FLYING LESSONS for February 21, 2013

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. You are pilot in command, and are ultimately responsible for the decisions you make.

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

FLYING LESSONS is an independent product of MASTERY FLIGHT TRAINING, INC. www.mastery-flight-training.com

This week's lessons:

Reader Ed Livermore wrote about last week's Mastery Flight Training Beech Weekly Accident Update (WAU) report, linked from *FLYING LESSONS Weekly* as "the Button of Death":

> You are so right to focus on this issue. It was an obvious pitfall when I was training with our new Garmin and glass panels a couple years back and did, in fact, develop my own checklist to avoid this hazard. Thanks for putting it out there in such detail. **One of the most important articles you have written.**

See www.mastery-flight-training.com/beech-weekly-accident-updat-2.html

Since the *LESSON* was hidden within the WAU, I repeat it here this week:

The NTSB reports the Beechcraft Bonanza "impacted trees and terrain in a wooded area...while on an instrument approach for landing at the Monroe Regional Airport (KMLU), Monroe, Louisiana. The commercial pilot and three passengers were fatally injured. The airplane was destroyed by the impact and a post-crash fire. Instrument meteorological conditions prevailed, and an instrument flight rules flight plan had been filed. The flight originated from Beaumont Municipal Airport (KBMT), Beaumont, Texas, at 1225, and was destined for KMLU.

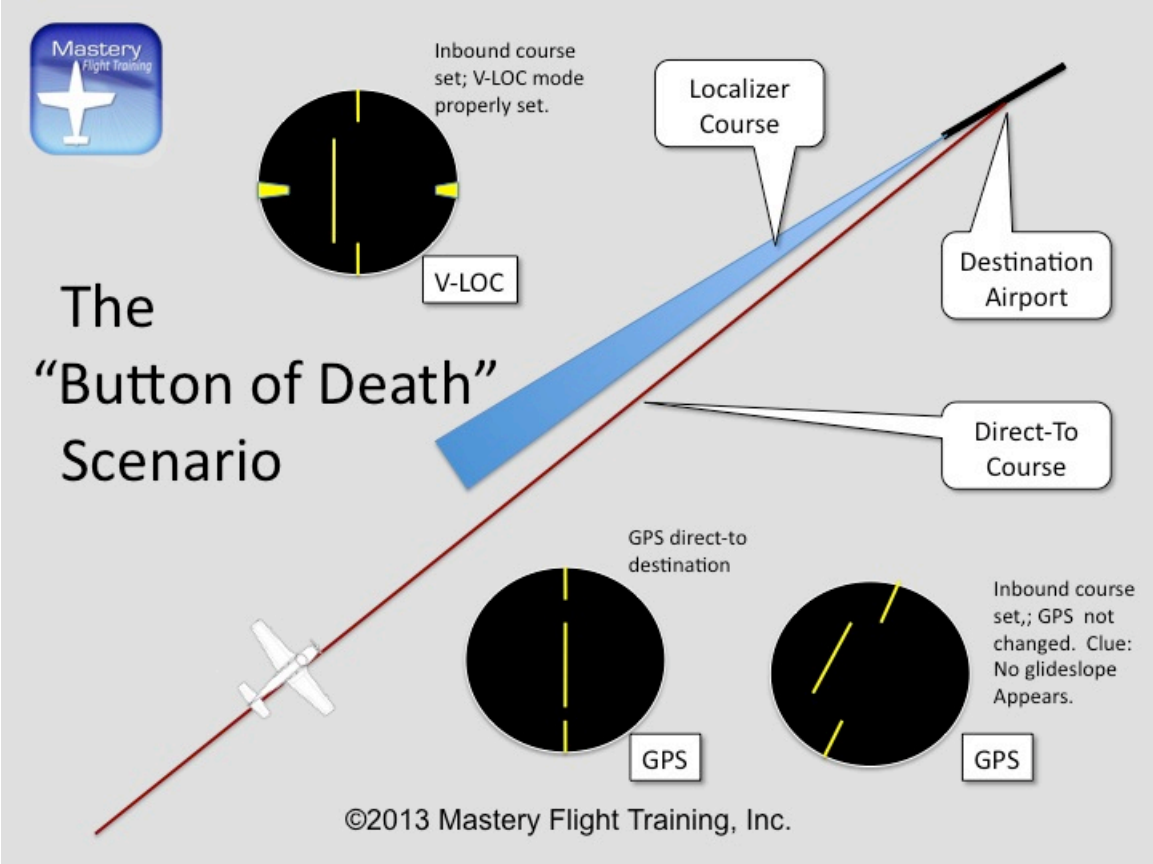
"KMLU's air traffic control tower supervisor said that the first contact with the airplane was about 1330 and the accident happened at 1349. He said the airplane came in from the south at 7,000 feet mean sea level (msl). When the airplane was about 33 miles from the airport, the local controller gave the pilot instructions to turn left 15 degrees to intercept the localizer to runway 4 and descend to 2,000 feet msl. The airplane made the turn to intercept the localizer but overshot the inbound course. The airplane was about 2 miles left (north) of course and continuing north when the local controller asked the airplane if he was established on the localizer. The local controller then gave the pilot instructions to turn right 70 degrees to re-intercept the course. The airplane turned onto the localizer. At 4 miles from SABAR, the outer marker and glide slope intercept point for the approach; the pilot was cleared to contact the tower. When the pilot did so, the controller cleared the pilot to land runway 4.

"When the pilot told the controller that he was at 3,000 feet, landing clearance was canceled and the controller issued missed approach instructions. Radar data indicates the airplane made a tight right turn to the south. The airplane was at 1,600 feet and 211 knots. The airplane climbed to 1,900 feet, then descended and disappeared from radar. At that time, the airplane was in a tight descending right turn at 1,600 feet and 2 miles inside SABAR at an indicated ground speed of 210 knots. A short time later, witnesses saw the airplane descending almost vertically at a high rate of speed just prior to losing sight of the airplane in the trees and hearing the impact trees and terrain."

Speculation: "Flying inbound from the south" does not necessarily mean from due south of the airport. The pilot was flying northeasterly toward the airport when assigned an instrument approach to a northeasterly aligned runway. Given the available approach procedures it's logical to assume the pilot of the IFR GPS-equipped airplane (filed /G) was cleared for the ILS Runway 4 approach. If the pilot was navigating GPS direct--and the flight track suggests that was the case--

the primary navigation instrument (the HSI) would have been closely aligned to the inbound approach course and, as the Bonanza approached the airport, the course needle would have been centered.

What if, because the HSI was aligned with the runway, and the course needle was nearly centered, the pilot made the (simple) mistake of forgetting to change the GPS' OBS selector from **GPS** to **V-LOC**? Closer in, the pilot may have found himself a little south of the HSI course track and steered north to intercept what he *thought* was the final approach course. The needle would not center, however, and the pilot continued northward until prompted by the controller.



Since (in this *speculative* example) the GPS was in the improper mode, the glideslope did not appear and the pilot did not descend when expected. The controller issued additional instructions but by then the pilot was (speculatively) confused, and began to fixate with troubleshooting and programming the GPS and autopilot. Forgetting the prime directive of aviation--fly the airplane--a pilot in such a case might lose control of the aircraft, allowing it to fall off into a spiral that resulted in a fatal, vertical descent into the ground similar to that reported about the accident airplane in this event.

I've seen similar GPS source confusion in pilots before, both in simulators and in the airplane. I've seen pilots forget to change GPS modes for an ILS approach. And I've seen (and while training, manufactured) scenarios where the pilot nears an airport on a heading nearly straight-in to an instrument approach course, and becomes confused about what the navigational instruments are saying.

What can help prevent the scenario suggested by this deadly crash from unfolding again and again? Develop your own Approach checklist, customized to the equipment on your airplane, and faithfully use it *every* time you fly--get the airplane set up the way you want, then **confirm you've not missed anything** by running through the printed checklist. Avoid forgetting the "button of death."

"The pilot...said he was flying back from Fort Smith, AR [and] planning to land the twin-engine, turbocharged Beech Duke at Abilene Regional Airport, but realized he didn't have enough fuel so he attempted to fly to Elmdale Airpark [also near Abilene]. When he realized he couldn't make it to Elmdale, he attempted to land in a plowed field but came up short, landing in a pasture instead. [The pilot] was able to walk away from the emergency landing uninjured. The plane crashed into mesquite trees in the pasture."

The planned flight was to take one hour and 47 minutes at 14,000 feet. A rough approximation of fuel burn in this type of aircraft would be 20 gallons burned in climb and then 70 gallons in cruise, and 10 more for descent--100 total gallons before reserves (20 gallons for minimum-legal VFR reserves, 30 gallons for IFR). Since the flight was on an instrument flight plan, the absolute minimum takeoff fuel load for this trip should have been 130 gallons...nearly full fuel for the 142 gallon-capacity aircraft.

Another attempt to stretch range to just a little further than the fuel would allow, perhaps aggravated by a desire to get to lower-priced "based airplane" fuel at home, according to posts on multiple blog sites.

***FLYING LESSONS* has noted before** that the majority of fuel exhaustion events happen within a few miles of the home airport after a cross-country trip. We have also discussed how pilots of general aviation airplanes tend to estimate fuel requirements based on en route fuel burn, and not the much higher flow rate common during takeoff and climb. In the Duke, for example, cruise fuel flow might be around 40 total gallons per hour depending on power setting and leaning technique, but takeoff and climb fuel is 60 GPH or more--enough to make a major difference even after only a short climb. The difference may be less on the airplane you fly…but cruise fuel burn alone does not define an airplane's fueled range.

"Just in case you thought fuel starvation only applied to GA," wrote one of several *FLYING LESSONS* readers who forwarded a recent report on the crash of a Nigerian MD-83 airliner in June 2012. According to "sources close to the investigation," the Wall Street Journal quotes that the crash "was likely caused by the crew's failure to properly monitor fuel flow and turn on certain fuel pumps," leading to fuel starvation and dual engine flameout. If it can happen to a professional multipilot crew, it can happen to you—*unless* you know the airplane's fuel system well, and have a formal fuel monitoring and management plan that includes regular crosschecks of actual versus planned fuel burn…a frequent topic in *FLYING LESSONS Weekly.*

See http://allafrica.com/stories/201302130408.html

Questions? Comments? Let us know, at mastery.flight.training@cox.net

---

Thanks to AVEMCO Insurance for helping bring you *FLYING LESSONS Weekly*.

See https://www.avemco.com/Information/Products.aspx?partner=WMFT.

Debrief: Readers write about recent *FLYING LESSONS:*

General aviation and airline pilot, and frequent *FLYING LESSONS* Debriefer, David Heberline writes:

> I am writing to you about an article [J.] Mac McClellan wrote in the most recent EAA *Sport Aviation* magazine. He wrote about an accident involving a highly experienced, highly trained, highly qualified pilot. What struck me about this accident is not that this individual made such a classic mistake, but that **no one called him out on operating on fumes**. This is an area you recently covered with the debate over running tanks dry. Here is an example of a pilot who was so proud of his fuel efficiency that he made a logbook entry about it. Unfortunately this miserly attitude towards fuel was his ultimate undoing. This brings up another issue. As highly regarded as this pilot was, *did anyone dare challenge him on his fuel policy*? Those of us who take safety seriously and train on a yearly basis have to watch out for our blind spot(s). Are we so highly regarded that other pilots are intimidated from pointing out a flaw in our thinking? We are only human after all.
>
> I remember years ago when I first got checked out in a [retractable gear aircraft]. The young instructor was so blinded by the fact that I was an airline pilot that I had to beg to do stalls and steep turns. Unfortunately, I did not know about the emergency gear extension [procedure] and did not ask to see it demonstrated. That did not come until years later when I got checked out in my own aircraft.
>
> We all put our pants on one leg at a time and should be humble enough to welcome any constructive criticism. I got annoyed at my daughter when she first rode with me in my airplane. On short final she asked me if the gear was down. With some annoyance in my voice a gruffly assured her that it was indeed down and locked. I immediately understood my mistake (barking at her), but waited until after landing to thank her for her concern. I told her that in the future, she should feel free to ask me anything. It would be my privilege to answer her questions and keep her assured of our safety. Short final may seem to be the wrong place to ask a question, but, what if the gear was NOT down? She would have saved me from a costly and deeply embarrassing mistake.

See www.eaa.org/sportaviationmag/

Thanks, David. Two topics with a common theme: the potentially bad effects of pilot ego.

Reader Tom S. chimes in:

> I've been enjoying your weekly *FLYING LESSONS* for more than a year. They have filled in some significant gaps in my traditional instruction.
>
> With respect to declaring emergencies, I believe pilots are much too resistant to declaring. I often listen to live ATC coverage of my local airport to practice my instrument comms. On two occasions in the last month I heard Airbus pilots declaring emergencies for flap failures due to cold conditions. They were given priority but apart from that no real disruption to their flights or other traffic was evident.
>
> On a flight with an instructor we also had a gear failure (thankfully retraction, not extension) due to cold weather on a PA23 Apache. We declared an emergency and have had no further ramifications.
>
> I think this reticence also extends to go-arounds. In my training go-arounds were rarely practiced, and then only when expected.

Pilots are by their nature can-do people. We like to accomplish things, and when they're not going precisely as planed, we like to fix them. And we usually like to do it alone—all part of the hero culture of aviation, probably a Hollywood construct and reinforced by half a century of World War II aviation movie reruns. As you said, Tom, we need to be able to admit when we need priority handling to assure a safe outcome. And we need to be spring-loaded to break off a maneuver, like a landing, and go around to set up and try it again before it becomes too late to make that go-around.

Reader Tom Allen comments:

> Great article [on type-specific knowledge last week]. My simple airplane has things that I have never used, like alternate static, etc.
>
> I really can't imagine routinely landing with 30 minutes remaining fuel. It doesn't happen often, but imagine

> being number 12 to land at Addison [Airport, near Dallas, TX]. Or once, I was told that there was so much traffic that I needed to leave and come back later. 30 minutes of fuel means the fuel gauges are on "E."

Thanks, Tom. Like the airplane that landed gear-up ahead of you mentioned by a reader last week, there are other scenarios completely out of your control that can require you have a more-than-legal fuel reserve.

Reader Mike Radomsky also revisits last week's *LESSONS* about the need for airplane type-specific training:

> Even though I have not (until now) commented on *Flying Lessons*, I am an avid reader and a big fan - you do a really nice job, and I commend you on a fine service to your readers.
>
> You used the example of how Alternate Air varies by model to illustrate why it's important to know the specifics of the model you fly. I recently taught a module on the specifics of the Alternate Air system in a normally aspirated [Cirrus] SR22…it turns out to be a hybrid of some of the systems you discussed. I looked into it because I was puzzled by the fact that the manifold pressure dropped when I selected alternate air in flight - I had expected it to rise.
>
> I quickly discovered something I probably should have known after 3500 hours of Cirrus flying - not only is Alternate Air sourced from the lower-air-pressure bottom half of the engine, but it is also drawn from the hot air right above the exhaust port for cylinder #5 - almost certainly for the reasons you cite, to prevent freezing of the Alternate Air butterfly door. The combination guarantees a lower MP when using Alternate Air - or it *should*.
>
> The MP drop in the Cirrus is about 1" when the filter is clean (while at cruise speed and power). Pilots can (should?) use knowledge of the difference between manifold pressure at the "Normal" and "Alternate" air positions, when they have manual control, to assess the cleanliness of the air filter. In airplanes like the Cirrus, if the difference is less, the filter may be dirty.
>
> In airplanes where the Alternate Air is sourced via a ram duct, or just somewhere near the air filter but bypassing it, the GREATER the difference the more likely it is that the filter is dirty.

Great example, Mike, and thank you. Another Mike, reader Mike Busch, also writes:

> In a normally-aspirated Cirrus SR22, pulling manual alternate air DECREASES MP by about 1", despite the fact that the induction air filter is bypassed. The reason is that the induction air filter is mounted above the engine crankcase nose in the cold, high-pressure area of the engine compartment. When alternate air is selected, that air comes from the area below the #5 cylinder in the hot, low-pressure area of the engine compartment. The reduced ambient pressure and high temperature (low density) air reduces the pressure by noticeably more than the gain that comes from bypassing the filter.
>
> If memory serves, the same thing is true of the [carbureted] Cessna 182. (In this case, the control is called "carb heat" but it's really the same thing as manual alternate air by another name.)
>
> In both the SR22 and the C182, because pulling the knob increases induction air temperature and decreases induction air pressure, it causes a major enrichment of the mixture. [The pilot] has to compensate by pulling back the mixture control knob [leanig] to restore the desired mixture. The opposite is true when you turn push the [alternate air or carburetor heat] knob back in: You need to enrichen to restore an appropriate mixture.
>
> Some twin Cessnas have a two-step alternate air knob. Pulling it out to the "detent" provides cold alternate air. Pulling it all the way out provides hot alternate air. The POH says that if you select hot alternate air, you are supposed to depressurize the cabin because the hot alternate air source could be contaminated with carbon monoxide.
>
> There are a zillion different alternate air configurations. One definitely needs to read the POH. **Habits transferred from a different make or model could be hazardous to your health**.

And *that* was last week's *LESSON* about type-specific training. Thank you, Mike.

What do *you* think? Let us know, at Mastery.flight.training@cox.net

---

FLYING LESSONS supporter Bill Caton writes:

> I appreciate you being there for us.
> You definitely add value to the fleet and our investments in our airplanes!

It costs a great deal to host *FLYING LESSONS Weekly*. Reader donations help cover the expense of keeping *FLYING LESSONS* online. **Be a *FLYING LESSONS* supporter through the secure PayPal donations button at www.mastery-flight-training.com.**

Thank you, generous supporters

"The absence of an accident doesn't mean your [flight operation] is safe."

- Flight Safety Foundation president and CEO Kevin Hiatt, told to Aviation International News.

See www.ainalerts.com/AINsafety/021813.html

Do, as well as say

When I was a simulator instructor I was amazed at how often I could "fail" one of the three green lights of the landing gear indicator, and when the pilot extended the gear he or she would still call out "three green." Have you ever *said* you've done something, but not actually *done* it? It's called "making a rote callout," or going through the motions of confirming a checklist step but not actually doing the check. The NTSB has published a Safety Alert titled "Avoiding Rote Callouts" that identifies this common pilot habit, and suggests ways to guard against it. This is one of a series of quick NTSB Safety Alerts for aviation (and other modes of transport). Take a look!

See:
www.ntsb.gov/doclib/safetyalerts/SA_018.pdf
www.ntsb.gov/safety/safety_alerts.html

Share safer skies. Forward *FLYING LESSONS* to a friend.

Personal Aviation: Freedom. Choices. Responsibility.

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
