will enable you to "live to fight another day!" I'm not saying that they will make you immortal in your aviation endeavors, but they *will* give you an "ace in the hole" when the stakes are the highest.

Know Your Own Capabilities

When you are just starting out, this is an evolutionary process. If your ego attempts to make you "run before you can crawl," you will surely violate this rule. The bottom line is: go slow, learn at your own pace. Don't try it because others can; don't let "peer pressure" force you into a situation beyond your capabilities (this is important for you "old heads," too). Learn to analyze your abilities before each flight.

Make sure that you are physically, mentally, and professionally prepared. Don't press your luck in any of these areas. No one but you can accurately assess all of these things. Mishap reports often speculate about shortcomings here, but again, only you truly know; and if you violate this rule, you may not be around to confirm the "real story." If it's beyond your present capabilities, admit it to yourself and others.

A little extra practice may be all you need to be the best (here, the best means being a consistently good aviator). As you progress in capability, don't be misled into believing that flying time equates to judgment. Experience does not either! The analysis of your experience is the key! If you make a mistake, and you will, analyze it, profit from it, and *share it* — with a little "egg on your face" — with those that may find themselves in the same situation. Be realistic! Make it all work for you. *Remember, Kamikaze pilots never get to brag at the bar and shoot down their hands; skilled survivors do!*

Know Your Aircraft

This not only means knowing what makes it tick (flight manuals), but what you get when you mesh the capabilities of the aircraft with your own. Ideally, we would like our ability to match the "max" performance of the aircraft. However, this is an ideal situation, which few are likely to attain. So, knowing where to "stop pressing" becomes extremely important to your survival.

If you push yourself and your aircraft into a regime that you have never experienced before, you may find yourself flying, or more aptly put, a passenger in an aircraft totally new to you. But knowing the relationship of aircraft/aircrew capability will lessen the likelihood of this event. Remember, the performance capability of your aircraft if everything remains in working order does not change, but yours does! You are the variable. Human factors research is uncovering new facts about how pilots perform. However, this area is beyond the scope of this article.

But what if your aircraft has a "bad day" and does not work normally? Then you must be aware of what has happened, what the remaining capability of the aircraft is, and what you can do to modify or correct the difficulty. In severe cases, your recognition, analysis, and proper timely corrective action may save your life. You may only have a few seconds! In recent mishaps, some have been able to do this — some have not!

Quick analysis of the problem based on your knowledge of the aircraft and your situation (i.e., altitude, attitude, etc.) should enable you to determine if you're fighting a losing battle. If you are, get out! Too many people have made that decision too late.

A friend of mine departed controlled flight at about 18,000 feet. The book states that "if positive recovery is not in effect at 10,000' AGL, eject." He rode the spinning aircraft into the ground, yelling over the radio, "I can get it, I can get it!" He could have ejected but made no attempt. Why? Ego, maybe? We'll never know. He was experienced and knew the aircraft inside out. Or, did he? Maybe not! He didn't know when to "fold 'em."

If you find yourself in a similar situation, know what the book says and stick to it. Don't try to rewrite it. Much exhaustive testing and experience went into it already! You may pay dearly for trying to add to it extemporaneously.

Know the Capability Of Your Enemy

This includes the aircraft, weapons, and aircrews. Additionally, if you are flying over "his" terrain, it includes a knowledge of the weapons he may have placed there to "ruin your day." To know all of this requires a lot of study, but it's worth it. Know your enemy better than he knows you. Know how to get the advantage and *keep it!* Know his shortcomings, his methods, and habits. Above all, don't sell him short! Don't try to bluff him. He's holding a good hand.

The combat environment is not the time to try to "get your act together," the training environment is. Learn to make that training work for you. Don't be satisfied with just filling "the squares." (This is a subtle hint for managers as well.) Make sure that you understand the rules of the game before you play against some of the best for "all the chips." ■

Next Generation Trainer

FRANK WEATHERLY
San Antonio Air Logistics Center
Kelly AFB, TX

■ San Antonio ALC was recently assigned system management responsibility for the Air Force's next generation trainer aircraft by Headquarters AFLC. The assignment is based on a recommendation by the Assignment Selection Advisory Council and continues the Center's past and present involvement with the primary pilot training system.

The assignment action followed several years of careful study and deliberation by Air Force officials on a replacement aircraft for the aging T-37 "Tweet."

Built by Cessna Aircraft Company, the T-37 made its first flight in 1955, but did not go into service with the Air Force until 1957. The aging T-37 aircraft are rapidly approaching their service life of 15,000 hours, some having reached 13,000 hours.

Since the need to replace the T-37 fleet with a next generation trainer is becoming more pressing, the pace of actions necessary to acquire the new fleet of trainers has been stepped up. Assignment of system management responsibility for the next generation trainer to SA-ALC is one of the actions required in the acquisition process. At SA-ALC, the Directorate of Materiel Management, headed by Colonel George D. Benjamin, will be carrying out the system management responsibility for the next generation trainer.

Source selection for a prime contractor to build the new trainer aircraft and its engine began in early 1982, with full-scale engineering development planned for the third quarter of fiscal 1982. The first

Party Line

■ Everybody in the neighborhood talking on the same frequency: annoying sometimes; sometimes very useful in providing clues on the activities of others. And sometimes productive of problems. First, a report from an alert and responsible pilot to illustrate party line value. Second, instances of the opposite. Some faulty "hearback" appears, too.

■ We (in aircraft "A") were proceeding south on the airway at Flight Level 370 when we heard another aircraft ("B") report on the frequency at FL 430, so we assumed this might be opposite direction traffic. A few minutes later we heard an unidentified voice on the Center frequency saying things like, "Hello, hello, hello . . . Test, one, two, three, hello, hello . . . Do you hear me? . . . I can't hear you, George . . . test one, two. . . ." Shortly after this the following conversation (to the best of my recollection) took place.

Center: Aircraft B, descend at pilot's discretion to maintain one six thousand, Altimeter XXXX.

B: Roger, Aircraft B cleared to six thousand.

(Shortly thereafter)

B: B is leaving 430 for six thousand.

Center: Roger.

Me (Aircraft A): Center, this is A. Just out of curiosity, we thought we heard you clear the other aircraft to ONE six thousand and he read back SIX thousand twice and you acknowledged. Which is correct?

Center: ONE six thousand! Aircraft B, maintain sixteen production of next generation trainers is expected by the middle of fiscal 1984. Initial operational capability of about 50 of the next generation trainers is expected to occur during fiscal 1988.

The next generation trainer will not have any state-of-the-art technology, although it may have some graphite composites. It will be more fuel-efficient, will have a lower noise level than the "Tweet," a liquid oxygen system rather than a gaseous system, a pressurized cockpit, side-by-side seating, single-point refueling, longer sortie time, updated instrument panel, ease of maintenance and other improvements.

While all improvements of the next generation trainer are important, the pressurized cockpit is especially significant because it will allow the aircraft to operate above 25,000 feet, the ceiling limit of the T-37 primary jet pilot trainer. In the crowded airspace of today and of the future, this feature will allow more operational flexibility and will increase safety during flight.

San Antonio ALC will be working closely with key personnel in other organizations in matters pertaining to the next generation trainer. Among these are personnel assigned to the Air Training Command, the Air Force Acquisition Logistics Division of Headquarters AFLC, Wright-Patterson AFB, Ohio and the Air Force Systems Command's next generation trainer System Programs Office located at Wright-Patterson AFB. ■

---

thousand; that's ONE SIX thousand.

B: B, descending to one six thousand. We were just about to ask you about that.

Center: A, thank you very much. I had you on the overhead speaker because maintenance was running some checks on the headphones, and that sort of confused the issue. Thanks again.

Admittedly, I don't know for sure that B was on the same airway, but considering that there's a 6,500 foot mountain on the centerline south of the airport and that on that day the cloud bases were about 2,000 feet and the tops about 10,000. . . . Had things gone differently there might have been a CFIT.* This is, perhaps, a classic example of the start of a snowball effect — a series of minor occurrences each insignificant by itself but cumulatively disastrous. I think history has shown that distraction or changes in routine are often associated with snowball type accidents. I suggest that pilots and controllers be especially alert whenever there's something unusual going on, however minor it may seem.

People who study the human factors involved in aviation safety think of this sort of thing as a chain with a number of links. If the chain is broken at any point short of the end, the otherwise inevitable result will be averted. Our conscientious reporter broke one of the links — and all was well. — Courtesy ASRS *Callback*, Oct 1981. ■

*CFIT — Controlled Flight Into Terrain.

4950th TW Completes Floodlight MODs To Six KC-135As

■ Time exposure photography created this nighttime study of a U.S. Air Force F-16. For photographic purposes, the illumination is four times as great as the actual output of the floodlight atop the KC-135s vertical stabilizer.

Aeronautical Systems Division's 4950th Test Wing has completed installation of floodlights on six KC-135As to support operational nighttime refueling for USAF F-16s. The floodlight illuminates the F-16 for aerial refueling at about twice the intensity of a full moon for better visibility by boom operators. The six KC-135s received lead-the-fleet modifications (Class IVB prototype) in expectation of starting fleet retrofit in December 1982. The tail-mounted floodlight is one part of the KC-135 Improved Aerial Refueling Systems program managed by ASDs Deputy for Airlift and Trainer Systems. ■

Hazards Of LOW LEVEL Flying-- part IV

COLONEL GRANT B. McNAUGHTON, MC
Directorate of Aerospace Safety

■ The first three articles in this series illustrated how deficiencies of perception, attention, and knowledge contribute to collisions with the ground. Deficiencies of judgment, while a potential hazard in any type of flying, are of particular concern in the low level arena because of the reduced margin for error.

There's an axiom in aviation which states: "There are old pilots and there are bold pilots, but there are no old, bold pilots." What makes the difference is judgment. Judgment is the mental attribute of common sense based upon a healthy survival instinct that keeps pilots from doing the dumb things that have a high potential for injuring themselves, their machines or, for that matter, their careers. Judgment is a function of intelligence, experience, and maturity. It is the capacity to think through a situation, determine what's important, to profit from past mistakes (your own, or better yet, those of others), and make accurate, timely decisions. Good judgment avoids situations that exceed the pilot's capabilities and require luck to survive unscathed. Good judgment means always having an "out." But don't be misled. Judgment should not be confused with ultra-caution or timidity, and this is where the fine line is drawn. When are you being timid and when are you being smart?

There are several aspects of judgment in flying: a sense of priorities, an awareness of over-all perspective, a realistic appraisal of your own capabilities, and a sense of self-reliance.

Priorities — or a sense of first things first, is necessary in successful flying — especially at low altitude. The ground has a P_K very close to one. Regardless of other tasks, the pilot must check his flight path continuously. He must be constantly aware of the surface/obstacles and his projected flight path. In the low-level arena there is one inviolate priority:

"Don't hit the ground or things attached to it!"*

There are many other tasks or distractions which tend to compete for a pilot's attention. They are important, but they are secondary to the first priority and cannot be accomplished unless the first priority is achieved.

This is why the low-altitude environment is uniquely demanding. Those other tasks related to weather, enemy defenses, formation, navigation, cockpit switches, target acquisition, weapons delivery, etc., collectively represent successful mission accomplishment. BUT, in order to successfully perform your mission, you must first survive. If you permit your priorities to break down, you may have just done the enemy's work for him. You just can't ever

**Inherent, if not self-evident, in this priority is the fact that the pilot is flying the aircraft – in the sense that aircraft control is never sacrificed for anything.*

afford to forget that the ground is deadly and close at hand.

One example wherein priorities failed involved an F-4 wingman returning in a 2-ship from the range. With the wingman spread to the right, lead started a right turn to initial at 500 AGL. Instead of crossing to the outside of the turn, the wingman attempted to maintain the formation, got lower and slightly ahead of his lead, and was most likely looking back over his left shoulder at lead when he hit the ground.

Perspective — or the big picture — is a sober appreciation of the purpose of the mission, which, in peacetime, is generally to train and prepare to fight a war. It places primary importance upon learning and improving. It also implies a certain responsibility and duty to preserve fighting resources (both man and machine) and avoid squandering them taking unnecessary and foolish risks.

Perspective commonly breaks down in the name of mission accomplishment where it is seen in the forms of overmotivation and pressing.

Overmotivation is conscious, premeditated determination to accomplish the mission regardless. Pressing is the same except that it's normally spontaneous rather than premeditated and is generally made in the interest of immediate mission accomplishment. In combat, these traits may be highly desirable. In peacetime, they are not. Overmotivation often results from criticism of a past failure. The victim simply decided not to let that happen again regardless of circumstances. Overmotivation also results from overemphasis on competition with attendant underemphasis on training. Pilots are competitive; they're all over 21 with a driver's license, and the nature of the beast is not to back off. Naturally, they want to win; they want to look good, and they want their unit to look good.

An example involved a young fighter pilot who got a master caution light at 300 feet. He did not want to climb to cope with it "because of the SAMs and AAA." And this happened over Arizona!

Overmotivation and pressing may be tempered by squadron command and control elements. The true purpose of the mission needs to be placed in proper perspective and bears periodic reemphasis.

Realistic appraisal of capabilities — capabilities appraisal or capability — judgment gap — a "gap" between a pilot's confidence and his performance capabilities, and his judgment.* Judgment here is a realistic assessment of his actual capabilities, and tends to be greater the more competitive and aggressive the pilot. A pilot's competitiveness and aggressiveness may be inapparent during the early orientation and

*"*The Capability-Judgment Gap,*" *Lt Col Victor J. Ferrari, Jr.*, Flying Safety, *Dec 81*.

Hazards Of LOW LEVEL Flying -- part IV

continued

transition phases of training or upgrade programs; however, as soon as he gets his feet on the ground, the gap widens rapidly.

For example, formation flying and ground attack sorties foster this competitive spirit. Though it may not cause a mishap, it commonly leads to a close call, which only the pilot knows about and which he may never mention. This event is valuable in that it develops "judgment." Whether or not a mishap actually occurs during this phase, the potential is high. This "gap" needs to be recognized and controlled in order to optimize learning and minimize the hazard. This "gap" needs to be filled by the IP, who needs to exercise mature judgment himself, in handling upgrading pilots. An inexperienced or immature IP may misinterpret a student pilot's confidence and performance capabilities as an indicator of "good judgment" and thus set up a potential mishap. IP upgrade programs should emphasize this point. Supervisors, too, need to ensure their inexperienced IPs understand the importance of a sound IP — student pilot relationship.

The gap is basically due to overconfidence. It is not necessarily confined to formal "training" situations but is there whenever a pilot thinks he's better than he really is, or is ignorant of flight parameters, or machine limitations, or environmental phenomena and how to allow for them. Until the fledgling aviator accumulates sufficient experience, maturity, and judgment, he may try to take on more than he can or should handle. He needs strong and astute squadron leadership to help him fill the gap.

Self-reliance — another aspect of judgment is self-reliance and the influence of command and control elements. While command and control elements establish the rules by which you play the game, they do not fly your aircraft, nor can they replace your judgment, nor do your thinking. There have been instances in which a controller or lead aircraft drove his charge into a mountain. There have been other instances in which operations overcommitted a relatively inexperienced pilot, leading to a task saturation mishap. In order to survive, the smart pilot develops a strong sense of self-reliance, coupled with a healthy questioning attitude.

A recently retired veteran of 10,000 hours 3,000 of it in the F-100, had this attitude: "No bandit will ever fly me into the ground; nor will anybody else." Those words reflect the voice of experience. The guy who lacks that experience, however, is still just as responsible for himself and his machine as is the old survivor. But due to his inexperience, he is less apt to have developed a well-ingrained system of priorities, may not know how to plan or think ahead as effectively, and may not see the "big picture" as clearly. Furthermore, he is less likely to possess a realistic appreciation of his own limitations; and in his natural and normal desire to do well, win the approval of his supervisors and acceptance of his peers (and who doesn't want that?) he is likely to press himself beyond his capabilities or his machine beyond its design limits.

The inexperienced guy thus needs special "judgment" counseling to fill that "capability — judgment gap." He needs to understand that the fundamental purpose of his missions is to train for war and to learn how to handle his aircraft and his weapon systems effectively to survive. If, at any point in the mission, he gets so far behind that his basic priorities of flying the aircraft and avoiding the ground are compromised, he is task-saturated for that altitude and is in grave danger. He is no longer in a learning situation. He needs to get away from the ground and take sufficient time to sort things out.

Judgment is a synthesis of common sense, intelligence, maturity, and experience. Until you have that experience yourself, listen to those who have. That's a good start on the foundation to developing your own judgment. ■

Dieting and Flying

COLONEL LOWELL C. SUCKOW, MC, SFS
HQ ATC/SGPA
Randolph AFB, TX

The recent change to Air Force weight standards has put a little more pressure on those of us "on the back side of 30." With the phase-in of the new, lower weights this is an opportune time for a brief reminder of the hazards associated with dieting and flying.

■ A large number of people are overweight — probably 30 to 50 percent of the general population. Our flying force also has its share of obesity. The Air Force emphasizes the prevention and treatment of obesity through its weight control program, through recent efforts to reduce cardiac risk factors with the HEART (Health Evaluation and Risk Tabulation) program, by routine physical examinations, and during evaluations of fliers at the School of Aerospace Medicine. Dieting is the primary means of weight reduction and weight control.

Essentially, all diets work by reducing caloric intake either directly (i.e., low caloric diets, high fiber diets, fasting) or indirectly by suppressing appetite (high protein or low carbohydrate diets). One result of all these dieting methods is a reduction in the body's stores of glycogen. Glycogen is a form of stored sugar, a reduction of which may decrease stamina and promote fatigue sooner.

G tolerance is seriously reduced when fliers fast 12 to 24 hours. Fasting (not eating) decreases the amount of fluid in the blood vessels (blood is composed of fluid or plasma and blood cells). When a person with less fluid in the blood vessels is exposed to increased G forces, pooling of blood occurs in the lower parts of the body with proportionately less blood remaining available for the brain. This causes early grey out, black out, or even loss of consciousness and may occur at levels of two to three positive Gs. If loss of consciousness occurs, the flier will be incapacitated for nine to 15 seconds (from time of onset of loss of consciousness to regaining alertness, including situational awareness). As you are aware, two positive Gs are commonly seen in the traffic pattern.

Other conditions can also produce a decrease of fluid within the blood vessels. The conditions would include dehydration, ingesting diuretics, fever, diarrhea, sweating, and others. Dehydration commonly occurs on long flights because fliers do not drink enough fluids while flying, and our sensation of thirst comes only after dehydration has occurred. Coffee, tea, and cola beverages all contain caffeine, a diuretic that causes us to increase our fluid loss by increased urination. All these factors that reduce fluid within the vascular space are additive.

Obviously, not everyone who misses a meal or drinks coffee before flying will notice problems with G tolerance. However, a study by the Civil Aeromedical Institute (CAMI), using a lower body negative-pressure box to duplicate the effects of G loading, showed that the vast majority of fliers had a significant decrease in G tolerance when fasting for 24 hours.

How can fliers achieve weight reduction and control? First, a flight surgeon should review the diet that a flier plans to start. Aeromedical consultation should support the decision to diet as well as the extent and method of dieting.

Second, a moderate diet should be selected. Crash diets rarely produce long-term benefits and are much more likely to cause hypoglycemia and decreased G tolerance.

Third, eat before flying. Plan your meals for the day around your flying schedule. If you miss a meal, don't skip the meal before flying.

And finally, limit your intake of foods and beverages containing large amounts of refined sugar. Highly sweetened foods or beverages, when eaten with limited protein, may cause a delayed hypoglycemia one to three hours later.

Maintaining a healthy weight is an important goal for all of us. With a normal weight we are more likely to live longer and be more effective aircrew members. Dieting remains the primary means of obtaining that goal. By knowing the possible adverse effects of dieting, and by using a moderate and enlightened approach to dieting, we can achieve a healthy weight without additional risk while flying. ■

OPS topics

Taxi Mishap

■ A C-141B landed at a European base, cleared the runway, and proceeded toward the parking area. The crew saw a follow-me waiting for the aircraft at the entry throat and started a turn into the parking area.

Just after starting the turn, the right main gear departed the taxiway. The aircraft had to be downloaded and defueled before it could be towed back onto the pavement. The taxilines were properly marked, and the C-141B could be safely taxied if the nose gear stayed on centerline.

The pilot turned early and so the aircraft turn radius took the gear off the hard surface. Many European bases have narrow taxiways and tight quarters. Operations there, particularly in the dark, rainy winter, require extra care and vigilance.

Light Aircraft Tragedy

A major and his family were returning from leave in a rented light aircraft. The pilot filed an IFR flight plan for a 1 + 30 flight. The weather forecast for the route of flight included light to moderate icing and light rain. While enroute, the pilot checked in with a stopover airport, requested, and was cleared for VOR approach.

A special weather observation shortly before the aircraft made its approach was for an 1,100 feet overcast with two miles visibility in snow. Mountains obscured all quadrants. The pilot reported missed approach and requested clearance for another approach. He reported no problems, and the clearance was granted. Six minutes later, the Center lost radar and radio contact with the aircraft.

The aircraft crash site was located the next day. There were no survivors. A second special observation taken about five minutes after contact with the aircraft was lost showed rapidly deteriorating conditions. At that time, the ceiling had dropped to 300 feet and two miles in light snow.

In a period of less than one hour the ceiling and visibility at the airport where the pilot was trying to land dropped from 2,500 feet and 10 miles to 300 feet and two miles in snow.

Flight Control Restriction

In the December 1981 issue of *Flying Safety* we published an Ops Topic about snow freezing between control surfaces and causing control binding. That item was generated by civilian aircraft reports, but now a similar report from an Air Force aircraft has come to our attention.

A CT-39 encountered heavy precipitation on arrival at a West Coast airport. The rain had ceased by departure time, and the takeoff was uneventful. During the climbout passing about 16,000 feet, both pilots noticed significant stiffness in the ailerons.

Because a return to the departure base would involve several turns as well as penetration of heavy IMC with some icing, the crew elected to continue to their destination a little more than an hour away where a straight in approach could be made. The aircraft was landed without further difficulty.

The post landing troubleshooting revealed that a combination of misaligned conduit clamps and ice accumulation in the area of the aileron bell cranks were the most probable cause of the binding ailerons.

A-7 Heat Exchange Failure

Our sister service recently reported an A-7 problem which should be of interest to Air Force A-7 jocks. The text of this report follows.

"After the A-7 landed aboard the carrier, the pilot reported that the air-conditioner made *a loud noise* and did not deliver cold air. Before the next launch, the pilot reported the turbine outlet pressure (TOP) was one inch above target TOP.

"At the conclusion of the flight, recovery was made under EMCON conditions. The first approach was waved off for a foul deck. When the pilot added power for the waveoff, the LSO noted an attitude change accompanied by smoke coming from the tailpipe. The pilot was in the 'middle' of the approach and the aircraft continued to settle for about two seconds, bringing the A-7 low over the flight deck. A foul deck waveoff produced similar results on the second approach. On the third approach it became evident to the LSO that the A-7 was going low and the cut lights were placed in 'steady' calling for full power. The aircraft touched down at full power for a 'taxi 1-wire' landing.

"A subsequent maintenance investigation revealed that the core of the heat exchanger had completely disintegrated. After replacing the heat exchanger, the aircraft was test flown without further incident.

"The heat exchanger failure allowed excessive venting of bleed air. This resulted in a significant loss of thrust during a critical phase of a carrier approach.

The corrective action was a recommendation to brief all A-7 pilots as to the possible loss of thrust associated with heat exchanger failure. There is a high probability of regaining lost thrust by placing the cockpit pressurization switch in the cabin dump position, closing the bleed air pressure limiter and shutoff valve.

"The CO commented: 'Heat exchanger problems are not new to the A-7 community. However, the associated loss of thrust when one fails may be an area heretofore unknown. Anything that reduces thrust and power responses of the TF-41 engine must be viewed with great concern and given widest dissemination.' " — *Courtesy USN* Weekly Summary, *No 49-81.*

Disorientation

An F-16 pilot was setting up for a BFM engagement. When cleared, he began a hard 5 - 6 G turn attempting to keep the other aircraft in sight. Almost as soon as the turn was initiated, the pilot experienced vertigo and could not focus on the other aircraft. He terminated the engagement and rolled out straight and level. At this point, the vertigo disappeared.

The pilot believed that the vertigo was a one-time sensation resulting from a combination of sun, clouds, obscured horizon, head movement and high G. Therefore, the engagement was set up again, and the pilot initiated another hard 5-6 G turn. Again, he experienced vertigo and terminated the engagement. This time the pilot decided to knock it off completely and initiated a recovery.

He declared an emergency and then made an uneventful landing. There was apparently no problem with the aircraft. However, the flight surgeon's examination of the pilot discovered an ear infection as the most likely cause of the disorientation.

continued

OPS topics continued

Not A Glider

Often, the most critical part of a flight is the last half mile on final, when airspeed is decreasing toward stall, while angle of attack and induced drag are increasing. We all know the key to a good landing is to maintain precise airspeed control throughout the final approach to touchdown. Final approach airspeed is based on weight and designed to hold lift and drag in the desired relation. Will this guarantee happy landings? Not alone it won't.

Concentrating on airspeed, you may overlook the thrust and drag effects. Thrust deficiency on final will result in a higher than normal airspeed bleed-off rate and a subsequent increase in sink rate. More drag than thrust is a simplification of the region of reverse command or what you may call flying on the backside of the power curve. This could put you literally on your backside.

The only way to avoid the high sink rate or recover from one is with power. Power after the fact will not be a quick fix however. If you are on final with a 1,200 foot per minute rate of descent, power at idle, and select maximum afterburner, you will still experience a considerable altitude loss you really might not be able to afford. If your engines took just six seconds to accelerate to maximum (they could easily take a lot longer), you would lose approximately 120 feet in the time it took them to spool-up.

The final approach for the T-38, like other high performance aircraft, is a minimum-maneuvering powered descent. Your throttle should be much closer to that required in level flight than idle. You don't *glide* the T-38 into the landing, you *fly* the final approach to touchdown. — Capt Tothacer, ATC Flight Safety, Randolph AFB TX.

Canopy Pressure

An A-7 was scheduled for a range mission, but deteriorating weather forced cancellation before the aircraft taxied. The pilot prepared for shutdown but neglected to open the emergency vent door before opening the canopy. The normal pressure differential inside the canopy caused it to jerk upon opening damaging both the canopy actuator rod end and the canopy hinge bolts.

How To Become An Old Pilot

An airline recently asked their pilots to state in a single sentence or less the one rule they never break and which they thought was most important in keeping them alive in the air.

Their one-line rules listed below form a mosaic law for survival. Do you have a one-line survival rule?

- Be skeptical of all human inputs.
- Follow the book, don't shortcut.
- Maintain crew coordination.
- Plan ahead, be prepared.
- Recognize and combat complacency.
- Minimize nonessential talk during takeoff, approach and landing.
- Don't assume, double check. — *Courtesy Royal New Zealand Air Force Flight Safety* Insight.

Another Complication

An F-15 pilot was enroute at FL 300 when he experienced a gradual loss of cabin pressure. The pilot immediately descended to FL 250 and started to RTB. When the SOF was contacted, he directed the pilot to go to 100 percent oxygen and descend below 10,000 feet. To accomplish the descent, the pilot had to fly into an undercast.

While in the weather, he began to feel the sensations associated with hyperventilation. He declared an emergency and landed without incident. The pilot probably increased his breathing rate due to his aircraft problem and the poor weather. This increased breathing rate induced the hyperventilation symptoms.

CAT

A C-130 was cruising at 16,000 feet over northern Texas when it encountered one or two seconds of abrupt, severe turbulence. Despite the very short duration of the encounter, the damage and injuries were significant. Two additional crewmembers in the cargo compartment (both unrestrained) were injured, one severely enough to require grounding temporarily. The two aircraft engines carried as cargo were also damaged by the abrupt aircraft movement.

One of the two crewmembers injured had been seated unrestrained. The turbulence lifted him from his seat, and he landed on his back on the cargo floor striking a cargo tie down.

A Winter Note From Rex Riley

The recent disaster at Washington's National Airport has created considerable thought and speculation about cold weather operations. Ironically, just a few hours prior to the loss at Washington National, I found myself trying to overcome resistance to deicing an aircraft at a midwest base. The arguments were common: we're busy, there's nothing but loose snow on the control surfaces, the weather's not that bad. All of those were good excuses, but there was snow melting and refreezing, and control surfaces were definitely sluggish.

To make a long story short, the deicing crew finally showed up and did a cursory job of squirting off the wings. Unfortunately, they didn't touch the gear, and when I preflighted there was ice in the mechanism and retraction would have been impossible.

I was ready to blame maintenance for this until, after doing some checking, I found that the only warning anywhere about ice accumulations in the gear is found in Section VII of the T-39 Dash One. The icing crew would not have bothered with the gear *unless* the pilot (me) told them to!

This is a happy story because there were no problems that could not be handled. I even got the gear deiced (once I pointed out the Dash One requirement). Still, I can't help but wonder how many times pilots tire of arguing about deicing or assume that that's a maintenance function and press on as is. When the weather is bad, everyone is in a hurry.

The bottom line is that it's your aircraft — no matter what. Shortcuts and cutting corners can always be rationalized before the fact. But absolutely nothing relieves the pilot of the responsibility for safe operation.

When you're a transient, you may be the *only* expert. ■

TEMPORAL DISTORTIONS

continued from page 10

enough to mention. All of these mishaps occurred within the last 36 months.

■ The first mishap was a midair collision between two F-4s. The WSO of one aircraft made these comments: "Ejection was initiated with min time decision (.5 - 1 sec) by me. As a unified movement, I pulled the handle and threw my head back (I practiced all ejections in simulators that way so that action was automatic). Between pulling handle and canopy separation, I was aware of being enveloped in a fireball; time distorted, and I was acutely aware that the canopy had not yet separated."

■ This mishap was also an F-4. Again, the comments were extracted from the WSOs narrative: "Emergency was left wing folding on takeoff. As soon as we were airborne, the aircraft started a roll to the left. I delayed ejection until I felt the aircraft would hit in a clear area. Time was expanded greatly, so it felt like several minutes before it was time to get out. Still no feelings of excitement. Waiting to eject felt no different than waiting to change the INS to the next turn point. I assumed ejection posture and pulled the lower handle. Again there was time expansion. The canopy leaving, the seat going up the rail, and the aircraft disappearing below me seemed to take several minutes. Because of altitude, I had elected not to perform the four-line jettison, but it seemed to be taking forever to come down. Since I was coming down on the parking ramp, I wanted to see where I was going and what I was going to hit. Only a few seconds later, my feet hit the ground, and I felt a pain in my left ankle. I tried to release my shoulder harness but only got the left one. After what seemed a very long time, I managed to release my harness and came to an immediate stop. Just as immediate, I was surrounded by people asking how I was, and the one and one-half minute ordeal that took 10 minutes was over."

■ This is still another F-4. The aircraft departed controlled flight at 2,000 feet above the terrain. Ejection was initiated at 1,200 feet AGL. Here are the aircraft commander's initial comments from his narrative: "In retrospect, my perception of time is the most interesting aspect of the incident. After warning the WSO that recovery from our unusual attitude was doubtful and then putting all of my attention into aircraft control again, it seemed like minutes from the emergency's onset until our ejection. It was actually very few seconds."

In addition to these examples, other escape system reports included numerous indirect references to inaccurate time estimations. Two pilots reported parachute rides of 10 to 15 minutes after ejection. The computed descent time in one case was seven minutes, and five and one-half minutes in the second case. Several F-4 pilots mentioned a long time delay from the time the back seat left the aircraft until the front seat fired. The first female to use an escape system was a student pilot who ejected from a jet trainer following an engine fire and loss of control. After parachute deployment, she stated that "I sailed for about three to four minutes, down to a farmhouse front yard on one of the main roads back to the base." However, ejection was initiated at approximately 2,000 feet AGL, so the parachute descent time was actually closer to 90 seconds!

I can personally attest to the fact that a temporal distortion can occur under stress, and its effect can be dramatic. While performing a functional check flight on an F-4, I experienced an engine bay fire. We took off only about one minute before I got a fire light so I immediately declared an emergency and turned back to the airport. During the descent, level off, and base turn everything was unhurried. The WSO and I completed the emergency checklist items. Total elapsed time to this point was four and one-half minutes.

After rolling out on base leg, the situation and my perception of time changed dramatically. The landing gear and flaps would not extend, both fire lights and both overheat lights abruptly illuminated, two hydraulic systems went to zero, and aircraft control started to deteriorate. I told the WSO the aircraft was becoming uncontrollable, and we would have to get out. I used what little control we had left to point the aircraft toward a clear area. As soon as the aircraft was pointed away from the city, I told my backseater to bail out and grabbed my lower ejection handle. I felt that the flight time from the base turn to the ejection point was longer than the flight time up to the base turn. A radar plot later indicated that it was only 54 seconds.

The entire ejection sequence from pulling the handle to parachute deployment appeared to take at least 30 seconds. (It was actually six or seven seconds.) I heard the rear canopy pop, was aware of a delay, and then heard the double bang as the rear seat departed the aircraft. It seemed to take several seconds before anything else happened. I looked at the instrument panel, confirmed both fire lights and overheat lights were still illuminated, noted the aircraft heading, altitude, attitude, airspeed, and engine instrument readings. I was totally amazed that the ejection sequence was taking so long and that I was thankful the aircraft wasn't in a dive. The front canopy finally departed with a loud pop. I was surprised there was no apparent windblast, and I still had time to think "OK, here it comes!" The explosive charge fired, and the aircraft appeared to drop away. Then the seat rocket motor ignited, and I blacked out momentarily from the acceleration. The only thing I was totally unprepared for was the noise. (It is loud!) The seat slowly pitched forward and started to roll to the right. For the first time, I was aware of windblast. The drogue gun finally fired, and a short time later the chute deployed with a "Whump."

I saw my backseater in his parachute, and then directed my attention to our crewless aircraft. It appeared to be moving in slow motion as it approached the ground about a mile away. The thought that went through my mind was pure disbelief — it was impossible for the aircraft to fly that slowly! I watched the airplane impact in an empty field and start to break up. The fireball boiled up at about the same rate as a nuclear explosion.

At this point, I was so sure that I wasn't going anywhere I actually looked up to see if my chute was hung up on something! It seemed to take five or six minutes to reach the ground, even though the descent actually took about one and one-half minutes.

My perception of the ejection sequence was that it took as long to happen as it took you to read my description of it. The point is: *Under acute stress, you cannot trust your sense of time!*

These temporal distortions, like spatial disorientations, are particularly dangerous because they are insidious. We tend to believe our perceptions. Our brains, like computers, take in information, process it, and make a decision. That decision is translated into a course of action. If some of the information is erroneous, the decision could be a bad one, and the resulting course of action, particularly in the case of an aviator, may be a fatal one. To illustrate this point, let me put you in the following hypothetical situation.

You've just completed two engagements on a DBFM mission, and things couldn't have gone better if you'd written the script yourself. There was plenty of fuel left for one more engagement, so you're inbound and eagerly looking

continued on next page

TEMPORAL DISTORTIONS

continued

forward to making the humiliation complete for the other guys. Your wingman makes a quick call, "Lead, break right! Two bandits 4 o'clock high." You make the break and get a tally. A quick look shows they're committed nose low and really smoking. (Hot dog! Pull just a bit and they'll overshoot. Then a quick reverse and we'll have 'em.)

Suddenly your nose slices to the left, and you start an uncommanded roll as the nose descends through the horizon. Instinctively, you shove the stick forward to unload the aircraft. A cold flash shoots through your body and your mouth instantly feels dry. The aircraft is nose low and rotating to the left. (Is this a rolling departure, or am I in a spin?) A quick glance at the altimeter shows that you're passing 10,000 feet. (This is getting serious!)

The adrenalin is really pumping now, and everything is slowing down. (Hey, the rotation rate is decreasing. It's about time. I'm starting to get a little low.)

"Lead, bail out!"

"Standby, two — I've just about got it!" (I think I've just about got it. Everything's slowing down.)

"You're too low, bail out now!"

(Why doesn't this stupid bird respond? Everything is so sluggish. Holy cow, there's the ground! I don't believe it — I really gotta get out of this thing!) You grab the handle and pull. (What's wrong? Why is it taking so long? There goes the canopy! Why doesn't the seat fire? OOF! What a kick! I'm still in the seat, and here comes the ground. What's taking the chute so long! If it doesn't open soon, I'm not going to make it . . .).

It's tragic, but hundreds of aviators over the years probably had similar final thoughts. On top of that, they watched themselves die in slow motion. Don't let it happen to you!

Temporal distortions have not been treated seriously in the past. Now there is ample evidence which seems to indicate that they may be responsible for delayed ejection attempts. It's time to stop thinking of this phenomenon as a mildly interesting curiosity and start treating it seriously. It's a killer and has to be recognized as such.

OK, so much for that. Now, what can you do? Here are some suggestions which might help you if you find yourself faced with an ejection decision.

- **Recognize the problem** If you read this article, you made a start. Realize that this can happen to you when you're under acute stress.
- **Make the ejection decision on the ground** The ejection decision is not an easy one. Believe me, it's the most difficult decision I've ever had to make. Don't wait until you're faced with an immediate decision. Plan your course of action in advance, and if the time comes, stick to your plan.
- **Believe your instruments, not your senses** Treat a temporal distortion like a spatial disorientation. Remember, those ejection altitudes for controlled and out-of-control conditions are minimum recommended altitudes. Once you recognize the aircraft is gone, for whatever reason, write it off and get out! You've made the decision; now execute it immediately. Don't waste those few precious seconds.

In conclusion, I want to say that everyone in the Directorate of Aerospace Safety is dedicated to making aviation safer. Temporal distortions will be treated seriously while we gather more data on this phenomenon. When we get enough information to draw some definite conclusions, I'll write an update and keep you informed. ■

CAR Troubles

■ Back in the Seventies *Aerospace Safety* was the universal Air Force safety magazine. It covered all disciplines and so had an authorized distribution large enough to reach the whole Air Force. In the Eighties, *Aerospace Safety* has been changed to *Flying Safety* and the audience reduced to include *only* aircrew and direct aircrew support personnel.

This reduction has meant a reduction in authorized distribution. However, we continually find that units never made the change in distribution when requested, so there are still non-aircrew organizations receiving large quantities of *Flying Safety*. If you receive *Flying Safety* and it does not relate to your job, ask your Customer Account Representative to change your distribution.

If you are in an aircrew or aircrew support organization, the authorized distribution is one copy for every three persons. ■

☆U.S. GOVERNMENT PRINTING OFFICE: 1982 — 583-020/1004

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.

CAPTAIN
John D. Hauck, Jr.

CAPTAIN
Stephen B. Frye

FIRST LIEUTENANT
Gregory D. Breland

MASTER SERGEANT
William T. Nicholson

STAFF SERGEANT
John W. Gordon

STAFF SERGEANT
Gene N. Powell

SERGEANT
Kenneth D. Millahn

SERGEANT
Mark H. Crooker

30th Military Airlift Squadron
McGuire Air Force Base, New Jersey

■ On 28 June 1981 Captain Hauck and his crew took off in a C-141B from Lajes Air Base, Azores, on a routine airlift mission. The aircraft carried 32 passengers and 10 pallets of cargo. Shortly after liftoff, as the gear was coming up, the crew received a radio call from another C-141 crew on the ground that Captain Hauck's aircraft appeared to have a gear problem. The crew had already noted an unsafe gear indication. The instructor engineer, Sergeant Powell, went aft and visually confirmed that the left main landing gear strut had separated, and that the gear was held only by the front scissors arm. The crew proceeded to a holding pattern and took stock of the situation. A gear-up landing was impossible because the gear could not be retracted. Other options were eliminated for various reasons leaving the crew no choice but a landing at Lajes with the damaged gear extended. No one could accurately predict the aircraft's behavior on landing, but Captain Hauck decided that, in the interests of passenger safety, the cargo should be jettisoned. The crew proceeded to jettison all 10 pallets without difficulty, a feat that had not been accomplished since the initial development testing of the C-141. Finally, Captain Hauck set up for a straight-in approach. The landing was complicated by a gusting left crosswind and by the unknown action the damaged gear would take as the aircraft settled to the runway. After touchdown, the dangling left gear sheared off about 1,000 feet down the runway, and the left wing began to settle toward the ground. Captain Hauck and Captain Fry, acting as copilot, were able to keep the wing from touching until the aircraft had slowed to 60 knots. The aircraft slid to a complete stop with the nose wheel two feet left of runway centerline without injury to passengers or crew and minimum damage to the aircraft. The superb performance and skill of Captain Hauck and crew prevented a much more serious mishap and possibly saved 32 lives. WELL DONE! ■