UNITED STATES AIR FORCE

FLYING Safety MAGAZINE

JULY 1999

Training

UNITED STATES AIR FORCE
FLYING Safety
MAGAZINE
AIR FORCE RECURRING PUBLICATION 91-1
JULY 1999, VOL 55, NO 7

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Cover photo by SSgt Steve Thurow

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24 hour fax: DSN 246-0931
Commercial: 505-846-0931

DEPARTMENT OF THE AIR FORCE — THE CHIEF OF SAFETY, USAF

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DISTRIBUTION — One copy for each three aircrew members and one copy for each six direct aircrew support and maintenance personnel.

POSTAL INFORMATION — *Flying Safety* (ISSN 00279-9308) is published monthly by HQ AFSC/SEMM, 9700 "G" Avenue, S.E., Kirtland AFB NM 87117-5670. Periodicals postage paid at Albuquerque NM and additional mailing offices. **POSTMASTER:** Send address changes to *Flying Safety*, 9700 "G" Avenue, S.E., Kirtland AFB NM 87117-5670.

CONTRIBUTIONS — Contributions are welcome as are comments and criticism. The edior reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning.

flight notams

HOPE FOR THE BEST—PLAN FOR THE WORST

MAJ DAVID A. DUKE
DDMS
Patrick AFB, FL

I've briefed it hundreds of times: "…Flight Engineer, check engine status during entry into practice autorotations, especially the first auto, to confirm that the engines stay on line. If an engine goes during an auto, we'll take it to a touchdown."

So when one of my two engines failed just after entering my first practice autorotation of the day, it was as if we'd been doing touchdown autos every day for the past 10 years.

"Number one engine failure," the flight engineer (FE) said, almost nonchalantly, from his crew position just behind the pilot's seat. The engine-out audio warning came on as the FE's words came across the intercom. A quick glance at my turbine gas temperature and gas producer gauges confirmed the FE's analysis and, with only 350 feet of altitude remaining and a rate of descent close to 2,000 feet per minute, I announced my intention to continue the auto to the ground. My copilot and FE gave a quick "Roger" to my intentions, and the landing was uneventful.

As a friend of mine would say, with a deep southern drawl, "We done good." Here we were, faced with a rare and potentially life-threatening situation, and we handled it as we had always hoped we would. But it wasn't anything that any other crewmember in our unit couldn't and/or wouldn't have done in the same situation.

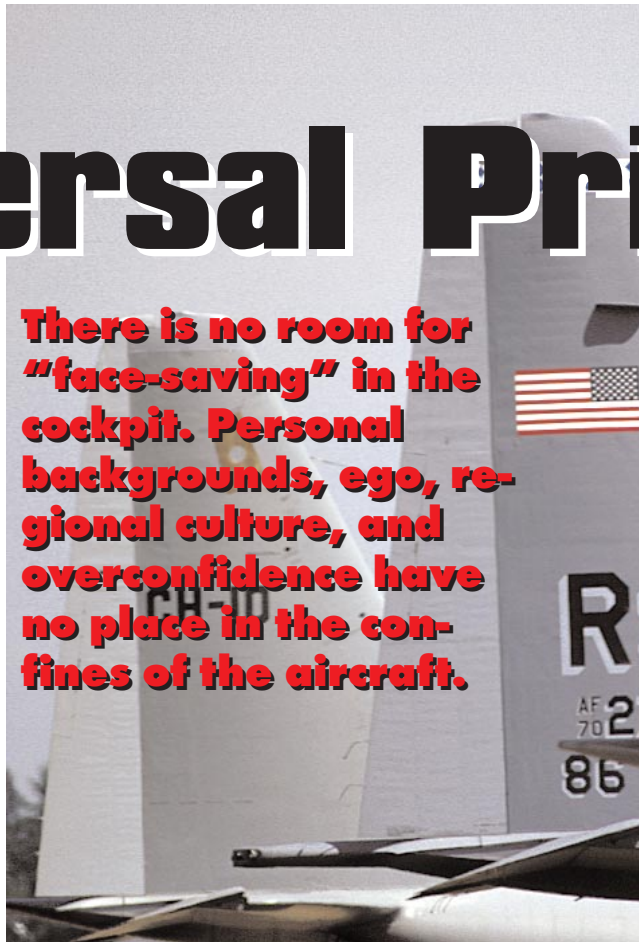
I write that last sentence with confidence for one reason—good training. Whether it's in preparation for tactical missions or routine "trash hauling," we prepare, brief, and train ourselves for any foreseeable contingency.

Hope for the best—plan for the worst. *Talk amongst yourselves.*

■

A Universal Pri

CAPT ROB RAMOS
U.S. Military Training Mission
AWACS Extended Training Service Specialist



Training foreign nationals can be challenging for an instructor. Training them in their own country can be even more challenging. Instructors in security assistance missions may face foreign languages, cultures, and customs which take quite some time to adjust to. This adjustment can be hampered by the limited time available in a 1-year remote tour. The shortness of the tour can also create obstacles to change in the host unit. The host unit, like any other unit, may have institutional inertia which may not be overcome in just 1 year. In addition to these structural problems, the problem of adequately conveying critical information can pose a threat to flight safety. Currently there are several security assistance training missions around the world where USAF instructors, flying side by side with foreign nationals, are working to prevent situations like the one described below.

There I was, an American navigator with a foreign flight crew, in a heavy aircraft, in adverse weather conditions, with a wet runway in a region that averages only 10 days of rainfall per year. Abeam the final approach fix 3.2 NM from touchdown: on speed, wings level, 2 NM left of course on the VOR/DME to runway 19. Here's what happened next:

Nav: "You're 2 NM left of course. Recommend heading 220." (30-degree correction)

Pilot: No response. Begins a 5-degree correction to the right. Begins descent to MDA.

Nav: Scanning for thunderstorm activity, monitoring VOR, "Still left of course and correcting."

Pilot: Continues small correction to course. Begins final descent.

At 2.2 miles from the threshold, the aircraft is 1 NM left of course, correcting to the right:

Copilot: "Go right—***way*** right."

Pilot: Quickly makes a large correction to the right and overshoots the course, then begins to correct back to the left.

Copilot: "Go around."

Engineer: "Better to go around"

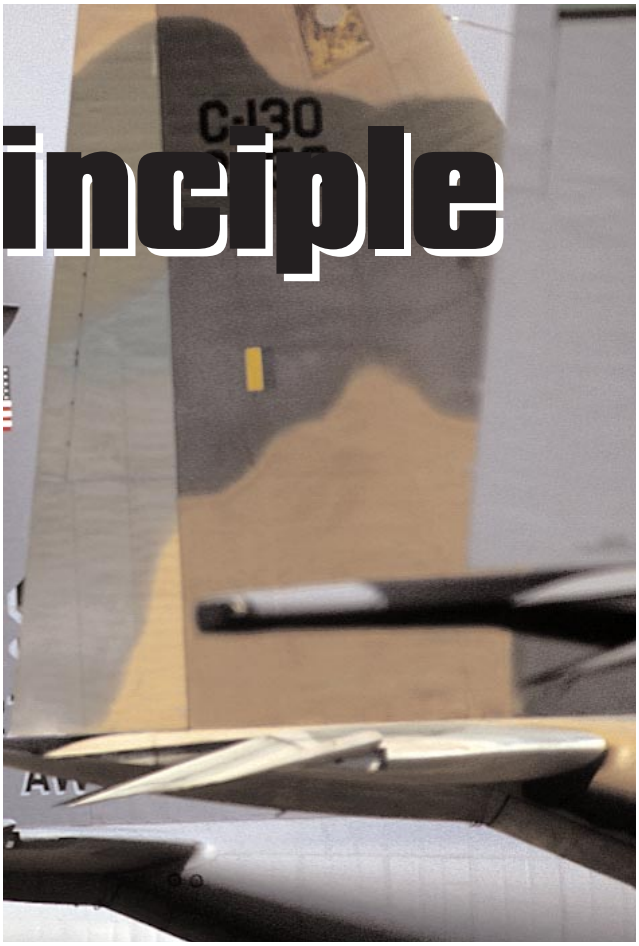
The pilot lined up the plane on the far left side of the runway with a 5-degree heading correction and in a slight bank just prior to touchdown. The aircraft touched down on the right main landing gear; luckily, the pilot was able to safely correct back to the runway centerline.

Congratulations? Hardly. In the above situation there was a major breakdown in flight procedures, crew coordination, and flight discipline.

First, the pilot should not have descended at the final approach fix, since he was well off published course and heading. Even after crossing the FAF, he was clearly not established on the final approach course and initially made only a 5-degree correction to the published course. Poor flight procedures.

Second, the overcorrections at 2.2 NM to get back on course should have alerted the pilot to execute a missed approach. If the pilot had established the aircraft on the final approach course earlier in the approach, the large corrections on short final would not have been necessary. AFMAN 11-217, Instrument Flight Procedures, Chapter 14, paragraph 14.1.2.2.3.2, states, "During the latter part of the approach, pitch changes of 1 degree and heading corrections of 5 degrees or less will prevent overcontrolling."

Third, the go-around calls by the copilot should have resulted in the pilot executing a go-around. The fact that he didn't execute a go-around or acknowledge any crew transmissions indicates a lack of flight discipline and crew co-



USAF Photo by MSgt Perry J. Heimer

ordination, as well as a dangerous reliance on his own skills. The pilot was not listening to his crew.

What causes a breakdown in flight discipline and crew coordination? Cockpit resource management experts tell us that there are several factors. Personalities, unfamiliar conditions, fatigue, overconfidence, and lack of Crew Resource Management (CRM) training can all lead to such breakdowns. Another factor is culture, both of the country and the unit. In this case, both of these cultures hold "saving face" as extremely important to the individual. There are also a lot of strong personalities/egos which do not tolerate challenge to their authority. Additionally, overconfidence in ability sometimes causes crewmembers to attempt unsafe maneuvers because they may feel some kind of attack on their pride or status if they do not continually demonstrate their skills. The aircraft commander on this flight had a history of "pushing the envelope" and "bending the rules." These are some issues that security assistance advisors must confront in accomplishing their mission, but which apply to all aircrew members everywhere.

In the West, and particularly in the United States, recent efforts to develop effective crew coordination have been quite successful. This is probably due to a western cultural norm where admitting fault is not necessarily equated with a loss of personal status. However, in other cultures, it is sometimes more difficult for people to admit fault or blame. There is a tendency to take any comments or criticisms as a personal attack on their status and ability, and therefore, a reluctance to use those comments to improve the situation. This is compounded by having the comments given to them in front of the unit/country members which may result in losing face or a loss of personal status.

As a security assistance advisor, one is challenged to present solutions to problems in a way that is not directly confrontational but which also corrects the situation. This requires thought—especially if you're accustomed to other aircrew members responding quickly to inputs. This requires one to learn the cultural cues of the host nation and apply them when practical.

The approach you take also depends on the situation. When there is no time to phrase a correction "nicely," there is no substitute for the direct approach, such as "GO AROUND" when on short final. At other times, a more subtle approach like, "Two degrees off course, fly heading 240" when the aircraft is slightly off course. Still, individual aircrew discipline will be the determining factor in what actually happens, in whether or not inputs are used effectively. In order to avoid potentially fatal situations, all crewmembers, irrespective of experience levels, personality traits, or cultural and institutional biases, must be open and responsive to crew inputs and to weigh those inputs appropriately.

The reason that the American advisors are in place is to provide advisory and technical support to the foreign air force in the development, implementation, and operation of the in-country equipment and technology. Attempting to transform another nation's air force into one that works as well as the US Air Force can be rewarding, but, since advice can be taken or not taken, the transformation is a long and often frustrating process. It requires lots of work both in the aircraft and on the ground. Developing trust, building professional relationships, imparting solid training, and, most importantly, perseverance, are the best bets for being successful.

Bottom line: There is no room for "face-saving" in the cockpit. Personal backgrounds, ego, regional culture, and overconfidence have no place in the confines of the aircraft. Don't let pride or personal feelings break down air discipline and jeopardize flight safety.

It's a principle that applies to aviators everywhere. ✈

Are We Teaching Mishaps?

USAF Photo by SSgt Andrew N. Dunaway, II

As the following article suggests, we may sometimes say one thing, but do something entirely different. Even though the story talks to emergency procedures from the author's perspective as a KC-135 boom operator, his theme "Are we really doing things by the book?" has universal application.

SSGT GORDO RINGLER
Central Flight Instructor Course (CFIC)
Instructor Boom Operator
54th Air Refueling Squadron
Altus AFB, Oklahoma

As instructors, we're supposed to teach people and hone their skills to make them better crewmembers. If we can't do any of these things, then as a minimum, we're supposed to follow the credo, "Do no harm." Meaning? Don't teach the student to do something wrong.

After hearing a series of air refueling safety messages at a recent safety briefing, something occurred to me. A rarity in itself, but nevertheless, I had an epiphany! There was a common thread in all of the mishaps, and this common thread came to me soon after when I was flying with a senior instructor boom operator in the squadron.

It was just a typical air refueling (A/R), and the senior instructor was with me to update his currency. After he finished, we did a seat swap, and while I was finishing, we realized that he needed to log a practice emergency separation. We didn't have time for another seat swap, so I briefed the separation in the normal briefing style, but stated that the senior instructor boom operator would call the separation shortly after contact.

The contact was going very smoothly when "it" happened. The senior boomer said, ***"Okay, it's time. Get the disconnect and I'll call the breakaway."*** And that's when it hit me! "*Get the disconnect?*" I replied to him, ***"You call the breakaway and*** *then* ***I'll get the disconnect."*** He replied, ***"****You get the disconnect* ***and*** *then* ***I'll call the breakaway!"*** I replied back to him, ***"No, you*** *call* ***it and then I'll*** *do* ***it!"*** He could see my bull horns coming out and finally yielded to my stubbornness. He called the breakaway, and I then took the required actions. All went normally, but I could tell that calling a breakaway while we were still in contact—A/R nozzle still in the receiver aircraft's receptacle—made him very uneasy.

I too have had this uneasy feeling. How

many times have you briefed (or ***heard***) a separation briefing that sounded like this: ***"This will be a practice emergency separation called by the boom operator, shortly after contact, and*** *after I see a positive disconnect (or nozzle release)"?* I've briefed it a thousand times. Just like my Combat Crew Training Squadron (CCTS) instructor taught me. Just like I've heard a thousand other boom operators brief.

The problem lies with the part that says *"…after I see a positive disconnect (or nozzle release)."* Even if you don't brief it like that, you probably do it like that. We practice these things almost every time we air refuel and are used to getting the disconnect ***first*** and calling the separation ***afterward***…it becomes habit. We've been conditioned—and likely trained others—to do it the wrong way.

And that's where the connection with all those mishaps I mentioned earlier comes in. Mishap after mishap, the boom or receptacle was damaged without a "Breakaway!" call. Why didn't the boomers call "Breakaway!"? The answer is usually ***"…because I couldn't get a disconnect."***

T.O. 1-1C-1-3, ***KC-135 (Tanker) Flight Crew Air Refueling Procedures,*** states: "For all breakaways, transmit the call sign and the word 'Breakaway' three times, and *SIMULTANEOUSLY* take the following actions:

✓ Actuate the disconnect switch;

✓ Flash the Pilot Director Indicator (PDI) lights;

✓ Clear the boom away from the receiver."

But we typically *don't* take these actions *simultaneously.* We want to see the disconnect first. Why? It most probably stems from guidance in the old SACR 51-135, Chapter 6. Now known as Multi-Command Instruction (MCI) 11-235, Volume 17, ***C/KC-135 Operations—Air Refueling,*** it says verbatim, as the old SAC regulation did, under the paragraph titled "Practice Emergency Separations":

✓ "If separation is initiated from the contact position, the receiver's AR system must be in normal; and a boom operator-initiated disconnect capability with the receiver must exist."

This statement scares us. Even if we do have disconnect capability, we still want to see the disconnect before we call the breakaway. We just don't want to call it before we see the nozzle come out. We say, ***"What if I can't get a disconnect? There goes my nozzle, or worse, right? So I'll make sure I get a disconnect*** *first."*

Smart, right? Yes, it may keep you from losing a nozzle someday when you get a delayed disconnect during a planned practice separation. But what's bad about that habit pattern is this: It conditions you into thinking ***"If I don't get a disconnect, I can't call the breakaway."*** And then one day, "it" happens: The receiver starts getting erratic, and you can't get a disconnect, so you delay the breakaway call, and serious damage—or perhaps even a Class A mishap—results. Why? Because, ***"That's not how I've practiced it a thousand times before!"***

And when the Safety Investigation Board asks, "Why didn't you call a breakaway?" and you explain why, you now become the central character in a safety crosstell—just like the ones you've heard before and asked yourself how such a mistake could have been made. How many mishaps have you heard about where damage was done and the breakaway wasn't called? Probably a few. Now, how many times have you heard of a planned practice separation having damage because of a delayed disconnect? Probably none.

So, back to instructing. Are we, the instructors, contributing to these mishaps? Are we conditioning our students into thinking, ***"I can't call a breakaway if I don't get a disconnect?"*** I believe we are, to an extent. Of course we tell our students that in a real breakaway situation, you just do it, like the book says. But how many times have we boomers actually called a breakaway with the nozzle still in the receiver's refueling receptacle? I can honestly say that I haven't done it that much. And I can't guarantee that I wouldn't hesitate in calling a breakaway if I couldn't get a disconnect.

You have to make the decision to cut your losses. You may lose the nozzle, but it's better than the whole boom, or worse, allowing a midair collision. It's a hard decision to make in the split seconds it takes for a C-141 to eat your lunch. Next time you fly, try calling a breakaway while the receiver is in contact. ***NOTE: Prove disconnect capability first.*** You'll no doubt feel very uncomfortable. But ask yourself: Do you feel uncomfortable because you might lose the nozzle if you get a delayed disconnect? Or do you feel uncomfortable because your training has conditioned you to disconnect ***first,*** and then—and ***only*** then—call for breakaway? An old motto says "In an emergency, you do what you've been trained to do." That may

And when the Safety Investigation Board asks, "Why didn't you call a breakaway?" and you explain why, you now become the central character in a safety crosstell—just like the ones you've heard before and asked yourself how such a mistake could have been made.

Rushing to Fly, Rushing to Die

USAF Photo by SSgt Steve Thurow

MR. DENNIS HERRING
Lear-Siegler
Columbus AFB, Mississippi
Courtesy *Torch*, Mar 99

Here we were, an experienced instructor pilot, an above-average student pilot, and a highly qualified crew chief. All of us missed the pins. How? We were under pressure—rushing to fly.

The day started like most spring days at Laughlin AFB. The low overcast and ground fog kept all of us anxious aviators huddled safely in our flight rooms. During the spring, the clouds were notorious for hovering right at the minimums, then suddenly lifting rapidly, catching everyone by surprise. Today was no exception. When we least expected it, the Supervisor of Flying announced it was time to "launch the fleet!"

The problem was we were all caught unprepared. Regardless of weather, we were ***supposed*** to brief for our flights, but we mistakenly considered it a waste of time. My takeoff time was upon me so quickly I barely had time to brief my fledgling aviator, Stanley Student, and run out the door to try to get in the air on time. I performed the preflight inspection while Stan strapped in and got the jet ready for takeoff.

Preflight complete and now strapped in my ejection seat, I kept the pressure on good ol' Stan. We were still rushing to make our takeoff time just minutes away. But Stan was an above-average student, and I placed a lot of confidence in him. A ***quick*** scan of the cockpit showed I was right—everything was set correctly.

Stan was flawless during engine start and taxi, and we barely made our takeoff time. The climbout was spectacular. The cloud layer wasn't thick, but it was dark and bumpy. We broke through the top of the clouds into the brilliant sunlight, and the bumpiness of the clouds gave way to glassy smooth air once we were in the clear. I was really enjoying myself and proud of Stan for his part in getting us airborne on time. Teamwork was wonderful!

As we passed 10,000 feet, I scanned the cockpit and observed as Stan performed the climb checklist. He once again was flawless, so I started to relax a bit. But my moment of relaxation was cut short! Beside my ejection seat, a bright red "Remove Before Flight" streamer caught my attention. The end of the streamer was attached to the ejection seat safety pin hard at work keeping the ejection seat safe from accidental usage. A few seconds later, which seemed like an eternity, I looked over at Stan's ejection seat only to see the same situation. I also noted the canopy jettison safety pin was installed.

I grasped the control stick, shook it gently, and said, "I have the aircraft." Even with his dark visor down, I could see Stan was puzzled, but he responded with, "Roger, you have the aircraft." I then gave Stan a gentle and soft-spoken but very rude awakening: "Why don't you pull the canopy jettison safety pin and your seat pin." His head jerked downward, and he stared quietly for a long moment at the seat pin. Slowly he reached out and removed the pins. When he finished, I gave him control of the aircraft, and I removed my pin too.

The rest of our flight was fantastic.

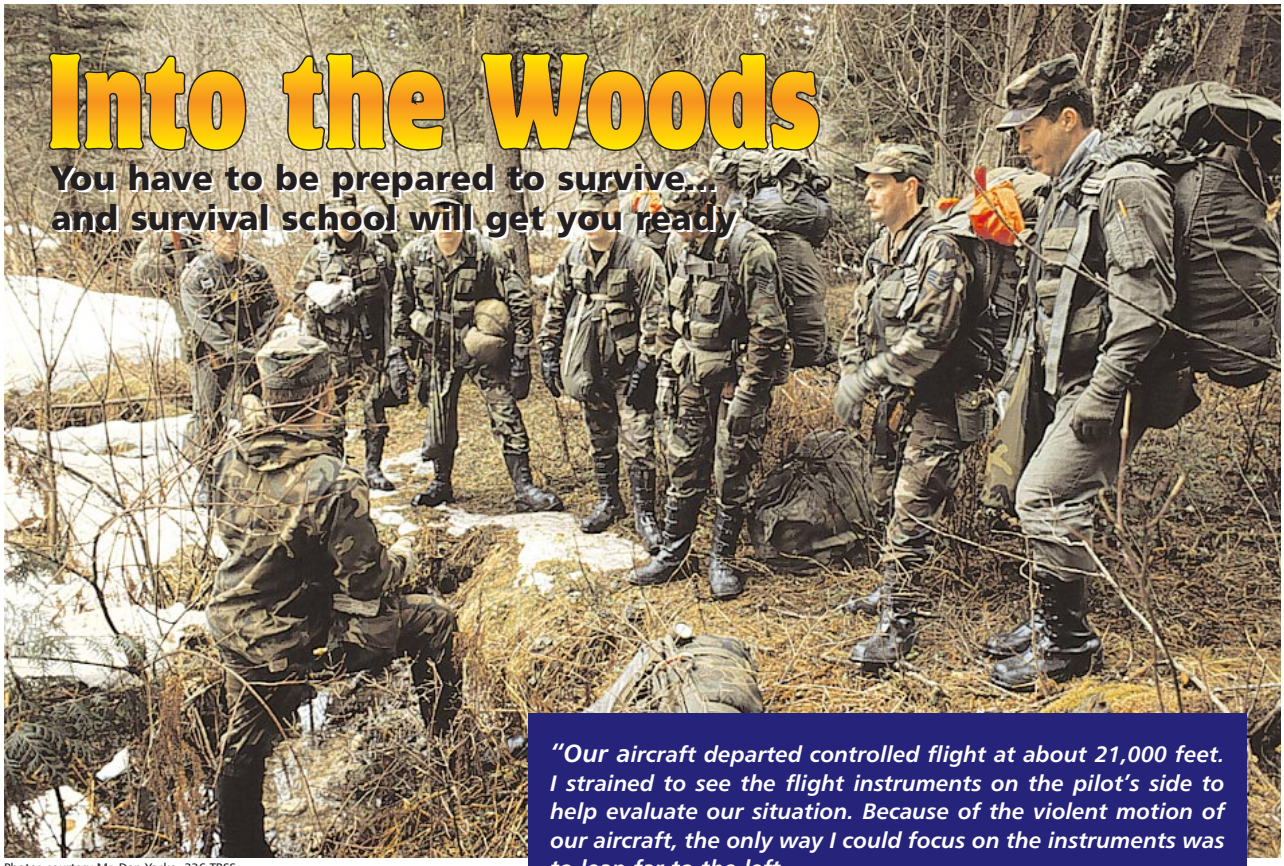
Debriefing the flight was interesting as we discussed the lesson learned. Here we were, an experienced instructor pilot (IP), an above-average student pilot, and a highly qualified crew chief. All of us missed the pins. How? We were under pressure—rushing to fly. Whose fault was it? Mine.

As the IP, I was totally responsible for my aircraft. Sure, we all had a hand in the mistake, but as the instructor, I was ultimately responsible.

I realized something that day which has always stayed with me: No matter what I'm doing, if I'm rushing around trying to do it, I'm more likely to make a mistake. I've taken that lesson into everything I do now. ✈

Into the Woods

You have to be prepared to survive... and survival school will get you ready



Photos courtesy Mr. Dan Yacko, 336 TRSS

"Our aircraft departed controlled flight at about 21,000 feet. I strained to see the flight instruments on the pilot's side to help evaluate our situation. Because of the violent motion of our aircraft, the only way I could focus on the instruments was to lean far to the left.

"The pilot command-ejected us without warning at an altitude of 10,000 feet AGL. My shoulder harness retracted during the ejection sequence and helped pull my head from under the canopy bow, but my left arm was grossly out of position.

"The last thing I saw as my seat left the cockpit was the altimeter rapidly descending through 11,000 feet (9,000 feet AGL). In a flash, I was clear of our aircraft as it spun out of control into the rugged terrain below. The wind ripped away my helmet and oxygen mask. I glanced up at my parachute as the violence of the ejection subsided and saw that it was perfect.

"As I hung in my chute, I screamed in anger and disbelief at what had happened to my arm and to what was a perfectly good jet.

"I was also very troubled because I could see I was going to come down in a hilly, heavily timbered area with no help in sight."

PEGGY E. HODGE
Assistant Editor
Flying Safety, May 93

You never know when you will be forced to eject and subsequently become stranded with "no help in sight."

All Air Force aircrews, and other career field members who must fly, are trained at Combat Survival School, Fairchild AFB, Washington, to effectively operate in this type of environment. Our profile of the school highlights their important survival mission. Since we are offered this training just once in our career, the photographs on these pages will review some important training information.

The School

The school at Fairchild began in 1949 when Strategic Air Command's General Curtis LeMay became concerned the crews of long-range B-36 bombers might be forced down anywhere in the world. Crews would have to survive for unknown periods of time.

Today, the 336th Training Group is committed to preparing aircrew members for the eventualities of flight, to include surviving in any type of environment regardless of friendly or unfriendly conditions.

"That They Shall Survive" is the school's motto and is representative of their critical Air Force mission. A highly skilled and professional staff of administrators and instructors conduct the Air Force's 17-day land survival/evasion and prisoner-of-war training course. Some of the instruction takes place in the Colville and Kaniksu National Forests, 70 miles from Fairchild AFB near Spokane, Washington.

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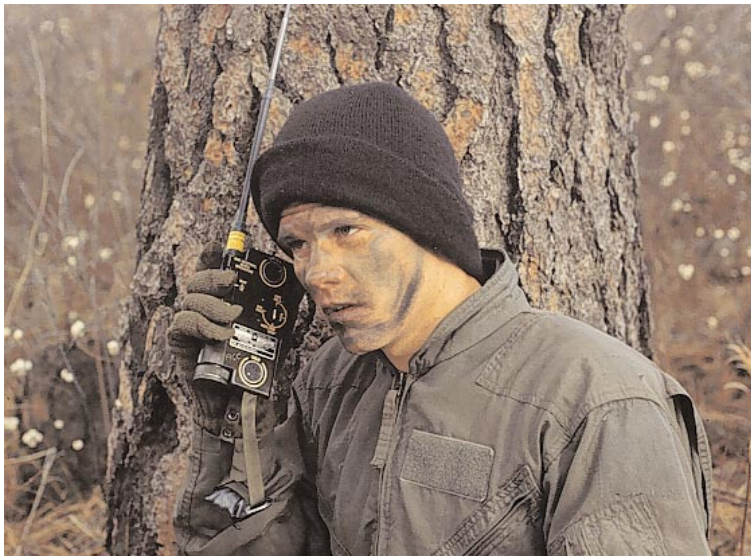

The Colville and Kaniksu National Forests near Spokane, Washington, provide a realistic environment to help ensure aircrew receive vital survival training. Communications for rescue, building makeshift shelters and learning fire making skills are all taught at the Combat Survival School.

Course content provides crews with valuable information on everything from firecraft to proper shelter construction to water purification. Sections on finding food—what you can and can't eat—parachuting, proper hoist procedures, and protection from the elements all may prove invaluable to aircrew. All these things and more are taught, not only for the wide range of climatic extremes crewmembers may find themselves in, but also so they can do them while evading capture or even as a prisoner of war.

A major goal at the school is to get aircrews who have had no experience in the woods used to the idea of being alone in this type of environment. It's an element many of us have little or no experience coping with. Classroom lectures provide theory and necessary basic information. The field days in the woods are for practice in developing survival and evasion skills.

The actual hands-on training in the woods is effective and as realistic as possible. Upon arrival, the students are divided into groups and given a minimal food allowance and sent on their way into the woods.

The terrain is very rugged (not your average hiking trail). They first must build their campsite. Although only 6 days in duration, long workdays include every kind of training. At the end of the day, the students are required to sleep in their self-made shelters.

Instructors must be skilled in all areas of woodcraft, wilderness medicine, rescue principles, and evasion techniques. Through training and experience, the instructor must meet the toughest challenge: "reading" the student to provide information in a way that the student will learn. At one extreme, there are students who have the attitude a survival situation will not happen to them. It can and does happen. A lot of good basic survival information is offered, and it is best to retain as much information as possible.

The other extreme is the student who presses too hard. Do not press your physical condition beyond its limits.

The End Result

Students learn all those basic skills one needs to get along "in the woods." Students graduate with an awareness of what is in the woods they can use to survive and what they can use to protect themselves.

Perhaps just as important as the basics is the confidence students gain after course completion and the attitude that **it can be done—you can survive!** ✈

336th Crew Training Group
Fairchild AFB, Washington
Flying Safety, May 93

Starting a Fire

■In any survival situation, a fire should be high on your list of priorities. Fire is used for cooking, warmth, signaling, purifying water, drying clothing, and can also be a big morale booster. Starting a fire, however, requires preparation.

When preparing to start a fire, you need to remember a fire needs fuel, oxygen, and a heat source. These three elements make up what is known as the "Fire Triangle."

Fuel is broken down into three stages relating to size and flashpoint: tinder, kindling, and fuel.

Tinder is any type of small material with low flashpoint which can be ignited with a minimum of heat, even a spark. It must be arranged to allow air between the dry, hairlike fibers. The preparation of tinder is one of the most important parts of firecraft. Dry tinder is so critical pioneers used extreme care to have some in a waterproof "tinder box" at all times.

Some common tinders are shredded bark from trees and bushes; crushed fibers from dead plants; fine, dry woodshavings; bird or rodent nest linings; cotton balls or lint; and foam rubber.

Kindling is the next larger stage of fuel material. It should also have a low flashpoint. It is arranged over the tinder so it ignites when the flame from the tinder reaches it. Kindling is used to bring the burning temperature up so larger and less combustible material can be used.

Kindling includes dead, dry twigs; pieces of dry, thinly shaved wood; coniferous seed cones or needles.

Fuel, unlike tinder and kindling, does not have to be kept completely dry as long as there is enough kindling to raise the fuel to a combustible temperature.

Recommended fuel sources are dry, standing dead wood and dry, dead branches; green wood which has been finely split; and in treeless areas, other natural fuels such as dry grasses, dead cactus, and dry animal dung. ■

SSGT DON WELCH
Soesterburg, Netherlands
Flying Safety, May 93

Proper Food Preparation

■ Cooking food at home and in the survival environment is a popular method of making food more enjoyable. Some foods taste better, are digested easier, and make us feel good when cooked. In any situation, cooking is also the best way to kill parasites.

AFR 64-4, ***Survival Training,*** says "all wild game, large insects (grasshoppers), freshwater fish, clams, mussels, snails, and crawfish must be thoroughly cooked to kill internal parasites." In a combat situation, cooking might not be feasible. In such a case, food may have to be ingested uncooked. However, in a training situation, there is no reason to ingest uncooked food which could carry parasites.

Overcoming food aversions is critical for survival, but you don't have to take chances. Take, for example, slugs found near rivers. Sure, survival students can learn to overcome food aversions by eating uncooked slugs; however, most people would agree any nontraditional food, cooked or uncooked, can be challenging. When training a student to overcome food aversion, forcing him or her to ingest nontraditional food could produce traumatic results, further hindering the training goal. Parasitic infections may result in distractions, illnesses, or absences which affect learning.

By teaching potential survivors how to cook food and that cooking will make the food more enjoyable, we help them overcome the aversion. After all, isn't this our primary objective? ■

A 2v1 GONE WRONG

"That Which Does Not Kill You Makes You Smarter"

LCDR IAN ANDERSON
VAQ 128
NAS WHIDBEY ISLAND, WASHINGTON

Five miles from the merge, and already the hop wasn't going too well for my Replacement Pilot. We were flying a 2 v 1 VID (visual identification) air-to-air tactics flight in our trusty F-14As, fighting the always challenging, full-up F-16N from the local adversary squadron (remember those guys?).

As our IP lead pushed it up to set up for a visual "mark" on the bogey, my RP started to get sucked while setting up for his 5-mile hook. Nothing new here, a pretty typical RP error. Grist for the debrief. But as the intercept progressed, our slightly sucked offensive combat spread was turning into a serious "combat left echelon" formation with miles of nose/tail separation between ourselves and lead. As a result, when lead merged with the bandit, we were about 4 miles away.

Predictably, my RP had the go-fast handles up as far as they would go as he tried to fix the problem, and I was at least pleased to hear "Tally One" from him just after lead's mark call. From the back, I got a brief glimpse of a speck of planform F-16N as it pulled to take out the angles and lateral separation with us. When my RP adjusted his flight path to do the same, my tally disappeared behind his ejection seat head box. Because of our gross separation from lead, the pressure was off the bandit pilot—he could make two neutral, 180-out merges happen and keep the Tomcats off his back for a while.

As our two aircraft went beak-to-beak with over 1,000 knots of closure, my RP called out "left to left" over the safety/shot common frequency. But the warm and fuzzy that call gave me was diminished a bit when he noted over the ICS that the merge geometry still didn't look right. With the F-16 still hidden by the pilot's head box, I asked my RP to call the pass again and exaggerate his nose position to visually establish merge geometry. He did so with another call and a wing dip, further adjusting our velocity vector to the right of the growing speck in the center windscreen.

I still couldn't see our opponent from my backseat, but I was feeling pretty comfortable based on what the RP was saying on the

radio and doing with the jet. That is, until his ejection seat head box sprouted wings and CATM-9Ms on either side. In situations like this, it's said that time slows down for the individuals involved. I'm here to tell you—it does. Almost like the near-death scene from the movie, ***Planes, Trains, and Automobiles.***

The nose and fuselage of the F-16 appeared over the top of the pilot's ejection seat. I could see the Viper was in a pretty hefty rolling pull to his right, his afterburner just completing its progress through its three stages. When GE F110 engines stage into burner, they occasionally vent a small quantity of unburned fuel. It did, and this fuel lightly coated our canopy as the sound of the bandit's passing engine briefly drowned out the hurricane-force howl of our Tomcat's ECS system.

The cockpit got dark, much like it would if you were flying during a solar eclipse. And then the Viper was gone. After a few choice expletives and a "knock-it-off," I elected to take my RP home. After spending a short time orbiting in the warning area until his hands and knees stopped shaking enough that he could smoothly fly the jet, we came back to a straight-in approach.

After reviewing our HUD tape, my estimation was that the last ditch, rolling pull drove the Viper from a low target aspect collision course to a slightly high left-to-left pass, missing us by about 50 feet. Debrief with the Adversary pilot (and a review of his HUD tape) revealed his perspective was a mirror image of ours. Because we were high and to his right after his merge with the lead F-14, he assumed a low-to-high, right-to-right pass would be the obvious outcome. A right-to-right was the flow generated by the geometry involved, and he couldn't reconcile the left-to-left call with wing-dip at about 2 miles. I'm sure the lessons learned are obvious, but just to beat a dead horse:

1. Listen to the calls your opponent makes—they tell you of his intentions, which he is probably already executing. If you don't agree, or you think the call is unsafe, either speak up and establish the proper pass geometry or clear and call a knock-it-off.
2. If you are approaching a merge and your opponent isn't drifting away from your velocity vector, you are about to have a close pass. If the speck isn't drifting at all, you are about to collide. Don't give away angles or separation, but make the pass happen safely. It is training, after all.
3. For RIOs/WSOs: Our jet had a marginal radar—not surprising for the F-14A, especially an FRS bird. This reduced my SA to what I could see out the front, which isn't much when the jet goes nose-on to its opponent. But if your mental ACM "clock" is telling you that you should be seeing a jet appear around the head box, speak up. I could have been more directive a few seconds earlier rather than just asking for the RP to restate the pass geometry.
4. The ACM Training Rules state: "Pass left-to-left passes, but not to the extent of crossing flight paths." While the bandit driver may have believed the RP was not adhering to this training rule, the relative geometry perception from each cockpit caused the two pilots to follow the same training rule in the opposite manner. One option might have included establishing vertical separation earlier to create more of a high/low split approaching the merge. Finally, classic bandit "don't hit me" wing dips at 1 - 2 miles might have helped here also. Clearly the big training rule violation for this flight was "500-foot bubble around all aircraft."
5. If you are fighting a nugget or RP, keep in mind that their bucket is probably pretty full. Call your 1 v 1 merges, establish geometry early, and "drive defensively" any time the jets are in close proximity to each other.

This was the closest pass I had in my 3-year tour as an instructor RIO, but not the only one. Surprisingly, it was the only close pass I had with a professional adversary driver—like this one, most of the others came on 2 v 1 hops, but the close pass occurred with the lead F-14. RPs tended to flock towards the IP's position (usually where the action seemed to be) and got in lead's way as he maneuvered his jet. Usually the last thing an IP is concerned about is his wingman getting between him and his opponent's control zone, and yet it can and does happen at the FRS. ACM training is one of the most risky and demanding things we do in a jet. Stay focused and alert to the cues, and you can manage those risks while getting the most out of your training flight.✈

From Oct 91 to Aug 94, and at the time of this story, LCdr Anderson was an F-14A/B/D Instructor RIO for VF-124. After tours as a super JO in VF-31 and as a flag aide to Air Pac, he transitioned to EA-6Bs, where he is currently assigned as Operations Officer for VAQ-128.

When GE F110 engines stage into burner, they occasionally vent a small quantity of unburned fuel. It did, and this fuel lightly coated our canopy as the sound of the bandit's passing engine briefly drowned out the hurricane-force howl of our Tomcat's ECS system.

Lesson Learned: *Never Give Up*

After months of investigation and extensive research, testing and analysis, the cause of this mishap has never been determined. The Army Safety Center, the CCAD Investigative Analysis Unit, AMCOM, and Boeing continue to monitor and evaluate all CH-47 flight-control anomalies to determine the cause of this mishap and take corrective action.

Never Stop Flying the Aircraft…

Photos courtesy *Flightfax*, U.S. Army Safety Center

Courtesy *Flightfax*, May 98

"First and foremost, control the aircraft."
"Fly the aircraft all the way to the ground."
"Never stop flying the aircraft."

These are all words our instructors have used to drive home the important point of aircraft control during simulated emergencies in the aircraft and simulator. Every aircraft operators' manual stresses the importance of controlling the aircraft when responding to real emergencies: "The most important single consideration is aircraft control."

Last year, four crewmembers survived inverted flight in a United States Army CH-47 because the pilots never stopped flying the aircraft—even when it appeared the aircraft was unrecoverable.

The two pilots, the flight engineer, and a mechanic had done everything right. They had spent 2 days inventorying, inspecting, and test flying the aircraft they were receiving from depot following phases one through four maintenance services. Although not required, they had performed a full maintenance test flight of the aircraft and found and corrected a few minor problems. They were more than merely satisfied that the aircraft was suitable to accept and fly; they agreed that this was one of the smoothest flying CH-47s they had ever flown.

The first leg of their planned 2-day mission back to their unit was without incident. They were about an hour into the second leg—and only 18 minutes from their destination—when they encountered their emergency.

The pilot in command (PC), who also was an instructor pilot (IP) and a maintenance pilot (MP), was on the flight controls when the nose of the aircraft began a slight pitch down. He applied aft cyclic to correct what seemed to be a normal divergence in the CH-47. But as he applied aft cyclic, the nose began a slow left yaw that he could not con-

trol with full right pedal.

The aircraft then began a slow left roll to about the 90-degree point and then continued with what seemed to be a snap roll through the remaining 270 degrees.

But it didn't happen that fast; it felt like eternity to the crewmembers. As the aircraft rolled inverted, the copilot (PI), figuring he had nothing to lose, joined the PC on the flight controls. (I am not advocating that two people try to fly an aircraft, but this action confirms that both pilots knew they were in a desperate situation.) Instinctively responding by doing what they had been trained to do, the pilots continued to fly the aircraft even as they saw the ground through the greenhouse, and it appeared there was no hope of recovering control of the aircraft.

The aircraft miraculously returned to a wheels-down attitude at about 250 feet AGL. The pilots were able to control the aircraft to a near-normal touchdown, although full right pedal was still necessary to control aircraft heading. As the crew performed an emergency shutdown, the aft rotor blades made contact with the fuselage since the damaged droop stops did not operate normally.

They had, in the words of the PC, "killed the beast"—all with only minor injuries to the mechanic, who had been standing at the onset of the emergency.

The aircraft was severely damaged, but four extremely valuable aviation resources who unexpectedly found themselves in a life-or-death situation that was not of their making are still with us today because they did not give up.

All four of these crewmembers share their stories on the following pages. What you'll read comes from the first-person accounts they gave only hours after the incident. We are publishing their stories here with their permission and approval, and we're grateful to them for their generosity.

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The View From the Cockpit

CW3 Bric Lewis, PC

It was cold, but we couldn't have asked for better weather—you could see forever.

We were going along at 1,100 to 1,500 feet above the ground, running between 130 and 135 knots indicated, and I was letting it float. I didn't have altitude hold engaged. I had my feet resting on the pedals and my hands lightly monitoring the controls. The aircraft would float up, and I'd bring it back down to between 1,500 and 1,100 feet, depending on the terrain.

After a 360-degree roll in flight, the crew managed to land the Chinook with surprisingly little damage. During shutdown, however, damaged droop stops allowed the aft rotor blades to pound into the fuselage.

I'd made a correction in altitude because it was climbing a little bit; we were somewhere around 1,100 feet AGL when I felt satisfied I was at an altitude that was okay. We were about 135-140 knots when I noticed that the aircraft nosed over. I let it go for a second. And then it yawed. The tail end was coming around the right side. I applied right pedal and a little bit of aft cyclic to stop the descent. But it got worse. The yaw rate increased dramatically, and I had full right pedal. It continued on around and Pat, the PI, grabbed the dash. I didn't hear anything from the guys in the back.

There were no indications on the dash that there was anything wrong, no lights—nothing. I thought for a second that there was an automatic flight control system (AFCS) problem.

And then the aircraft got on its side. Pat was screaming, "Catch it, Bric, catch it!" At that point, I had the pedal jammed against the stop, and it was still yawing to the left. By this time we were on our left side. The seat of my pants told me that the tail was coming around, so I applied full right cyclic.

The stick wouldn't move; it was like it was in concrete. Just about the time I noticed the stick wouldn't move, the nose pitched UP, and the aircraft rolled over on its back.

I yelled, "Oh, God!" and Pat got on the controls. I didn't know which way we were going. All I knew was, it's upside down. I

continued on next page

During the wild ride, flight pubs stowed on the right side created a blizzard inside the cockpit. Most of them ultimately settled on the left floor and dash.

was looking through the ceiling, and I could see the ground rushing up towards us. Pat was beneath me—from where I was, I could see the top of his head below me, and the aircraft was falling upside down. The nose was low, and I knew that the cockpit was going to hit first. I still hadn't heard anything from the crew chiefs. I could sense Pat on the controls with me. And they weren't moving.

I saw my wife.

Then the stick hit me in the leg, and I said, "This thing ain't gonna kill me!" We were flopping the cyclic around, but it wasn't doing anything.

We were getting fast, really fast. I had that elevator feeling in my stomach. And I thought, "This is the way it is. They lied. They tell your family it's instant." But you have that 2 or 3 seconds, and you know what's going on. It made me mad.

I remember thinking to myself, "It's upside down. There ain't nothin' you can do." And then it flipped over! I don't know why. I don't have any idea why it did.

Pat was on the controls with me. And we were FAST, fast. I looked at the airspeed indicator, and it said zero. I said, "No! It's FAST!" And he screamed, "250!" I thought he was calling out airspeed, but he meant altitude. The ground was rushing up.

Something flashed by the window, and I said, "We're close to the ground." I honked back on the stick, and Pat was with me. It was yawing terribly to the left, and we went—I know he was there—full right pedal and applied just as much aft cyclic.

I felt it lift. And I thought, "Yeah, we ballooned. Airspeed's coming back." I looked at the rotor, and it was coming back down through 115 percent—I don't know where it had been. And it was SCREAMING.

And I thought, "I'm gonna MAKE it!" It was slowing down. Everything was coming in good. We had back some altitude, and there was nothing in front of us. Just level ground. I thought, "Yeah, we're gonna make it." And then the nose kept coming up. "No," I thought, "we're going to end up stopped, but we'll be 25 feet off the ground!" So we pushed the stick forward, and the nose came down. This time it was SLOW—it was REALLY slow. I don't know how slow it was.

We got ready to cushion, but I couldn't lift the thrust. With all my strength, I couldn't lift the thrust.

I could feel that little jump you get when it's in the hangar and you move the controls—a little inch or so of movement. Pat was pumping it, and I was pumping it, and it wouldn't move. The aircraft was yawing BADLY to the left, and we still had full right pedal. Finally, I just flared a little bit more with the cyclic, and the back wheels touched. And then the front wheels touched. And it STOPPED. We didn't hit brakes—it just stopped.

For the first second or two—and it was SCREAMING—we sat there. And then WE started screaming, "We made it! We killed the beast!" And we gave each other the big high five right there in the cockpit.

Pat did the emergency shutdown while I tried to center the controls. The cyclic came back. We could move the thrust. The right pedal was stuck all the way to the front. And Pat was excited. He was hollering, and the blades were starting to wind down. And then he asked the crew chiefs to see if there was any fire. But we could tell; it wasn't coming apart. I mean, it felt normal. Pete, the flight engineer, said, "I don't see any fire." That was the first we'd heard from him.

And then there were three really fast bangs. And the whole airframe shook.

And then there were three more, not as fast. After the first three, we knew what it was.

Pat tried to lean down over the console, and I tried to get down between the pedals, but our shoulder harnesses were locked, and we were fighting with that. And I was thinking, "Man, this thing is still trying to kill us!"

All of a sudden, it came to a stop. It just—

everything stopped. We didn't holler again. We just shut off the battery. Pat was going to go through the checklist. "Just leave it like it is," I said. "Just leave it. Just make sure we're all okay."

We got out, and we were pumped. We looked at it. It was torn up, but we were on the ground.

CW2 Pat Nield, PI

We were at about 1,000 to 1,100 feet AGL, right at between 135 and 140 knots. The aircraft was tracked really smooth; it flew better than anything I'd ever flown out of Corpus. I was looking down at the map when I felt the nose pitch down, and I got a little bit of a shudder. I looked up and saw that the airspeed had picked up. At that point, Bric, the PC, started pulling back on the cyclic. That's the last time I looked at him because we started an abrupt yaw that made me grab onto the dash. My perception is that the nose pitched UP and continued to yaw really strongly. At this point, I knew things were bad; I didn't think we were going to be able to recover.

All of a sudden, the aircraft just snapped over; it felt like it went upside down. I was seeing ground through the greenhouse. Maps were flying everywhere in front of me. I heard Bric say, "Oh, God!" a couple times and things got really frantic. I remember thinking, "Oh, God, this is bad if HE's saying 'Oh, God'," because Bric's the best pilot I know.

When we went upside down, I figured I had nothing to lose, so I went ahead and got on the controls. I was fishing around, but nothing would bite. It was just like the rotor system was unloaded. I couldn't see anything inside the aircraft because everything was shaking too much. There was lots of noise, lots of vibration.

I was trying to obtain a ground reference point; I didn't get one until I could see the ground through the windscreen right in front of me. It was just rushing up, and we were turning. At that point, I remember trying to put in full right pedal, and I felt a response. I don't know if that was the response I felt or the billions of others I was doing. But something bit. Something took hold, and we got an input. I can remember pulling back aft left, and the aircraft started coming up. It was then that I realized that Bric was on the controls with me. He was still there. When we were upside down, I had no idea.

When the aircraft finally recovered, we were about 100 to 200 feet AGL and screaming out of the sky. We were both pulling back on the cyclic, flaring the aircraft. We started getting to where we were flared a little too much, and we thought the bottom was going to drop out on us. We attempted to pull up on the thrust and got maybe an inch at the most. Thrust just wouldn't go anywhere. So we started pushing it through. Bric said later that I was yelling out instructions; I don't really remember that. I just remember pushing the stick down.

We made a pretty good approach angle, and I remember touching down at what I'd estimate at 10 to 20 knots. It was really a relatively smooth touchdown. At that point, I released the controls, turned off the AFCS, and took both engines to stop. After that, I told the chief to check for fire on board. Then I looked at Bric; we got a little emotional and high-fived each other.

We thought it was over.

And that's when the rotor blades started slamming into the fuselage.

I knew that was a pretty bad thing because it could come through the companionway and chop up a crew chief or get Bric and me up in the cockpit. But, luckily, it slowed down and stopped.

I don't know how this thing righted itself other than God reached down and snatched this aircraft and turned it over. But it was like Bric and I had been joined at the hip at birth. We had worked together really well.

The View From the Cabin

DAC Peter Biessener, Flight Engineer

We were in level flight. I had done a ramp check, so I was looking at my watch and listening to the pilots and looking out the left forward window and thinking I probably needed one more ramp check before we landed. I looked over at Bill, the mechanic, in the other seat. Suddenly, the aircraft pitched down, and it started picking up speed. I thought, "That was kind of a strange descent."

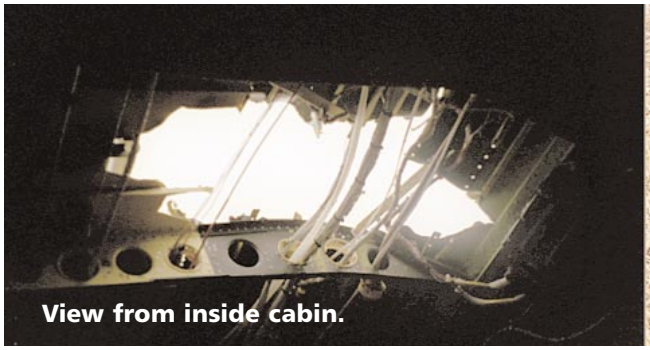
And then it started yawing. "Gee, we're out of trim. This isn't right." And then there was this tremendous lateral G force. The aircraft was really popping, and I thought, "This is really bad." I saw Bill wasn't in his seat anymore; he was up by the right-hand post of the companionway, right by the heater closet.

I saw the ground rotating around in my window, and I thought, "Oh, Jesus. We're going upside down."

We rolled to the left. Out the left window,

continued on next page

When we went upside down, I figured I had nothing to lose, so I went ahead and got on the controls. I was fishing around, but nothing would bite. It was just like the rotor system was unloaded. I couldn't see anything inside the aircraft because everything was shaking too much. There was lots of noise, lots of vibration.



View from inside cabin.

View from outside.

Aft rotor blades tore this hole in the top of the fuselage during emergency shutdown.

the ground was going around. And then Bill was up by the ceiling. We were upside down, and the aircraft was shaking really bad. "This is it," I thought. "We're upside down, and this aircraft's coming apart."

I heard Bric say, "Oh God!" And then it got really quiet. I never heard anything else from anybody.

I don't know why, but I started thinking, "I gotta get Bill." He was up on the ceiling. I was being pulled all over in my seat, but I was there; my seat belt was holding me in. And I had to get Bill because he was flying. I could see the terror in his eyes. The next thing, he kinda came down on top of me, right in front of the radio closet, and I held on to him.

It started getting really noisy, a lot of wind noise. Everything was really FAST. Like the engines. And the rotors—really noisy. Bill was trying to get up, and I was just hanging on to him. And then I looked out the window.

The ground was not above us anymore. It wasn't on top of the window, it was on the bottom. And I thought, "God, we're right side up."

The ground was coming up really fast. I was thinking, "I have to get Bill into a seat! He has to get into a seat because this is going to hit hard." He was trying to get up and go across the aircraft, and I was pushing him over there. He was looking at me, and I was pushing him. I was yelling, "Bill, get in the seat!" He grabbed the seat, and he fell back on the floor. And then I started calling, "Put your seat belt on!" I don't know why, but I grabbed mine, and it had become disconnected.

I looked out the window, and the ground filled the entire window. Bill was in a seat, but he didn't have a seat belt buckled. I rebuckled mine and again looked out the window.

The ground was right there, and it wasn't moving. I thought, "This is impossible; there was no impact!"

Everything was really quiet, and I got up. Looking down, I saw my mic cord on the floor; that's when I realized I had come unplugged. That's why I hadn't been hearing anything. I picked up my mic cord and plugged it in. From the companionway, I looked up front at Bric and Pat. They said something like, "We did it!" and gave each other a high five. Then Pat said, "Okay, guys. Let's check for fire. We're okay. We're on the ground."

So I turned around, and that's when I noticed the entire cabin was a mess. All our baggage had come out from underneath the cargo straps; it was thrown everywhere. I saw an oil can underneath my seat. The first-aid kits were on the floor. I couldn't believe it. I turned and went to the ramp and hit the ramp down. I stayed on the ramp—I didn't want to get off—and looked out the left at the engine. There was no smoke or fire or anything. Then I turned to go to the other side.

That's when the pounding started. Everything started hammering, and I looked up at the aft transmission. I started moving fast; I wanted off that ramp really bad. I'd seen a Chinook where the aft transmission had fallen out and onto the ramp, and I didn't want to be there. Somewhere toward the front of the ramp, I fell down. At that point, with all the shaking, I realized that the blades were actually pounding on the fuselage. As I was crawling on the floor toward the front, I saw that Pat and Bric were laid over in their seats. Pat was down by the center console, and he started hollering, telling me, "It's okay! Stay back! Stay back!"

I guess I stopped moving near the cargo hold. I was on the floor, and that's when everything just got quiet. And everything quit moving.

I got up and took my helmet off. Bill was

pulling on the door and looking to the back. When everything stopped, he kinda stood up, holding his back. His face was cut below his eye. He was hurting.

I looked around. I'm still amazed the way everything flew around the cabin. The scary part was the oil cans that were underneath my seat. I remember thinking that I don't always lock the ramp fire extinguisher in; a lot of times I just set it in its mount. And I thought, "Yeah, this time I locked it in, and it stayed there. It's a good thing."

I guess I thought a lot about securing equipment in the aircraft; I kept thinking about that. I was amazed. Stuff came out from ***behind*** the seats. It was in the cockpit. I mean this stuff that had been properly secured was thrown ***everywhere***. The crossed straps on the boxes of gear worked well. I have to remember this, that it's not all just forward loading or a hard landing or something. This stuff could be thrown ***sideways*** out of its straps.

We were just really happy. We thought that if they ever put this aircraft back together, we want it back. Because it stayed together. I mean, no matter what it did wrong, it still ***stayed*** together.

At the hospital, I started thinking that this was really a good day. Because we should have been a big pile, just a smoking hole. Chinooks don't go upside down and come back to life. They just don't do that. It's like God reached over and set us right side up again.

DAC Bill Gorenflo, Mechanic

So we're flying along. Pete does his ramp check. I'm impressed with ol' Pat; I can see him sitting in the front seat. He's got his map, and he puts an X and says, "I've got this tower over here. Bric, did you see that tower?" I mean, they're a good team. And Pete and I give thumbs up; these guys are ***all right***. I said, "Man, it was a good trip."

The aircraft's flying smooth.

We're just flying along, fat, dumb, and happy. Another ramp check comes up, and Pete says, "Systems okay. Ramp check good."

It was cold. We had the heater going, but I was cold, so I went to my suitcase and got my flight jacket out and put it on. I don't know how much time went by before I decided to unbuckle and see how ol' Bric was doing up there. I had just unbuckled my belt and started to get up when, all of a sudden, it's like catching one of those big updrafts. As I was getting up, it just threw me, slammed me up on the structure between the heater and the closet area. Just slammed my face up there. And I'm telling you, holy hell broke loose.

I turn around, and it slaps me up against the radio compartment. I'm airborne. I'm going, "What's going on?" It rips my headset off, and I can't hear anything but transmission screaming.

I can't see anything. I mean, my face hit that post and then, like when something pops you in the eye and you see a little bit of stars, and then all of a sudden, I'm spinning back toward the closet. I can't grab anything. Pete's in his seat, strapped there. He's trying to grab me. All I know is we're just rolling. I'm going, "Oh God, no!" And I picture my 6-year-old boy right there. And I go, "God, no!" And Pete's trying to hold me, and I'm looking at that seat belt over there. I say, "Oh God, no!" I know—we're waiting for the impact. You know, here comes the impact.

It throws me to the floor, and I'm trying to go for the seat belt over there. It's just happening so fast. And I'm on the floor. When the aft gear touches down, I'm still on the floor.

Finally, I look at Pete. He mouths, "We made it."

I can hear the pilots hollering up front, and I look up there. All of a sudden, the pounding starts.

I knew THAT sound; I knew the blades wanted to come through. It was just POW, POW, POW! I try to reach the knob to the lower cabin door so I can get the hell outa there. But the handle was turned; it was catching the top cabin door, and I couldn't get out. I looked back, and Pete already had the ramp down. He makes a beeline—I think he set a speed record for the low crawl.

Finally, it gets quiet. I look up. My face is hurting; my back is hurting. And we get out of there.

It's cold out there; I'm shaking. And I'm hurting. And I'm thinking, "What just happened?" I go back in. Pat's still inside, standing there. We just hug each other. I say, "Man, you guys saved our lives. What in the world…?" He says, "I don't know. Just thank God we're on the ground."

All I've got to say is that those two guys were a team up there, and with their ability and their experience and their training or whatever and the grace of God got us out of that or else it would have killed all of us. I don't know how they did it. ✈

At the hospital, I started thinking that this was really a good day. Because we should have been a big pile, just a smoking hole. Chinooks don't go upside down and come back to life. They just don't do that. It's like God reached over and set us right side up again.

CAPT J. C. FINDLEY
Air Force Advanced Instrument School

There has been a lot written on departure procedures lately. Awareness on how to properly depart from an airport on an IFR flight has risen dramatically since a C-130 crashed at Jackson Hole, Wyoming, in 1996. I've written this quiz so you can test yourself and see how well you understand departure procedures.

1. At Eagle Lake, Texas, the IFR departure procedure simply states Runway 17, 400-1. What does this mean to a USAF pilot departing from that runway?

a. The weather is there to tell civilian pilots that the takeoff minimums are nonstandard. They do not apply to Air Force pilots, so we can depart using our command weather minimums and climb at 200'/NM.

b. Air Force pilots aren't allowed to use nonstandard weather minimums in lieu of a published climb gradient. Because there is no climb gradient published at Eagle Lake, Air Force pilots may take off and climb at 200'/NM using AFI 11-202V3, ***General Flight Rules,*** weather minimums.

c. The TERPs specialist who designed this departure found an obstacle that would interfere with a standard 200'/NM climb. Instead of publishing a new climb gradient, he/she inserted this see-and-avoid weather minimum. Since there wasn't a climb gradient to be used in lieu of the nonstandard weather minimum, Air Force pilots may not depart IFR from Runway 17 at Eagle Lake.

2. You are departing IFR from Runway 23 in Birmingham, Alabama, and have been cleared for the Birmingham Three Departure.

a. A climb of 152'/NM will keep you clear of obstacles because there isn't a higher one published that applies to this departure.

b. A climb of 200'/NM will keep you clear of obstacles because there isn't a higher one published that applies to this departure.

3. You are cleared for the Birmingham Three Departure to 5,000 feet from Runway 18.

a. The required gradient is 200'/NM because there is not a higher one published on the Birmingham Three Departure.

b. The climb gradient of 360'/NM shown in the nonstandard minimums and IFR departure procedures for Runway 18 must be applied to the Birmingham Three Departure as well. An Air Force aircraft may depart Runway 18 as long as it can maintain 360'/NM.

4. At Birmingham, Alabama, Runway 36 has nonstandard weather minimums of 800-2 published. Runway 36 also has a published routing for departure on Runway 36.

a. An Air Force pilot may depart Runway 36 as long as he/she flies the published routing shown in the departure procedure.

b. The see-and-avoid weather minimums of 800-2 are designed to be used in conjunction with the published routing shown in the departure procedure. Thus, Air Force pilots may not depart IFR from 36 at Birmingham.

5. You are cleared to do a touch-and-go to Runway 36 at Birmingham, Alabama. Your clearance is to fly the Birmingham Three Departure, climb, and maintain 5,000 feet.

a. You can accept this clearance and climb out at 200'/NM using the routing in the Birmingham Three Departure.

b. You can accept this clearance even though the 800-2 shown in the departure procedure also applies to the SID because you are on a touch-and-go and not a "departing" aircraft.

c. You cannot accept this clearance because the 800-2 shown in the departure procedure also applies to the Birmingham Three Departure. Air Force pilots may not use see-and-avoid weather criteria to depart IFR, even from a touch-and-go.

6. You are departing McAllen, Texas. The IFR Departure procedure for Runway 36 says 300-1$^{1}/_{2}$ or standard with a minimum climb of 250'/NM to 500 feet.

a. You cannot depart this Runway IFR.

b. You can depart IFR as long as you can cross the departure end of Runway 36 at least 35 feet AGL and climb at 250'/NM to 500 feet.

7. You are departing IFR on Runway 18 at McAllen, Texas. You are "cleared as filed" up to 10,000.

a. You cannot accept this clearance because there is an IFR departure procedure shown for this airport (the "trouble T" symbol), and there is no climb gradient given for Runway 18.

b. You can do a diverse departure from Runway 18 because the published instrument departure procedure applies only to Runway 36.

8. At Eagle County, Colorado, Runway 7, the IFR departure procedure states nonstandard takeoff minimums are 5300-3 or 800-2 with a minimum climb gradient of 650'/NM to 11,800 feet.

a. You can depart IFR from Runway 7 as long as you can maintain 650′/NM to 11,800 feet.

b. You cannot depart from this runway IFR because the TERPs specialist who designed this departure requires ***both*** a see-and-avoid weather minimum off 800-2 ***and*** a climb gradient of 650′/NM.

9. At Texarkana Regional, the departure procedure is simply a note stating there are some 50-foot-tall trees 150 feet from the departure end of Runway 13 (see the sidebar).

a. This note is "nice to know" information, but a 200′/NM climb gradient will give you 48′/NM of clearance over any obstacles on departure.

b. This note advises you that these trees are obstacles that would interfere with a 200′/NM climb gradient, and you must figure out your own way around them.

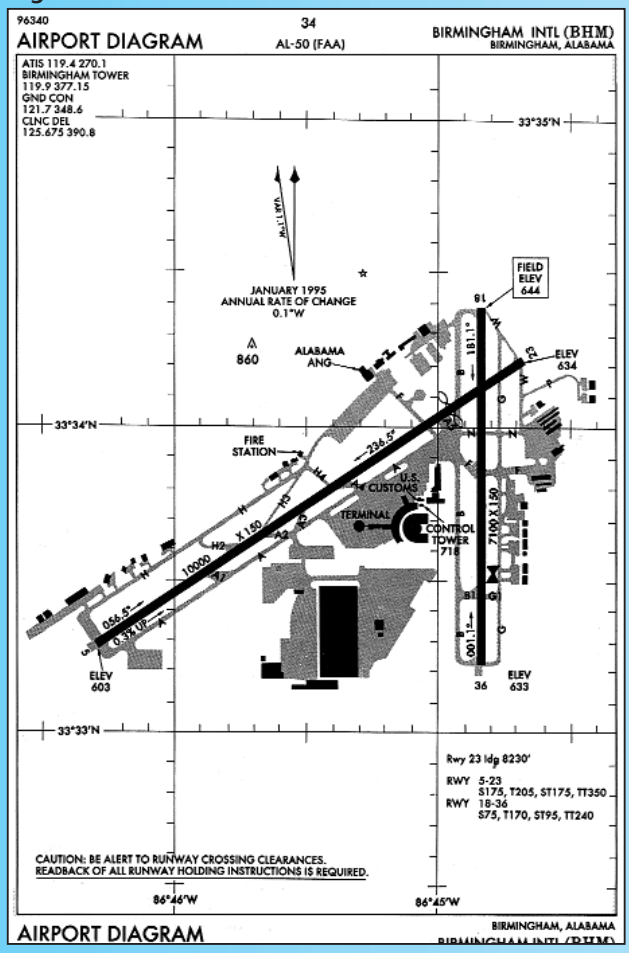
10. At San Diego's Lindbergh Field, there is a note that states there are 150-foot-tall trees and buildings 800 feet from the departure end of Runway 27. There is also a climb gradient of 570′/NM that can be used in lieu of the nonstandard weather minimums published (see figure 2).

a. You cannot depart from Runway 27 on an IFR flight because USAF pilots may not use see-and-avoid minimums.

b. You can depart from Runway 27 as long as you cross the departure end of the runway at least 35 feet AGL and maintain 570′/NM to 600 feet MSL. This climb gradient will keep you clear of all obstacles by at least 49′/NM.

c. You can depart IFR from Runway 27 but must compute your own climb gradient over the 150-foot-tall trees and buildings that are 800 feet from the departure end of the runway, then climb at 570′/NM to 600 feet MSL.

Figure 1



Answers

1. **c.** AFI 11-202V3, ***General Flight Rules,*** states Air Force pilots will not use see-and-avoid weather criteria in lieu of making a published climb gradient. AIM and TERPs state if there is nothing that would interfere with a normal climb gradient of 200′/NM, there will NOT be a published IFR departure procedure. (The new term for these will be "obstacle departure procedures.") While there is not a published climb gradient printed on the departure procedure, there is an obstacle that interferes with a 200′/NM climb gradient or there wouldn't be anything published for this airport under the nonstandard minimums and IFR departure procedures section. While the TERPs specialist has not chosen to print the greater-than-standard climb gradient, it is implied. Thus Air Force pilots will not use runways that have nonstandard weather minimums unless the runway has a higher-than-standard climb gradient that can be used in lieu of the nonstandard weather. These will state, "Or standard with" or "Standard with," then the increased gradient.

2. **b.** 152′/NM is the minimum climb that must be maintained on a missed approach, not on a departure. There is no published climb gradient for Runway 23 on the Birmingham Three Departure ***or*** in the nonstandard minimums and departure procedures section. Thus the minimum climb gradient is 200′/NM.

3. **b.** While there is no climb gradient published on the Birmingham Three Departure, AIM 5-2-6.b, 1 states the minimums in the nonstandard minimums and IFR departure procedures section apply to SIDs as well if the SID does not specify different minimums. So you have to look in the front of the book in DoD/NOS approach plates to find the climb gradient for Runway 18. The nonstandard minimums and IFR departure procedures section specifies a 340′/NM climb to 1700 feet for Runway 18. You must also apply this to the Birmingham Three Departure.

4. **b.** While you could use a departure procedure that has a published routing, you may not use the see-and-avoid weather minimums. The TERPs specialist who designed this departure procedure intends for you to use the nonstandard weather minimums to avoid a close-in obstacle and use the routing (runway heading to 1700 feet before turning) to avoid an obstacle that is further away. If you look at figure 1, you will notice there is a ridgeline 1/2 mile from the departure end of Runway 36. It would take a climb gradient of over 400′/NM to achieve proper TERPs clearance over this

continued on next page

ridgeline, but the TERPs specialist has given us only the nonstandard weather minimums to see-and-avoid this ridgeline. It is worth noting that if you cross the departure end of Runway 36 at 35 feet and follow the departure procedure's routing with a climb of 200′/NM, you ***will*** impact the ridge 1/2 mile from the departure end of Runway 36!

5. **c.** Don't forget, if you are returning to the IFR structure, the "go" part of a touch-and-go is an IFR departure. IFR departure rules then apply. The same reason you could not depart from Runway 36 in question 4 means you could not do a touch-and-go from that runway with an IFR climbout. (On a side note, if you get a radar departure from Runway 36, how do you assure obstacle clearance? The only way is to apply the nonstandard minimums section to ***all*** departures from that runway to include a radar departure. Thus you may not depart from this runway on an IFR clearance, period!)

6. **b.** Finally, a departure procedure you can use. While there is a nonstandard weather minimum listed, the TERPs specialist has given you a climb gradient you can use in lieu of the weather minimum. As long as you cross the departure end of Runway 18 at least 35 feet AGL and climb at 250′/NM you will have the required obstacle clearance.

7. **b.** Every approach plate to an airport should have the "trouble T" symbol if ***any*** of the runways on the field have nonstandard takeoff minimums or an obstacle departure procedure. The runways that are not affected by a departure obstacle will not have an obstacle departure procedure published and will not be listed ***at all*** under the nonstandard takeoff minimums and departure procedure section. If you are cleared as filed from this runway, you simply execute a diverse departure by climbing on the runway heading to 400 feet and turning in the shorter direction to your first-filed point.

8. **b.** The TERPs specialist has stated you must have 800-2 ***with*** a minimum climb gradient of 650′/NM to 11,800 feet. He/she expects you to have 800-2 to see-and-avoid some obstacles ***and*** climb at 650′/NM to avoid others.

9. **b.** The TERPs specialist ***must give*** the pilot a departure procedure if there is an obstacle that would interfere with a normal 200′/NM climb on departure. He/she has the choice of giving a specific routing, a nonstandard weather minimum that can be used to see-and-avoid the obstacle, a climb gradient greater than 200′/NM, or any combination of the three. However, there is a caveat in the TERPs manual that says the specialist ***will not*** specify a higher-than-standard climb gradient to an altitude less than 200 feet AGL. The TERPs manual says the specialist will make a note in the nonstandard minimums and IFR departure procedures section for such an obstacle. What this means is there can be an obstacle up to 199 feet AGL that would interfere with a normal 200′/NM climbout. The maximum height of the obstacle depends on the distance it is from the departure end of the runway. For example, an obstacle 1/2 mile from the departure end of the runway must be cleared by 24 feet. Thus there could be an obstacle up to 175 feet AGL that would not require a higher-than-standard climb gradient to 200 feet or greater. If you are departing a USAF field, this 175-foot obstacle would require a 300′/NM climb gradient to clear it by 24 feet, but only to 199 feet. In this case, the TERPs specialist would simply state, 175-foot-tall tree, 1/2 mile from departure end of the runway. In the case of Texarkana, the tree noted does violate the obstacle identification surface used to identify obstacles that affect a normal 200′/NM climbout. The remedy to the pilot—the specialist provides a note, and ***YOU*** figure out how to avoid it!

10. **c.** Like question 9, you have a note in this departure procedure that tells you of an obstacle. The difference is you are also given a climb gradient. Again, the TERPs specialist will not publish a higher-than-standard climb gradient if it is not required to at least 200 feet AGL. If you do the math here, you see an 873′/NM climb gradient is required just to clear the obstacles in the note if you cross the departure end of the runway at 35 feet.

I hope all of this gives you an idea how much you do or don't know about IFR departures. Feel free to e-mail me with any questions at findlyj@randolph.af.mil. **Take care and fly safely!** ✈

Capt J. C. Findley teaches IFR departures and TERPs at the Air Force Advanced Instrument School.

Here are the "givens" you'll need in order to choose the best answer for each quiz item.

EAGLE LAKE, TEXAS . . . . . Rwy 17, 400-1

BIRMINGHAM INTL, ALABAMA . . . . . Rwy 5, 800-6*
Rwy 18, 800-4**
Rwy 36, 800-2
* Or std with a min climb of 360/NM to 1700.
** Or std with a min climb of 340/NM to 1700.
Rwy 5, climb rwy heading to 1700 before turning on course.
Rwy 18, climb rwy heading to 2100 before turning on course.
Rwy 23, climb rwy heading to 2100 before turning on course.
Rwy 36, climb rwy heading to 1700 before turning on course.

McALLEN MILLER INTL, TEXAS . . . . . Rwy 36, 300-11/2*
*Or standard with a minimum climb of 250′/NM to 500.

EAGLE, COLORADO
EAGLE COUNTY REGIONAL . . . . . Rwy 7, 5300-3*
Rwy 25, 5300-3**
* Or 800-2 with a minimum climb of 650/NM to 11,800.
** Or 1700-3 with a minimum climb of 750/NM to 11,200.

TEXARKANA REGIONAL-WEBB FLD, ARKANSAS
Note: Rwy 13, 50′ trees 150′ from departure end of rwy, 420′ right of centerline.

A Hierarchy for Instructor Intervention

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"Flaps, pitch, power, roll," I said to myself as I rolled off the perch in my T-38 Talon.

Two seconds later, at 800 feet AGL, my UPT IP did it to me again. "I have the aircraft," he said. His professional tone showed no disgust, no anxiety, and no concern. In fact, the casual way he took the plane made me think he simply decided it was ***his*** turn to do a touch-and-go—except that he took the aircraft in this manner on almost every final turn of my first four sorties.

Now, 9 years later, I ***still*** wonder what I did wrong after rolling off the perch.

An IP's goal is to maximize training without sacrificing safety. Instructor pilots need to know not only ***when*** to intervene but ***how*** to intervene. There are many possible ways to intervene: Take the aircraft, block/prevent an improper control input, make a one-time control input (ensure your student knows he/she still has the aircraft), voice a control input, call a go-around, or do nothing. If we rank-order these options with respect to the degree of hands-on training received, the list would look like this:

Maximize Training	1.	Do Nothing
	2.	Voice an Input
	3.	Block/Prevent an Improper Input
	4.	Make a One-Time Input
	5.	Call a Go-Around
Maximize Safety	6.	Take the Aircraft

Let's say your student is weak at landing the aircraft. You vow to have him accomplish as many landings as possible on today's sortie. On a 10-mile ILS final and level at 2,000 feet, your student is on course, but maintaining 30 degrees of bank. What would you do?

→ Option 6, *Taking the Aircraft,* would instantly terminate training and might create a barrier to learning.

→ Option 5, *Calling a Go-Around,* would be ridiculous at 2,000 feet with the goal being to practice landings.

→ Option 4, *Making an Input* (rolling wings-level), would be inappropriate since such intervention need only occur if there was no time to talk.

→ Option 3, *Blocking an Improper Input,* is more useful when doing an Engine Failure, Takeoff Continued (EFTOC) or landing with crosswinds. (You ***want*** your student to roll out, but you could guard against exceeding 30 degrees of bank.)

→ Option 2, *Voicing an Input,* is the prudent intervention and what a good copilot would do ("approaching heading").

→ Option 1, *Doing Nothing,* would be effective in embarrassing your student into accelerating his/her cross-check.

The idea is that at 2,000 feet, you're not sacrificing safety by allowing your student to make certain errors.

Sometimes, however, the proper intervention is pure instinct. This occurs when the situation deteriorates rapidly and there is no margin for error. Let's move your "scenario aircraft" from 2,000 feet down into a landing attitude demo where you're planning to fly down the runway in the landing attitude. Now when you're level at 20 feet, slowing below touchdown speed, and beginning to roll into 10 degrees of bank. Your hierarchy runs right to Option 6—simultaneously take the aircraft to maintain wings level and increase thrust!

Perhaps if you had instructed more effectively, you might have been able to guide the student into preventing this bad situation.

This notional "Hierarchy for Instructor Intervention" can apply to any phase of flight and to any crew position. Instructors and evaluators must tailor their intervention based upon three factors: (1) the position of the aircraft; (2) the experience of the student; and (3) the instructor's ability to recover from a situation.

Instructors are like parents. They strive for their "kids" to function independently, but they don't want them to learn by landing gear-up. Remember the goal is to **maximize training without sacrificing safety.**

And finally, if you were my T-38 UPT IP and kept taking the jet from me in the final turn, you can finish debriefing me by calling Altus at DSN 866-7314. ✈

FLY THE AIRCRAFT!

USAF Photo by SSgt Steve Thurow

Aero Clubs...

Nine Steps to Professionalism and Safety

The author aimed this article at aero club flying, but his "Nine Steps" are things we should all think about.

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How often have we heard "Strive for professionalism" in our flying? This statement is sometimes accompanied by advice to "sound good on the radios," or "always try to taxi exactly on the yellow line." Aside from a few more catch phrases, we are rarely provided with concrete methods for obtaining professional decorum.

Professional qualities for pilots are tantamount to those of respected physicians, executives, and engineers. Certain attributes come to mind—courtesy, organizing skills, knowledge, responsibility, respect, and the pursuit of excellence. These common threads transcend career boundaries. We strive to emulate those qualities, but often have no specific guidance from a pilot's perspective.

Let's embark on a journey of discovery. I will expose what I hold to be nine key concepts of professionalism and how they relate to flying (in random order). Try to find applications to your personal flying in the Air Force Aero Club system.

1. *Know your shortcomings.* Athletes, soldiers, and politicians must intimately know their weaknesses in order to defend themselves or face failure. Pilots are no different.

The FAA Administrator, Ms. Jane Garvey, has identified our weak areas. As part of her "Safer Skies—A Focused Agenda" program, she has spelled out general aviation's Achilles heels—the six areas we are most deficient in—pilot decision-making, loss of control, weather, controlled flight into terrain, survivability, and runway incursions. Study these areas and their causes by attending FSDO-sponsored safety seminars. One of these emphasis areas is featured at each seminar. By getting smart on these accident realms, we instantly decrease the chances of falling prey to them.

2. *Strive for self-improvement.* Accidents are tragic. Repeat accidents are dreadfully tragic. True aviation safety wisdom comes from understanding there are no new types of accidents, only reincarnations of old ones. The circumstances may vary a bit, but the human errors responsible for accidents are and will forever be the same.

The NTSB accident and NASA Aviation Safety Reporting System (ASRS) incident databases are freely accessible on the internet. They can familiarize us with recurring pilot mistakes. Read each report to determine what happened, and ask yourself, "What am I doing to ensure this never hap-

pens to me?"

Additionally, keep a small notebook in your flight bag. Anytime you goof up during a flight, make a short note after the flight describing how your mistake occurred. Prior to each subsequent flight, review your list of "noteworthy blunders" (hopefully, this will take only a few minutes and not the entire afternoon), and you will slowly build up an immunity against those mistakes.

3. *Study the playing field.* Flying uses a tricky playing field that is confusion-prone and riddled with pitfalls. Every flying activity involves this operating medium, and in one way or another, all mishaps are caused or worsened by it. What is it? Communication!

Whether verbal, written, visual, or paralinguistic, communication permeates all flight activities. It can come in the form of verbal exchanges with ATC transmissions, chatting amongst the occupants of your airplane, checklists, placards, taxiway signs, gestures, etc.

For example, literally hundreds of accidents have occurred from using the simple phrase, "I've got it." What does this statement mean? Does it indicate you have the aircraft, the traffic, the chart, the frequency—what? Overcome communication traps such as this by being a stickler for standard phraseology and by carefully composing what you say to prevent ambiguity.

Always adhere to the guidance found in AIM, carefully enunciate, and use concise, accurate speech. Formulate your transmission in your head before pressing the "embarrassment button," a.k.a. the push-to-talk switch. Remember, using fancy jargon makes you sound amateurish. Stick to the standard vernacular and sound like a pro.

4. *Stay informed.* Aviation is a dynamic, evolving science. If you don't keep abreast of recent research findings, you are cheating yourself out of solutions to problems you will face in the future.

Incorporate the latest industry safety recommendations into your personal flying. Most safety practices adopted by the airlines can be applied to general aviation. For instance, keep a sterile cockpit (only safety-related conversation) within 1,000 feet of any level off and within 5 miles of airports. Reference ground checklists only when stopped. Always clarify confusing clearances with ATC.

There's important aviation research currently underway. Stay on top of it by subscribing to accident prevention periodicals, reading internet discussion forums, asking your instructor and local aviation safety counselor, and by attending safety seminars. Remember that safety seminars, internet forums, and on-line reports are free of charge.

5. *Practice risk management.* Risk management is a direct approach for reducing the unique hazards posed by each flight. If we attempted to avoid all the hazards associated with flight, we would just sit at home in front of the TV, wouldn't we?

Operational Risk Management (ORM) is both a preflight and inflight process. During preflight planning, assess the risks associated with the type of flight you have planned—surface winds, clouds, terrain, visibility, winds aloft, your state of mind, aircraft condition, etc.

Let's examine a sample flight to demonstrate how to apply ORM. You recently got checked out in a light twin and are planning a flight to mountainous West Virginia. Weather is marginal VFR, and you've just finished a long day at work, so it will be dark soon. You think you are confronted with a "go/no-go" decision, but you actually have one more choice. You actually are facing a "go/change variables/no-go" decision.

Perhaps you can safely undertake the flight by altering the risky variables. You may decide to take an airplane you are more comfortable with and delay your departure until the next day when it'll be daylight, and you will be freshly rested. The weather may still be marginal VFR, and the hills will still be there, but you have shaved off three unfavorable variables. Consequently, your mishap susceptibility has just dropped significantly.

Of course, not going is always your safest option, but so is staying in bed. My point being, if you are determined to fly, at least stack the deck in your favor! Try to reduce as many of the risks as you can, versus just treating it as a "yes-no," "go/no-go" decision.

Once you become airborne, ORM must be fluid (weighing risk as the flight progresses). By being fluid, I mean we must assess the rise in risk anytime any inflight variable worsens. Here are some examples of worsening variables. It starts to rain (the runway is now wet), surface winds increase, night falls, temperature approaches the dewpoint, you encounter unexpected headwinds at cruise altitude, aircraft systems malfunction, you run low on fuel, get tired, etc. Whenever a variable degrades, reevaluate the safety

continued on page 30

Incorporate the latest industry safety recommendations into your personal flying. Most safety practices adopted by the airlines can be applied to general aviation. For instance, keep a sterile cockpit (only safety-related conversation) within 1,000 feet of any level off and within 5 miles of airports. Reference ground checklists only when stopped.

Class A Mishaps FY99

FY99 Flight Mishaps (Oct 98 - May 99)	FY98 Flight Mishaps (Oct 97 - May 98)
21 Class A Mishaps	13 Class A Mishaps
7 Fatalities	4 Fatalities
16 Aircraft Destroyed	10 Aircraft Destroyed

6 Oct	✶	An airman suffered a serious back injury during a helicopter training exercise.
21 Oct	♣	An F-15E crashed during a SATN training mission killing both crewmembers.
22 Oct	♣	Two F-16Cs collided shortly after departure. One F-16 was destroyed and the other F-16 recovered uneventfully.
29 Oct		A C-9A's No. 2 engine failed and caught fire shortly after a touch-and-go.
9 Nov	♣	An F-16CG crashed during a day BFM training sortie, killing the pilot.
17 Nov	♣	An F-16C experienced engine failure and crashed during a day training sortie.
19 Nov	♣	An F-16CJ experienced loss of thrust shortly after takeoff and crashed.
4 Dec	♣	An F-16D experienced engine failure 25 minutes into flight and crashed.
15 Dec	♣	An F-16C on a day training sortie experienced loss of thrust on RTB and crashed.
29 Dec		An OA-10A's No. 1 engine throttle cable failed during flight. The pilot had difficulty landing, the aircraft departed the prepared surface, and all three gear collapsed.
7 Jan	♣	An F-16DG experienced an engine malfunction shortly after gear retraction and crashed.
13 Jan	♣	A KC-135E crashed northwest of the departure end of the runway. All four crewmembers were fatally injured.
20 Jan	♣	An OA-10A entered an uncommanded, nose-low attitude. Unable to return the aircraft to controlled flight, the pilot ejected, and the aircraft was destroyed.
21 Jan	♣	An F-16CJ conducting low-level tactical navigation struck trees on a ridgeline. The engine failed, and the aircraft was destroyed on impact with the ground.
28 Jan	♣♣	Two F-15Cs were flying a Dissimilar Tactical Intercept Training sortie against a three-ship of F-16Cs. The two F-15s collided during the first intercept and were destroyed.

3 Feb	♣	An F-16C on a training mission had an engine malfunction. The pilot ejected after an in-flight fire developed, and the aircraft was destroyed on impact with the ground.
24 Feb	♣✶	An RQ-1A UAV crashed and was destroyed.
17 Mar		A U-2S sustained significant engine damage.
18 Mar		An F-16C suffered major damage on landing.
26 Mar	♣	An F-16CG crashed during a day training sortie.
29 Mar	♣✶	A Global Hawk UAV crashed and was destroyed.
30 Mar		A U-2S suffered major damage on landing.
7 Apr	♣✶	A KC-135R sustained major fuselage damage. (Ground Mishap)
12 Apr		An AMRAAM and No. 1 launcher were liberated from an F-16CJ during flight.
18 Apr	♣✶	An RQ-1K UAV crashed and was destroyed.
26 Apr	♣	An F-16DG experienced a landing gear malfunction while attempting to land. The pilot executed a successful go-around and proceeded to the controlled bailout area, where both pilots ejected. The aircraft was destroyed on impact with the ground.
7 May	✶	A C-5B experienced hot brakes following high-speed taxi checks. (Ground Mishap)

- ❑ *A "Class A Mishap" is defined as one where there is loss of life, injury resulting in permanent total disability, destruction of an AF aircraft, and/or property damage/loss exceeding $1 million dollars.*
- ❑ *These Class A mishap descriptions have been sanitized to protect privilege.*
- ❑ *"♣" denotes a destroyed aircraft.*
- ❑ *"✶" denotes a Class A mishap that is of the "non-rate producer" variety. Per AFI 91-204 criteria, only those mishaps categorized as "Flight Mishaps" are used in determining overall Flight Mishap Rates. Non-rate producers include the Class A "Flight-Related," "Flight-Unmanned Vehicle," and "Ground" mishaps that are shown here for information purposes.*
- ❑ *Unless otherwise stated, all crewmembers successfully ejected/egressed from their aircraft.*
- ❑ *Flight, ground, and weapons safety statistics are updated daily and may be viewed at the following web address by ".gov" and ".mil" users: http://www-afsc.saia.af.mil/AFSC/RDBMS/Flight/ stats/index.html.*
- ❑ *Current as of 12 May 99.* ✈

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MAINTENANCE MATTERS PRESENTS...

YOU MAKE THE CALL!

[We now invite you to convert 20/20 hindsight into 20/20 foresight. See how folks put themselves and their aircraft in harm's way, and learn from their blunders. We also strongly encourage you to understand how applying a little Operational Risk Management (ORM) in each one of these scenarios would have meant the difference between having a mishap and not having a mishap. Don't become a statistic (or perhaps be the subject of a future Maintenance Matter) yourself. ORM: It's not just for Operators anymore!]

Scenario One. Two KC-135 crew chiefs were assigned to do a No. 2 tire change and a preflight. They encountered no problems during the tire change and immediately proceeded to work the preflight after leaning the bad No. 2 tire against the backside of the No. 5 and No. 6 tires. (For those unfamiliar with the KC-135, each of the two MLGs has four tires. The left MLG has tires 1, 2, 5, and 6, while the right MLG has tires 3, 4, 7, and 8. Tires 1, 2, 3, and 4 are located in front of the 5, 6, 7, and 8 tires.) In preparation for applying hydraulics and moving flight control surfaces, the lead crew chief cleared stands and ladders from around the aircraft. Once satisfied, he then directed his assistant to pressurize hydraulics and lower the flaps. As the flaps transitioned through 15 degrees, the lead crew chief heard a "crunching" sound (that sounded a lot like a $15,000 repair) and directed his assistant to discontinue lowering the flaps.

You Make the Call. The lead crew chief should have:

A. Directed his assistant to complete the preflight first and ***then*** break out his breakfast corn flakes.
B. Moved the bad No. 2 tire from its position in back of the LMLG (which, coincidentally, also placed it in front of the left inboard flap) before lowering the flaps.
C. Maintained better situational awareness.
D. B and C.

Scenario Two. A KC-10 (mishap aircraft 1/MA1) landed on a congested ramp in a foreign country, at night, and taxied toward the parking/refuel area. Because of ramp congestion, local procedures generally required that aircraft ***taxi*** into the refuel area and then ***get towed forward*** to make room for the next aircraft to enter the refuel area. Because maintenance was being conducted on another KC-10 (mishap aircraft 2/MA2) in the parking/refuel area, it was necessary to push MA1 backward into the refuel spot. During the pushback, MA1's boom struck MA2's radome. Then, while pulling MA1 forward, the tow team used a flap hinge on MA1's right wing to locate a B-1 maintenance stand in the raised position.

You Make the Call. The tow team should have:

A. Stopped after the first collision.

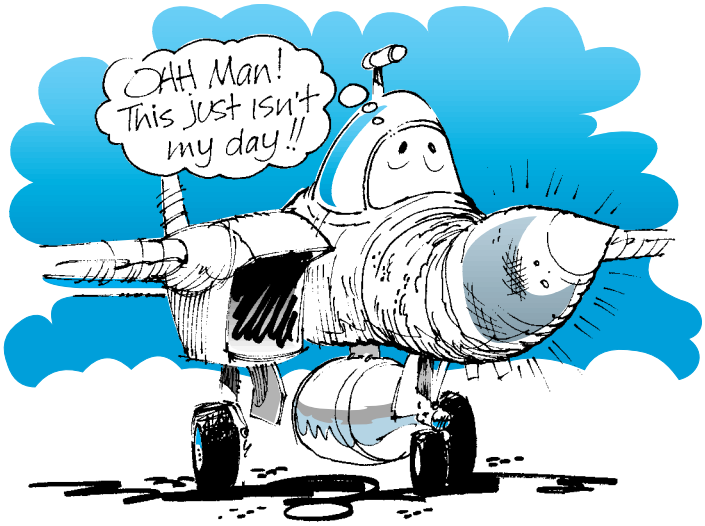
ce Matters

B. Gone for just one more collision to boost repair cost above $44,000.
C. Pulled a "Ferris Bueller" before the mishap investigator showed up.
D. Communicated effectively and applied risk management principles before beginning the tow.

Scenario Three. While doing a combined Pre/BPO on an F-16, a crew chief discovered first-stage fan-blade damage. Jet Shop personnel further assessed the damage and confirmed an engine change would be required. Once in the Jet Shop, in-depth inspection revealed even more damage to first-stage fan blades, as well as to fourth-stage compressor blades. Metal residue samples were taken from the damaged first-stage fan blades and sent along with photos for FOD analysis. As it turns out, the lab determined the engine change and $17,000 damage cost was attributable to—(drum roll, please)—a nickel-plated coin, most likely a dime or a nickel. To prevent future incidences of coin-induced FOD (Foreign Object ***Damage***) caused by FOD (Foreign Object ***Debris***), this unit's Supervision established a policy that maintainers will now empty their pockets at the beginning of their shift and store any personal items.

You Make the Call. A person who crawls into intakes with coins and other potential sources of FOD on his person should:

A. Have his birthday taken away permanently.
B. Receive the Iraqi "Well Done" Award.



C. Serve out the rest of his enlistment as a "Permanent Latrine Orderly."
D. Consider the consequences of his acts before acting (use some ORM).

Scenario Four. The F-15 was flying a routine mission when it experienced total utility hydraulic failure. It IFE'd in, made a successful barrier engagement, and was towed into its PAS (Protective Aircraft Shelter) for repairs. A maintenance run for troubleshooting seemed to point to a faulty switching valve on the left aileron as the cause. The bad valve was R&R'd, a mule was used to perform operational checks, and the on-scene supervisor decided to do a final maintenance run to verify system integrity. In order to protect the promise of confidentiality made pursuant to the safety investigation, we cannot provide all the details. However, we can say that something out of the ordinary happened when the supervisor fired up the engines. The LMLG chock came loose, and the F-15 veered toward the PAS wall, where its nose radome contacted the Weapons Storage and Security System (WS3) power transfer switch panel. Sadly, records indicated proper tech data wasn't signed out from CTK. Besides clipping an Eagle's wings (or beak) temporarily, this mishap resulted in more than $19,000 damage.

You Make the Call. A person who doesn't use proper tech data (as well as those who tolerate those who don't use proper tech data) could:

A. Cause serious injury (or even death) to himself.
B. Cause serious injury to (or cause the death of) fellow Maintainers.
C. Cause serious damage to (or cause the destruction of) critical warfighting assets.
D. Lose the right and privilege to be known as a "Maintainer."
E. Cause A, B, C, and D to occur simultaneously. ✈

There's ALWAYS someone you can report safety hazards to—ATC, an aviation safety counselor, airport managers, designated examiners, the local FSDO, and through NASA ASRS reports. We're all in the wild blue yonder together. Let's be neighborly and "share the sky" figuratively as well as literally.

of your flight. The best option may be to land, divert, or change your game plan.

6. *Pay attention to detail.* It's usually the little details that make the difference in life. It's also those little details that can get you in a bind. For instance, take the flight control lock discovered still in place at 60 knots on takeoff roll, the drained battery from the master switch left on after a flight, or the engine failure after forgetting to switch the fuel selector to a fresh tank of gas.

There are lots of details to manage in aviation. That's why, many years ago, the aviation industry developed a pilot aid called ***the checklist***. You should use a checklist for everything in aviation.

Often we have only the written aircraft checklist as an aid. I recommend having a detailed checklist for any important multistep activity—preflight planning, postflight actions, cruise flight, and before descent. If your checklist doesn't already have these areas, I highly suggest adding them. Write in any items you have forgotten in the past, but never delete or alter any items from the official checklist. Additionally, make mental checklists to augment your written ones—"BLT," "GUMPS," "Five Ts," etc. Any aid to memory opens more time for the most important aeronautical activity—***thinking!***

7. *Manage your resources.* As modern aviators, we are sometimes inundated with more resources than we can handle. Charts, GPSs, IFR approach plates, checklists, the AIM, the POH, Airfield Facility Directories (AFD), flight plans, navigation plans—you name it!

There's only one way to cope with this "information overload": ***Get organized!*** Start by carrying a current copy of the FAR/AIM with you. I suggest tabbing all the important sections for quick inflight reference. Have your cockpit fully organized before flight— charts folded open and stacked in order of expected use, destination and emergency airfields tabbed in the AFD, approach plates clipped open to the emergency return page, kneeboards in place (if you are of the kneeboard persuasion), and appropriate information on them (frequencies, pattern altitudes, NOTAMs, and weather). The more time you spend getting organized before taxiing out, the more time you can spend indulging in the art of aviating once you get airborne.

8. *Be receptive to criticism.* The professional pilots I admire have usually been soft speakers who are humble experts. It seems that being cocky only guarantees one end result—sooner or later, extreme embarrassment.

Criticism shouldn't just be accepted, it should be actively sought after. Remember that humility is the road to wisdom. I liken it to the old saying, "Better to keep your mouth shut and have people think you may be ignorant than to open your mouth and confirm it for them!"

9. *Be a team player.* Last—and perhaps the one that ties the others together—be a contributor to the team, not a spectator. It doesn't matter what we fly, we all share the sky together. The more we look out for one another, the more we'll keep each other out of trouble. See something unsafe? Report it! Trust me, you won't feel too good if something happens due to your apathy.

Imagine, if you will, landing at an uncontrolled field and seeing deer by the runway. Instead of calling out an advisory on CTAF, you taxi into the chocks and shut down. In comes a Learjet behind you and ***SMACK!*** Venison for dinner!

There's ALWAYS someone you can report safety hazards to—ATC, an aviation safety counselor, airport managers, designated examiners, the local FSDO, and through NASA ASRS reports. We're all in the wild blue yonder together. Let's be neighborly and "share the sky" figuratively as well as literally.

Hopefully, these nine steps can help us pave a path towards developing a professional attitude. They can be applied by a Piper Cub pilot or a Boeing 777 crew. You have probably noticed they are all interrelated and carry the common thread of safety. That's what professionalism is all about—safe, efficient, courteous task accomplishment. Give these nine steps a try. I guarantee you'll get more enjoyment out of flying and be a safer pilot to boot. See you at the safety seminars! ✈

Capt Cortes was previously assigned as a C-21A Evaluator Pilot. He is currently serving as a C-141B Aircraft Commander with the 6th Airlift Squadron at McGuire AFB, New Jersey. Capt Cortes is an FAA Aviation Safety Counselor with the Philadelphia FSDO and has been a General Aviation pilot for 14 years.

☆ U.S. GOVERNMENT PRINTING OFFICE 1998-673-366/43055

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.

LT COL MIKE J. McDONALD

LT COL HARVEY D. JOHNSON

CAPT BUEL J. DICKSON

120th Fighter Wing
Great Falls IAP, Montana

Leading a flight of two F-16s back to base after an uneventful training mission, Lt Col McDonald was 60 nautical miles from the field when he began experiencing difficulties. He noticed light to moderate uncommanded aircraft oscillations in roll and pitch accompanied by several seemingly unassociated flight control warning lights. Declaring an emergency, Lt Col McDonald, Lt Col Johnson (chase), and Capt Dickson (SOF) worked together to analyze the problem. After following checklist guidance, all warning lights were extinguished; however, the pitch and roll oscillations continued.

When the incident aircraft was 20 miles from the field, Capt Dickson directed completion of a controllability check. Lt Col McDonald initiated the checklist and configured for landing. Ten seconds after lowering the landing gear an explosion occurred. A panel was blown from the aircraft, and the tail section was engulfed in flames. Simultaneously, oscillations in pitch and roll increased to the limits of controlled flight.

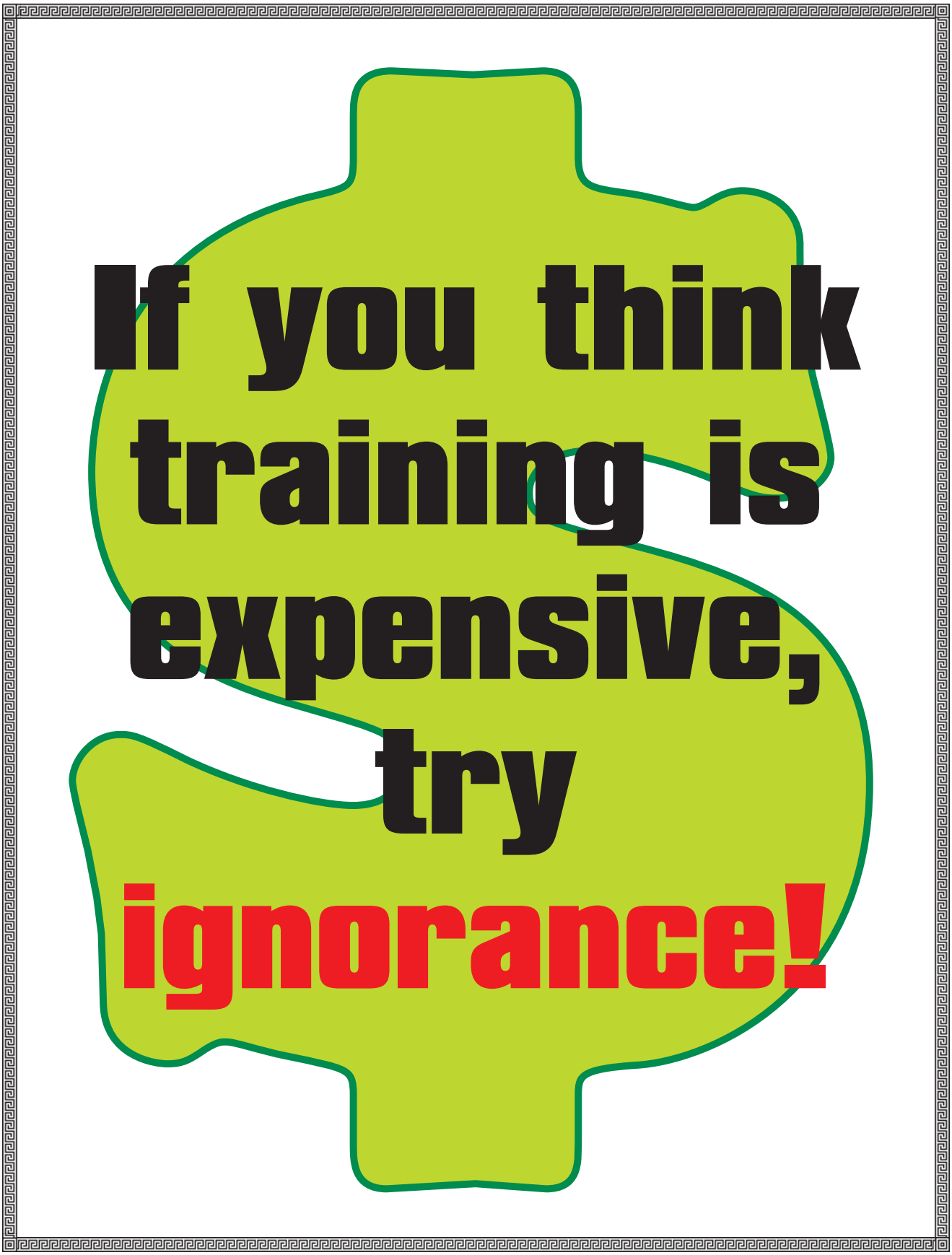
Lt Col Johnson notified Lt Col McDonald of the fire, monitored the flight path, and commanded "bail out." Lt Col McDonald regained control of the aircraft and turned toward an uninhabited area to ensure the wreckage would not injure anyone, stating, "Bailing out in ten seconds." Seven seconds into this countdown, Lt Col Johnson informed Lt Col McDonald that the fire was subsiding. As Lt Col McDonald continued to avoid rural residences, the flames extinguished.

Lt Col McDonald determined that the aircraft could be controlled through landing at a higher than normal landing speed and maneuvered his aircraft for an opposite direction landing to avoid overflight of the city. He stopped the aircraft before the departure end cable with emergency braking only and successfully egressed the aircraft.

The post-mishap investigation revealed that a wire bundle had chaffed against a hydraulic line, arced, and caused a pin-hole leak. The spray of hydraulic fluid ignited, and the resulting fire superheated a hydraulic accumulator until it burst, causing the explosion and near loss of the aircraft.

The superb teamwork of Lt Cols McDonald and Johnson, and the directions given by Capt Dickson, ensured that all emergency actions were accomplished. Their demonstrated Cockpit Resource Management resulted in the successful recovery of this uniquely damaged F-16. ✈

WELL DONE!


If you think training is expensive, try ignorance!