flying

SAFETY

JANUARY 1982

THE GREAT AMERICAN HERO

ON HITTING THINGS

Sixteen Tons

Aircraft Lightning Strikes

Never Trust Anybody

Memorandum To Aircrews

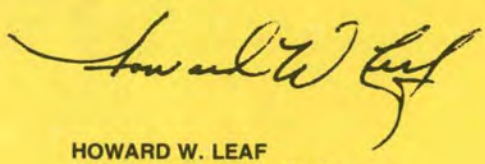
■ As we begin 1982, last year's mishap figures might lead one to believe that we had a pretty good year. As I dig deeper into the individual mishaps behind the numbers, however, I feel that, in fact, 1981 was a very disturbing year. Nearly one-third of our destroyed aircraft mishaps were *preventable at the aircrew level.*

Specifically, we had almost two dozen destroyed aircraft which were caused (or allowed to happen) by either pre-planned or spur-of-the-moment *mental* errors. These mishaps involved discipline/judgment breakdowns such as continuing the mission with a known aircraft malfunction, crew rest violations, disregard for procedures/ROE, and unauthorized low level (buzzing). We've passed the word to commanders and supervisors at all levels, but the "bottomline" mishap preventer is you — the operator!

Our flying environment is becoming increasingly more demanding — day by day. This behooves you — the aircrew — to have every flight thoroughly planned, briefed, and coordinated. Whether in a multi-place aircraft or a flight of fighters, every individual should know exactly what the plan is for the conduct of the mission. To prevent surprises and reduce the number of "instantaneous decisions," all participants must have completely clear in their minds what parameters, rules, and responsibilities will be followed to successfully (and safely) complete the task. Additionally, aircrews need to have an "ace in the hole" — that is, a mental back-up plan to be followed when the original plan goes sour. We also need to be spring-loaded to the "non-press" position. I'm not by any means advocating the softening of training or the relaxing of an aggressive pursuit toward skill and excellence. I do, however, want to emphasize the judgment and maturity needed to call "knock it off," to abort the low level and/or a range pass when the machine doesn't work or the weather isn't within limits or aircrew capabilities. Don't allow yourself to fall into the often fatal trap of pressing for mission accomplished despite bad equipment or marginal weather.

Lastly, we need to have a feeling of accountability for our actions. Duty as an aircrew member, regardless of crew position, carries with it a great deal of inherent responsibility. That duty places you in the responsible position for lives, property (government and private) and in the final analysis, a critical portion of the composite National Defense effort. Accountability by no means carries the connotation of mass lynchings for errors committed but it needs to be understood that poor judgment and premeditated violations of procedures will not be tolerated. There is no room within the ranks of the professionals for those individuals.

Let us vow to make this the year of the professional Air Force aviator. The professional aviator completes the mission safely and successfully with out cutting corners and endangering lives. The mission of the Air Force is to TRAIN and SURVIVE, in order to FLY and FIGHT (and win) another day! Good luck and good flying! ■



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UNITED STATES AIR FORCE

flying

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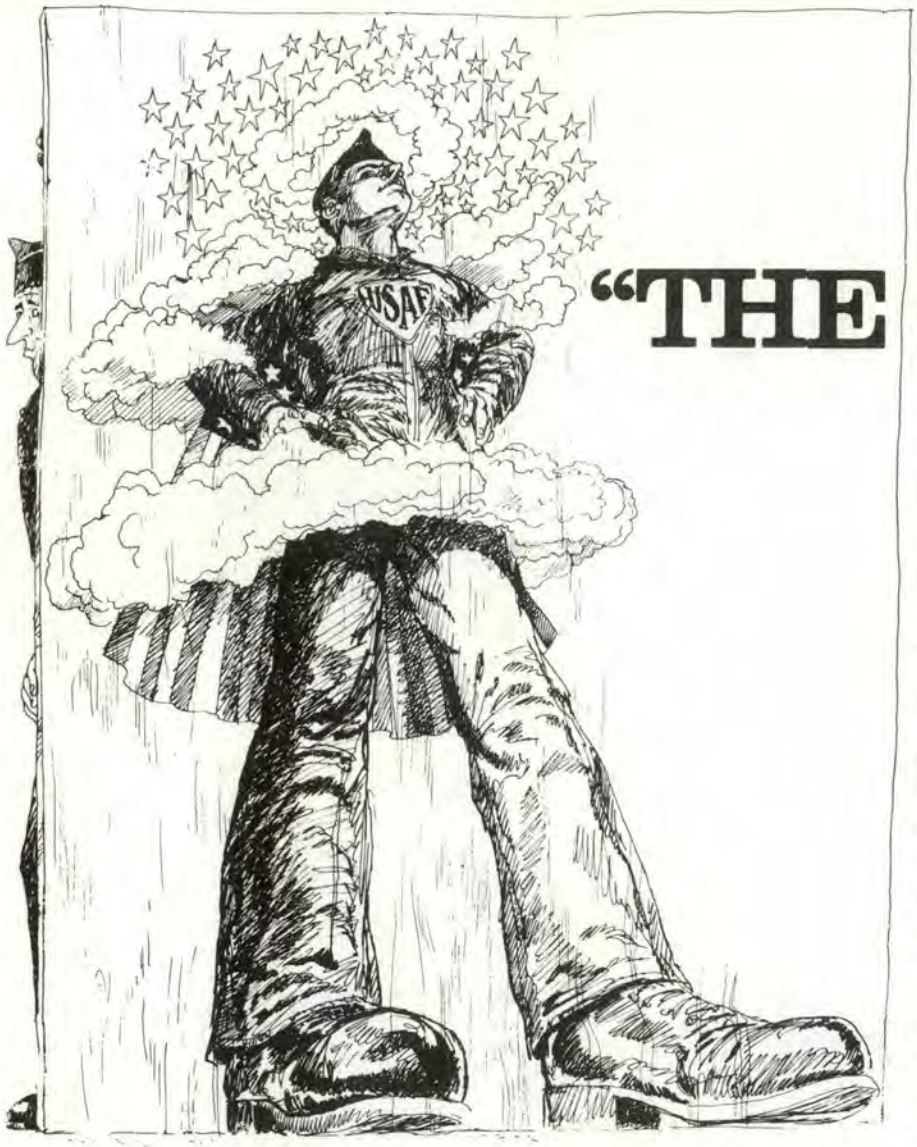
SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF



"THE GREAT

MAJOR GARY L. STUDDARD
Directorate of Aerospace Safety

■ I've been directly involved (primary duty) as a flight safety officer for the past five years. And to me, a driver of F-4s for 11 years, the total experience has proven to be rewarding, challenging, demanding, and frustrating. I've counted and investigated more incidents, reviewed more accidents, looked at more trends rise and fall, and given more safety briefings than I care to remember.

I've worked my way through the squadron level, a wing position, and finally up to the Air Force level at AFISC where I've gone from seeing a corner of the "Big Picture" to occasionally having a blurred image of the total picture. I even promised myself that if I was ever in a position to influence the final findings and causes of mishaps to protect the pilot that I would do so. But, alas, I failed. Who can argue with the facts.

I would like to think somewhere along the line I've prevented some mishap from occurring, but who knows. That is part of the frustration factor. The unique thing about safety is that we can only measure our failures. But the largest part of the frustration equation is the repetitiveness of the factors involved in our aircraft mishaps. Almost all the mistakes that can be made in flying an air machine have been made and safety has duly recorded them. I suppose the smartest among us know the safety history and avoid these same mistakes, but there are still those who refuse to heed the lessons learned. Probably the most common words which appear over and over in our mishap reports are the lack of leadership, supervision, or discipline. We teach them, write about them, preach them, continually hear them, and evaluate them until we all become queasy at our stomachs. I suppose it's possible these have just become buzz words which have lost their meaning. But, in the end, whatever we call it, actions (inactions) by aircrews (who should know better), are still the leading causes of our mishaps.

I have often wondered if there is something about we pilots that make us a little foolhardy. I realize we belong to a unique fraternity and take a great deal of pride in what we do, but I wouldn't really consider us a breed apart or that different from "Joe Citizen." Maybe we are stereotyped and merely try to live up to the image. Imagining Pappy Boyington as an F-16 squadron commander might bring warm fuzzies to many of us. Or, how about those cliches you can read in

AMERICAN HERO"

any piece of aviation literature such as, "cool, capable, granite-jawed, ruggedly handsome, crinkly-eyed towers of strength, instilling a confidence in their charges, born of uncounted ordeals by fire and long hours of lonely vigil?" See what I mean? Well, I think the run-of-the-mill aviators aren't so glamourous as the passages might describe. And most of us all-time-great pilots (oops!) don't really picture ourselves as such. So, in the final analysis, I guess I really can't say we fit into any specific mold . . . another blank wall in explaining our pilot-factor mishaps.

Maybe you can shed some light on the reasons we do the things we do. Cases in point:

- The pilot performs a TACAN approach when the field is below TACAN minimums and eventually goes around when he sees the field too late for a safe landing. He has fuel for one "good" GCA. The supervisor of flying becomes concerned about the aircraft's low fuel, believes the pilot is having difficulty with the approach, and directs a divert. The pilot accepts the divert without question, even though he does not have enough gas remaining to make the divert field. The aircraft flames out on final approach and the two crewmembers successfully eject.

- The aircrew performs an intentional, non-standard, or unauthorized maneuver in a non-aerobatic aircraft. The maneuver leads to a high-speed dive. Recovery is not accomplished. Two fatalities and one destroyed aircraft.

- A pilot allows his copilot to fly a popup attack, although the copilot was unqualified to perform the maneuver and had not been briefed on the attack. The copilot gets too close to the target as the popup is initiated. The pilot allows the popup to continue; an accelerated stall occurs as the aircraft is turned toward the target and control is lost. One fatality, one major injury; one destroyed machine.

- The two-ship flight completes their mission and on the way back to base, they overfly one of the crewmembers' home. The mishap aircraft descends. The pilot applies maximum power and a wing rock starts. During a 90-degree bank pulloff, the aircraft impacts a tree. One fatality; the aircraft is destroyed.

- The pilot had a history of fainting episodes and had undergone close medical examination. No abnormalities were found and a waiver for flying duty was granted. During the time between the waiver and the mishap, the medical problem resurfaced but the pilot did not report it. Following a routine mission, the aircraft struck the ground in a near vertical dive at high speed. The pilot was incapacitated at the time of the impact and he was fatally injured. The aircraft was destroyed.

Unfortunately, the list goes on and on. While the examples above are all a little different, they have the common "discipline" shortfall.

It's true accidents are an effective way usually to eliminate problems within the system because they get a lot of visibility and cause people to work the problem. In the logistics area, we eventually get it fixed. Admittedly, it may take awhile because of dollars, but it does get corrected. In the operations arena, no one has broken the code in solving discipline problems. In fact, if anyone has an iron-clad fix, give me a call — we'll patent it and retire rich.

In the interim, the best we have are established procedures, checklists, altitude limits, tested methods, and other rules which ensure longer life, enhance safety and mission accomplishment, and are the "Air Force Way." History has proven it is better to do things "by the book." We cannot afford the unique and unusual way offered by those who think that to be a "hero" you can't follow tested ways, procedures, limits of any type, or what experience would dictate as a right method. Successful missions are normally the direct results of team effort; this effort can only be achieved by following the established "game plan." Sustaining air discipline out in the system or around the flag pole requires a total commitment to the rules — no short cuts, no haphazard, minimum acceptable performance, no "close enough for government work" attitudes. No complacency. In a nutshell, professionalism.

How about you? Where do you fit into the mishap prevention equation? I think some of us (who need to) can still fit the walking model of a "curly blond hair, ice blue eyes, aquiline nose, set mouth, cleft chin, cloud-busting pilot who gazes over far horizons, and cruises the skies as did the intrepid mariners of yore." I believe we can possess these attributes and not relinquish our "professional group" standards. If we can't, I'll opt for being in the latter. With it we can do most anything. Without it, we are reduced to luck, and I don't like the odds. ■

Learning

MAJOR TIMOTHY J. SHAW
Directorate of Aerospace Safety

■ Can you teach an old crewdog new tricks? After flying a few years, crewmembers tend to develop certain operational philosophies. Ever heard "If it doesn't work — write it up?" It's a basic rule of thumb developed by flyers through years of filling out the AFTO Form 781 after every flight. Crewmembers document equipment malfunctions and the maintenance man investigates to find the cause. But did you know that as a rated officer with four years rated service you could be selected as an investigating officer of a mishap involving a part failure?

Your wing commander could select you as investigating officer for any mishaps involving aircraft damage that occur in your organization. The new trick for the crewmember investigator is to find the cause rather than document the mishap. The mishap data may include equipment malfunctions, but what caused it? The driving reason behind a mishap investigation is to prevent further mishaps. This may sound a bit ambitious, but finding the cause rather than documenting a malfunction can preclude future damage to both aircraft and crewmembers.

After a crash of a single engine aircraft, most crewmembers ask "What happened?" If the answer is "The engine flamed out and wouldn't airstart," the case is closed for most crewmembers. A simple case of "It didn't work and

New Tricks

couldn't be written up."

But, for a crewmember who is now the investigating officer it's a different story, as it must be.

When responding to an aircraft mishap caused by a material failure, the investigating officer must find more than what would go in the 781. Pointing a finger at a system that malfunctioned isn't good enough. To prevent future mishaps, crewmembers who become investigating officers must learn to distinguish the cause from effects. Sounds easy, huh? Well, by definition from AFR 127-4, a cause is a deficiency which, if corrected, eliminated, or avoided could have prevented the mishap.

It should be noted that an investigating officer doesn't have to be a maintenance expert or a design engineer. Technical assistance can be requested to conduct research, but the key to providing a credible report is the investigating officer asking pertinent questions.

Let's investigate that destroyed single engine aircraft whose engine flamed out in flight and wouldn't relight. Why did the engine flame out? Experts say fuel starvation due to a bad fuel controller. This is the point where the investigating safety officer could short circuit prevention. The fact the fuel controller malfunctioned is not the cause. *The fact that any part breaks or malfunctions is not a cause*. It's a result.

To find the cause and prevent other flameouts the safety officer must continue to ask "Why?" Why did the fuel controller fail? It failed because it was loose. Why? It was loose because one B-nut was not safety wired in accordance with tech data. That is a cause of this mishap. We should also look into who failed to perform and why they failed, lack of training, stress, motivation, or any of the other human factor problems.

The immediate preventive action may be a one-time inspection of fuel controller B-nuts for safety wires on all aircraft of this type. The prevention payoff occurs when a pilot safely flies in the same type of aircraft at another base with a fuel controller that has just been tightened and safety wired because of this investigation.

After some mishaps, warnings and cautions have been added to the flight manual and to maintenance TOs to help prevent recurrence. The details of the aircraft mishap aren't mentioned in the warning or caution, but all the prevention is. Prevention is also the reason for periodic inspections and mandatory part time changes. Finding the cause helps protect aircrews and the aircraft they fly.

The greatest number of safety investigations are for Class C mishaps. A Class C mishap involves damage costing between $1000 and $100,000. If the crewmember doing an investigation doesn't understand that a good 781 write-up is not the same as a mishap cause, a problem immediately develops. How can something be prevented if the cause remains unknown? Take a look at what some investigators labeled as "cause" in three different Class C mishaps.

1. The left hydraulic system failed in flight.
2. The landing gear circuit breaker popped.
3. A piece of the pylon cover broke off in flight.

They resemble fairly common 781 write-ups, but they are not causes of the reported damage. The investigator has to find out why the hydraulic system failed, why the circuit breaker popped or why the piece of pylon cover broke off and state it as cause. The core of a good flight safety program is thorough investigation of Class C mishaps. Finding the cause of these mishaps really can prevent recurrences.

Actually, there is no trick to a good investigation. Just get past the fact that a part malfunctioned, and find out why it malfunctioned. When you find the why, you've found the cause. ■

On Hitting Things

MAJOR JOHN E. RICHARDSON Directorate of Aerospace Safety

■ The greatest occupational hazard in low level flying is the possibility of hitting something. Of course, the earth is the most obvious candidate and unless you are very lucky your chances of surviving are small. However, there are many other things to hit in the air above the ground. In addition to birds, bats, bullets (ricochets or other), and other airborne objects, low flying aircraft have to contend with a wide variety of fixed objects.

In the past few years U.S. Air Force aircraft have hit everything from cactus plants to grain elevators. The really indefensible part of this is that every one of these mishaps was preventable! Easily preventable in most cases. To see why, let's look at some examples.

Trees 3 Helicopters 0

There are many more tree strikes in the file but three examples will give you the basic scenario.

■ A UH-1 was standing alert at a gunnery range when the IP decided to show the crew an interesting area some distance away. He started to hover taxi down an old taxiway. At first there was sufficient clearance on either side, but soon the helicopter came to an area where pine trees 30-40 feet high lined both sides of the taxiway. As the aircraft approached these trees, the right side observer told the pilot that they were very close to the trees on the right. The pilot apparently corrected slightly to the left. Almost immediately, the main rotor blades struck a tree.

■ The helicopter was heavily loaded in anticipation of a long mission. The pilots estimated that there would be a two percent margin of power available over power required. The helicopter made it to the operating site without difficulty. Then, when the pilot attempted to take off and enter a five foot hover, rotor droop began almost immediately and rotor speed decayed to below 100 percent. The pilot, having difficulty controlling the aircraft, was not able to keep the tail rotor from swinging into a tree some 20 feet behind the original landing site. After reducing the gross weight of the aircraft, the crew were able to successfully recover with only minor damage to the tail rotor. A review of weather conditions at the site showed that had the crew computed their takeoff data they would have discovered that power available was three percent less than power required.

■ Finally, a UH-1 was simulating an attack helicopter threat as part of an exercise. To avoid both ground based and airborne antiaircraft weapons, the UH-1 pilot was using terrain masking techniques. The ROE called for a minimum altitude of 25 feet; nevertheless, the main rotor struck a 50 ft. tree on a ridge. The aircraft was in a hard turn at the time of the strike, and the pilot was not aware of how low he really was.

Fixed Wings vs Trees

Helicopters are not the only aircraft who have trouble with trees. Every category has participated in woodcutting at some time. Often the difference between a flaming crash and a minor incident is luck and inches.

■ A B-52 was flying a special mission which required racetrack patterns at 200 feet AGL. The crew were flying the aircraft on autopilot with altitude hold engaged. This would have worked fine if the terrain had been level, but the land sloped up from sea level to about 100' MSL. At that point, there were also 86' trees. At the point of impact, the B-52 was in a 43 degree bank at an absolute altitude of 130 feet. This placed the wing tip 71 feet above the ground. The impact with the trees damaged eight feet of the wing leading edge as well as the left external fuel tank.

■ During a low level navigation sortie the lead F-4 aborted and nr 2 continued with the mission. After the aircraft landed, maintenance found that it had hit a tree. The crew were flying 1,000' AGL except for ridge crossings. They were supposed to maintain a minimum of 500' AGL but for some reason allowed the aircraft to get low enough to hit a pine tree.

■ Two fighters were cleared for a

TACAN approach. At 5 DME the flight sighted the runway. At this point, nr 1 went around and cleared nr 2 to continue the approach. Number 2 began descent to TACAN minimum descent altitude using TACAN DME and altimeter while visually cross-referencing the VASI system. At two miles the aircraft encountered rainshowers. Using what he thought were good references, the pilot continued descent into the tree tops — on center line, one mile from the runway. The aircraft was 360 feet low at the point of impact.

■ Distraction can be a serious problem when low level. During the first delayed turn the pilot saw his low level map fall from the clipboard. After rolling out of the turn he reached down and retrieved the map. As he glanced back up to put the map in the clipboard, he saw the hill top and trees immediately ahead. He pulled up, but too late to prevent an impact with the trees.

Wires

The Army spends a large effort each year in preventing wire strikes by helicopters. Air Force helicopters strike wires too, and so do fixed wing aircraft.

■ A flight of two F-4s were flying escort for two F-111s. The four aircraft were 3,000 to 5,000 feet apart in rugged terrain and flying at 1,000' AGL. The flight path took the aircraft up a 2½ mile wide valley surrounded by 2,000 to 3,000 foot peaks. The lead F-111 spotted power lines on the map, then visually on the valley floor. Then they also spotted support structures on the hillside and lines at 1,000' AGL. The lead F-111 made a pull-up and simultaneous radio call but before the second element could react, the lead F-4 struck two of the wires with the vertical stabilizer. The two lines were 1½ inches in diameter and carried 220,000 volts. During debriefing, the crew expressed surprise that power lines could be stretching across the valley at 1,000 feet above the ground.

■ In another case, the pilot never saw the cable nor was it marked on the map. During a joint attack warfare system mission in an MOA, an A-10 was maneuvering for a gun pass in a small valley. The aircraft was in a 5 G wings level pull-up when the pilot heard a loud pop and saw a bright orange flash. He then saw that the outside panel of the center windscreen was broken 12 inches from the base. After the aircraft landed, investigators found that the cable's first contact was on the nose of the aircraft just forward of the air refueling door. Then the cable slid up over the rain removal duct and struck the center windscreen breaking it. At this point, the cable broke. The wire map plot did not show this cable which had recently been installed.

■ The wire problem can be insidious. A flight of four F-105s were flying a 100 foot low level training route in an intrail box formation. The flight was traversing a valley when the pilot of nr 4 heard a thump and saw something flash by his right side. The aircraft had struck and severed two static lines on top of some electric power lines. The static lines were 58 feet AGL.

Soon after nr 4 struck the wires, Number 3 in the same flight rolled out of a turn, realized he was below 100 feet, saw wires ahead and pulled

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FLIGHT SAFETY CROSSFEED

On Hitting Things

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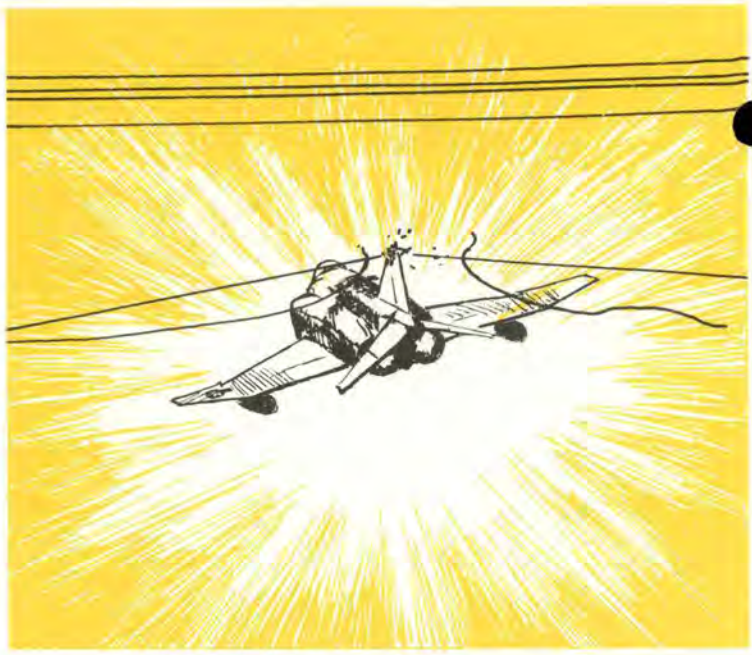


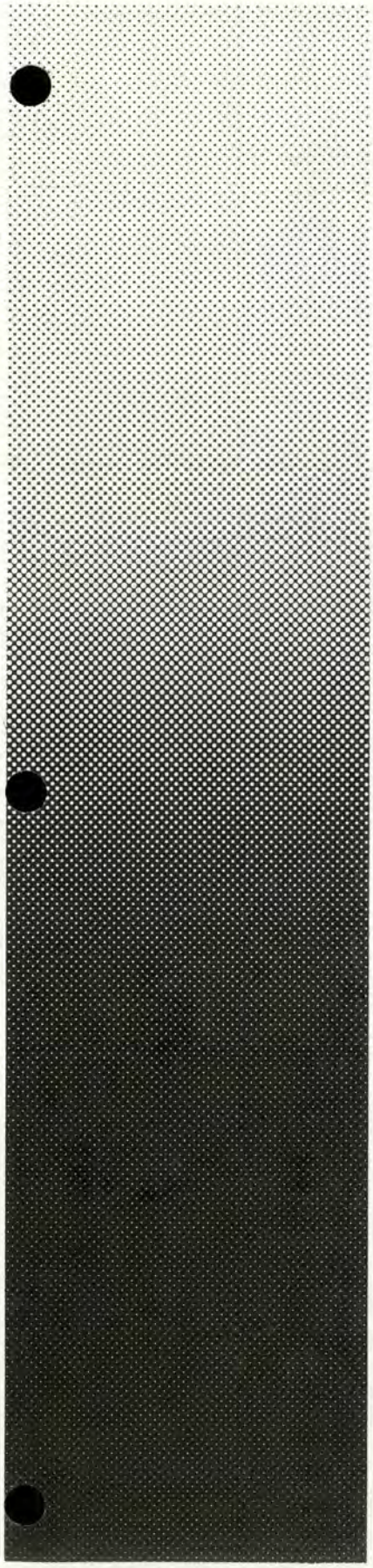
up. It was not until after landing that the pilot discovered that his 450 gallon tank had struck the wires about 25 feet AGL. The combination of rolling, rising terrain, overcast, and lack of contrast on the ground prevented the pilots in both cases from perceiving their true altitude.

The Final Category

There is one type of mishap that is especially tragic because it is completely and absolutely unnecessary. That is the striking of a tree, wire, etc., due to deliberate violation of directives.

- An F-4 departed on a single-ship mission after the other members of the flight cancelled. The briefed alternate mission was basic flight maneuvers/aerobatics. After entering the operating area, the crew began maneuvering. As the aircraft was coming out of the bottom of a loop, it hit a tree. The pilot had deliberately descended below minimum altitude. The WSO did not object to the low altitude acro. As a result of distraction, visual illusions, and over-confidence the crew failed to maintain terrain separation.
- The flight lead of a T-33 flight indicated during preflight briefing that he intended to fly below minimum safe altitude. He requested the lowest possible IFR enroute altitude for each route segment. While enroute, the flight lead departed an assigned altitude without clearance and descended below authorized altitude into a gorge. The wingman did not question Lead's action and observed Lead strike two steel cables in the gorge. The aircraft broke up and crashed. The pilot did not eject.
- A Forward Air Controller took off on an early morning navigation sortie. Not long after takeoff, the 0-2 was seen by witnesses at extremely low altitude (15-20 over a ridge). A witness to the mishap saw the aircraft make a sharp, low altitude turn, then roll out extremely low along a dirt road. Then the witness saw two bright blue-white flashes as the aircraft hit two power lines 38 feet above the ground. The aircraft crashed just beyond the power lines.

There isn't much else to be said. Low altitude flying is challenging and also is an essential tactic in today's high threat environment. Nonetheless, hitting things other than targets is not part of the objective. ■



THIN AIR

■ Aircraft accidents involving acute hypoxia due to lack of oxygen in the pilot's air supply are rare. Much effort has been expended in flight training programs worldwide towards educating pilots concerning the need for the use of oxygen or maintenance of a cabin atmosphere below 10,000 feet, and pilots of high performance aircraft generally are aware of the hazards of hypoxia and the need for maintaining an adequate supply of oxygen.

Such accidents still occur, however. In one recently cited accident involving a high-performance business aircraft, an oversight in equipment operation combined with the lack of emergency procedures training in the type aircraft involved resulted in a fatal accident.

Post-accident analyses by French government officials lead to the development of the following scenario by investigators.

An emergency descent was to have been practiced from FL 310 during a training flight after cabin pressure had been released. Upon loss of pressurization, the crew donned oxygen masks for the remainder of the training maneuver. Normally, this would have presented no problem. In this instance, however, the investigation results indicated that the oxygen system had not been turned on. The crew apparently quickly lost consciousness, and the aircraft orbited under control of the autopilot until fuel exhaustion.

The pilots' loss of consciousness and consequent death is not surprising considering the fact that the time of useful consciousness (TUC) without oxygen for the average person at 31,000 feet is 60 seconds. Several factors determine the length of TUC, including:

- Rate of ascent — slow depressurization, obviously, prolongs the TUC period.
- Physical activity — exertion shortens TUC.
- Physical condition — cigarette use, alcohol, poor physical condition and advancing age all reduce TUC.

It should be obvious but, it bears repeating. Great care must be taken when simulating aircraft emergencies. In a case such as the one just described, the emergency is not simulated unless all the proper precautions have been taken. It is an emergency in its own right.

Without proper preparation and correct execution of emergency procedures, depressurization at FL 310 is not conducive to flight safety. Although the goal in such an exercise is training, it must be recognized that creating actual emergencies can be an expensive way of conducting flight training. — Courtesy FSF *Accident Prevention Bulletin,* July 1981. ■

SIXTEEN TONS

■ "Excuse me, Major, but aren't you flying this evening?" Major Bud Johnson sighed and glanced at his watch. "That's right, thanks for reminding me. I'm so far behind with this paperwork I'd forgotten all about it. Please button up the shop, Sergeant — see you in the morning."

As Bud drove toward the flightline, he reflected that the weatherman had been right. The ceiling and vis were still good, but light rain had started as scheduled and the gray afternoon foretold of layers and layers of clouds. "I sure hope we can top this stuff," he mused. "If not, I'll be a tired boy after 2.3 of night wing weather."

Major Bud Johnson was, in fact, a pretty tired boy already. After years of learning the ins and outs of squadron operations, his new job in ops and training was both strange and trying. Early mornings and late nights had become his routine, and still too much of his work came back from the DO with the note: "Good start. Scrub it down again, coordinate with the DM, and run with it."

It was a quarter to five when Bud walked into the squadron — plenty of time to climb into a flight suit and scan the FCIF before briefing.

Suited up, he checked by the duty desk. "Are we going to have some birds tonight?" he asked. The duty officer quickly checked the schedule board. "Looks real good as far as the aircraft are concerned, but the tankers may be called off because of weather. We're waiting for the command post to get that

finalized and will let you know as soon as we can."

After filling his coffee cup, Bud joined his GIB and the other crew in the flight briefing room. He was greeted with a cheerful "Hello, wing weenie" from his old squadron mates and retorted with a short comment on their backgrounds. As Bud took his seat, the flight leader began the briefing. Once the time hack and aircraft assignments were made, Bud's thoughts drifted to other things.

"I wonder if I was smart to take this job," he thought. "The timing was certainly bad. Here it is the start of summer and the whole family was really set on taking that leave. The boys have been working on getting the camper squared away and the wife has enough travel books to choke a horse. But there was just no choice. If you pass up a chance to move up, you just don't get another. Maybe next year."

The duty officer interrupted the briefing with news that the refueling part of the mission had been canceled. "Sorry, but weather has PIREPS that this stuff is fairly well layered up to over 30 thou. The field should hold up fine so the mission can go — just no tanker square to fill."

"That's just great!" the flight leader exclaimed sarcastically. "We all have more than enough night time — the tanker was the only reason we were going to fly anyway. Just abso-bloody-lutely great! Now we can bore holes for 2.0."

The briefing was quickly concluded. After minor changes in EACs and a quick check on the flight plan were made, there was still time for a final cup before going out to the aircraft.

Captain Joe Willer was flying with Bud. A sharp WSO with more than two years in the squadron, he sensed a change in Bud's usually outgoing manner. "Bud, you're being awful quiet. Anything wrong?" he asked. "Your wing job can't be all that bad."

"Well, it's more than I figured it would be, but what really tears it is the fact that the boss is leaving in a couple of weeks and the new guy won't be in for over a month, so I had to cancel my leave."

"I'll bet the dearly beloved was torqued down pretty tight when you told her about that!"

"Sure she was — and still is," Bud replied. "But she'll get over it after a while. She's been around the Air Force long enough to know that these things happen. Well, I guess it's time to get on with the flying business — the fun and games of a night round-robin!"

With a final pit stop and the usual pocket-slapping check to make sure gloves and other miscellaneous gear were on hand, the flight members hopped in the bread truck for the ride to the aircraft. A few words and a reminder from the flight leader: "See you on button eight at three zero."

The preflight went rapidly, the way they always do when it's raining. Once in the cockpit, they ran the checklist items down to engine start.

"Well, it all looks good to me," Bud muttered. "I wonder why the bird always breaks when it's day VFR and on a night hole-boring mission you can't find anything wrong even if you try. I'd much rather be sitting at home right now than strapped to this machine."

"Yeah, I know what you mean," said Joe. "I've got a date with a real honey tonight and I'll be dragging so much after this that I'll hardly be sociable."

Engine start and the after-start checks passed quickly, and they followed lead to the quick-check area. "Say, Bud, it took eight minutes to get an alignment after the heat light went out, and the ground speed is up to 50 knots already. INS may not be too shiny tonight."*

"Rog. Everything else seems OK except that we don't have a TACAN lock-on yet — it should be there, but let's give it a couple more minutes."

The quick-check progressed with its usual boredom and lead's thumbs-up was returned. Switch to tower freq — check-in — ready to go. "Cobra Flight, this is Tower, hold one. The SOF is checking with command post."

Bud and Joe wondered aloud about what the SOF might have in mind. Maybe the tanker would make it after all.

"Cobra, this is the SOF. Bring 'em back in and shut 'em down. The TACAN is off the air. Maintenance says it'll be a couple of hours before they can get it back on. The mission's canceled."

"Another practice engine start — great fun!" Bud remarked. "Let's clean it up and head for the barn."

Taxi back — chocks in — throttles off. "Let's get out of this old girl, Joe. See you on the ground."

While waiting for the other crew to join them in the truck, Bud and Joe were strangely silent. Then Joe said, "Bud, I don't want to shake you up, but do you realize that your lower ejection guard wasn't up when you climbed out?"

"You're kidding?! Damn, I'm glad I didn't hang a leg strap in that beauty. I may not be too sharp

* *Reference is to Inertial Guidance System*

SIXTEEN TONS continued

tonight, but that's one thing I never thought I'd forget."

"Bud, I know you want to get home, but would you mind stopping by the club with me for a cool one? There are some things I need to talk to you about. You know, kind of privately."

"Sure, Joe, but only one. It's too late for dinner with the kids, but if I hurry I'll have a little time with them."

Driving toward the club after a short debrief, Bud wondered what kind of problem Joe might want to talk about. "Joe's a nice kid," he thought. "Probably got girlfriend troubles and I guess he thinks I have all the answers. What a laugh!"

Joe was already seated at the nearly deserted bar when Bud walked in. The bartender served a frosty mug as he sat down. "What's troubling you, Joe? One of those sweet young things trying to pin you down?" Bud jokingly asked.

"Don't take me wrong, Bud, but it isn't me with the troubles — it's you. Tonight you really scared me. I knew you were tuned out at the briefing, but I wasn't really concerned until you blew three or four items on the checklist. Honestly, I was damned glad we aborted!"

With a sigh, Bud glanced around and then took a long sip. "It really shows that much? I thought that with as much time as I have in the bird I'd be able to fly a simple mission without any trouble. The problem is that I'm tired. Oh, I could pass a flight physical right now — it's just that everything seems to be piling up and there's no light at the end of the tunnel."

"Bud, why don't you hang up the old G suit for a couple of weeks? Tell squadron ops you need a little time off from flying."

"Joe, the wing type that always checks the weather and then finds his staff meeting schedule getting tighter as the ceiling's getting lower has always shown me nothing. What's more, when the squadron finds out that they can't depend on you and knows that they're going to pick up a deviation about half the time you're on the schedule, then you can just kiss the good flights goodbye. Not for me."

"Bud, you'll end up in a smoking hole with some poor GIB three feet at six o'clock if you don't stop trying to play superman."

Bud waved to the bartender and signaled for two more beers.

"You're right, Joe, and thanks — I mean it, thanks. It's hard after all these years to admit that I can't hack it, but it's true. I appreciate how you must have been gritting your teeth this evening and will make one promise — I'll never try to hack a mission again when I know I'm not in shape, either mentally or physically, to do a first-rate job."

"Sounds great, Bud. When you get back on the schedule, count on me for your back seat, OK?"

"It's a deal." — *Reprinted from* Aerospace Safety. ■

THE SEASON FOR THE COMMON COLD

■ Over the course of an entire year, most adults will get two to three colds. If you have children at home, you're likely to catch six colds annually. So it's safe to say that almost all aviators must often deal with runny noses, scratchy throats, sneezing, and other cold symptoms, especially during fall and winter. But while the discomforts may be relatively minor, the common cold can cause pilot incapacitation during flight which may result in an aircraft mishap.

Two commonly held misconceptions can cause aircrew members to disregard the common cold as a significant hazard when flying. First, it is erroneously assumed that the common cold is a minor illness and very seldom need a cold keep a person from flying a mission. Second, if we fly close to the earth and altitude changes during flight are relatively small, the physiological effects of altitude are minimal.

The cold is no minor problem in aviation. Swollen lymph tissue and mucous membranes can block sinuses as well as ears. This can cause incapacitating pain and pressure during descent which may result in vertigo and loss of control of an aircraft. Additionally, infection of the inner ear by various cold and flu-like viruses can produce severe vertigo which makes straight and level flight impossible.

Even low altitude flight can be hazardous as this example shows: Following cruise flight at 4,000 feet msl in a UH-1H, a student pilot (SP) and instructor pilot (IP) descended to 700 feet msl in an ILS approach. The SP experienced middle ear discomfort and on final, when a missed approach was declared, developed ear pain. The IP took control of the aircraft, landed, and referred the SP to the flight surgeon. The SP was treated for an ear infection.

Pressure symptoms in the ear or sinuses depend on the absolute pressure difference between what's inside the body cavity and the ambient. A "pressure" sensation develops at about 15 Torr* differential and pain occurs at about 45 Torr difference. At 90 Torr differential, the one-way "valve" into the middle ear closes such that the valsalva maneuver won't work. The only relief is to ascend again, either in an aircraft or in an altitude chamber. Atmospheric pressure changes occur faster for a given increment in altitude the closer to sea level. For example, on a standard day, atmospheric pressure drops 53 Torr from sl to 2,000 msl, 50 Torr from 2,000-4,000 msl and 47 Torr from 4,000-6,000 msl; whereas, from 10,000 to 12,000 msl, it only drops 39 Torr.

It is true that at 4,000 feet msl hypoxia is not a problem. However, atmospheric pressure increases more rapidly with altitude changes as one approaches the earth's surface.

The point to remember is that change in atmospheric pressure, rather than change in altitude, is the important factor.

** 1 Torr = pressure of 1 mm of mercury at o°c and lg.*

Another problem with the common cold is the tendency of individuals to treat themselves with home remedies or medications which do not require a prescription. The cold capsules your wife took to keep her feeling well enough to clean house, prepare your meals, and drive the kids to school are forbidden when flying. Most of these medications contain antihistamines and carry a warning that they may cause drowsiness and should not be used while driving a motor vehicle or operating heavy equipment, not to mention flying an aircraft. This is why aircrew members are prohibited from flying for 24 hours after taking antihistamines prescribed by a flight surgeon. A flight surgeon may treat minor nasal congestion without ear and sinus involvement with nasal sprays and decongestants which do not contain antihistamines and permit an individual to fly. However, that is the flight surgeon's decision to make, and only after he has made an adequate examination.

If you have the sniffles, see your flight surgeon. Don't take a chance on being incapacitated at a critical time during your next flight. — Adapted from *Flightfax*. ■

CIRCLING APPROACH

MIKE BRUNELLE
Engineering Test Pilot
Aircraft Division
Northrop Corp.

■ *"A good way to avoid busting up airplanes and closing runways is to* ***not*** *fly circling approaches in actual bad weather – low ceiling and reduced visibility. Manage the flight so you land from a straight-in approach whenever possible.*

"On the other hand, circling approaches should be practiced frequently in a training environment. Why? Because sometimes they can't be avoided. When it becomes necessary to fly a circling approach in actual marginal weather, the demands on the pilot are high, and so is the accident potential."

This quotation comes from a high-time tactical fighter pilot whose flying career has spanned some twenty-plus years of all-weather flying at air bases throughout the world. He has something else going for him that adds weight to his words — an accident-free flying record.

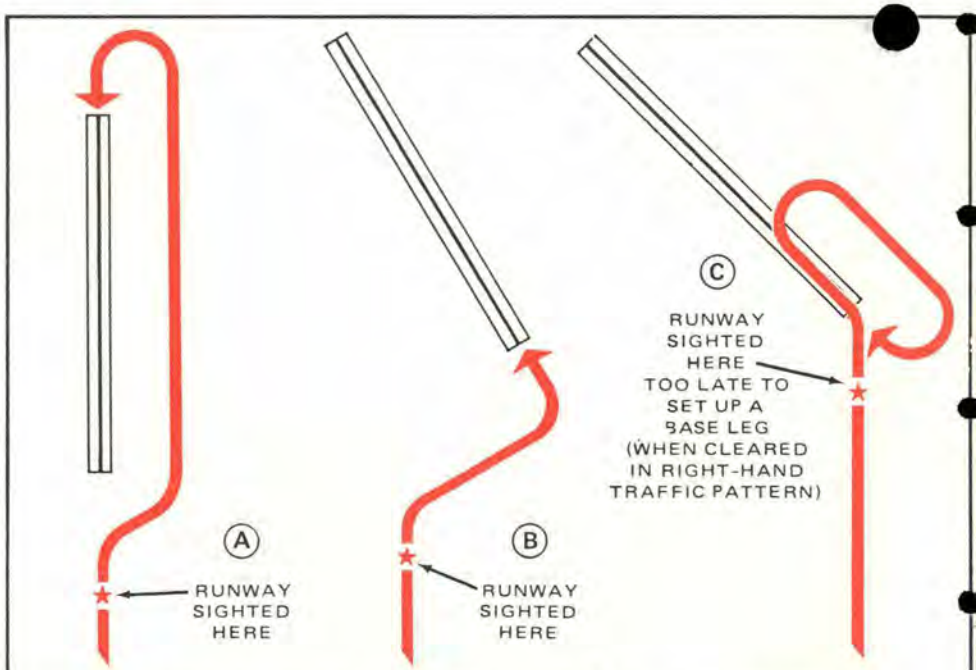
The circling approach he refers to is the visual maneuver used to align the aircraft with the landing runway when an instrument approach has put the pilot in visual contact with the runway but on a heading from which he cannot make a straight-in final approach and landing (Figure 1). Although circling approaches such as those shown in the figure look pretty basic and easy to accomplish, the record over the years has proven otherwise. Shooting circling approaches in good weather is just not the same as shooting them in bad weather. Pilots need to understand the potential hazards involved in making this type of approach-to-a-landing in actual marginal weather.

The following two accidents are typical examples of how things can go wrong during a circling approach. In these instances, the aircraft were transitioning from an instrument approach for one runway to make a landing on a different runway:

CASE 1 — A tactical fighter/trainer was executing a circling approach in visual flight conditions. The tower noted the aircraft was in close on the downwind portion. A steep banked, hard final turn was initiated which resulted in a stall. A student pilot, an instructor pilot and a civilian died in the crash.

CASE 2 — A tactical fighter/trainer circled in visual flight conditions and rolled out on final, approximately three-quarters of a mile from the end of the runway at circling minimums. The pilot lowered the nose and flew a 10-degree glide slope in order to avoid overshooting the runway. The force of the landing impact collapsed the landing gear and resulted in a major accident.

In these and similar aircraft accidents, pilots transitioned from instrument flight to visual flight and then set up a landing pattern that differed considerably from what they were used to flying. Coping



- Example A indicates a landing on a heading 180° from the approach course. As the approach is made, the runway is sighted at Point ★. Turn to establish a downwind leg and keep the runway in sight.
- Example B shows a situation where the approach course requires a large turn to the runway heading.
- Example C shows a pattern which can be used if the runway is sighted too late for a base leg turn.

Figure 1. Typical Circling Approach Patterns

with the unfamiliar approach, the pilots got into trouble. This much is clear: A circling approach is a *potentially* hazardous maneuver and should not be made in actual low ceiling/poor visibility unless the pilot is proficient and understands what the pitfalls are.

Straight-in instrument approaches should be accomplished by descending right on down to the Minimum Descent Altitude (MDA) from the Final Approach Fix (FAF). A circling approach should be made above weather minima if visibility and ceiling permit. Practice these maneuvers in visual flight conditions, reducing altitude as proficiency increases.

Let's take a look at some of the pitfalls of a circling approach. They are neither mysterious nor obvious, but they are sometimes overlooked or disregarded at times when they can lead to accidents.

OVERSHOOTS: The pilot flying the circling approach is likely to see the runway at a shallower look angle than he's used to, because the circling approach altitude is often about one-third the altitude above the ground that he enjoys in a normal overhead pattern. The shallower look angle results in a *tendency* to fly a downwind and base leg so close to the runway that he either overshoots the final approach or has to descend too steeply on final or both.

OVERBANK: There is a tendency to bank too steeply while keeping the runway in sight during the circling maneuver in marginal visibility. This really jacks up the stall speed (Figure 2). Steeper bank angles can place the aircraft in a condition of stall, high sink rate, or both. And recovery from those conditions may not be possible before ground impact.

UNDERPOWER: You'll find that you need higher thrust settings to complete a circling approach in level flight than you need for making a normal descending base and final turn. Failure to maintain the higher-than-normal thrust on the approach can place your aircraft in the conditions of stall and high sink rate we've just described.

WRONG RUNWAY: It's easy to line up and land on the wrong runway from a low visibility/low altitude circling approach. (Yes, it's been done!) Having the heading marker set at runway heading and cross checking it on final helps prevent this embarrassing (and sometimes, dangerous) possibility.

With more airfields relying on sophisticated landing aids to ensure safe straight-in landings, circling approaches are becoming less popular as a means of positioning the aircraft on final approach for landing. However, the requirements for pilots to remain proficient in this maneuver are still with us, and will be with us in the foreseeable future. The circling approach is not obsolete and isn't likely to become so unless somebody discovers a way to eliminate temporarily closed runways, surface winds blowing in the "wrong" direction, communication-out problems between pilot and GCA, instrument landing system malfunctions . . . well, you get the idea. – *Courtesy* Talon Service News, *Fall Quarter 1981*. ■

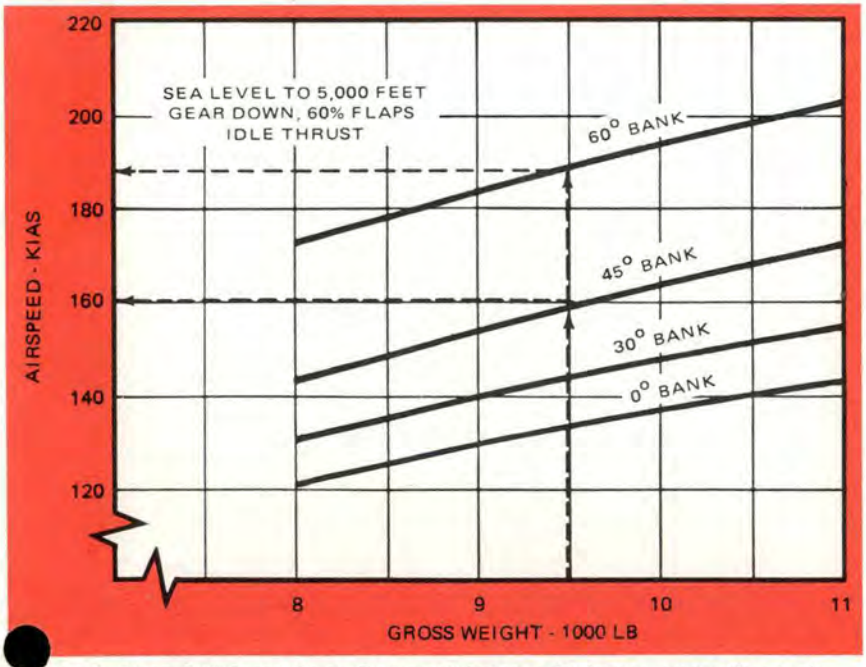
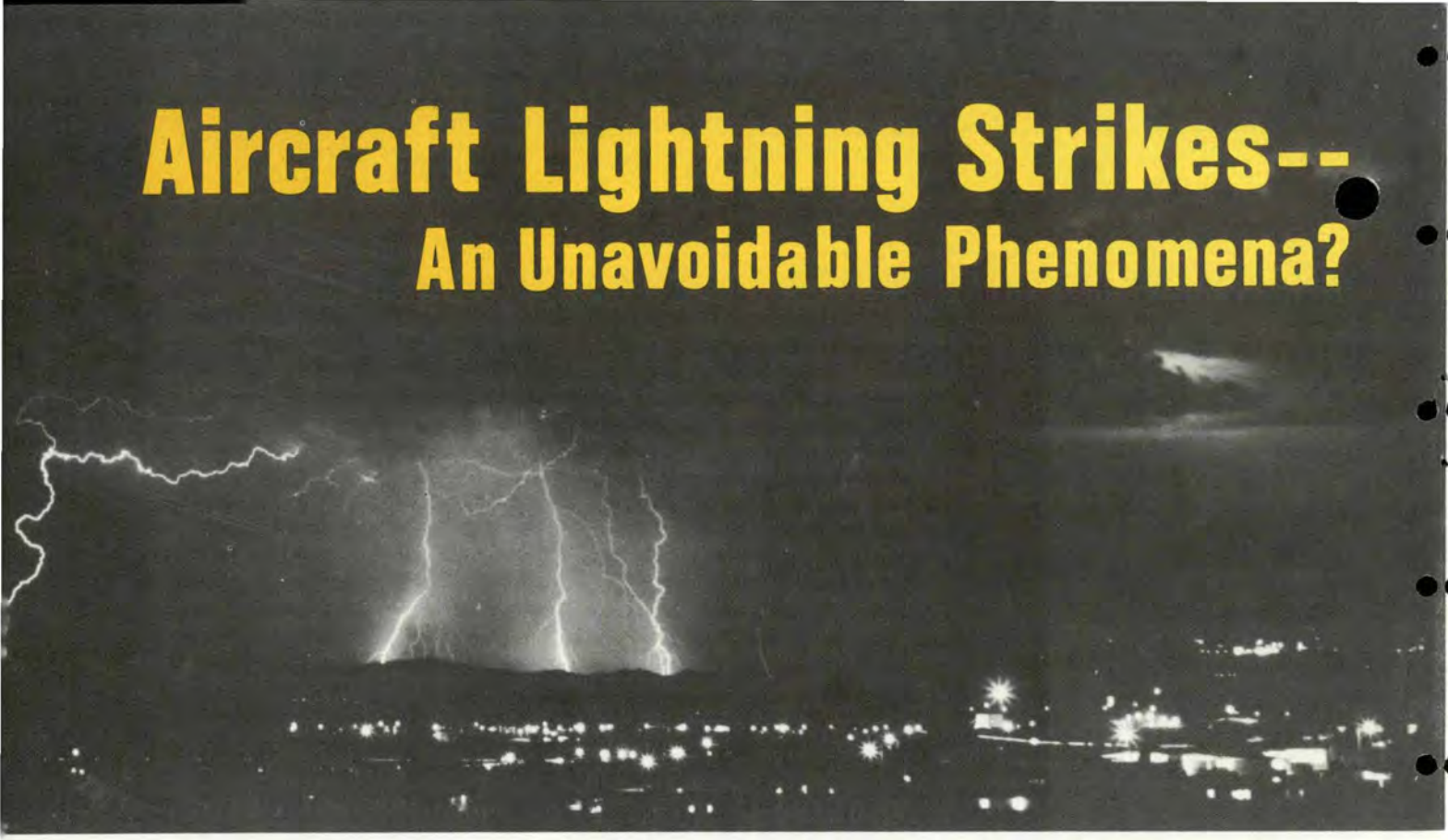


Figure 2. Talon Stall Speed Chart. Stall speed increases by large amounts when bank exceeds 45° in a level turn. (Power on stall speeds would be a bit lower.)

Aircraft Lightning Strikes-- An Unavoidable Phenomena?



MAJOR JAMES E. ELLIS, USAFR
Aeronautical Systems Division
Wright-Patterson AFB, OH

■ Aircraft damage from lightning strikes is usually limited to burned or punctured wing tips or tail surfaces, or damaged radomes. Sometimes the strikes are life threatening, resulting in inoperative avionics, temporary crew blindness, and even explosions in nearly empty fuel tanks. In many cases, flight crew reports that the strikes occurred well away from any known thunderstorms have been met with skepticism. A study recently completed by the Aeronautical Systems Division lends credence to the claim that lightning strikes can be, if not "a bolt from the blue," at least a phenomenon not limited to the vicinity of severe thunderstorm cells.

Under the direction of Mr. Charles E. Seth, and with the assistance of the Air Force Inspection and Safety Center at Norton AFB, the Aeronautical Systems Division at Wright-Patterson AFB collected data on worldwide lightning strike incidents involving U.S. Air Force aircraft. Data was collected from April 1977 until August 1978.

Less than 100 useful reports were received, and not all of these provided all of the data requested for each incident. In some cases, it was apparent that the lightning strike damage was discovered only after the aircraft had landed. Crew descriptions of conditions encountered, particularly following long flights, could not always accurately pin down exactly when, where, and how the lightning strike occurred. Despite these shortcomings, the data collection and analysis resulted in a useful addition to the aviation community's knowledge of aircraft lightning strikes.

A category-by-category analysis of the data was performed, and the results are presented below.

ALTITUDE Lightning strikes to aircraft were reported at altitudes

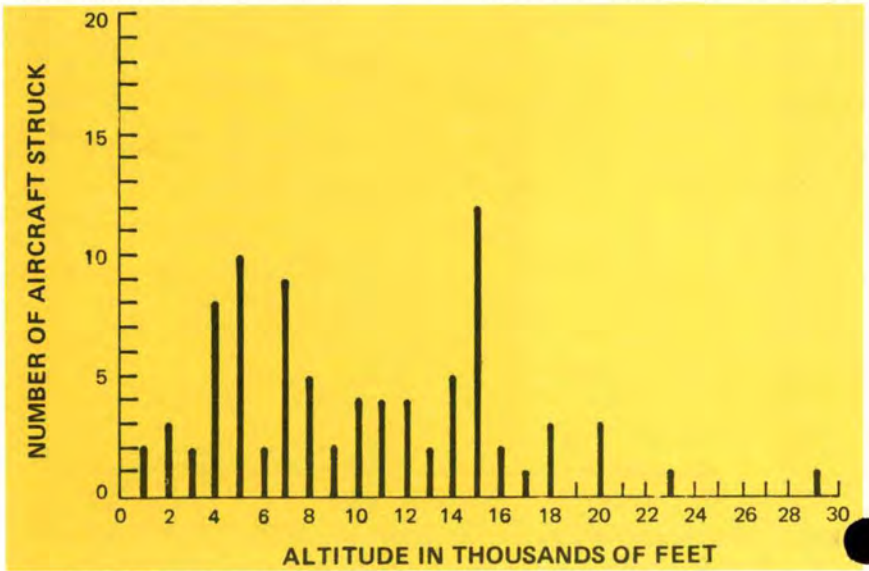


Figure 1 Altitude vs number of aircraft struck.

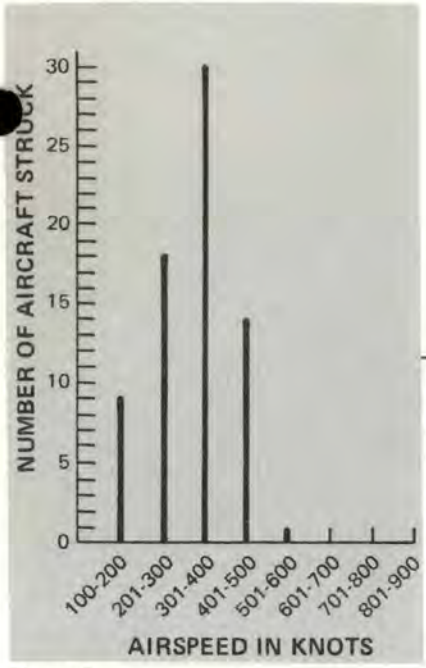


Figure 2
Airspeed vs number of aircraft struck.

between 1,000 feet up to and including 29,000 feet as shown in Figure 1. The largest percentages of aircraft strikes reported were 14.11 at 15,000 feet; 11.76 at 5,000 feet; 10.59 at 7,000 feet, and 9.41 at 4,000 feet.

A conclusion that can be drawn from the data is that the majority of lightning strikes on aircraft occur between 4,000 and 15,000 feet MSL. The normal mission profiles for Air Force aircraft were not available to provide an evaluation of how the distribution of lightning strike reports compares to the distribution of typical flying altitudes; however, less than 10 percent of the strikes were reported at or below 3,000 feet MSL, even though SAC Oil Burner routes regularly use these low altitude profiles.

AIRSPEED Lightning strikes versus airspeed are shown in Figure 2. Highest percentage of strikes (41.66%) was found to occur between 301 and 400 knots indicated air speed. Substantially large numbers of strikes occurred at 201-300 knots (25%) and at 401-500 knots (19.44%).

No specific conclusions can be drawn from this data, which very likely correlates to normal Air Force mission profiles. It is interesting that no reports were received of lightning strikes on aircraft traveling at supersonic speeds.

TIME A total of 83 percent of the reported strikes occurred from 0800 to 1600. From the available data, it was not possible to determine how the strike data would correlate with normal mission profiles. It seems reasonable to assume that most flying activities are still performed in normal daylight hours despite advanced technological capabilities.

MONTH There was, surprisingly enough, no correlation between months and number of lightning strikes. This is somewhat surprising in that the "standard wisdom" would expect greater numbers of lightning strike incidents between May and September, which would normally be considered peak thunderstorm season. June, July, and August had relatively few reported incidents, with only one reported incident in July.

VISIBILITY AND CLOUD TYPES 80 of 95 aircraft reporting (93.6%) noted the presence of clouds, 29 (32.5%) reported the presence of cumulus and cumulonimbus formations generally associated with thunderstorms. 30 of the 89 (33.7%) reported the presence of stratus or cirrus clouds, which pilots do not generally associate with the nearby proximity of thunderstorm cells.

Of the 95 aircraft reporting, 15 (15.8%) indicated a visibility of three miles or less, which is the visibility figure used by the FAA to indicate instrument meteorological conditions (IMC). However, the 65 reports (68.4%) not reporting specific visibility figures in most cases contained the statement "in-and-out of clouds," which also is indicative of IMC conditions.

LIGHTNING, ST. ELMO'S FIRE, RADIO STATIC Many flight crews consider the presence of visible lightning, St. Elmo's fire, or radio static as reliable means to warn of an impending strike. The study results do not bear this out. Out of 95 aircraft reporting, only four (4.2%) reported seeing lightning prior to the strike. Only seven (7.3%) reported seeing St. Elmo's fire prior to a strike. Only 13 (13.7%) reported radio static prior to the strike.

Fifty-four of the 95 aircraft reporting (56.8%) lightning strikes reported seeing the flash that struck them. Unfortunately, seeing the flash as you get hit doesn't do much to avoid being hit!

PRECIPITATION AND TURBULENCE Out of 95 aircraft reporting, 51 (53.6%) reported being in light rain or showers. Snow was reported in an additional 10 (10.5%) cases. Icing was reported in 12 reports (12.5%), and turbulence in 21 reports (22.1%). Only one report involved severe turbulence. In the majority of the reports of turbulence, the turbulence occurred coincident with, and not prior to, the lightning strike.

Rain was prevalent, therefore, in slightly more than half of all lightning strikes reported, with light rain or showers being most conductive to lightning strike conditions. However, a lack of rain does not preclude a strike occurring. Snow, icing, and turbulence are not reliable indicators of lightning strike occurrences.

THUNDERSTORM/CELL DETECTION BY RADAR Seventy-nine of the 95 reports noted that either airborne or ground

continued

Aircraft Lightning Strikes-- continued

weather radar was available for weather avoidance. No thunderstorm cells were reported observed in 49.5% of the incidents, and in another 35% of the incidents, the aircraft struck was 20 miles or more from the nearest cell noted on the radar.

One B-52 report noted "one radar echo at 28 miles," and reported being hit upon entering an isolated cloud. A C-130 report that the scope showed "no hard returns indicative of thunderstorms." These comments are typical of pilot reports received, indicating that weather radar used to avoid the heavy precipitation of thunderstorm cells does not provide a reliable means for avoiding lightning strikes.

FLIGHT CONDITION Of 95 aircraft reporting, 25 (26.3%) were struck by lightning during climb, 41 (43.2%) during level cruise, and 24 (25.3%) during descent.

Recognizing the limitations of the limited size data base, the following conclusions can be drawn:

- Lightning strikes are not associated only with thunderstorm cells or other areas of intense precipitation. Reliable reports of lightning strikes were noted 25 nautical miles or more from the nearest storm cell sighted on aircraft or ground radar.
- It is just as likely that an aircraft will be struck by lightning in the vicinity of a cirrus or stratus cloud formation as in the vicinity of a cumulus or cumulonimbus formation.
- The lightning production phenomenon does not appear to be easily identifiable by either current flight or ground radar systems. Therefore, present ground or airborne radar systems cannot be relied upon to avoid lightning strike incidents.
- Proximity to a thunderstorm may lead to a higher incidence of a lightning strike, but maintaining a reasonable distance from the cell will not guarantee that a strike will not occur.
- Visual observations of lightning or St. Elmo's Fire, or auditory observations of radio static, do not provide reliable warnings of increased lightning strike probability.
- The probability of lightning strikes is greater in precipitation, but precipitation and turbulence are not reliable indicators of impending strikes.
- The incidence of lightning strikes is greatest between 4,000 and 15,000 feet MSL.

Are lightning strikes on aircraft an unavoidable phenomenon? Unfortunately, the conclusions of the study indicate that while avoiding thunderstorms greatly reduces the risk of a lightning strike, it does not eliminate it. Weather radar, which relies on detecting areas of heavy precipitation, does not provide a guarantee against aircraft lightning strikes.

The results of the study support the theory that the electrical potentials which generate lightning strikes build up wherever wind shear exists in the presence of water ice particles on which charge concentrations can build. In more concise terms, turbulence plus clouds may equal the potential for an aircraft lightning strike.

Thunderstorm avoidance by use of weather radar remains the primary means of avoiding lightning strikes on aircraft. But avoiding thunderstorms will not eliminate lightning strike incidents, and there is no easy near-term answer to this problem. Integration of technology such as the Ryan Stormscope, which displays the relative position of lightning discharges, into future digital weather radar presentation may be one answer. Proper aircraft design, testing, and construction to minimize the impact of lightning strikes on an aircraft's ability to safely perform its mission will also continue to be important. Like most aviation safety problems, there are no easy ways to absolutely avoid the damages of lightning strikes on aircraft. ■

NEWS FOR CREWS

Something good is going on in the helicopter force. New helicopters, diverse missions, worldwide unit locations, exchange tours — they all contribute to the best retention rate in the Air Force. Career opportunities and new programs within the helo force make this one of the most dynamic and rewarding missions in the Air Force.

■ Search and rescue, special operations, surface and midair retrieval of drones and air launched cruise missiles, missile security, range support, VIP transport, and support of tactical air command and control systems are many of the day-to-day missions of the USAF helicopter force. These, plus assignments to 48 worldwide unit locations flying H-1s, CH/HH-3s and the CH/HH-53s, are major factors why the helo world has the best pilot retention in the Air Force.

Over 71 percent of the 6-11 year groups are remaining on board. This retention, combined with current UPT-H production rates, allows for expanded job opportunities on our rated staffs and in the rated supplement as well. With high helo manning, rated supplement opportunities in the engineering, scientific, maintenance, education and training areas are just a few of the career fields where rated requirements exist. For the right man-job match, we can release some pilots to pursue these career broadening options. If you are interested — let your desires be known. Call us at AUTOVON 487-5766 or the rates supplement resource manager at 487-6507.

Pilots desiring to remain operational will find many challenging and rewarding positions varying from exchange tours in Australia, the UK, Saudi Arabia, and the U.S. Coast Guard to MAJCOM positions on either the MAC or TAC staffs. For those pilots wanting our most challenging flying assignments, we anticipate on-going requirements at both the 1550 ATTW, Kirtland, as instructor pilots and at Hurlburt as PAVE LOW pilots in the special operations force. On the horizon, the UH-60A and the HH-60D (HX) programs make the future for helo pilots very promising. These two helicopters will form the helo force of the future.

UH-60A

The Sikorsky-built UH-60A "Blackhawk" is expected to enter the Air Force inventory in the spring of 1983. The "Blackhawk" is a medium-to-heavylift helicopter built with survivability in mind. With a 20,200 pound gross weight and 7,000 pound payload, the "Blackhawk" is expected to play a significant role in the expanding combat rescue and special operations missions. Its 360NM unrefueled range and 160 KTS maximum speed make it an ideal aircraft for low level and nap-of-the-earth flying. The crew complement (in the ARRS configuration) will be two pilots, one flight engineer, and two pararescuemen. While specific numbers of UH-60As airframe and subsequent beddown locations are still being worked, crewmembers may volunteer now for the initial cadre. Qualifications for instructor pilots include 750 hours total helo time and at least 100 hours IP time, regardless of whether training is conducted at Kirtland or in-unit. The remaining pilot force will be selected through the normal assignment availability cycle — three years time on station for stateside moves and upon DEROS for overseas volunteers.

HH-60D (HX)

The HH-60D is expected to reach its initial operating capability (IOC) in FY86. Like the UH-60A program, the HH-60D is initially expected to be a force build in lieu of a one-for-one replacement for the H-1/H-3s. The D model will incorporate a 10 percent growth engine as well as the avionics package similar to the PAVE LOW IIIs terrain following/terrain avoidance radar and forward looking infrared radar. In addition, the D model will have an inflight refueling capability making it an immediate worldwide deployable aircraft. The HH-60D will be used primarily in the combat rescue and special operations role. It will be the primary Air Force helicopter well into the 1990s.

Whether you're looking for flying, staff, supplement, or an exchange tour, your Form 90 is the best vehicle to let MPC and your MAJCOM know your desires. If you're interested in an exchange position or any other special duty, be sure to complete the special duty application portion (block 38) on the Form 90. Finally, for the rest of you who want to fly the H-60, make sure you send a Form 90 directly to AFMPC/MPCR OR4J, after giving three copies to your CBPO. Don't hesitate to call Captain Lee Massey or Captain Mark Hodges for more information at AUTOVON 487-5766. ■

OPS topics

Correction

■ In the article "Take A Last Look" (October 1981 issue) we tried to highlight a deadly serious problem — not looking where your aircraft is going when flying close to the ground.

The illustration made the point but the words didn't. The picture shows a jock close to the ground, maneuvering and checking six. If he persists too long he risks a collision with the ground, trees, towers, powerlines, or even another aircraft. His vulnerability comes from not looking where he is going. It can happen during joinups, intercepts, ACT/DACT, low level nav, on the wing, on/off the range, over water, snow, or sand. The object of attention can be another aircraft (friendly or not), SAMS, missed checkpoint or target, or a bomb spot, cockpit instruments/switches, practically anything. It doesn't matter what you're looking at if you bump into something else in the process. It's what you're not looking at that can get you — your projected flight path.

Our words about checking altitude/altitude instruments were wrong and drew some well deserved Bravo Sierra flags. You're right, guys — looking at the gages in this environment can be just as lethal as staring at six. The worlds' biggest attitude indicator with moving map display is on the outside of the windscreen. Use it and live!

Soft Field Landing

The flight was to be a training flight for the pilot in preparation for a single engine land rating. The pilot positioned the PA-28 (Piper Cherokee Arrow) on a left downwind for a soft field approach over a 50-foot obstacle.

Abeam the touchdown point, the pilot began the landing check. During this check he disabled the automatic gear extension system. This was to allow the gear to retract prior to 85 knots during climbout. The early retraction was necessary since the maneuver planned was a soft field approach over a 50-foot obstacle to a touch-and-go followed by a soft field climbout over another 50-foot obstacle.

The pilot advised the IP that he had disabled the automatic gear system and received an acknowledgement. Then both crewmembers became engrossed in setting up for the rather complex, difficult soft field approach and departure. The aircraft touched down gear-up and skidded 440 feet to a stop.

The investigator found the gear switch up upon arrival at the aircraft. Both crewmembers remember hearing the gear warning on final but mistook it for a stall warning. This confused them because the airspeed was well above stall. No one thought to check the gear.

The use of the gear lock out for a soft field take off is recommended by the manufacturer. However, its use does negate a safety feature and builds a perfect scenario for a habit pattern breakdown mishap like this one.

The investigator also questioned the combining of three complex, demanding maneuvers. Although the FAA does require a pilot to demonstrate proficiency in both soft field landings and takeoffs, they are not done from a touch-and-go. This combination places an extremely high demand on the pilot and can lead to task saturation as it probably did in this case.

The investigator recommended that such maneuvers not be combined, that the gear extension lock out not be used for pattern work, and that challenge and response gear checks be made.

Aero Club Membership Is A Privilege

Recent events, in particular willful violations of Air Force and Federal aviation regulations, have prompted a statement of policy on such actions by Air Force officials. This policy is quoted as follows: "Any Aero Club member who violates Air Force regulations, base directives, or FAA directives relative to the operation of Air Force and club aircraft or who commits any unsafe act as set forth in AFR 215-12, para 5-10, without just cause must be permanently suspended from membership in any Air Force Aero Club and will be denied participation in any Aero Club flying activity. The Aero Club manager will bring potential suspension actions under these provisions to the board of governors (BOG), which will determine if suspension action is required. A recommendation will be forwarded to the installation commander by the BOG. The commander will order suspension in appropriate cases. All suspension actions will be reported to HQ AFMPC/MPCSO through the MAJCOM."

AFMPC will keep records on persons permanently suspended and can provide lists of such persons to Aero Club managers.

New Rescue Equipment Developed

The Air Force has designed a program to more accurately rescue and search for survivors of "downed" aircraft.

The Survival Avionics Systems (SAS), an Air Force, Army, and Navy program, will be capable of locating survivors from distances as great as 100 nautical miles. The program is managed by Aeronautical Systems Division's Deputy for Aeronautical Equipment.

The SAS consists of two basic parts: The Avionics subsystem installed in the search and rescue aircraft, and a hand-held survivor radio which automatically responds to interrogation signals initiated by the subsystem. Each radio unit has a unique identification code (ID) to which it alone responds.

When searching for survivors, the rescue aircraft transmits a coded signal, including the survivor's ID code, through the avionics subsystem. When the survivor's radio receives its ID code, a return signal is transmitted to the rescue aircraft.

The distance and bearing of the aircraft to the survivor are then displayed graphically on a console on board the aircraft. This data is determined in less than one second, and becomes more precise as the aircraft gets closer to the survivor.

Once the exact location of the survivor is known the rescue aircraft then proceeds to rescue by the most direct and least risky route. With past systems, the rescue aircraft had to practically be flying directly over the survivor before a rescue attempt could be made.

According to the SAS program manager, the SAS is definitely a more accurate and safer system. Prior to SAS, there was constant transmitting of signals between the rescue aircraft and the survivor. Because of this, enemy forces were also able to determine the survivor's location, sometimes reaching the survivor before the rescuers. This is less likely with SAS, which only transmits signals intermittently.

Designed to operate in all types of weather, day or night, and over all types of terrain, SAS can locate and store in its memory the positions of six survivors. Therefore, survivors from different aircraft can be picked up during the same rescue mission.

The SAS avionics subsystem will be installed on selected Air Force search and rescue aircraft, including the HH-3, HH-53 and HC-130. SAS is also planned in the equipment for the H-X as part of the combat helicopter modernization program.

continued

OPS topics continued

A Success Story

At 200 feet AGL, 540 KIAS, while on final for a low level weapon delivery, an F-111F took a birdstrike (seagull) in the aircraft's forward windscreen. The only damage was substantial cracking radiating from the middle of the windscreen.

Not too many years ago, the results of this birdstrike would have been dramatically different. The aircraft probably would have been lost, and most likely the crew too. The retrofit of F-111s with the BIRT (Bird Impact Resistant Transparencies) windscreens is a real success story. Although there were tradeoffs in cost, maintainability, weight, and optical qualities, they were well worth the price. This safety modification has greatly reduced the risk of low level operations and allowed crews to train with confidence. — Major Donald H. Ross, Directorate of Aerospace Safety.

Exercise Excitement

An F-4 was parked inside a TAB VEE shelter with the shelter doors open. The aircrew arrived and, in preparation for a local exercise, began the preflight. Both the aircrew and the crew chief noticed that the aircraft was slightly cocked to the left off the taxi guidelines.

About one-half hour after they arrived, the crew received a start signal. After start, the pilot discovered an antiskid fault but, since the exercise required taxi only, he elected to taxi with the fault. There were two crew chiefs present, and as the pilot signaled for taxi the marshaller moved out to his position while the other crew chief moved to the right side of the aircraft nose.

The aircraft started forward but had to be stopped for a maintenance truck blocking the aircraft taxi path. For exercise requirements, the crew had closed the canopies. Once the truck was moved, the crew chief motioned the aircraft forward again. The pilot noticed as he started to taxi again that the aircraft was developing a left drift in the TAB VEE. He tried to correct the position with nose wheel steering but the aircraft would not respond. The pilot called for the WSO to check the nose gear steering circuit breaker just as the left wing tip struck the TAB VEE door. The marshaller had turned his attention to aircraft moving toward him on the taxiway and did not see the wing strike the door.

The aircraft antiski and nose wheel steering were checked immediately after the mishap. The maintenance troubleshooter found the gear handle in the full up position. Unless the gear handle is down, nose wheel steering is inoperative. The pilot had failed to check the gear handle position as required in the checklist. The marshaller concentrated on the approaching aircraft on the taxiway and did not monitor the aircraft movement off the taxilines. The pilot and WSO also failed to clear the wing tip during taxi.

Wiper Effect

. . . British Airways has alerted its pilots to the insidious nature of, of all things, windshield wipers. The flickering light effect caused by wipers in rapid motion apparently ca bring about decrease

alertness and disorientation. This effect is similar to that of "flicker vertigo," a hazard long recognized by pilots of helicopters and propeller-driven aircraft. Flicker vertigo has even been blamed for seizures among susceptible pilots.

When wipers are in use, the following precautions should be followed.

- Set the speed of the wipers no faster than required.
- Do not stare through the wiped window for prolonged periods. Change your field of vision.
- Be alert for signs of incapacitation in fellow crewmembers and alert them if you feel your own condition is suspect. — Courtesy FSF *Accident Prevention Bulletin*, Aug. 1981

Ed note: Another wiper effect that can be just as insidious is extremely slow motion. In such a case the effect on a tired crewmember can be the same as a metronome or swinging watch used by the hypnotist. The hypnotic effect may be even more common and more hazardous than that reported by British Airways. The last two precautions mentioned in the article are just as valid for slow motion.

Landing Is Hard (Sometimes)

The first pattern in the Cessna 150 was normal. Then on the second, the pilot flew a low, dragged in final. On short final, the pilot added power, but a hard touchdown occurred nonetheless.

The first touchdown was in normal landing attitude, then the aircraft bounced into the air. The pilot stated that when the aircraft bounced she released the yoke to neutral and the aircraft began to settle. She flared again and the aircraft bounced again, then touched down a third time and slid to a stop with a collapsed nose gear.

Maintenance inspectors found that the last two touchdowns were nose gear first. The overstress from these hard touchdowns damaged the nose gear tire rim and fractured the supporting struts which link the nose gear to the engine mounts and firewall.

It Pays To Listen

A T-43 was on short final (¼ mile, 100 feet AGL) when the pilot saw three fire trucks start across the approach end of the runway. The pilot went around and later the situation was sorted out.

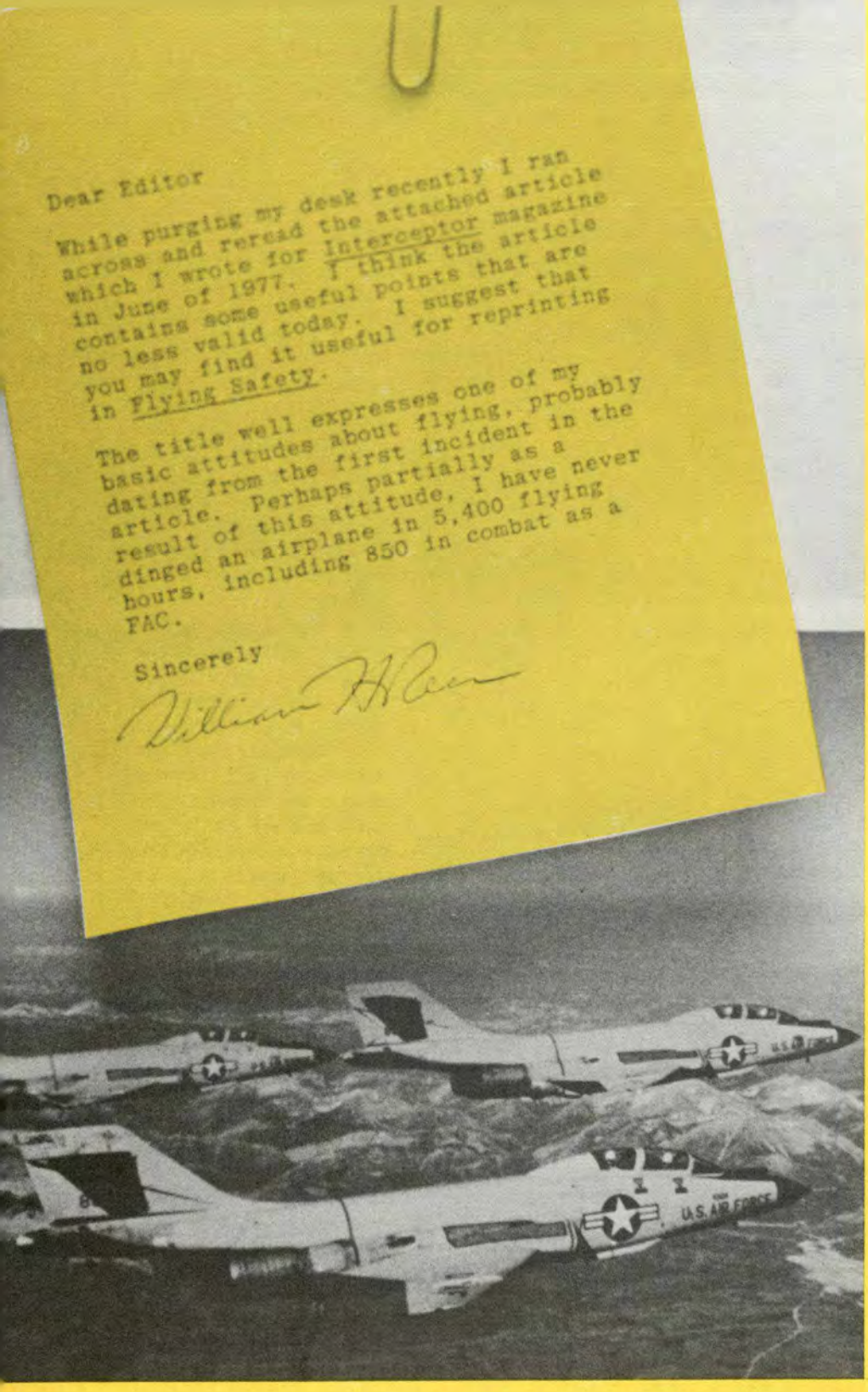
Four fire trucks had responded to an aircraft emergency. After the aircraft landed, three of the four trucks requested clearance across the other active runway to return to the fire station. The ground controller directed the trucks to hold short since the T-43 was on short final. However, the lead truck misinterpreted the radio call as clearance and proceeded to cross the active.

Procedural Complacency

At Tinker AFB, one of our pilots was cleared to fly an instrument approach to runway 17 and to circle for a right downwind for runway 12. While at circling minimum on downwind for runway 12, tower requested the pilot to turn left for a "270 degree turn to base" for spacing on an aircraft landing runway 17.

In a congested airport traffic area, this is frequently requested for VFR traffic spacing and something that pilots frequently accomplish. In this particular incident, the pilot forgot to consider his altitude and also forgot to consider the circling obstruction criteria, i.e., 2.3 NM from end of the runway for category D aircraft. When the turn was initiated "AWAY" from the runway environment and while the aircraft was departing the circling obstruction clearance area, a bright light sitting on top of an 1,888 foot tower came into their view — 32 feet below the aircraft. A climbing turn was initiated to maintain clearance from the tower.

Complacency happens to everyone. In this case, both the pilot and tower/controller failed to consider the aircraft's altitude and location in requesting or accomplishing a routine "270 to base for spacing." Our local procedures have been reviewed — have you reviewed yours lately? — *Lt Col John Tagnesi, 552d Airborne Warning and Control Wing, Tinker AFB OK.* ■



NEVER

LT COL BILL REES
23d Air Division/DOT
Duluth IAP, MN

■ Some time ago, certain instructor pilots claimed that the ultimate example of trust and formation discipline was four holes (airplane shaped, front profile) in the White Cliffs of Dover. The holes were allegedly made by a flight of four fighters during World War II. The arrangement of the holes illustrated perfect flight discipline — to every end.

How many instructors, over the years, have used that example to impress upon their students what is expected of them in formation discipline? Some instructors have used another legendary example from World War II. In this case, the students were from allied countries, and there were language problems. The instructor made it simple. "The next guy to break out of formation gets washed out." They then made a four-ship formation takeoff and just past the field boundary, the instructor's engine quit. Four T-6s bellied in, in perfect formation.

What most of our younger jocks already suspect and our old heads have hopefully already learned is that nobody is perfect, including the old heads. In formation flights, as in other missions, a pilot must trust as much as the mission requires, but keep the old brain working. He must never, ever assume that things will go exactly as advertised.

We will illustrate the point with a few war stories which center around formation flying. Stories from other phases of flying could illustrate the point just as well, but the following selected stories from personal experience are more tellable and,

TRUST ANYBODY--
(More Than 99%)

ah, just by pure chance, don't reflect adversely on the author. The selection process and the passing of time obviate the need to resort to "Ghostwriters."

Among other things, the stories to follow illustrate the effects of:

- A hasty reaction by an intimidated student.
- A bombastic instructor with a poor sense of timing.
- Insufficient awareness of, and consideration for wingmen.
- A single, unclear briefing on an eager young pilot.
- A wrong impression confirmed by the example of a young, but slightly senior pilot.
- Impulsive "improvements" on a briefed mission.

Episode nr one involves a formation takeoff in T-33s during basic pilot training. Students are in the front seats and instructors are in the back . . . Lead giving wind-up signal, wind 'em up to 80 percent and check the gauges, all look good, look at Lead and nod O.K. He puts his head back — head forward, release brakes — damn! He didn't move! Slam on brakes, gained five feet, did we really have tiptank clearance?

Debriefing — As leader student put his head back for the brake release signal, his instructor bellowed, "Turn down the — damn cockpit heat." "Yes, sir!" said terrified student as he instantly leaned forward to grab the cockpit heat knob.

Episode nr two took place during advanced flying training, Interceptor (F-86L). The instructor briefed, "In all-weather interceptors, we fly in all kinds of weather from takeoff to landing. Today we will get you your first formation landing." The mission was great until GCA final. Instructor leader was a little high, so his power was retarded a bit, and student's bird was a bit cleaner so his power was retarded just a little more. Instructor saw he was going to be a little long, so he chopped his power over the threshold, and student took the lead. This time there was wingtip clearance. Oh well, at least the briefing had been excellent! Debriefing — his majesty, the instructor, did not comment on the landing phase of the mission in any way.

Episode nr three occurred at the nugget's first squadron, tenant on a TAC base, flying F-102s. The unwritten rule says no formation landings. Somehow, the notion grew in nugget's fertile mind that this was a base, rather than a squadron restriction. At about that time, an old-head first balloon led nugget cross-country to an ADC base, and a formation landing. Notion confirmed. Shortly thereafter, two not quite O/R nuggets ferried two birds to Tyndall to replace birds in the firing program. Tyndall is an ADC base, in fact, the very fountain-head of interceptor expertise. Obviously, a formation landing is in order. Right? Dead wrong! Irate squadron commander personally rebriefed his personal formation landing policies in great detail, and placed two bewildered nuggets on his list.

Episode nr four — Ex-nugget is now a flight commander in Voodoos descending to the final approach fix with a nugget on the wing. The sun has just set and there is thick, soggy stratus from 1,500 feet up to 5,000. Level at six, now descend to three. Gentle descent, "Black in here," approaching three, a gentle back pressure on the stick, feel a little seat pressure — the horizon bar *does not move!* Another gentle tug on the stick, seat pressure, horizon bar *still* does not move! Bad time to witch lead! Quick! Partial panel. Voodoo's lousy on partial panel, be gentle. Needle centered, altimeter starting up, vertical speed indicating up a couple of hundred, gently feed in a little power, hit the mike button. "Two-lead has an attitude indicator out, but we're under control and going back up on top, stick with me." "Rog!" On top, check it out — pitch axis frozen, bank axis O.K., no off-flag, switch lead and recover, no sweat.

Debriefing — Immediately on hearing the radio call, nr two told his WSO to lock the radar to its main bang (which gave the WSO an attack display with a radar horizon bar) and to confirm their flight attitude even as they stuck to the leader's wing. This has to be an example of an outstanding wingman, a guy who trusts his leader and follows him, yet realizing that his leader could get in trouble, instantly takes action to prepare himself to back them both up — just in case, and who knows his airplane well enough to know what immediate backup actions are

continued

NEVER TRUST ANYBODY--

continued

possible. Yes, nugget did get a nine, which he deserved in every way, and he's doing quite well in the Air Force today.

Episode nr five — Occurred at a Gunnery School, an AT-33 Course intended as background for Forward Air Controllers. Students and instructors were from all over. Some were better than others. This was a wing formation takeoff flying solo; Lead had an instructor in the back. Wind-up signal, O.K., head back, nod forward, release brakes, Lead moves two feet and STOPS! Cripes! Jam on brakes! Have seen this one before! Only gained three feet this time. Leader stud looking again, a strained look in his eyes. Nod head, "Yeah! I'm ready, let's go!" Head back, head forward. Suspicious this time, only release a little brake, *leader does not move!* Gained a foot. See instructor's head bobbing as if emphasizing a point into the intercom. Ah, so! Big eyeballs again, same drill. Head nods for brake release. Sure, buddy, sure. Lead rolls, ahhh, finally! Release brakes and get off only a hundred feet behind.

Debriefing — At the time of the first brake release, the instructor had not finished briefing his student, so he jammed on the brakes. When the student signaled for the second brake release, the instructor was still holding the brakes.

Episode nr six — Involved a local mission flown from a friendly base north of the border. Three ANG Voodoos were being led by a real veteran, a full-timer. Recovery was briefed to include a flyby in honor of the hosts. An old-head Pan Am pilot would be flying right wing and the group advisor, the left. Nothing but experience in this flight. Approaching 500 knots a couple of miles out, and the air is bumpy. Halfway down the runway, leader spots the bubbles of the local GCI site and instantly decided to favor the site with a pass; only a 20 degree right turn is required. A big gust pumps Pan Am high, and leader banks smartly 30 degrees into him. As the remaining flight of two complete the bubble check, advisor thinks, oh-oh, left turn next and I'm inside — back off, sure enough, whap! 40 degrees of left bank (man, those ailerons are sensitive at high airspeed!). Flight of one, plus one, and a shaken straggler land quietly, shortly thereafter.

Debriefing — None. In fact, no one said much of anything for quite a while.

Episode nr seven — Goes back to the Second Saguenay Sap Sucking Spree, (mid-60s) a superb multinational gathering of air defense experts. Squadron commander was leading a flight of four visiting F-101s. An arrival pass in diamond formation was obviously required and was meticulously briefed. Mission proceeds as briefed until the formation is right in front of 425 ops, a little faster and a little lower than briefed. Everybody is in tight and it just has to look good. Then, the boss decides to improve the show and calls "burners-now." Three birds get lights, two of them a little late, and the slot man goes idle and boards. The boss decides a tight left turn is needed in order to further impress the spectators. Shortly after, a group of Voodoos resembling a flock of crows skulk into the pattern and land without further fanfare. Thank God!

Debriefing — Old buddies of the boss handled the debriefing in an exemplary manner. Besides, what can three captains say to a squadron commander whose cronies have just seen him disgrace himself! Why naturally — have another Rye-on-the-rocks, sir! ■

Mail Call

AGGRESSIVENESS

■ . . . What does it mean to you? It seems that it means something different to everyone you ask. The dictionary defines "Aggressiveness" as — 'Energetic pursuit. Devotion to a cause; bold self-confidence in expression.' I think we can all agree with these, but I thought it would be interesting to poll a cross-section of pilots and come up with a composite definition directly related to flying.

To ask this question of only one command, i.e., TAC, SAC, or MAC would definitely skew the definition to the type of flying being done; so I took the opportunity while recently serving in an ATC wing to poll pilots from all the major flying commands (TAC, MAC, SAC, and ATC). Here are some of the responses I received.

- Ability to make a decision concerning control inputs.
- Act in a timely manner to implement decisions.
- Definite, confident aircraft control.
- Attitude to fly the best mission possible in the most efficient and common sense way.
- Ability to see small changes and correct them quickly and smoothly.
- Desire to be on top of things, constantly thinking ahead.
- Attitude of taking charge.
- You must fly the aircraft, don't let it fly you.
- Maneuvering your aircraft as necessary to produce positive results.

Comments like these were numerous. By cutting and pasting the inputs I formulated the following composite definition which I think all pilots can relate to and benefit from.

"Aggressiveness: A positive attitude toward mission accomplishment that results in maximum success through precise aircraft control. To achieve maximum success, it may require smooth control inputs, or abrupt control inputs, but in all cases, these inputs should be appropriate for the situation. It's a take charge attitude tempered with knowledge, wisdom, and judgment that produces the best job in the most efficient and common sense way. It's an eagerness to correct deviations and strive for perfection, which results in you making the aircraft do what you want it to while maintaining flying discipline and safety. And, lastly, it's knowing your procedures, your personal limits, your aircraft's limits and exploring these limits safely, but with GUSTO!"

Captain Jeffrey R. Riemer
Fort Worth, Texas

335TFS SETS RECORD

On 10 September 1981 the 335th Tactical Fighter Squadron became the first F-4E squadron to log over 80,000 flying hours without a major mishap. When this milestone was reached, the 335th "Chiefs" had gone almost 12 years without a major mishap.

Capt Andrew R. "Bud" Tuson, left, and 1Lt Keith A. Coleman, right, both members of the 335TFS pose by their aircraft after setting a new 80,000 hour safety record for the F-4E. With them is the aircraft crew chief, SSgt Wayne Devall, of the 4th AGS.

The 335th has a distinguished history. Members of the Chiefs have flown some of the most famous fighters of World War II and more modern times, starting with British Spitfires and P-47s up to today's F-4Es.

We are proud of the 335th record in both operations and safety.

Lt Col James D. Mynar
Seymour Johnson AFB, NC

Congratulations to the "Chiefs." This is a record for other Air Force fighter units to try to beat no matter what their equipment. – Ed. ■

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CAPTAIN
Thomas H. Colton

FIRST LIEUTENANT
William S. Harris

401st Tactical Fighter Wing

■ On 4 April 1981 Captain Colton and Lieutenant Harris were flying a routine ferry mission in an F-4D. On takeoff, as the aircraft accelerated through 130 knots, 10 knots faster than maximum abort speed, smoke began to billow from the Inertial Navigation System (INS) control head in the rear cockpit. After the aircraft had passed 150 knots the Master Caution light in the front cockpit illuminated indicating the INS platform had failed. In addition, the right generator dropped off the line and the electrical bus tie did not close.

Captain Colton selected the standby position on the attitude direction indicator and continued the takeoff. Since all navigation equipment and half of the attitude reference systems had failed, the crew used dead reckoning techniques to fly the ground track of the instrument departure. The crew decided to secure the INS, at which time the smoke ceased. Captain Colton informed the controlling agency of the emergency and the aircraft reached visual flight conditions above the clouds at FL060. At that time, Captain Colton discovered the heading system was approximately 120 degrees off from the magnetic compass and requested a no-gyro holding pattern. Use of the right generator or bus tie could not be regained. With radios working off the battery and all navigational aids inoperative, compounded further by adverse weather throughout the local area, the crew began fuel dumping and requested vectors for landing.

During their initial penetration, in IMC conditions, the crew were informed that radar contact could not be maintained due to the loss of the F-4s IFF transponder system. To regain use of their only means of radar identification they elected to shut down the single operating generator, which permitted electrical power to be supplied to the IFF transponder by the emergency ram air turbine generator (RAT). Radar contact was then gained by approach control, and a no-gyro, heading system out, precision approach was initiated and flown to an approach end BAK-13 barrier engagement. The timely and professional actions of Captain Colton and Lieutenant Harris resulted in the safe recovery of a valuable aircraft. WELL DONE! ■


USAF
FLYING
SAFETY
WEEK
MAY 17 - 21