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FLYING LESSONS for October 9, 2025

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 most 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 in your success as the 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

Things I Won't Do: Airframe Ice

We all want maximum utility from our airplanes. Instrument pilots don't want to limit flight to VFR-only operation in the colder parts of the year. Most *FLYING LESSONS* readers are where the icing season is just beginning. My Southern Hemisphere readers are near the end, but the season's not done yet. Wherever you fly it's good to review personal minimums and the legalities of flight in suspected and "known" airframe icing conditions.

See https://www.faa.gov/newsroom/safety-briefing/personal-minimums-worksheet

Although recent years have brought us tremendous advances in icing forecasts there is still no Stormscope or StrikeFinder equivalent for airborne ice detection. **You don't know you're in it until you are**, ***and* you can't predict how heavy the ice will be** until it accumulates.

According to FAA Advisory Circular (AC) 91-74B, "Pilot Guide: Flight in Icing Conditions" (with my emphasis added), a "thin ice accretion on critical surfaces, developing in a matter of minutes, can sometimes have dramatic **effects on *stall speeds*, *stability*, and *control***. Wind tunnel testing indicates that if such accretions are particularly rough, they can have more adverse effects than larger accretions that are relatively smooth." That, and the fact that ice is very unpredictable and varies rapidly, is the hazard of flight in clouds and visible moisture when the temperature is near or below freezing.

See https://www.faa.gov/documentlibrary/media/advisory_circular/ac_91-74b.pdf

So how can you get maximum utility from an airplane not certificated for ice when flying in cold-weather conditions? Here are some strategies:

- Fly VFR and remain clear of all clouds and precipitation.
- If you elect to fly IFR, avoid flight in clouds and liquid precipitations when in freezing temperatures (from about +5°C to -15°C in stratus clouds, and as cold as -40°C in cumulus).
- Ask for block altitudes or request a VFR on Top clearance to remain in ice-free air, but only if you can climb and descend to those altitudes without entering clouds in the ice-likely temperature range.

If you're flying a "known ice" airplane you have greater flexibility. But just as exercising an instrument rating requires more decisions in the "grey areas" than face a VFR-only pilot, so too

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must the pilot who can legally venture into ice make more decisions than the pilot of a non-ice airplane.

See https://rosap.ntl.bts.gov/view/dot/71212

Either way, as you exercise your strategy consider:

- Even if your airplane has the power to climb through ice, eventually you may have to come back down into it.
- Take icing PIREPs seriously. If you have an encounter file icing PIREPs yourself, so the system works for the next pilot.
- Even in "known ice" airplanes, treat the first wisps of ice accumulation the same way you'd react if you unexpectedly heard the stall warning horn—**do something NOW** to eliminate the problem. Climb, descend, or turn to ice-free air.
- Any mention of "SLD", or supercooled liquid droplets, means enough liquid moisture is suspended in the atmosphere to invalidate even "known icing" certification. SLD potential you cannot fly around, or under at temperatures above freezing, is a no-go item.
- Figure icing delays or cancellations into your trip planning. Pre-plan for scheduling flexibility and you'll be less likely to be pressured into making a bad decision.

Why might airframe ice form when the outside air temperature is as high as +5°C? Ice will form when ***the surface of an object*** is below freezing and encounters liquid moisture. If the wing and tail are cold-soaked from flight in below-freezing air, ice may collect when descending into clouds or moisture even that is slightly above freezing. Also, the temperature frequently drops several degrees when you enter a cloud. If you're in clear air with the outside air temperature (OAT) slightly above freezing, it can be below freezing as soon as you enter a cloud at that height. For both of these reasons, anticipate the possibility of ice even when the OAT is as high as 5°C.

You wouldn't fly into a line of towering cumulus that is alive with lightning and extreme precipitation; you'd fly completely around it, delay your trip or cancel altogether. That's a reality of flying during thunderstorm season. **Icing is exactly the same—*except*** we have no good way to actually detect ice's location, type or intensity. So we have to be even more conservative to avoid encountering ice.

The two best products for flight planning are the Current Icing Product (CIP) and Forecast Icing Potential (FIP). Both are available at **https://aviationweather.gov/gfa/#ice**.These products supplement any AIRMETs and SIGMETs for areas of ice, and PIREPs (pilot reports) of actual conditions encountered in flight, whether positive or negative for ice.

The CIP provides a graphical view of the current icing environment. The CIP is updated hourly and provides reports of actual, current icing conditions including severity graphics and icing probability graphics. All graphics display icing severity in five levels consistent with those used in other weather reports: *negative (none)*, *trace*, *light*, *moderate*, and *heavy*. These severity levels depicted are not specific to a type of aircraft or flight condition. The FAA says, "they are only intended to depict general icing conditions for supplementing flight planning and situational awareness."

The FIP is a forecast of icing potential. It examines prediction models to calculate the potential for in-flight aircraft icing conditions. This icing potential demonstrates the confidence that a location will contain supercooled liquid water that is likely to form ice on an aircraft. In addition to predicting areas of possible trace, light, moderate and heavy ice accumulation, it also includes hatching when SLD is a threat.

You can select the overall severity model, with or without SLD, areas of less than 25% chance of ice (bearing in mind that ***even a 1% chance is still a prediction of ice***), and less than 50% chance—with each option having separate charts in 2000-foot increments above sea level.

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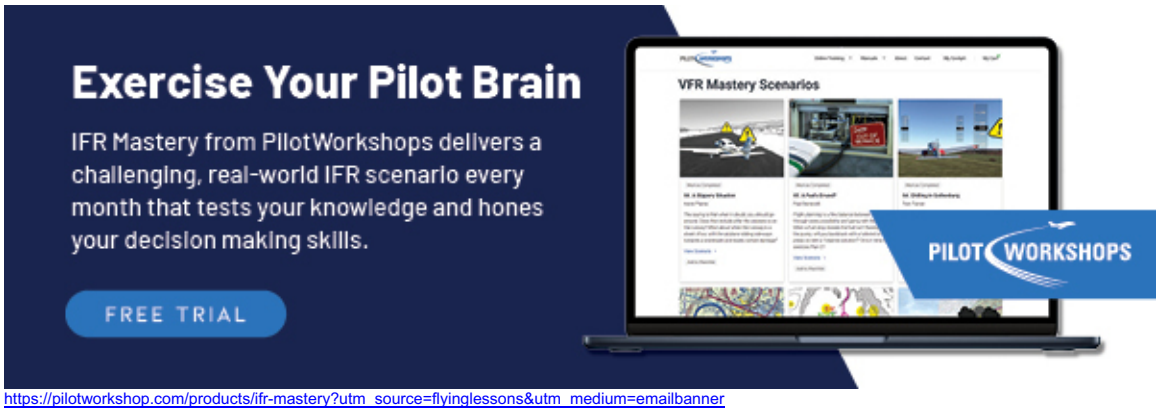
Both the CIP and FIP combine other weather products, including the Skew-T diagrams frequently cited in online discussions of ice prediction, in a format that includes much more information and graphically depicts the results in an easily readable image.

Most *Pilot's Operating Handbooks* carry the limitation "Flight into icing conditions is prohibited." This limitation is not negotiable—meaning that yes, most of us are prevented from IFR flight during the cold months. The good news: it's often VMC in the wintertime. And warmer weather is only a few weeks away.

My personal strategy? I plan around icing conditions—not *just* known ice but suspected also—the same way I plan around thunderstorms: in airplanes not certificated for flight in icing conditions I stay **clear of clouds** when the air temperature is in the icing range. Flying in ice without the equipment to do so safely and legally, or flight in SLD or remaining in ice for extended time in a "known ice" aircraft, are **things I won't do**.

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



https://pilotworkshop.com/products/ifr-mastery?utm_source=flyinglessons&utm_medium=emailbanner

Debrief

Readers write about recent *LESSONS*:

Reader Bill Audenaert writes about last week's *LESSONS* and flying in the aftermath of a bird strike:

> I wear tinted safety glasses that wrap around the sides and include a strap. My hope is that these glasses would stay on or at least still be around my neck if I had a bird penetrate. They would help my eyes deal with the airstream. As a prior Air Force maintenance officer, we had a B-52G out of Castle AFB hit three geese at low level and the crew made it back with two cockpit and one wing root penetration.

That's a good idea. I wear prescription glasses so safety glasses become quite cumbersome. I carry a spare pair of glasses in my flight bag in case my primary pair is damaged or knocked off and lost. I'm not sure how much protection prescription glasses provides or if they are more of a hazard. Thanks, Bill.

Reader/instructor and frequent Debriefer Brian Sagi adds:

> I would like to touch on **how to assess the capability of the airplane** to fly following an airborne mishap. The military uses a procedure called ***controllability check*** to assess an airplane's ability to fly after sustaining damage or suffering an in-flight malfunction.
>
> Here is the [U.S.] Naval Air Training and Operating Procedures Standardization (NATOPS) procedure, which I edited to be more applicable to general aviation aircraft:
>
> 1. *Climb as required (5,000 feet AGL recommended), maintaining flying airspeed while proceeding toward the point of intended landing.*

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2. *When possible, obtain a visual inspection by another aircraft to assist in evaluating the damage. [Not recommended, unless both you and the other aircraft have prior formation flight training.]*
3. *Slow the aircraft to [insert appropriate Vle gear speed for your aircraft] KIAS in 10-KIAS increments.*
4. *Landing gear – DOWN.*
5. *Slow the aircraft in 5-KIAS increments; slow to an airspeed at which flight controllability starts to become marginal (no slower than Vapp). Increase airspeed 10 KIAS and use as a minimum airspeed for the duration of the flight.*
6. *If no damage is evident in the flap area, extend the flaps to ½ then FULL and check controllability as in (5) above. Flap extension is at pilot discretion.*

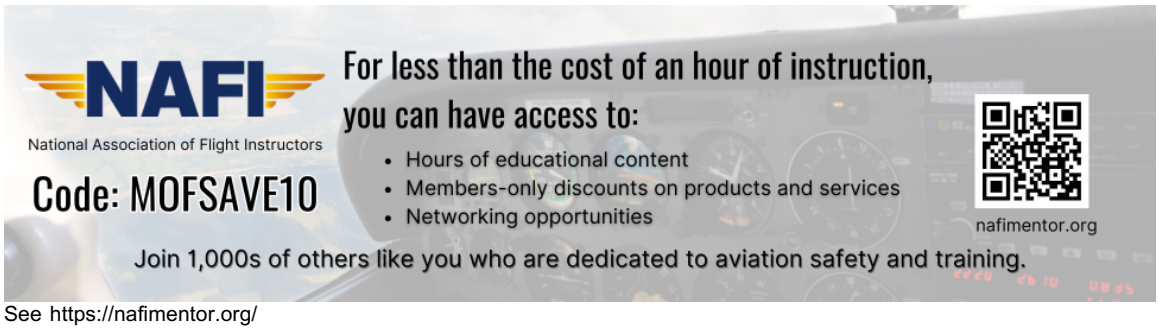
Aircraft control is tested in both straight and level flight, in shallow bank (~10-15° angle of bank) turns in both directions and, if satisfactory, in higher bank of 20-30° angle of bank turns in both directions. Any asymmetry is noted. Flight control is considered marginal if more than ½ roll (yoke/stick) input and/or ½ yaw (rudder) inputs are required to fly.

Thank you again for all you so for aviation safety!

Thanks for your thorough response (and for keeping me from having to quote the NATOPS controllability check). I appreciate it, Brian!

See https://navyflightmanuals.tpub.com/P-1242/Procedures-Controllability-Check-132.htm#google_vignette

More to say? Let us learn from you, at **mastery.flight.training@cox.net**



See https://nafimentor.org/

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