What weather conditions would cause you to stay on the ground as an IFR-rated pilot?

When many pilots first get their instrument ratings, they have a tendency to feel they can now fly their airplane like an airliner. And it is true that while the safety record does not necessarily improve with instrument rated pilots, they do get a lot more utility out of their airplanes.

But there is a limit to the amount of utility you can get and still have reasonable safety. Dick Smith, who was head of Australia’s version of the regulatory part of our FAA, frequently commented that it is impossible for a piston airplane to achieve the level of safety of jets under the same conditions. “Safety equipment weighs too much and costs too much to be able to make a piston airplane the utility and safety equivalent of an airliner,” he said.

For instance, even though a piston aircraft may be certificated for flight into known icing conditions (FIKI), not all deicing systems are equal. High-performance jets have heated leading edges that are so hot they vaporize any moisture that touches them. Their deicing systems are very, very effective. That’s why you just don’t hear about icing accidents in jets.

On the other hand, the best-equipped piston airplane will simply not be able cope with some icing conditions. Even a more capable turboprop aircraft certificated for flight in known icing conditions doesn’t have either the power or the systems to cope with all icing conditions. For example, in 1994, a turboprop commuter airliner (an ATR-72 certificated for flight in known icing conditions) crashed in Roselawn, Indiana due to icing.

So one of the things that would cause me, as an IFR pilot, to stay on the ground in a piston airplane is icing, when I can’t come up with a reliable strategy to avoid it. You don’t want to be boxed in by a combination of visible moisture, freezing level, and terrain where you can’t quickly get out of the ice. Even if I had FIKI, to go I would have to be certain that I had a strategy to quickly get out of any ice I might encounter.

One other thing about avoiding icing, it is not a good idea to try and fly over the top of cumulus clouds. They grow quickly and that’s where the super-cooled moisture and the worst icing conditions are.

In addition to having better deicing systems, jet airliners have higher wing loading, which makes them naturally safer around thunderstorms. The wing loading of a 737-800 is 130 pounds per square foot, while on a high-performance piston airplane, like a
Bonanza or a Cirrus, it is only 20 to 25 pounds per square foot. This means that any gust of wind or vertical shear has at least five to six times the effect on the high-performance piston as it does on the Boeing, making the piston airplane five to six times harder to keep in control in thunderstorm-induced turbulence.

So another thing that would keep me on the ground is thunderstorms when I don’t have a rock-solid, 100% way of avoiding them. The turbulence in a thunderstorm is unbelievable and indescribable. You can’t even keep your arms under control. The turbulence flings them all over the cabin. The panel shakes so badly that the instruments are an unreadable blur. In a thunderstorm, even the most skilled and experienced pilots are relying on luck that they don’t lose control of the airplane and overload it before they fly out the side of the cloud.

It is hard to imagine anyone more skilled and experienced than Scott Crossfield, the first man to fly at twice the speed of sound. Yet he lost control of his Cessna 210 and struck the ground after getting into a thunderstorm while being vectored by a controller. As demonstrated by this accident, it is not a good strategy to rely on a controller as your thunderstorm avoidance tool. Their equipment really isn’t suitable, and although staying out of the thunderstorm is your top priority, it isn’t theirs.

So I will never plan to fly a route with thunderstorms in the vicinity unless I have a solid plan for avoiding them. I must be able to see them. If they are imbedded in clouds or it is night and I can’t see them, I must have on-board radar. Because of the delay built-in to Nexrad, it is not a suitable substitute for on-board radar, except as a tool to stay completely away from the vicinity of thunderstorms. So if the visibility won’t allow me to see the thunderstorms and I don’t have on-board radar, I would either divert around the storms or cancel my trip all together.

Another thing that would keep me on the ground is a trip that would require me to fly IFR over a mountain ridge in strong winds. It doesn’t take much of wind over a ridge to create a downdraft that piston airplanes can’t out-climb. There are a half-dozen or so airplanes on Vulcan Mountain in Southern California that are testaments to that fact. Most of them have wound up on the mountain on a night IFR trip in strong winds. Add the probability of downdrafts and icing together, and you might conclude that flying a piston airplane over mountain ranges like the Sierras or the Rockies during a snowstorm is not wise.

One other circumstance that could cause me to stay on the ground is an IFR flight over a widespread area of terrain or low ceilings where I couldn’t land if I had problems. I have
put myself in enough bad situations to realize that it is just not a good idea to put myself in a situation where I might run out of alternatives.

It sounds like there are a lot of times when I wouldn’t be willing to fly IFR. Actually, these circumstances don’t come up all that often. If one of these situations does come up, the free time that has just been handed to you will give you a great opportunity to have a party and celebrate the fact that you are hale, hearty, and a wise IFR pilot who is avoiding a lot of risk and stress.