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AVIATION SAFETY FROM COVER TO COVER

How To Buy an Airplane Part 2

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FEATURES

DEPARTMENTS

FRONT COVER: 1980 Piper Navajo C/R

BACK COVER: Learjet 35A (Both photos courtesy of manufacturers)

How To Buy an Airplane Part 2

by Bill O'Brien

There comes a time in every pilot's life, usually during a weak moment, that the idea of owning an airplane is seriously entertained. If that moment hits you, here are some of the things you should know before you buy an airplane. Part 1 of this article covered researching the perfect airplane, checking the paperwork, and the inspection of the interior. Part 2 moves to the exterior inspection of the airplane and the flight test.

Wings

Okay, now we are going to look at the modern marvel of flight, the wing. Take a position on the end of the wing, and look down the wing towards the fuselage. Check the position light on the wing tip for security, operation, and cracks in the glass. Next check the sheet metal around the main spar. If the spar is not immediately visible, the main spar is approximately within the first 20% of the wing measured from the leading edge. Also on many small GA airplanes the main spar is in-line with the pilot's seat. Also check the sheet metal around the rear spar. The rear spar is usually within inches of the trailing edge of the wing.

When you check the rest of the wing, I want you to check both the top and bottom of the wing for buckled or raised sheet metal, corrosion, or obvious signs of damage. Make sure each fuel tank is placarded with the proper octane and quantity and take a look for signs of fuel leaks. Take several fuel samples and check for color, clarity, and signs of water. Open the tank and with your explosion-proof flashlight check and see if you can see dirt or debris on the bottom of the tank. If the aircraft has replacement internal rubberized/vinyl tanks, check that the tank is secured to the top skin, also check for wrinkles in the bottom of the tank. These wrinkles trap pockets of water so the pilot cannot get rid of the water when he or she samples the fuel.

Water in the fuel is always a problem. If you have a regular cap on a fuel tank, check the vent hole in the cap to see if it is open and make sure the "O" ring or gasket is in good shape. Also check the filler neck area of the fuel tank to ensure a fuel nozzle from a fuel truck hasn't gouged out some metal and allowing rainwater to get into the tank.

For aircraft with flush mounted caps, the easiest way water can get into tank is not by passing the big "O" ring on the perimeter of the cap, but by getting pass the one or two small invisible "O" rings that seal the pop up lock in the center of the tank. If you want to check the cap lock for leakage take a small sample of clean fuel and pour it into the pocket the lock fits flush into. If the fuel disappears, your "O" rings are bad. While we are still taking about fuel caps, you should check the fuel tank vent. These are tubes on the bottom of the wing that face forward. In the spring a lot of critters seem to take a liking to an apartment that is perfumed with the exotic scent of 100 low lead. They move in and shut the door, usually with mud. The fastest way to determine if a vent is clogged is when you open the fuel tank cap and you will

Check the wing top and bottom for bulges, cracks, and hangar rash.

hear a whoosh sound. You can also probe the fuel vent pipe with a pipe cleaner.

If you find out that a fuel tank was leaking and a sealing compound was used to seal the fuel leak, before any flight make sure the outlet screen in the tank is pulled and inspected. Sometimes the fuel tank outlet screen is partially clogged with tank sealer and the problem only gets worst over time and one day it will shut the fuel off or restrict the fuel flow to a point that the engine will only produce very low power.

Check the flaps operation to insure they go up and down together and all the hardware is secure. If you are checking an aircraft with a Fowler flap design (where the flaps extend back as well as drop down) there are a couple of things you should check. With the flaps in the down position, check the top flap skin for missing paint or rub marks just aft of leading edge of the flap. If the flap has missing paint or rub marks visible, this is usually caused by excessive wear in the flap rollers or the flap rails. This rubbing occurs in cruise flight because the flap rollers/track wear is allowing enough up and down play so the top of the flap is vibrating against the underside of the wing.

Checking the ailerons for proper operation is a little more extensive than pumping them up and down in a poor imitation of bird wings, and then walk away thinking you have done a good job. I want you to do a better inspection of one of your primary flight controls. First move the aileron control to full left than right. Make sure the aileron contacts its stops. Listen for any scraping or rubbing noises indicating a cable off a pulley. Next, check the top and bottom of the aileron skin for cracks. Most of the cracks form at the trailing edge where the bend in the sheet metal is the greatest. Also, check the attachment of the aileron hinges to the wing and the aileron. Then hold the trailing edge with your hand and gently push and pull on the aileron. If the free play exceeds an 1/8 of an inch, then the hinges and/or hinge pins have to be replaced. Also check the attachment of the aileron push-pull rod to the aileron and the nut and bolt on the rod end for security and lubrication. Also turn the rod end side to side and check for freedom of movement.

FAA Websites

For those who have access to the Internet, there is a wealth of information available from the FAA. Once you have chosen your dream aircraft click onto <http://www.faa.gov/avr/air/airhome.htm> for available information on advisory circulars, Airworthiness Directives (AD), Regulatory and Guidance Library (RGL), Supplemental Type Certificates (STC), and Type Certificate Data Sheets and associated model information (TCDS - make/model).

You should check the push-pull access hole to the wing for bird droppings. If there is even the slightest evidence that a bird was there—even a piece of straw—you can almost bet that a nest the size of a two-bedroom condominium is inside the wing. Please make sure no birds have set up housekeeping inside the wing for two major reasons. Obviously, the first reason is nest material may foul the flight control cables and bellcranks, and the second reason is that bird droppings are very acidic and corrosion inside a wing is very difficult to treat.

Next check the leading edge and wing tip for damage. Usually leading edges of wings show a little "hangar rash" which is mechanic speak for scrapes, dents, and dings usually found on the very outboard of the wing. While it is important to check for damage and cracks in the hangar rash area, it is even more important to check the rear spar attach point where the wing is attached to the fuselage for severe damage. How so? If you think of the wing as a lever, a little movement on one end (e.g. hangar rash area) will multiply the force on the rear spar attach point many times. Check the rear spar area for pulled or loose rivets or creased or bent skin. Take your time, and look carefully. This kind of damage is very, very expensive to repair because of the man-hours involved.

One neat trick I learned as a mechanic is how to check the aileron rigging without jacking and leveling. First of all this trick only works on high- or low-wing aircraft without interconnected flight controls, so *Ercoupe* or *Tripacer* owners have to do the check the hard way. First open the cockpit door and ensure that the aileron trim is neutral and the flaps are in the up position. Next go to either wing and pinch both the aileron trailing edge and the flap trailing edge together so they are in the cruise configuration. Next look at the control yokes in the cockpit. They should be level with the horizon. Now, look at the aileron on the opposite wing. The aileron trailing edge should be in line with the flap trailing edge. If the control yoke shows more than five degrees of bank or if the opposite aileron is either up or down 3/8 of an inch, the ailerons are out of rig and most likely the cause is the cable tension is less than what it is suppose to be.

Wheels, Struts, and Brakes

Bad wheel alignment equals bad landings.

Aircraft wheels are usually the last things to leave the ground and the first to arrive—if every thing works as advertised. First thing to check is the tires' condition. FAA policy states that a tire is unairworthy if there is cord showing or if the sidewall is cracked. Remember FAA sets minimum standards. My own personal standard is, if there are cracks or no tread, replace the tire. Why? On a 600 X 6 four-ply tire, when you have no tread you have only 1/4 inch of rubber left between you and a blow out.

If you find the tire is worn on one side, the wheel alignment toe in or out is off. This is corrected by adding or subtracting washers to the torque links. However the alignment process takes a couple hours (jacking, leveling, and using a jig) so the labor cost is high to correct the problem.

Make sure that the dust cover or hubcap is on the wheel. You see many aircraft without them. However, the owners of these aircraft would be surprised to learn that when the wheel bearing fails because of dirt or water contamination one of two things would happen. First, either the wheel bearing disintegrates and the wheel leaves the axle passing nicely over the retaining nut. Or secondly, the wheel bearing simply seizes and locks up the wheel and takes the airplane and the wide-eyed pilot on a great simulation of Mr. Toad's wild ride. While I am not sure which one would happen first, I am sure both events will be equally memorable.

Since you are already down on your hands and knees, take a look at the hydraulic strut. If the strut has a little evidence of rust on it, borrow a 10-power magnifying glass and take a look at what is causing that rust. You will find initially the chrome surface was damaged, usually by a stone that cracked the chrome strut plating. On closer inspection you will find the chrome plating is splitting open because the steel strut is rusting and the rust is pushing the chrome plating outwards. Since chrome is very hard, thin, and brittle material the chrome splits and forms thin, very sharp slivers. Each sliver is as sharp as a knife. Depending on how advance the rust is and how hard your next landing is, when the hydraulic strut is fully collapsed those tiny knives will cut the struts quad or "O" ring and the strut will start leaking. Just re-plating a landing gear strut starts around $600,

so keep that in mind when you are buying an airplane.

Contrary to popular belief, or your last flight instructor's tongue in cheek comment, the nose wheel is not designed to shimmy and soft field takeoffs and landings are not the rule. Nose wheel shimmy is commonly caused by a defective shimmy dampener. It is usually out of fluid. But the shimmy can also be caused by worn or lose torque links or hardware, worn strut bearing inside the main strut housing, or the tire is out of balance. While the many causes of nose wheel shimmy are known, all are expensive to repair. So pay strict attention to any shimmy problems on take off and landing when you do the test flight.

Aircraft brakes are a compromise between stopping power and weight, so now you know the answer to the question: "Why are runways so long?" Your standard GA aircraft has steel brake disk and the brake pads are riveted lining. If the disks are pitted, rusted, or grooved, the disks are bad. Next, inspect the brake linings. What is not widely known is that only 60% of a new brake lining is usable. The other 40% makes up the material that the rivets use to hold the entire lining pad in place. Once you wear the lining past the 60% mark, the brass rivet heads get shorn off and the lining falls away instantly turning your brakes into grinding wheels.

If the wheel pant is not in the way, one way you can check the thickness of the brake lining is to lay a common paper match on the visible end of the brake lining. If you see more braking lining than match, go fly. No brake lining, more match, brakes are close to the 60% mark.

Engine and Propeller

Here is another mechanic's trick you can use to impress your friends. You can determine if the engine's hard rubber isolation mounts need to be changed without taking the cowling off. First make sure the paint trim on the fuselage and the engine cowling match up. This match paint check is just to make sure the cowling is on right. Without moving the propeller, measure the distance between the top of the propeller spinner and the cowling. Next measure the distance between the bottom of the spinner and the cowling. If the distance is greater at the top by a 1/4 to 3/8 of an inch compared to the bottom measurement, the engine mounts are sagging inside the cowling. How so? Since the cowling is attached to the fuselage, not to the engine, when the top two engine mounts begin to wear, they stretch, because of the weight of the engine acting on them. At the same time, the bottom two-engine mounts are being compressed, so the engine drops inside the cowling. The amount of sagging is what you are really measuring between the spinner and the cowling. The engine mounts usually last between 500 to 1,000 hours and cost approximately $500 plus labor to replace.

After you get the cowling off, I recommend removing one bottom spark plug from each cylinder for safety reasons and mark the cylinder they came from. Next, carefully examine the propeller spinner backing plate for cracks. The spinner plate takes a lot of punishment when pilots push on the spinner in order to back the aircraft into its parking space. Also check the spinner for cracks and repairs. Most manufacturers do not allow spinners to be repaired. Quite frankly, if you ever experienced the noise and accompanying jolt of a spinner leaving the airplane in cruise flight, you would agree with me that a spinner is one of those airplane parts that you replace and never repair.

Now we want to check the "track" of the propeller. With one spark plug removed from each cylinder and the aircraft on level ground, place a large wooden block or a tool box that is at least a couple inches higher off the ground than the propeller blade tip, next to the propeller tip so they both just touch. Next rotate the propeller slowly in the direction of rotation. We want to see if the next blade "tracks" through the same point of the arc and touches the block. Both blades should be within 1/16" plus or minus from one another. If the difference is greater that an 1/16" than the blade is out of track. An out of track propeller will cause

Dual exhaust pipes should never touch.

vibration and stress to both the engine and airframe and may cause premature propeller failure. Some causes for out of track condition are: Propeller blade is bent, improper torque, and a bent engine mounting flange.

The propeller blades should be checked for surface or pitting corrosion. Surface corrosion, as the name implies, attacks the surface of the metal blade and is whitish in color and rough to the touch, but can be treated in the field. Pitting corrosion is a more advanced form of corrosion and appears as small dark holes or cavities extending into the parent metal. The propeller should be removed and sent to a FAA-approved propeller repair station for inspection and repair.

Nicks in metal propellers are almost always on the leading edge of the blade. Under a 10-power glass the nicks appear as V-shaped. Nicks are caused by high-speed impacts with stones or gravel. It is very important that each nick is "dressed" out by a trained mechanic. Why? Because each nick will definitely in time become a crack. This is because operating stresses will concentrate at the bottom of the "V" and start the cracking process. The crack can migrate across the blade until blade failure occurs. When the blade separates from the rest of the propeller, a massive imbalance condition occurs and the engine can be ripped from the engine mounts in less than five seconds.

Now we can concentrate on the engine. First, just look at the engine from all angles. Find the engine DATA plate and copy down the engine model and serial number. Compare it with the type certificate data sheet requirements. If the engine in the airplane is the wrong make, model or outside the approved serial number range, just pack up, say good-by, and don't look back.

Let's say you have the right engine, what's next? You should check for burnt paint, broken/missing cylinder cooling fins or gap seals, and oil and fuel leaks or stains. Now write down what you have found. Next check the oil dip stick for oil quantity,

Check the paint stripes alignment before you measure spinner to cowling gap.

cleanliness, and a burnt smell. If you have blistered paint on the engine surface, a burnt smell coming from the dip stick, and the exhaust pipes are blue/black in places instead of the normal river mud brown color, the engine was probably treated to a high temperature condition. You should ask to see the oil screen and cut open the oil filter and check for metal if you suspect the engine was run hard and put away wet.

Another way you can tell how an engine was maintained in the not too distance past was to examine the air cleaner. While not an exciting piece of aircraft hardware, an air cleaner will speak volumes. Remove the air cleaner and tap it lightly over a clean piece of newspaper. If you see a lot of sand, straw, and dirt on the paper you can bet an equal amount is still inside the engine. If the log book does not record oil changes, or infrequent ones, you can bet the engine is dirty inside which causes a lot of wear that shortens the engine's life and means the owner is looking at an engine overhaul just over the horizon.

Now examine those bottom spark plugs that you removed earlier. Check the plugs for wear, carbon or oil fouling, or signs of high temperature operations. Make sure you record your findings. Next, put your thumb in the spark plug hole of each cylinder and rotate the propeller in the direction of rotation. When the engine comes up on the compression stroke you should feel the pressure build up in the cylinder. The pressure should be the same for all cylinders. While not as accurate as a compression test done by a mechanic, any lack of resistance will indicate a weak cylinder and possibly a need for a top overhaul.

Next take a look at the mixture, throttle, carb heat, or alternate air controls. Have someone in the cockpit slowly move the controls to see if they hit the stops. Check the mounting hardware and ensure that the cable housing is properly supported so it doesn't bend too much when the control is being moved.

Check the exhaust system for cracks and holes caused by misalignment, rubbing against engine mounts or airframe, or corrosion. Most cracks occur at welded areas so take your 10-power glass and examine these areas carefully. Look for exhaust trails at cylinder flanges or at the inlet to the muffler(s). Everyone knows exhaust systems components are very expensive and can eat a sizable hole in your

life savings, but carbon monoxide poisoning leaking from the exhaust into the cabin is a proven killer. So take your time.

While we are on the subject of carbon monoxide poisoning, check the scat tubes for holes or tears. Scat tubes are the red/orange flexible tubes that move hot or cold air around the engine compartment or into the cabin. The average GA airplane contains approximately 21 feet of different size scat tubes, and the average cost of scat is $12 a foot. So make sure the scat tubes are in good shape.

Next check the engine mount and its attaching hardware. Look for cracks or wear/rub marks, especially any place where the stainless steel engine control cable housing comes close to or is attached to the mount. Next check the firewall. Not many people know that the firewall is the starting point for the manufacturer of the airplane. This is the place where all measurements and alignments are taken from. Stand to the side of the firewall and look across it. If the firewall is buckled or has signs of recent repairs, this should ring a big alarm in a perspective buyer's head. If you find out that the major repairs were performed to the firewall and associated airframe, make sure the aircraft was fitted in a jig to ensure proper alignment during the repair process. Make sure all the cables, lines, and wires that go through the firewall are properly sealed to prevent carbon monoxide from getting into the cabin. When the time comes for you to reinstall those spark plugs make sure you use a calibrated torque wrench and the proper torque.

Electrical System

Your basic electrical system is made up of an alternator, battery, amp/load indicator, starter, bus bar, and associated wiring. Most aircraft batteries are designed with weight in mind so they are not as robustly built as their automotive cousins. Figure that an aircraft battery has an average life span of two years. When you check the battery, make sure that the battery box drain and intake are working as advertised and the box and surrounding sheet metal is corrosion free. Also when checking the battery, determine if the battery cables are made out of aluminum. In the sixties and seventies, aircraft manufacturers switched to aluminum to save weight and money. Over time the aluminum cables corroded causing high internal resistance. This high internal resistance of the wire is translated into making the aircraft very hard to start, despite a hot battery. If the aircraft has aluminum wire from the battery to starter relay to the starter, figure you will have to spend about $400 to change it to copper wire once you buy the airplane. Aircraft alternators and generators are very reliable and should run for the recommended overhaul time for the engine. However, generator or alternator belts are another story. If a belt is cracking, replace the belt. Any belt that is cracking, even small cracks, is a belt in the failure mode and it will not disappoint you.

Shimmy dampners are designed to stop nose wheel shimmy, not cause it.

Now we move back along the fuselage, checking for cracks or corrosion or other damage on the top, bottom, and sides. Especially check antennas and their mounts for damage or cracks. Make sure the static ports are clear and clean. Also check the aircraft's data plate. The data plate is either on the cabin doorframe or back on the tail. Copy down the data plate information and compare it with the Type Certificate data sheet, the aircraft logbook, and airworthiness and registration certificates for agreement.

Back at the tail, check the tail tie down ring for damage. If an aircraft landed tail low, this is where the damage will be evident. Like hangar rash on a wing, a damage tail tie down ring is only a beginning point to do an in-depth structural inspection.

Have someone move the controls for the elevator/stabilizer and rudder. Listen for any rubbing or scraping sounds that indicate that a control cable is off a pulley or scraping a fair lead. Make sure both controls hit their stops. With your flashlight and mirror check the attach points and hardware for security.

Tail cones are another place birds love to set up housekeeping. Pay very close attention for debris and droppings, because corrosion is very expensive to repair or treat. Now move the elevator/stabilizer briskly up and down. If you hear the control cables slapping the fair leads, you can be pretty sure the cable tension is very low.

To check rudder alignment, put the nose wheel in line with the center line of the aircraft and the rudder trim at neutral, check the position of the rudder in relation to the center line of the airplane. If the rudder is off center, you have a rudder that could be out of rig.

Take special pains to check the free play in the control hinges using the same method we used on the ailerons. Also check the elevator/stabilizer and rudder trim control for operation.

Well, that just about covers everything for the pre-buy inspection. While the inspection we just performed is not in the same league as an annual inspection, you can at least make a decision whether or not to test fly the aircraft.

Test Flight

The test flight of an aircraft that you may buy is not the place to save money. I strongly recommend that you hire a flight instructor who is familiar with the make and model aircraft to fly with you for safety reasons. Later, when you are done flying, you can get the instructor's insight on the aircraft. Also be very familiar with the aircraft's flight manual or else your findings will be as insightful as a focus group report.

The flight test should make sure the following areas are covered:

1. Engine hard or easy to start? Hard starting might mean magneto/fuel or electrical system problems.

2. All engine instruments operating? Copy down the initial oil pressure reading. If it is not a very cold day, the oil pressure should be in the green after a brief warm up period. This might be a good time to shut the fuel selector off and see how long it takes to starve the engine of fuel.

3. Radio communication okay? Does the radio sound garbled? Static? Or low volume?

4. While taxiing, on level ground, does the aircraft veer to the left or right when you take your feet off the rudder pedals? If the aircraft does, the aircraft's landing gear is out of alignment.

5. Are the brakes adequate? Do the brakes pull the aircraft to one side or the other when they are applied?

6. During run-up first record the engine's idle RPM, the RPM you are performing the run-up, the magneto drop, and any carb heat RPM drop if so equipped.

7. On take off commit to memory, the engine static RPM at full throttle, the oil pressure, temperature, and if the nose gear shimmy is present.

8. Make sure the directional gyro and the wet compass agree on which way you are heading once you get some altitude.

9. At cruise speed is the turn and bank ball in the center? If not the aircraft is out of rig. How much aileron trim does it take to correct it?

10. How does the aircraft fly, hands off? Is the aircraft nose heavy or tail heavy with elevator trim at neutral? How much trim does it take to correct? Excessive amounts of trim point to a weight and balance problem.

11. Does the engine sound and respond normally? Are there any unusual noises or vibrations at certain RPM settings? Is your electrical system showing a charge?

12. Is there above normal wind noise? Do you smell any exhaust or gasoline fumes?

13. Do radio and navigation equipment work as advertised?

14. How does the aircraft handle with the flaps in different positions? How does the aircraft handle during slow flight?

15. With an emergency field in sight, change fuel tanks.

16. Perform a power on and power off stall. Note stall speeds.

17. Perform simulated departure and arrival stalls. Note stall speeds.

18. Check airspeed indicator reading at low, mid, and high cruise RPM settings.

19. Note the engine oil pressure and temperature again before landing. For example, if the oil pressure is dropping and the temperature is rising, it is an indication of a sick engine.

20. After landing check for oil and fuel leaks. Also note the fuel burn for the flight test.

Well for argument sake, the aircraft looks and flies great. But you are still not done. Remember when you buy an aircraft there are really two prices to consider. The first price is the purchase price. The second price is the aircraft's yearly up keep.

In the 9000 degree heat of the airplane buying frenzy many new owners forget to factor in: Hangar or tie down rent, insurance, fuel, property taxes, and maintenance costs. Maintenance costs is the one factor that is not fixed. To avoid a long explanation to one's spouse why the kid can't get new shoes, I strongly recommend that the aircraft be looked at by an

experienced mechanic before the big decision is made.

A mechanic who is working for you is the best insurance policy you can have. I suggest that it is well worth having at least a 50-hour inspection before purchase. Or if the annual inspection is only a couple of months away, you can negotiate with the present owner on sharing costs. Either way, remember one never knows what evil is lurking behind a closed inspection panel. Tell the mechanic to research the records and provide a list of Form 337, Major Repairs and Alterations. Any major repairs or alterations should have its own Form 337, which should provide an accurate description of what work was done to the aircraft. The mechanic should also check the Airworthiness Directives (AD) on the airplane and provide you with a list of AD's that were due and that were accomplished. Also ask for a list of recurring AD. These recurring AD's will be a big factor on deciding you can afford the aircraft after you buy it.

Also do not forget to subtract the engine hours from the recommended engine overhaul time. The engine hours remaining before hitting the manufacturer's recommended overhaul time will be a big factor in whether you buy the airplane and on what your final bid will be.

Okay, you like what you saw and are ready to sign the papers. One final note, I recommend that you buy title insurance. For a price of a dinner for four, complete with cheap wine, title insurance will protect you and your airplane from any future tax or mechanic liens against the airplane as well as confirm the present owner is who he/she claims to be. Well that's about it, except before you take your friends and family up for a ride, why not invest in a couple of hours of emergency and instrument time with a flight instructor. Why? You invested a lot of money in your dream, why not invest some money and time in the dreamer.

‡

Bill O'Brien is a National Resource Specialist in Flight Standards' Continuous Airworthiness Maintenance Division.

FACTS
BEFORE YOU BUY

Here are some sobering thoughts for your consideration and review before you set out to buy an airplane:

1. Faced with a take-it or leave-it deal when buying an airplane—leave it.

2. The average age of a single-engine general aviation airplane is 32 years old. But it is not the years since new, but the hours since new, that determines the airplane real age.

3. Ninety-eight percent of general aviation aircraft have been altered in some way that they no longer meet the original type design.

4. Most new aircraft buyers do not know the importance of FAA Form 337, Major Repairs and Alterations.

5. It is not uncommon for an airplane to have the wrong, airworthiness certificate, registration certificate, weight and balance, engine, propeller, or instrumentation installed.

6. "As is condition" usually means it will cost more than the national debt to make it airworthy.

7. "All AD complied with" statement in the log book is as reliable as a politician's promise.

8. "Fresh Annual"—is not always the same as a "good" annual.

9. "No Damaged History," means the logbooks show no damage, but the airplane might tell another story.

10. "Always hangared," "never used for training," "one of a kind," "one owner," "no corrosion," "good compression on all cylinders," are not true statements, but statements that must be proven true.

Watch What You're Doing
Avoiding Controlled Flight into Terrain

by Patricia Mattison

During the entire course of our lives we are cautioned in one way or another to watch what we are doing. When we first learned to walk we were told by our parents to be careful and watch out for objects that might get in our way. As we grew older we were watchful when we drove the car for the first time—ever vigilant for bumps, curbs, telephone poles, pedestrians, etc.

We embraced the opportunity to fly with both excitement and anticipation. During the process of becoming a new pilot, we were extremely careful to plan out any flight we took meticulously and completely. Because flying was a new experience to us we were necessarily cautious and flew in only good weather conditions, especially during night flights. We leaned toward the safe side, again, ever vigilant to imagined or impending disaster. In some ways, as a brand, new private pilot we were the most cautious, best pilot we would ever be. We were not going to become a statistic—no way, not us.

Flying into marginal weather and being unprepared for night flight are the two occasions when a fatal accident is more likely to occur. Accident statistics reflect that poor weather conditions and night flight, or a combination of both, are when Controlled Flight Into Terrain (CFIT) is most likely to rear its ugly head.

What is CFIT?

CFIT occurs when a pilot operating a perfectly airworthy aircraft, under the pilot's complete control, gets into circumstances which result in an impact with the ground or water. (Yes, water is considered terrain.)

In order to understand CFIT we must be aware of the associated contributing factors:

- Instrument Meteorological Conditions (IMC).
- Lack of situational awareness.
- Lack of vertical awareness.
- Improper altimeter setting.
- Navigational errors.
- Communication errors.
- Lack of a stabilized approach.
- Lack of up to date weather briefing.

A Great Day to Fly

It was one of those rare, clear, calm, cool spring days which compels a pilot to wander toward the airport—a great day to go flying. The route of flight our pilot planned to take was also clear of any weather that might prove to be a problem to him. He was an occasional pilot with a private certificate and flew at most only twice a year, and then from point to point on a business trip or infrequently on vacation. This particular trip would be a business meeting with a client 400 miles away.

He was a well-respected lawyer, a pillar of the community. As a quintessential family man he was attentive to his family's every need. With two children and another one on the way at any time, it was the perfect family in every way, living the American Dream: a lovely home in an upscale neighborhood, two cars, and a secure future.

His law firm was composed of another lawyer and himself and they had joint ownership in an old 172 that they kept at the local airport. His law partner was also his best friend and a private pilot with an instrument rating. He had tried for years to persuade our pilot to get an instrument rating, but somehow there was never enough time or money, or his wife was jealous of flying time spent away from her, or, or, or.... The excuses were endless.

Early on the morning of the fateful flight, our pilot went to the airport, checked the weather with Flight Service, and set out to pre-flight his aircraft. As was mentioned earlier, the aircraft was flown infrequently at best,

was parked out on the ramp rather than in a hangar, and was exposed to the elements. On the family vacation trip the summer before everything was working as well as could be expected—considering the age of the airplane—so this particular trip of 400 miles away should be no different.

The pilot walked around his airplane looking for obvious problems. Perhaps his mind was not on the job at hand, but preoccupied on the business venture ahead. After all, it was his airplane, and he knew what to look for. He checked the oil. Yep, he had some. He climbed into in the plane, closed the door, and prepared to start the engine. Unfortunately, the pilot failed to notice that an annual inspection that should have been done a month or so before had been "overlooked." The pilot was aware, however, that he had had a problem with the number one (and only) communication/navigation radio for quite some time. The radio panel was the original that had come from the factory. "No matter," the pilot likely thought, "this was going to be a day VFR flight."

His trip to the meeting was uneventful. By early evening the business deal was successfully concluded. Only the meeting had lasted longer than he had thought it would be. He determined that it would be best to return home rather than stay out of town overnight. He was worried about his wife, who was due to deliver at any time. That was reason enough—he probably felt—to push on towards home.

He had the 172's fuel topped off, and once again checked the oil, finding it two quarts low. The pilot did a perfunctory pre-flight and took off into the evening twilight. He had checked the weather that morning before he left on the business trip and that was good enough for him. The forecast was for clear skies until early the following morning, when fog had been predicted to form.

Every time he flew he requested VFR flight following from approach control. He felt that it was the easiest way to keep track of traffic and position. The old VOR (navigation radio) was marginal at best, but the aircraft was not used, by him anyway, for instrument flight conditions (IFR). It is doubtful that he gave any thought to assuring that the VOR was accurate. Remember, he was a very VFR pilot.

About half way along on his trip he noticed that the com/radio was getting intermittent. It was beginning to become more and more difficult to understand approach control when he called for a traffic alert. As he got closer to home the pilot was handed off by center to the local approach control facility, with the caveat that "this one may go nordo [no radio] on you." When the pilot received the handoff he switched radio frequencies and contacted local approach control. The controller receiving the call contacted the aircraft.

"Cessna November 12345, Approach, do you have current weather at your destination?"

The pilot answered that he did. Sure he did. He got it that morning, some 18 hours previous.

His home airport was inland about 15 miles from the ocean. From past experience, the pilot was sure that even if the forecast fog formed it would take awhile for the fog to get to his destination airport.

It was getting very cold now at the cruise altitude that he chose for the return leg. There was enough moisture in the air to form a thin coating of ice on the airplane's leading edges, but our pilot could not see the ice forming. It was dark after all and that also meant he probably couldn't really see the OAT dial, and he didn't have a flashlight to help him read it. The ice would be building up and becoming increasingly heavier, again beyond his notice. He would notice, however, that the airplane was handling strangely, but couldn't understand what was going wrong. He mentioned to approach control that he might have some ice accumulation on the airplane.

Approach control called him back with a weather update and informed the pilot that his destination airport was at 10 o'clock and five miles. The weather was 1,000 overcast two and one-half miles with fog and haze. The pilot was probably astounded. According to that morning's forecast this was not supposed to be happening.

The controller then asked him his fuel status.

He replied, "I'm not sure. I've flown 400 miles and did not refuel. I think I'm pretty low on fuel, and I'm not sure that I can trust my fuel gauges."

The controller came back, "There is an airport about 20 miles to the north that is clear. Would you like vectors?" By now the controller, who had been at that facility for over 20 years is beginning to get the picture that this pilot is pretty inexperienced and has had little or no weather flying experience. The controller called another controller over to his station.

"You know , I do believe we could have a problem on our hands," he said.

The controller called the pilot again and asked, "N12345, are you IFR-rated?"

The reply was a chilling, "No."

Shortly after that call the pilot sees what he believes to be his hometown through a hole in the overcast and reports this to the controller: "I think I see a hole and the airport below. I'm going to descend and take a look."

The controller called with an alert to the pilot, "There are mountains to your immediate north, east, and south. Are you sure of your position? We have you at four miles east of your airport."

Our pilot has made up his mind by now and is determined to go through the hole. His determination fueled by the situation at home.

He asks control, "Where is the airport from my position?"

The controller replies, "240 degrees at six miles."

With that, the pilot turned right from the heading of 090 he was on to 240 and continued his descent. He chose the shortest way around.

"Terrain alert," warns the controller. "N12345, you are descending below the terrain. N12345, we have lost radar contact. N12345, how do you hear approach control. N12345, you are below the terrain. Turn to 270 degrees and climb to 7,000 feet. N12345, how do you hear? N12345. N12345. N12345." The controller turns to his co-workers and says, "Oh no, I think we just lost one."

A pilot was lost to his family that night, not just late returning home. He could have broken the chain of events at many different points. If he had only chosen to remain overnight after the meeting, if he had just listened to his partner and acquired that instrument ticket, if he had an aircraft that was better equipped and knew how to use that equipment, if he had refueled his aircraft en route, if, if, if... But this accident chain started before he ever took off. His aircraft had not had the necessary annual; therefore, it was not legally airworthy. And to add to the list, it was found out later that the pilot had not had a flight review—ever!

Once in the air, the chain of events is all too obvious in this case:

- Communication error. He had an old aircraft with marginal radios that were not operating properly. He was unsure of communications from approach control.
- Lack of an up to date weather briefing. It had been too long since he had received a weather brief. Also he had not believed the controller and diverted to the alternate airport that was clear.
- Night IMC. It was an unplanned night flight, which resulted in a low fuel situation, and the pilot was ill-equipped to fly in instrument conditions.
- Navigational error. He descended on a hunch that the city below him was his destination. He flew his airplane into a mountain while in control of that airplane.
- Lack of situational and vertical awareness. He turned into the mountains instead of turning left, the long way around, to the heading that the controllers gave him. If he had situational and vertical awareness he would have realized the mountains were closer in the right turn.

Situations such as this one are all too frequent and could have been avoided. Let's take a look at another accident that ended as a CFIT.

High Odds

The next accident scenario began as part of a vacation trip for a family of seven. Mother, father, and three children were visiting grandmother and grandfather in a western state. The father, who had struck it rich in a casino, decided to surprise the whole family with a trip to a distant amusement park. This is when the chain of events began.

The father began to look around the local airport for a charter airplane to take his family of seven to the amusement park. Several air charter companies had multiengine charter aircraft available that held six passengers and a crew of two. The weather in the town where the amusement park was located was forecast to be IFR at the time that the family planned to travel.

Charter service after charter service turned the family down because a crew of two pilots was required for flight into instrument conditions and the aircraft only had six passenger seats. After several hours and many phone calls the father finally located one pilot who could be talked into taking the family to their destination despite the instrument conditions.

Father chose to sit up front in the right seat next to the pilot. The rest of the excited family boarded the airplane and settled into their seats in the cabin. The flight began in beautiful warm, clear weather conditions. As the flight continued, true to the forecast weather report, a cloud layer formed at altitude then began to lower as the pilot flew closer to their destination. The pilot began to descend in response to the lowering cloud layer. As the plane flew closer to the destination it was suddenly engulfed in a fog bank. The pilot continued to drop lower yet to follow a highway that he thought led to the destination airport.

Once into the fog the pilot lost track of the highway he was following and made a slight left turn. Nobody knows what really was on the pilot's mind—perhaps his intention was to reverse course—but it was obvious that the pilot had no idea of where he was. Immediately after the turn the pilot flew a perfectly good airplane under control directly into a mountain ridge where all aboard perished.

What were the contributors to this CFIT accident?

- IMC conditions. Inadvertent flight into IMC without the proper crew.
- Lack of situational awareness. The pilot thought that he was following a highway when in fact he saw the wrong road.
- Lack of vertical awareness. The

pilot had no idea the elevation or location of the terrain.

- Navigational errors. VFR flight was not an option and it appears that the pilot was flying by pilotage at the time of the accident. He should have been on an IFR flight plan.
- Disregard and violation of regulations as well as possible outside pressure from the person who contracted with him for the trip.

Notice a pattern forming?

Illusions

Situations, which cause CFIT accidents similar to the previously mentioned accidents, occur all too frequently. These were flights that ended up with inadvertent flight into Instrument Meteorological Conditions (IMC). Flights that have been on instruments from the onset have also flown unintentionally into the terrain. Most of these have occurred at night or in poor weather conditions, which can lead to illusions that distort the pilot's situational awareness.

One illusion that most pilots have experienced while flying at night, especially in unfamiliar territory, is the black hole phenomenon. I am sure that many of you have experienced this sensation while you are descending on approach to a remote airstrip at night. The black hole phenomenon is most obvious on extremely dark nights with no moon in the night sky. There might not be any lights from a nearby city or town to lend definition to the surrounding landscape. Suppose that you have filed IFR, since it was a night flight, but the area is relatively new to you. You have been there only once or twice before.

Charts have been checked for terrain elevations earlier that day in preparation for the flight. Arriving at the destination airport, you cancel IFR once you have the field in sight. The airport has a narrow strip 4,000 feet long with a pilot controlled lighting system. There is a VASI to aid in determining the glide slope needed to avoid obstacles while on the approach path—a hill with a stand of trees on it.

From the pilot's point of view, the airplane appears to be high, because of the width and length of the runway. This perception would be enhanced if the pilot is accustomed to landing on wider than normal landing strips. A pilot's natural reaction to being too high on the approach is to increase the rate of descent. This presents to the pilot the perception of a more normal approach path. In an effort to arrive at the desired visual picture of the runway a pilot could disregard the VASI indications entirely.

A pilot's inability to judge terrain features in darkness while on approach is hazardous enough. Let's complicate this with a lack of depth perception caused by a lack of definition, foliage such as tall trees or unmarked obstructions. Combine all of that with an unstable approach, poor visibility, and lack of pilot currency or experience, and you have a deadly combination.

Black holes are not exclusively limited to landings. The same phenomenon can occur when taking off at night. Some time ago a pilot found herself in a situation, that in retrospect, was similar to a black hole. The pilot had landed during daylight at a small strip on the desert surrounded by hills. A small hill was located a short distance from the departure end of the runway. There were power lines and water tanks near the airport which supplied the small settlement.

The pilot knew that the obstacles were there, but felt that the airplane being flown could out-climb the hill and turn in plenty of time to avoid power lines and water tanks. The pilot departed off a lighted runway after dark, into a pitch black sky that only a desert area can produce. The lighted runway and lights from the small settlement gave off enough light to cause temporary night blindness for the departure.

Shortly after takeoff the pilot realized that the aircraft was rapidly approaching the hill and initiated a turn. Only then did she see the water tanks and realize just how large they were. Suddenly, two power lines loomed up into the aircraft's flight path. Fortunately, the pilot managed to avoid a CFIT accident, and the pilot learned the lesson that depth perception is not at its best in the dark—not to mention unfamiliarity with the terrain.

That situation could have very likely ended as a CFIT. Let's look at the errors.

- Unfamiliar terrain. The hills were closer than anticipated.
- Night flight. The pilot was not prepared to fly out of that airport at night; was not aware that night time means a lack of depth perception.
- Lack of vertical awareness. The hills were higher than anticipated.
- Lack of situational awareness. The water tanks were larger than anticipated and the power lines closer.

Even Good Weather is no Guarantee

The next scenario is a compilation of several accidents with the same causes and end result. CFIT occurs even in the most favorable weather conditions. In the following scenario the pilot had reviewed the terrain features displayed on the charts earlier in the day and is now on an instrument clearance to his destination. It's a clear night. The pilot is instrument current and familiar with the multiengine airplane.

While being vectored to the final approach course the pilot temporarily loses track of the aircraft's position and then overshoots the localizer approach course inbound to the airport. The approach controller alerts the pilot to the error and vectors the pilot back to the final approach course. Satisfied that the pilot is on course, the controller hands the pilot off to contact local traffic on the Common Traffic Advisory Frequency(CTAF).

During the turn the pilot misreads the altimeter and thinks that the aircraft is well above the Minimum Approach Altitude. The pilot begins to descend to what the pilot feels is the correct altitude. However, this correction places the aircraft at an altitude which, as the descent continues, causes to aircraft to crash short of the runway.

So what was the chain of events that led up to the accident?

- Night VMC. The pilot fell into the black hole syndrome. Had there been a VASI at that airport and had the pilot followed the VASI indications, the accident might have been avoided.
- Situational Awareness. The pilot lost track of where the plane was in space and overshot the approach.
- Vertical Awareness. Misreading the altimeter and going below what he thought was the correct descent path led the pilot into unexpected terrain.

Human Nature Being What it Is

Most of the time pilots catch their errors well before they become accidents. Human factors or human nature being what it is; we sometimes ignore tendencies toward failure. If you were asked if you would ever duplicate any of the actions that were done by the pilots in this article, you would most likely reply, "I know better than to do that." Logically we all "know better," but once in a while our human failings cause mistakes to happen.

Not too long ago there were a series of CFIT accidents that were caused by a white-out condition in Alaska. The flat light caused by snow fall obliterated any indication of a forward horizon over a series of glaciers. An aircraft on a tour flight flew into a glacier and crashed. Fortunately, everyone survived. Two company aircraft (not trained SAR crews), in separate attempts to rescue the first aircraft's pilot and passengers, tempted fate. They crashed on the same glacier only a short distance away from the first aircraft. Again, no one was injured, but three crews and passengers had to wait for better weather to be rescued by appropriate search and rescue entities.

Back to human failings. I feel confident that the pilots of the three aircraft did not purposely venture into poor weather to affect a crash. Rather, they were all professionals who were doing business as usual. The pilots in the rescue aircraft were lulled into a false sense of security. They had flown the course many times before and felt that they knew the route well enough since they would have taken a group of tourists normally on the same route. They had their minds set on the rescue effort. They were determined to locate their downed friend and the passengers. I am willing to place a bet that those pilots, especially the "rescue" pilots, were sure that they would never have put themselves in a position that ended in a CFIT accident, except that in this case it happened—three times.

Statistics show that from 1980-1988 the division between CFIT accidents and other accidents was about 50/50. It was felt that, with increased awareness and improvement in training, recognition of wind shear avoidance, and the advent of TCAS, accidents could be reduced. Sure enough, between 1988 and 1990, the division between accident causal factors shifted. Wind shear and midair statistics were reduced from 50% to about 20%. CFIT, however, became the most significant cause of accidents at approximately 80% overall.

Investigations into CFIT accidents have been a catalyst in the recognition of the contributing causal factors mentioned throughout this article. Of the accident cases studied, it appears that most aircraft were within five miles of an airport or on approach to an airport before impact. Amazingly, graphs showing the approach paths flown by these aircraft implied that most were flown in a straight, unvarying path directly into the terrain. The graphs also indicated there was no apparent indication of any effort to avoid impact with the terrain.

Suffice to say that pilots do not plan to impact the terrain when they go flying. It is simply not why a person becomes a pilot. Pilots are for the most part careful and thoughtful in their flying and eager to do a good job. Whether the pilot is a student pilot or an astronaut, they begin the journey with one thing in mind. Is it safe for me to fly today?

As I have said from the beginning of this article, there are several contributors to the CFIT problem. Night flight, flight into instrument conditions, not being aware of your position in space, poor navigation and communication, and a lack of an up-to-date weather information. These are the major CFIT accident contributors to consider before you take a flight.

Other contributors to CFIT are related to outside pressures, (get-home-itis, management pushing the flight, etc.), flying ability, or unforecast weather, to name a few, but pilot decision making has a big part in how safely we fly under any circumstance.

Every once in a while we all have made a decision that we have regretted making, even though it seemed like a good idea at the time. A poor decision made involving any of the listed reasons for CFIT increases our chances for a CFIT accident. Extra care in the decision making process can help us prevent being a statistic on the CFIT graphs. Besides, life is too dear to throw away because of poor decision making.

No one wants to have any kind of an accident in an airplane, and, as far as I am aware, there are few pilots who look out the window one morning and say, as the Klingons do, "Today is a good day to die." If you should find yourself in an uncomfortable position, one that has the potential for a CFIT situation, drop back to the basics as taught by your first instructor, "Climb, Communicate, Confess, and Comply."

Climb to a safe altitude clear of surrounding terrain and obstacles.

Communicate with a nearby control facility.

Confess to the facility what the problem is.

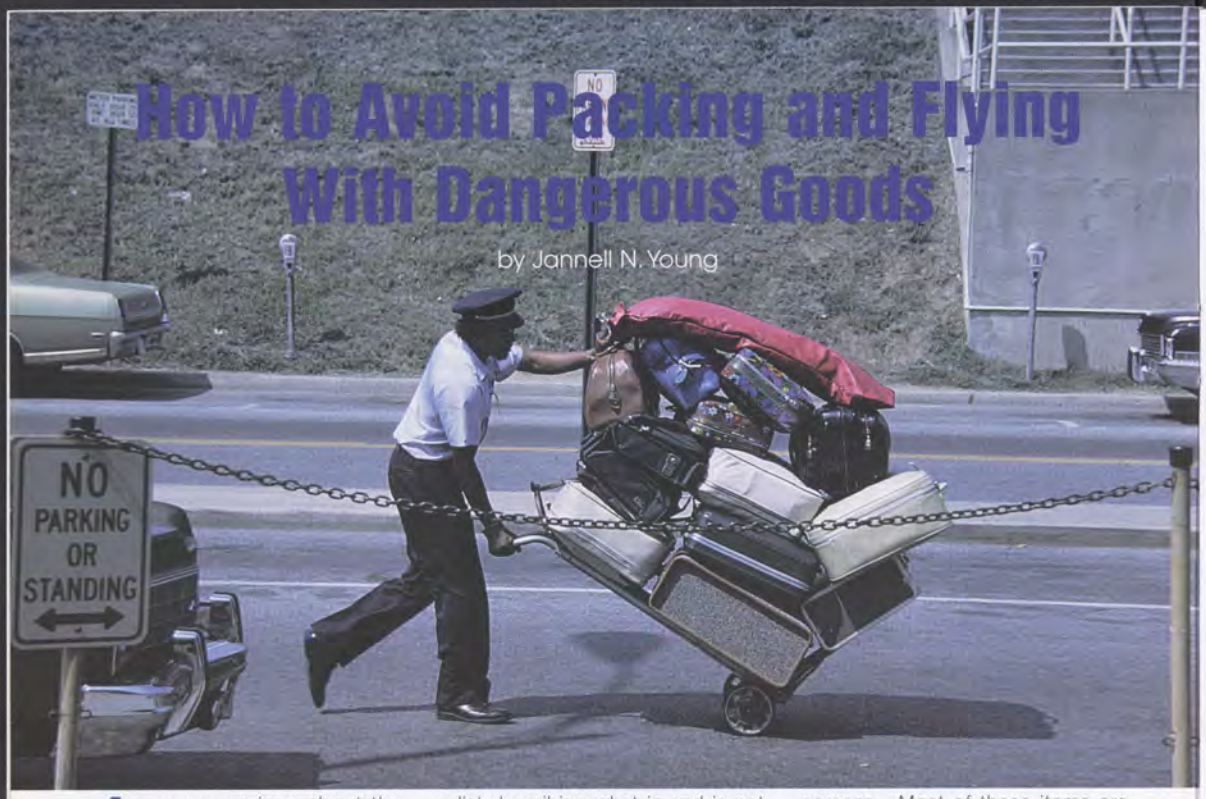
Last but not least, *Comply:* Be prepared to follow instructions.

As a pilot you should always have a backup plan ready just in case you need an out, and the four C's are as good a plan as any. Don't wait for a potentially dangerous situation to loom up ahead.

Ms. Mattison is the Safety Program Manager in the FAA's Juneau, Alaska Flight Standards District Office.

How to Avoid Packing and Flying With Dangerous Goods

by Jannell N. Young



Are you curious about the safety of the items you've just packed in your luggage? Based on the amount of reported incidents aboard aircraft, it has been found that a number of people are packing dangerous goods or hazmat for a trip. Of course, this is usually done unintentionally because most people are uncertain about the safety of the items they are packing and do not realize that some items are considered dangerous goods or HAZMAT only when transported by air. We do not intend to endanger our lives nor the lives of our fellow passengers when packing for a flight.

The purpose of this article is to educate the aviation community and the general flying public on how to pack safely for a flight. The information provided in this article can be considered as a brief workshop on "packing luggage for flight safety." Items included in this article are: guidance and tips on how to pack safely, some real life examples of incidents as a result of packing dangerous goods, and a list describing what is and is not considered a dangerous good or HAZMAT. Also included are some packing guidelines based on the amount, the circumstances, and the manner in which the items are packed or packaged and the description of the differences in packing for travel on a commercial aircraft versus a non-commercial or small and private aircraft.

Let's start with packing for your next flight. This particular flight is a pleasurable trip. You are taking a break from your customary environment, planning to see different places and people, and you are excited because all business will be left behind until your return. You intend to have a great time and want to be sure that you have everything you will need and want for the trip; so you will pack generously. Special attention is given to personal items such as colognes, hair products, disinfectants, and other various aerosols. If your destination is to a tropical climate, you may want to include insect repellants and sun screens. Most of these items are used routinely and are usually packed in reasonable amounts (especially aerosols). Well, there is a strong possibility that some of these items may become dangerous goods or HAZMAT once in the air.

If you are going to an unfamiliar environment and have listened to some tall tales about the safety of that location, you may also plan to take some Mace™ along for good measure—not that your plans are to actually mace anyone. Mace™ is a trademark for a mixture of organic chemicals used in aerosol form as a weapon to disable with intense burning eye pain, uncontrollable winking of the eye, acute bronchitis, and respiratory irritation. Since Mace™ is a weapon, you can be fined or prosecuted for carrying a weapon on an aircraft.

Now, let's say in the midst of packing, you remember a promise to someone at your destination to bring some items, which you plan to pack in dry ice. Dry ice is considered potentially dangerous goods because it

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contains carbon dioxide. Carbon dioxide is a colorless, odorless, incombustible gas, CO_2, formed during respiration, combustion, and organic decomposition and used in food refrigeration, carbonated beverages, fire extinguishers, and aerosols. Because dry ice contains carbon dioxide, it can evaporate to gas under special or extreme conditions. That it why it is so important to check with the airline for packaging procedures and policies before attempting to transport dry ice on a flight.

As previously mentioned, most of the items packed in luggage are basically considered safe in reasonable amounts, but are still being reported as causes of some incidents. No matter how safe the items appear, you just don't know if they will remain that way once airborne because of the changes in the air pressure. The reason these items, which are considered harmless initially, become dangerous once in the air is usually because of the changes in the air pressure of the aircraft. The air pressure usually maintains the same pressure as the aircraft climbs from the ground to approximately 8,000 feet above sea level (this number may not always be exact—it can sometimes vary). As the aircraft climbs about 8,000 feet above sea level, the cabin pressure will start to decrease. When the aircraft descends from 8,000 feet above sea level to the ground, the air pressure will rise. This calls for additional precautions when deciding on what to place in your luggage. One way to use caution is, whenever possible, replace any aerosol cans, hair sprays, deodorants, insect repellent, etc., with non-aerosol versions. This effort can clearly decrease the number of incidents.

Now that you are at the final stages of your packing, you begin to question some of the items you have just packed. You may sometimes hear a tiny voice in the back of your mind asking, "Are these items safe to carry on a flight?" Or, is it flammable and can become combustible once in the air? Can someone get injured because of the items in my luggage? You are also concerned that if something should happen because of what is in your luggage, it could very well be your fault. You may wonder if it will be safer to place them in the carry-on bag. But, will it be safer? Well, we should consider this tiny voice a good voice, one that is very concerned about safety. This may be the time to listen to that tiny voice.

Problems Encountered by Packing Potentially Dangerous

One of the problems of packing dangerous goods/HAZMAT usually begins at the airport while submitting to the required screening of your property. This can result in detainment because of the potentially dangerous goods in the bags, which can also be an inconvenience to everyone who is trying to get on a flight. Also, items of personal value could be confiscated, and there is no guarantee that these items will be returned.

For example, I accidentally left a small Mace™ container on my key ring, and it was confiscated by the airport security. They placed the Mace™ in a container near the screening section with other confiscated items. Although, I was told that the Mace™ would be returned to me, I did not see the possibility of that actually occurring. And, if by some miracle, it had

been returned it wasn't worth the hassle to me. Luckily, I was not detained or even arrested for attempting to carry a weapon on the flight. I won't do that again. This example shows that the more we consider what we are packing, the fewer inconveniences encountered, and we can enjoy a safer flight. The danger of Mace™ was described earlier, but always remember that it is not only dangerous, it is a weapon, and you can be fined, prosecuted, or both for carrying weapons on board a flight. As suggested earlier, check with the airline for their policies regarding transporting weapons.

Here are some additional examples that are based on actual events of what can happen when dangerous goods are on a flight:

A seamstress friend usually carries her sewing kit (including the scissors) in her carry-on bag when traveling. On each trip as she attempts to go through the airport screening procedure, the scissors are always confiscated by the airport security. Since she is accustomed to taking her sewing kit with her everywhere, she usually forgets to remove the scissors when going on a flight. The scissors could have been packed in her check-in luggage. Scissors are prohibited on board a flight whether they are on your person or in your carry-on bag. Scissors are considered a potential weapon. Remember, there is always the possibility of being fined or prosecuted for taking a weapon on board, regardless if it was unintentional.

A passenger innocently packed a disinfectant in her bag and placed the bag in the overhead compartment in the cabin of the airplane. The product was harmless before the airplane took off. But, once in the air, it rolled around in the overhead compartment, the top worked its way off the container. The contents spilled into the overhead lights in the passenger cabin producing strong fumes in the cabin and placing everyone in distress. The airplane had to land in order to locate the source of the problem. Everyone was safe, but the flight was delayed and the passengers and crewmembers were alarmed because of the diversion.

A similar incident involved a passenger who packed hair spray in the carry-on bag. This bag was also placed in the overhead compartment of the passenger cabin of the airplane. After some light turbulence, which agitated the container, the top came off. The spray nozzle was then jammed against another item in the bag, and the hair spray sizzled out of the can into the air ducts of the cabin. This activity created a hissing sound and a puzzling odor. Again, the airplane had to land in order to locate the source of the problem.

The above events may appear small, but they are real and can cause real problems. Always remember that small problems can grow into large problems if not detected. Someone could have become sick from the fumes of the hair spray or disinfectant. And, don't forget the flight crew and the pilot. They are confined in the same airplane as we are, and the fumes could get to them. And, the unexpected diversion is a potential safety issue. The pilot and the crew are very valuable to us on a flight. We require and depend on their alertness to arrive safely at our destination, which gives us more reasons to pack safely for our flight.

Pilots of Private and Small Aircraft and Their Passengers

Although all pilots are required to complete similar training before receiving their certificates and ratings, the pilots of small and private aircraft in noncommercial operations are not required to comply with the same safety screening procedures before each flight, as required of the pilots and passengers of commercial aircraft. However, because these pilots and their passengers are not required to the same screening process, it does not mean that the pilot is not responsible for the safety of the flight. Therefore, they should be personally conscious of what is in their passengers' luggage before the flight takes leaves the airfield.

For example, let's say that you are the pilot of a small or private aircraft in a noncommercial operation, and you are planning to fly a passenger, who is a product distributor, to a convention two states away. The passenger is carrying bags filled with promotional products to distribute at the convention. You have no idea of the contents in the bags, and your passenger is not aware of the potential hazards of the items. The passenger is not a pilot, has no flight safety training, and, most of all, has no idea of what could happen to the products (especially if they are not properly packaged). Therefore, it is the pilot's responsibility to question the contents of the bags.

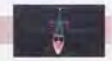
So, how do you tactfully accomplish this? The pilot can discuss the possibility of potentially dangerous goods with the passenger(s), and share the "clip and save" list accompanying this article. As a courtesy of the FAA Dangerous Goods and Cargo Security Office, guidance and tips are provided on what and how to pack safely for a flight. This listing should alleviate a large portion of the uncertainty of what may or may not be considered dangerous goods. There are times when asking the right questions is necessary to assure a safe flight.

In summary, we should continue to be aware of the types of items our passengers and we are packing before a flight. If we proceed in our efforts to pack cautiously for flights, the fewer incidents will occur.

If you continue to feel unsure about the items you plan to pack in your luggage or ship as cargo, you can always contact your airline representative and /or the FAA Dangerous Goods and Cargo Security Division. The Dangerous Goods website is <http://cas.faa.gov/cas/dgp.htm>. You can also access the HAZMAT website at <http://hazmat.dot.gov>.

Don't spoil your holiday travels by packing dangerously.

Jannell Young is with the U.S. Environmental Protection Agency and served on the magazine staff as a Women's Executive Leadership Program candidate.



Clip and Save

"Clip and save" this list and attach it to the inside of your favorite luggage as a reminder on what to pack before taking to the air.

Do Not Pack These Items in Check-In Luggage nor Carry on Board

- Radioactive material
- Batteries: Wet-type
- Firearms: Ammunition, gunpowder, loaded guns, Mace™, tear gas, or pepper spray and items resembling firearms. (In some cases, firearms can be transported in the check-in baggage or shipped as cargo. They usually have to be declared, the ammunition removed and packaged separately, and the weapons have to be placed in locked containers.) Always contact the airline for their policy and procedures because each airline varies. Remember, you can be fined, prosecuted, or both for illegally carrying a weapon at the airport or on a flight. Law enforcement personnel needing to travel with their weapons should check with their air carrier ahead of time for any special procedures they need to follow.
- Fireworks: Sparklers, signal flares, or other explosives
- Pressure containers: Spray cans (deodorants, hairspray, paint, etc.), butane fuel, scuba tanks if pressurized, propane, self-inflating rafts
- Equipment: Containing fuel, poisons, infectious substances, dry ice, wet-cell batteries, and poisons
- Household items: Drain cleaners and solvents including paints and paint materials
- Personal Items: Propane hair-curler refills
- Flammable Liquids or Solids: Lighter Refills, Matches, and Fuel
- Trade Tools: Some tools can be shipped as cargo as long as the fuel is removed, but some are considered weapons, e.g. screwdrivers, hammers, large wrenches, etc. Again, check with the airline.

You May Pack These Items with Caution

- Personal Care Items: Items such as flammable perfumes, aerosols which contain hazardous materials can be carried on board if the contents total no more than 75 fluid ounces and the contents of each container is not more than 16 fluid ounces.
- Dry Ice: Four pounds or less for packing perishables may be carried on board the aircraft if the package is vented. (Check with the airline before carrying on board.)
- Matches and Lighters: May be carried only on your person. Striking matches, lighters with flammable liquid reservoirs, and lighter fluid are prohibited.
- Electric Wheelchairs: Disconnect and remove the battery and the battery terminals insulated to prevent shortage. Transport in accordance with the airline requirements.
- Carbon Dioxide Gas Cylinders: Worn by passengers to operate mechanical limbs and spares of the same size for the same purpose are permitted in both carry-on and check-in baggage.

Note: The items listed may still have additional restrictions attached to them. Also, sometimes there are certain exceptions for medical needs, sporting equipment, and items to support physically challenged passengers.

Clip and Save

Top Ten Travel Tips for Holiday Flights

Thanksgiving and December holidays, traditionally the busiest times of the year for the nation's airlines and airports, are fast approaching. To help travelers minimize delays during the busy holiday season, the FAA today issued some simple suggestions.

1. Arrive early. Holiday crowds coupled with current security measures may increase the time you need to check in. Build even more time into your schedule if you need help with infants, young children, elderly or disabled passengers, or passengers with medical conditions.

2. Parking lots may be full, so consider using public transportation or having a friend drop you off. If you are driving, add extra time to your schedule.

3. Don't leave your car unattended in front of the terminal and be sure to observe all parking restrictions. Because of increased security, local parking rules are being strictly enforced.

4. Keep your photo identification handy. Some airlines require you to have proper identification to fly. If you do not have a photo identification card, make sure you have two pieces of identification, one of which must be issued by a government authority. Minors are not required to have identification. Failure to have proper identification may result in additional security scrutiny.

5. For international flights, airlines are required to collect your full name and ask you for a contact name and phone number. The Department of Transportation recommends that you provide the information.

6. Keep your eyes open for unattended packages and bags, and report them to authorities. Watch your bags and don't accept packages from strangers.

7. Be prepared to answer questions about who packed your bags and whether you might have left them unattended at any time. Think carefully and answer honestly—history has shown that criminals and terrorists use unwitting passengers to carry bombs or other dangerous items on board aircraft, either by tricking passengers into carrying packages or by simply slipping items into unwatched bags. Answering "yes" to either question will only lead to a little extra scrutiny of the bag.

8. Do not joke about having a bomb or firearm in your possession. Security personnel are trained to react when they hear these words. Penalties can be severe, and can include the possibility of time in prison and/or fines.

9. Both carry-on and checked bags are subject to being hand-searched, so it's a good idea to leave gifts unwrapped until after you arrive at your destination. If airline security personnel cannot determine by X-ray the contents of a package, they can and will open it, or ask you to open it, for inspection.

10. Leave your firearms at home, and do not pack fireworks, flammable materials, household cleaners, or pressurized containers. Remember that violators of hazardous materials regulations are subject to civil penalties of up to $27,500 per violation, as well as possible criminal prosecution.

If you would like to find out if there are any special travel advisories in effect, call the Department of Transportation's Travel Advisory Line at 1-800-221-0673.

Courtesy of FAA's Office of Public Affairs.

MEDICAL stuff

Just about Everything You Need to Know about Fiber in your Diet

by Glenn R. Stoutt, Jr., MD

The subject of dietary fiber sounds about as dull as flossing your teeth, judging an accordion competition, or updating your Jeppesen charts. But, fiber is the bedrock of all good nutrition.

The perfect diet: To meet the dietary guidelines for Americans, the U.S. Department of Agriculture, and the Department of Health and Human Services recommended that most of the calories come from whole grain products, fresh fruits and vegetables, low fat milk products, lean meats, fish, poultry, and dry beans. Fewer calories should come from fats and sweets.

This classic diet contains lots of fiber, a substance found only in plant foods, and is mostly indigestible. The majority of our fiber should come from whole-grain breads and cereals, beans, peas, and fresh vegetables and fruits. Every item in this perfect diet can be found in a supermarket.

There are two types of fiber, classified by whether they dissolve in water: soluble fiber (such as oatmeal) and insoluble fiber (such as All-Bran). The average American diet contains 10 grams or less of fiber, but we need at least 25-30 grams per day for optimum health.

What are the benefits of fiber?

- Blood sugar regulation: Soluble fiber allows a slow, gradual absorption of sugar from the intestines, preventing jolting highs and lows of the blood glucose level. Helps prevent maturity-onset diabetes and is an essential part in the management of diabetes.
- Obesity control: High fiber diets help you feel full, slow the emptying of your stomach, and contain fewer calories. Controlling obesity reduces the incidence of cancer, heart disease, stroke, diabetes, and high blood pressure.
- Cancer prevention: High fiber diets may help reduce the risk of cancer of the breast, bladder, and prostate. *The International Journal of Cancer* (April 12, 1999) reaffirmed the reduced incidence of cancer of the colon and rectum associated with a high fiber diet. Soluble fiber will absorb water and makes stools bulky, causing carcinogens, bile acids, and cholesterol to pass more readily through the intestines.
- Less constipation, diverticular disease, irritable bowel syndrome, and hemorrhoids: Soft, formed stools solve the problem of constipation. ("Irregularity" is a wuss word.) You are getting enough fiber if your stools float. (Easier gauge than counting fiber grams.) Fiber adds lots of water to hard stools, making them softer, lighter, and much easier to pass. Irritants, wastes, and carcinogens (which are cancer-inducing agents) have less time in contact with the intestinal wall.
- Cholesterol reduction: This is one of the most important effects of a high fiber diet. Cholesterol is an ingredient of bile, which is used in the digestion of certain foods. A large portion of bile (bile acids) is excreted in the intestines and then reabsorbed to make more cholesterol. Soluble fiber sops up these bile acids and then they are excreted in the stool. This process and a decrease in dietary saturat-

FIBER FACTOIDS

- High fiber foods are naturally low in fat and cholesterol.
- Instead of fruit juice, eat the whole fresh fruit, including thin skins and pulp.
- It's very important to increase your fiber intake gradually to avoid bloating, gas, and abdominal discomfort—go slowly.
- You absolutely must drink plenty of water; fiber soaks up loads of it. Avoid "sludge" in your intestinal tract!
- Canned beans produce less gas, but are often loaded with salt. People with high blood pressure who should be on a low sodium diet should read all labels carefully and avoid foods with high sodium.
- One serving of All-Bran supplies almost half the daily requirement of fiber.
- Read labels carefully. "Organic" or "natural" really mean nothing, as all foods are both organic and natural. "Lite" and "light" also mean nothing. "Reduced fat" may only mean that some of the fat has been replaced with sugar. "No fat" could be a label for a bowl of pure sugar. Also, read the portion sizes. Some foods are so high in fat, sugar, or salt that the portion recommended may be only a tiny amount. (Called portion distortion.)
- No laxatives are ever needed if one supplements his or her diet with sufficient fiber.
- It is best to obtain fiber from foods, not from concentrates sold in the pharmacy. Foods contain not only fat, protein, carbohydrate, and fiber, but also micro-nutrients such as vitamins, minerals, and hundreds of phytochemicals (from "phyto," meaning plant) necessary for good nutrition and health.

ed fat may significantly reduce elevated cholesterol levels.

The best way to increase fiber is to make plant foods one of the foundation of your diet. A good source of fiber contains at least two grams per serving. Most packaged foods indicate the amount of fiber on the label. Plant foods usually have both kinds of fiber. The following are some of the important sources of the soluble and insoluble fiber:

Soluble fiber: Beans and oatmeal head the list. Other good sources are prunes, peas, rice bran, corn, apple pulp, bananas, pears, citrus fruits, carrots, strawberries, raspberries, and blueberries. Soluble fiber absorbs many times its weight in water and forms a viscous paste-like substance, making a great "mop" for clearing cholesterol-producing substances from the stool.

Insoluble fiber: Wheat bran and whole-grain cereals and breads are the mainstays. Also included are most leafy vegetables (such as lettuce, spinach, and cabbage), apple skins, beets, carrots, cauliflower, Brussels sprouts, broccoli, turnips, beans, and peas. (As you can see, there is some overlap, as most plant foods contain both soluble and insoluble fiber—beans being the main one.) Insoluble fiber softens stools.

In planning your lifetime diet, stick to the fundamentals recommended by all the respected health organizations. Avoid fad diets.

Yours for good health and safe flying,

Dr. Stoutt is a partner in the Springs Pediatrics and Aviation Medicine Clinic, Louisville, KY., and he has been an active FAA Aviation Medical Examiner *(AME) since 1960. No longer an active pilot, he once held a commercial pilot's license with instrument, multiengine, and CFI ratings.*

Note: The views and recommendations made in this article are those of the author and not necessarily those of the Federal Aviation Administration.

This article originally appeared in the Winter 1999 issue of The Federal Air Surgeon's Medical Bulletin.

SAFETY REMINDERS

The following incidents are accounts of near misses of several kinds. They were reported to NASA's Aviation Safety Reporting System (ASRS) and appeared in past issues of *Callback.*

Operations at Uncontrolled Airports

Non-standard procedures at uncontrolled airports continue to be a frequent subject of ASRS reports. In our first report, a general aviation pilot preparing for a landing met transient traffic in an unexpected place at an uncontrolled airport.

About five miles out, I called for an airport advisory, then a couple of minutes later, I called to announce that we were two miles south of the airport. The airport wasn't very busy, with just one plane taking off. I looked for traffic along the downwind leg that might interfere with our entrance into the pattern and that might not have a radio or had failed to make use of the one they did have. Everything looked clear. I announced that we were mid-field at 1,400 feet entering a downwind for Runway 28. Just after crossing over the runway, I looked down to check the windsock...and saw the shadow of another airplane converging on our shadow with only seconds to go. I turned my head just in time to watch the wing of a high-wing aircraft slide under the tail of our plane no more than 20 feet below us. It was a chilling sight.

It was an enroute aircraft, not landing at our airport. Good pilots use the radio and fly above the traffic pattern when traversing an airport's traffic area. Other pilots may not.

The reporter concludes that the basic "see-and-avoid" rule is still the best defense against pilots who are not following good operating procedures.

An airport that normally has an operating Control Tower becomes an uncontrolled airport when the Tower closes for the night. Pilots then use the Tower frequency as a Common Traffic Advisory Frequency (CTAF). At least some pilots do. An air carrier Captain reports:

We transmitted our intentions on CTAF and proceeded to Runway 20. During taxi, we heard no other radio calls. We announced on CTAF that we were taxiing onto Runway 20. We had still heard no calls from any other aircraft. I was about to advance the throttles, when to our total astonishment, we saw a light aircraft lifting off, coming straight at us on Runway 2. Due to the lay of the land, we were unable to see him until he lifted off. He flew overhead and finally broke the silence by announcing that he was turning downwind. After he was well clear, we departed uneventfully. It was just luck and fortunate timing that we did not meet head-on at high speed at mid-field.

The preceding reports emphasize the importance of vigilance and radio communications at uncontrolled fields.

Canyon Calisthenics

The next incident, recounted by the pilot of a high-performance single-engine aircraft, made white-knuckle flyers out of several veteran pilots. It occurred just after a routine passenger pick-up at an airport in the West whose elevation is almost 4,000 feet AGL.

The incident began at [an] airport on [the] lake. I was part of a group of five similar airplanes there to pick up a group of river rafters... The load I was given was five men, two of them quite large, and quite a lot of baggage. There were no scales in the plane so there was no way to know exactly what the load was. However, it was clear that it came very close to max weight. I refused some of the bags and put them aboard another plane. I loaded up the passengers and proceeded to depart. The takeoff was normal and although I could feel the weight of the plane, it did climb out normally.

The weather was hot with high winds and turbulence as is usual for this location. There were also updrafts and downdrafts. On climb-out I flew into one of these downdrafts and the plane began to sink. I was flying over the river which has steep canyon walls. In this downdraft I could not climb out of the canyon. I knew that eventually the downdraft would abate and I could climb out, but my passengers were beginning to panic. Two of them were pilots themselves. The passenger sitting behind me took the initiative without my orders to open the pilot-side door and throw out all the bags into the river below, a load of perhaps 150 pounds. I did not resist this move as to do so may have increased their panic. Eventually the downdraft abated and the plane climbed out of the canyon and up to a safe altitude, then landed safely.

In retrospect I believe there are a number of ways the incident could have been avoided. I could have been more conservative on the load and refused more bags...I was over-confident about the capabilities of the plane. Also, unconsciously I was relying on the judgment of two of the other pilots present...Both of these pilots had much more experience at this location than I did. I could also have...allowed for the possibility of downdrafts.

It's possible that the open aircraft door and resultant drag worsened the downdraft situation. Our reporter might have prevented the passenger panic and subsequent baggage barrage by briefing on the local flight conditions prior to departure.

Powerline Encounters: A Hit. . .

An unplanned encounter with powerlines is an experience most pilots do not soon forget. Our first reporter, a glider-tow pilot, had avoided some well-known powerlines on numerous prior approaches, but a downdraft at just the wrong moment changed all that:

After towing a glider to 2,000 feet AGL, I entered a normal left-hand pattern for Runway 03. As I turned short final at about 350-400 feet, some sink was encountered. After crossing the last house and powerlines, I felt a slight tug on the aircraft. A normal landing followed. Upon visual inspection from the ground, 4-6 feet of the 200-foot towrope had snagged, broken off, and was hanging in the powerlines crossing the end of Runway 03. No powerlines were down and no damage could be detected. The local utility...came and removed the piece of towrope.

My error occurred when I did not add power once the sink was encountered. All remaining approaches were re-routed over a less hazardous route (fewer wires), accompanied by a steep slipping final approach, so the tow rope would remain up behind the aircraft and not hang down below.

We hope that "less hazardous route" becomes the standard route at this glider port from now on.

. . .And a Miss

Another General Aviation pilot, also familiar with the powerlines at a local airport, overlooked an important factor about best-rate-of-climb in an aircraft that was a variant of the model usually flown. The result was a very tight squeeze between the ground below and the powerlines above.

...Reaching 55 knots, I rotated the airplane. The stall light came on so I reduced pitch slightly. By this time, I was about two-thirds of the way down the runway and had climbed no higher than five feet. I attempted to abort. The end of the runway was quickly approaching, and I knew I could either continue braking and possibly put the plane over a 2-3-foot bank and into a canal...or I could add full power and attempt to climb and avoid the obstacles. There are powerlines...12-15 feet high at the departure end of the runway. I applied full power, climbed over the bank and the canal, maintained a 1-2 foot clearance over [a field of grapevines], and avoided the powerlines approximately three feet above me. As I saw the powerlines pass overhead, I noted the airspeed at 65 knots, sufficient to establish a climb...

From this experience I have learned to review the speeds critical to proper rotation and climbout as noted in the pilot handbook, not on the checklists, and to have a pre-determined point at which to attempt a safe abort.

Our reporter is lucky to have survived such a close encounter with 120 kV of electricity.

Anyone interested in reviewing past issues of Callback can find them at <http://asrs.arc.nasa.gov/main.htm>. Click on publications.

Correct Time for ELT Testing

The July-August 2000 article "How to Buy an Airplane" contains the statement, "You must wait until five minutes after the hour to activate the ELT...."

This indicates that you can not operate the ELT for the first five minutes, and by implication, can operate the ELT for the next 55 minutes! Suggest you reconsider this one.

Richard J. Lewis
Madeira Beach, FL

We did. We blew it big time, as several other readers have also pointed out to us. For that reason we are devoting a full page to this letter. The following information is copied from Chapter 6 of the current edition of the *Aeronautical Information Manual* (AIM). As noted in paragraph (b) Testing, the correct time to test an ELT is within the first five minutes after the hour. Paragraph (b) explains the correct way to test an ELT.

Please note the AIM only discusses the 121.5/243 MHz ELT's. It does not discuss the newer 406 MHz ELT. The National Oceanic and Atmospheric Administration (NOAA) has announced the termination of satellite monitoring of 121.5/243 MHz ELT's. A proposed date is 2009. Although the exact date is still to be determined, once the capability to monitor 121.5/243 MHz ELT's on satellites is terminated, then the In-flight Monitoring and Reporting outlined in paragraph (d) below will be the prime method of distress alerting for those aircraft equipped with 121.5/243 MHz ELT's. The newer 406 MHz ELT's with 121.5 MHz terminal homing will still be satellite monitored.

As a result of the pending phase out of the space capability to monitor 121.5/243 MHz ELT's, the following procedures will become even more important to both prevent false alerts and to detect activated 121.5/243 MHz ELT's whether they are a false alert or a real emergency signal.

6-2-5. Emergency Locator Transmitter (ELT)

a. General.

1. ELT's are required for most General Aviation airplanes.

REFERENCE-14 CFR SECTION 91.207.

2. ELT's of various types have been developed as a means of locating downed aircraft. These electronic, battery operated transmitters emit a distinctive downward swept audio tone on 121.5 MHz and 243.0 MHz. If "armed" and when subject to crash generated forces they are designed to automatically activate and continuously emit these signals. The transmitters will operate continuously for at least 48 hours over a wide temperature range. A properly installed and maintained ELT can expedite search and rescue operations and save lives.

b. Testing.

1. ELT's should be tested in accordance with the manufacturer's instructions, preferably in a shielded or screened room to prevent the broadcast of signals which could trigger a false alert.

2. When this cannot be done, aircraft operational testing is authorized on 121.5 MHz and 243.0 MHz as follows:

(a) Tests should be conducted only during the first 5 minutes after any hour. If operational tests must be made outside of this timeframe, they should be coordinated with the nearest FAA Control Tower or FSS.

(b) Tests should be no longer than three audible sweeps.

(c) If the antenna is removable, a dummy load should be substituted during test procedures.

(d) Airborne tests are not authorized.

c. False Alarms.

1. Caution should be exercised to prevent the inadvertent activation of ELT's in the air or while they are being handled on the ground. Accidental or unauthorized activation will generate an emergency signal that cannot be distinguished from the real thing, leading to expensive and frustrating searches. A false ELT signal could also interfere with genuine emergency transmissions and hinder or prevent the timely location of crash sites. Frequent false alarms could also result in complacency and decrease the vigorous reaction that must be attached to all ELT signals.

2. Numerous cases of inadvertent activation have occurred as a result of aerobatics, hard landings, movement by ground crews and aircraft maintenance. These false alarms can be minimized by monitoring 121.5 MHz and/or 243.0 MHz as follows:

(a) In flight when a receiver is available.

(b) Prior to engine shut down at the end of each flight.

(c) When the ELT is handled during installation or maintenance.

(d) When maintenance is being performed in the vicinity of the ELT.

(e) When the aircraft is moved by a ground crew.

(f) If an ELT signal is heard, turn off the ELT to determine if it is transmitting. If it has been activated, maintenance might be required before the unit is returned to the "ARMED" position.

d. In-flight Monitoring And Reporting.

1. Pilots are encouraged to monitor 121.5 MHz and/or 243.0 MHz while in-flight to assist in identifying possible emergency ELT transmissions. On receiving a signal, report the following information to the nearest air traffic facility:

(a) Your position at the time the signal was first heard.

(b) Your position at the time the signal was last heard.

(c) Your position at maximum signal strength.

(d) Your flight altitudes and frequency on which the emergency signal was heard-121.5 MHz or 243.0 MHz. If possible, positions should be given relative to a navigation aid. If the aircraft has homing equipment, provide the bearing to the emergency signal with each reported position.

FREQUENTLY ASKED QUESTIONS ABOUT CUSTOMER SATISFACTION SURVEY #2 AIR OPERATOR / AIR AGENCY PHASE (#3)

1. What is this phase of the Customer Satisfaction Survey all about?

This is a Flight Standards Customer Satisfaction Survey that is being sent to all certificated, domestic air operators and air agencies and the flight departments of other organizations. Questions focus on satisfaction with the quality of service Flight Standards field offices are providing and how these organizations get their needs met.

2. Wasn't there another Flight Standards Customer Survey awhile back?

Yes, there was. It was a survey of the individuals--pilots and aviation maintenance technicians—involved in aviation. Those results are being analyzed and will be available for the public in the near future.

3. What is the schedule for conducting Phase #3?

Current plans are to launch this phase in September 2000.

4. How will the results of the survey be used and who will receive them?

The results will be used to address specific concerns, to spot "best practices," to target resources based on trend results, and to perform tactical and strategic planning. A general analysis of the questionnaire results will be available at a future date, either in a technical publication or on an FAA website.

A contractor will be tracking the nature of the comments and will produce an analysis of how often major areas of concern are mentioned—no names or organizations will be recorded. No one in Flight Standards having jurisdiction over any of the companies or their operations will see the original questionnaire forms.

5. Can I personally be affected?

Unwarranted "pointing of fingers" will be guarded against in the following two ways:

- As mentioned, no comments *per se* will be included in the analysis. The analysis will consist only of an analysis of the frequency of subject matter topics.
- Each question will have a validity check. That is, any question without sufficient respondents will be discarded so that erroneous conclusions can be minimized. This will ensure that those questions with sufficient respondents will have valid results.

6. How long will it be before the results are published?

This is highly dependent upon the following number of factors: 1) the schedule for conducting the survey, 2) the time it takes to get approvals for official publication of the results, and 3) the time it takes for the actual publication. If the survey is implemented on schedule, preliminary results will be available in January 2001, with a technical publication or report on the Flight Standards website at a later date. Published reports will include only the rolled-up national results.

7. Whom may I contact to ask questions or give feedback about Survey #2?

Plans are to obtain a toll-free number, which will be announced soon on the Customer Survey section of the FAA website. If you have any questions, please feel free to phone us and leave a message. Your call will be returned with an answer to your question provided.

RUNWAY INCURSION CORNER

FAA To Buy New Ground Surveillance System For 25 Airports

The Federal Aviation Administration (FAA) announced it will buy a new ground surveillance system that the agency says will improve runway safety at 25 airports. FAA Administrator Jane F. Garvey made the announcement June 26 at the opening of the agency's Runway Safety National Summit in Washington, DC.

Called ASDE-X, the new airport surface detection equipment will provide detailed coverage of runways and taxiways at an airport and also alert air traffic controllers in the tower to impending collisions. "ASDE-X will provide an increased level of safety at these airports, and will also give controllers detailed information about aircraft locations and movement at night and in bad weather," Garvey said. "It will help us meet or highest safety priority—reducing accidents and collisions on airport runways."

The new system provides similar data to the current ASDE-3 ground radar that is installed at 34 of the nation's busiest airports. Those airports will have the Airport Movement Area Safety System (AMASS) in operation by late 2002. AMASS is a computer enhancement to the ASDE-3 radar that alerts controllers to an impending collision on or near the runway. In essence, ASDE-X offers the functions of ASDE-3 and AMASS at less-busy and complex airports and at lower cost. The FAA plans to award a contract for production of ASDE-X in September.

Garvey said the 25 airports that will get ASDE-X were selected through a rigorous safety risk assessment the FAA and MIT conducted. The safety assessment focused on potential accidents and fatalities in determining which airports have the greatest need. (A list of the 25 proposed airports is bellow.)

The Runway Safety Summit, Garvey said, is the latest in a series of steps the FAA has taken to reduce runway incursions—incidents in which an aircraft landing or taking off comes too close to another aircraft or ground vehicle. The number and rate of incursions increased during most of the previous decade before dropping slightly last year. However, the number of incursions increased 27 percent in the first five months of this year compared with the same period in 1999.

Garvey placed new emphasis on the runway safety program last fall by elevating it to a higher level, providing more resources and appointing a director of runway safety. This spring, the FAA held nine regional runway safety workshops around the country. These involved the entire aviation community—airlines, general aviation, airports, pilots and air traffic controllers—in working together to share experiences and to develop ways to reduce incursions.

The Summit was a forum to share the results of nine regional workshops and of the symposium on human factors the FAA had held earlier this spring. It also explored ways to increase the education, training and awareness of the hundreds of thousands of pilots, air traffic controllers and airport vehicle drivers who operate daily at more than 450 airports.

Garvey also announced the FAA will act shortly on several recent recommendations the NTSB made regarding runway safety, including modifying current taxi-into-position-and hold procedures and developing coded taxi routes at airline airports. The agency will expeditiously review the other NTSB recommendations, she said.

Proposed Airports to Receive ASDE-X

Arizona - Phoenix
California – Burbank/Glendale/Pasadena California, Oakland (Metropolitan), Ontario, Orange County Airport (John Wayne), Sacramento, San Jose
Colorado - Colorado Springs
Connecticut - Windsor Locks (Bradley International Airport)
Florida – Tampa, Ft. Lauderdale, Orlando
Hawaii - Honolulu
Illinois - Chicago Midway
Indiana - Indianapolis
Nevada - Reno
New Mexico - Albuquerque
North Carolina - Raleigh-Durham
Ohio - Columbus
Puerto Rico - San Juan
Rhode Island - Providence
Texas – Austin, Houston (Hobby), San Antonio
Wisconsin - Milwaukee

• Missing Website

Help! I was trying to find the FAR Part 61 Q&A website, but it isn't where it's suppose to be. I know that there were 300 to 400 Q&A's posted there when last I looked. What happened? Has it been discontinued or was it moved to another website?

Via the Internet

No, the Part 61 Q&A website is still alive and well and growing. In our AvNEWS section last issue we gave the new website location, but the site location has again changed since those last instruction. The website can be accessed by used the following directions.

Access the Internet at <http://afs600.faa.gov>. Next look on the left side of the page and click on "AFS640." Next series of clicks will be: "Designee Seminar," "DPE," and "FAQ." At this point you will have five choices, which are:

1. *"chg11pt61.htm" which is the Part 61 FAQ's in a htm format.*
2. *"faqs-chg11.htm" which is a file that contains only the FAQ additions and changes from the last revision. (By the time this is printed this file might be updated.)*
3. *"faq-pt61.pdf" which is the Part 61 FAQ's in pdf format.*
4. *"faqpt141.pdf" which is the Part 141 FAQ's in pdf format.*
5. *"aero-exp.pdf" which is a file that contains an aeronautical experience checklist to assist in checking an applicant's FAA Form 8710-1, Airman Certificate and/or Ratings.*

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to H. Dean Chamberlain, FORUM Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463; e-mail address:

Dean.Chamberlain@faa.gov

• Class E Airspace Surface Area

At a recent AOPA seminar, it was stated that it was a violation of FAA regulations to fly (at 5,500 ft. for instance) through Class E airspace designated to the surface, if a surface weather condition (200 feet & 1/2 mile for example) at the airport was reported, unless a pilot obtained a Special VFR (SVFR) clearance from air traffic control (ATC). Is that true? I believe that with the old airspace designated as a Control Zone it would have been acceptable.

Also, if in Class E airspace designated to the surface, the ceiling is 1,000 feet, are you permitted to fly a normal pattern (800 feet AGL)? In other words, is it possible to fly at an altitude less than 500 feet below the clouds?

Thanks for your help.
Tom Miller
Via the Internet

In this example, a Special VFR (SVFR) clearance is not required to operate at 5,500 feet when flying through a Class E Surface Area, and the pilot remains clear of the traffic pattern. As long as the pilot is operating with the basic VFR minimums, as outlined in FAR §91.155, no clearance from ATC is required.

When operating within Class E surface areas, an aircraft must remain at least 500 feet below the clouds. However, FAR §91.157, Special VFR weather minimums, provides for some exceptions to this rule. When the ceiling is reported as 1,000 feet, and you wish to operate in the pattern at 800 feet, a Special VFR clearance must be obtained. A SVFR clearance allows a pilot to operate clear of clouds with one-mile visibility. When operating with a SVFR clearance, the basic VFR weather minimums contained in FAR §91.155 do not apply.

• Overlooked Resource

One FAA resource overlooked in the "How to Buy an Airplane" article in the July-August 2000 issue is the accident/incident database available via the FAA's Office of System Safety's (ASY) National Aviation Safety Data Analysis Center (NASDAC). The ASY website allows the public to access the NASDAC databases, which include the National Transportation Safety Board's (NTSB) accident/incident database, the FAA Incident Data System, NTSB recommendations, Aviation Safety Reporting System (ASRS) reports, and Near Mid-Air Collision (NMAC) reports.

A prospective aircraft buyer can type in an "N" number to see if that aircraft has been involved in any accidents or incidents, or to check the accident history for an aircraft type. Or, in the rare case, uncover a scam artist trying to sell a wrecked airplane.

Our website is http://www.asy.faa.gov.

Chris Pokorski
Office of System Safety

Thanks for reminding us of some of the services ASY provides. The ASY website also provides many other kinds of safety-related information.

TWICE AROUND THE WORLD IN 60 DAYS

As part of his flight plan, Captain Hans Georg Schmid landed at New Jersey's Teterboro Airport on April 6, during his record-breaking journey. The 51-year old Swissair senior captain, with 13,500 flight hours, became the first pilot to attempt to fly around the world twice (eastbound, then westbound) in 60 days. This incredible journey began on March 2 and was completed on April 30 in Zurich, Switzerland. His plane, a Long-EZ HB-YCT two-seat canard aircraft, was modified for extreme long-range flights.

Captain Hans Georg Schmid touching down at TEB airport in his Long-EZ HB-YCT aircraft during his record-breaking journey.

DOT LIBRARY PUBLISHES CIVIL AIR REGULATIONS TO THE WEB

The Department of Transportation (DOT) Library has dramatically improved the accessibility of superseded, but still important, civil aviation regulations and manuals by publishing them on the World Wide Web. The documents consist of Civil Aeronautics Manuals, Civil Air Regulations and superceded Advisory Circulars that were published before the 1960's when the DOT installed an electronic document management system. Before imaging these documents, the few remaining typewritten copies of the documents were stored at the DOT library where they were difficult to access and would have deteriorated over time. DOT Library Technical Services contracted with Microsearch Corporation of Saugus, MA, to scan and index the documents and publish them on the Web using their proprietary, super-fast search technology. Many airplanes that were built under the old regulations are still flying today and are still covered by these regulations. For that reason, people involved in servicing and regulating them must still frequently consult these documents. The documents are also often involved in legal cases that arise from accidents and other causes.

According to the DOT Library Reference staff who have been running periodic training sessions to introduce DOT Library customers to the new product, the responses from the DOT staff and the general public who use these documents have been highly complimentary. DOT Library staff and their customers have said that it's much faster and more convenient to access these important historical documents over the Web.

The DOT Library is one of the largest transportation libraries in the United States. The Library holds more than 300,000 titles, including over 1,200 periodical titles. The Library collects materials related to all areas of transportation, both in print and electronic formats. These documents and the National Conferences on Street and Highway Safety and the Interstate Commerce Commission Investigation of Railway Accidents can be found at the Online Digital Special Collection <http://specialcollections.tasc.dot.gov />. Other historical transportation documents are being evaluated to determine which ones are both unique and important to the general public to include in this collection.

FAA TO CHARGE OVERFLIGHT FEES

The FAA has announced that as of August 1 aircraft operators will be required to pay fees for air traffic control services provided to aircraft that operate in U.S. airspace, but do not take off or land in the United States. Unlike other aircraft operations, these "overflights" have not been paying for the FAA air traffic control services they receive.

"This rule assesses fees directly related to services provided by one of the safest air traffic control systems in the world," said FAA Chief Financial Officer Donna F. McLean. "The charging of overflight fees is consistent with the practices of almost every other nation and will recover most of the costs

of the services provided."

Under the new rule, fees will be based on the distance flown through U.S.-controlled airspace. Overflights will be charged at the rate of $37.43 per 100 nautical miles in the enroute environment, and $20.16 per 100 nautical miles in the oceanic environment.

These fees will apply to operators of aircraft that fly over U.S.-controlled airspace. There are some exceptions. No charges will be assessed on military and civilian aircraft operated by the U.S. government or by a foreign government. In addition, users who accrue $250 or less in fees per month will not be charged for these operations.

The FAA will bill users by sending a monthly invoice. Affected users are requested to designate and submit to the FAA the name and address of a U.S. agent for billing. Users not providing a billing address will be billed at the address of record of the aircraft owner as maintained in the country where the aircraft is registered.

The fees will go into effect August 1. The FAA held a meeting June 29 to hear comments from the public and will accept public comment until Oct. 4, 120 days after the interim final rule's publication in the *Federal Register*. A final rule will be issued after a thorough review of public comments.

For a copy of the interim final rule, check the Department of Transportation's docket web site at <http://dms.dot.gov>. The docket number is FAA-2000-7018.

NEW SMITHSONIAN MUSEUM FACILITY NAMED

In October 1999, at a ceremony at the National Air and Space Museum (NASM) in Washington, DC, aviation businessman Steven Udvar-Hazy donated $60 million to NASM Capital Campaign. The Smithsonian has recognized this extraordinary generosity by naming the NASM's new facility in northern Virginia in his honor. The entire gift, the single largest donation in the 153-year history of the Smithsonian, will go toward construction of the National Air and Space Museum Steven F. Udvar-Hazy Center. It is scheduled to open in December 2003 on the centennial of the Wright brothers' flight at Kitty Hawk, NC.

The structure, which will be two and a half football fields long and 10 stories high, will be home to more than 300 aircraft and spacecraft, including the space shuttle *Enterprise* and an SR-71 *Blackbird*. Along with state-of-the-art storage and restoration facilities, the center will feature educational facilities, an archival resource center, a large-format theater, museum shops and restaurants, and an observation tower from which visitors can watch aircraft arriving and departing from nearby Washington Dulles Airport.

The Smithsonian Board of Regents also formally recognized the lifelong commitment of Vice Admiral Donald D. Engen to aviation education by naming the observation tower the Donald D. Engen Observation Tower. The former director of the NASM was killed last year in a glider accident. His commitment to building the new center was legendary and it was his idea to add an observation tower for air traffic viewing to the new museum complex.

75 YEARS AND STILL GOING STRONG

The Goodyear blimp celebrated its 75th birthday on June 3. One of the world's most easily recognizable corporate icons, the blimp has come a long way since the first airship, the *Pilgrim*, was launched with little fanfare in 1925. According to the Goodyear Tire and Rubber Company's press release, it has "attended most of America's major sporting events in the last 75 years: Super Bowls, World Series, the Indy 500, the Daytona 500, the NBA Championships, the NCAA Championships, even the Olympics. I have gone to war with our country and helped protect our ships at sea. I've provided a bird's eye view of World Fairs and helped celebrate the Statue of Liberty's rebirth in 1986. During disasters, I helped people find food, water, shelter, and each other. Each year I spend hundreds of hours promoting non-profit and charitable causes."

Editor's Runway

Selected remarks by FAA Administrator Jane F. Garvey at the Runway Safety National Summit, Washington, DC, June 26, 2000

...Runway safety is an enormously complex issue. It involves the human performance of thousands of air traffic controllers, more than 600,000 pilots, and what could be a million or more people authorized to operate vehicles on our nation's airports.

Yes, it is a complex issue. It is also an urgent issue. Air travel—so vital to our nation's economic well being and to our quality of life—is growing, and growing rapidly. Our forecasters project a 35 percent increase in commercial airline flights and a 21 percent increase in general aviation operations in the next ten years. This significant growth at *virtually the same airport capacity that we use today* only makes our job to improve runway safety even more important and more pressing. We know that taxiing on the airport surface is the most hazardous phase of flight. The risk becomes greater when mishaps can involve two planeloads of people.

I can tell you today that the FAA is committed—as we have never before been committed—to improving runway safety. We want to move beyond the record into results...Human factors is a key to runway safety, but so is technology...

Within the past two weeks, we have received thoughtful recommendations from the NTSB as a result of their investigations of runway incursions. Based on our initial analysis, we expect to be able to adopt several of those recommendations within the next week to 10 days. Specifically:

- We will modify our taxi into position and hold procedures.
- We will emphasize to controllers to use a reasonable speech rate when communicating with all flight crews, especially those whose primary language is not English.
- The agency will develop coded taxi routes for air carrier airports and we will expand data link for issuing taxi clearances to departing aircraft.
- And we will review intersecting runway operations at all airports served by scheduled carriers to ensure that separation standards meet our safety standards.

Improving runway safety *has my full attention*. We're using the same model for runway safety that was so successful with Y2K. This program has central focus—accountability—and real deadlines. From all the workshops, all the discussions, all our experience—one thing is very clear. We can only improve runway safety through the *constructive collaboration* of the entire aviation community. Government, industry, labor, aircraft and airport operators must all work on this together. This is why it is so good that all elements of aviation have come together at this National Summit....We believe the aviation community is determined and energized to tackle this issue.

We now know more than ever before about runway safety—about the risks, about the contributing factors, and about ways to improve the safety of airport operations. We also know there are no easy answers. There is no silver bullet. In all our work with runway safety we know that most runway incursions are the result of human error. To prevent human error we need human error prevention strategies.

One of the most important prevention strategies sounds deceptively simple. But, it is straightforward. What we need is better *awareness* of the problem. Recognizing the problem truly is the first and most important step to the solution. This is exactly why we are working so hard and focusing so much effort on collaborating with industry to increase awareness of runway safety. Awareness is the key...

Over the next several years, the aviation community will make an even stronger commitment to awareness through education and training for pilots, controllers, and ground vehicle operators. That means more emphasis on runway safety in initial as well as recurrent training...

Improving runway safety is one of the most critical aviation safety issues the aviation community faces. But, we have faced critical safety issues before. This is a community that has been tested. We know how to meet challenges. Yes, the aviation community has come together before. We have made the changes needed to make the safest form of mass transportation even safer. And that's what we intend to do again. Take the necessary actions to improve runway safety. To work together to make air travel even safer.

For the full text of this speech see <http://www.faa.gov/apa/speeches/garveysp.htm>

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