

# **FLYING LESSONS** for July 22, 2010

suggested by this week's aircraft mishap reports

*FLYING LESSONS* uses the past week's mishap reports to consider what *might* have contributed to accidents, so you can make better decisions if you face similar circumstances. In almost all cases design characteristics of a specific make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any airplane you fly. Verify all technical information before applying it to your aircraft or operation, with manufacturers' data and recommendations taking precedence.

**If you wish to receive the free, expanded *FLYING LESSONS* report each week, email "subscribe" to [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).**

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## ***This week's lessons:***

**Airplane problems rarely fix themselves...**and more often than not, they get worse over time. Pilots, on the other hand, tend to express frustration with mechanical and aeronautical failings by trying to *force* the airplane to do what the pilot wants it to do. Combine a systems failure or an inability for the airplane to perform well enough for conditions with this common pilot trait, and you have a recipe for disaster.

**If you experience abnormal airplane performance,** investigate it before trying to do the same thing again. Don't rationalize that something was wrong that will get better next time, because history shows it almost certainly will not.

**If you can't detect the cause of the performance discrepancy** then terminate the flight as soon as practical. If you're on the ground, don't try to take off. If you're near the ground and have the ability to climb, get a few thousand feet between yourself and obstructions before evaluating your options.

**Check your fuel caps**—personally—before boarding the airplane. Fuel can slosh out of the tanks during ground operations, presenting a fire hazard. In flight the low pressure created atop the wing can draw fuel out a loose fuel cap.

**Float-type fuel level** transmitters may be drawn upward as fuel is pulled out, creating an *increase* in indicated fuel level even as the tank rapidly empties. Beware and respond to an unexpectedly high fuel level just as seriously as you'd act with an unexpectedly low indication.

**Once you're in the air,** visually check your fuel caps for security, and that there's no fuel siphoning out. If you're flying a high-wing airplane, look at the trailing edge of the wing behind the fuel cap's location. Fuel may form drops along the trailing edge in both high- and low-wing airplanes.

**If you see indications of fuel siphoning,** whether a direct visual check or an unexpectedly high fuel level in a tank indicated by a float-type sender, you have no way to tell for certain how much fuel remains in that tank. If adequate fuel remains in other tanks not placarded against use in descent and landing you may continue your flight. Otherwise, your only safe choice is to land within the range of the "good" fuel tank(s), confirm the actual fuel remaining once you're on the ground, and if you can't determine the amount of fuel remaining add fuel until you know the true fuel state.

**Unless your engine is supercharged** (including turbocharged and turbonormalized), describing a failure as "losing manifold pressure" is probably a misnomer. Manifold pressure is a

measure of the air pressure in the induction manifold, not a direct indicator of engine power—it shows the *potential* but not the *presence* of power development.

**A normally aspirated engine that quits** will show no change in the manifold pressure and it will increase at the lapse rate as the airplane descends, unless the loss of power is a direct result of an obstruction in the induction manifold.

**That said**, many pilots use the terms "manifold pressure" and "power" interchangeably. This may be indicative of a lack of systems knowledge that might be manifested in other ways. If you're uncertain about an aeronautical term, or if you're a flight instructor conducting a Flight Review or other training

**I don't know a single pilot** who hasn't at one time or another started the engine only to remember (or have pointed out) that the chocks were still in place. Who would be in so much a hurry that they'd send a passenger out, or let one volunteer to go out, to remove the chocks with the engine still running? Who is so unfamiliar with hot-starting a fuel injected engine that he/she is afraid to shut down the engine in such a situation?

**As a final check** before boarding the airplane, squat down and visually check all wheels for wheel chocks, and ensure removed chocks are not in a position they may be sucked up into a moving propeller or turbine inlet.

**Shut down the engine(s)** any time someone will be near your propeller, or any time someone will exit or board through a cabin forward of the wings (aft of the wing in pusher designs), or directly in front of jet intakes.

Comments? Questions? Tell us what you think at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).

### The issue is weather...

The [July/August 2010](#) issue of *FAA Safety Briefing* focuses on aviation weather and its critical effect on safe general aviation flying. Articles address obtaining and interpreting weather data, developing strategies for avoiding marginal or hazardous weather, and what services air traffic control can and cannot provide in adverse conditions.

See [www.faa.gov/news/safety\\_briefing](http://www.faa.gov/news/safety_briefing)

## Debrief: Readers write about recent *FLYING LESSONS*

Reader Dave Higdon writes:

[I] second Mark Briggs' response to the reader suggestion the SPOT as an operational alternative to those nasty old ELTs. My [writing and research](#) on the subject -- including working on a project examining the effectiveness of various 406 PLBs and EPRBS -- leaves me convinced that there are no perfect solutions, only solutions that advance the state-of-the-art from the last imperfect solution. Today's new 406 ELTs...are considerably improved over the original ELT technologies, particularly in triggering mechanisms; I'll won't repeat the other advantages -- Mr. Briggs more than covered them. And meeting the requirements of the FARs is not an option -- hence the recent hyperventilation over the prospect of the FCC prohibiting the use of old 121.5 MHz units. It's one or the other -- and it would be sort of silly to depend on a technology that can't be heard by today's SARSAT satellites. As a result, a 406 ELT is part of our upgrade plans.

Nonetheless, for the technology- and gadget-attuned searching for something beyond the legal mandated gear, this [blurb](#) from today's HeliNews from HAI might offer an adjunct to the required ELT that doesn't require human intervention to trigger. Keep up the good work...

See:

[www.aea.net/avionicsnews/ANArchives/TOCJul10.pdf](http://www.aea.net/avionicsnews/ANArchives/TOCJul10.pdf)

[www.rotor.com/Publications/RotorNewssupregsup/tabid/177/newsid375/71178/Default.aspx](http://www.rotor.com/Publications/RotorNewssupregsup/tabid/177/newsid375/71178/Default.aspx)

SPOT proponent Jim Herd sends this follow-up to his original post and last week's Debrief response:

Your dialog with Mark Briggs was interesting but I'm afraid it falls short of putting the SPOT controversy to bed. Allow me to push the ball further down the court.

The studies I have read (I could dig them up for you) indicate that a 406 ELT has no better success rate during SAR operations than does the old 121.5 ELT. I fully realize all the technology leaps with 406 ELTs, but their record is probably so unimpressive because they still don't overcome the obvious limitations. Any ELT is prone to failure in so many ways during a high-g event – broken antenna, power loss, smashed electronics, not working before the crash event, antenna shielded by rocks or trees or water, etc. These failings are common to 121.5 and 406. The result, according to two studies I have read, is that ELTs of either type have a success record during actual SAR situations of something less than 66%. Very much less in one particular study. This is terrible, imho, and certainly not worthy of praise or confidence.

SPOT, on the other hand, by its very concept has several profound benefits. First, it is functioning all the time, so checking its functionality is easy and almost automatic. Second, it obviously matters far less if the unit gets destroyed in an accident because the breadcrumb remains on file and will direct SAR to a reasonably-focused area for search. Also, the obvious benefit of having loved-ones track your plane brings untold new utility. I can personally attest to all of this after 2 years of extensive use of SPOT all across the USA in my Bonanza, motorglider, and RV. And note that the primary value is NOT the emergency 911 button – sure, it's nice to have, but as Mr. Briggs explains there may be no time to press 911 in a sudden dire emergency. Note also that there is huge value in locating a catastrophic crash site quickly, even if the souls on board have no chance of survival. Why? Because it makes a huge difference for loved-ones left behind, as well as avoiding extensive and wasteful SAR resources.

Further, the second generation SPOT addresses one complaint of Mr. Briggs. It saves the location of the previous two breadcrumb data points and reports them along with the current data point being reported in ten minute progressions. So this “back-fills” most lost data points. That said, my own experience with the first generation product has been that breadcrumb data points are rarely missed. But the beauty is that you can detect every data point that is missing and do something about it when you get on the ground! Not so with an ELT of any type. What can you do if your SPOT is missing tracking points? Well, the usual culprit is positioning of the unit – it must not be shadowed by anything opaque to the incoming GPS position signals or the outgoing Globalstar sat phone signal. Both are weak signals and work well, but only with a very clear view of the sky. Also, I understand that Globalstar has been replacing lost satellites in their network of about 24 that fly in Low Earth Orbit and fall to earth every ten years or so. A better constellation of satellites will reduce the occurrence of lost tracking points.

In defense of 121.5 ELT, for those of us flying mostly over the “civilized world” of the Lower 48 and Southern Canada 121.5 will still function, and arguably almost as well as 406. Airliners, CAP aircraft, and SAR aircraft still monitor 121.5. All-in-all I see little reason to invest in a 406 ELT because of its marginal utility and serious shortcomings when contrasted with SPOT, unless you fly to Canada or Mexico where 406 may become mandatory.

But my major point is this. It is the CONCEPT of SPOT that is so impressive, not necessarily the initial generation of the product. The first mechanical hearts weren't perfect either. As a CONCEPT, breadcrumb tracking is far more promising than ELT! And the sad part is that there is so much false confidence in ELTs that it masks the obvious need for a better solution. The FAA should take a reality check on ELTs and pay far more attention to breadcrumb tracking technology. So far, I have detected little more than the FAA ignoring this wonderful concept, or even treating it with disdain. We will all be best served with an open and honest dialog on this but sadly, biases, self-interest, and mistruths continue to dominate this topic.

Thanks to Tom Turner and Mark Briggs for creating a forum for honest dialog. Now, who else wants to chime in?

2009 National FAA Safety Team Representative of the Year and former U.S. Marine Corps search-and-rescue coordinator Kent Lewis reminds us to never forget the basics:

A few other items that help SAR crews find downed pilots are mirrors and flashlights. Even if there is a GPS coordinate, these items help crews navigate the last few feet to the right spot. These lightweight items should be in everyone's flight kit.

Thanks, Kent.

Come see my presentation, "The Lost Art of Directional Control" at 10:00 am Saturday July 31 AirVenture, in the FAA Aviation Safety Center. And I invite you to the General Aviation Safety Awards Wednesday, July 28 at 7:30 pm in the Theater in the Woods—because you, *FLYING LESSONS* readers, are the main reason I'll be there.

Reader Lew Gage adds to the on-going discussion of reducing  $V_a$  for reduced airplane weights:

Maybe I missed it in all of the information that several people sent in regarding maneuvering speeds. The listed speeds are maximum speeds, not necessarily the speed for safest flight. Although the original maneuvering speed for my G35 [Bonanza] at maximum weight was 131 MPH/IAS I always would use a maximum of 120 and probably slow to 100 to 110. These listed maximum speeds, just as the maximum landing gear operating speeds, are a good place to stay away from.

Thanks, Lew. I did indeed review early in this conversation—several issues back now, easy to forget—that flight in turbulent air will result in occasional speed *increases*, and pilots must slow to a speed well below computed  $V_a$  so that maneuvering speed is not exceeded in any of these higher-speed excursions. Thanks, Lew, for the reminder to drive home this point.

Reader Dave van Horn writes about last week's reader comment about the effect of regularly reviewing aviation mishaps:

As Andy Buehler's comment highlights, although we may think that "the belt and suspenders approach, and then throw in an additional belt just for good measure" will inspire confidence, in fact it has just the opposite effect: People who wouldn't have thought twice about it before will decide there must be something seriously wrong with your pants if you need to go through all that. Consider whether constantly rehashing the dangers enhances safety more than it discourages both passengers and pilots.

Thanks, Dave. Believe it or not, I sometimes struggle with that question myself. In my soul-searching I figure as long as I still feel a little sick and disappointed when I open the 50 or more general aviation accident reports that are posted each week that I'm still "getting" my own intent. Further, my approach to "lessons-from-tragedy" appears to strike a chord based on the popularity of *FLYING LESSONS*, read by thousands each week on six continents, with a net increase in subscriptions each week. And of course each of you is free to [unsubscribe](#) at any time.

I ask readers to chime in on this topic in this week's Question of the Week, below. But first, here's an article from the archives of [www.ipilot.com](http://www.ipilot.com) that I hope explains where I'm coming from.

### **Morbid Curiosity...or Survival Technique**

By Thomas P. Turner  
Published: 11/19/2001

With a little guilt and the same morbid curiosity that prompts viewers to watch footage of the same tragedies over and over on television news channels, I check the FAA and other accident-reporting web sites daily. It's hard not to look. The Federal Aviation Administration (FAA) web site routinely lists 50 or more aviation accidents in the U.S. every week. Many incidents (ground loops, ground collisions, landing gear mishaps) aren't reported and therefore add to this total, according to friends in the insurance industry.

For a long time, I felt guilty poring over and writing about airplane accident reports. I sometimes feel like I'm emphasizing all the bad, to the exclusion of the good, about aviation's safety record. In a short period of time, though, I came across two writings that reaffirm that -- done correctly -- accident reviews are beneficial in avoiding future accidents.

**#1: What is Judgment?** A popular figure in recreational aviation, retired airline captain Bob Siegfried reminded me of an adage that judgment is the result of **experience** and **training**.

**Experience** is learning from what happens directly to you -- you 'experience' a situation and change your future actions based on what worked (or almost didn't work) for you before

**Training** is learning from the experiences of others -- exactly what we're doing when we fly with an instructor, and when we evaluate aviation accident reports. Who could be safe in an airplane if all they knew was what had happened directly to them?

We must look at what has happened to others in past emergencies if we wish to be competent when we face similar circumstances in the future.

**#2: Fear of the Unknown.** Newspaper columnist (Timothy Hooker, the *Cleveland [Tennessee] Daily Banner*) was writing about something completely unrelated to aviation when he penned:

*The whole thing centers around fear... We live in a world where you simply have to have insurance to survive. But let's be honest. The insurance business is based on fear -- the fear that something bad is going to happen... You cannot have Fear without The Unknown. If you know something bad is going to happen... you will do something to prevent it from happening.*

We need insurance “just in case” -- but by knowing what historically causes accidents we can take active steps to avoid repeating accident history.

**LESSONS LEARNED** from years of reviewing airplane mishaps:

- **Pilots rarely come up with new ways to crash airplanes.** It's the same things over and over again that put pilots and passengers at risk.
- **Don't overestimate your piloting abilities.** An old *Flying* magazine poll found that over 90% of all pilots feel they have 'better than average' ability. Unfortunately, we can't all be better than “average!” Honestly appraise your skills and decide if they're up to your flight plan.
- **Use your airplane for its intended purpose.** Don't fly minimally equipped airplanes at night or in poor weather conditions. Don't overload airplanes. Don't try aerobatics in non-aerobatic airplanes.
- **No airplane is an “all weather” airplane,** regardless of how it's equipped. Fly enough and you will have to delay or cancel a flight due to weather. Admit this beforehand and you'll be better prepared to make the no-go decision when conditions exceed your abilities or the capabilities of the airplane.
- **Fatigue is a big “unknown” factor in flying accidents.** Evaluate your alertness not on the basis of how it is on takeoff, but how it's likely to be after a few hours in turbulence, at night or in the clouds.
- **Airplanes don't fix themselves.** Intermittent mechanical problems will only get worse and equipment seems to fail at the worst possible time. Take command -- you need to decide if the airplane is sound for flight and continued flight.
- **Get familiar with systems and procedures.** If your airplane has it, know how to use it. Insist on a good checkout in avionics, retractable landing gear systems, autopilots, and anything else you're not completely familiar with.
- **Use your good sense.** Follow established procedures. If it violates the rules, it's likely to be hazardous. If you have a “gut feeling” that something's not right, your instincts are trying to tell you something.
- **“Pilot error” really does account for nearly 80% of all accidents.** If poor decisions cause crashes, then learning to make better decisions should make you safer.

All flying is an exercise in managing risks. Use accident reports to help you more accurately evaluate the potential risks when you make your own decisions about how and when to fly.

Which brings us to the...

## Question of the Week

This week's question is a four-parter. Please send your answers to and comments about each question by number (or copy-and-paste the questions with your answers) to [mftsurvey@cox.net](mailto:mftsurvey@cox.net):

1. **When we review accident records in print and discussion do we risk portraying our entire industry as excessively risky?**

2. **Do you believe flying is inherently dangerous, requiring constant study and practice to be an acceptable risk?**
3. **Does *FLYING LESSONS* go too far in presenting lessons to be learned from the mishap record?**
4. **Can we accomplish the same thing (avoiding repeats of common accident causes) differently, and if so, how?**

I'd really like every one of you to answer these questions. Maybe there's something we can be doing differently to stop the constant stream of mishap and tragedy stemming from the same causes over and over again.

*Last week we asked:*

**Have you ever encountered a suspected microburst? What happened? What did you do?**

We got one response:

The very first day I bought my Bonanza in Australia 16 years ago, I left the town where we bought the aircraft with a really experienced pilot. 45 minutes into the 3hr flight home we had to stop at a country airport called Narramine due to storm build up which I had never experienced as a pilot. A friendly local came out to the aircraft and offered to put VH-EUB into a hangar for a small fee. I was really puzzled to why I needed to put the a/c away and declined his kind offer. My pal and I went to the aero-club and ordered a coffee and waited for the storm to pass. I had never seen a storm like this (this was Kansas-like territory) and as it came closer it became blacker and then green. Just like in your introduction, a Bonanza with husband wife and two kids onboard made a rushed taxi to the threshold and took off immediately towards the storm. It initially went up to about 50 foot by the end of the runway and then just dropped suddenly out of sight into a wheat field. I waited for the bang and explosion. Nothing happened for about 30 seconds when the Bonanza miraculously appeared from long strands of wheat with its tail between its legs slinking back to the taxiway. Almost immediately hailstones the size of golf balls came from the sky and they were big enough to kill you if you stood outside. I know now why the guy offered the hangar for VH-EUB and everyone in the aero-club wanted to beat up the pilot who almost killed his wife and kids. I really hate these storms and never fly near them. Only the quality of the Bonanza saved the family.

We also had another response to the recent question about filing VFR flight plans:

*I file VFR flight plans even when I'm flying within a 25 nm radius – such as when I'm sight seeing with friends. Anyone who doesn't file is throwing away their last best hope of survival should a serious in-flight emergency occur. I also use VFR flight following on every flight when I've got the luxury of radar coverage. In the northwest there are lots of areas where you have to be on O2 to be at minimum radar altitudes, but most places it works. A flight plan is more important than VFR flight following. There are several instances where ATC dropped the ball in initiating SAR when aircraft were using flight following. I don't know of any such instances when a flight plan is on file and opened.*

Thanks, readers!

*FLYING LESSONS* will not be published next week, July 29<sup>th</sup>, because of my duties at AirVenture and the Wednesday evening General Aviation Awards presentations. The next issue of *FLYING LESSONS* will be posted for August 4<sup>th</sup>.

***Fly safe, and have fun!***

Thomas P. Turner, M.S. Aviation Safety, MCFI  
2010 National FAA Safety Team Representative of the Year  
2008 FAA Central Region CFI of the Year



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