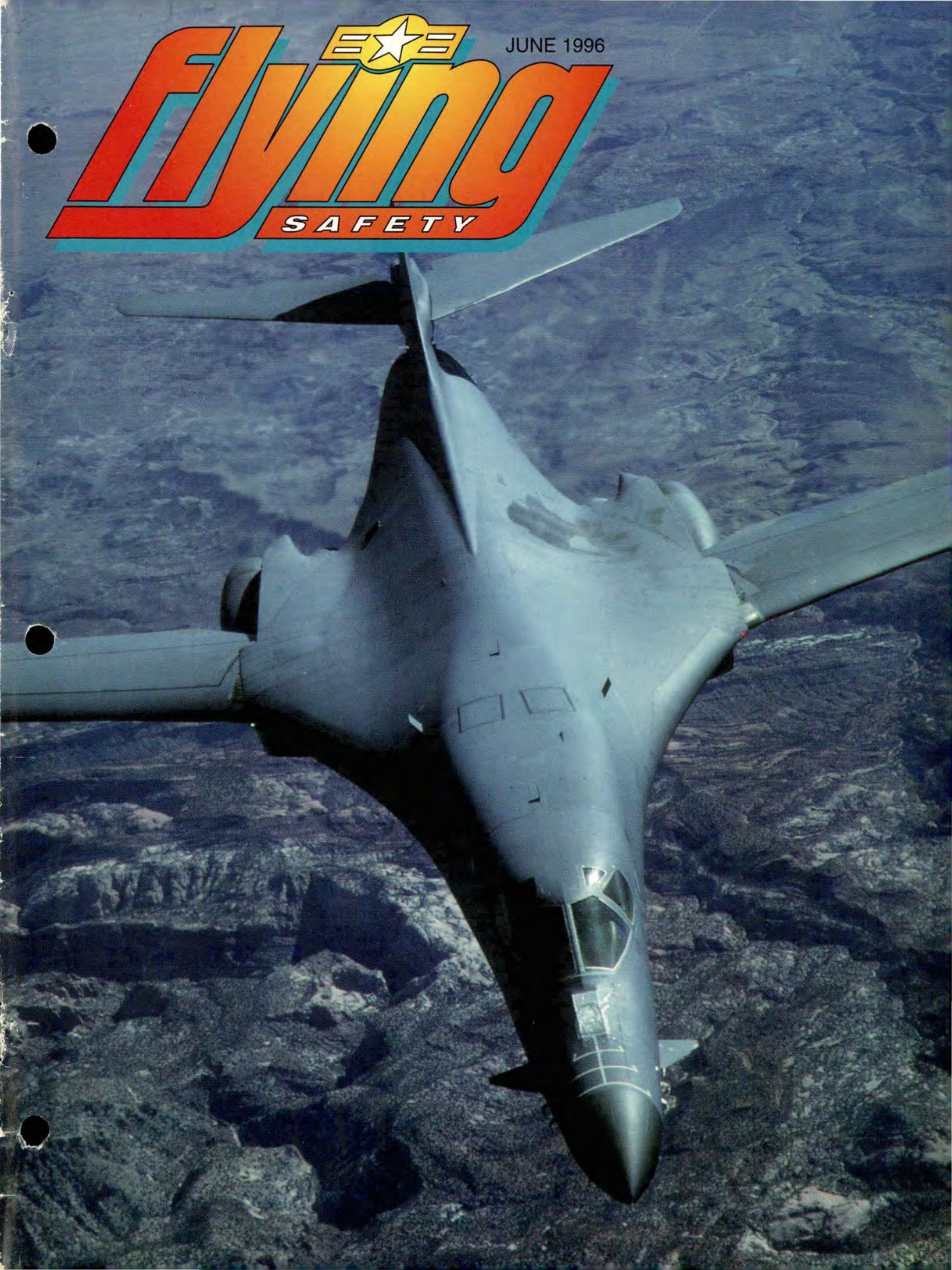

JUNE 1996
flying
SAFETY

There I Was

USAF Photo

CAPT CHET ENIGENBURG
617 ASOS
Mannheim, Germany
Reprinted from *Air Scoop*, Dec 95

■ The only engine I had was operating like the engine in my parent's car — on the day I learned how to use a clutch. Although the GE-100 engine was still producing thrust to keep my F-16 flying, it seemed to be cycling in and out of military power. I didn't know why or what to expect next.

It started as a low-altitude awareness training mission for my four-ship in the Utah Test & Training Range above the Great Salt Lake Desert. Being late spring, the salt floor was covered with a shallow bed of water since the snow had long since melted. Ejection at this time of the year meant landing in a clear marsh with unpredictable complications.

We had split up into a 2 v 2, with my two-ship simulating the "blue air" (good guys). My wingman was engaged north of me, and I was engaged on the man in the south. At 490 KIAS, 690 feet (AGL), and in a climbing left turn to close in on my target for an AIM-9M shot, I suddenly felt an obvious deceleration from military power. "Oh, @#$&! This is not good."

I immediately rolled wings-level, checked the throttle in MIL power, set the pitch to 30 degrees nose-high, and initiated a knock-it-off. Although grateful for the ever-increasing altitude between my jet and the salt flats, I knew there was still a long way to breathing a sigh of relief. The engine continued to operate erratically. At this point, I had no intention of continuing straight ahead over the Great Salt Lake just to return to Hill AFB. So, I chose an easy right turn, selected steerpoint No. 24, and put Michael's Army Air Field on the nose.

By now, it was evident my engine had been operating at less than 100 percent. Passing 10,400 feet, I noticed the secondary engine control (SEC) enunciator light had illuminated. This indicated the engine, at some point, had automatically transferred to SEC.

The Dash One (operator's manual) states that operating in SEC results in only 70 to 95 percent of the selected thrust, and the afterburner function is disabled. As the surging continued, I realized what was happening. The engine was cycling in and out of SEC, explaining why the resulting thrust was so inconsistent.

From 21,000 feet, with Michael's runway 23 miles on my nose, I manually selected SEC to stabilize the engine and pulled the throttle to IDLE for a simulated (I hoped) flameout landing. Although the idle thrust was higher in SEC after touchdown because of the nozzle position, the landing was uneventful, and the crash crew was there to greet me.

It took 3 days and two engine changeouts to determine the culprit was an intermittent electrical short caused by wire chafing in the engine compartment. The Dash One and the F-16 recurring training unit (RTU) systems instructors did a great job of driving home the fact the engine "can automatically transfer to the SEC." The idea the engine could transfer out of SEC once it transferred into SEC was never addressed. Even after I drove back to Hill from Michael's and scrubbed the Dash One for an entry covering this occurrence, I came up empty-handed.

The moral of this story is **the Dash One and all of the emergency simulator rides in RTU could never address every possible emergency situation** which finds its way into your cockpit. For a guy like me, I hope this unpredictable element will always justify the need for a thinking, breathing pilot at the controls and protect what I consider to be the best job in the world. ✈

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Our cover photo by
SrA Andrew N. Dunaway, II
1st Combat Camera Squadron

SPECIAL FEATURES

REGULAR FEATURES

CONTRIBUTIONS

Contributions are welcome as are comments and criticism. No payments can be made for manuscripts submitted for publication. Call the Editor at DSN 246-0936 or send correspondence to Editor, *Flying Safety* Magazine, HQ AFSC/PA, 9700 G Ave., S.E., Ste 282, Kirtland Air Force Base, New Mexico 87117-5670. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

WHEN IT RAINS, IT POURS!

CMSGT DON A. BENNETT
Technical Editor

■ *There's no substitute for responsible, realistic education and training. Once provided to a collection of aircrew members, you have created a highly knowledgeable, cool-headed team of individuals that is capable of superior performance under even the most extreme cases of duress and surprise. That's a fact!*

Here's an excellent mishap-prevention reason why nothing can be taken for granted in today's flight simulator training. It's because you just never know what to expect once you're airborne, so train for the inevitable. We all know the adage "When it rains, it pours," which describes how little things can accelerate to crisis situations, sometimes by the bucketfuls, one right after the other, right?

Before long, "we're up to our armpits," and it's difficult to stay focused. Some aircrews never recover and never return. But for many of you, right when you swore the swamp gators would come out the victors in your particular dilemma, your excellent sim training scenarios and crew teamwork, coupled with healthy doses of self-confidence, systems knowledge, and good judgment, prepared you for the opportunity to beat the odds and arrive safely back home. Here's another success story out of many.

A C-141B crew had terminated a night training mission and was heading home in weather only burrowed frogs would appreciate. There was a 2,000-foot overcast with a jagged cloud base, 7-miles visibility with heavy rain, and strong, gusty winds. It would turn out to be an exciting ride home.

Descending past 8,000 feet MSL, the No. 2 internal navigation system (INS) inop light lit, plus "off" flags on the copilot's attitude and heading reference instruments. No sweat. They turned off the No. 2 INS, and the copilot switched to the attitude and heading reference system (AHRS) as a backup.

At 4,000 feet MSL, the No. 1 INS failed also. Of course, the pilot went to the AHRS system, too. Both pilots were on the backup system. Still no big hill for these climbers — on they went!

On the final turn at 2,000 feet MSL, the Starlifter's crew was further challenged with a "smoke and fumes" situation in the cargo compartment. They took care of this promptly with the smoke and fumes elimination checklist. However, at this point, the unfolding mishap plot thickened! It really started to pour!

Immediately after the smoke and fumes drill was completed, the pilots lost the AHRS and were forced to use the standby attitude indicator and look to the ground to stay with the horizon ahead. The pilot was quite familiar with the area, so he descended to 1,000 feet MSL to remain VMC and make it to the runway. If this ain't enough to make you earn your pay, now comes the deluge!

The crew had declared an emergency with ATC but didn't get to give out other info because of task saturation within the cockpit. After configuring for the approach, the crew was handed off to tower, **then immediately lost intercom and partial radio communications!** (They were really fightin' upstream now!) The ensuing interruption with communications kept ATC from further receiving any emergency response requirements. The pilot's radio could transmit, but he couldn't tell if ATC was receiving anything, which forced the pilot to blindly transmit *without* the benefit of acknowledgment.

The crew finally landed the stricken airlifter and safely egressed. *WHEW!* Now that's the kind of exciting ride we address and stress in sim training but sure like to avoid in flight. And it must be working by the aforementioned professional actions and reactions of this aircraft commander and his crew — **a great performance, y'all!**

Okay — back on the ground — what caused the airlifter to go haywire?

Paralleling the adage "When it rains, it pours," it was, in fact, raining pretty hard during the mishap flight and had been for several days. Because water may have seeped into the cockpit, the impounded aircraft was suspected of having some wet components. Unfortunately, after numerous days of extensive troubleshooting, and the aircraft probably wrung out to within an inch of its life, maintenance still didn't find anything to support the wet component/arcing/shorted-out assumption. In fact, nothing was ever found to support any failure mode at all! (This kind of news will give any prod super or maintenance officer a few worrisome, sleepless nights!) The aircraft was eventually flown on a VFR day for a functional check of all aircraft systems, and everything was fine.

Oh well, as they sometimes say, stuff happens, and all we can do in between these events is prepare our crews for the inevitable. And that's one thing the Air Force does well!

Fly safe! Stay focused! And know when you ain't! ✈

Flying SAFETY

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GLOC ...is the clue bag half full or half empty?

MAJ JOHN AUTEN
82d Medical Group
Courtesy *Torch*, Sep 95

■ It has been a little over 11 years now. While flying an A-10 at 500 feet on a flight lead upgrade sortie, a buddy of mine crashed and died. The tragedy left me and the other lieutenants in the squadron shaking our heads. It must have been a flight control malfunction or some overwhelming visual illusion that caused Greg* to ride his jet into the ground.

But the investigation board concluded the crash was caused by G-induced loss of consciousness (GLOC). "Yeah, right guys. Sorry fellas, y'all missed the target on this one," I thought. "How could a young, healthy fighter pilot, flying the A-10, of all things, pumped up for an upgrade sortie, put himself to sleep?" Later, the flight doc on the board explained to me their reasoning. I was convinced. Given the evidence available to the board, I believed they probably came to the correct conclusion.

Wanting to live a long and happy life myself, I tried to learn from Greg's death. I decided it was my friend's inexperience that killed him. He had just 300 hours or so in fighters. Maybe he didn't realize his G available and snatched the stick. Maybe he thought the jet would turn faster than it did and was unprepared for the additional G he requisitioned.

I filed these thoughts away and became determined this would not happen to me. My clue bag was a little less empty.

A few months later, my first A-10 IP, the best instructor I had ever seen, was killed in an F-5 crash. Capt Compton* was on a continuation training (CT) basic fighter maneuvers sortie when he flew his jet into a nose-low attitude and did not recover. The board decided GLOC was the cause. I was shocked. Capt Compton was highly experienced, and if anyone knew what to expect from himself and his jet, he did.

I was forced to modify my theory that inexperience leads to GLOC. I decided complacency will result in GLOC as quickly as inexperience. Maybe Capt Compton wasn't properly psyched up for this routine CT sortie. Maybe he didn't mentally prepare himself for the punishment

continued on next page

...is the clue bag half full or half empty?

GLOC

As AETC instructors, it is important for us to develop in our students an instinctive AGSM on which they can rely during periods of task saturation. Similarly, students must establish the goal of developing a habitual AGSM which becomes second nature and begins before Gs are applied.

his body would take during the mission. I determined I would never consider any mission "routine." Armed with this determination, I was convinced I could never fall victim to GLOC. I made another deposit in my clue bag.

A couple of years later, a G-related incident occurred to someone else I was particularly attached to — ME! I was an "experienced" A-10 pilot by this time. My wingman and I were practicing coordinated attacks with the help of a forward air controller on simulated targets in the South Carolina countryside. During an IP to target run, while reviewing attack parameters, confirming switch positions, checking six — holy #$%*! An F-16 was closing from my 7 o'clock!

Last I knew I was in a level turn at 300 feet AGL. But, unsure of my present attitude or altitude, I could not bring myself to relax the G. I began to strain, looked straight ahead, and attempted, by feel, to roll out of some bank. After an eternity, I was able to see glare shield, then horizon. Luckily, I was still in a left turn with the nose pointing up.

After this episode, I was very thankful and more than a little confused. I was one of the more experienced pilots in the squadron. I had been to the centrifuge, for crying out loud! I was pumped for my mission. How could I have neglected to strain against the Gs I intentionally demanded from my jet? If I had pulled on the stick a little more aggressively or pulled .5 more Gs, I would have bypassed the visual cues associated with impending GLOC and gone to sleep. I felt as if my clue bag had a gaping hole in it.

The Air Force's clue bag, where GLOC is concerned, has also had periods of varying fullness. In the last 10 years, great strides have been made to avert mishaps and enhance operational capabilities. Factors that decrease G tolerance have been identified and training practices modified. G-awareness maneuvers are accomplished routinely. Quick flow valves have been installed in anti-G systems. Centrifuge training is widespread. New equipment is being fielded. These and other changes have prevented the loss of aircraft and crewmembers.

For a while it seemed the problem was licked. Recent mishaps (including two GLOCs while using Combat Edge) have shown us that, while our clue bag is filling up, it is not yet full.

The failure rate at the Holloman AFB centrifuge (near zero) has shown that about anyone can acquire an adequate anti-G straining maneuver (AGSM). But there are two important things to remember about the AGSM. First, the AGSM (and its timely use) is a skill. As such, it must be practiced just like your golf swing or your backhand.

Research shows a person's resting G tolerance does not decrease after a lack of exposure; however, we all know a layoff adversely affects a person's overall G tolerance. This is because without regular exposure to G, we lose proficiency in performing and timing our AGSM. Since it is a skill, it must be learned properly and evaluated regularly.

The second important thing about the AGSM is that, during high task portions of a mission, we may do a poor AGSM or forget to do one altogether. That's what happened to me. Several things were going on in my cockpit at once. I was momentarily task saturated, and I failed to accomplish the most important task on my "To Do" list.

During the course of a recent Class A mishap, I reviewed 14 GLOC mishaps over the last 10 years. I found that all but one occurred during demanding portions of the mission when pilots channelized their attention or misprioritized tasks. There were no other common threads. The pilots involved in these mishaps represented every size and shape. They had varied levels of experience and physical fitness. The pilots simply failed to perform an adequate AGSM before they pulled on the pole.

As AETC instructors, it is important for us to develop in our students an instinctive AGSM on which they can rely during periods of task saturation. Similarly, students must establish the goal of developing a habitual AGSM which becomes second nature and begins before Gs are applied. Emphasis on this must begin before a student's first sortie in the T-3 and must continue as long as his or her flying career involves pulling Gs. We will do this in the briefing, in flight, and in the debriefing by addressing the AGSM the same way we address any other important aircrew action.

Only through our constant emphasis will an automatic, instinctive AGSM be added to our clue bag. ✈

**Names have been changed.*

A 79-Cent Miracle

Pilot Saves Out-of-Control Jet

USAF Photo by Mr. Walt Weible

Prologue:

It's a paradox that some modern fighters can't be flown by skill alone. Designed to maneuver swiftly, these planes are so aerodynamically unstable they can't be controlled without the aid of a computer. For instance, in the F-16, the balance between disaster and flying agility lies not only in the pilot's hands, but also in the decisions made by the fighter's "fly-by-wire" computer — decisions which, when the computer goes awry, can lead to catastrophic results.

BOB VAN ELSBERG
Managing Editor
Road & Rec Magazine

November 28, 1989, was a bright, sunlit day over Arizona. High above the desert, about 45 miles south of Tucson, 1st Lt John David Noah of the 906th Tactical Fighter Group, Wright-Patterson AFB, Ohio, was flying his second solo conversion flight in an F-16A.

Off his right wing, an instructor pilot (IP) from the Arizona Air National Guard's 162 TFG kept station as the two Fighting Falcons came out of a turn. Suddenly, things went very wrong with Noah's plane.

"I was flying fingertip formation with my instructor pilot when it looked as if he had pushed straight over," Noah said. "In fact, my jet was climbing into a loop. The first thing I noticed, besides the horizon disappearing beneath the nose, was the onset of an almost G-induced loss of consciousness.

The F-16 roared up into a loop. A malfunction in the fighter's fly-by-wire computer had jammed the stabilator (the control surface which causes the plane to climb or dive) in an "up" position. The Falcon screamed through almost two complete loops while Noah fought to gain control of the fighter.

"Down the backside of the second loop, I

continued on next page

As the F-16 roared upward, Noah reached down to the cockpit's lower-left console and hit the computer's manual override switch. Immediately, the aircraft came out of its pitchup, and he regained control. He needed to land the fighter, but he had a serious problem. He couldn't use his left hand to simultaneously operate the throttle and hold the manual override switch. That's when he conceived his 79-cent solution to the F-16's computer problem.

realized I could still roll the plane," Noah said. "I rolled left — just because it seemed the most natural thing to do — and lit the afterburner to preserve some of the airspeed."

As Noah rolled the fighter to the left, the jammed stabilator acted as a rudder, hauling the plane into a tight left-hand turn. About 90 degrees into the turn — or about 20 seconds after the stabilator first locked — the computer released control. To Noah's surprise, the F-16's nose pushed down sharply as the stabilator reversed from up to down. He realized he had instinctively shoved the stick forward and held it there since the pitch-up occurred.

"The first thing that went through my mind was, 'How do I get it across to the instructor that it wasn't me so I don't fail this ride,'" he said.

The IP was also trying to find out what was going on.

"The first thing he said to me was, 'Dave, where are you?' because he didn't see me leave," Noah said. "He said that he looked at me, I looked at him, then suddenly I wasn't there."

Puzzled at Noah's disappearance, the IP caught sight of Noah's F-16 as it came out the bottom of the second loop.

Realizing the fighter could snap out of control at any moment, Noah and his IP hurried toward Tucson International Airport to land the fighter quickly. Noah began putting together a strategy to give him the best possible chance of getting the F-16 down in one piece. Choosing to land the fighter "hot" — without deploying the aerodynamic speedbrakes — Noah also disconnected the trim and autopilot.

"If it pitched up while I was near the ground, I wanted as few drag devices out as possible to streamline the aircraft and keep airspeed bleed-down to a minimum," he said. "Disconnecting the trim and autopilot was a 'Hail Mary' attempt to take out as much of the computer's vote as possible because we weren't sure what was causing the pitchups."

The F-16 responded perfectly to his control inputs and seemed to be flying normally. Noah scanned the cockpit instruments looking for any indication of what had caused the problem, but there were no clues.

The pair of Falcons headed back toward Tucson. Descending through 8,000 feet MSL (mean sea level), or about 5,500 feet above a mountain range below, the computer again took control.

The F-16 pitched up, roaring through a loop. On the downside, "I got a good, close look at the mountains in front of my HUD (head up display)," Noah said.

Although scared, he was prepared to act when the second pitchup occurred. Knowing he could use the ailerons, Noah slowly and deliberately put the F-16 into a left-hand horizontal "corkscrew" barrel roll. By doing so, he kept the fighter on a more or less straight course.

"I was getting a lot of help over the radio from my IP," he said. "Once I started into the left-hand roll, I could hear him saying, 'Roll, roll, roll!' and that's when he said, 'Locate your ejection handle.' I was way ahead of him on that one."

The pitchup lasted for 27 seconds. At that time, the Falcons were 10 miles east of Tucson, flying over a sparsely populated area.

As they neared the airport and entered the 2-mile final approach, the nose of Noah's fighter briefly pitched up about 15 degrees, then settled down again. Noah told the IP, holding at about 200 feet off his right wing, "That wasn't me."

Noah's IP, noting they were low on fuel and close to landing, advised they continue the approach. Forty-five seconds later, Noah's F-16, its landing gear down, crossed over the runway's outer boundary. At that moment, flying at only 200 feet above the ground and slowed to 180 knots, the fighter entered its fourth and "most brutal" pitchup, Noah said. Disaster lay a split second away.

"As soon as I began to feel the 'G' onset, I rolled left and hit the afterburner," he said.

"We had already talked about what to do if this happened low to the ground," he said.

"I was to roll left away from the city, light the afterburner, and keep the lift vector just above the horizon. If the pitchup happened too low and I was out of control, I was to get out of the plane."

Grasping the throttle with his left hand, Noah engaged the afterburner. He accidentally hit an adjacent switch.

"There are so many switches on the throttle," Noah said. "Maybe you've heard the expression, 'playing the piccolo' (throttle). When I threw the throttle forward into the full afterburner range, my hand went forward over the VHF radio transmit switch. On the control tower tapes, you could hear me and the IP broadcasting at the same time. You could hear me breathing and saying my stuff (grunting to control G-induced blackout) while the IP was saying, 'Punch out — bail out — bail out — bail out!' Because we 'stepped on' each other (both transmitting simultaneously), I never heard the command to bail out."

Noah had already chosen to stay with the stricken fighter. Looking out of his cockpit, he saw an airliner directly below him on the runway. Knowing the F-16 was still marginally controllable, he decided to get the fighter away from the airport and the city's 700,000 residents.

As the F-16 roared upward, Noah reached down to the cockpit's lower-left console and hit the computer's manual override switch. Immediately, the aircraft came out of its pitchup and he regained control. He needed to land the fighter, but he had a serious problem. He couldn't use his left hand to simultaneously operate the throttle and hold the manual override switch. That's when he conceived his 79-cent solution to the F-16's computer problem.

Reaching into a pocket of his flight suit, he pulled out a standard government-issue pen. Noah said, "The pen seemed like a logical choice, and it was just thick enough. It was your basic government-issue ballpoint pen I carry with me when I fly."

Noah took the pen and jammed it between the override switch and the metal guards on either side. It worked! With the pen pressing the override switch down, Noah could fly the fighter without interference from the computer.

There was no question of trying to land the fighter again at Tucson International Airport.

"We flew out to Gila Bend Auxiliary Airfield, which is in the middle of the desert about 110 miles past Tucson," Noah said.

"I punched off the centerline fuel tanks on the way because I was planning to take the approach-end barrier, which is a cable stretched low across the end of the runway."

"If I touched down and the plane pitched up on the landing roll, I'd be out of airspeed, ideas, and options," Noah said. "There wouldn't be much chance of using the ejection seat there, so I wanted to get stopped as soon as possible. It worked like a charm."

Both Noah and his F-16 came through the emergency landing unscathed. By choosing to stay with his airplane and landing it intact, Noah gave the Air Force, Air National Guard, and General Dynamics investigators a chance to find the computer problem — which they did.

Noah also potentially saved the lives of many civilians on the ground at Tucson and those of future F-16 pilots who might have encountered the same problem. Pleased with the choice he made, Noah admitted there are no simple answers for a pilot facing an in-flight emergency.

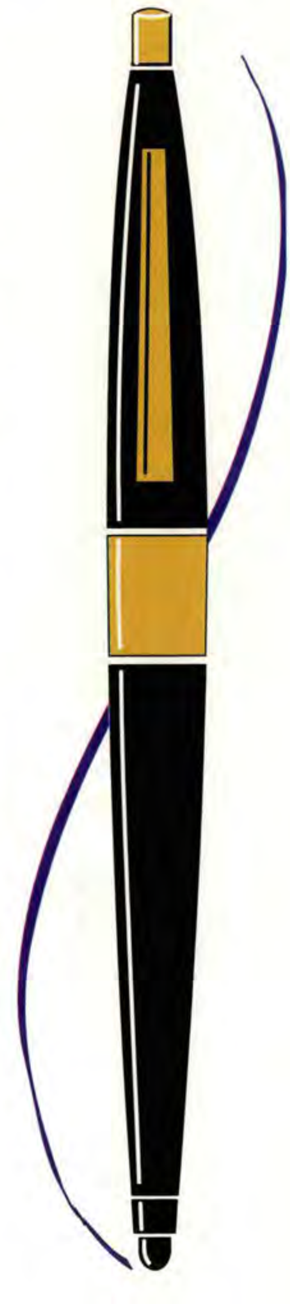
"There is no easy advice," he said. "Fall back on all the training you have because the U.S. military, and especially the Air Force, gives you the absolute best."

Despite his close call, Noah remains dedicated to his job in the Reserve and to flying the F-16.

"I wouldn't trade being a fighter pilot for anything in the world," he said. "The Guard and Reserve system can't be beat."

About the Fighting Falcon, he added, "The F-16 is, without a doubt, the best production plane made — bar none."

Epilogue: *On July 22, 1991, 1st Lt John David Noah received the Koren Kolligian, Jr., Trophy at a special ceremony held in Washington, D.C. The trophy, presented annually, honors the aircrew member who most successfully coped with an in-flight emergency.*



Altimeter Too Low ? LOOK OUT BELOW !

MAJ MICKEY L. QUINTRALL
31 SS/SOS
Maxwell AFB, Alabama

■ As professional members of the international aviation community, it's important for us to understand the different types of altimeter settings and how to apply them to flight. The general knowledge of how an altimeter uses barometric pressure to give accurate altitude information is basic. However, if terms like *transitional level, QNE,* or *millibars* are strangers, this article is for you.

One of the most important considerations during flight is ensuring the altitude indicated on the instruments is the aircraft's correct altitude, referenced by a particular area's barometric pressure, or standard (common) altimeter setting. Of course, the pilot must attain updated altimeter settings throughout the flight. This seems easy enough, but it's sometimes a little more difficult than one would expect. If a flight occurs in more than one country, it becomes a bigger challenge ensuring the correct pressure settings are used.

Altimeter settings (barometric pressure readings) are given to the pilot using a variety of terms. In the United States, most of the time the pressure is given, it is measured in inches of mercury (Hg). In Europe and other world flying arenas, they are provided to pilots in millibars (Mb) or Hectopascals (hPa); thus, conversion tables are found in many aviation publications, including the Flight Information Handbook (FIH).

Adding to the confusion, the International Civil Aviation Organization (ICAO) recognizes three types of "Q" coded aviation altimeter references: QNH, QNE, and QFE. These codes belong to an aeronautical code which defines what altitude corresponds with a particular altimeter setting. Sound confusing? Sometimes the misuse can mean the difference between a safe flight or a major catastrophe.

The QNH altimeter setting represents the pressure that would exist at sea level at that location by measuring the surface pressure and correcting it to sea level pressure for a "standard day" (75 degrees F or 15 degrees C and 29.92 Hg or 1013.2 Mb). That's a tough way of saying "the QNH setting will always display to the pilot the aircraft's altitude above mean sea level (MSL)." Most charts and approach criteria are based on this QNH altimeter. However, another way to check the QNH is to adjust the aircraft's altimeter to indicate the same altitude as the airport's field elevation (altitude above sea level, plus or minus an allowable instrument error).

The QNE altimeter is based on a "standard day" at sea level and is used to indicate the aircraft's height above the Standard Datum Plane, known better as Flight Level 0 or FL0. This FL0 could be above or below sea level, on any given "nonstandard day," which is almost always the case. Nevertheless, the standard barometric reading of 29.92 Hg or 1013.2 Mb gives all aircraft working in the altitude spectrum above a certain altitude the same altitude reference indications. Is it becoming clearer?

The QFE altimeter setting displays to the pilot his altitude above the ground. If the proper QFE is set, the aircraft altimeter, when on the main runway threshold surface, should indicate 0 feet. (Note: Elevations on an airport can greatly vary, even from one end of the runway to another!) Though the QFE isn't used much anymore, this barometric reference is still used in the United Kingdom and is still a reference standard in France.

Okay, okay, I know all of this! Challenge me. Tell me something I don't know. Well, it becomes even murkier with more definitions.

Other terms knowledgeable aviators know are transition altitude (TA), transition level (TLv), and transition layer (TLa). TA is the altitude in the vicinity of an aerodrome, at or below which the altimeter is set to the local area's altimeter setting (QNH). The altitude between the TA and the TLv is known as the TLa.

When an aircraft is assigned an altitude above the TLa, altitudes are referred to as "flight levels" (FL). When an aircraft is assigned an altitude below the TLa, altitudes are referred to in "thousands of feet."

The TLv is the lowest usable flight level, available for use above the TA. However, Annex Two (Rules of the Air), Chapter Three, to the ICAO Convention further defines these altitudes as the cruising levels at which a flight, or a portion of a flight, is to be conducted shall be in the terms of:

(a) flight levels; for flights at or above the lowest usable flight level or, where applicable, above the transition altitude;

(b) altitudes; for flights below the lowest usable flight level or, where applicable, at or below the transition altitude.

It seems simple enough. Altitudes will be referred to as flight levels at or above the transition altitude with an altimeter of 29.92 Hg or 1013.2 Mb. Below the transition altitude, altitudes will be referred as real altitudes, based on the area's actual barometric pressure. It's not quite that easy in today's world of aviation.

Depending where on Earth a flight takes place, the TAs differ. In the United Kingdom, the TA is either 3,000, 4,000, or 6,000 feet, depending on the specific area. In the Middle East, the common TA is 13,000 feet. In the southwest part of the Netherlands, a departure from Germany, westbound through Belgium, must deal with a 5,000 to 3,000 to 4,500 TA, all within about 25 nmi. It takes a keen flightcrew to keep up with some of the rapid European TA changes. It's a little easier for an arriving pilot into Europe because the TAs are indicated on all European approach plates. You might think it's easier when flying in the United States. You decide.

In the United States, the TA isn't necessarily the one QNE-QNH transition. Rather, the TLv is the transition standard and changes with respect to the QNH. As long as the QNH is 29.92 Hg or above, the lowest usable flight level is FL 180. When the QNH falls below 29.92 Hg, the lowest usable flight level is raised in order to keep aircraft using the QNE (aircraft at or above FL 180) above those flying with the QNH (aircraft at or below 17,000 feet). The changing TLvs are established by Federal Aviation Regulation 91.121 and can also be found in The Airman's Information Manual, the FIH, and other aviation reference material.

Obviously, the correct "Q" coded altimeter is a critical flight safety factor. For each .10 Hg decrease in the QNH, the aircraft using QNE is 100 feet lower. Less obvious is the importance of how the altimeter is issued to the pilot. Does it make a difference if the phraseology "two niner niner two" (29.92 Hg) is shortened to "niner niner two" or "three zero zero zero (30.00 Hg to "triple zero")? Sure it does! How the barometric pressure is transmitted could mean the difference between separation and no separation. Maybe it's time for a couple of illustrations.

Prior to descent into destination airport, the arrival controller transmits the QNH as "niner niner one." It's a night ASR approach, and the weather is at minimums. Three miles, on final, the radar final controller transmits, "Three miles from runway, altitude should be niner hundred." The first pilot, monitoring the approach, calls out, "Go around. Go around . . . radar altimeter reads two hundred and fifty feet!" The crew executes a missed approach at (what everyone else thinks is) 800 feet above ground level (agl). When the aircraft commander asks air traffic control to confirm the altimeter is 29.91, they respond "Negative! QNH niner niner one millibars." (This reading equates to 29.27 Hg, a difference of almost 650 feet. The aircraft's real missed approach altitude was 150 feet agl. Considering a 1,000-foot-per-minute descent rate, this example puts the aircraft less than 15 seconds from ground impact (providing there were no trees, towers or buildings).*

Who made the mistake? How could this have been avoided? One other example illustrates how important the correct altimeter setting is.

Aircraft No. 1, IFR, is descending through the TLv, assigned 8,000 feet, but retains (mistakenly) the QNE rather than changing to the QNH. Aircraft No. 2, IFR, departs a nearby airport assigned 7,000 feet with the correct QNH of 28.95 Hg. The results: Aircraft No. 1, with 29.92 Hg dialed in, is really only about 30 feet higher than aircraft No. 2, and with those altitude assignments, probably going opposite directions.

Thus, the saying, "From a high to a low, look out below." This may be considered an extreme example, but it provides the necessary emphasis required for attention to detail and procedural checklists when aircraft change altitudes.

Pilots and controllers must help prevent the barometric pressure confusion factor by saying what they mean. If an aircraft is operating above the TA/TLv, then flight levels or "angels" should be used, not thousands and hundreds of feet. These distinctions should act as a key identifying which altimeter should be used. There are times fighters will continue to use the QNH while operating above the TA. Typically, if the operating airspace is both above and below the TA/TLv, the QNH will be the only barometric pressure reference used and will be prebriefed.

QNH vs QNE vs QFE and Mb/hPa vs Hg and TA vs TLv vs TLa — although it's tough to be a worldwide aviator, the altimeter must be given to the pilot without confusion. It's not just the difference between the professional and unprofessional. It could be the deciding factor between life or death. ✈

*U.S. controllers won't do this unless the pilot specifically requests "Recommended altitude on final."

Trouble Ahead... BIG Trouble!

Courtesy *FlightFax*, Feb 96

As I ruffled back through a moldy logbook and found my frantic handwriting entered, the events described there came back in a vivid rush of memories. As I recall, it was a perfect fall morning. I was a relatively new UH-1 PC (Pilot in Command) of 3 months, just 11 months out of flight school, with approximately 500 helicopter flight hours under my belt. Not bad for a butter bar back then.

The Mission

Our mission was to fly an Air Force officer from a radar site on the west coast to a new gunnery range and return. I elected to fly from the left seat since my pilot was a new WO1 (Warrant Officer 1) fresh out of flight school. We picked up our passenger and were on our way to the range, expecting an uneventful flight.

While the Air Force officer conducted his business at the new range, my pilot, crew chief, and I lounged around the Huey, eating poagie bait, reading the news, and catching a little sun on the side. Before we knew it, we were an hour overdue from our scheduled departure, and the Air Force officer was nowhere to be found.

Since there was no landline set up yet at this remote site, I decided to send our crew chief to base camp to find our passenger while my pilot and I flew to the top of a nearby mountain in an attempt to extend our flight plan and get a weather update. Luckily, we were able to radio our requests through a nearby radar facility that relayed our flight plan change to the flight-following agency. Our weather update was basically "clear blue and 22"; great flying weather. Perfect, I thought, even though we would probably have to refuel en route since we had used some of our fuel reserve flying to the top of the mountain. (As things turned out, that may have been the only smart thing I did that day!)

The Return Trip

We finally found our passenger and immediately departed the range at maximum range airspeed en route to the refueling point, which was due to close in an hour. The refueler obviously wasn't pleased with our delayed arrival. But he proceeded to top off our fuel bladder with cold gas, and I rewarded him with the only thing I had, a stale box of C-rats. By the time we departed refuel, we were 2 hours behind our originally scheduled flight plan. The fast-setting sun in front of us gradually hampered our vision, making it extremely difficult to navigate with the surrounding terrain. (Reliable navigation equipment capable of providing location in this type of terrain was virtually unheard of in a TO&E (Table of Organization and Equipment) unit at this location at that time.)

Just One Thing After Another!

Nightfall quickly approached. I desperately attempted to tune in the VOR at the destination Air Force base — our only available navigation aid. No such luck. Suddenly, a freezing-cold breeze swept through the cockpit, causing the inside of the windows to completely fog up. Thank God our Huey had an excellent defogging system.

We then realized we had just crossed through an unforecasted 20°F temperature inversion that most likely meant trouble ahead. I immediately tried to contact flight following for a weather update. No reply. I tried all of the flight-following agencies for which I had frequencies. Nothing! Now my floor microphone was stuck in the transmit mode. I loosened my shoulder harness and bent over to try to fix it, and my kneeboard along with my radio frequency cheat sheet snapped off my leg and fell into the chin bubble between the pedals.

We then realized we had just crossed through an unforecasted 20°F temperature inversion that most likely meant trouble ahead.

Suddenly, loud sounds erupted as if we had been hit by a truckload of marbles (either hail, sleet, or very large raindrops). It lasted for about 10 seconds. I reached up to turn on our windshield wipers; neither of them worked. I guessed that this was supposed to be my final wake-up call. One thing after another was happening, and our once uneventful flight was becoming entirely too eventful.

I looked out toward the western horizon, and with what natural illumination remained, I noticed an ascending bed of ground radiation (or evaporation) fog combined with a descending overcast. It was as if we were flying directly into a tunnel. I told my pilot to initiate a right 180-degree turn and find a place to land. As we rolled out back to the east, total darkness surrounded us. The few visual ground references we had were quickly being swallowed up by the fog.

Instantly, I realized we were in ***big trouble.*** With all the previous commotion, I knew we were now completely lost, and I was running out of ideas. I thought of all the times my commander, IPs, and safety officer had cautioned me, "Don't ***ever*** get into a situation where you are *forced* to go into IMC." Those words now pounded deeply inside my head.

I instructed my pilot to make right 360-degree turns and remain clear of the surrounding clouds while I tried to radio approach control. After several attempts, I finally established contact with them and requested clearance for radar vectors to the PAR approach. They asked if I was declaring an emergency. My ignorance and frustration seemed to force me to announce "Negative." Approach control gave us a transponder squawk and told us to maintain present position until positive radar identification was established.

With minimum visibility to Mother Earth, my pilot continued 360-degree turns while I struggled helplessly through every instrument publication I had on board. Suddenly, I felt the Huey shudder and begin to sink to the ground as my pilot unknowingly slowed to 15 knots. I yelled at him to increase power and keep the airspeed at or above 40 knots.

Our wait for ATC clearance seemed like an eternity! I couldn't help but think that we were in the vicinity of "Chinook Valley" — a name given to it by aviators after a CH-47 crew trying to avoid IMC got tangled up in 350-foot power lines, killing all on board. I also knew that we had to be just south of a known area of heavy wires that had already taken the lives of several Army aviators. Most of them either crashed into the mountains or got strung up by one of the many wires in that area while trying to maintain VMC.

Suddenly, I noticed our rotating beacon and position lights reflecting off the clouds. I reached up, turned off the lights, and immediately saw a flashing red light as we passed within inches of a large smokestack. I grabbed the flight controls and began a climb while yelling out instructions to my pilot. I then realized that my floor microphone was still stuck, and everyone who was tuned to the approach control frequency was well aware of how I felt about the situation we were in.

We were completely "in the soup" as I requested priority handling. Approach asked me again if I was declaring an emergency. This time, without hesitation, I acknowledged "AFFIRMATIVE!" They immediately responded with a heading and altitude to intercept the PAR approach. Then it hit me like a ton of bricks — *vertigo.*

The constant 360-degree turns we had been flying had given me a serious case of spatial disorientation. I have never in my life fought as hard as I did then against this powerful physiological effect. My brain was insisting that I was in a hard left turn, while my attitude indicator was telling me we were straight and level. I remember shaking my head from side to side hoping to cage my inner ear. It didn't work. I kept yelling at myself, "Fly the instruments; rely on your instruments!" I swear I could hear my IERW (Initial Entry Rotary Wing) instrument instructor telling me, "Believe in your flight instruments and know how to use them because one of these days, they'll save your life." Sweat was now pouring down my face even though it must have been 65 degrees in the cockpit.

Slowly, I began to overcome the vertigo and was able to focus on all the instruments. As the controller vec-

continued on next page

tored us onto final approach, I started to calm down for the first time in almost 2 hours. Even the rain dripping on the top of my helmet (either from the greenhouse or the overhead vent) wasn't going to make me lose my concentration on this PAR. I was totally dedicated to getting us out of the mess I had gotten us into. We heard a flight-following specialist from the flight-following agency trying to contact us. We ignored him as we were not sure which of our four radios he was calling us on, and the preset channels were not working correctly.

It was the darkest night I could ever remember. The rain continued to pound the windows and fuselage surrounding us.

Almost Home

I took a deep breath and mentally prepared myself for the PAR. My attention was now entirely devoted to my instructions from the controller.

It was the darkest night I could ever remember. The rain continued to pound the windows and fuselage surrounding us. I told my pilot to maintain his vision outside the cockpit and to take the controls after he ensured visual contact with the runway. Just as he acknowledged the instructions, a bright orange light lit up the cockpit: a master caution! My stomach felt as though it had dropped through my lap and into the chin bubble where my kneeboard still lay.

The pilot looked down at the caution panel lights and announced a 20-minute fuel light. The fuel gauge indicated approximately 200 pounds remaining. Up to this point, fuel had been the last thing on our minds. I now realized we didn't have enough fuel for a missed approach. Again I asked approach for the current altimeter setting (barometric pressure) and convinced myself that if necessary I would be forced to descend below decision height.

"On course, on glide path." So far, this had been the best PAR I had ever flown, and it had to be. At 50 feet above decision height, my pilot saw nothing; at 25, still nothing; at decision height, nothing. The only thing I could do was to slow to 30 knots while maintaining a 200-foot-per-minute rate of descent.

Within seconds, I experienced the most beautiful sight I had ever seen! The big, bright, high-intensity runway lights glowed throughout the entire cockpit as they guided us onto the runway. This caused us to partially lose our night vision, but at this point, we didn't care. We turned on the beacon, position, and landing lights, and believe it or not, the pilot windshield wiper began to work as we hovered up to base operations. The fuel gauge indicated 100 pounds. "Gas hog," I thought to myself.

Back on the Ground

While we were shutting down, our passenger (frankly, I had almost forgotten we had a passenger) jumped out of the cargo door and thanked us a dozen times. He then ran at a full sprint to base operations. It was obvious that he couldn't have cared less about not making it back to his original destination. I never saw him again.

As the rotor blades came to a stop perfectly parallel with the tail boom, our crew chief yelled out, "I owe you a six-pack of beer, sir." We all laughed off some emotion and stress. I then jumped out of my hot seat, hugged our Huey, kissed the ground, and looked up into the black, stormy skies to thank whomever was watching over us.

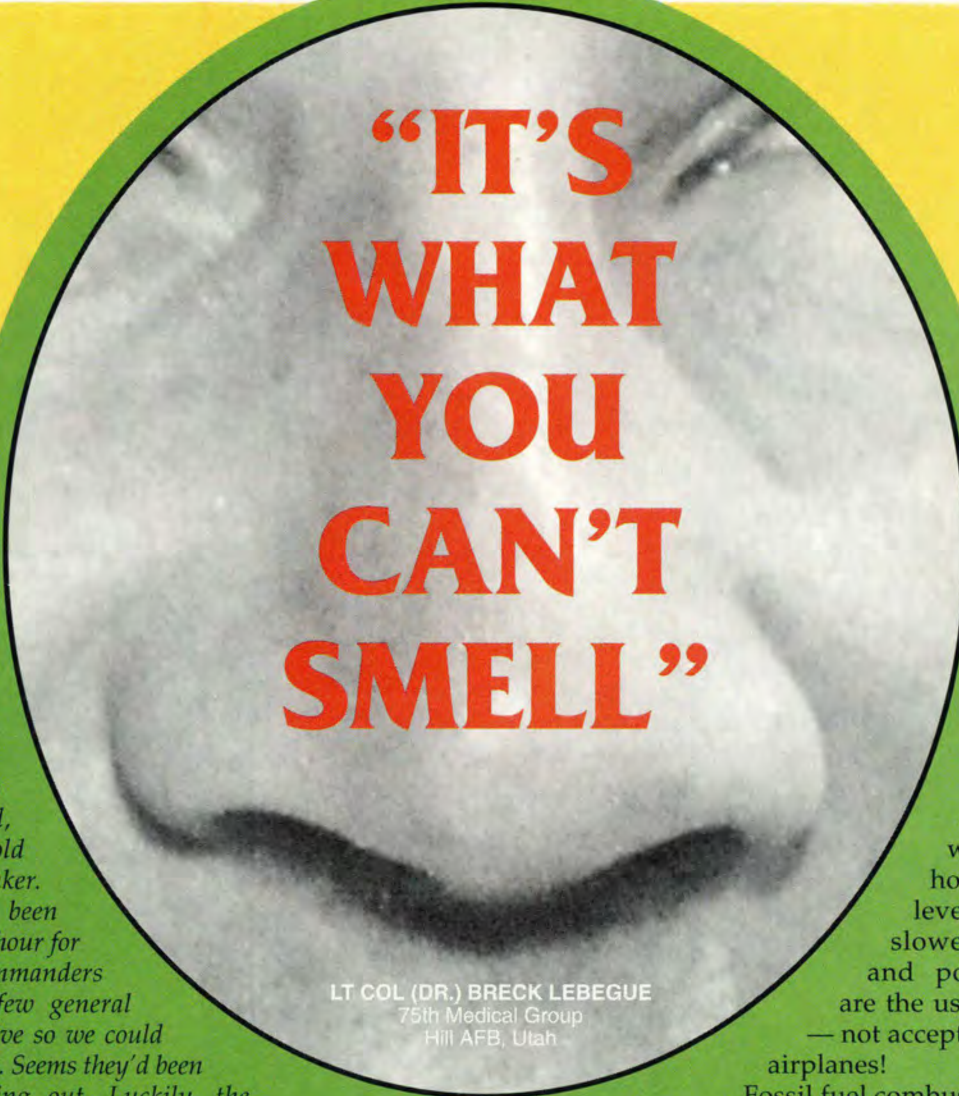
Looking Back

It's amazing how a relatively smooth mission can rapidly and without warning turn into a dangerous situation. We can all learn from the many events that can lead to a disaster. And I wish that I could have shared this story years ago, but at that time, I was afraid that my commander and SP would ground me forever. So my pilot, crew chief, and I swore this mission to secrecy, and I didn't dare log the .6 hours of actual instrument time into the aircraft logbook.

Since that mission, I have accumulated an additional 4,000 military flight hours without a single incident. I have encountered several unforecasted inadvertent IMC situations in other military aircraft (mostly at night under NVGs), but I was always prepared with ***preplanned recovery procedures.***

I've gone over the details of this mission a hundred times in my mind, trying to determine what I should have done better or differently. I don't think there is a specific school solution for this situation, but there are several points to ponder. The Army has implemented many different safety programs over the years that have obviously made a significant impact on our improving safety record.

When this mission was flown, minimum crew-rest policies were established but rarely enforced, blind cockpit procedures and mandatory SFTS (Synthetic Flight Training System) requirements were little to none, hood time was minimal, actual instrument flight was virtually unheard of for Army helicopter pilots, and navigation equipment was very limited. And there was no such thing as risk management, risk assessment, a hazard communication program, a cockpit or crew coordination program, a mission briefing officer, or mission briefing forms. Yes, we've come a long way; and I, for one, don't wish for the good old days one bit. ✈



"IT'S WHAT YOU CAN'T SMELL"

LT COL (DR.) BRECK LEBEGUE
75th Medical Group
Hill AFB, Utah

■ *It was 0700, about 40 degrees on the ramp, damp, with a 20-knot wind, so it was cold inside the tanker. Worse, we'd been waiting for an hour for 20 senior commanders (including a few general officers) to arrive so we could take them home. Seems they'd been delayed checking out. Luckily, the ground guys had the heater fired up. It was pouring hot air up the hatch, so it would be nice and warm for the generals — but there were also some fumes. "Nah, don't worry. All the heaters smell like that," was the reply when I asked if it was safe.*

It's not the smell that kills you. It's the odorless carbon monoxide you **can't** smell that's fatal. In fact, the fumes you smell indicate incomplete combustion, which produces carbon monoxide because there's not enough oxygen available to the fire. When carbon products, including fuels, burn completely, they produce carbon *di*oxide (CO_2), which is readily released from hemoglobin during respiration.

However, when the fire is "starved" for oxygen, it produces carbon *mon*oxide, which binds to hemoglobin ***240 times*** as strongly as oxygen! In fact, breathing a mixture of only 0.1 percent carbon monoxide in air can cause a 50 percent carboxyhemoglobin level in the blood (enough to cause coma and death within 4 hours). At lower levels, headaches, slowed thinking, and poor judgment are the usual symptoms — not acceptable for flying airplanes!

Fossil fuel combustion produces about a 5 percent carbon monoxide level in the exhaust, so it can be very dangerous, very fast. Furthermore, it takes 4 to 5 hours in ambient air, or 80 minutes on pure oxygen, to breathe off just *half* of the carbon monoxide once it's stuck on the hemoglobin molecule.

"Hey, a/c, can you guys do without the heater? I'm more concerned about carbon monoxide than the cold. I'll ask the ground guys to get the bioenvironmental engineer to bring his instruments to sniff for carbon monoxide in that one and to get another one for us."

In this case, they pulled the heater. The generals boarded before we froze, and the story has a happy ending. Sadly, some don't. The most common cause of carbon monoxide poisoning (including some tragic, preventable deaths) is incomplete combustion in home furnaces. Each winter, at the start of heating season, some families never wake up on the first cold morning. ✈

WHAT YOU CAN DO: Be alert. Don't breathe fumes. Remove the source and go on 100 percent oxygen in flight if you smell fumes. Burning plastic can produce cyanide gas — also fatal. Check your car exhaust and home furnace for leaks, and fix them immediately.

Space Command Safety Strategy

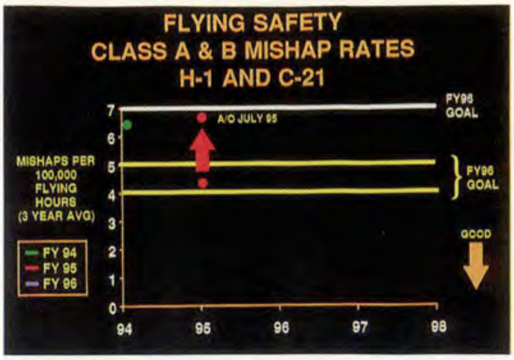
GENERAL JOSEPH W. ASHY
Commander, Air Force Space Command

■ To be effective as a military organization and combat ready, we must have prepared, trained, and motivated people operating quality equipment in sufficient quantity to accomplish the tasks assigned. Our strategy to improve the preservation of our people and equipment resources has been fourfold: emphasize good planning and execution; balance risk and reward of mission accomplishment; provide adequate resources to meet taskings; and most importantly, place emphasis on responsibility at the first echelon of leadership — the supervisor and flight commander levels. We have also maintained our emphasis on recognition programs — both individual and unit.

Overall, we did a very solid job meeting objectives as evidenced by winning the Secretary of the Air Force Safety Award, a testament to the commitment of our people.

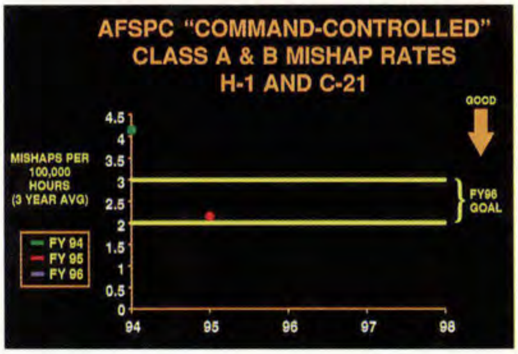
From left, Gen Joseph Ashy, commander of Air Force Space Command; Maj Gen John Gordon, Air Force director of long-range planning and AFSPC's former director of operations; Lt Gen Patrick Caruana, AFSPC vice commander; and Col Kirby Fetzer, AFSPC director of safety, hold the Secretary of the Air Force Safety Award.

However, we can do better in flying safety. At the beginning of 1995, when we were considering an alternate goal for flying safety, we recognized that the existing 3-year flying safety rate for AFSPC (mishaps per 100,000 flying hours) was over six — poor compared to the overall Air Force rate. We did not set the 1995 AFSPC goal immediately to the AF average of about 2.5,

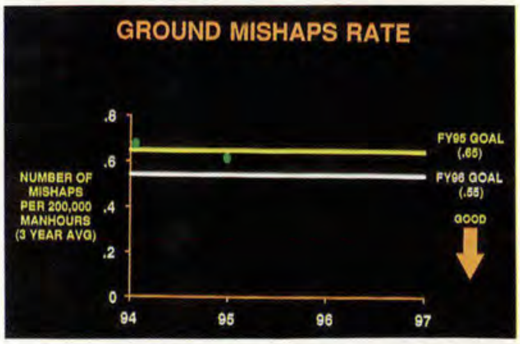


because we knew it could not be attained (if we experienced zero mishaps in 1995, the best we could achieve was a rate of 4.2). Therefore, we set the rate in an attainable window between 4 and 5 (assuming no mishaps in 1995) with a longer term objective to keep decreasing our rate. Unfortunately, we experienced a helicopter mishap this year, so we did not achieve our goal. We considered this in establishing our goal for 1996.

However, there is some good news. Since the 1995 mishap was due to material failure, it was not a "command-controlled"



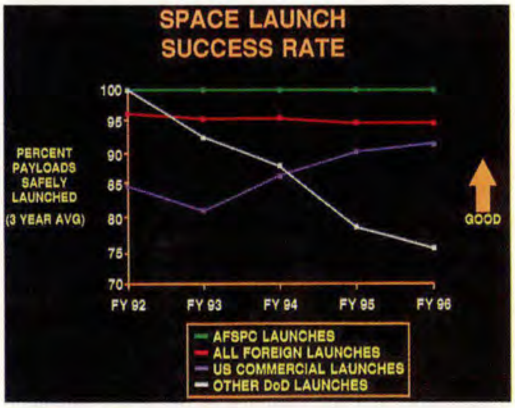
mishap (our operators and maintainers had no control over it). Therefore, when one reviews our record in this category, we improved considerably as the figure indicates. As mentioned previously, we must keep improving and planning. Good execution and leadership are the key elements which will render good results.



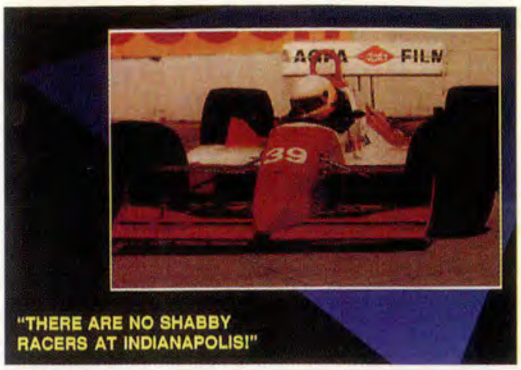
In the ground safety area, our objective was to reduce the 3-year average rate for on-duty and civilian mishaps by 3 percent. We accomplished that objective; very important since it is a measure of the well-being of our people. We believe it also reflects a positive, mission-oriented attitude!

Likewise, in the weapon safety category, we concluded that a rate below two mishaps would be attainable, demonstrate improvement, and prudently balance risk with mission accomplishment. We also accomplished that goal.

One of our major missions in AFSPC is space forces support — and that includes the important task of placing payloads in orbit from our launch bases at Patrick and Vandenberg. DoD delegated expendable vehicle launch operations to the USAF, and in turn to AFSPC. We also support the civil (NASA, etc.) and commercial organizations in their expendable launch vehicle operations. These and other worldwide operations provide valuable benchmarks against which we can measure ourselves.

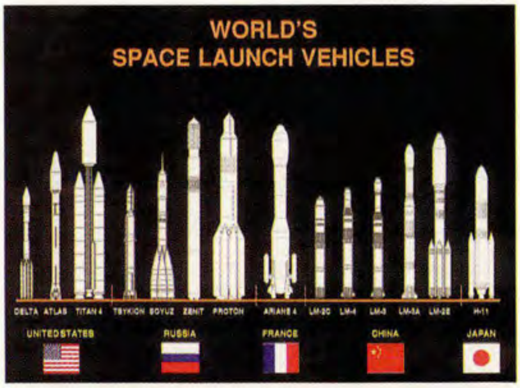


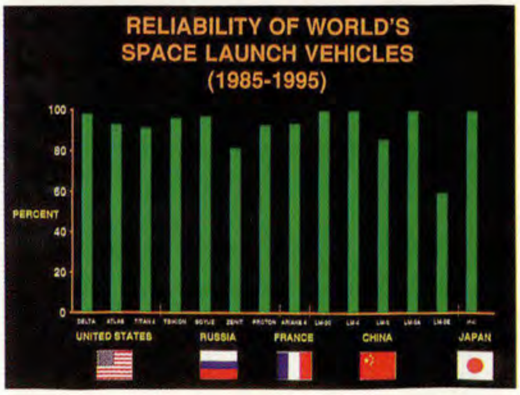
This work must be as perfect as possible and we must be meticulous. That's why we have placed a lot of responsibility, authority, and accountability in our launch commanders to "optimize launch success." We believe the results speak for themselves: great testament to not only the process, but also the professionalism of our command teams. We need to keep our "shoulder to the wheel."



We recently completed an aggressive command training program for safety investigation board (mishaps) and accident investigation board presidents to ensure we have wing commanders, operations group commanders, and logistics group commanders ready to lead the boards in the event of an accident involving any of the command's weapon systems.

To ensure continued availability of trained board presidents, we have secured 20 training slots in the recently created Air Force-level board presidents course to be taught by the Air Force Safety Center at Kirtland AFB. Investigation of incidents involving loss of life or valuable equipment is a very important process and necessary to demonstrate the command's responsible stewardship of the resources entrusted to us — we are putting emphasis on the process accordingly. ✈





HATRs: YOU make the call

MSGT DENNIS R. KING
Chief, USAF ATC Stan/Eval
HQ AFFSA/XATI

SETTING 1: 26 September 1995, 1455 local, swing shift just comes on duty at a midwestern control tower. Being Friday, and having already met the sortie rates for the month, the flying schedule is very slow.

Looks like just another slow swing shift; a time for contemplation or maybe even studying for the upcoming proficiency test. As the watch supervisor scans the airfield, she sees a vehicle accident occur at the intersection by the departure end of the runway. Because the accident is quite serious, and there appears to be no one responding, she gets the attention of the flight data controller.

The flight data controller contacts security police and attempts to describe what has occurred. The ground controller glances at the accident just in time to see one of the vehicles catch fire. During this time, he has been watching a civilian vehicle proceeding around the perimeter road. Believing the vehicle operator is authorized to be out there and, therefore, familiar with the runway environment, the ground controller switches his attention to stare in amazement at what is now a two-vehicle fire with people running everywhere.

The local controller, now the only one in the tower not looking at the accident, quickly scans the runway and clears the only departure scheduled for the first half of the shift. The local controller, also assuming the vehicle now approaching the runway via the NAVAID access road is authorized to be there, is looking directly at the departing aircraft, watching for any abnormalities. As the departure begins what appears to be a normal, safe takeoff roll, the local controller also turns to see what all the commotion is about.

Meanwhile, the flight data controller, who has been on the phone with the security police, looks up to see if the emergency response has arrived. Seeing that the emergency vehicles are, in fact, responding, she turns her head back to her position and prepares to notify airfield management of the aircraft departure. When she looks up, she notices a vehicle entering the runway from the NAVAID access road.

Then it clicks. This picture is not right. The flight data controller quickly gets the attention of the local controller who recognizes the problem and immediately cancels takeoff clearance. The departure aborts takeoff and comes to a stop 100 feet from where the access road enters the runway, with the vehicle directly in the center of its windshield.

Disaster averted, the pilot thanks the controllers for their timely reaction and requests to return to departure end for takeoff. The ground controller, angry at the vehicle operator, advises the flight data controller to contact airfield management and have them send someone out to pick up the driver.

As this conversation continues, airfield management is notified, and the watch supervisor begins gathering statements necessary to justify a save package for the wonderful job her crew did in saving the lives of the pilot and that stupid vehicle operator who should probably have a HATR filed against him, but vehicle incursions happen all the time and, of course, everyone makes mistakes.

The pilot, in an attempt to meet their scheduled departure window, again reaches departure end, is cleared for takeoff, and departs without further delay. Because the pilot was in a hurry and nothing really bad happened ("the system worked as advertised"), no HATR was filed by the pilot.

The watch supervisor, knowing the right way to do things, advised the chief controller who requested the tape be pulled for review. The chief controller listened to the tape

NEWS ITEM IN LOCAL PAPER:

A mother and her three small children died today when their vehicle was struck by a landing aircraft at this midwestern Air Force base. The family had been stationed at the base for less than a week. The mother had taken the children to see their new school, got lost, and apparently thought the access road would lead them back to the housing area. According to the base public affairs office, the mishap investigation revealed the warning and hold signs located along the access road had been temporarily removed by a construction crew resurfacing the road.

and decided that although an aircraft save may be appropriate for the actions of the flight data controller, a HATR would also be appropriate. The chief controller completed the AF Form 651 (Hazardous Air Traffic Report) and forwarded it, along with the information for the save package, to the airfield operations flight commander (AOF/CC). The AOF/CC agreed with the save, but due to recent guidance passed down through the wing which identified HATRs as quality performance measures (QPM), decided a careful approach with processing the HATR would be best. The AOF/CC decided to call the operational support squadron commander (OSS/CC) to get their feel for the idea of filing a HATR when the pilot had not deemed it necessary. The OSS/CC, who had also been briefed of wing policy reference HATRs as QPMs, decided to call his friend at the base safety office. The base safety officer reinforced the OSS/CC and AOF/CC concerns by stating, "The wing commander would certainly like to reach zero HATRs."*

A save package was completed, the AF Form 651 was thrown away, and a locally conducted investigation was completed. It was determined that a construction team working on the access road had removed the warning and hold signs without permission from airfield management in order to pave the road. The newly paved road, without warning signs, looked like any other road on the base. The case was solved, wrapped up neatly, and placed in a file in the base safety office.

SETTING 2: 26 January 1996, 1455 local, another Friday, another slow swing shift in another midwestern control tower.

Flight data control sees an ultralight enter the airspace at approximately VFR pattern altitude, moving very erratically. In true amazement, he yells for the ground controller to "Look at that!" The ground controller turns to look where the flight data controller is pointing. The watch supervisor, hearing the conversation and wondering what's so interesting about an ultralight, also goes over to the window and looks out.

The local controller is busy watching an aircraft on short final for a full-stop landing and scanning the runway. As the aircraft gets over the approach lights, the local controller thinks something looks unusual with the gear. The local controller picks up the binoculars and checks the gear — nope, everything is okay. As the local controller continues to watch the aircraft land, a civilian vehicle approaches, then enters the runway from a seldom-used NAVAID access road. The vehicle wanders aimlessly (because the driver is confused and lost) back and forth across the runway centerline.

Meanwhile, the pilot of the aircraft has his hands full. He spotted the vehicle just as he was flaring for touchdown. As he applies full power in an attempt to go around, he hears and feels the landing gear make contact with the vehicle.

The local controller is stunned by the sight on the runway. In a wavering voice, the local controller advises the watch supervisor of the incident and advises the flight data controller to activate the crash phone.

THOUGHTS: These incidents didn't actually occur, but could they? Could a HATR investigation and subsequent well-disseminated report of the 26 September 1995 incident (the one which identified the perimeter road and lack of warning signs as contributing factors) have helped prevent the 26 January 1996 mishap? Also, if read closely, other vital mistakes or false assumptions were made due to outside distractions. Highlighting these mistakes as part of the HATR investigation and the fact they were directly related to outside distraction might have prompted the second location to be on the lookout for similar situations! If the next time the decision to file or not to file falls within your area of responsibility, we can only hope you make the right call!

*Just a reminder — in accordance with AFI 91-202, attachment 3, the HATR Program is not to be used as a quality performance measure, nor is it punitive in nature. ✈

JEPPESEN APPROACHES: WHY CAN'T WE JUST USE THEM?

Maj Kevin Jones
HQ AFFSA / XOFD

■ I recently went TDY to Ramstein AFB, Germany, where I was reacquainted with life in the "real Air Force." As a guest of the 86th Airlift Wing's 37th Airlift Squadron, I became acutely aware of how busy life is these days in an operational squadron that responds daily to "real world" contingencies. During my week at Ramstein, I also gained a great deal of insight into how USAF rules affect the aircrew's ability to effectively perform their mission.

The aircrew "question of the day" at Ramstein is no different than the calls we receive from the field every day here at the Air Force Flight Standards Agency (AFFSA): "Why can't we just use Jeppesen approaches?" It's a valid question which affects the way we do our mission, and it deserves an honest answer.

Let's use a common scenario to frame our discussion. You show up at the squadron to fly, only to find the schedule is covered in red ink. The mission you expected to fly has been changed because of a short-notice tasking. No problem. Changes are what make your job challenging. Flexibility is the key to airpower, right?

You haven't heard of your destination before, so you go to the flight planning room to look up the field in FLIP. Amazingly enough, you discover the field's approaches are not published in DoD or NOAA FLIP. As you scratch your head and wonder what to do next, another member of your crew rushes in waving a copy of a Jeppesen approach servicing your new destination. Assuming the approach is current (big assumption), what other factors should you consider as the aircraft commander?

Our starting point is a book we are all familiar with — AFI 11-206, *General Flight Rules.* Paragraph 8.4.1

defines the term "Published Instrument Approach." Our discussion will center around bullet 4, which says a published approach is . . .

"Any product not published in a DoD or NOAA FLIP document, but approved by the MAJCOM for which an operational requirement exists. The MAJCOM Terminal Instrument Procedures (TERPs) office must review the product before MAJCOM grants approval. The MAJCOM TERPS office shall inform aircrews when a product does not meet recognized obstruction clearance and (or) flight inspection criteria."

First, let me point out one important fact: We are not singling out Jeppesen approaches in AFI 11-206. Paragraph 8.4.1 applies to ***all*** non-DoD/NOAA instrument approach procedures — Jeppesen just happens to be the company which publishes most of the non-DoD/NOAA approaches we use. Although the rest of this discussion will center specifically on Jeppesen approaches, the rules apply equally to ***all*** other non-DoD/NOAA instrument approach procedures.

Back to our scenario. *Can you use the Jeppesen approach?* According to the fourth bullet from AFI 11-206's paragraph 8.4.1, you can consider the Jeppesen approach a published approach as long as two things have happened. First, the approach must be reviewed by your MAJCOM TERPs office. And second, your MAJCOM must grant you permission to use the approach. If both of these events have occurred, you may use the Jeppesen approach as a published approach. If either of these two events has not occurred, the airfield you are going to must be treated as if it has no published approach.

How do you know the appropriate review has been accomplished? Here's where things get tricky. AFI 11-206's guidance is very clear; however, MAJCOM flight directives (MAJCOM supplements to AFI 11-206, 55- and 11-series MCIs and/or MCRs, FCIFs, FCBs, etc.) provide conflicting guidance. The important thing to remember is that MAJCOM flight directives can never be less restrictive than Air Force-level guidance. Operational commanders must provide aircrews with the appropriate approved flight publications for the missions they are tasked to fly. As usual, though, the last line of defense is the aircraft commander. In the end, it is the responsibility of the aircraft commander to ensure any non-DoD/NOAA approach procedures have been properly reviewed and approved by the MAJCOM.

Now, I know a lot of you are out there saying, "Your requirements are unreasonable. We can't go through this process every time we have to use Jeppesen approaches. We can't do our mission, etc. . ." I understand your concerns. Let me tell you a little about Jeppesen, and then we'll do a "sanity check."

As I mentioned earlier, I'm not picking on Jeppesen. Jeppesen is highly respected in the aviation community. However, they are strictly a publishing agency. They take locally developed procedures, print them in the Jeppesen format, and sell them to users worldwide.

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Lessons In SAFETY From

COMMANDER CURRENT

TSGT KRISTOFER J. CARLSON
85 GP/SE
Keflavik, Iceland

■ Even the best of us make mistakes. That's what I try to tell myself, anyway. If we make our mistakes in private, and if we can fix them before anyone notices, our reputation remains intact. But what happens when we blow it in front of God and everyone else? This is a story of such an incident.

It was the early 1980's, and I was a young 5-level working on F-111Ds at Cannon AFB, New Mexico, during my first ORI. Because of the high workload and low manning, I was working alone. The ORI had raised the stress level to new heights, and all of us were working at a fever pitch.

I was working several avionics problems concurrently. I had changed the Inertial Reference Unit and had begun a gyrocompass alignment of the Inertial Navigation System (INS). During the 24 minutes it took for a complete alignment, I began troubleshooting the ground radar system by performing a pressure check on the radar waveguides. The flightline expediter drove by and told me an aircrew was on the way, to leave the INS running for them, but to stop all other maintenance and button up the aircraft. The F-111D had a backup to the broken radar system, and the pilots would take it as is.

I was stressed from the pace of the exercise, from the long hours in chem suits, and angry about not being allowed to fix the aircraft. I ripped 4 or 5 feet of safety wire off the spool and began to safety-wire the radar pressure ports which were positioned about 18 inches above the main AC power panel. Because the INS was aligning, power was still applied to the aircraft.

Can you see what's coming? In retrospect, it seems obvious. One end of the safety wire was grounded to the pressure port. The long end of the safety wire made its way through a ventilation hole in the back of the AC power panel and contacted a 20-amp circuit breaker. The safety wire melted instantly. I was lightly holding the safety wire, and I wasn't grounded, so I didn't receive an electric shock. The dripping metal solidified inside the AC power panel and all over the ground, creating a foreign object hazard. The molten metal left a nice charred line across the inside of my palm.

My hand had begun to hurt by the time the expediter came back, and I asked if I could go to the clinic, or at least use a first-aid kit. He freaked out when I told him what had happened, and even though I assured him I hadn't been shocked, he called for medical assistance. I was picking up the pieces of solidified safety wire from the ground when the fire trucks and ambulances arrived. I received an EKG, an overnight stay in the hospital for observation, and embarrassing nicknames like "Kid Spark" and "Commander Current."

The Air Force Safety Center recently defined a mishap as "the unplanned result of a behavior or condition that is likely part of the organization's culture." During the early 1980's at Cannon AFB, we had our own way of doing things — things like not using the two-man concept when working around live electrical circuits, or waving our hands in front of the radar feed horn to see if it was radiating. (If our hands got warm, it was. This worked fine until our hands began to go numb from nerve damage.) We also had to work several different malfunctions at the same time, even if it wasn't always safe, because the F-111D's high failure rate and the ever-increasing sortie commitments forced us to. Safety was always a minor consideration. We thought rules were for fools. We had the *right stuff*. We knew better. And we had a lot of incidents as a result.

Why did the incident happen? Well, ignorance was part of it. Young 5-levels may be book smart, but lack experience. "Seasoning" young troops by failing to supervise them is an invitation to trouble.

Another factor was the failure of supervisors and commanders to call a halt when the taskings became greater than the available resources could safely fulfill. But most of all, it was my fault. I set myself up for an accident by responding inappropriately to stress. I let my emotions override my judgment. Given the potential for disaster, I was lucky to come away with only a bruised ego and a couple of embarrassing nicknames. Will you be as fortunate? ✈

Don't Forget the FORMS! — Revisited

CMSGT DON A. BENNETT
Technical Editor

■ **Once you're properly trained and educated on your Air Force duties and responsibilities, it's a simple function of "be where you're at — stay focused."**

We ran an article in the October 1995 issue of this magazine with the same title. The initial article related the story of an aircraft maintainer and a fighter pilot hastily launching a jet for a mission, yet *both* failed. As a team, they shaved a few critical corners when they got behind the power curve, and their mission had to be scrubbed for foreign object damage (FOD) to one of the jet's engines.

The FOD was caused by the ingestion of the mishap jet's forms during the engine start. The forms had been left in the engine's inlet and weren't **rediscovered** by either the crew chief or the pilot on their respective walk-around and preflights (checklist discipline?).

Well, here we go again with another story about an engine sucking up a set of aircraft forms — **another preventable FOD incident!** It also entails the same lack of effective *ops-maintenance* communications, the same levels of individual and ops-maintenance launch team complacency, the same costly results because of another case of "rush-itis." The mishap die was cast only moments after the pilot stepped for the mission.

When the pilot finished reviewing the aircraft forms, he handed them (plus some AFTR tapes to be installed in his aircraft) to the aircraft crew chief. The crew chief, in turn, **set the forms in the jet's engine intake,** then went to install the tapes! From this moment on, the mishap countdown clock started ticking. It was only a matter of time — *when* the mishap would happen — not *how* it would happen!

The crew chief next performed his prelaunch walk-around (time pressure?) while the pilot did his preflight. *Neither* made an attempt to remove the forms from the engine intake (task channelization?), nor did another maintainer assisting in the prelaunch duties (not to worry, he probably thought the crew chief who put the forms there in the first place would also remove them).

An interesting question arises at this point in time: Aren't thorough engine intake inspections an **absolutely critical** part of walk-arounds, thruflights, preflights, etc., performed by ground and flight personnel? In fact, *both* the pilot and the assisting maintainer had observed the forms sitting in the engine intake prior to the engine start. So that makes a total of three people who knew of the preexisting unsafe condition, yet not one of them (organization's safety culture ailment?) did anything to stop ol' Murphy from springing another mishap trap.

After the crew chief strapped the pilot in and climbed down the ladder, he called out his checklisted launch action items as completed and cleared the pilot for engine start. The other maintainer was posted as a fire guard at a position which was left and aft of the mishap engine. So naturally, he wasn't able to see the forms in the intake — **for the last time** — prior to the engine start. Apparently, the primary crew chief *never* looked again at the engine intake after descending the ladder and before giving the engine start clearance (rush-itis?).

Everything went all right during the engine spool-up, except for a few unusual rumblings observed by the pilot at approximately 30 to 35 percent rpm. And there still weren't any indications within the cockpit that something was going wrong even as the pilot performed a few engine performance checks. The crew chief, and especially his assistant — the posted fire guard with a front-row seat by the engine's exhaust — must not have observed anything wrong either (channelization?). Thankfully, nearby maintenance supervisors saw a strange-looking exhaust coming from the mishap engine and called the pilot up and directed an immediate engine shutdown. **What if the engine hadn't been promptly shut down at this time? Class B? Class A?**

Soon they all got to see what was left of the aircraft forms and *another* costly FOD'd out engine, just because several key people responsible for safely launching an aircraft became channelized in the performance of their duties, failed to communicate, developed a textbook case of **"rush-itis,"** and then promptly forgot all about the forms!

Now, how in the world do three experienced, trained people forget about a set of forms sitting in an engine's intake just minutes before the engine is started, especially when several of them had a distinct checklisted responsibility to ensure the engine inlets are cleared of foreign objects and safe to start? For instance, why would an experienced crew chief give the okay for engine start *without* visually checking the engine intake first, as it is directed and expected of our Air Force maintainers during *any* engine start?

REPEAT: **Why would *any* experienced, supposedly maintenance-disciplined crew chief give the okay for an engine start *without* visually checking the engine intakes first?**

Just as incredible, why did the pilot allow the aircraft forms to be stored in *his jet's* engine intake in the first place, for *any* reason?

So maybe all three of the FOD incident participants were task-saturated or mission-rushed, but so what? They had a checklist that's supposed to help them out and keep them focused on the minimum requirements to safely launch their jet. There are thousands of pilots, aircrew members, maintainers, and ops support personnel who face these same hectic, fast-paced conditions every hour, every day throughout the Air Force, yet they don't cause a mishap, and they **"don't forget the forms"!**

"BE WHERE YOU'RE AT — USE YOUR CHECKLIST — STAY FOCUSED." ✈

USAF Photo by MSgt Perry J. Heimer

Hammer ACE technicians are equipped with some of the latest communications equipment. They can deploy a three-person team worldwide within 3 hours of notification. These experts and their gear respond to situations as small, fast moving, flexible teams. Pictured above are MSgt Michael Vaught (front), TSgt Vernon Hoehn (left), and SSgt Steve Tucker (rear).

In mid-September 1980, two nuclear-related accidents occurred in the United States that drew sensational coverage in the press, alarmed the public, and revealed a communications deficiency in the Air Force's command and control capabilities. On the night of 15 September 1980, a nuclear-loaded B-52G bomber caught fire during an engine start and burned on the parking ramp at Grand Forks AFB, North Dakota. While no nuclear contamination resulted from this accident, it had been a serious and potentially catastrophic incident.

Hardly 72 hours later, on 18 September, an even more grave event menaced the public safety when a maintenance worker dropped a 3-pound wrench into the silo housing a Titan II Intercontinental ballistic missile which punctured a fuel tank. As flammable vapors escaped, technicians worked furiously to plug the leak. At 3:01 a.m., as technicians gave up repair operations and began climbing out of the silo, the mixture of fuel and oxygen exploded. Orange flames spewed out, and the blast blew off a 750-ton concrete cover. One worker was killed and 21 others were hurt.

"Hammer ACE — The Manifestation of a Concept" by Timothy J. Mucklow, November 1988

The Need

Following these incidents, Air Force investigators revealed that firefighting and recovery efforts had been seriously impaired by the lack of flexible, secure radio communications between on-site commanders, the base command posts, and HQ Strategic Air Command, Offutt AFB, Nebraska (now Air Combat Command, Langley AFB, Virginia). Also, throughout the latter incident, members of the local press and representatives of the major television networks monitored the Air Force's efforts to extinguish the fire and recover the nuclear warhead.

By listening to the Air Force's unsecured radio transmissions, the media followed the disaster as it unfolded. Reporters, not familiar with Air Force terminology or disaster operations procedures, sought to keep the public abreast of the story as they understood it. Press and television coverage, therefore, heightened rather than allayed the public's anxieties. And the press unwittingly revealed sensitive information and procedures whose compromise might be considered damaging to the national interest.

The Answer

The Air Force's answer to this type of situation is Hammer ACE. Hammer ACE is the Air Force's special purpose, quick reaction communications unit which supports worldwide emergency and disaster response forces, civil disaster relief operations, and military exercises and communication equipment testing/evaluation. Hammer ACE can deploy a three-person team, worldwide, within 3 hours of notification.

Hammer ACE technicians are equipped with some of the latest communications equipment. These experts and their gear respond to situations as small, fast-moving, flexible teams. They can adapt to any situation's communications needs with cellular telephones, facsimiles, land mobile radios, message traffic support, air-to-ground communications, satellite communications, and still-frame photography. Store-and-forward still frame video systems and International Maritime Satellite (known as INMARSAT) communications terminals are additional options available to the on-scene commander which make the teams the most well-rounded communications source available. In addition, the unit is equipped with solar panels and electrical generators for equipment operation when commercial power is unavailable.

Who to Contact?

Providing superior communications for the warfighter doesn't necessarily mean it has to be an Air Force warfighter. Hammer ACE has and will support anyone in the Department of Defense and other Federal Agencies if and when the need arises.

For emergency requests, contact Scott AFB, Illinois, Command Post, DSN 576-5891 or commercial (618) 256-5891. Requests are initiated by wing or base command post with **followup message** within 24 hours. Provide organization, rank, and telephone number of requester. Emergency requests are funded by Hammer ACE. Support for testing and exercises can be obtained by contacting Hammer ACE at DSN 576-3431. Hammer ACE requires funding from the supported unit for testing and exercises. ✈

Message address is:
AFC4A SCOTT AFB IL//SYG//SYGA//
INFO AFC4A//CC
Mailing address is:

Hammer ACE
AFC4A/SYQA
607 Pierce St., Rm 409
Scott AFB, Illinois 62225-5421

HOW HAMMER ACE WORKS

May 1995 — Zuni Indian Reservation
Southern New Mexico

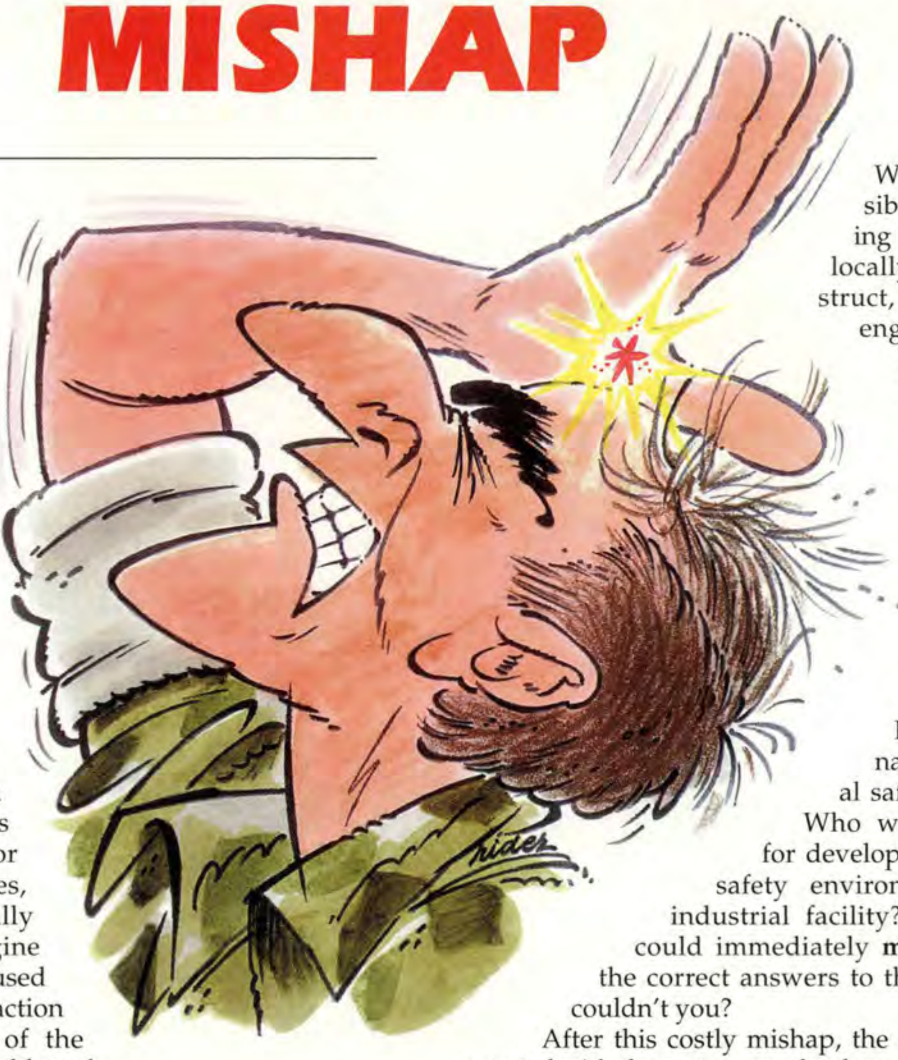
Within hours of an F-117 crash in the New Mexico desert, Hammer ACE was notified, and a three-man communications team was en route via C-21 Learjet. Landing at Kirtland AFB, New Mexico, the team offloaded their 16 suitcases (about 640 pounds) of communications gear to a waiting chopper. Hammer ACE arrived at the crash site, an area accessible only by helicopter and dirt trails, where "organized chaos" was the order of the day. The on-scene commander, because of a communications blackout, could not receive or transmit vital information needed for recovery operations.

Upon Hammer ACE's arrival, the on-scene commander was briefed on the team's communication capabilities, and a communications plan was set into motion. Electrical power was a major concern, as neither commercial nor generator power was available. The Hammer ACE team's first priority was to set up a power supply network consisting of solar panel power supplies, lithium batteries, and a DC to AC inverter connected to a vehicle battery. Within 20 minutes, a command post was established in the back of a Chevrolet Blazer with two International Maritime Satellite (INMARSAT) terminals, one half-duplex secure UHF Tactical satellite radio (UHF SATCOM) with a backup, and ground-to-air communications. With the "Hammer Zone" established, the on-scene commander had worldwide connectivity, ending the communications blackout.

The remainder of the first day was a blur of UHF SATCOM phone patches and INMARSAT phone calls to the base and other agencies that ended when darkness forced the on-scene commander to halt operations for the day. By day two, equipment was under generator power, and the command post transferred to a general purpose medium tent. For the next 11 days and through a snowstorm that quickly melted leaving the ground a mud slick, Hammer ACE provided INMARSAT, UHF SATCOM phone patch, secure fax, network access, secure Land Mobile Radio, and ground-to-air communications to the helicopters coming and going from the site. Hard-won experience and preparation paid off — the Hammer ACE team established reliable, secure communications which allowed the recovery team to complete their mission successfully.

A Creative Management's MISHAP

CMSGT DON A. BENNETT
Technical Editor



How do you create a mishap? Well, here's an outfit that "managed" it quite well — over $130,000 for this industrial masterpiece! However, after reading on, maybe you'll find the term "mismanaged" would have been more appropriate.

An engine repair facility ran short on engine transport trailers (which were used for engine storage purposes, as well), so they locally constructed some engine stands designed to be used for **storage only.** This action would free up more of the transport trailers. And although the storage stands had forklift tines slot provisions, there were no visible warnings posted on the stands to advise against transporting one of the stands with an engine mounted on it. It's clear employees could easily **assume** these homemade stands were safe to transport by forklifts — whether an engine was installed or not.

As Murphy's Law would have it, an employee wanted to transport one of the engines. Seeing how the transport trailers were scarce, the employee was directed to move the engine while still mounted on its storage stand — a homemade stand, mind you, that wasn't designed, constructed, or capable of being used as a transportation carrier.

Anyway, while driving only 3 miles per hour, the forklift operator experienced the normal bouncing effect common during forklift operations over uneven surfaces. Since the stand wasn't designed to withstand the resulting bouncing and torquing actions, one of the stand's engine mounts finally tore loose, causing the engine to drop within the stand's framework.

Who was responsible for approving the decisions to locally design, construct, and use these engine stands? Who was responsible for ensuring the storage stands would conform to sound engineering principles, especially to Air Force and national industrial safety standards? Who was responsible for developing the quality safety environment of this industrial facility? Most of you could immediately **manage** to give the correct answers to these questions, couldn't you?

After this costly mishap, the unit's **management** decided to remove the homemade storage stands from service — definitely a little too late — but necessary just the same. Yet, do these stands have to be removed from service forever? Maybe not! After the stands are evaluated by qualified engineers, they might still be deemed safe and sound, but for storage only — their original intended purpose! All management would have to do then is make sure the stands are used for storage only and that all employees know this. After all, the bosses were in a bind. They didn't have enough certified engine transportation/storage trailers to keep their production going smoothly. Creative management was absolutely necessary to overcome this production shortfall — but **creativity should not overlook safe, quality standards.**

Back to the drawing board on this one, ladies and gentlemen. And good luck on all your other creative measures to circumvent your production shortfalls, because the belt-tightening budget cuts won't get any better in the near future. **It's a future that absolutely demands safe, quality management — and that's the key to success!** ✈

OPS TOPICS

One Vulture, One Engine, and One Cool Head

■ For pilots, taking a bird strike to an engine during low-level maneuvers will certainly challenge airmanship skills and resolve. But if that FOD'd out engine is the **one and only engine,** the situation would critically demand "**one** cool head."

The F-16CJ (Block 50) ***Viper*** was on a low-altitude tactical navigation route to an air-to-ground range when the bird strike occurred — 1500 AGL, 450 knots. The F-110-129 engine started vibrating. The nearest divert field was 55 nautical miles away.

The pilot decided to leave the throttle at the 93 percent position it was in at the moment of the bird strike and immediately began a climb to 19,000 feet MSL. He consciously didn't jettison the external stores but was spring-loaded to do so if his **only** engine's condition worsened. Next, he had to gangload the oxygen regulator when burning oil smoke entered the cockpit. Finally, an "engine lube low" pilot fault list wouldn't clear — an obvious conclusion to the burning oil smoke.

After setting up a 1 to 1 glide ratio and aligning with the runway, the pilot performed a straight-in, simulated flame-out approach and landing. He had some hot brakes, and one of the main wheel fusible plugs blew, but the fire department was Johnny-on-the-spot in case of a fire.

Despite the $700,000 plus damage to the bird-struck engine, a valuable jet and one of the Air Force's most important and precious resources, a human being, were saved — saved by the self-confident, timely, and courageous efforts of **one** cool-headed pilot!

Super "stick" work, sir. Thanks! ✈

JEPPESEN APPROACHES

continued from page twenty

Jeppesen gives no guarantee other than the disclaimer printed in their manuals: *"Jeppesen makes no express or implied warranty, and disclaims any liability with respect to the design, adequacy, accuracy, reliability, safety, or conformance with government standards or regulations, of any flight procedure prescribed by a government authority, including, but not limited to, any express or implied warranty of merchantability or fitness for a particular purpose."*

With this statement in mind, let's do a "sanity check." Are all Jeppesen approaches 100 percent reliable according to our DoD TERPs standards? The answer is "No." If all Jeppesen approaches are not 100 percent reliable, should someone review Jeppesen approaches before our aircrew fly them? I think we all agree the answer is "Yes."

Now, who should review Jeppesen procedures to ensure they meet DoD standards? I think an instrument procedures expert should do it — sounds like a TERPs guy, right?

If the expert reviewing the Jeppesen approach procedure discovers any discrepancies, should the crew be notified prior to flying the approach? Of course. Sounds a lot like AFI 11-206, doesn't it? When you view AFI 11-206, paragraph 8.4.1 in these terms, it is clear the guidance is sound. The problem is getting the appropriate approaches reviewed in the time available — time that is often limited by real-world short-notice taskings.

So, what's the answer? If your unit flies into a location without DoD/NOAA procedures regularly (AFI 13-209 says three times or more per year), then request the procedure be included in FLIP. (Process is in FLIP GP Chapter 11.) If the location is not flown into regularly, notify your MAJCOM TERPs office as soon as you realize you need an approach reviewed. While many trips are short-notice, most of our trips are known several days in advance. If the trip is really short-notice, work out a process with your MAJCOM TERPs office to handle short-notice taskings on a priority basis. The TERPs review is crucial, and we all need to work together to make sure it gets done.

One last note regarding Jeppesen approaches: Most of us are not familiar with Jeppesen's approach plate symbology. Since we are usually handed a copy of the approach to fly without the associated legend, we normally don't even have the opportunity to review the legend prior to the flight. Many of the symbols used are different than what we are used to seeing and can create a lot of confusion. If your unit uses Jeppesen approaches, then you should be trained in the proper way to use them.

Finally, here's a commercial message: AFFSA can marshall a great deal of resources to assist you or your unit with any flight-related problems that come up. Feel free to give us a call. Our number is DSN 858-5418. Fly safe and fly smart. ✈

Maintenance Matters

It Ain't Closed — Until It's *REALLY* Closed!

■ An airlift support aircraft crew was at an en route base, preparing for their last leg home. They took on some gas at this station, accomplished by their contract maintainer. Everything from preflight to takeoff went off without a hitch.

Then, up jumped the gremlins! Shortly after takeoff, the onboard contract maintainer heard a sudden loud noise coming from one side of the aircraft. ***However, he didn't inform the aircraft commander until several hours later!*** (Luckily, whatever was causing the strange noise didn't eventually cause some catastrophic, structural failures which could have been averted if the cockpit was alerted earlier.)


USAF Photo

Anyway, the aircraft commander performed a walk-around inspection after block-in at home station and found the source of the noise. The single point refuel (SPR) receptacle door had been badly damaged and was sort of stuffed back into the SPR receptacle's cavity. It was determined only one of the four door latches was undamaged. This gave a high probability the undamaged latch wasn't latched properly before takeoff, whereas the other three latches were latched. Of course, the door was forced open and the other three latches were damaged when the airstream got under the door (negative airloading effect) around the unsecured latch. Result: almost $15,000 in repairs.

The contract maintainer (who serviced the gas and was the last one to close the SPR door), loadmaster, and the aircraft commander *all* missed the unsafe condition during their predeparture exterior inspections. Three people with checklists! How is that possible? Wonder why the contract maintainer didn't mention the unusual loud noise until several hours later? Maybe it was because of a deficient (or a lack of) unit crew resource management training program for *everyone* making up a "flight" crew. How about deficiencies with the aircraft commander's aircrew briefings?

Remember, the SPR door — in fact, any door or panel — ain't closed until it's *really* closed — hands-on closed! PERIOD!

Hidden, Destructive Corrosion

Right after takeoff and gear retraction, an F-15D pilot got a red light in the gear handle but no lights on the landing gear indicators. A wingman observed the right main and nose gears were both up while the left main landing gear was still down. When the gears were extended, the right and nose gears lowered normally, and the left gear remained down (and appeared locked). However, the left gear still had an unsafe cockpit indication.

After running the unsafe landing gear checklist and declaring an emergency, the pilot dumped fuel in preparation for an approach-end arrestment. Shortly after the fuel dump action was completed, a utility "A" (hydraulics) system failure light came on! So now the utility "A" system failure and the landing gear emergency extension checklists were also accomplished.

After touchdown, but before engaging the arrestment system, the jet's left wing started settling to the runway. The pilot used a combination of flight controls and the right brakes to counter the settling effect until the barrier engagement. The left main gear had collapsed, so the jet finally settled on the left wingtip, left main gear outer door, centerline tank, and the left stabilator, then slid over 1,000 feet to a stop.

What caused the gear to collapse? Corrosion! Big time — well hidden — corrosion, the kind that goes undetected until it finally wallops an unsuspecting pilot or maintainer with a mishap.

The corrosion was located **within** the left main gear's linkage assembly, lower drag, torque tube. It's also known as the **jury link** by maintainers (part numbers 68A410550-1003, -1005, and -1007). Because the torque tube was broken into two pieces, the excessive amount of corrosion was easily detectable. It would have been undetectable by visual inspections of a serviceable one. The failure of the jury link happened close to an inside tab which connects to the gear actuator.

This is the second such incident for the mishap unit — same identical part, same type corrosion at the same failure location. However, in the first incident, the jet was successfully recovered. Both mishap jets were F-15D models with similar total flight times (3,700 and 4,000 flight hours).


USAF Photo

This second incident has prompted the mishap unit to begin its own NDI inspections of selected jets, e.g., the same model jets with similar total flight times. In the meantime, they are recommending a depot review be conducted for trends and historical data on the failure of the jury links.

Not bad ideas! Maybe some of the other F-15 units should do a little snooping around these jury links for similar corrosion problems — at least until the depot item and systems managers have the time and money to come up with permanent solutions. Besides preventing loss of life and limb, the extra attention given to this problem could also save you over $140,000 in damage repair costs.

Better safe than sorry, right?

Fighters Soaked to the Tune of $75,000!

Three F-16 Vipers were parked inside a maintenance hangar undergoing various maintenance activities. All three were bedded down and secured for the weekend. Their configuration: One had all access panels installed and the cockpit canopy closed; but the other two had various access panels off, canopies opened, and the ejection seats removed. These two also had a canvas tarp covering the cockpits to protect against dust and foreign object damage (FOD) while parked inside the maintenance hangar.

Late one night, the hangar's fire suppression system (FSS) activated because of a failure of the FSS compressor. Because there wasn't any automatic backup compressor, the FSS sensed the drop in the system pneumatic pressure and self-activated. Naturally, the "firefighting" water poured all over the three jets. One of the jets escaped water damage because it was "buttoned up." However, the other two were water soaked to the tune of $75,000 in damages. It seems the cockpits' protective canvas tarps filled up with water, then collapsed. The collected water was dumped inside the cockpits.

Of course, the water was cleaned up and the water-damaged components were replaced, but is that really the end of the mishap? Well, let's hope so, but there've been incidents of past water-soaked cockpits packed with electronics equipment coming back repeatedly to haunt the mishap unit. Sometimes it's almost impossible to locate and dry out all water deposits. Residual water could be discovered weeks or months later hidden in the most unusual places, e.g., inside computers, black boxes, terminal blocks, etc. Plus, there's the possibility of electrical spikes, arcing, etc., caused by corrosion deposits, sticking relays, internally shorted components, etc.

This mishap could also serve as a special safety reminder for all the building custodians of aircraft maintenance hangars. This incident could easily be repeated for some of you. For instance, does your hangar's FSS have a backup compressor in case the primary fails? Do you keep accurate records of preventive maintenance work and inspection schedules? Do you know when the last time your FSS compressor was serviced or the complete FSS was tested? I advise you to contact the civil engineering folks if you can't answer these questions. **Today!**

Is it time to assess the need to update or modernize your maintenance hangars' fire suppression systems — especially incorporating a "fail-safe" feature to prevent **non-fire** activation of the system? The best guess on the age of the mishap FSS was 20 to 30 years old!

LT GEN GORDON A. BLAKE

AIRCRAFT SAVE AWARD

MSGT GEORGE INGRAM
HQ AFFSA/XATP

■ When Imperial Japanese Navy aircraft attacked Pearl Harbor on 7 December 1941, they struck without warning, in large numbers, and at great speed. Major Gordon A. Blake, Hickam's base operations officer, had been in his office since 0700 on this day, preparing for the arrival of 12 unarmed B-17s from California. While listening to reports coming into the tower, he suddenly heard a loud explosion. Dashing outside, he saw a dive bomber with the rising sun of Japan on the underside of its wings, pulling up almost directly overhead after bombing the Hawaiian Air Depot. Maj Blake's first thought was to get the incoming B-17s down safely, so he ran up to the tower to guide them in. Holding them out of enemy range and sneaking them in one at a time between waves of enemy aircraft, Maj Blake brought the B-17s in, all without regard for his own safety.

Around the control tower, havoc reigned. Planes burned on the ground; bullets ricocheted; nearly every building except the control tower had been hit at least once. The Japanese made repeated strafing runs against the tower. Yet, when the pilots asked for landing instructions from the tower, a calm voice gave wind direction, velocity, and the runway on which to land as though it were any other day, occasionally reporting that the field was under attack by "unidentified planes." Though Lt Gen Gordon A. Blake's entire career was distinguished, we air traffic controllers best remember him for this act of heroism.

In November 1988, the Air Force Communication Command renamed its award given to air traffic controllers who assist pilots in saving an imperiled aircraft. Formerly called the "Aircraft Save Award," it was renamed the "Lt Gen Gordon A. Blake Aircraft Save Award" to add prestige to the award and emphasize the proud link to the past. **General Blake best personifies the current requirements for an aircraft save: "The controllers' actions must be distinguishable, professional, and cast no reasonable doubt that, without these actions, probably damage to the aircraft would have occurred."**

Since 1957, air traffic controllers have saved more than $4.5 billion worth of aircraft, but more importantly, they have saved more than 8,000 lives, both military and civilian. To date, the "Lt Gen Gordon A. Blake Aircraft Save Award" has been presented to more than 2,500 air traffic controllers. The save board would like to extend congratulatory remarks to the latest recipients:

Air Force air traffic controllers are demonstrating superior talent unsurpassed. Keep up the good work!!! ✈

TSgt Casimir L. Tabaka (Tower, Senior Controller), 72 OSS, Tinker AFB, Oklahoma. Inoperative right main landing gear priority valve on an E-3A aircraft during an approach. The aircraft commander intended for the Supervisor of Flying (SOF) to verify the landing gear was down. From the SOF's perspective, the gear appeared safe, and consent was issued to the pilot to full stop. TSgt Tabaka carefully reinspected the gear during a low approach and noticed a slight abnormality. TSgt Tabaka informed SOF of his observation of the landing gear configuration. After a second low approach, it was determined that the abnormality did present a threat to a safe landing of the aircraft. TSgt Tabaka's outstanding attention to detail and vigilance are directly responsible for the prevention of a disastrous situation involving a valuable Air Force asset.

MSgt Steven P. Murphy (Assistant Chief Controller), Alpena Combat Readiness Training Center (CRTC), Michigan. A civil aircraft entered onto the runway in the path of an aircraft on short final for landing. While off-duty, MSgt Murphy was on the ramp awaiting the arrival of a C-130 and observed a C421 enter the runway. MSgt Murphy yelled to a transit alert vehicle to warn the aircraft over his radio not to land because of the aircraft on the runway. The transit alert vehicle operator was unsure of what MSgt Murphy was indicating, so MSgt Murphy drove his vehicle toward the alert vehicle. He immediately activated the transit alert radio, issuing a go-around to the C-130 aircraft. MSgt Murphy's superior situational awareness of a potentially deadly conflict undoubtedly averted a disastrous situation. The actions of MSgt Murphy extended well beyond the call of duty to ensure the safety of others.

SSgt Kenneth R. Elliott (Tower, Local Controller), 341 OSS, Malmstrom AFB, Montana. A vehicle in charge of snow removal operations entered the runway while a C-9 attempted to land. SSgt Elliott issued go-around instructions to C-9 aircraft. SSgt Elliott's keen situational awareness undoubtedly averted a disastrous situation. Had it not been for the actions of SSgt Elliott, several lives may have been lost.

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WELL DONE AWARD
UNITED STATES AIR FORCE

THE 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.

Captain Mark D. LaFond
68th FS, 347th WG
Moody AFB GA

■ Captain Mark D. LaFond was leading a two-ship of F-16s on a local close air support training mission. The mission proceeded uneventfully until the full-stop landing. Shortly after touchdown, the right main landing gear collapsed, and the aircraft began to veer sharply to the right. Capt LaFond quickly realized that a high-speed runway departure was eminent and initiated a go-around in afterburner. He simultaneously advanced the throttle to max AB and applied controls to minimize the right roll and drift. The afterburner initiated before the aircraft departed the right side of the runway, and the jet became airborne shortly thereafter.

During the sequence, portions of the right side of the aircraft were damaged by contact with the runway. Capt LaFond maneuvered the aircraft away from the ground, left the gear down, and called for his wingman to join on him. Once joined, his wingman confirmed the damage to the aircraft and that the gear appeared to be down and locked. With limited fuel remaining, Capt LaFond performed a controllability check and accomplished the checklists for controlled ejection and landing with unsafe gear. The gear still indicated down and locked, but Capt LaFond decided that an approach end arrestment would be the safest means of recovering the aircraft with the questionable reliability of the gear. Capt LaFond executed a flawless straight-in approach and landing to a successful approach end arrestment. This time the gear remained down and locked.

Post-flight inspection of the aircraft revealed significant damage to the right stabilator, ventral fin, speed brake, and the captive Maverick missile, which was loaded on the right weapons station. Capt LaFond later explained that he considered ejecting from the aircraft as it was about to leave the runway, but chose instead to stick with the jet as he felt this course of action would minimize the probability of harm to himself and the jet.

Capt LaFond's skillful and timely actions resulted in the successful recovery of a valuable combat asset and more importantly, the saving of his own life.

WELL DONE! ✈

Most **FOD** could be eliminated if people would tighten the screw between their ears.