FLYING LESSONS for January 25, 2018

FLYING LESSONS uses recent 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 airplane have little direct bearing on the possible causes of aircraft accidents—but knowing how your airplane's systems respond can make the difference as a scenario unfolds. So apply these *FLYING LESSONS* to the specific 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.**

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This week's LESSONS:

Decision Points, part 2

The pilot of a high-performance, experimental/amateur-built aircraft (E/AB) departed from western Kansas shortly after nightfall. His intended destination was Santa Fe, New Mexico. The National Transportation Safety Board reports:

> According to preliminary information, the pilot departed under visual flight rules (VFR) and contacted air traffic control (ATC) for VFR Flight Following to SAF. The pilot subsequently told the controller that the airplane had encountered instrument meteorological conditions (IMC) and that the airplane was accumulating airframe structural icing at 9000 ft mean sea level (MSL). The pilot, who was instrument rated, requested an instrument flight rules (IFR) clearance to SAF. The controller issued a heading change and told the pilot to climb to 10,000 ft MSL; however, the pilot reported that he was unable to maintain altitude and declared an emergency. The final radar return was recorded 8.5 miles southeast of SAF at 300 ft above ground level.
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> According to Federal Aviation Administration inspectors, who responded to the accident site the following morning, the airplane had landed in rough terrain about 8 miles southeast of SAF. The FAA inspectors observed several accumulations of structural ice on the airframe and along the wreckage debris path.

See https://app.ntsb.gov/pdfgenerator/ReportGeneratorFile.ashx?EventID=20180117X23437&AKey=1&RType=Prelim&IType=LA

The flight track of the airplane is blocked on public sites as the direction of the airplane's owner. A direct route, however, would take the pilot over gradually rising flatlands until within less than 50 miles from the destination, then require a climb to over 14,000 feet to clear terrain. From the information provided it appears the pilot may have made a slight detour to the southwest, then through a pass that permits entry into the Santa Fe area at a much lower altitude. I've flown that route several times myself, and it's easy in a normally aspirated airplane at the 10,000-foot Minimum Enroute Altitude (MEA)…*unless* that airplane's wings are contaminated by ice.

It's reasonable to assume isolated clouds near mountains at almost any time. If the temperatures aloft support it, it's almost certain that any clouds in areas of mountains will contain ice. So while conditions in the pilot's preflight weather briefing (assuming he obtained one, or if he self-briefed, that he studied it fully) might have reported clear skies at all reporting points along the planned route of the night flight, that doesn't tell the entire story…especially in the microclimates of mountainous terrain.

Remember that METARs and TAFs—the reports that show up as little green (VMC), blue (Marginal), red (IMC) or pink (Low IFR) on tablet-based flight planners—are ***only valid within five miles of the reporting point***. The Graphical Area Forecast charts (which recently replaced Area Forecasts in the U.S.) might suggest cloudiness between reporting points.

More telling might be the Visible Satellite imagery, although it shows cloud tops, not bases. Once the sun's down the view is useless. I've never had much luck getting usable information from the Infrared satellite information at night.

Even better are the Current Icing Potential (CIP) and Forecast Icing Potential (FIP) charts. These products take the almost cult-status Skew-T Diagram information and add to it the temperature, humidity and other factors needed to generate a good idea of where icing might exist, and if so, at what intensity.

See:
https://www.aviationweather.gov/icing?gis=off
https://en.wikipedia.org/wiki/Skew-T_log-P_diagram

Whether the pilot reviewed all these items before flight and then made a decision to "go," we won't know. Even if he had, it's imperative that his plan should include an immediate diversion back to ice-free air in the event he encountered ice in flight.

The airplane in question is a canard-type airplane with a high-performance, laminar flow wing. Both these design characteristics are known to be more susceptible to disturbed airflow with even minor accumulations of ice than more conventional airplanes. I suspect, however, that given the evidence found the next morning by Federal investigators, that the ice load was sufficient to have created hazardous conditions even in a conventional, type-certificated airplane.

As we've seen so many times before, the pilot's proximity to his destination airport at the time he encountered icing may have enticed him to try to pick up an instrument clearance and continue inbound when he unexpectedly entered instrument meteorological conditions. That may be the ultimate *LESSON* of this event even if the investigation determines some other cause in this specific case:

> **Execution of your plan for escaping airframe ice or an unexpected instrument conditions encounter is independent of how close you are to your ultimate goal. *If you say you'll turn around at the first sign of hazardous conditions, you have to turn around even if you encounter those conditions* very near *your planned destination.***

Don't try to "sneak it in" if you're close to where you want to be. It didn't work for this pilot, and it probably would not work for you.

Comments? Questions? Let us learn from you, at mastery.flight.training@cox.net

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Thanks, Tom. Your impact on my personal flying techniques and knowledge is indispensable, and much appreciated. A rare educator is one in whom their learners not only have complete confidence, but also fun while learning. You set the bar. – Andrew Urban

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Can you do me a quick favor?

I'm evaluating whether to invest the time and money in the capability to host all back issues of *FLYING LESSONS Weekly* going back nearly 20 years in a paid-access web archive, and/or (finally) publishing a book compilation of The Best of *FLYING LESSONS*. To help me decide, I need everyone to please take this very short, three-question multiple choice survey. It should take you less than a minute to let me know how best to commit my time and resources, or if I should do so at all. Please take the survey. Now, to continue this week's report….

See https://www.surveymonkey.com/r/JMPCH7D

Debrief: Readers write about recent *FLYING LESSONS:*

Frequent Debriefer John Scherer writes about the last *LESSON* on Decision Points:

> I read with interest your article about decision points and the G35 Bonanza accident. My questions point to the decision before takeoff. Why not go IFR (since pilot was instrument rated)? That raises the question of single pilot IFR at age 78 at night. I'm 65 and have been flying for 49 years now. I would not consider a night IFR flight single pilot. Why not go in the daytime? And your points about having an escape route are also critical. Know the IFR MEA if you're VFR. If instrument rated, **commit to avoiding the IMC or have a plan to climb, declare an emergency** and get an IFR clearance. This accident is disturbing to me. I think the decision in this flight should have been made before takeoff. Thanks for your great articles!

See http://www.mastery-flight-training.com/20180111-flying-lessons.pdf

Reader Steve Guetter writes:

> You are right on about continued monitoring of a flight while in the air. We sometimes say "plan your flight and fly your plan." This is fine as long as we acknowledge that **our plan may change along the way**. Usually a few times a year we will do a cross country of over 1,000 miles (usually to escape the cold of Minnesota). Flying long distances in the winter months can present many challenges including winds, icing and widespread areas of low IFR conditions. We have found that the past laid plans put in place less than 24 hours before departure are subject to change. The plan is just that, a plan. **A pilot must not hesitate to make a change to the plan when conditions are not what was expected**. This is basic to the Aeronautical Decision Making (ADM) model.

Absolutely correct, Steve. Be ready to exercise an alternative at the first indication of the need to do so.

Reader Howard Johnson adds:

> Because it was night, single engine, I would have been at happy hour instead. But in daylight, I would have done the 180 [degree turn] when it was apparent that the climb to 7100' wasn't going to work.

That was my main point, Howard: day *or* night, when approaching any potential hazard (and at night, anything requiring visual detection is by default a potential hazard), you need to have an escape plan in case the hazard presents itself. **If that plan does not result in escaping that hazard, then it puts all your hazard avoidance strategy in question.** At that point, you (should) have no choice other than turning to improving conditions and then getting the airplane on the ground until you can gather more information and formulate a new plan: to divert, delay, or cancel. Weather avoidance is not something to be making up as you go in flight.

Reader Alistair Moon chimes in:

> The Jan 11 *LESSON* triggered the memory of an occasion when "I learned about flying."
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> Late 1980s, flight from Denham (west of London, UK) to Cannes, France. 4 seat Cessna with retractable gear. Pilot - old, bold (one of the very few); co-pilot - me, ex-military pilot, 10 years out of current flying practice. Rear seats - our wives. Pilot filed flight plan for Lyon Bron, with alternate of Cannes. We set off under a 2600ft cloudbase - not a problem as we were VFR and had to stay below the London TMA (Class A, 2500ft base) - but as we progressed the weather improved, such that by the time we were close to Lyon, we had climbed to 7500ft, ceiling well above and were cracking along at a TAS of over 170kts.

> During the previous few days there had been an occlusion sitting over Barcelona which had been TIPPING down with rain.
>
> Over Lyon, old, bold pilot diverts to Cannes - 45 minutes flying, therefore legal.
>
> As we progress towards Cannes, **the mountains come up and the cloud comes down**. To add just one more straw to the camel's back, we were **using the loudspeaker for the radio**, without headsets. The **rain starts**, because the occlusion has moved north and is positioned between Lyon and Cannes. There we were, at 10,000ft, **rain on the canopy so loud you could hardly hear the radio**, me in the right-hand seat as pilot flying, trying to remember how to fly on instruments (on the left), and pilot (non-flying) managing the situation.
>
> ***Fuel decreasing, weather still deteriorating***, we ended up doing a very dirty dart down the Rhone valley and landing at Marseilles ("VFR monsieur?" "Well, marginal!") to refuel and continue along the low level route to Cannes. On to the hotel, large gin-and-tonics and on to the dinner we were hosting to start our day's work!
>
> **"Press-on-itis" ruled that day.** How very easy to see in hind-sight that the simple thing to do was a 180° back to Lyon, before it was too late. I know not how much attention my pilot had paid to the meteo [weather briefing] before we left, but on the way back I took a VERY keen interest in the METARs and TAFs. And I never rely on a diversion to make my destination, and those diversions tend to be nearer than my destination. Nowadays, mindful of that learning experience, I tend to plan my trips to death at least the day before. Luckily, in the southern part of France the weather is usually good for VFR flights.
>
> I hope this is of some interest to you, even if a bit long.

Indeed it is interesting, Alistair. It's a great example of how pilots set out with seemingly logical and manageable plans, then allow themselves to continue onward to fit those plans even when the conditions outside get worse. ***That's* how pilots get into trouble, by putting their goals and preconceptions ahead of realities.** Thank you for sharing your experience.

Long-time reader Mike Busch also writes:

> *FLYING LESSONS* for January 11, 2018. That's why, in the nearly 50 years since I earned my instrument rating, I've never flown VFR at night and hardly ever flown VFR during the day (unless I was just going around the pattern to warm up the oil prior to draining it). *It has always puzzled me why so many pilots who are instrument-rated fly VFR if they possibly can. That's certainly not a good way to keep your instrument skills current.* Heck, I pay lots of taxes to support our ATC system and national airspace system, and I figure I'm damn well going to use all the services they have to offer. Plus, flying IFR is just soooo much easier; I never have to worry about TFRs or special-use airspace, because the dude on the ground is handling all that stuff for me (and I pay him a handsome salary to do that). He also tries to keep me from hitting anything made of granite or aluminum or convection, which is comforting. Flying VFR is just too much work for my taste, and flying night VFR is nuts.

A lot of pilots I know fly IFR whenever possible. I'm one of them, primarily to keep myself current flying in the system, as well as the added safety benefits of someone on the ground helping watch over me (although I'm still the one in charge of hazard avoidance). One note: history shows that controllers are not required to keep you separated from TFRs (Temporary Flight Restrictions). There have been several cases where pilots were held responsible for TFR violations even when under positive control. Further, controllers are not required to prevent you from flying procedures, notably in this case, instrument approaches that are not authorized at night. It's still our job to determine whether we're permitted to fly a certain procedure. That all said, flying "in the system" is an added layer of protection that may help.

Of course, many nations do not permit VFR operations at night. Others, like my friends in Australia, do allow nighttime VFR, but require a specific pilot rating to do so. The Australian Civil Aviation Safety Authority (CASA) Nighttime VFR rating requires the pilot have at least 10 hours of dual night instruction, including at least five hours of dual night cross-country; and also log instrument dual instruction. The VFR – Night Rating test requires the pilot to demonstrate mastery of these tasks:

> (a) manually performing the following manoeuvres **solely by reference to the instruments**:
>
> (i) recovery from unusual attitudes (not required for airships);

(ii) normal turns of at least 180 degrees left and right;

(iii) climbing turns to a pre-determined altitude at a constant speed;

(iv) descending turns to a pre-determined altitude at a constant speed;

(v) straight and level flight;

(vi) climbing and descending;

(vii) in the case of single-engine helicopters, autorotative flight with power recovery; and

(b) **using visual clues** at night through the following manoeuvres:

(i) take-off, circuit and landing;

(ii) baulked approach;

(iii) in the case of multi-engine helicopters, cruise flight in the reduced power configuration (simulated 1 engine inoperative);

(iv) in the case of multi-engine aeroplanes or airships, asymmetric flight in the cruise configuration; and

(c) correctly manipulating the **radio navigation** aid or aids for which endorsement is desired and demonstrate proficiency in:

(i) interception and maintenance of a designated track to and from a station; and

(ii) orientation problems; and

(d) **navigating at night** by visual reference both with and without the assistance of radio navigation aids.

Pilots seeking the VFR – Night Rating musrt demonstrate these maneuvers "with no sustained" deviations from these completion standards:

a) Heading: ±10°;
b) Indicated airspeed ±10 knots of a nominated speed;
c) height ±200 feet.

See https://www.legislation.gov.au/Details/F2005B00858

That sounds like a very wise minimum standard of training for night VFR flight, whether or not the regulations under which you fly require you pass a checkride to do so.

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

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

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Thomas P. Turner, M.S. Aviation Safety
Flight Instructor Hall of Fame 2015 Inductee
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year
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