flying

SAFETY

JUNE 1987

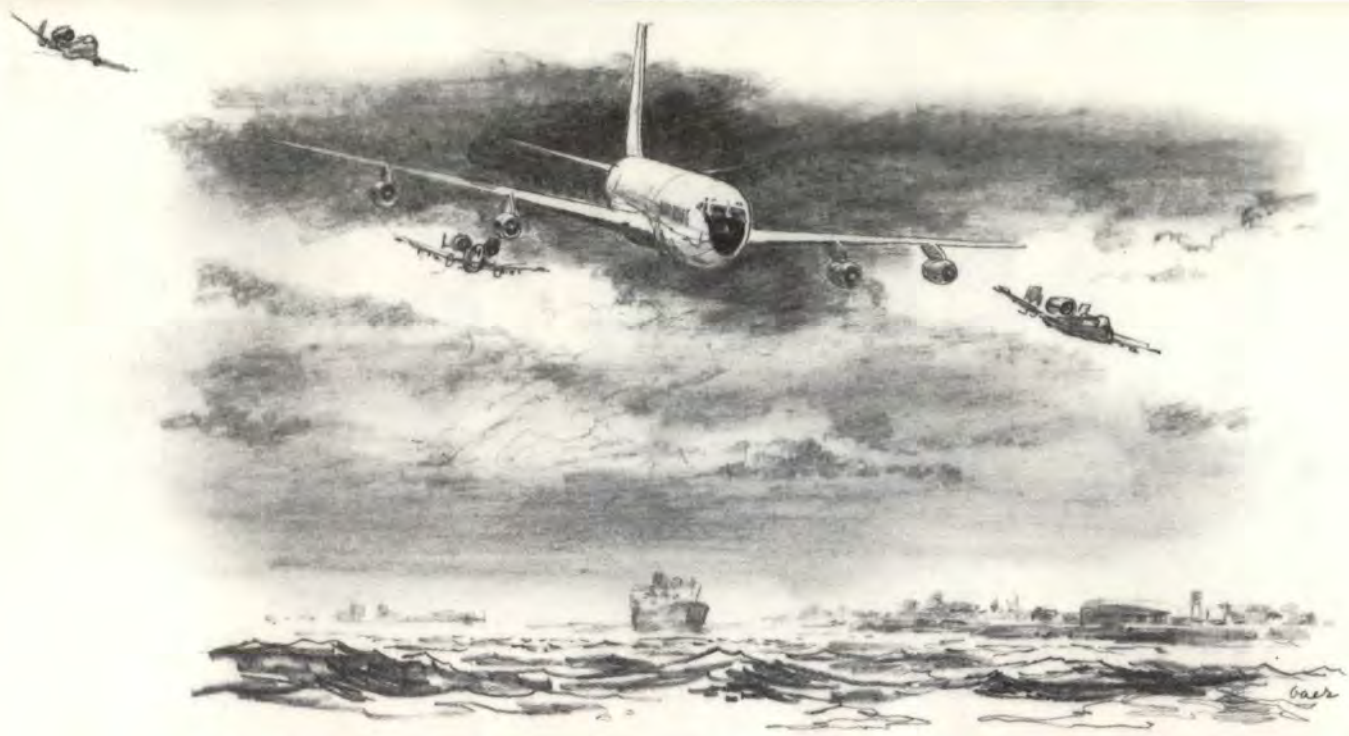
MIDAIR COLLISIONS

Keep Out of the Dirt

Thunderstorm/Heat Stress

The Right Move

AIRLIFT RODEO '87



THERE I WAS

■ We were scheduled for a Saturday morning air refueling mission followed by a flyby, with our receivers in tow, at a small coastal airport. Our normal crew of four was augmented by an extra copilot who was occupying the jump seat.

The rendezvous and refueling with three A-10 receivers were completed without incident. The game plan was to have a receiver on each wing and one in the precontact position for the flyby.

We received a handoff from center to a radar facility at a naval air field about 50 nm from our destination airport. Vectors to a VOR approach were provided. From the time we were handed off, it was a struggle to stay close enough to the power curve to even see it, let alone stay ahead of it.

The vectors we received brought us in very close to the airport, and by the time we intercepted the final course and were descending, we were very high and in the clouds. It was about this time the extra copilot contacted the airport on the Unicom. We were informed we were the highlight of the airshow because of numerous cancellations due to the weather which was currently marginal VFR.

When we finally reached 1,000 feet AGL, we were overhead the airport and just below the bottom of a very ragged cloud deck, not exactly what you would call the highlight of an airshow. The pilot decided to bring the flight back around VFR and do another flyby. All this time, the extra copilot was giving a spiel to the crowd below about the KC-135, the A-10, and the units and crews involved.

In the meantime, the pilot and copilot were straining to keep the airport in sight as it passed our 3 o'clock position as we skirted the bottom of the clouds. The boom operator had positioned himself in the boom pod prior to the first approach. From the navigator's seat, I had a good view of what was going on. As the extra copilot continued to talk on Unicom, I noticed we were beginning to lose altitude rather rapidly as the pilot leaned forward in an effort to keep the airport in sight.

Passing through 700 feet, I called "watch your altitude" over the interphone but was not heard by the pilot over the dissertation coming from the jump seat. The next thing I knew we were passing 500 feet in a nose down, 30-degree bank turn. All I could see was water out the front windscreen. I screamed over the call position "altitude" and thought I was going to die.

Immediately, the pilot pulled his head back into the cockpit, leveled the aircraft, and started a climb. Meekly, he asked the copilot and boom operator if we still had wingmen. Fortunately, we did.

As we passed over the airport and were thanked for the dazzling performance, the airshow seemed pretty unimportant. ■

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SPECIAL FEATURES

REGULAR FEATURES

DEPARTMENT OF THE AIR FORCE • THE INSPECTOR GENERAL, USAF

MIDAIR COLLISIONS

MAJOR MARTIN V. HILL
Directorate of Aerospace Safety

■ Midair collisions have already claimed their first victims for 1987, both in military and civilian aviation. The risk of midairs has been with us since the beginning of flying, and due to their suddenness and generally lethal results, they hold a special place in every pilot's nightmares.

The Risk

Although everyone who flies is at risk by nature of being airborne, the nature of that risk varies greatly depending on who you are. The FAA tells us 80 percent of all general aviation midairs occur within 5 miles of an uncontrolled airport, below 5,000 feet AGL, and usually on short final for landing. Similarly, the airlines and other commercial carriers have their greatest statistical risk, as measured by their near miss rate, in the arrival or climb phases below 10,000 feet AGL, and the vast majority occur between the months of May and September and between noon and 3 p.m. local time. Still, the industry calculates the historical average of actual midair collisions is one every 7 years.

However, the Air Force fighter/recce/attack community had seven midairs last year alone. If we apply the same mishap forecasting techniques used for other general mishap types, we can predict six reportable midair incidents involving actual physical contact in 1987 for this community alone. The greatest risk here by far is from another fighter, either a wingman or known adversary in the tactical training area.

This does not mean Air Force nonfighter types are not at risk; however, their experience tends to parallel that of the major carriers. It is the tactical Air Force (TAF) that has the largest USAF midair mishap rate every year, and for reasons unique to itself and its missions. In 1983 and 1986, the Air Force recorded its two worst years for midairs. All incidents involved fighter/recce/attack aircraft and no one else. Let's examine this mishap experience in more detail.

A lot has been written and said about fighter midairs lately, and the idea of this article is not to mesmerize you with another set of numbers. However, the first step in safely dealing with a risk is understanding the true nature of the threat. With this in mind, we will look at the TAF midair experience since 1981.

TAF Midairs

We have had 35 total reported midairs (Class A, B, C, or HAP) in this timeframe. We decided to look at them all, because often the difference between an aircraft destroyed (Class A) and just a clipped wingtip (Class C) is only a few feet and a heartbeat or two.

The first lesson stands out right away. Of all these midairs, only four (11 percent) involved collisions between fighters and civilian aircraft in the air traffic control (ATC) en-

vironment or nontactical circumstances. All the rest (89 percent), with one exception, have occurred where a fighter hit another fighter, either in tactical maneuvering or routine formation work. The one exception is where the fighter collided with its civilian target during an active air defense intercept.

Of this 89 percent, or 31 total occurrences, 19 happened during the tactical portion of the mission. In 14 of these, the collision was with the target or a member of the adversary element, and in 5, members of the same element collided while engaged or reacting to an air or ground threat. The other 12 occurred in the administrative phases of formation flight, such as rejoins, battle damage checks, and the like.

While the fighter/recce/attack aircraft experience more midair collisions than other types, no aircraft is immune.

Lessons Learned

A quick analysis of these numbers reveals several interesting points. The first lesson, which has already been mentioned, is putting the proper emphasis on where the risk truly is for the fighter/recce/attack pilot. At flying safety meetings over the years, most pilots have dwelled on the risks of midairs in the traffic pattern, with approach control, or on an instrument approach. There is a risk, but by far the greatest danger is from each other out in the area and not some stranger in the traffic pattern.

The second lesson is in the largest subcategory (almost 50 percent of the total) where the fighter hits somebody he is attacking, such as in BFM, or a member of the adversary element. Common elements appear to be: Not acquiring the bandit (failure to clear flightpath), losing sight in the final stages of attack (failure to ensure diverging flightpaths if sight is lost), and fixating on one aircraft to the exclusion of all others (lack of situational awareness, or S/A).

The last lesson is contained in the disappointingly large number of mishaps that occur due to failure to perform the basic skills of formation flying (12 of 35, or 34 percent). Poor interior and exterior lighting and flight lead technique play a role here, but the real reasons are the same killers as in so many other mishaps; channelized attention, distraction, and misprioritization of tasks.

Avoiding Midairs

There are no magic rules or words of advice to offer about avoiding midairs. They are an inherent risk of aviation, especially in effective and realistic air combat training. The rules of engagement (ROE) we train under appear sufficient if adhered to and their limitations properly understood.

But the prime directive should always be to ensure your flightpath is clear; be it from your target, your wingman, or anyone else who wants to occupy that small amount of airspace with you. Almost by definition, if you have a midair, it will be with someone you do *not* see or have just lost sight of and who does *not* see you. The only remedy is to look harder and more often in the critical areas of the sky you intend to use.

Two of the "contracts" we train and fight with also need emphasis. First is the mutual support contract. In the new age where bandit ordnance makes them almost as dangerous forward of the three-nine line as aft, checking your wingman's extended flightpath becomes almost as important as his deep six. An added benefit may be preventing a midair if you know what to look for and have thought about what you are going to say before you have to do it for real.

Secondly, we need to emphasize, in the engaged or support fighter contract, the responsibility for who stays out of the other's avenue of attack and when and what constitutes the switching of that responsibility. It may seem very basic, but we have had too many instances of the leader and wingman running together chasing the same bandit, which could be called the ultimate loss of mutual support.

Situational Awareness

We need to constantly evaluate

continued

MIDAIR COLLISIONS continued

and improve S/A. It is a difficult area to train, much like judgment, yet we all tend to think we know it when we see it (or vice versa). Simple, sound tactical plans adequately briefed contribute to S/A, and effective, detailed, and impartial debriefings are the best tool to evaluate it.

Modern air-to-air radars have greatly improved our ability to target and sample bandits and thus increase our S/A prior to the merge. However, this mix of hi-tech and single-seat cockpits has often increased task saturation potential and caused many pilots to be heads down in the tube when they should be looking outside.

The term "sort to the mort" is not unique to the Eagle community, and you must discipline yourself to not fixate on the radar or other in-cockpit aids. Even if you are getting your information from the head up display (HUD), you must still consciously focus your attention on effective flightpath clearing.

An interesting sidelight to this is how little we know about near misses in the tactical arena. We have tremendous amounts of near-miss data from the ATC environment through various computer generated reports and the HATR system. Using this potential midair data to constantly evaluate and improve the system is why the voluminous amount of traffic is handled as safely as it is. We have no system to preserve the hard won knowledge of this type of "close-call" in our tactical maneuvering, and we all know it happens all too frequently.

We owe it to our wingmen and future flight leaders to thoroughly dissect these near-midair instances when they happen to learn from them what part of S/A broke down and why. We need to preserve this invaluable experience through safety seminars, war stories, and other means to better train through example. Nobody likes to admit they made a mistake and scared themselves, yet by swallowing your pride and investing a little time in the "lessons learned" portion of the debrief and the next flying safety meeting, you may prevent someone else from having a tragedy.

The lucky ones get to walk away from a midair collision — others don't.

In addition, we are trying to increase awareness of the problem and encourage open discussion at a higher level than the squadron or the wing. This article is an example, and we solicit any and all comments or opinions on the subject.

The "There I Was" section at the beginning of the *Flying Safety* magazine already provides the perfect forum for anonymously telling your most memorable war story and what you learned from it. If you have an interesting piece of VTR tape or HUD film, send it along as well. We have also produced a videotape presentation of some interesting things we have in our files concerning midairs. If we can get some more data, we will produce similar products in the future. Just as awareness is the biggest key in analyzing this threat, open discussion is the biggest key in eliminating it.

This was not meant to be targeted solely at fighter types, yet in the Air Force, that is where the midair problem manifests itself. However, the lessons to be learned about situational awareness, channelized attention, and flight discipline can be applied with effect throughout aviation and regardless of weapons system.

The Bottom Line

Almost every midair mishap report contains a reference to the pilot's failure to "see and avoid" as causal. It is so commonly used, in fact, it risks losing all meaning and just becoming another de facto phrase for pilot error and hence a meaningless generalization. Yet, it is the guiding statement of where the ultimate responsibility lies for avoiding a midair collision. Adherence to the ROE should make this task easier and allow you to make a mistake without risking disaster.

Failure to see and avoid is the bottom line mistake of every midair mishap, yet see and avoid is the primary duty of every pilot and crewmember and a valuable skill in peacetime or combat. ■

THE PRICE IS WRONG

LT COL JIMMIE D. MARTIN
Editor

■ Two F-15s had been airborne for about 2 hours on an air defense mission. Everything had gone as briefed, and no problems had been encountered. As the flight was rejoining with a tanker, the wingman noticed a cycling master caution light. He then saw the oxygen quantity gauge pointer was rotating counterclockwise continuously. When the pilot performed a PRICE check, he found all his connections were good and the oxygen regulator had normal indications.

Bad Gauge It would have been very tempting at this point to say everything is OK, just a bad gauge. But, the pilot felt the oxygen pressure was less than normal. He gangloaded the regulator, but still felt the pressure was not as high as normally experienced in the "Emergency" position.

Still trying to figure out the problem, the pilot returned to normal on the regulator. He then noticed the oxygen quantity pointer had stopped rotating and now indicated 2-½ liters of oxygen remaining. Problem solved?

Not quite. Shortly thereafter, he began experiencing his personal hypoxia symptoms. Thinking he might be hyperventilating, he concentrated on controlling his rate and depth of breathing.

Hyperventilation Once again, the pilot had an opportunity to explain away the problem by saying it was hyperventilation brought on by concern over the malfunctioning oxygen quantity gauge. But, he felt his breathing was and *had been* normal, and he still felt hypoxia symptoms. He again gangloaded his oxygen regulator and checked his cabin altitude. The cabin altitude was good and matched lead's.

Come On Down The flight descended to 10,000 feet, declared an emergency, and diverted to the nearest suitable field. The pilot began to feel better during the descent, and all his hypoxia symptoms disappeared except for tingling extremities. He activated the emergency oxygen bottle and disconnected the main oxygen hose. The emergency bottle pressure was strong, but the tingling and generally "not right" feeling remained.

The remainder of the recovery was uneventful. The pilot tried emergency oxygen, normal oxygen, and mask off with no change in the symptoms. The flight surgeon met the aircraft and took the pilot to the hospital for a complete checkup. All symptoms disappeared after about 10 minutes.

The Answers Maintenance performed a complete check of all oxygen and pressurization systems. The pilot's oxygen mask, hose, and CRU-60P connector were also tested. The oxygen quantity gauge functioned normally, and they could find no explanation for the temporary in-flight failure. The only malfunction with the system was a leak from the bottom port of the oxygen regulator. This was the cause of the pilot's hypoxia.

This is a case where the pilot did the right thing. He didn't fall victim to the "mission hacking" syndrome. Even though the oxygen system seemed to check out after the initial gauge malfunction, he knew something just wasn't right. Rather than rationalizing it all away and continuing the mission, he declared an emergency and came home. Pressing on in spite of a known or suspected physiological problem is the wrong thing to do. Do what this pilot did — head for home. ■

USAF SAFETY AWARDS

for 1986

Koren Kolligian, Jr., Trophy

Colombian Trophy

SICOFAA Flight Safety Award

As part of the Air Force Safety Program, awards are presented to recognize outstanding safety acts or achievements. Each year, Flight Safety Awards are presented to those who have performed outstanding feats of airmanship, support to aircrew, or action which averted a serious mishap. The Flight Safety Award Program is very competitive and prestigious. Nominees meet very demanding criteria by their major commands and the USAF Safety Awards Board. The units and individuals selected are indeed "the best of the best." Flying Safety magazine proudly recognizes and congratulates the 1986 participants.

THE KOREN KOLLIGIAN, JR., TROPHY

The Koren Kolligian, Jr., Trophy was established in 1957 in memory of First Lieutenant Koren Kolligian, Jr., declared missing in the line of duty off the coast of California on 14 September 1955. The Kolligian family established this memorial because of Lieutenant Kolligian's great feeling for the Air Force and love of flying. The award recognizes outstanding feats of airmanship by individual aircrew members. The trophy is awarded annually to the USAF aircrew member who most successfully coped with an in-flight emergency situation during the preceding calendar year.

THE KOLLIGIAN TROPHY FOR 1986

CAPTAIN JONATHAN D. GEORGE
9th Strategic Reconnaissance Wing
Beale Air Force Base, California

Captain George was flying his very first operational mission in a U-2 aircraft from a forward operating location when his aircraft experienced a full nosedown runaway trim condition which caused the nose of the aircraft to pitch down abruptly. During the 50 minutes of descent to the recovery base, excessive control pressures were required resulting in extreme fatigue, muscle cramping, and other physiological problems related to heavy exertion while enclosed in a full pressure suit. Three times he was close to abandoning the aircraft as the agonizing physical and mental exertion took him to the limits of endurance, but he summoned the strength and courage to remain with the aircraft and made a successful landing. After landing, Captain George was literally pulled from the aircraft and taken to the flight surgeon with extreme exhaustion.

THE COLOMBIAN TROPHY

The Colombian Trophy was originally established in 1935 by the Republic of Colombia to recognize the Air Force group having the lowest aircraft mishap rate during the preceding year. The criteria originally established for the award have been modified but are in keeping with the donor's original intent to award the trophy annually for military aviation safety in a tactical organization. Today, the Colombian Trophy is awarded annually to a wing-level tactical organization for the most outstanding achievements in flight safety during the preceding calendar year.

THE COLOMBIAN TROPHY FOR 1986

81ST TACTICAL FIGHTER WING

The 81 TFW flew more than 46,850 hours and 27,950 sorties in A-10A aircraft during 1986 without experiencing a single Class A or Class B aircraft flight mishap. This achievement assumes greater significance because it is the third consecutive year without the loss of a wing pilot or aircraft. This outstanding safety record, compiled while performing a demanding close air support training mission from 22 different locations in 13 countries, attests to the professionalism of aircrews and dedication of maintenance and support personnel.

THE SICOFAA FLIGHT SAFETY AWARD

The Chiefs of the American Air Forces (CONJEFAMER) established the System of Cooperation Among the American Air Forces (SICOFAA) Flight Safety Award at their annual meeting in May 1976. The purpose of the award is to promote safety in the Air Forces of Western Hemisphere countries by recognizing flight safety accomplishments of military organizations. Each Air Force determines its own criteria and annually grants this award to one of its units.

THE SICOFAA AWARD FOR 1986

552D AIRBORNE WARNING AND CONTROL WING
Tinker AFB, Oklahoma

The 552 AWACW flew 26,500 hours in E-3 aircraft during 1986 without a Class A or B aircraft mishap. More than 10,600 hours were flown over the Persian Gulf, and 2,100 of the hours were flown over the North Atlantic. Also, the Wing logged 3,035 sorties while training 271 new crewmembers. "Flag" exercises and deployments were integral components of the aircrew training curriculum.

During the year, the Wing participated in over 100 deployments and exercises while performing its worldwide mission. In 1986, they completed 10 years without a Class A aircraft mishap.

The air discipline and professionalism of aircrews; the excellence of aircraft maintenance; the constant deployments, exercises, and real-world flying operations; and the effective mishap prevention program of the 552 AWACW fully met the high standards established for the SICOFAA Flight Safety Award.

KEEP OUT OF THE DIRT

LT COL SAMUEL CRAIG
Directorate of Aerospace Safety

■ The demands on fighter/attack pilots during the daily accomplishment of their missions are very taxing, to say the least. When you couple this with factors like channelized attention, loss of situational awareness, and target fixation, their job can become overwhelming. In many instances, the result is a category of Class A mishaps called controlled flight into terrain (CFIT).

A CFIT mishap is one in which a mechanically sound aircraft is inadvertently flown into the ground. Class A mishaps resulting from pilot G-induced loss of consciousness, aircraft departures, and stalls are not included in this definition or in the data provided in this article.

To give you an appreciation for the magnitude of the CFIT mishap problem, let's look at some data. At the Air Force Inspection and Safety Center (AFISC), Norton Air Force Base, California, mishaps are separated into two major categories: Operational (pilot-related mishaps) and logistics (machine-related mishaps).

An AFISC study shows that from the beginning of 1977 to the end of 1985, there were 241 operational Class A mishaps and 147 logistics Class A mishaps.* To highlight the CFIT mishap problem, CFIT mishaps were broken out from the rest of the operational mishaps, and the result is shown in Figure 1.

* AFISC study titled "Controlled Flight Into Terrain" by Lt Col Charles F. Fitcher and Mr. Lowell Earl. Other information was received from HQ USAF, HQ AFLC, HQ AFSC, and ASD.

Figure 1. Aircraft Mishaps 1977-86

Note that the number of CFIT mishaps is almost equal to all other operational mishaps combined and is only 20 percent lower than the logistics mishaps. Also over this period of time, CFIT mishaps represent 30 percent of all Class A mishaps. The 117 CFIT mishaps resulted in 117 aircraft lost and 140 fatalities.

Now that you have an appreciation for the magnitude of the problem for fighter/attack aircraft, let's look at some background information about CFIT mishaps on other types of aircraft.

Background

The civilian sector has also experienced CFIT mishaps with commercial aircraft. A system called ground proximity warning (GPWS) was developed to reduce the number of these mishaps. GPWS provides a warning in the following situations:

- Inadvertent descent below clearance height, minimum descent altitude, or decision height.
- Inadvertent flight into rising terrain.
- Misread altimeters.

- Air traffic control clearance errors.
- Excessive sink rate after takeoff.
- Improper landing configuration.

In 1975, the Federal Aviation Administration (FAA) made GPWS mandatory for all large commercial aircraft. The dramatic results of this action are shown in Figure 2 from a CFIT study done by the National Transportation Safety Board.

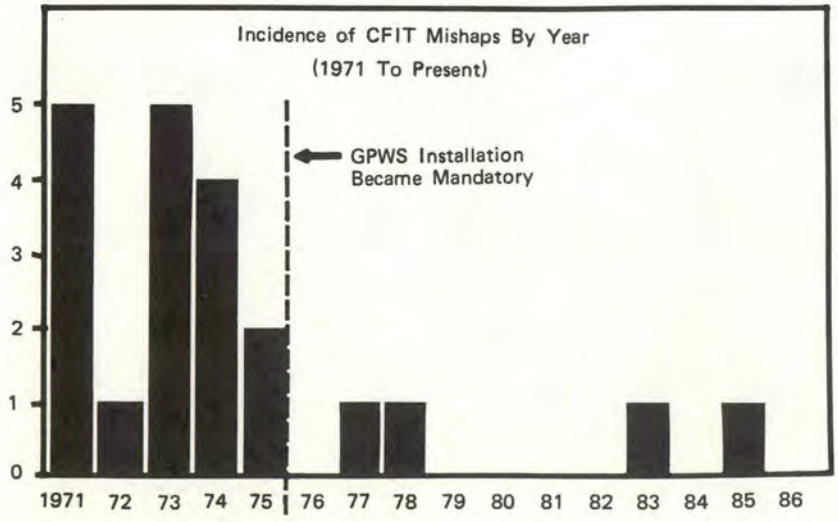
These data show that in the 5 years previous to the FAA GPWS requirement, there were 17 CFIT mishaps but only 4 CFITs in the subsequent 11 years.

In 1978, the USAF bought first-generation GPWS equipment and installed it in cargo/transport aircraft like the C-5, C-9, C-137, C-141, E-4, and T-43 fleets. Later, the KC-135, C-20, and KC-10 also received GPWS equipment.

When USAF cargo/transport airplanes with GPWS installed are compared to those without GPWS, its effectiveness becomes apparent. From 1979 through 1985, the CFIT mishaps number 3 for aircraft with GPWS and 10 for those without.

The success of GPWS in the civilian commercial and military cargo/transport communities, coupled with the high incidence of CFIT mishaps for fighter/attack aircraft, prompted the Tactical Air Forces (TAF) to pursue a CFIT warning system.

Figure 2.



What's Being Done

In 1982, the TAF released a statement of operational need (SON) for a warning device to assist the fighter/attack pilot in avoiding CFIT mishaps. This device not only has to provide warnings for the situations described for GPWS, but also for those situations associated with fighter/attack mission profiles that occur during low-level operations, weapons delivery, and air combat.

The technical task of developing a warning device for fighter/attack aircraft is more challenging than for the cargo/tanker aircraft because of the missions involved.

AFISC's fighter/attack aircraft study shows:

- Single-seat aircraft are more prone to CFITs than dual-place aircraft.
- Aircraft whose primary mission is air-to-ground or ground support are more prone to CFITs than air-to-air aircraft.
- Low-level activities and weapons delivery operations combined account for the majority of CFIT mishaps.

In describing the desired operating characteristics of the needed warning device, the TAF SON specifies three levels of coverage:

- Minimum Essential: Predictive warning up to and including ± 60 degrees of roll and ± 45 degrees of pitch.
- Desired: Predictive warning up to and including ± 135 degrees of roll and ± 90 degrees of pitch.
- Optimum: Predictive warnings at any altitude.

The CFIT warning device for fighter/attack aircraft has been designated the ground collision avoid-

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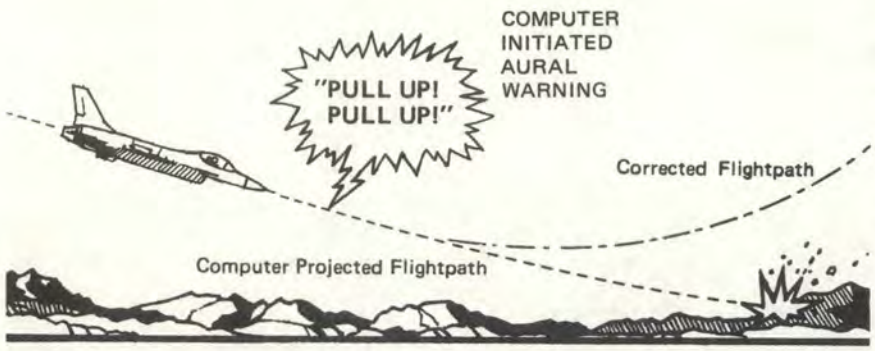


Figure 3. To be effective, a ground collision avoidance system must inspire aircrew confidence. To do this, the system must react to all threats and avoid false or early warnings.

ance system (GCAS). The development of GCAS equipment has proceeded on several fronts.

The A-10 version of GCAS is called the low-altitude warning system (LAWS). The LAWS employs a CFIT warning algorithm developed by the Aeronautical Systems Division (ASD), Wright-Patterson AFB, Ohio. The algorithm is integrated into the head-up display (HUD) of the A-10. The computer symbol generator, part of the HUD, uses combined altitude and radar altimeter data, central air data computer data, and inertial navigation system data to compute the warning. A voice box has been added to issue the audible warning. Computer response is proportional to dive angle, airspeed, and external environmental limits. Thus, the steeper the dive angle and the higher the airspeed toward the ground, the quicker the warning.

The F-16 is following a systematic approach to improve GCAS capability.

- Current capability is contained in a system called Ground Clobber. This predictive system uses fire control radar air-to-ground ranging to provide visual pullup clues to the pilot. Ground Clobber only works in the air-to-ground master mode. This system is in all F-16A/Bs and Block 25 and 30 F-16C/Ds.
- An Enhanced Ground Clobber, which requires the combined altitude and radar altimeter data and uses aural and visual pullup cues with a predictive algorithm in all master modes, is scheduled to replace the Ground Clobber.
- The F-16 System Program Office is also studying and flying the Enhanced Ground Clobber, A-10 LAWS, and ASD-developed GCAS algorithms in their F-16C full-mission-capable simulator. This is being done to select the optimum GCAS system for future F-16 production incorporation and fleet retrofit.

ASD developed a generic algorithm that can be incorporated as a software change into the Operational Flight Program Tape or other aircraft black boxes, such as a flight data computer, mission computer, or flight recorder, if memory space is available. This algorithm uses data from the same kind of sensors mentioned for LAWS to compute predictive paths toward the ground and provide aural warnings through a voice box.

HQ USAF tasked HQ AFLC and HQ AFSC to determine the optimal approach to implement a GCAS capability on aircraft they have management responsibility for and to provide proposed funding requirements and implementation schedules. This information will be evaluated by HQ USAF, systems will be prioritized for GCAS incorporation, and the appropriate program management directives will be updated to include the GCAS requirement.

When flying at high speed and low altitude, there is no room for even a momentary lapse of attention. A ground collision avoidance system provides a necessary safeguard.

Conclusion

As you can see, the CFIT problem has visibility at some of the highest levels within the Air Force, and people within the responsible organizations are feverishly working to implement a solution. Of course, that will take time, and time can mean destroyed aircraft and loss of life. In 1986, we lost one F-4E, two F-15s, and two F-16s to CFIT mishaps, and these resulted in six fatalities. Earlier this year, we lost two A-10s with two fatalities. Until GCAS implementation is complete, it will remain the pilot's vigilance and awareness that keep him and his machine "out of the dirt." ■

FSO's CORNER

A Few Words on Photo Documentation

CAPTAIN DALE T. PIERCE
99th Special Operations Group
Eglin AFB Aux Fld 3, FL

■ Most FSOs are continually searching for ideas to enhance their flight safety meetings. The quality of visual aids used has a significant impact on how flight safety meetings are perceived by attendees. In addition, quality visual aids have a positive impact on participants' attention span.

I recently received a letter from an ex-FSO who told me he often used 35mm slides of local incidents and mishaps to bring home the point in living color. I've been using this technique for several years and have developed quite a library of 35mm slides. I not only use 35mm slides of local incidents, but use general purpose aircraft systems slides to provide system orientation when discussing system failures, and slides of local activities to show how someone else's mishap might occur where we work.

I also keep some Dash-one diagrams and other figures from various publications in 35mm slide form. In addition to flight safety meeting support, I use slides of deployment locations to support predeployment briefings.

So, where do all these slides come from? I make the general purpose slides when I have an occasional slump in activity. At those times, I just check over my "I wish I had a slide of that" shopping list, grab my camera and some film, and "go shopping." I make slides of deployment locations whenever I have the opportunity. Slides of local mishaps are easily obtained, and the base photo shop can usually process the film in short order if necessary.

Having a camera ready is good practice because it can be used to preserve valuable evidence and provide the basis for building any requested briefings associated with mishaps. I have full photo-documentation of several mishaps in my 35mm slide library, which now consists of four large U.S. Government binders.

If you're not a photographer and don't want to be one, find one in your unit. There is usually someone in the unit more than willing to take photographs as an additional duty. If all else fails, check with your public affairs office, they might like to be involved.

Keeping the library is easy. Mine is organized in a manner logical to me. I use standard government issue three-ring binders available at the base service store. In the binders, I keep clear plastic loose-leaf pages that hold 24 slides each. These 35mm slide holders are also available from the base service store. They can be found under Federal stock number 7530-00007-2164.

Major Terry E. Paasch provided this month's FSO's Corner idea. He's the Chief of Maintenance at the 419th Tactical Fighter Wing, Hill AFB, Utah.

What are you doing in your program that could help other FSOs if they knew about it? If you have an idea, call me (Dale Pierce) at AUTOVON 579-7450 or send your name, AUTOVON number, and a brief outline of your program idea to 919 SOG/SEF, Eglin AFB Aux Fld 3, Florida 32542-6005. Don't worry about your writing skills — all I want is your good idea. ■

LT COL JIMMIE D. MARTIN
Editor

■ The T-38 runway supervisory unit (RSU) controller checked final approach and saw a civilian Cessna 150 on short final for the T-38 runway. At approximately the same time, a T-38 instructor in the final turn called out the traffic on final and stated the T-38 would be making a low approach.

Upon contacting the tower, the RSU controller found the tower had no knowledge of the Cessna and was not talking to the pilot on the radio. Assuming the pilot might be experiencing an emergency, the RSU controller decided to allow the 150 to land. He directed all five T-38s in the traffic pattern to go straight through on initial and watch for the Cessna. He directed a solo student entering the final turn to make a low approach.

The Cessna pilot continued the approach and landed about 1,200 feet down the runway. Just before coming to a complete stop, the Cessna began to accelerate. As the 150 accelerated to takeoff, the RSU controller told the solo T-38 student on the low approach to clear the runway to the west to avoid the Cessna.

The Cessna pilot's aircraft became airborne again, and before reaching the end of the runway, turned east and crossed over the center and right runways. Both runways were active, but no conflicts occurred.

As the Cessna cleared the airfield boundary, the pilot finally contacted the tower. The pilot stated he was trying to land at the nearby international airport and had mistaken the Air Force base for the airport. The pilot was cleared out of the area and made an uneventful landing at the airport.

Investigation revealed the Cessna pilot had never flown into this area before. He flew in to visit some friends in the city. Not only was he unfamiliar with the area, but he was not carrying any of the required navigational charts or airport diagrams.

He contacted approach control about 7 nm northwest of the airport for landing. His transponder was inoperative, so he had to do several turns for radar identification and traffic sequencing. About halfway between the airport and the Air Force base, the pilot said he had the runway in sight. He was then cleared to contact the civilian tower. Radar contact was lost at this time as he flew directly over the radar antenna.

The pilot was cleared to land on the left runway and was told radar

Believe It Or Not

contact was lost west of the airport. The pilot acknowledged his clearance to land and stated he had the airport in sight to the west of his position. (Notice anything wrong with that?) During the approach, the tower controller asked the pilot several times to state his position and to flash his landing light. The pilot kept giving his position in relation to the Air Force base which he had mistaken for the airport.

As he descended on final approach to the Air Force base, the pilot lost radio contact with the tower at the airport. The airport tower controller asked a crop duster in the area if he had the Cessna in sight. Upon receiving a negative reply, the controller called the Air Force tower controller. This call came just about the time the Cessna was taking off again. When the pilot once again contacted the civilian tower controller, he was told to contact the Air Force base tower.

Although this pilot met all FAA currency requirements, he was certainly not proficient. He had only flown 12 hours since 1982. He flew into a strange area without charts or airport diagrams. He located a big airfield, assumed it was the one he wanted, and landed. He had a lot more luck than he had sense.

The skies may be friendly, but they are crowded. You had better watch out for people like this. You can bet there are others out there who fly just like they drive — except they don't look out the window. They seem to think they're all alone up there.

Don't get me wrong. I'm not condemning all civilian pilots. Most are very competent and take their flying seriously. But, it sometimes only takes one idiot to cause a mishap. Be careful out there! ■

SURVIVAL TIPS

Cold Feet

USAF SURVIVAL SCHOOL
Fairchild AFB, Washington

■ The temperature on the ground has been in the upper 30s since you jumped out of your crippled jet. Rescuers were unable to reach you before dark, so you set up camp for the night.

Your leather boots were warm and comfortable until they got wet. You decided to dry your boots by the fire. Which is the best method of doing this? Would you:

a. Hang the boots right-side-up to the side of the fire?

b. Hang the boots right-side-up over the fire?

c. Set the boots on the ground near the fire right-side-up?

To survive, the best choice is "a." Hang the boots to the side of the fire. Damp leather can shrink if dried too fast, so don't put them too near the flame.

Never hang clothing above the fire as in "b." The fire may flare up or the support may break, dropping the items into the fire.

The boots will dry on the ground as in "c;" however, they will dry more quickly hanging near the rising column of heat from the fire. ■

Thunderstorms and Hea

Winter is over, spring has sprung, and summer is here! June, July, and August present two very serious problems for crewmembers — thunderstorms and heat stress. We offer the following as a reminder of the possible problems associated with these hazards and some key prevention tips. — Ed.

AVOIDING THUNDERSTORMS IS THE BEST POLICY

. . . however, sometimes this is not possible. We offer the following as a reminder during this year's thunderstorms!

THUNDERSTORM AVOIDANCE

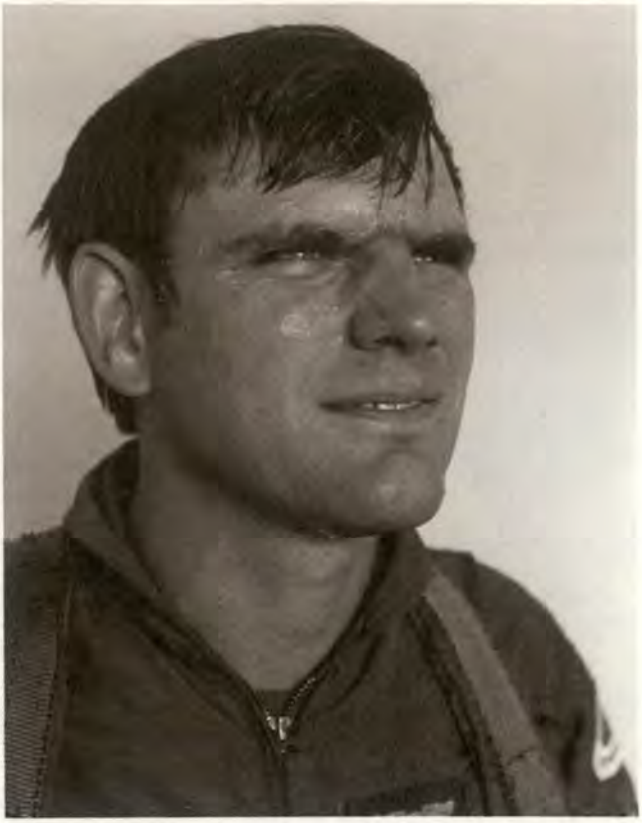
- **DO** find out if any part of your trip will be in the clouds, near CBs, or in precipitation. Try to arrange it so as few of these "ingredients" as possible are present, even if it means a delay or a reroute.
- **DO** check with weather for any last-minute changes just before you leave.
- **DO** be continuously aware of the location of potential threat areas with respect to your flight plan.
- **DO** remember the higher the aircraft altitude, the farther away from a thunderstorm you should fly.
- **DO** avoid flying close to, or between high surface features (ridge tops, towers, etc.) and an overhead thunderstorm while at low level.
- **DO** avoid penetrating the cirrus decks that were once associated with thunderstorms. Electrical activity generated by a thunderstorm may exist *after* the thunderstorm cell has decayed.
- **DO NOT** fly *under* a thunderstorm. Hail, turbulence, lightning, and wind shear are very real threats.
- **ALWAYS** be prepared for the worst. Thunderstorms can build and multiply very rapidly.
- **NEVER** take off with an old weather briefing. A thunderstorm can change in character in less than 10 minutes.

FOR INADVERTENT THUNDERSTORM PENETRATION

- **DO** make sure instrument and cockpit lights are full bright to minimize temporary blindness from lightning flash.
- **DO** verify pitot heat and engine anti-ice are on. Icing can be rapid at almost any altitude and can cause instantaneous power failure and/or loss of airspeed indication.
- **DO** make sure safety belts and shoulder harnesses are tightened and locked.
- **DO** remember you can expect more lightning hits penetrating a thunderstorm area at altitudes above the freezing level.
- **DO** maintain constant attitude: **DO NOT** chase altitude.
- **DO** maintain a good instrument cross-check until clear of the storm.
- **DO** keep your eyes on your instruments. Looking outside may cause temporary blindness from lightning flash.
- **DON'T** change your power settings. Maintain those settings recommended for thunderstorm penetration.
- **DON'T** turn back once you enter a thunderstorm. The quickest way out is usually straight ahead, and turning will increase stress on the aircraft.

NOTE: For more information on thunderstorms, see *Flying Safety* magazine, February 1987, "Avoid The Jolt From A Bolt," and *Flying Safety* magazine, August 1986, "I've Heard It Before."

at Stress



DEHYDRATION AND HEAT EXHAUSTION

Air Force flightlines get as hot as anywhere in the world. This makes crewmembers prime targets of thermal stress. Two major problems face crewmembers due to working in this hot environment — **dehydration and exhaustion**. Awareness and subsequent action are the keys to prevention.

DEHYDRATION The body is approximately 80 percent water. The average adult loses about 3 quarts of water a day through normal activity. You must at least replace this lost water or suffer the effects of dehydration. The early signs of dehydration are:

- Darkening of urine.
- Dizziness.
- Headaches.

As it progresses, the victim may:

- Become dizzy.
- Develop a headache.
- Have difficulty breathing.
- And finally, lose muscular function.

Unless water is soon made available, a person experiencing such dehydration may die.

PREVENTION

- Drink more liquids — preferably water rather than caffeine or sugar-laden fluids — than thirst requires.
- Avoid coffee and alcohol as they tend to further dehydrate you by their diuretic effect.
- Avoid sugar-laden fluids as sugar delays fluid absorption.
- Increasing water intake to a point where you feel you will float away is beneficial when working in the heat.
- Make a habit of drinking water on a scheduled basis that begins *before* heat exposure by up to an hour.
- Drink one or two hours before a mission. Our kidneys do regulate the balance of water very effectively. You can't really overdo it.
- Take fluids with you on your mission.
- Make sure the fluids you will be receiving in your dinner from the flightline kitchen are acceptable to you.

HEAT EXHAUSTION may be due to water depletion or salt depletion. General symptoms are:

- Moist and clammy skin, usually pale.
- Profuse sweating.
- Slightly decreased blood pressure.
- Shortness of breath.
- Normal or subnormal temperature.
- Rapid pulse.

Heat exhaustion due to water depletion results when water lost due to prolonged sweating is not replaced. It causes:

- Very high body core temperature.
- Thirst.
- Fatigue.
- Dizziness.
- Scanty urine output.

Heat exhaustion due to salt depletion results when salt lost due to prolonged sweating is not replaced. It causes:

- Fatigue.
- Nausea.
- Dizziness.
- General weakness and giddiness.
- Muscle cramps.
- More of a problem in individuals not acclimated whose salt loss per volume of sweat is higher.

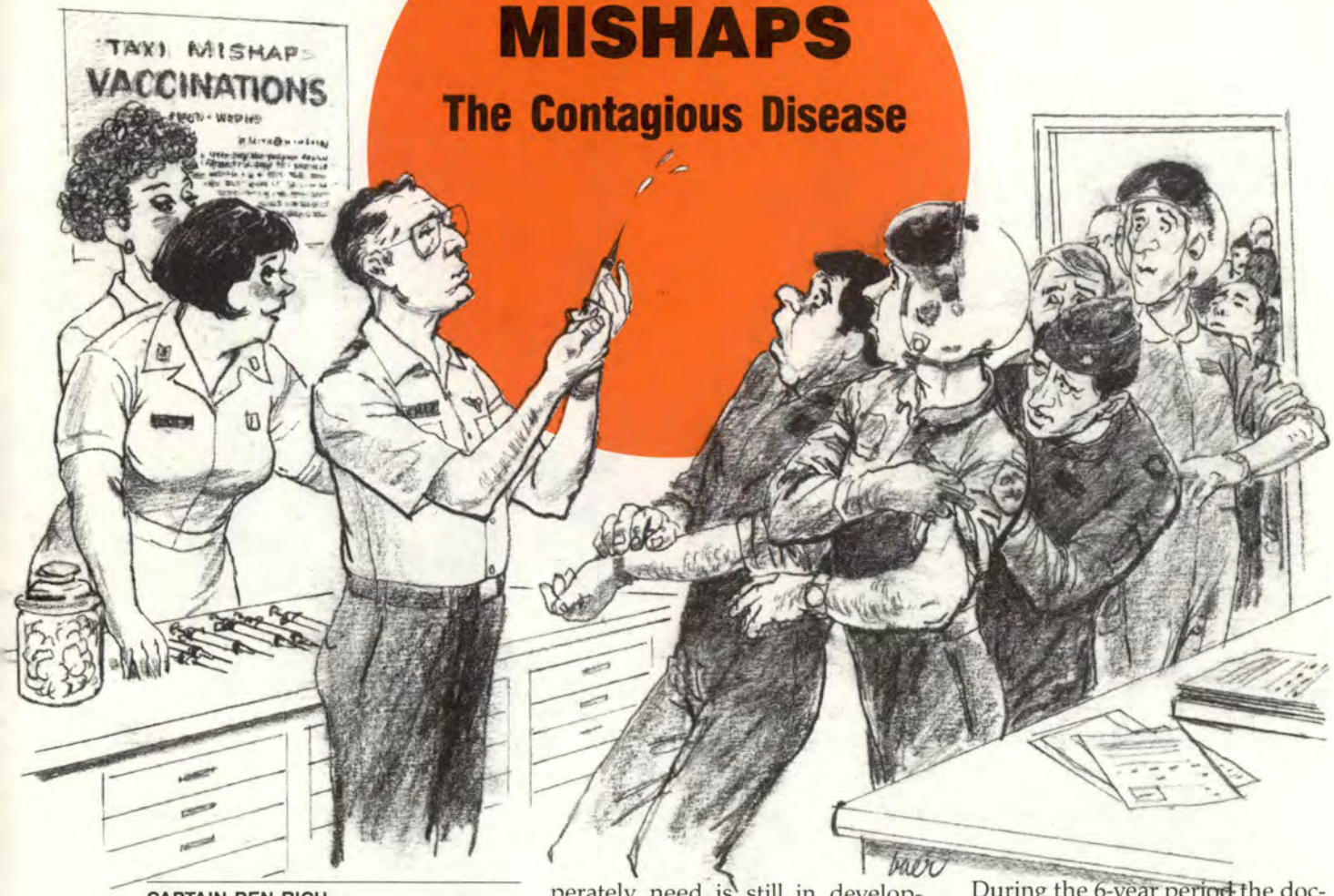
PREVENTION

- Prevention of heat exhaustion associated with water depletion naturally depends upon a sufficient water supply.
- To prevent heat exhaustion due to salt depletion, ensure an adequate intake of salt as well as fluid. Generally, liberal salting of the food is all that is required, and salt tablets can actually worsen the problem by at least temporarily drawing fluid into the gastrointestinal tract where it is of no use.
- This phenomenon of retaining fluid in the gut is also seen when sugar-laden fluids are ingested. The osmotic effect slows absorption.
- Rest and removal from the thermal stress. ■

NOTE: For more information on heat stress, see *Flying Safety* magazine, August 1985, "Thermal Stress," and July 1986, "When The Going Gets Hot."

TAXI MISHAPS

The Contagious Disease



CAPTAIN BEN RICH
Directorate of Aerospace Safety

■ I went to the flight surgeon last week, and after examining my shot record, he informed me my routine vaccinations were up to date. However, due to a recently highlighted worldwide problem, I was in need of a new shot — **The Taxi Mishap Vaccination.**

The doctor informed me this epidemic is running rampant throughout the Air Force, and no one is immune. I learned this affliction can strike at any time — day or night; and anywhere — home or abroad. The ambassador of medication showed me that between 1 January 1980 and 31 December 1986, 67 aircrews have been stricken with this affliction — some never to fly again. Unfortunately, the vaccine I so desperately need is still in development, and I will have to wait and take my chances in the system with everyone else.

Not to be deterred, I began an investigation of my own to learn more about this nemesis I fear so much. I found that like the common cold, the taxi mishap can strike without warning; and once afflicted, the only cure is to endure the pain and agony, drink plenty of fluids, take aspirin, and see the operations officer in the morning.

Exact statistics are impossible to obtain because in many cases, the incident went unreported since casualty (damage) costs didn't meet minimum reporting criteria. Recent directives from some MAJCOMs have made reporting of this disease mandatory, so future studies will be more reliable.

During the 6-year period the doctor reviewed, I found at least 19 MAC crews came face-to-face with this dreaded ailment. While MAC crews, with their big airplanes, were amassing a league leading 19 mishaps for a single command, the tactical air forces also contributed their share with USAFE, TAC, PACAF, and the AAC combining for 23 encounters with this insidious monster. SAC placed third in the overall competition with 10 mishaps. (See Figure 1.)

A review of the specific mishap factors revealed some interesting trends. In many of the mishaps, the crew judged the size, shape, location, etc., of the obstacle of concern was not a factor, indicating this affliction not only affects depth perception, but impairs judgment. At least one mishap occurred when the

aircrew thought they would be able to taxi **over** the obstacle. (Has this thought crossed your mind?)

Pilots of fighter type aircraft seem to be afflicted more with task saturation leading to loss of positional and environmental awareness. This resulted in collisions with various obstructions such as parked aircraft, formation mates, fire extinguishers, and in one case — a fuel truck.

No one group is exempt from this affliction. (See Figures 2 through 4.) Besides the fighter and transport communities, I found the rotor wing, reconnaissance, and trainer families have also suffered from this scourge of the earth. While MAC was taking the overall lead in the command statistics, the aircraft accounting for the most reports was the F-4 — a crew airplane with short wings and relatively good visibility.

My examination of this problem has left me with one conclusion: Until the medical community can come up with an effective preventive vaccination for this dreaded disease, it will be up to you and me to take our own precautions. Number one on my list will be increased environmental awareness — paying more attention outside my aircraft.

I also found that although ground marshalers provide excellent guidance in most cases, I am still responsible for the safety of my crew and aircraft. If questions rise concerning obstacle clearance, stopping the aircraft and deplaning my scanner will be my course of action.

In the last 6 years, the Air Force suffered over $3,480,900 in damage due to this disease, and until an adequate innoculation becomes available, prevention will have to remain the best medicine. Prevention tips include:

- Increase your environmental awareness while taxiing aircraft.
- Become more familiar with the ground handling characteristics of your specific aircraft. (Does your aircraft experience "wingtip growth" during turns?)
- When in doubt, **STOP YOUR AIRCRAFT** and evaluate the situation.

The final responsibility for avoiding this disease rests with aircrew members. We are the final line of defense. ■

Figure 1.

Pilot Induced Taxi Mishaps

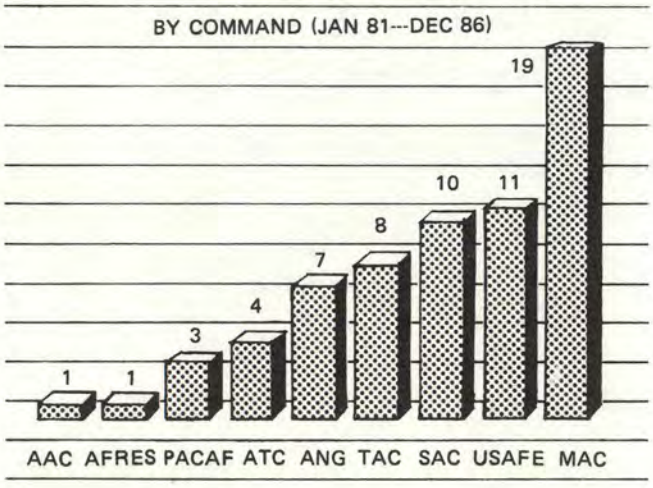


Figure 2.

Pilot Induced Taxi Mishaps

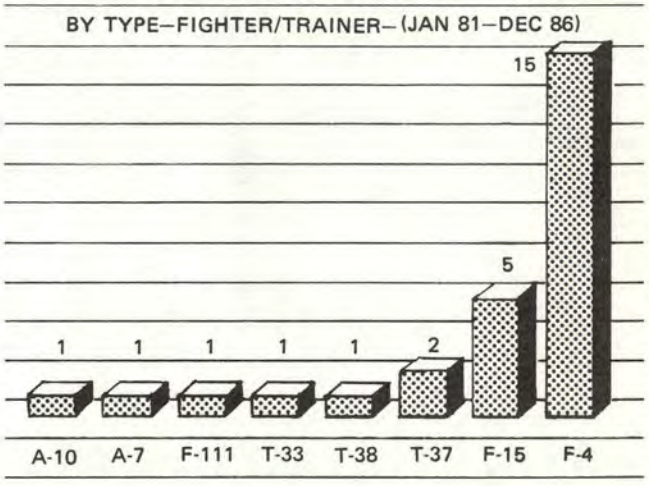


Figure 3.

Pilot Induced Taxi Mishaps

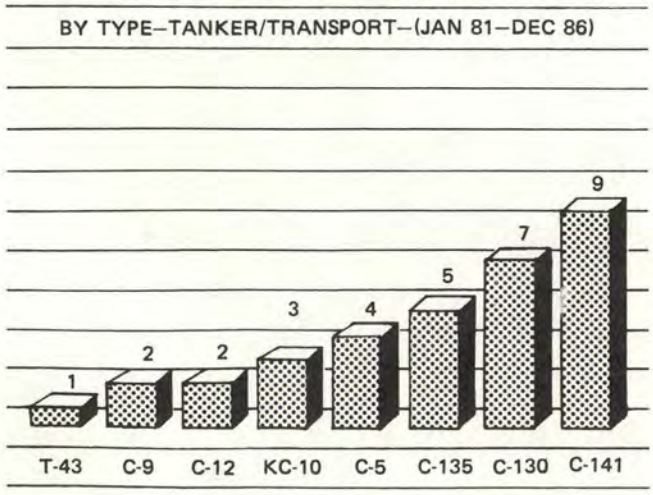
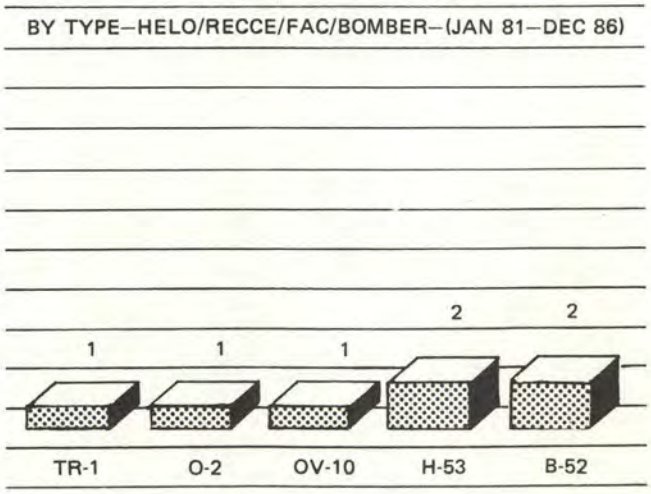


Figure 4.

Pilot Induced Taxi Mishaps



THE RIGHT MOVE

Take a close look at the ejection decision during takeoff and landing emergencies. What move would you make?

LT COL GEOFFREY W. MCCARTHY
Commander
USAF Hospital Misawa

■ Picture yourself in these memorably uninviting situations:

■ You are rolling smoothly down the runway in your A-7 on an FCF. Liftoff. Suddenly the SLUF slams into a heart-stopping right bank. You manage to roll out some of it as the jet drifts off the runway at about 10 feet of altitude. What is your next move — eject or ride it out? Will you live or die, or worse yet, be badly broken up and never fly again?

■ It's another dreaded night takeoff in your F-16 electric jet. (In my view, *all* night takeoffs are dreaded.) Along about rotation speed, you hear a muffled bang. You sense a cheerful glow behind, and the jet, no longer accelerating, is drifting wantonly to the right. Now what's your move?

■ Here's a freebie, no questions asked. An OV-10 driver heard and felt the left tire blow, and his jet — or prop — hooked hard left off the runway into the tulies. Feeling a bit uneasy about his new role as a passenger, he made his move, ejecting. Dusting himself off, unhurt, he noted the Bronco idling nearby, also unhurt. In a splendid display of aeronautical chivalry and safety-consciousness, he walked over to it, reached in, and shut down the engines.

■ It's not your night, you think. A routine formation takeoff has turned a bit sour, and you are now riding your Rhino (F-4) through the infield — roughly — with grass and culverts underneath where smooth concrete should have been. You are contemplating unstrapping to be ready for ground egress when the aircraft stops. What is your backseater thinking? Come to think of it, what did you brief him? If the intercom quits, what is the bailout hand signal? Is there one for ground egress? Will you live or die? Will he?

What *do* you think of ejecting during takeoff and landing? Are you of the cocoon school of thought: I'm already surrounded by layers of aviation angle-iron, or space-age alloy, or even by a titanium bathtub, so why abandon it for an uncertain, cascade-like sequence, ending up in thin air, suspended from a nylon sheet a few feet above the ground, with no time to take more than maybe one swing before dealing with all that unforgiving concrete? Or maybe you already have your jump wings and are itching for a chance to sample the automatic mode.

I'm of the egomaniac school: Any jet that is treating me this way doesn't deserve my continued presence . . . Actually, over the 13 years from 1973-1985, several of your fellow ejection seat riders were forced — usually by Murphy's law — to make a choice. (See Figure 1 for numbers.)

Figure 1
Ejection Decisions
(1973-85)

Aircraft	Number	Crew-members	Ejections
F-4	7	14	12
T-38	2	4	3
OV-10	2	2	2
A-7	2	3	3
F-15	1	1	1
F-16	1	1	1
TOTALS	15	25	22

Ask yourself, seriously for a moment, whether this group had an excessive death or major injury rate, then read on.

They didn't. In fact, they had exceptionally few injuries and a low fatality rate — 86.3 percent of them survived, and only 21.1 percent had a major injury.

Were their injuries severe, disabling maybe? No. The only major injuries were four compression fractures from seat acceleration and two minor cracks in pelvic or spine bones from the parachute landing fall (PLF). The SLUF driver above was one of these: He had both a compression fracture from the seat and a cracked tailbone from the PLF, but was observed smartly double-timing away from the fireball, muttering something about folding-wing Navy jets.

How does this group of ejections compare to other situations? Thought you'd never ask. Favorably. Very favorably — 80.3 percent of all ejectees during this period survived with a 26.1 percent injury rate. Contrast the above and below 500 feet data in Figures 2 and 3.

Now stay line abreast with me through a bit more detailed analysis of these data. Policy is, we jump out at 10,000 feet when out of control, 2,000 feet minimum if the jet (or prop) is controllable. The Air Force Inspection and Safety Center (AFISC) tracks and presents data on survival above and below 500 feet ejection altitude. Below 500 feet, the survival and injury rate is about 50-50, enough to give your wife, kids, and insurance agent grey hair.

But submerged in the below-500 category is the group of takeoff and landing ejections that have a far better prognosis, both for living and living without serious injuries.

An example is the electric jet driver above, who ejected and walked away without a scratch while his jet burned up. The table has all the precise numbers, proving once again what Rudy Delgado, Egress Systems Safety Manager at AFISC, has been saying for years: Postponing the decision to eject until you are below 500 feet is a very bad idea. But these new numbers conversely prove that ejecting during takeoff or landing roll is as safe as ejecting at altitude.

Rocket scientists: Take note of the rigorous, pedagogic, computer-like statistical treatment here. Survival and injuries from ejection on the runway do not differ significantly from controlled ejection at altitude, but do differ from other below-500 feet ejections.

And what of the seats? — and of the jets? — very good and very bad. Ninety-one percent of the seats worked as designed. One was damaged by impact and did not fire. Its

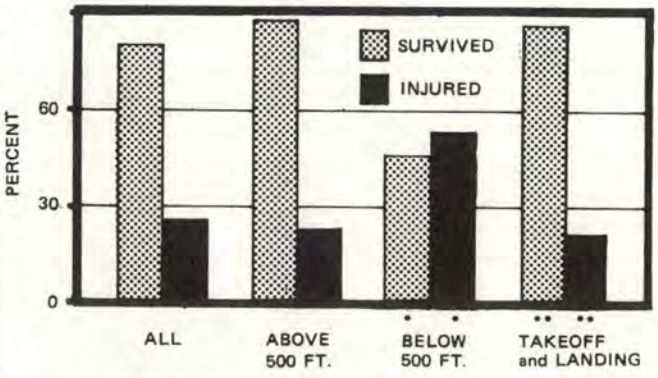
continued

Figure 2
USAF Ejection Survival and Injuries 1973-1985

	Number of Ejectees	Survived (%)	Major Injuries (%)
Above 500 Feet	705	624 (88.5)	142 (22.8)
Below 500 Feet	175	81 (46.3)*	43 (53.1)*
Takeoff and Landing	22	19 (86.3)**	4 (21.1)**
TOTALS	902	724 (80.3)	189 (26.1)

*Significant when compared to above 500 feet.
**Significant when compared to below 500 feet.
(Data on compression fractures not separately tracked.)

Figure 3
Ejection Survival and Injuries
(1973-1985)



*Significant when compared to above 500 feet.
**Significant when compared to below 500 feet.

The Right Move

continued

occupant, flat out of ideas, unstrapped and jumped down — a shorter distance than usual — since the nose strut, now in the cockpit, was the source of the seat malfunction.

Ten of these 15 aircraft were destroyed or severely damaged, often by fire. Look at this from your jet's point of view: What is a runway, anyway? Answer: The only place to put your feet down for miles around, a narrow ribbon of salvation smack in the middle of that minefield of gear-cutters. Going off it is about as much fun as being the guest of honor at an IRA knee-capping party.

Here's some proof. In the same data package are the sagas of four involuntary ejection seat riders. Two Rhino back-seaters were victims of Rube Goldberg's revenge: Open rear canopy, get ejected. An OV-10 passenger ejected himself while — he thought — arming the seat. These three survived just fine. A fourth back-seater was killed when a fire on takeoff initiated the seat catapult motor only. There's a lesson there, too: Jets breaking up on the ground almost always burn, and fire leads to . . .

And for those of you who fly in crewed, committee-model machines, you'd better have a clear consensus of who does what and when, if your jet is showing you its idea of the Baja 500. In 3 of these 15 jets, the back-seaters ejected while the pilot egressed. So much for WSO confidence levels and prebriefed crew coordination. All six were fine.

But how about the F-4 crew above? You guessed it. As the pilot unstrapped, the WSO decided to eject him — one fatality. Perverse justice prevailed, though, this WSO ejected in a misrigged seat — two fatalities, where none should have been. Go look up the interphone-out bailout signal, if you don't know it. There isn't one for egress, but I brief my own: Left hand, left side, pointing down, whenever I'm flying an incentive rider.

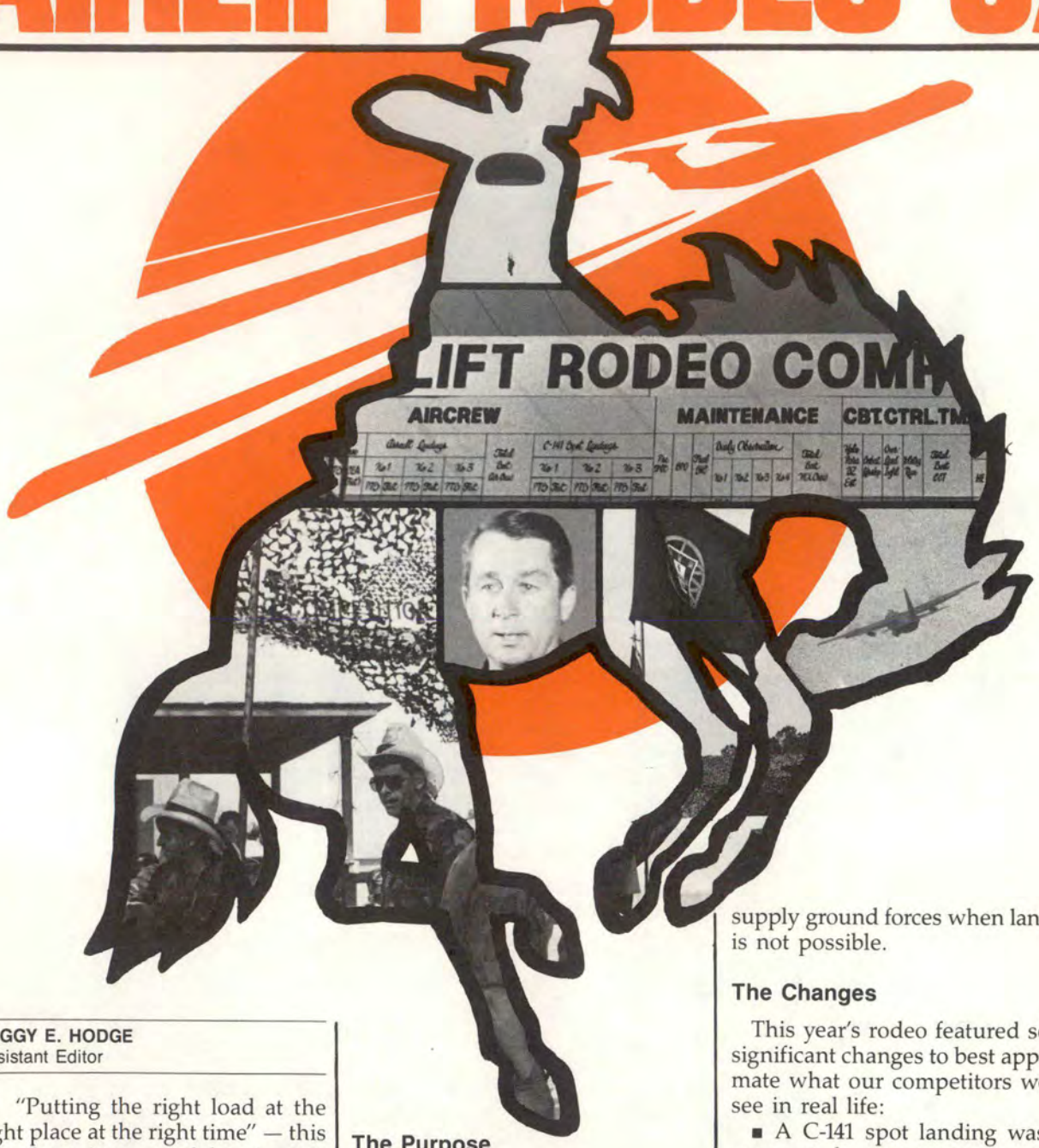
The only other fatality was a T-38 pilot who landed long and hot, went around too late, stalled, then ejected, hitting the ground in his seat. His nonrated passenger wisely jumped out seconds before and was uninjured.

Whenever I give this pitch in person, I start with a spectacular film of an F-18 pilot ejecting on the runway. His jet, unknown to him, is firmly in the barrier, but yawing sharply right and banking left. As it settles back down and stops, intact, the scene switches to his HUD video. Here he comes in his chute, landing about 30 feet in front of his jet, the only pilot ever known to take his own picture with his gun camera. (This unique naval aviation epic was preceded by the infamous gear check call, "three struts, two wheels down" . . . But, again I digress.) As the appreciative oohs and aahs from the audience fade, I flash a still photo of another Hornet off the runway, intact, canopy off, overturned. Inside is one of the Navy's only two current Mig killers — dead.

My message here is direct, simple, and statistically proven: Aircraft almost never survive takeoff and landing excursions off the runway. But ejecting on the ground is just as safe as a controlled ejection at altitude. If you need it, do it. It *is* "The Right Move." ■

We have all seen statistics that show low altitude ejections are not as safe as those at high altitude. But how do they compare to ejections on the runway?

AIRLIFT RODEO '87



PEGGY E. HODGE
Assistant Editor

■ "Putting the right load at the right place at the right time" — this was the primary goal for aircrews participating in the MAC-sponsored Airlift Rodeo '87. Held annually at Pope AFB, North Carolina, more than 40 teams from MAC active duty units, the Air National Guard, Air Force Reserves, U.S. Marine Corps, as well as 10 foreign nations participated in this ninth annual rodeo.

The Purpose

Airlift Rodeo '87 competitively tested the flight and ground skills of MAC crewmen as well as the related skills of combat controllers, security police, flightline personnel, and maintenance team members. It provided valuable training for all participants. And finally, this competition tested our capability to resupply ground forces when landing is not possible.

The Changes

This year's rodeo featured seven significant changes to best approximate what our competitors would see in real life:

■ A C-141 spot landing was incorporated as a new contest. This event prepares aircrews for wartime situations where they may be faced with landing on shorter-than-normal runways.

■ Another significant change was the increase in daily maintenance observations. Daily aircraft maintenance was judged for 4 days of flying competition instead of the

continued

AIRLIFT RODEO '87

continued

The West German Transall — The 62d Air Transport Wing, Wunstorf, Germany, won Best Wing *and* Best Allied Aircrew at Airlift Rodeo '87.

Foreign nations displayed their wares at Airlift Rodeo '87. They included Australia, Brazil, Canada, Italy, Israel, Morocco, Portugal, the United Kingdom, and West Germany.

3 days scored in the past. This recognized the activity maintenance people are performing.

Another three new rodeo events have been incorporated into the combat control team competition: Drop zone establishment, combat leadership, and tactical overland infiltration.

- On the high-altitude, low-opening drop zone establishment, teams using ram-air parachutes executed a military free-fall employment and established a drop zone.
- In the combat leadership course, teams demonstrated their leadership and "followership" skills and physical capabilities by running an obstacle course, as a team, with their equipment.
- In the tactical overland infiltra-

The Winners

AIRLIFT'S BEST

Category	Unit	Category	Unit
Best Wing	62d Air Transport Wing Wunstorf, Germany	Best Security Police Team	463d Tactical Airlift Wing Dyess AFB, Texas
Best C-141 Aircrew	437th Military Airlift Wing Charleston Air Force Base, South Carolina	Best Combat Control Team	23d Air Force Red Team Hurlburt Field, Florida
Best C-130 Aircrew	314th Tactical Airlift Wing Little Rock AFB, Arkansas	Best C-141 Engine Running On-Load/Off-Load Team	438th Military Airlift Wing McGuire AFB, New Jersey
Best C-141 Maintenance Team	445th Military Airlift Wing (Reserve) Norton AFB, California	Best C-130 Engine Running On-Load/Off-Load Team	70th Squadron RAF Lyneham, United Kingdom
Best C-130 Maintenance Team	46th Aerobrigata Pisa, Italy	Best Aerial Port Team (Joint Airborne Inspection)	314th Tactical Airlift Wing Little Rock AFB, Arkansas
Best C-141 Spot Landing Aircrew	443d Military Airlift Wing Altus AFB, Oklahoma	Best Aerial Port Team Combat Endurance Run	317th Tactical Airlift Wing Pope AFB, North Carolina
Best C-130 Short Field Landing Aircrew	176th Tactical Airlift Group (ANG) 146th Tactical Airlift Wing Van Nuys, California	Best Allied Aircrew	62d Air Transport Wing Wunstorf, Germany

Airlift Rodeo has become a showcase for professionalism in one of the Air Force's most important missions: Airlift.

C-130 aircraft performed tactical assault landings on unimproved dirt and short paved landing strips.

Esprit de corps, friendship, and shared experiences highlighted Rodeo '87.

Green smoke "marked the spot" for loads dropped in the C-141 airdrop competition.

tion, each team fired at human and mechanical targets using MILES — the multiple integrated laser engagement system.* They also demonstrated tactical abilities and proficiency with a compass while navigating from point to point and risking fire from snipers.

■ The security police also had a new Airlift Rodeo event — combat marksmanship. Each team demonstrated marksmanship skills by firing live rounds at pop-up targets, as the team assaulted an objective over rugged terrain.

■ Finally, the combat endurance course has been added as a new event for some participants. In previous years, the course had officially tested those competing for "Best Security Police." This year, the combat endurance course challenged airmen competing in "Best Joint Airborne Inspection" — for those best at loading pallets.

The Benefits and Goals

Airlift Rodeo '87 provided valuable training for all participants. The most important long-term benefit of Airlift Rodeo is increased cooperation between airlift forces from several nations.

As a training exercise for the best tactical airlifters in the world, Airlift Rodeo allowed the competitors to demonstrate capabilities, improve procedures, compare notes, and enhance standardization for uniform and fast-acting worldwide deployment.

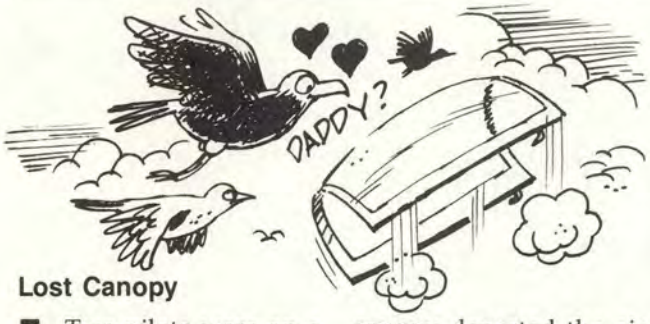
Collectively, the ultimate goal was to develop and improve techniques and procedures to enhance airlift operations. The spirited cooperation at Rodeo furthered that aim, while strengthening the mutual purposes and bonds of friendship joining the competing countries.

Congratulations to the winners and all the participants of Airlift Rodeo '87! ■

The Military Airlift Command and General Duane H. Cassidy, MAC Commander in Chief, hosted this year's rodeo. General Cassidy directs the worldwide airlift operations from his headquarters at Scott AFB, Illinois.

*MILES gives airmen one of the most realistic training scenarios possible without the use of real bullets. The system's two primary components are a transmitter that fits on the end of an M-16 rifle, and a receiver, consisting of a vest and helmet. When a blank cartridge is fired, the transmitter emits a laser beam, which sets off a steady tone when it strikes within a few inches of the laser sensors on a receiver vest and helmet. A nine-volt battery powers the system.

OPS



Lost Canopy

■ Two pilots were on a T-38 accelerated copilot enrichment (ACE) cross-country mission. The rear cockpit (RCP) pilot made the takeoff. The front cockpit (FCP) pilot rested his hands on the canopy breaker tool and the canopy downlock handle during the takeoff.

At about 50 feet above the ground and 200 knots, the FCP pilot saw a flock of birds suddenly appear. He thought the birds would hit the aircraft and instinctively flinched. When he did so, he pulled the canopy downlock lever back. The unlocked canopy departed the aircraft and was destroyed when it hit the runway.

The RCP pilot climbed to traffic pattern altitude and stayed in the VFR pattern until a sweeper cleared the runway. He then landed uneventfully. Postflight inspection revealed no defects in the canopy mechanism.

Another case of someone having their hands where they didn't belong. Be careful where you put your hands when not flying the aircraft. Where is the safest place? Probably in your lap.

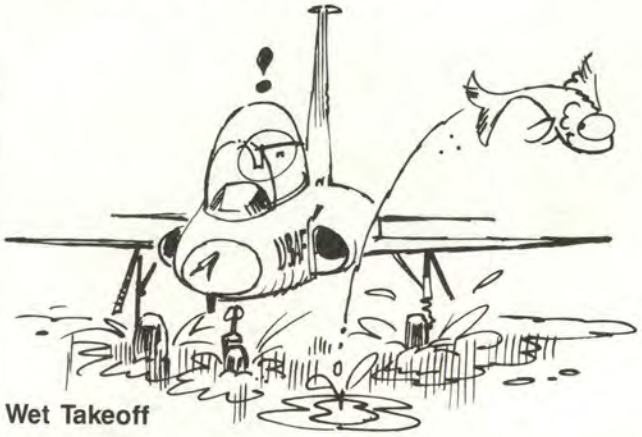
ZZZZZip!

An F-16 pilot on a cross-country navigation mission performed a walk-around of his aircraft with a transient alert crew chief. No problems were encountered with the aircraft, but the pilot couldn't start the engine because a quiet period had started at the base. So, he returned to operations to wait.

After the quiet period was over, the pilot and crew chief returned to the aircraft and performed another walkaround. Nothing unusual was noted, and the pilot proceeded with his interior preflight checks.

As the pilot started the engine, the crew chief saw something enter the intake and signaled the pilot to shut down. When the pilot crawled inside the intake, he found pieces of his flight cap, checkbook, and address book. These items had been in his unzipped G-suit pocket during the walkaround.

The moral? If you didn't know why they put all those zippers on flight suits and G-suits, you do now. Please pay attention to the expensive lesson this pilot learned whether you fly little airplanes or big ones.



Wet Takeoff

Two pilots were preparing to take off from a cross-country base in a T-38. There was a light drizzle falling, and the runway was reported as wet. Another T-38 had taken off about 30 minutes earlier with no problems.

As the crew took the runway, the tower advised them of possible standing water on the runway. The crew discussed the possibility of water ingestion by the engines if the nose wheel encountered standing water. But, as they looked the runway over, the only standing water they could see was along the edges of the runway. Since the runway centerline was noticeably higher than the edges, the crew reasoned they would have no problems if they used the center of the runway.

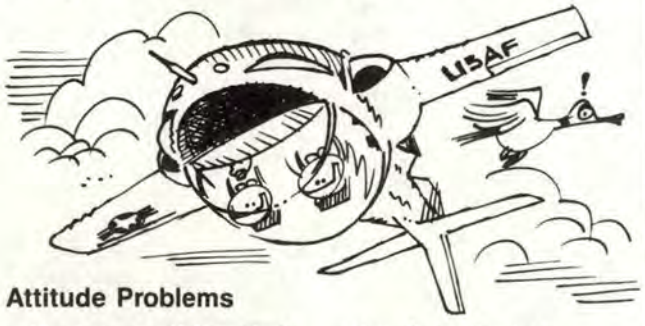
The takeoff roll was normal until the aircraft

TOPICS

rolled over the barrier cable at 100 knots. The front cockpit pilot felt a sudden loss of thrust and heard a muffled cough from the engines. As he initiated an abort, the pilot checked the instruments and saw both engines had flamed out. He brought the aircraft to an uneventful stop on the runway.

Neither pilot had seen any standing water during the takeoff roll. But, witnesses said they saw water spraying up around the engine intakes just prior to a sudden decrease in engine noise. It is difficult, if not impossible, to see puddled water on painted surfaces of the runway such as the centerline. With the nose wheel on the centerline, the crew didn't see the puddle that caused the flameouts.

Be aware of visual illusions and take them into account in your decisions. This crew took what seemed to them the best course of action. They weren't aware of the visual illusion that can be caused by wet, painted surfaces. Had they kept the nose wheel slightly displaced from the centerline, they most likely would have experienced no problem on the takeoff.



Attitude Problems

During an IMC climbout in a T-37, the instructor pilot (IP) noticed a difference between his attitude indicator and the performance instruments. He first noted a slow rate of climb coupled with a relatively rapid rotation of the attitude indicator to a 45-degree nose high position. Suspecting vertigo, the IP gave control of the aircraft to the student pilot (SP). The SP transitioned to level flight on his attitude indicator.

However, the IP noted this gave them a 2,000 feet per minute rate of descent. The OFF flag began to appear intermittently on the attitude indicator. Suspecting a problem with both attitude indicators, the IP took control of the aircraft and made a needle, ball, and airspeed climb to VFR conditions.

After level off, both attitude indicators showed 35 to 45 degrees nose high. All attempts to recage the indicators were unsuccessful.

The IP declared an emergency and requested a chase ship. Another T-37 was sent to lead them down through the weather for landing. Both indicators failed different bench checks by maintenance after the flight.

Good heads-up action by this IP saved himself, his student, and the aircraft. His cross-check of performance instruments against the attitude indicators kept him from being fooled by a double malfunction.

Food Poisoning

At approximately 0600, the C-130 flight engineer purchased a chicken filet sandwich at the snack bar before taking off on a flight. He took the sandwich along for a snack and ate it at 1100.

The aircraft completed its first flight at about 1300 and the crew went to lunch. At 1600, the crew departed on the return flight to home. Approximately one hour after takeoff, the flight engineer started to feel some nausea and went to the back of the aircraft to lie down. Two hours later, he developed severe stomach cramps followed by diarrhea and vomiting.

An ambulance met the aircraft at its destination, and the flight engineer was taken to the hospital for treatment. The cause of the sickness was later diagnosed as food poisoning from the chicken filet sandwich. The sandwich had not been refrigerated during the 5 hours between the time the engineer bought it and finally ate it.

Crewmembers have been known to eat some pretty strange things at strange times. But, be careful. If you're going to carry perishable food around with you, be sure to keep it refrigerated. It doesn't take very long for bacteria to go to work. Don't take a chance with food poisoning. Here it was an uncomfortable illness, but it can be deadly. ■

tech topics

ANYONE SEEN THE OIL COOLER CAP?

■ During a maintenance run for a "smoke in the #4 inlet" writeup on a C-141B, the engine crew decided to install the breather test gauge. After removing the main oil tank cap, one crewmember placed it on a B-4 stand used for the run. Once they had installed the breather kit, the team members moved the stand to the wingtip for the engine run. Unnoticed, the cap dropped from the stand.

Not long into the run, as they advanced throttles to 1.90 engine pressure ratio (EPR), the team saw sparks come from the engine inlet. When the person in the pilot position retarded the throttles to idle, he found instrument readings were normal. When the throttles were advanced to 1.5 EPR and the scanner noticed sparks again, the engines were shut down.

Finding the oil cap missing from the B-4 stand, the crew inspected the engine and found pieces of the cap in the main engine oil cooler and severe engine damage amounting to $17,502.

To prevent recurrence, the unit identified a place to stow the oil cap during engine runs while the test kit is installed, made a warning label to be placed on the kit as a reminder, and directed personnel to enter a red X condition in the 781 forms if the breather test kit is installed.

During a hush-house engine operation at another unit not too long ago, one of our aircraft swallowed an unsecured steel safety pin from a 150-pound halon fire bottle. After previously using a light gauge steel wire that was easily broken to hold the pin, the unit went to using a plastic seal along with an attached long, swedged cable to ensure the pin would remain with the extinguisher when the pin was pulled.

The important lesson for all maintenance folks is the danger of unsecured items around running engines. Everytime we place anything aside in preparation for some flight line maintenance, an alarm should sound in our heads. Does that item have the potential to wander away and enter the path of an engine's suction? If it does, secure it!

And don't forget those fire bottles! If the safing pin is removed or missing, there is not only the potential FOD hazard, but just as important is the potential of not having a serviceable fire bottle if and when an emergency occurs.

Experience has shown that an organized campaign against FOD will produce worthwhile results. It will certainly pay big dividends in mission accomplishment.

THE LONG AND SHORT OF IT

During takeoff on a functional check flight (FCF) following a 200-hour phase inspection, the HH-53C crew heard a loud bang from the right side of the helicopter. Immediately scanning from the crew entrance door, the crew chief observed the cowling falling from the engine area and stepped back to avoid being hit by debris. The aircraft commander safely aborted the takeoff and shut down the engine without incident.

After thoroughly inspecting the helicopter, the maintenance folks found a 49-inch long hinge pin missing from the engine cowling. In its place were two, 2-inch long pins inserted into each end of the hinge

to secure the cowling to the helicopter.

Just prior to the phase inspection, the cowling's original hinge pin was removed for use on another helicopter. As a temporary measure, someone installed the two short pins until the correct length pin could be obtained. However, this discrepancy was never entered into the aircraft forms.

There are always those folks with great memories who may not feel the need to document their work, especially cannibalization actions. They feel they'll be around to remind others when aircraft are reassembled. The sad part is, they'll continue to believe this right up to the day their actions are featured in a mishap or incident report.

BELIEVE IT OR NOT

Because ramp space was needed on the flight line for a mobility exercise, the unit positioned some of its F-15s on a taxiway known as the dead runway. When the time came to launch one of the Eagle jets from this area, the line chief decided to retain his more experienced people

to help build up mobility pallets. So he sent two qualified, though relatively inexperienced on the F-15, mechanics to the dead runway where they met the pilot.

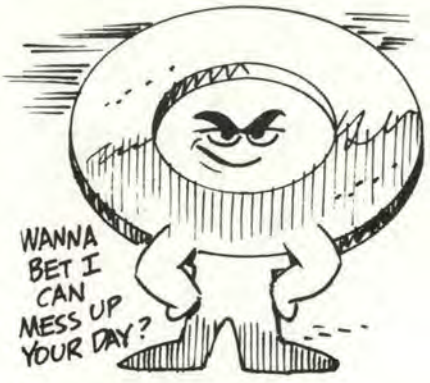
Engine start and pretaxi checks were normal. The aircraft then taxied approximately 50 feet for the prearranged end-of-runway (EOR) inspection by the same two mechanics. With the checks complete, the aircraft proceeded to the runway for takeoff.

When the gear handle was raised on takeoff, the pilot suddenly observed door 3R (large avionics access panel on the Eagle's forward, right side) rotate up from the fuselage. He immediately retarded power, hoping to retain the panel by slowing. However, the panel separated at the door hinges, grazed the windscreen, and continued over the opposite side of the fuselage, bending the angle-of-attack probe and causing the pitot-static instrument readings in the cockpit to become erratic.

Another F-15 was immediately launched to lead the mishap jet down for a straight-in landing, while door 3R dropped in a grass area alongside the runway.

Investigation revealed a number of discrepancies. Because of the mobility exercise, the unit was in a period of non-routine operations. When the pilot met with two maintenance technicians at the aircraft, door 3R was open to allow setting the Mode II identify friend or foe (IFF) code. Because this was a cross-country flight, the pilot did not set a Mode II code. Neither the pilot, crew chief, nor aircraft mechanic remembered closing or checking that door 3R was closed and secured. Neither mechanic had a launch or an EOR checklist. During the EOR check, the same two simultaneously checked each side of the Eagle instead of one remaining in front as a safety observer and the other performing the actual inspection.

During periods of non-routine operations such as mobility exercises and red-balls, it's easy to get caught up in the rush mode. This is where supervisors not only need to know the level of experience of their people, but also should remind them of the need for things like safety and checklists. Granted, the workforce talent may be spread a little thin during exercise taskings such as pallet buildups, but experience has shown this should be the time for the greatest vigilance by everyone.



HARDWARE ITEMS

When performing maintenance on your aircraft, did you ever have to replace a worn or missing hardware item such as a nut, washer, or clamp? Most would agree it is a fairly simple task to obtain hardware items from bench stock or order them from the supply folks. But what happens when the needed hardware is unavailable? Even though the following story happened at one of our tactical airlift wings, there's a lesson here for all aircraft maintainers.

While airborne during the first scheduled flight following an engine change, the C-130E crew was forced to shut down the number two engine for an excessive tailpipe vibration. After an uneventful landing, the aircrew turned the aircraft over to the maintenance investigators who found improper washers installed on the number two rear lord mount. In fact, these washers and nuts had actually pulled through the rear lord mount, leaving it connected only by the top bolt.

While reviewing past maintenance documentation, investigators found the rear lord mount on the C-130's number two engine had been changed for a previous vibration discrepancy. During that maintenance, a technician needed to replace washers on the two lower bolts on the rear lord mount. All of the required hardware was available in the shop's benchstock except for these particular washers, which had to be issued through the shop's supply point. When the washers were unavailable, the technician obtained an improper substitute and used it, not realizing this washer was small enough to pull through the mount during engine operation.

The aircrew in this mishap was fortunate, as they were able to shut down the vibrating engine and land their aircraft safely. In 1982, another C-130 crew also experienced an engine vibration, only they weren't able to land their aircraft.

Once again, it's the small things that contribute to mishaps. We aircraft maintainers need to coordinate with our supply folks to ensure only the correct hardware is issued. Here's another thought.

This particular unit developed a system of making its own rear lord mount change kits so a technician only has to go to the supply point in the shop and obtain one item which includes all necessary hardware.

Perhaps you may want to take a look at your own hardware replacement procedures. Are sufficient replacement items such as nuts, bolts, screws, washers, and clamps available? And, most important, are they the correct type? Proper hardware, even washers, can make a difference. ■

MAIL CALL

EDITOR,
FLYING SAFETY MAGAZINE
AFISC/SEPP
NORTON AFB, CA 92409-7001

"Outstanding Group"

■ I am writing to you about the outstanding group of jet engine technicians who are assigned to the 7023d Aircraft Generation Squadron (AGS), Spangdahlem AB, Germany.

Since November of 1985, they have earned 45 consecutive zero defect (ZD) inspections from quality assurance on the installation of the J79-17 engine in the F-4E/G aircraft.

With tremendous hard work and dedication, they have totally shattered the previous Spangdahlem record of 12 ZDs. Their remarkable record is second to none in the USAFE and challenges to be the best in the U.S. Air Force.

I hope this exceptional achievement and their tireless efforts will be mentioned in your magazine. They are true professionals and deserve to be recognized for keeping freedom under America's wing.

SSgt John S. Kikta, USAF
7023d AGS
Spangdahlem AB, Germany

Thanks for your letter and superb words on the outstanding group of professionals in the 7023d AGS. Flying Safety magazine is proud to hear of this conscientious and dedicated maintenance team. ■

SHARE THIS MAGAZINE

Our distribution ratio for *Flying Safety* is 1 copy for every 12 aircrew, aircrew support, and maintenance people. So, remember, there are 11 others who want to see this issue!

What Would You Do?

BIRD STRIKE

■ During a regular channel mission while on climbout from an overseas base, a C-141 struck a single bird at 1,000 feet AGL. The bird hit the left edge of the radome and punctured it. The bird then struck the leading edge of the left wing and was imbedded in the wing. The crew could not see any damage and notified the command post of the bird strike.

What would you do?

a. Abort the mission and land for a maintenance inspection.
b. Continue the mission and have the aircraft inspected at your destination.
c. Ask for a chase aircraft to look your aircraft over.
d. Something else.

What the crew did.

In this case, the crew chose to continue the mission (option b). After an uneventful flight and landing at their destination, the damage was found during the postflight inspection. They were successful, but was this the best course of action?

Bird strikes (even one small bird) can cause extensive damage to aircraft. There is no way a crew can accurately assess that damage from inside the aircraft. A chase aircraft can possibly see external damage, but can't see the total extent of the internal damage. Broken wiring may short out and cause a fire, cracked support members may later cause structural failure, and damaged engines may disintegrate and cause further damage. The list of possibilities is endless.

The safest course of action after a bird strike is to abort the mission and land as soon as practical. There is no peacetime mission that can't be flown another day. ■

Send your real-life submissions to:
What Would You Do?
Flying Safety Magazine
AFISC/SEPP
Norton AFB CA 92409-7001

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UNITED STATES AIR FORCE

Well Done Award

Presented for outstanding airmanship and professional performance during a hazardous situation and for a significant contribution to the United States Air Force Mishap Prevention Program.

Pictured from left to right are TSgt Gene Bouler, Capt Thomas Ferguson, Capt Marc Felman, MSgt Gerald Treadwell, and MSgt Patrick Kennedy. MSgt Clarence Bridges was TDY at the time this photo was taken.

CAPTAIN
Marc D. Felman

TECHNICAL SERGEANT
Gene Bouler

CAPTAIN
Thomas M. Ferguson

MASTER SERGEANT
Patrick S. Kennedy

MASTER SERGEANT
Clarence Bridges

MASTER SERGEANT
Gerald G. Treadwell

68th Air Refueling Wing
Seymour Johnson Air Force Base, North Carolina

■ On 5 March 1986, Capt Marc D. Felman commanded a flight of two KC-10s on an operational deployment of six Marine A-4Ms to Lajes, Azores. Rapidly deteriorating weather at Lajes required him to divert to Santa Maria AB, Azores.

After landing, MSgts Gerald C. Treadwell and Patrick S. Kennedy, boom operators, prepared the aircraft for refueling as a possible strip alert tanker for the following cell. MSgt Clarence Bridges and TSgt Gene Bouler, flight engineers, computed critical takeoff and flight data.

Shortly afterward, an A-4M from the second cell experienced a sheared strut. Because of poor visibility, the A-4's emergency was unknown to the tower; however, the KC-10's crew witnessed the mishap. Immediately, Captain Felman directed crash equipment to the disabled aircraft while Capt Thomas M. Ferguson, copilot, notified the airborne KC-10 of the runway closure.

With weather deteriorating and a KC-10 and three fighters still airborne approaching minimum fuel, Capt Ferguson planned an inflight refueling with the airborne cell. Capt Felman launched his KC-10, performing a successful intersection takeoff and refueling. All five aircraft diverted safely to Rota AB, Spain.

The actions of Capt Felman and his crew clearly prevented the loss of life and four valuable aircraft. Well Done! ■

Project Warrior

1987 Warrior Ten Books

1. **The Men of Company K: The Autobiography of a World War II Rifle Company**
   Harold P. Leinbaugh and John D. Campbell
   William Morrow & Company, 1985

2. **Iron Eagle: The Turbulent Life of General Curtis LeMay**
   Thomas M. Coffey Crown Publications, Inc., 1986

3. **The Challenge of Command: Reading for Military Excellence**
   Roger H. Nye Avery Publishing Co., 1986

4. **Air Force Spoken Here: General Ira Eaker & the Command of the Air**
   James Parton Adler and Adler, 1986

5. **Race to the Swift: Thoughts on Twenty-First Century Warfare**
   Richard Simpkin Pergamon Press, Inc., 1985

6. **Once a Warrior King: Memoirs of an Officer in Vietnam**
   David Donovan McGraw-Hill Book Co., 1985

7. **Crossroads of Modern Warfare**
   Drew Middletown Doubleday & Company, Inc., 1983

8. **A Genius for War**
   Trevor N. Dupuy HERO Books, 1983 (reprint)

9. **Soldiers: A History of Men in Battle**
   John Keegan and Richard Holmes Viking Press, 1986

10. **Fighting Back: Winning the War Against Terrorism**
    Neil C. Livingstone & Terrell E. Arnold (Eds.)
    Lexington Books, 1985