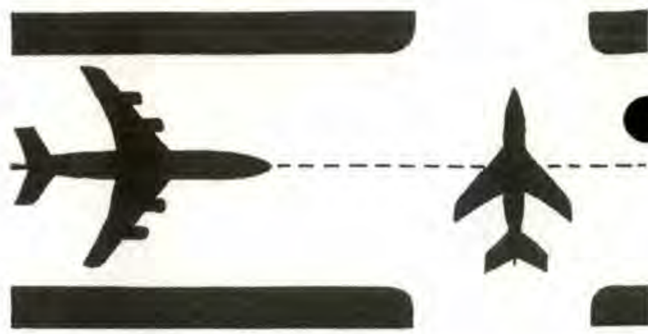
AEROSPACE

SAFETY • MAGAZINE FOR AIRCREWS

SEPTEMBER 1979

MISHAPS
On The Runway



■ After landing, a 747 was steered off the pavement at high speed to avoid colliding with a 727 which was taxiing across the runway.

Weather at the time was 300 feet overcast, visibility ½ mile, RVR 3000, light freezing rain, fog and haze. Time 0911 CST. The 747 broke out at approximately 300 feet, but then went into what the captain described as a "whiteout condition." Landing lights were turned off to minimize light reflection.

Touchdown occurred 1000 to 1500 feet from the threshold. Two engines were reversed (because of an inoperative reverser), and about that time the crew observed a 727 approximately 2500 feet ahead, holding short of the runway on the parallel taxiway to runway 14R/32L. The 727 was then observed to begin slowly taxiing across the runway from left to right. The 747 first officer transmitted "Watch out Delta," over the tower frequency, but the 727 crew did not hear the warning because they were monitoring ground control. Initially, the 747's captain attempted to avoid the 727 by steering toward the right side of the runway, but soon it became obvious that there was insufficient clearance.

After ground control cleared the 727 to cross runway 9R, the first officer and captain reported that they looked toward the approach threshold and saw no traffic. After entering the runway, the first officer looked again and saw the 747 closing fast. The first officer yelled "Stop," and the captain quickly braked to a halt. By this time, the 747 captain had turned his airplane approximately 18° right of the runway heading and applied full right wing down control deflection. It is not known whether the wings were level as the 747 passed the 727. Runway departure occurred at the southeast corner of the runway/taxiway intersection, in excess of 100 KIAS.

The 747 plowed through three-foot deep snow, shedding the number 2 engine, collapsing both wing gear and nose gear, and severely damaging the lower forward fuselage, right inboard flap and number 3 pylon, before stopping 100 feet right of the runway and 100 feet west of the North-South taxiway.

Nine days later, a Falcon Fan Jet and a Beechcraft Model 18 collided on runway 9 at Memphis International Airport. The Beechcraft had landed on runway 35R and the flight was cleared by the ground controller to taxi across runway 9. The Falcon Jet had been cleared to land on runway 9. The planes collided as the Beechcraft taxied across the runway. Both aircraft were damaged, but no one was injured.

These two accidents and a near miss in a similar setting prompted the NTSB to issue a Safety Recommendation to the FAA, part of which is quoted below.

"Although the circumstances surrounding these accidents were different, all have one element in common with respect to air traffic control (ATC) operational control. In each case one airplane was controlled by the ground controller and the other airplane was controlled by the local controller. In two of these cases, the ground controller and local controller failed to effect the required coordination. In the third case no oral coordination was required; a local facility directive allowed the ground controller to clear aircraft across an active runway while the airport surface detection equipment and Brite radar displays were operating and radar observations by the ground controller revealed that no traffic conflict existed.

"In all three of these mishaps, ATC had authorized the pilot to taxi on or across an active runway. In two of them, the reported visibility at the airport was more than adequate to enable the ground controller to maintain visual surveillance of his traffic, although hours of darkness prevailed. In the other occurrence, reported visibility was ½ to 1 mile in daylight conditions."

The NTSB then recommended FAA alert controllers and pilots to a serious safety problem, with emphasis on the need for both groups to "maintain greater visual surveillance in taxi operations involving runway crossing."

While we haven't had a serious problem of this nature recently, we have had several cases of vehicles of various kinds on runways during takeoffs and landings. We have mentioned some of these in *Ops Topics*.

The lesson to be learned from these mishaps is obvious. Controllers must maintain control and aircrews must be very cautious when crossing active runways. The same applies to any vehicle operators who drive on to runways. We certainly don't want another Tenerife. (Source: Pan Am's *Crosscheck* Feb/Mar '79; NTSB Safety Recommendation A-79-42 and 43.) ■

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DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

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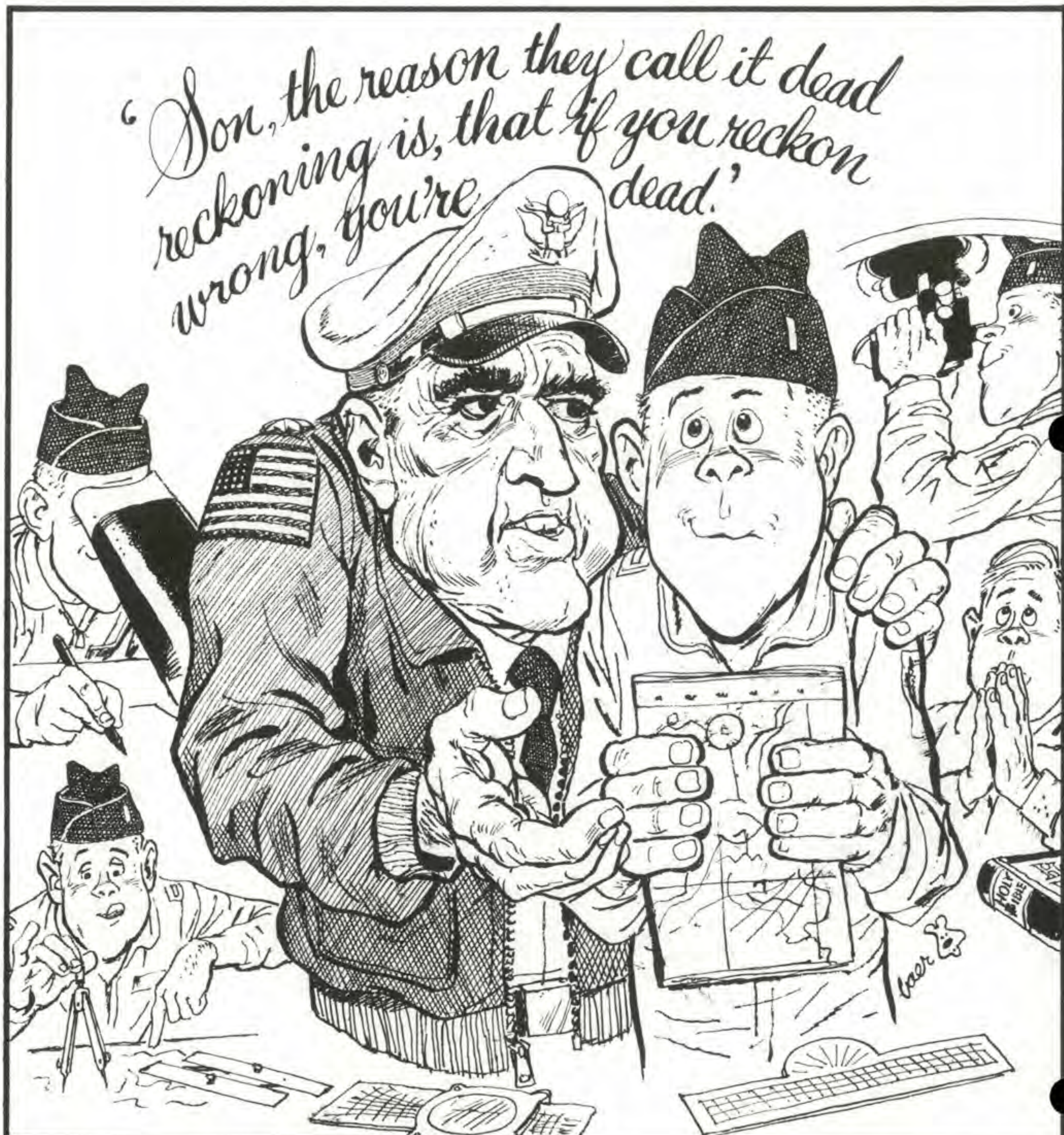
You've Come A Long Way NAV! ~~Baby~~

CAPTAIN DREW RIOLO
964th Airborne Warning and Control Squadron
Tinker AFB, OK



Reprinted from the recent pages of the Interceptor Magazine, we offer you an article with an insight to the changing world of the Nav.

■ It was 5 years ago this winter when I directed my maiden navigation voyage on the vintage T-29. It was a navigation route, overland south. My primary means of navigation was map reading, and I plotted my course by sightseeing. Over the copilot's shoulder I spotted the grain elevators at Tulare. "Turn left here," I insisted. "Head for those power lines at Visalia."

"Say again, pilot. You say we have not even passed the Fresno TACAN?"

"Don't know about that, pilot. My course in radio aids isn't until next week!"

"Sure! I'm sure I know where we're at! See that dog race track next to that football stadium? Or is that a drive-in movie next to a railroad yard? It doesn't matter which, Tulare is the only city in the valley big enough to have any of those things and it's our turn point!"

"Roger, pilot. You say Los Angeles Center wants our estimated time of arrival at Las Vegas? Standby pilot, I'll check in the drift meter and have one for you shortly. Let's see . . . 10,000 feet, groundspeed 150 knots, 300 miles to Las Vegas. . . . Pilot, this is the nav. We'll be there in 12 minutes.

Through 6 hours of sheer student navigator panic, my instructor looked on in complete bewilderment, shook his head, cursed his fate and the months ahead when he would have to teach me such advanced navigator mysteries as radar, celestial and grid.

After 10 months at Mather, however, they told me I had mastered those techniques. And the silver wings on my chest proved to everyone I could dead reckon (DR) and shoot celestial right along with Magellan and Columbus. I was ready for the next challenge.

It was a KC-135. I envisioned this four-engine jet to be well-equipped with navigational aids. To my consternation it had fewer than the propeller driven T-29 I left behind. So I spent the next 4 years flying a thousand hours strictly on nav judgment.

I lived the horrors of searching for Hawaii with only pressure pattern.

Of DRing acorss the South Pacific in hopes of finding that dot called Guam.

I survived the fright of spending 12 hours in twilight over the North Pole in grid steering, with only the sextant and few books called the H.O. 249 Volumes to guide me over what seemed like endless plots of ice.

I even suffered the embarrassment of not being allowed to fly on the North Atlantic Tracks to Europe because the KC-135 was not navigationally equipped to ensure track adherence.

Those days are no more.

Today I fly on the world's most expensive airplane. I sit at the heart of a $125 million system called E-3A, an airborne warning and control ship. It is a modified Boeing 707 which demands a crew of seventeen. The E-3A flies at 40,000 feet, cruises at 8 miles a minute, grosses out a 325 thousand pounds, and carries the world's largest *frisbee*® on its back. It has inflight refueling capability and its airborne time is limited only by engine oil requirements.

The navigation system is the most advanced in the world. The navigator can select from a combination of two inertial navigation systems (INS), a doppler radar, and an omega system. Three present position displays are available for comparison along with dual TACAN/VOR's located on the navigator's panel.

The two inertial systems are self-contained units, which rely strictly on gyro alignment. They provide call-up readouts for heading information of track, true heading, drift angle, across track, track angle error, and desired track. They also provide information concerning groundspeed and time to go to any one of nine preset waypoints. The INS also presents an immediate readout of current wind direction and velocity.

The doppler unit is also independent of ground based navigation aids. It provides velocity and drift inputs. It can even be programmed by the navigator to adjust to land or ocean surface environment.

The omega receiver monitors eight ground positioned omega stations, and uses the best four signals to determine position. This omega receiver system gives the navigator complete inflight alignment capability.

The really amazing machine at the E-3A navigator station is the omega computer, which receives position and velocity data from each INS, position data from the omega

You've Come A Long Way NAV! ~~Baby~~

continued

receiver, and velocity and drift data from the doppler radar, then presents the most reliable position of the aircraft. On its display unit, nine waypoints may also be selected. Aircraft steering patterns of line point-to-point, circle, racetrack, or figure eight may be selected. This computer control display unit also exhibits a date-time grouping, a directional vector, altitude readout, and pitch and roll information.

The control unit display leads the navigator by illuminating appropriate switch indicators for each step of alignment and configuration. If an unlighted switch is pressed, the computer ignores the action. The navigation control unit computer continually oversees itself for faults. If a fault is found, the computer displays a warning code indicating which subsystem or component has failed. The navigator must then choose to delete or update that subsystem or component.

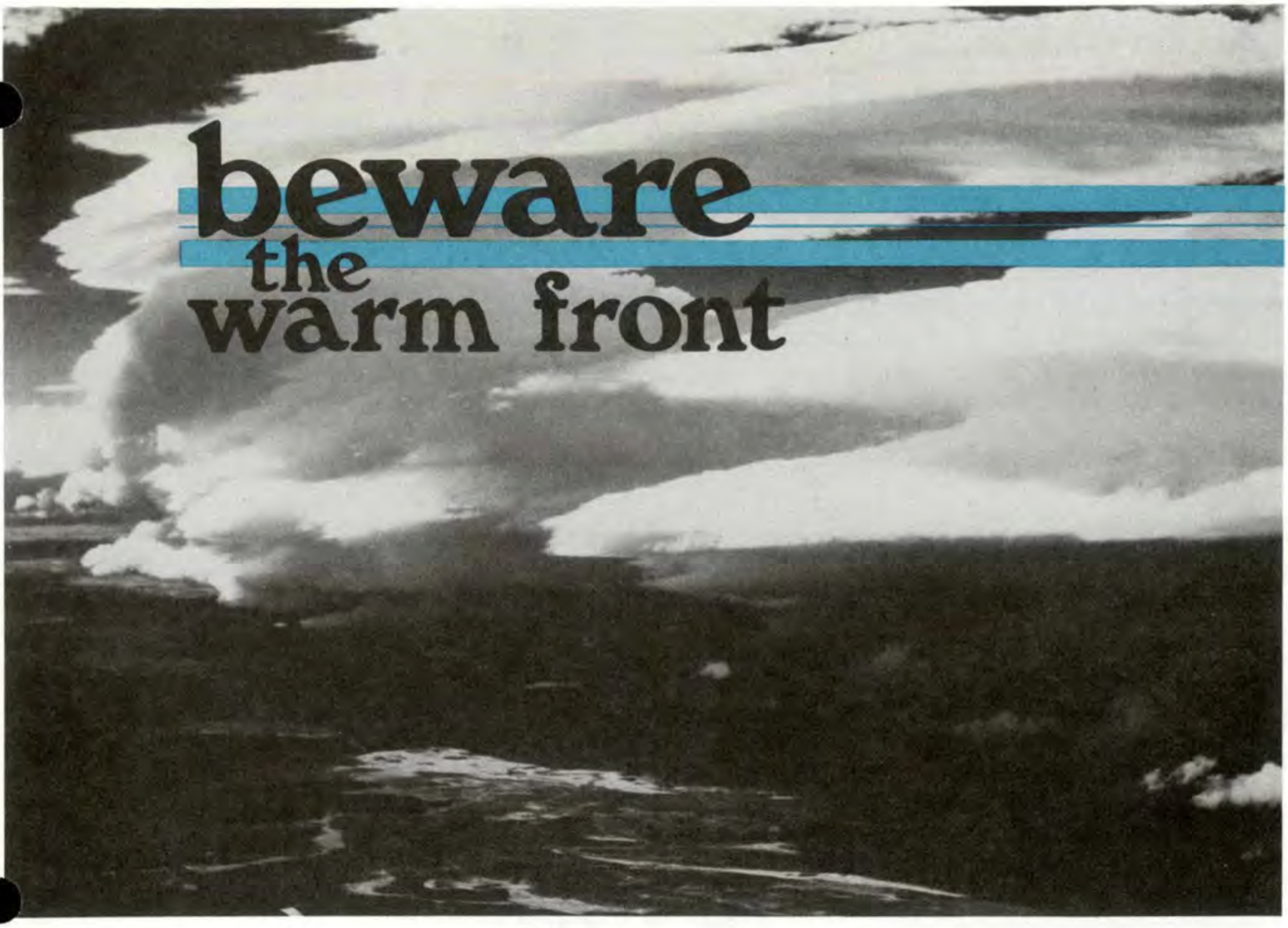
All displays on the navigator panel must be continually monitored. It is the navigator's choice of the position information to be fed to the mission equipment in the back of the aircraft. The air surveillance technicians and weapons directors rely on this information for program and placement of controlled aircraft, and position identification of hostile aircraft. The navigator also governs the pilot's autopilot source.

You have come a long way, nav! With all this electronic wizardry displayed, it is possible to fly around the world and not even pull your divider, plotters, or MB-4A hand-held confuser out of your nav bag! But two things remain the same. The E-3A still carries a sextant, and the primary means of navigation is still dead reckoning.

As I sit in the nav's seat on the E-3A, enjoy my in-flight steak, watch colorful flashing lights, and monitor electrical displays that would have marveled Marconi, I still remember what my instructor told me when he presented me my wings on graduation day. Major Gator looked at me with those eyes that had seen three wars, twenty thousand hours in the air and forty thousand celestial precomps, put his arm on my shoulder and said in a Texas drawl: "Son, the reason they call it dead reckoning is, that if you reckon wrong, you're dead." ■

ABOUT THE AUTHOR

Captain Riolo graduated from the Air Force Academy in 1972 with a B.S. in Civil Engineering. After Undergraduate Navigator Training at Mather AFB, CA, he was assigned to KC-135s at McConnell AFB, KS, as a navigator/instructor navigator. He is presently assigned to the 964 AWACS at Tinker AFB, OK, flying the E-3A. Captain Riolo has a multi-engine commercial pilot's license with an instrument rating. His ambition in life is to be able to hit a one iron.



beware the warm front

CAPTAIN TERRY S. BARKER
3350 TCHTG/TTMV
Chanute AFB, IL

■ Summer is slowly, but persistently, blending into autumn. Cooler temperatures and longer nights lead our thoughts to winter with the host of weather hazards that threaten aircraft safety. Usually, when thoughts turn to threatening weather, we think of the cold front because of its entourage of violent weather, but the warm front also carries a full complement of hazards that impede aircraft operations.

From *Basic Weather I* you'll remember that the warm front is located on the surface weather maps where the trailing edge of a cold air mass rests on the Earth. The retreating cold air is replaced by warm air moving to fill the void. We typically tend to view the warm front as a welcome respite to the colder temperatures.

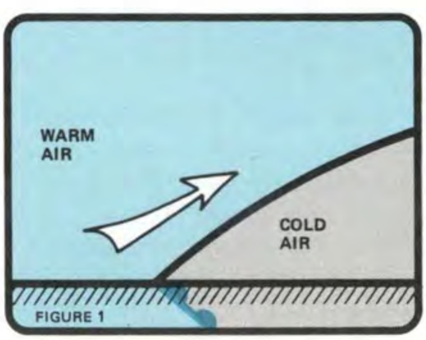


FIGURE 1

In the upper levels, the warm air rises over the colder, more dense air below as a consequence of the gently sloping frontal boundary in the upper levels. Warm air is capable of holding larger quantities of water vapor than cold air, but as the warm air rises above the cold air, it begins to expand and cool, clouds form. Depending upon the amount of moisture carried aloft, clouds spread out in a broad band above the frontal boundary.

The first visual clue to an approaching warm front is a tenuous layer of cirrus advancing across the sky. The layers of cloud progressively thicken and lower as the front approaches. At the front, clouds covering the ground in the form of fog are common. Weather patterns that accompany the warm front depend upon the movement of the front, the stability of the air carried aloft, and the quantity of moisture available.

Stable air quietly rises above the frontal boundary to deposit its moisture as a smooth, uniform layer of stratus clouds. As droplets of moisture collect, drizzle begins to fall from the clouds, while further coalescence leads to rain.

Precipitation falling through the cold layer of air below evaporates and saturates the air to create a low layer of stratus clouds below the frontal boundary.

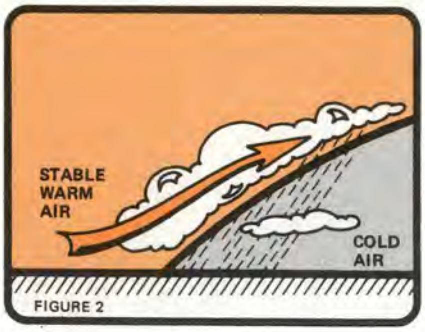


FIGURE 2

Cumuliform clouds and thunderstorms are produced when unstable moist air flows over the warm front. The instability of the air creates rising and falling currents of air that bring about the showery nature within the extensive stratus clouds. Low stratus clouds are produced in the cold air below, but due to the showery nature of the precipitation, low clouds tend to be less extensive.

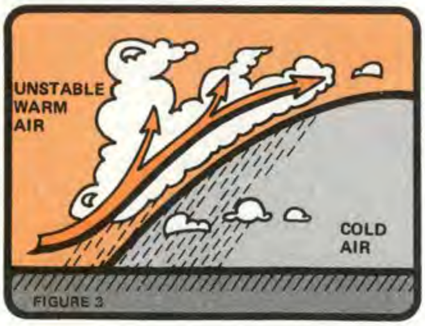


FIGURE 3

The aviation hazards that accompany the unstable warm front are quite similar to those found with a slow-moving cold front, except for the coverage. The warm front has a more shallow slope than the cold front, so the area of weather covers a larger area. Thunderstorms are a major hazard with the unstable warm front since they are hidden within the more extensive stratified clouds. These thunderstorms cannot be detected and avoided unless the aircraft has airborne weather radar.

Icing is also a major aviation hazard that is associated with the warm front. When the stratiform cloud layers of the front are near or below freezing and the aircraft control surfaces at 0°C or lower, rime icing forms on the airplane. The small cloud droplets in the stratified cloud layers freeze nearly instantaneously and entrap small air pockets to give the rime ice its milky appearance. Rime ice is relatively light, but it forms in rough, irregular shapes, and thus robs aerodynamic efficiency.

Mixed icing is found in the cloud layers of the unstable warm front. In the colder layers of the stratiform clouds, ice particles and snow are formed. The unstable cumuliform cells have larger, liquid water droplets that are carried aloft in the updrafts. Aircraft flying through this meteorological situation will see liquid water droplets and ice crystals intermingled. When this mixture is deposited on the aircraft, the icing rapidly forms into a rough irregular conglomerate of clear ice, rime ice and ice particles, adding weight and stealing lift.

Warm air carried aloft over the cold air creates an especially hazardous icing condition. Warm rain falling out of the warm frontal clouds can fall into below freezing air and refreeze. On the ground this is freezing rain, but in the aviator's domain, it is severe clear icing. Just as freezing rain coats exposed surfaces with a glaze of heavy ice, aircraft will accumulate damaging layers of ice when operating within this environment. Supercooled water droplets that impact the aircraft can overwhelm deicing equipment as clear icing coats surfaces with its heavy, hard layer. Avoidance is the best measure, but if encountered, climbing to the warmer layers above is the best action.

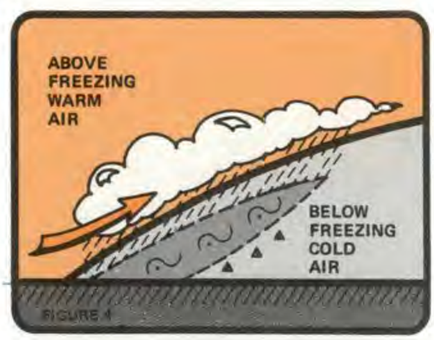


FIGURE 4

Turbulence can be found with any frontal surface, but the warm front will tend to have less than cold fronts. This is a result of the gentle frontal slope and stable air-mass configuration of the warm front. Turbulence occurs in the unstable air above the warm frontal boundary because of the rising and sinking air

currents. The majority of the turbulence reports with warm fronts are a result of wind shears.

Wind shear occurs where differences in wind speed, wind direction, or both, are found in close proximity. The warm front can be a harbinger of wind shears along the frontal surface. Warm fronts can have winds as much as 180° opposed on either side of the frontal boundary. Wind velocities will typically be stronger above the warm frontal surface than below it. These two factors can combine to create a vigorous wind shear potential. The shallow slope of the warm front can bring the wind shear close to the surface of an aerodrome, even when the front on the surface is miles from the area.

FIGURE 5

The warm front can create extensive areas of poor visibility since the warm rain or drizzle falls into colder air below. Cold air is less capable of holding moisture, so saturation of the air produces stratiform clouds and fog. Warm frontal processes tend to shroud extensive areas with fog and/or low stratus ceilings. Vertical depth of the stratus clouds can range anywhere from thin layers to a cloud deck that essentially merges with the stratiform clouds above the warm front. The large areal coverage is significant to pilots because of the necessity of finding a suitable alternate airfield. When flying into an area that will be under the influence of a warm front, query the forecaster with care to ensure an acceptable alternate is available.

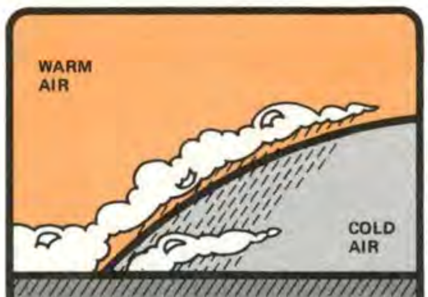


FIGURE 6

Visibility problems can persist with slow-moving warm fronts when haze and smoke are trapped in the cold air. Vertical mixing across the frontal boundary is minimal since the air masses are in a stable configuration. Rain and drizzle falling through the cold layer also acts to reduce visibilities on its own, even before stratus and fog are formed.

Extensive areas of advection fog can form in the warm air behind the warm front. Advection fog forms when warm, moist air flows over a cold land surface, causing a surface layer of fog to form. Although advection fog appears like radiation fog, it is more dangerous because it covers a larger area and is slower to break. Combined with the fog that forms ahead of the warm front, extensive areas can be brought to below minimum conditions.

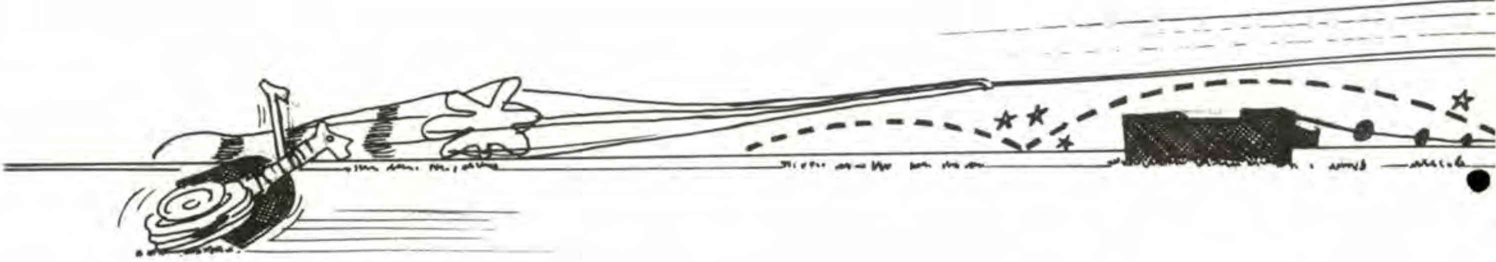
The warm front can pack a potent package of aviators' nightmares. Embedded thunderstorms, wind shears, extensive areas of icing and poor surface visibilities can accompany that innocent-looking front. The "red" of warm front can symbolize warmer temperatures, but it also flags "danger" to the aviator. If the forecaster mentions "warm front," find out how extensive the flight hazards are with the system so you can prudently plan your route, fully aware of warm frontal weather hazards. ■

ABOUT THE AUTHOR

Captain Barker, a native North Carolinian, graduated from North Carolina State University at Raleigh in 1973, with a Bachelor of Science degree in the biological sciences (biochemistry). He received his Air Force commission through the ROTC program. He continued his training at North Carolina State as a second lieutenant in the basic meteorological program. Upon completion of the school in August 1974, he was assigned to Rickenbacker AFB, Ohio, as a weather officer. He is currently assigned as an instructor in the weather technician course at Chanute Technical Training Center.

CAPTAIN ERNIE R. ARMSTRONG
555th Tactical Fighter Training Squadron
Luke AFB, AZ

THE MISSING



■ The mission had gone as briefed and two fighters were going home. During the descent, passing 5,000 feet 15 miles out, lead, in a two-seater with another pilot, experienced throttle failure. He analyzed the failure, declared an emergency and told tower he would need the cable. He flew a 200 kt straight-in, touching down at 180 kts, 1,000 feet down the runway.

Then it all fell apart. The drag chute failed; both main tires blew, 4,000 feet down the 10,000 foot runway; the hook didn't grab the cable 600 feet from the end; the aircraft departed the runway, sheared the gear, wiped out an ILS antenna and came to rest 700 feet past the end of the runway. Both crew members egressed under their own power.

The investigation turned up (as usual) a number of contributors. Elimination of any one of these would have prevented this mishap. A broken throttle cable was discovered. The damage was caused by overtorquing which induced a fatigue failure. The T.O. was found to be in error when compared to the manufacturer's specifications and, when followed, would result in overtorquing.

Even though the part failed, there was an emergency procedure to cover this type of emergency. So we have to take a look at the pilots.

The front-seater was current in all aspects of the mission and considered well-qualified. The rear-seater was flying as a copilot because he had not met local standards even though he had successfully completed a formal IP upgrade course. Investigation of the crew coordination discussion during the briefing revealed that responsibilities during an airborne emergency were not covered. Even though the problem was correctly analyzed, no one covered the procedures.

The copilot stated he was going to read the steps while the pilot performed a 360, but the pilot changed his mind and headed for a straight-in.

The copilot assumed everything was under control.

There was an IP in the other aircraft, and he assumed everything was under control.

The RSO was monitoring the frequency and had informed the SOF of the problem. The SOF responded with the correct emergency procedure and told the RSO to pass it on but he didn't, assuming

LINK

everything was under control.

Instead of turning the fuel shutoff switch off when landing was assured, as the checklist stated, the pilot shut off the throttle. The thrust of the still running engine combined with the speed at touchdown caused the chute to fail.

After the chute failed, the hook was lowered. The pilot's initial statement indicates that the first time he thought about turning the fuel shutoff switch off was after the hook was lowered.

The copilot did not use his shutoff switch in the event the pilot elected a go-around.

Witnesses stated they saw puffs of smoke coming from the tires, followed by a steady stream of smoke just before they blew.

Investigation revealed the antiskid switch was in the off position. The pilot had experienced antiskid failure on his previous ride and correctly identified it. He could not remember if he turned the antiskid switch off on purpose, thinking he again had antiskid failure, or if he reached for the fuel shutoff and turned off the antiskid switch. The antiskid switch is located in close proximity to the fuel shutoff switch.

A single reason could not be determined as to why the cable arrestment was not effective, but several problems were discovered.

- A photo taken following the mishap revealed a definite sag in the cable.
- The concrete cable housing was ⅜-inch higher than the asphalt, and this could have caused the hook to skip.
- The cable could be raised or lowered by tower personnel from a slot in the runway. Taxi test showed that oscillations were set up by the gear passing over the cable.

Any one, or a combination of these problems, could have caused the hook to skip. There was a mark on the concrete and on the cable where it had been hit by the hook. The cable had to be low in the slot for this to happen.

As we look at this mishap we see problems with logistics in that the T.O. was in error; pilot error in not shutting down the engine as per the checklist; supervisory error in not passing the SOF's message to the pilot; and a support factor, the cable. Anywhere along this chain, a missing link would have prevented the mishap.

Learn and live! ■

It's monday morning, Judge

MAJOR LARRY D. REA
142 FIG (ANG)
Portland Intl Arpt, OR

We invite you to join a mishap board in progress and evaluate their deliberations. At the end, you will be presented some questions designed to promote discussion directed at both aircrew and supervisory functions.

INVESTIGATING OFFICER

■ Gentlemen, it's time for the daily review. Let's cover what we have learned about this mishap and determine what direction we should take in the investigation.

PILOT MEMBER

Considering a crew of five and the short time interval from takeoff, they were operating close to maximum gross weight. The search mission was being conducted at high density altitude. The performance charts indicate they were within the capabilities of the machine but very close to the top of the performance envelope. Any loss of engine power would have disastrous effects on lift production.

MAINTENANCE OFFICER

I agree. If the engine did malfunction, we will have an easy explanation for the uncommanded descent and crash. It won't take us long to finish this report.

The engine has been shipped for teardown analysis, but the reports won't be back for at least a week.

The preliminary indications are such that I suggest we assume no malfunctions and use this week to look for other probable causes to explain loss of lift. That way, the delay waiting for the teardown report won't be lost time if the engine is clean.

AERODYNAMIC ENGINEER

OK, let me dazzle you with some theory. Lift is created by the complex interrelationship of rotor rpm, rotor angle of attack, relative wind, and the effective lift area.

Assuming the simple condition of maximum engine power, an attempt to increase rotor angle of attack will result in loss of rotor rpm and a loss of lift. The relative wind then becomes the key to producing more lift. The pilot must dive the aircraft to increase airspeed/relative wind and thus increase lift.

At maximum power, a loss of headwind or a turn to downwind becomes a critical factor in lift production. In fact, a turn itself, as every pilot knows, reduces the area of effective lift and causes the aircraft to descend unless the loss of lift is compensated for in some way. Normally, that compensation is provided by more power or increased angle of attack. However, we have seen that at maximum power the only option the pilot has is to dive the aircraft.

PILOT MEMBER

Loss of lift can be accounted for in another way. Wind across rough terrain creates turbulence. The weatherman's analysis indicates that surface winds could have created vertical velocities reaching 500 feet per minute in the search area. At maximum power, the aircraft could not cancel the effect of a downdraft. If terrain clearance were not adequate a crash landing would be inevitable.

FLIGHT SURGEON

A factor to consider is pilot perception of increasing terrain height. Not only does it insidiously reduce a safe clearance, but the tilt of the terrain could affect his perception of level flight and altitude requirements, leading to a judgment error.

INVESTIGATING OFFICER

Regulation establishes standard search pattern airspeeds and terrain clearance altitudes. Those requirements are designed to compensate for most of these factors and give the aircraft some margin for safety.

FLIGHT SURGEON

Remember, the pilot was under pressure to change the search pattern. A survivor who was able to walk out reported that badly injured survivors remained at the crash site. The area he indicated for the crash site had been searched previously with no success. Since several days had elapsed, the whole search crew felt a sense of urgency to locate the wreckage.

To complicate things, the aircraft was painted white and had crashed in snow covered, forested terrain. White wreckage against white snow provides little contrast and would be difficult to see. The aircraft commander elected to solve these problems by flying lower and slower to give the observers more acquisition time.

PILOT MEMBER

The regulation states that when circumstances warrant, modifying the search pattern is the aircraft commander's prerogative.

AERODYNAMICS ENGINEER

But, slowing down eliminated the power reserve for climb capability and descending eliminated the option of diving for recovery.

INVESTIGATING OFFICER

The decision to modify the search pattern was critical to the crash and is the key.

BOARD PRESIDENT

This analysis agrees closely to the testimony of the aircraft commander. He said they were proceeding up the canyon when the left observer spotted footprints in the snow. He lost visual contact and requested a left turn to reacquire the trail.

The turn was made toward the higher terrain of the canyon wall. The pilots noted the descent rate and increased power to the maximum. They attempted to arrest the descent by increasing the rotor angle of attack. The ''low rpm'' warning sounded followed shortly after by the rotor striking a tree. The aircraft then crashed to the ground resulting in its destruction and injury to the crew.

Gentlemen, I think we have a reasonable explanation for the crash even if the engine was performing as advertised. However, this type of explanation suggests some more questions.

1. Do we expect aircrew and supervisors to be this knowledgeable?
2. Have the supervisors provided proper control and training?
3. Does the flight manual adequately warn of the dangers present?
4. Are the crews adequately evaluated on their knowledge and ability to recognize conditions requiring maximum performance?

How are you, the reader going to answer those questions? ■

NEWS FOR CREWS

Career information and tips from the folks at Air Force Manpower and Personnel Center, Randolph AFB, TX.

CAPTAIN RANDY LUPOLT
Rated Supplemental Management Section

RATED SUPPLEMENT MANAGEMENT: What it means to the rated officer

■ In March 1978, we presented an article concerning the dynamics of the rated supplement. As a review, the key points of that article were that the supplement provides an immediate trained resource to augment or replace attrition in crew and staff requirements during contingency operations, and that the supplement consists of rated officers in the grades of lieutenant colonel and below serving in AFIT, PME and nonrated duties. With that in mind, let's turn to the subject of this article, today's management of the rated supplement and what that means to you.

The largest single factor which is affecting the management of the rated supplement today is a decreasing population of rated officers available to meet rated requirements. We just don't have the numbers of people we had a few years ago. Because of this, we've been decreasing the supplement size by returning most supplement officers to rated duty on their current supplement completion dates and by limiting new inputs. Most officers see this as contrary to their experiences in the early and mid-70's when a large supplement was developed, many officers were retained for extended supplement tours, and there was a great deal of opportunity for supplement entry. It's a significant change in management and it's going to continue for the foreseeable future.

The supplement inventory is projected to decline over the next few years until flying training production and the total rated force size reach a level which will maintain enough pilots and navigators to meet all of our rated requirements. This decline, or drawdown, is necessary to insure reasonable rated manning levels and to provide a career broadening opportunity to as many rated officers as possible during a period of shortages.

Since last March, the number of rated officers in nonrated duties has declined by about 2100 officers, from 6550 to 4450 at the end of June 1979. This decline is projected to continue at the same rate until the supplement size stabilizes at a level of around 3000 by the end of FY 80. Because the impact of this drawdown is being felt in all areas of the rated and support force, the management of this problem is not a matter to be worked solely by personnel.

In April of this year, a board of thirteen general officers met at AFMPC and convened the Rated Supplement Requirements Board (RSRB). The RSRB reviewed the stated requirements for rated officers to serve in each support career field with inputs provided by each MAJCOM, Air Staff functional manager, and the support career field manager at AFMPC. The RSRB identified a minimum peacetime requirement for slightly less than 3000 rated officers to serve in support career areas on a sustained basis. The board also recommended a specific distribution of the total by support AFSC. The majority of these requirements are in research and development (R&D) and logistics, and at the precommissioning sources and PME faculties.

The officers who have entered the supplement over the last yew years – as well as the career fields they are serving in today – determine to some degree how we'll manage each career area in the supplement over the next few years, as we work toward the objectives of the RSRB. For most support career fields, there will be a limited capability for rated officers to enter until those currently assigned return to rated duty, are promoted to colonel or retire. For the areas mentioned in the foregoing paragraph, however, there is a need for increased inputs and some capability for the currently assigned officers to extend.

One of the most emotional and sensitive issues we have to deal with today is the management of lieutenant colonels who entered the supplement during the big buildup in the early 70's. Today this officer could represent a great deal of experience and expertise in the support career field to which he is assigned. Balancing that vested interest against our need for him in a rated AFSC is a big challenge – one we take very seriously. Among the factors considered in reaching this decision are the officer's retainability, his OER ratings, his job level, the criticality of current manning in his AFSC, his educational qualifications for the position, his weapon system background and flying currency, the need for rated inputs where he could be reassigned, and the proximity to his consideration for promotion to colonel. Over the past 2 years, we've been tracking the decision-making in this area, and in contrast to popular belief, over 40 percent of the lieutenant colonels completing supplement tours are

continued on page 23

The following describes an aggressive program pursued by a base which didn't fare too well during a Rex Riley visit last year. We think it's a super approach to solving some problems!

letter to rex

■ Many times we become so primary mission oriented we tend to treat our ancillary responsibilities lightly particularly when there are no apparent difficulties. As long standing Air Force members we also have a fierce pride in our ability and performance. On occasion our bubble is burst by a subjective evaluation by an outsider who tells it like it is and has the benefit of comparative analysis. It turned out that we were not as shiny as we led ourselves to believe. We were determined to bring our level of performance up to the highest possible standards. Our treatment and handling of transient aircrews *would* improve. This is important from two primary standpoints; first, an aircrew in a good frame of mind is a safer one and next, transient aircrews are our guests and should be treated accordingly.

Toward the goal of providing the best possible services within our resources, a transient aircrew services panel was formed to resolve problems and seek better methods. The panel is comprised of representatives from transient alert, base operations, fuel management, communications, civil engineering, transportation, services and weather. Those organizations not under our cognizance were asked to participate, which they did readily. This panel, which we feel may be somewhat unique, meets monthly and is chaired by the airfield manager. The primary tool used to identify problems is the aircrew questionnaire. Problems are surfaced with an eye to taking corrective actions which endure. It became readily apparent that the majority of our solutions hinged on the attitude of the people with whom the aircrews come in contact. In these days of extremely tight budgets there was little which could be done in the way of improved facilities, and it turned out that little was needed. A good attitude and positive, helpful approach were generally the answer to most problems. Less than satisfactory remarks are normally investigated immediately before the trail becomes cold. In most cases a proper explanation is provided to the crew before they depart. Some situations require more indepth solutions and that is where the transient aircrew services panel is most effective.

The transient aircrew questionnaire is the most important tool available to improve services. This is a double-edged sword however, since positive as well as derogatory remarks are important. Very often those involved with providing transient services get little feedback on the results of their work. A pat on the back, if deserved, does wonders. On the other hand, well identified trouble areas can be better handled when sufficient information is provided.

The key to proper transient services is communication between those in the service business and those receiving the service. The transient aircrew questionnaire and the transient aircrew service panel provide the medium of communication to get the job done.

When Rex Riley gets to this base now he will recognize the difference that a combined effort toward providing good service can make. ■

Aircraft Control Loss

■ One of the big players, along with collision with the ground, which has played a major role in increasing our destroyed aircraft rate and our pilot fatalities, is the pilot-induced control loss. Since January 1978, there have been 32 destroyed aircraft, resulting in 34 fatalities, where a pilot-induced control loss was involved. All types of aircraft have contributed to this accident trend. The majority, however, (all but seven of the 32) were fighter/attack aircraft.

Activities and aircraft break-out are as follows:

- Three trainers have been lost due to pilot-induced control loss. These mishaps all occurred in 1978. In two of the three, student pilots were on board without IPs. One of these occurred in the traffic pattern where the student pilot lost control attempting a go-around during the turn to final. In the second mishap, two students were aboard and they were apparently attempting some rolling maneuvers and dished out severely. In the third trainer mishap, a student pilot with an IP was demonstrating a new wrinkle to an old maneuver (Immelmann) and they both ended up ejecting when control was lost.
- Two cargo aircraft were lost because of control losses and in both of these, the aircraft was stalled in the traffic pattern. One was in weather on final, searching for a resupply field; the other was at night, turning base to final, also searching for a poorly lighted assault type runway. In both, the air speed was allowed to decay and control was lost. In both, the first action apparently was to raise the flaps when the pilot became aware that he was in trouble.
- Two observation aircraft, in 1978, also were lost due to control losses. In one, the pilot was attempting to locate a low level target for visual navigation purposes and allowed his aircraft to become slow, low, and stalled. In the second, the pilot had engaged in ad hoc ACT with another observation aircraft. He maneuvered his aircraft to a low altitude, high-angle-of-attack situation, and ejected when control was lost.
- One helicopter in 1978, on an actual SAR mission, was attempting to follow footprints in the snow at a low altitude over high terrain and slowed his aircraft to a point he no longer could maintain altitude. Vertical control was lost; he crashed attempting to move back toward lower terrain.
- One bomber, an EB-57, was lost this year when the pilot experienced pitot static malfunctions, which indicated a rapid increase in Mach and altitude. He countered by reducing power, extending flaps, speed brakes, gear, and stalled. A spin was entered and the crew ejected.

As mentioned earlier, 25 fighter/attack aircraft have been destroyed in the control loss mishaps resulting in 21 fatalities. In all but two of these, aircraft control was lost at an altitude or attitude which precluded recovery from the onset. Fourteen of the 25 were engaged in ACT, DACT, or BFM at the time of the departure.

In most every instance a brisk reduction in alpha would have flown the aircraft out of the maneuver before it progressed to a full departure mode.

The heart of the control loss problem, then, in fighter/attack aircraft, concerns departures while maneuvering during air combat tactics training at an altitude below that necessary for recovery. The trick is preventing departures – not concentrating on recovery. The fatalities associated with these types of control losses attest to the fact that the crews were trying to recover the aircraft when they should have been trying to eject. It was clear from our reports that the initial departure symptoms were not recognized by the crews who, with a high adrenalin level, were in the full kill, kill mode. In most every instance a brisk reduction in alpha would have flown the aircraft out of the maneuver before it progressed to a full departure mode. But having said that, the desire and motivation to have, or not be had, may have been too fully developed in these folks for them to recognize that they were even close to a departure situation.

Some observation from our reports concerning air-to-air combat are as follows (control losses only):

- It is the defender over the attacker, two-to-one. It is the less capable aircraft over the greater, four-to-one. If you have just been had and reengage, your odds rise remarkably, and should there be an exercise in progress we all try harder.

Somewhat surprising is the fact that five of the aircraft which were lost, not engaged in air-to-air tactics or combat, were single-ship, low-level missions where the maneuver was at the choice of the pilot – not generated by another thing. Photo reconnaissance aircraft were involved in three of these. In one additional control loss mishap, the pilot was attempting to avoid a simulated SA-2. In another, the pilot was attempting to avoid a bird. In two more – both F-15s – the pilots had declared "lost wingman" in weather and lost control of their aircraft.

In all of the aircraft, regardless of type, it is basic that, when the angle-of-attack is increased to the point where the wing stalls, the aircraft will no longer fly. This can be done in two basic ways. Hold the G level and allow air speed to bleed off, or hold the air speed and increase your G level. In both cases, the yaw induced will couple aerodynamically to the pitch axis. The aircraft will also stall with negative alpha and exhibit the same loss of control symptoms as positive alpha stalls. The difference, of course, is that in the latter you are experiencing negative G with a canopy full of junk and you end up inverted. Abrupt maneuvers in either the yaw, roll, or pitch axes at critical positive angles-of-attack will almost assuredly result in a control loss of some kind.

Know the operational limits of your aircraft and its predeparture symptoms when it is near the stall angle-of-attack.

There are really just two approaches to avoiding departures.

- First, know the operational limits of your aircraft and second, you must know the predeparture symptoms of your aircraft when it is impossible to fly with your head in the cockpit. Burble, wing rock, nose rise, yaw excursion are those symptoms which most aircraft exhibit as they near the stall angle-of-attack.

- Know what your aircraft does and then heed those very subtle warnings and be sensitive and attentive to those warnings when they occur.

- Experience helps and to this end, feel your way out to the aircraft limits in a series of missions rather than trying to do the whole thing at once. Event proficiency is very important here. If you have not done the high alpha mission for awhile – ease into it.

Control loss mishaps have increased substantially in the past 2 years. We probably aren't having any more control losses than we ever did, but because of the altitude at which they occur, recovery is not possible. All the more reason to know exactly what your particular aircraft requires in terms of altitude, AGL, for recovery. When you are maneuvering at high angles-of-attack below that altitude, be extremely sensitive to those subtle warnings the aircraft will give you, even when you are in the full kill mode. ■

L/D back to basics

MAJOR NEAL R. MORRIS • 479th Tactical Training Wing • Holloman AFB, NM

■ Question: What do you call two instructor pilots flying in the same aircraft?

Answer: An accident looking for a place to happen.

Sound a little farfetched? Read on.

Two instructor pilots were flying from their home field to an auxiliary airfield to serve as the RSU controller for that day. The IP who was flying the aircraft from the left seat, began an idle power descent to position himself on an inside downwind.

Lowering the speed brake and the landing gear just prior to beginning his final turn, he noted the flaps were up and told his right seater that he would make a no-flap, idle power descent and landing. He rolled out on final slightly long and high and decreased his pitch to adjust to a no-flap approach angle. As he reached the desired glidepath, he increased his pitch to establish the proper approach angle. He then felt the aircraft begin to sink and noticed the airspeed rapidly decreasing through his desired airspeed. To arrest the sink, he lowered 50 percent flaps, moved the throttles to 100 percent and raised the speed brake.

As he applied back pressure, he felt a tickle. He relaxed back pressure slightly in an attempt to fly the aircraft at or near the tickle to obtain maximum performance. When it became apparent that the aircraft would land short, he applied more back pressure and stalled the aircraft short of the runway. The crew ground egressed safely, but the aircraft was destroyed.

Something that could happen to you? Never. Let's go over some of the events leading up to this mishap and look at it from your point of view.

■ The instructor pilot flew an idle power descent and approach into an uncontrolled airfield.

Okay, sounds innocent enough. No need to ask why a "professional pilot" would elect to perform this maneuver, especially when there are no such training requirements. Perhaps he was preparing for his next stan/eval check. Besides, it was an uncontrolled airfield, and we all like to show our stuff when the "sup" is not around.

■ Shortly after rolling out on final approach, the aircraft developed a sink rate in conjunction with a rapid loss of airspeed for undetermined reason(s). Most probably: (1) Increase in the angle of attack, in combination with idle power and extended speed brake; (2) Windshear; (3) A combination of both.

Should this pilot have been surprised at the decrease in airspeed when he raised the nose to increase the angle of attack? What should have he expected with an increase in the angle of attack without an increase in thrust? Everyone knows that you control the airspeed of a glider with the stick. Does a powered machine differ? Boy, wish I could remember all that aero class from a few years back.

Windshear – horrors! Everyone knows this can be a problem, especially during the critical phases of roundout and touchdown. The weather warnings "always" flash through my mind just prior to each takeoff and landing. (During the

rollout on final approach? Well, I just make sure I have what I want while I recheck my configuration and runway alignment. Windshear is not too important this high on final.)

■ The IP did not initiate a go-around.

This is not too difficult to deal with. Really no need to go around. The landing can still be made. After all, what would the pilot in the right seat think of such a poor display of airmanship. Much better to demonstrate how good I really am with this little bird.

■ The first pilot failed to take action or provide assistance.

Now the troop in the right seat is really up for grabs. He has observed this ''unusual'' display of skill from the start without any comment. He has great confidence in the other IP flying the aircraft. He observes the flight path and observes that the airspeed is slightly . . . uh, 5 knots, no 10, no . . . uh, 30 knots below that airspeed recommended by the dash one. He says nothing, believing that ''old Joe'' can hack it. I wonder how far he allows his students to go before taking corrective action.

■ The IP lowered 50 percent flaps to arrest the sink rate.

What can we say here? Back to the aero classes. Yes, lowering flaps will decrease your stall speed. Yes, lowering flaps will decrease touchdown speed, decrease landing roll, require more thrust, etc. Will it increase your airborne distance? If so, why not use half flaps to fly cross-country? The answer should be obvious. Lowering flaps one-half or full will decrease glide distance.

Consider a no-power approach. What do you do if you are going to be long? Solution: lower flaps to increase drag. Maintaining L/D max is the way to obtain the maximum glide distance. Looks like our friend may have his basic aero principles confused.

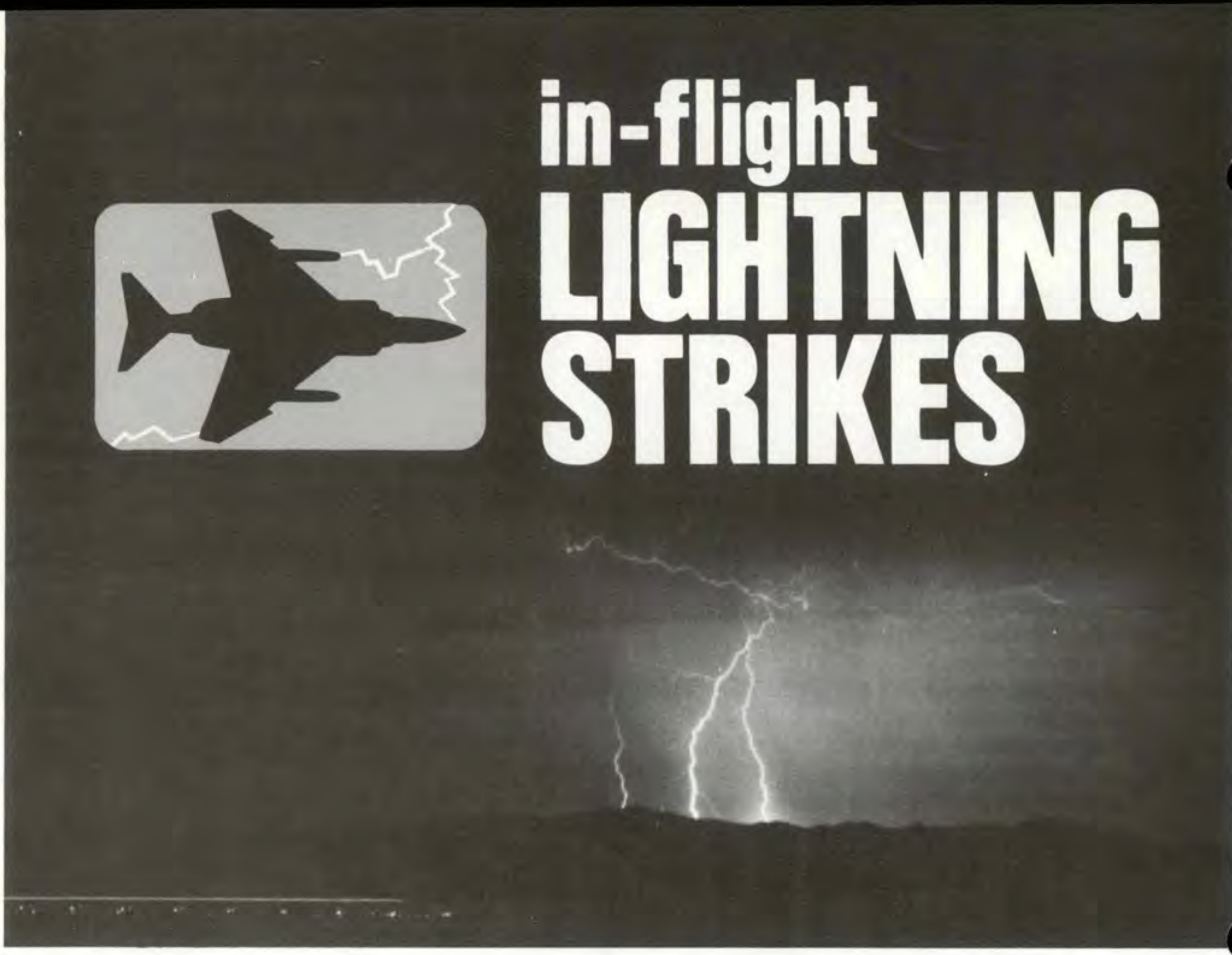
■ The IP delayed adding power and raising the speed brake until the aircraft approached a stall.

■ He continued to fly the aircraft in the region of reverse command.

■ The IP stalled the aircraft just prior to impact.

Do these last three items sound a little familiar? Seems like I remember a movie about those things. Something about a ''Sabre Dance.'' I thought that stuff was just for the F-100. Well, no matter. I know what my machine can do as well as I know what I can do. You will never catch me making any of those dumb mistakes. I have to go now; I have a bet on my gunnery flight for this afternoon. ■

in-flight LIGHTNING STRIKES



■ One of the most feared phenomena associated with thunderstorm activity is lightning. An awesome force to behold from the ground, it commands even greater respect in flight. Fortunately, most lightning strikes do not cause serious aircraft damage. In fact, many go unnoticed until the small attachment scar or pitting become evident during a casual exterior inspection several weeks later. A General Electric study of over 200 aircraft lightning strikes revealed that 78 reported no effects on the aircraft, 32 had some degree of radome damage, 40 involved interference or damage to instruments, 27 had static discharger damage and only 27 resulted in holes burned or skin panels damaged.

Lightning occurs when one highly charged area of the atmosphere discharges into another. Circumstances for this discharge exist during heavy rain or thunderstorm conditions. Rapidly developing rain clouds become positively charged at the top and negatively charged at the base while the earth's surface generally maintains a positive charge. As convective action builds, the charge intensities increase until a discharge of lightning occurs between the charged surfaces of the same cloud or between two clouds or between a cloud and the ground.

The lightning charge itself begins with a "stepped leader" or faintly luminous path of ionized gas about 150 feet in length emanating from the cloud or charge center. The "stepped leader" twists and turns to avoid atmospheric resistance and accelerates ionization in the air to the point that luminous ribbons or "positive streamers" similar to the stepped leader grow from the ground or opposite charge center. As a positive streamer contacts a stepped leader, a conductive path is established and a tremendous surge of electrons instantly drains the charge. It is estimated that three such surges or strokes occur with each bolt of lightning, however, as many as 14 strokes per bolt is not unusual. Lightning studies suggest an average distance between a cloud's charge centers of nearly 4 miles; however, charge distances between different clouds can well exceed this.

Most lightning strikes occur near convective activity where thunderstorms may or may not be present. The General Electric study revealed the following conditions during strikes:

- 96 percent occurred at altitudes below 25,000 feet, 4 percent between 33- and 37,000 feet.
- 88 percent occurred during precipitation.
- 84 percent happened to aircraft within clouds.
- 81 percent involved reported turbulence.
- In 68 percent the aircraft was

LT COL GEORGE J. BIFOLCHI
Directorate of Aerospace Safety

either climbing, descending or on approach when struck.

- In half the incidents, electrical activity or nearby lightning strikes were evident *before* the strike.

In summary, the majority of strikes took place in a cloud, during precipitation and light turbulence, climbing or descending at 250 knots between 10- and 12,000 feet with the outside air temperature near the freezing point.

The effect of an in-flight lightning strike can vary from a tiny molten surface scar or puddle to a complete melt-through of aircraft skin. If it enters an aircraft fuel tank, it can readily ignite explosive mixtures within, perhaps destroying the aircraft. Lightning also introduces the indirect effects of electromagnetic coupling which can severely damage internal aircraft electronic equipment. Current technology, low power, microelectronic circuits, for example, are particularly vulnerable to lightning induced current surges. New aircraft employ these circuits in many critical systems such as flight controls, electrical power distribution and weapons management consoles.

Electromagnetic coupling is made easier through the increased use of nonmetallic or composite structures. Without the protection of a metallic exterior acting as a "Faraday Cage," lightning is easily permitted to enter the aircraft interior.

Aircraft fuel systems are also vulnerable to lightning. In a recent transport mishap, a lightning melt-through on the wing caused a main fuel tank to explode — destroying the aircraft. Fuel vent systems present the problem of protecting fuel effluents from lightning ignition as they leave the aricraft. It is also difficult to devise flame arrestors which can deal effectively with high-speed flame propagation in the vent ducts.

The chart shows statistics for the period 1 January 1977 to 30 April 1979, which give some idea of the relative expense associated with in-flight lightning damage:

Aircraft	No of Strikes	Dollar Loss	Cost Per Flying Hour
F/FB-111A	15*	15,445,092	77.08
C-130E	35*	3,667,298	4.58
KC-135Q	14**	332,592	.53
F-4	19	116,420	.12
T-39	3	7,914	.03
C-141	4	1,109	.0016
C-5	1	6,180	.05
A-7	3	—	—

*(1 destroyed)
**(1 Class A)

Several locations on an aircraft are prominently susceptible to lightning strikes; the wing tips and ailerons, antennas, vertical stabilizers, and nose radomes. Although it seems incongruous that nonconductive radomes should be struck by lightning, these strikes occur because metallic components beneath the radome send out streamers which meet an approaching stepped leader. If the strike intensity is sufficient to explode the air within, the radome can be severely damaged.

Antennas often provide the means for lightning to enter the cabin, endangering personnel and equipment. Lightning arrestors built into the antenna system are a typical means of protection from this hazard. With aircraft flight controls the problem is one of current transfer between fixed and removable surfaces. Bonding jumpers can be installed to facilitate this transfer. Control surfaces should be carefully inspected if they were possibly struck by lightning.

Another by-product of a lightning strike is magnetism. Because of the intense field associated with lightning, ferrous metals on the aircraft become magnetized. Of particular concern regarding this effect are magnetic compasses. Following a strike, ferrous metal components should be checked for magnetic effects and if appropriate, degaussed to remove them.

Reducing the risk of a lightning strike is a difficult prospect for today's aviator, particularly in a tightly controlled air traffic environment. While improvements in aircraft design and construction increase their resistance to strikes, the key to safety continues to be lightning avoidance through knowledge of the hazard, resourceful planning, and timely alternatives. ■

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THE PROFESSIONAL APPROACH

Air Force Communications Service
Scott AFB, IL

■ Aircrew members have noted that some DOD FLIP En Route Supplements have become unmanageable in flight due to the thickness of the product. One of the primary reasons for this unwelcome growth is that many aerodrome remarks normally designed to depict pertinent data required for en route use have become lengthy with miscellaneous information. Furthermore, the continued growth has resulted in yearly budget increases in the production, printing, binding, and transportation of the products.

In FY 79 the DOD FLIP budget was over $7 million dollars, and with the increased cost of paper and printing, this figure could rise even higher if FLIP managers at all levels do not take steps to reduce costs. There is a program underway to reduce the size of the US IFR Supplement. HQ USAF/XOOTF has directed HQ AFCS/FFOS to review the aerodrome remarks for each CONUS Air Force and Air National Guard activity for the purpose of retaining data pertinent for inflight, enroute use and remove data which does not meet the established criteria that appears in the legend of IFR Supplement-US, page 8.

Some of the information to be removed can be classified as "Flight Planning" information and will be relocated in AP/1, AP/2 or AP/3 under a new entry title "Supplementary Aerodrome Remarks." Specifically, this additional entry will accommodate the supplementary aerodrome remarks, as well as flight hazards and route and areas restrictions applicable to the aerodrome. This combination will relieve the planning data for that aerodrome.

The entries titled "Flight Hazards" and "Routes and Area Restrictions" will be retained to accommodate areas not affiliated with an aerodrome, e.g., "Lake Mattamuskeet and Pungo Lake" on page 3-15 AP/1.

There are steps we can take to decrease the cost of FLIPs:

1. At the base level, FLIP users can periodically review their requirement to ensure they are not ordering more products than they actually need.

2. All agencies authorized to submit inputs for inclusion in FLIP products should take a hard look to ensure the information is actually needed for operational use, and the information not required for flight planning or en route use, labeled as "nice to know," is not included in the requests.

Other FLIP improvement programs are underway. Emphasis will be on flight safety and costs savings. You can be assured the quality of pertinent information will not be sacrificed; however, it is the responsibility of the aircrew member to know where to look for appropriate information. In short, don't forget to check the General and Area Planning publications before jumping off into the blue.

In the past, several units have had problems receiving their FLIP products on time. In addition, some have had problems receiving the correct number. If you are not receiving the correct number of publications or receiving them late, check with your local FLIP account manager to verify you are on correct distribution. If this does not provide any solutions, have your FLIP manager notify DMAAC/GADMS, St Louis, MO, by message or telephone AUTOVON 693-8387 or commercial 314-263-8387 ■

OPS topics

Traffic Info

■ A recent HATR addressed the requirement for air traffic controllers to issue traffic advisories. A review may be in order. The issuance of traffic information is an additional service on the part of the controller. The air traffic control handbook instructs controllers, "Provide additional services to the extent possible contingent only upon your capability to fit it into the performance of higher priority duties. . . . The provision of additional services is not optional on the part of the controller, but rather is required, when the work situation permits." Remember, controllers have complete discretion for determining if they are able to provide or continue to provide the service in each case. Their reason not to provide a service in a particular case is not subject to question by the pilot and need not be made known to him. – Maj Joseph R. Yadouga, Directorate of Aerospace Safety.

Air Force Chief of Staff General Lew Allen, Jr., presents the Cheney Award for heroism to Captain Christopher C. Soto in a Pentagon ceremony. (U.S. Air Force photo)

Cheney Award

Captain Christopher C. Soto, an EWO in the 35th Tactical Fighter Wing, George AFB, CA, has received the Cheney Award for heroism. The award was based on Captain Soto's action in pulling his pilot to safety after their F-105G crashed on takeoff. Captain Soto had escaped when he saw the pilot was trapped in the burning aircraft. He rushed back, opened the canopy and assisted the pilot to safety.

Aero Club Mishap

Pilots of military aircraft flying high speed, low-level missions are not the only ones fooled by rising terrain. An aero clubber was a recent victim. While on a cross-country, in mountains with rising terrain, the pilot did not realize that the ground was rising faster than the aircraft. The application of full power could not provide enough gain in altitude so the pilot landed in an open area. The landing was successful until the nose wheel dug into mud and the aircraft flipped onto its back. Both the pilot and his passenger escaped uninjured and probably much wiser.

Up And Out—Fast!

How well do you know your emergency ground egress procedures? Have you switched aircraft types or ejection seats lately? If your aircraft caught fire on the ground today, could you get out safely in minimum time?

All are simple questions that should be easy to answer, but be honest – it's your life! Each year approximately 25 aircrew members are faced with an emergency ground egress situation. Most of them are successful in evading serious injury, but occasionally the heat and flames have caused individuals to revert to old habit patterns, and the results have been fatal. Do you have your current procedures down cold? Do you actively practice them? If so, you are upping your chances, of surviving and escaping an aircraft fire – Maj Wm Harrison, Directorate of Aerospace Safety.

OPS topics

continued

Canyons Have Cables

Canyons seem to have a fascination for most people. That's fine – unless that fascination leads a pilot down the garden path to destruction.

Just such a tragedy occurred recently when a young pilot flew his aircraft into a canyon and struck a pair of heavy cables spanning the canyon. As has been demonstrated countless times – with both military and civilain aircraft – in a tangle with large cables the aircraft will always lose. In this case, the pilot went in with the airplane. No use moralizing. He made a bad bet and paid the supreme price for losing.

Lightning

F-111 mishap aircraft was on the wing after takeoff. Passing 6,000', the flight entered clouds, and number 2 received a severe lightning strike to the radome. The crew had some erroneous airspeed indications but hung in there and landed at an alternate on the wing. Good job! It's still that time of year.

Near Hit

A recent near miss emphasizes that even a vigilant crew might not see another aircraft in its vicinity.

An RF number one on final spotted a light aircraft nearby and warned number two. Two turned final, but the crew did not see the light plane until they rolled level. There he was – about 300 feet away. The aircraft had violated the base control zone by crossing the final approach at 2,500 feet.

Watch That Leak!

About the halfway point of an overwater leg, the loadmaster found a pool of hydraulic fluid under some aircraft start carts. Aircraft continued on to destination and carts were downloaded. No leak could be specifically located, even after everything sat on the ramp for 3 days. Climbs, descents or pressure changes could cause some phantom leaks! Good case for extra vigilance over cargo in flight!

Ejection Seat "Safe"

When the pilot pulled the pin prior to takeoff, he noticed he had the flag – the T-handle – and what appeared to be the pin; however, close scrutiny revealed that the pin was just the insert and that the outer sleeve had remained in the seat. Under this condition, the seat was still safed and would not have fired during an ejection attempt.

Finding: The pin had been in use for an undetermined length of time and apparently the outer sleeve had failed inside the T-handle due to fatigue.

Lesson: A positive visual check of all safety pin removals increases the probability of a successful emergency ejection. – Capt Mike Fowler, Directorate of Aerospace Safety.

Dropped Objects

We've noticed a few messages regarding dropped objects. This may be a good opportunity to think about the procedures involved. Supervisors – do the throttle-benders know "who, what, when and where" if something falls off their machine while airborne? Check it out!

NEWS FOR CREWS continued from page 12

extended due to one or more of the considerations mentioned above.

For those of you currently in rated duties who have interest in supplement opportunities, between now and the end of FY80, we need approximately 300 rated officers in the following areas: aircraft maintenance, munitions maintenance, field training detachment commanders, acquisition program management, development engineering, research and analysis, civil engineering and instructor or staff duty at Officer Training School, Squadron Officer School, Air Command and Staff College, Air War College, Reserve Officer Training Corps detachments, and the Air Force Academy. If you have qualifications and interest for assignments to any of these areas, give us a call — if you can be released, there's still plenty of opportunity and a variety of jobs available.

In summary, the supplement will be reduced in size considerably over the next few years to meet Air Force operational commitments. This drawdown will affect the future assignments and career development patterns of many rated officers. We're working this drawdown on an individual basis to maintain the optimum balance between the needs of the Air Force and the desires of the individual involved. At the same time, ample opportunities for career development in selected supplement areas will continue to be available for those who are releasable, qualified, and interested. ■

ABOUT THE AUTHOR

Captain Randy Lupolt has been assigned to the Air Force Manpower and Personnel Center as an action officer in the Rated Officer Career Management Branch since January 1977. After graduation from Wittenberg University, Captain Lupolt flew as a B-52 radar navigator at Fairchild AFB and Anderson AFB, Guam. ■

Sit Down or Press On?

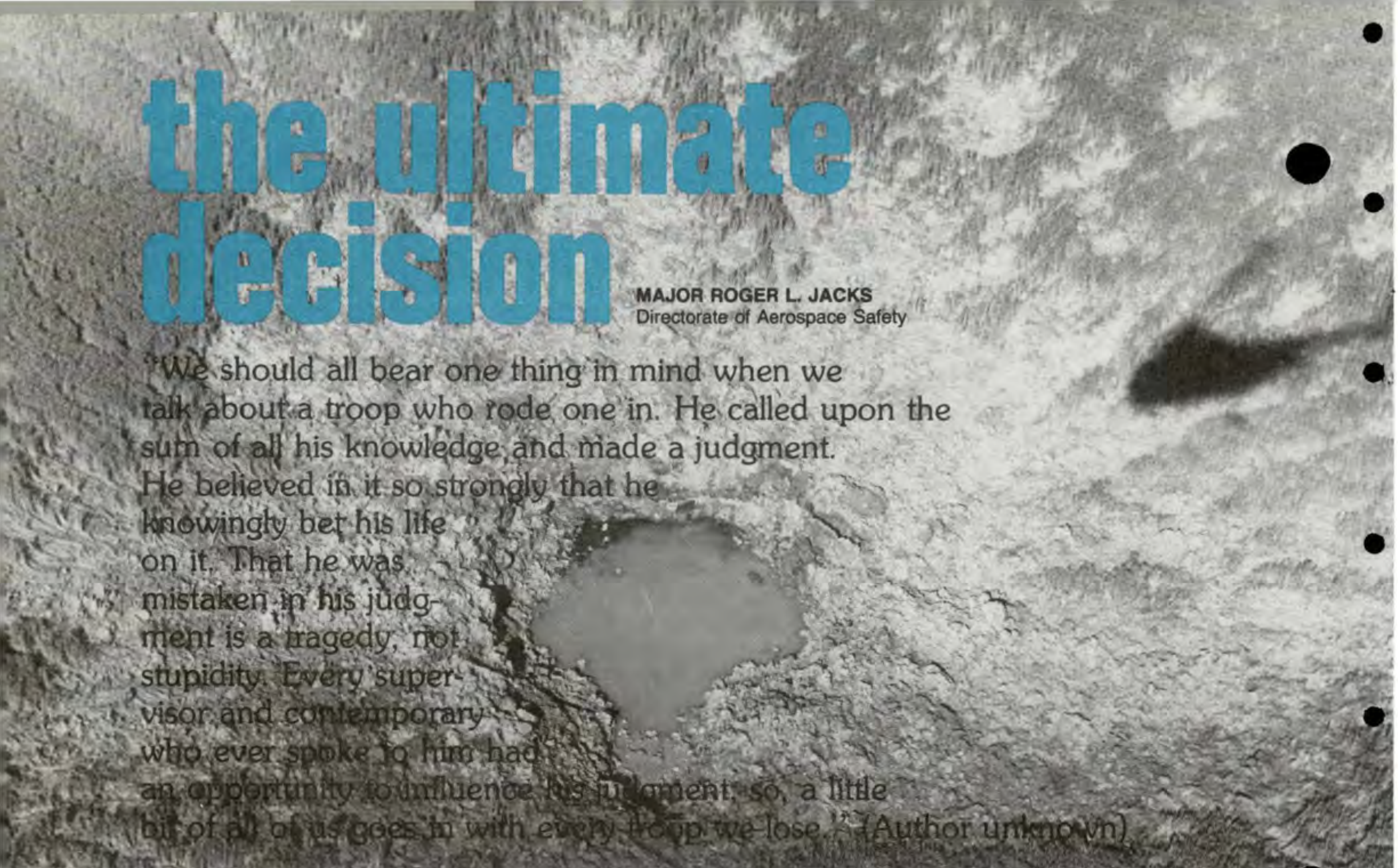
■ While in contact with approach control, the helicopter crew was informed that the weather forecast was not holding up and that conditions were deteriorating rapidly due to a fast moving cold front. Nine miles from the airport, the pilot requested radar vectors, and, at 6 miles, he decided that he could not stay clear of clouds and make the field. He maintained VFR, informed the tower of his intentions, and landed in an open area before the storm passed, 45 minutes later, the crew took off and continued on their way.

■ The flight of two helicopters was an IFR departure from a cross-country refueling point. Five miles southwest of the airport they were instructed to proceed on course and asked by Center if they were IFR or VFR. The lead replied, "VFR." The flight was then observed on radar to descend from 2300 feet MSL to 1100 feet MSL, which placed them approximately 300 feet AGL. Sometime later the helos were observed to be about 10 and 35 feet above the trees, respectively, trying to fly VFR in IMC. Within 2 miles, the lead flew into the side of a cliff, without altering course or attitude. Everyone aboard was killed. The wingman attempted to turn away but stuck his tail rotor in the trees. The crew chief was killed.

These are actual examples. No elaboration is needed. Helicopters have the unique capability to land in any clear area. However, since we are all-weather pilots with all-weather aircraft, too often we have been reluctant to exercise this option. Trying to maintain VFR flight, in conditions which are not suitable, has cost many lives and helicopters over the years. There is no rational reason for staying in the air when you can't see anything and are not flying IFR. In fact, it's quite stupid. — Courtesy USN *Weekly Summary*. ■

F-102 Pilots

A reunion is planned for November 9th and 10th at Sheppard AFB, TX, in conjunction with dedication of a pedestal mounted F-102 aircraft. Anyone interested contact: Col John M. Franklin, 4300 Shady Lane, Wichita Falls, TX 76309, phone (817) 692-6081.



the ultimate decision

MAJOR ROGER L. JACKS
Directorate of Aerospace Safety

"We should all bear one thing in mind when we talk about a troop who rode one in. He called upon the sum of all his knowledge and made a judgment. He believed in it so strongly that he knowingly bet his life on it. That he was mistaken in his judgment is a tragedy, not stupidity. Every supervisor and contemporary who ever spoke to him had an opportunity to influence his judgment, so, a little bit of all of us goes in with every troop we lose." (Author unknown)

■ We've been losing our friends and fellow fliers at an alarming rate. As of June this year, our aircrew fatality rate represented the worst loss of life per 100,000 hours of flying time since 1959. The frustrating aspect of this grim statistic is that there is no readily apparent solution. We know most of the mishaps are human factor related. Material failures are at a comparable rate with previous years; but human factor mishaps are going wild.

I have heard a lot of reasons given for the high fatality rate, such things as inexperienced crews, a lack of qualified instructors, mass exodus of pilots, poor and/or inexperienced supervision, too many additional duties, poor scheduling, inadequate training, not enough flying time, more demanding missions, crew overloading and realistic training scenarios such as Red Flag. A lot of these are valid problems and staff agencies at all levels of the Air Force are actively seeking a solution. But let's discuss some things the crew member can do now to raise the odds against being "a troop who rode one in."

In anything we try, attitude, knowledge and ability are the key factors. The flying game is no exception. Attitude (or motivation) is probably the most important factor, followed by knowledge and ability which we can translate into experience. During a typical tour in a weapon system, a crew member's motivation and experience levels usually demonstrate some dynamic changes. During initial checkout, one studies hard to learn the new job. Although experience level is low, motivation is high. By the time he is operationally qualified, his confidence factor is high and he is quite capable of handling the basic mission and straightforward emergencies. His experience level, however, is still relatively low. A prudent crew member in this situation would be aggressive while keeping in mind his limited experience.

It's easy to overextend yourself when you're trying to establish yourself as a top notch crew member. To be the best, we must be aggressive, but also realistic about our abilities and use our judgment and common sense to keep a check on runaway pride or an inflating ego.

After a couple of years experience, it's easy to look back on those earlier days and realize just how limited our skill level really was during that initial qualification period.

Most of us are at our best during the two-to-five year period. Experience levels are high and so is motivation as crew members in this bracket are competing for instructor

Training missions are successful only if they produce mission-ready aircraft and crews. Smoking craters do neither, not to mention the most important aspect — the loss of our friends and fellow fliers.

slots, flight leads, standboard and other leadership positions. After the four-or-five year point, however, some crew members' motivation may begin deteriorating and complacency may start to show its ugly head. It is easy at this point to take on an attitude that all of the experiences of an old head will get a guy through a future sticky situation. Will it? Don't bet your life on it!

Each year we have mishaps where an old faithful work horse manages to dazzle the crew by providing them a mind boggling, hair raising experience. It always amazes me that an aircraft can be in the inventory for 10 years or better and we still discover things about the system we didn't know. Often it takes a new, inquisitive guy checking out in the aircraft to discover the oddity; or, sometimes it unfortunately takes a costly mishap. Lip service to studying aircraft procedures won't hack it. No matter how much time one has in an aircraft, it's essential to routinely hit the books!

After studying the dash one and, in particular, the emergency procedures, it's smart to sit back and think about making that decision on when to abandon the aircraft. Mentally review possible egress situations and how procedures change as the aircraft transitions from one flight profile to another. Take a look at decision timing when pitted against absolute altitude, airspeeds, sink rates, vertical velocities and bank angles. In our new aircraft we have the best escape systems ever and yet far too many crews are not getting out. Why?

The answer may be linked to the mission. Tactics have dictated edge of the performance envelope maneuvering as well as extremely low flight profiles. With tactics such as these, the new escape systems are not as reassuring. Edge of the envelope ejections with seconds to make key life-saving decisions become overriding factors.

Under these circumstances, we need a good game plan to ensure survival. It's easy to develop tunnel vision and focus all of our attention on saving an aircraft that, in reality, is an impossible task. Situational awareness, along with a game plan that dictates a cut-off point where saving the aircraft is abandoned and saving ol' Ish becomes paramount, is essential. In a multiposition aircraft, it is important that the crew get together and discuss aircraft egress decisions.

Thorough, proper training is all important. In these days of limited budgets and minimum flying hours, last minute pencil whipping of quarterly requirements doesn't get it. We have to get all the practice we can and make every effort to get the training in a timely recurring fashion (event scheduling). If the scheduling system doesn't work the way that it should, we need to tell the squadron and wing chain of command. We can't settle for inadequate and poorly timed training. With the emphasis on realistic exercises, such as Red Flag, we can't afford to short change ourselves.

Especially for the newer troops: don't intentionally exceed your ability in an effort to save your pride or feed your ego. In a training environment it's better to "live to fight another day." Training missions should be used as learning tools, not as a life or death battle.

I'm not telling you to scuttle the mission for safety. I am saying that training missions are just that, training! It's easy to get carried away and attach tremendous importance to the mission. Sure, training missions are important but for different reasons than mission accomplishment, no matter what. They are for practicing, for developing experienced crews (old heads if you will), for checking out aircraft and systems and determining system reliabilities.

Training missions are successful only if they produce mission-ready aircraft and crews. Smoking craters do neither, not to mention the most important aspect — the loss of our friends and fellow fliers. ■

SURVIVAL Survival Equipment
(OPEN WATER ENVIRONMENT)

TSGT CHARLES W. LOVELADY
Operations & Requirements Branch
3636th Combat Crew Training Wing
Fairchild AFB, WA

Recently, we received a phone call from a captain stationed at Barksdale AFB, LA, congratulating us on the articles appearing in this magazine. During the course of our conversation, the topic of sea survival arose and the captain asked about the possibility of our doing an article on equipment for *Aerospace Safety*. Well, captain, here goes it.

■ The chances for overwater emergencies are high considering that four-fifths of the earth's surface is covered by water! And experience tells us that some aircrew members will succumb needlessly to the hands of the open seas. In order to give you a better handle on some sea survival tidbits, let's review some of the primary pieces of equipment that can save an aircrew member's life.

One primary piece of equipment is the life preserver. There are two basic types in the Air Force inventory and both are actuated in the same manner. The primary difference is that one has a harness of its own, while the other is attached directly to parachute harness by zippers and tie strings. To properly fit the life preserver, put it on like a coat or vest (see Figure 2). Adjust the flotation cell container so it is as high as possible under the armpit and still comfortable. The waist strap should be adjusted to fit snugly. If you are unsure as to which type of life preserver you have or have questions concerning proper adjustment, don't hesitate to ask your local life support people. At this point you should ask yourself: "Do I know how to inflate the preserver?" Remember, you are provided the best possible equipment; however, it does you no good if it isn't used properly.

The next piece of equipment is the raft, of which there are currently four basic types in the Air Force inventory: one, seven, twenty, and twenty-five man.

The primary raft for ejection seat type aircraft is the one-man. There are four variations of this raft (see Figure 3). The newer version incorporates an inflatable spray shield and floor which provide protection from the elements.

The raft for multi-place aircraft will either be the seven, twenty or twenty-five man raft. The accessory kits aboard these rafts will contain a variety of survival equipment. T.O. 14S1-3-51 outlines the mandatory equipment that will be packed in the kits. Local units may add additional items to the accessory kits dependent upon the mission requirements.

Do you remember how to board

FIGURE 1

FIGURE 2

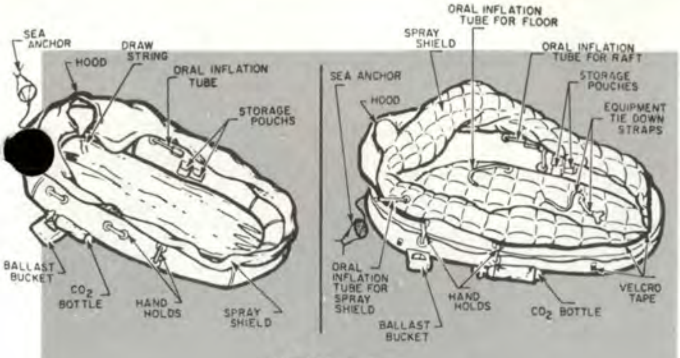


FIGURE 3

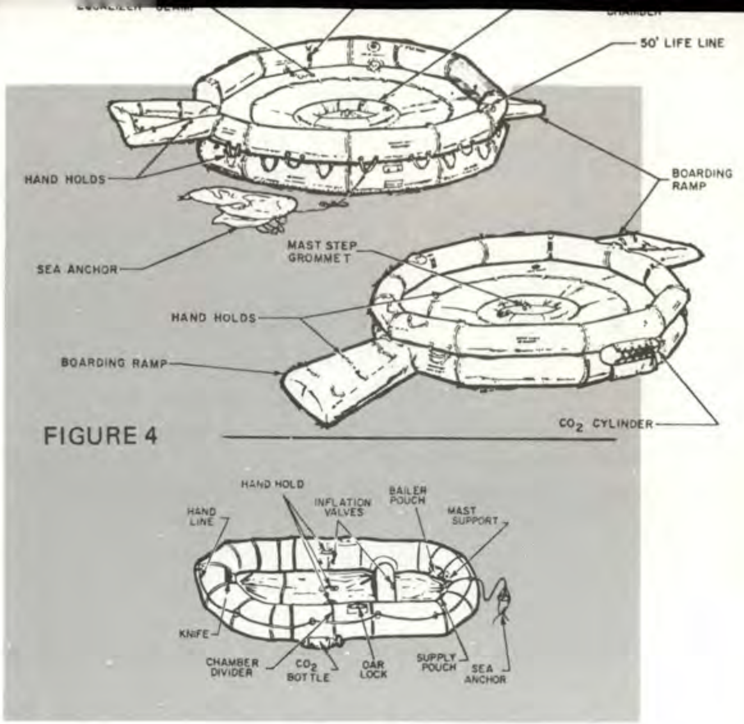


FIGURE 4

these rafts? If not, be sure to check with your local life support personnel. Your life may depend on it.

Perhaps the greatest single threat to survival at sea is exposure, which accounts for the greatest number of fatalities. Figure 5 indicates how long the average crew member could expect to survive in the water wearing only a flight suit. Wearing of an anti-exposure suit doubles the survivor's life expectancy. The suit is designed to protect the wearer while immersed in cold water and from wind, spray, and rain when adrift in a raft. Be sure to check the suit for proper fit to include water tightness.

After climbing safely aboard your raft, other problems of basic survival begin, problems of food, water, shelter, etc. Sea survival is unique; water everywhere but none to drink. True, there is a shortage of potable water; however, you will find some canned water in the raft accessory kits for immediate use and some devices that may be used to procure drinkable water during your stay in the raft. These devices are the solar still and the desalter kit. Instructions for using these devices are provided in the kit. One word of advice: no matter how thirsty you are, *never drink sea water!* If you do, dehydration and/or an electrolyte imbalance of body fluids could occur and cause death.

The aircrew member who is thoroughly familiar with the principles of survival and the life support equipment provided for his use is more likely to survive in an emergency. ■

Time of life expectancy in water with no exposure suit

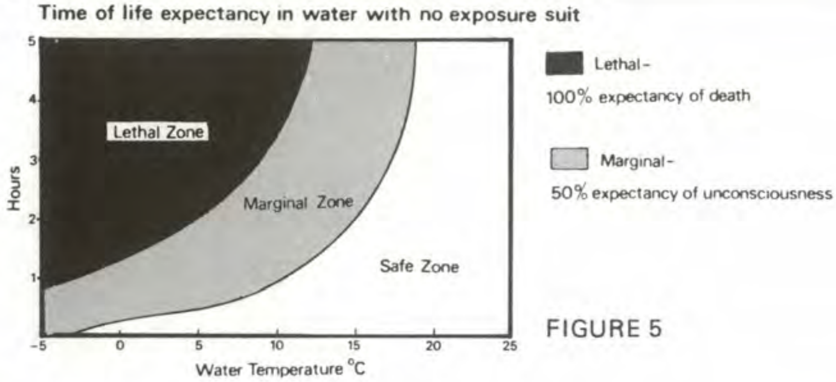


FIGURE 5

CAN YOU PASS THIS TEST?

1. What survival equipment is carried aboard my aircraft?

2. Where is the equipment located?

3. How is it deployed?

4. If the equipment malfunctions, how do I correct it? If you're not sure about the answers to any of these questions, check with your life support personnel.

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MAIL & MISCELLANEOUS

TWO "OLD PRO'S"

■ "Friday the 13th" (of April 1979) was anything but an unlucky day for Lieutenant Colonel Doyle D. Baker, Assistant Director of Operations of the 343rd Tactical Fighter Group at Elmendorf AFB, Alaska. On that day, he flew his 4000th hour in an F-4.

Colonel Baker started flying F-4s in the early 1960's as a U.S. Marine pilot at MCAS El Toro, California. He was to fly 75 combat missions from Da Nang AB, Vietnam, but it was exchange duty with the Air Force in 1966 which proved to be the turning point in his career. Assigned to the 16th TFS, he returned to combat duty at Udorn RTAB, Thailand. Here his combat mision totals went over 220, with some 100 over North Vietnam. On 16 December 1967, he became the first Marine pilot to down an enemy MIG-17 in aerial combat. In September 1969, the colonel made an interservice transfer to the Air Force and has since enjoyed a career as distinguished as his earlier Marine Corps service.

During this historic flight, there were actually two "Old Pro's" in the air—Colonel Baker and F-4E 67-208. The officer's military career began in 1961, the airplane's in 1968. On the flight in which the colonel passed 4000 hours, the airplane passed 5000.
—Adapted from *Product Support Digest,* Vol 26, No 3, 1979, McDonnell Aircraft Company.

MARIJUANA (*Aerospace Safety,* May 1979)

Mr. Stanton, publisher of *Executive Health*, informed me he gave permission for my late husband's article on marijuana, to be reprinted in *Aerospace*. I am delighted as such information needs exposure.

Our book *Sensual Drugs: Deprivation and Rehabilitation of the Mind* was reviewed by Dr. Powell in the second half of the *Executive Health* article which wasn't printed in *Aerospace*. It is an especially informative book and the only one of its kind. It grew out of ten years of Dr. Jones' experience in presenting the facts about psychoactive drugs to undergraduates at the University of California, Berkeley. It is a good source for the layman and student on the effects of marijuana (and other psychoactive drugs) on the brain and the body.

Thank you again for your interest in the marijuana problem and the reprinting of Dr. Jones' article in *Aerospace.*

Helen C. Jones
2315 Durant Avenue
Berkeley, CA 94705

THE LIFE YOU SAVE . . .

We strive for involvement in our Flying Safety meetings. For this reason we requested that members of the 74th Aeromedical Evacuation Squadron provide a demonstration of the Heimlich Method, Anti-Choking Maneuver at one of our meetings. An explanation of the basic maneuver and its proper execution was followed by a question and answer period. Few of us present thought we've ever be tested on the subject matter.

On Friday evening, March 30, 1979, members of the 901st Aerial Port Squadron were seated on a C-130 as it started engines in preparation for a weekend UTA deployment to Pope AFB, NC. One of these members, TSgt Garth O. Parker, was finishing up a submarine sandwich prior to departure. Without warning, Sgt Parker suddenly lost his ability to breathe as a portion of the sandwich lodged in his throat. The sounds of Sgt Parker gasping for air could be heard over the roar of the C-130 engines. TSgt Ronald Ploof, seated next to Sgt Parker, responded immediately to the crisis. He applied the Heimlich maneuver three successive times without success. On the fourth attempt he dislodged the sandwich and Sgt Parker once again had a ready source of air.

Had Sgt Ploof received special lifesaving training that allowed him to act so quickly? No! He had seen the Heimlich Method demonstrated twice previously, but one of those occasions was two months prior, at the monthly Flying Safety Meeting. His magnificent response to a critical emergency reflects great credit upon himself. But it also demonstrates, quite emphatically, the benefits of effective training programs. Our hats are off to TSgt Ron Ploof for his life-saving effort and to Capt Harris and Lt Riccio, 74AES, for a class well taught.

Robert T. Martens, Capt, USAFR
Flying Safety Officer
439th Tactical Airlift Wing (AFRES)
Westover AFB, MA ■

☆U.S. Government Printing Office: 1979—683-011/11

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
Stephen C. Gillette

CAPTAIN
James W. Delk

307th Tactical Fighter Squadron
Homestead Air Force Base, Florida

■ On 29 November 1978 Captain Gillette and Lieutenant Delk were leading a two-ship ground attack mission in an F-4E aircraft. During target egress at 500 feet, the aircraft hit a turkey vulture which penetrated the left windscreen quarter panel. As a result of impact forces on the emergency canopy jettison handle, the front canopy was jettisoned. High speed windblast prevented intercockpit and radio communications, so the crew followed their prebriefed procedures by climbing and decelerating to allow cockpit communication. Once they determined that neither was injured and they had positive control of the aircraft, an assessment of damage was made. The front cockpit instrument panel was torn from its mounts on the left side and rotated 20 degrees toward Captain Gillette. Numerous instruments were broken and others dislodged. A join-up was made with nr 2, and Captain Gillette decided to land at Avon Park Auxiliary Airfield. Then the UHF radio control head in the rear cockpit began smoldering due to shorted electrical connections, forcing the crew to turn off the radio. By visual signals, they related to the wingman their intentions for recovery, by arresting gear, on the 5,400 foot runway. An aircraft controllability check was made in the landing configuration and flight control response was found to be satisfactory. Captain Gillette relinquished the lead of the flight to his wingman and flew formation on the nr 2 aircraft until touchdown. He was able to check runway alignment during the approach by looking through the hole in the left windscreen. The arresting gear was successfully engaged and the crew egressed the aircraft without further incident. Captain Gillette and Lieutenant Delk averted possible injury to themselves and the loss of a valuable aircraft by their prompt, professional actions. WELL DONE! ■

Above all else, remember

To put that bomb on the target
Lay that pallet on the spot
Complete that low-level in weather
You must---

Fly the airplane All the time