Thomas P. Turner's
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FLYING LESSONS for August 28, 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:

"Re[garding] your *Twin and Turbine* article ["Twins: The Other Advantage," August 2025]," Brad Wolansky wrote:

> My wife (not a pilot) continues to question me with unbelieving tones about why our Seneca V is unable to haul 6 adults, with luggage and full fuel. Her logic is if Piper built a 6 place airplane, and the capacity to hold 122 gallons, one would think the plane could fly with all 6 seats occupied…and a little more (luggage). Not so much I tell her. The tradeoff between fuel hauling and payload hauling seems to be always the case in piston twins. Yes, they carry more. But not as much as a non weight-and-balance person may think.

I replied: Hi, Brad: One would think. But as you know, the engineers design a great four-place airplane with tons of baggage space, and the marketers say, "you know, there's room for another couple of seats." That thinking is not limited to twins.

Brad continued: [I'm] still looking for a compact way to convince my wife. She thinks I'm mis-using ForeFlight weight and balance.

And I responded: Aircraft manufacturers design their products to give airplane owners and pilots as much flexibility as possible. This is most notable when making **tradeoffs between *payload, range* and *performance***. If an airplane is **loaded reasonably lightly** most designs provide enough **extra fuel capacity** to permit pilots to fly a greater duration (therefore usually, more distance) without refueling. If payload is the major consideration **most airplanes allow you to fill the seats with a reduced fuel load** and still fly two or three hours with safe reserves.

Lighter airplanes perform better, and especially in the case of light twins single-engine performance and safety margins are increased dramatically with even a relatively small reduction in airplane weight.

The distribution of that weight is also a consideration. To be controllable an airplane needs to be loaded so its center of gravity is within an allowable range fore and aft. In an airplane like the Seneca that range is generous, but too far forward or aft and the airplane becomes difficult to control. Taken to extremes an out-of-limits CG makes the airplane impossible to control. Within the allowable range if the center of gravity is toward the aft end the airplane rides rougher in turbulence but flies a little faster; if the CG is forward within the "loading envelope" the ride is more stable at the cost of a few knots of airspeed. Rearward CG also has negative effects on single-engine performance in the event you need to take advantage of the ultimate benefit of multiengine airplanes.

Everything is a tradeoff. The pilot in command must ***choose* the utility desired** for a particular flight—payload vs. fuel, range vs. cabin load, climb and single-engine performance vs. cruise endurance—and load the airplane to **maximize the desired utility of that flight** while retaining adequate quantities of the others. Programs like ForeFlight and other app-based loading and flight planning software make it easy for pilots to quickly and accurately determine the airplane is loaded properly for maximum utility, performance and safety before every flight.

See https://www.twinandturbine.com/twins-the-other-advantage

This exchange reminded me of an article I wrote for the recently-defunct'd *Aviation Safety*:

The Myth of Utility

Not a winter goes by without someone sending me an email that includes the sentence "You aren't really suggesting I don't fly my airplane in IMC in the winter?" It's usually from the pilot of a very capable piston single or light twin that is not certificated for flight in icing conditions; often the pilot includes something like "I live in the Great Lakes and we get icing a large part of the year." Sometimes I get a similar question about passenger and baggage loads. "The engineers at [insert airplane manufacturer name here] wouldn't have designed the airplane with six seats if it couldn't carry six adults, or at least four adults and two kids. Do you really mean I can't fill the seats and the fuel tanks?" A current trend is questions about synthetic vision systems in glass cockpit panels or cutting-edge heads-up displays. "With an essentially VFR depiction of the runway, I can make a zero-zero takeoff and even a zero-zero landing 'if I have to', can't I?"

A lot of authors fill a lot of column-inches and web pages with detailed explanations of how to fly IMC in potentially icy clouds with little or no ice protection. Much instructional time and chat line space is devoted to techniques for managing fuel and baggage load to operate at the very edge of the weight and balance envelope, sometimes with a wink and a nod toward flying "a little outside" the approved limits. The ability to land with synthetic vision systems regardless of cloud ceilings or visibility is one of the hottest topics of discussion on the aviation chat lines.

And yet as someone who reads and considers every general aviation accident report that comes across the FAA and NTSB websites I've come to a very unpopular conclusion: when asked "do you mean I can't fly IMC in the winter, or with the seats and the fuel tanks filled, or to a landing below minimums even if the runway is right there in front of me on the synthetic vision system?" by answer is…*yes, that's what I mean*.

Why is this such an unpopular stance, even backed with two decades of studying mishaps and thinking about ways to avoid them? Because like all cultures, our society of pilots has developed its own set of stories and myths. One of the most pervasive of all among general aviation pilots, especially those who fly Part 91 operations for recreation, personal travel or business, is what I call The Myth of Utility.

Utility: Origins

The Myth of Utility states that the expense and upkeep of an airplane is justified because we can do so many things with it, and it improves the quality of our life or the success of our business. It's popular in myths to develop a short, detailed and often quite improbable "origin story" that explains how a frankly absurd character or situation is acceptable and even "normal." Like Superman's destroyed home planet Krypton and our dense yellow sun, or Spiderman's bite from a radioactive spider, there is an origin story to our mythic belief that general aviation airplanes have something called "utility." When as pilots we buy into this myth, we're setting ourselves up for asking more from the airplane than it is able to deliver.

I believe there are three distinct components to the myth of aviation's utility: aircraft and instructional sales, personal economics, and pilot ego. Let's take a look at each.

<u>Sales</u>

Each airplane manufacturer may have entered the business out of a love of airplanes and the people who fly them, but the firms that survive are those that quickly learn they have to do

whatever it takes to keep selling airplanes. It's a cutthroat market out there. A very small percentage of potential airplane owners can afford to buy an airplane purely for recreational use. Most need to have "justification" for such an expensive combination of acquisition and ongoing support and operational costs.

That justification usually comes in the form of either "take the family to Grandmas," "look at the range of weekend recreational opportunities the airplane opens for you and your family," or "add to your business' bottom line and serve your customers better than the competition by flying your own airplane while they're stuck on the highway below." Corollaries to these marketing tag lines include emotional appeals like "live the [insert airplane manufacturer's name here] lifestyle," "visit three customers in a single day" and "be home from the business trip in time for the Little League game." This utility argument isn't made solely by the manufacturers and sellers of airplanes. It's also central to the presentations of flight instructors and others who promote the business of learning to fly.

Sales staffs and airplane modifiers give us visions of increased utility without showing the tradeoffs that permit its use. For example, even when one manufacturer's airplanes were suffering industry-leading fatal accident rates, most in adverse weather, it heavily promoted its product with the marketing line "Life without delays or cancellations." This was an appeal to the airline business traveler who might prefer to travel by personal airplane, but it was also proclaiming (as least subconsciously) that its products could be flown at the pilot's whim regardless of the weather. Ironically, most airline delays and cancellations are because of weather.

Manufacturers must sell airplanes to keep our industry alive. Instructors and aviation promoters have to make flying as attractive and useful as possible to justify the required investments in time and money. We all need the factories to sell new airplanes to help support the aircraft already in the fleet.

In any economy, but especially the last 15 to 30 years, marketers must be creative and aggressive to move units out the factory door. The major strategy for almost all in the industry has been to promote the "utility" of personal aviation. I guess it's up to us and "buyer beware" to read between the lines and, more importantly, read the *Pilot's Operating Handbook* to determine how much of that utility is usable under what circumstances. It's our job to determine which compromises we must make in payload to get range and performance, for instance, or in range and performance in order to get the greatest payload capability.

Economics

By economics I mean the financial aspects of buying, owning and operating an airplane as they impact a family's budget or a company's bottom line. Some economic concepts are beneficial in a real sense—bonus depreciation, for one. Others, however, are less objective.

This probably isn't the first time you've heard any of the marketing phrases discussed above to whet your desires to own an airplane. Be honest—if you own an airplane now, you probably used at least one of these approaches with your family or the chief financial officer to justify the expense. But you probably felt just a little bit dirty in doing so, too.

And yet we use the arguments to substantiate the costs. Our chosen airplane can do it all. We load up World War II-era light taildraggers and modern LSAs with miniature glass-cockpit displays that give them more cross-country navigation and weather capability than the Delta Airlines DC-9 I rode to Atlanta last month. We spent huge sums of money to get just a little additional weight-carrying capability (gross weight increase STCs seem to run anywhere from $15,000 to $20,000 for each additional 100 pounds' increase) instead of homework with the weight-and-balance charts. We expect every airplane to be able to fit every mission—it *has* to, to justify the expense to ourselves, our family or our accountant. And that assumption often gets a pilot—and his or her passengers, and sometimes even people on the ground—killed.

Ego

Lastly, we want "bragging rights" to say our airplane can do it all, whether "all" means the combination of load-hauling and short-field work, or a fast, low-wing airplane used for pipeline

patrol (which screams out for a high wing and a low cruising speed), or a serious IFR airplane that also does aerobatics (that's a conflict in stability design goals). We buy the high-performance retractable-gear airplane or a light twin when our typical flight is more in Cessna 172 or Light Sport territory. We take airplanes that aren't certificated for ice into icing conditions. We want to fly aerobatics but don't fly an aerobatic airplane.

Several times I instructed the owner of an extremely well-equipped light twin who only flew outside the immediate airport area when I'd come to town for his recurrent training. Although it didn't make sense to me, he wanted to fly a twin. Hey, he could afford it, and he put in the time needed to stay current—who am I to say it was wrong? It's a benign example, however, of what can lead to a very risky attitude if taken to other extremes: flying an airplane that doesn't meet the mission.

Choose your utility

If you read this far you're probably a little angry at me for "turning traitor" and exposing flaws in the justifications of owning and flying an airplane. Yet I'm a huge fan of getting the most out of general aviation airplanes, and I travel by personal aircraft whenever I possibly can. I do so by choosing "the" utility I need for the specific flight.

The myth of utility becomes a bad thing if you think the airplane can achieve *all* its maximum capabilities on a single flight. Any given airplane presents a wide range of capabilities. For any give flight we must choose which utility we value most—and make the sacrifices necessary in other areas in order to achieve the goal. For instance, using the short runway at a fly-in resort means landing and taking off at the lowest possible weight…even if that means you can't fly there or back non-stop, or you have to ship you suitcases ahead instead of bringing them along in your airplane. I can have payload, or I can have range…but I can't have both on the same flight. I can have personal-airplane scheduling flexibility, but only if I remain clear of weather that's outside my airplane's envelope.

Everything has tradeoffs. No airplane will do it all. For a much greater chance of a long, safe lifetime of flying, strictly observe the airplane's limitations—they, not the marketing hype or your personal desires, define what the airplane can do. In other words, fly the airplane you're flying…not the airplane you wish it to be.

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

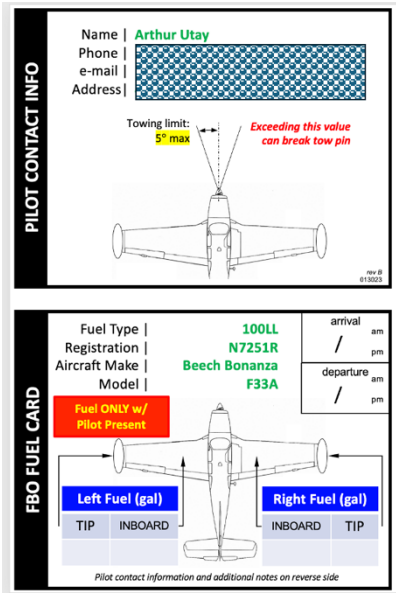
Debrief

Readers write about recent *LESSONS*:

Frequent Debriefer Art Utay wrote about last week's *LESSONS* stemming from a fuel exhaustion accident:

> Your comments about ensuring correct fueling this week are on the mark. However, I'll up your comment, "**It's always preferable** to be physically present as your airplane is being fueled" to ***"it's absolutely required."***

> Whenever my plane is refueled, it's either me doing the fueling, or I'm supervising. When RON [remain over night], I leave specific written instructions that **fueling is not to occur unless I am present**.
>
> A few years ago, Beechtalk had a post highlighting info cards for FBOs to ensure clear communication. I took the idea and enhanced it as shown. These two-sided cards contain important information for the FBO, so there's no assumptions on the FBO staff. I print these on perforated card stock (4 per 8 x 10 page) and keep a stack in the glovebox of my F33A. As you can see, I highlight in red fueling instructions, even as I alert the facility as to how much fuel I might require.



Very thorough, and very wise. I almost always remain at the airplane at least until I know the proper grade of fuel is being loaded, and the fueler is observing fueling limitations (inserting the nozzle no more than three inches into the tank, etc.)…and leaving *only* if I've ordered the tanks to be topped off, which I can easily verify with my pre-departure visual check. I say *almost* because there are always times, such as when I'm working at fly-ins and air shows, when you don't know precisely when the fuel order will be carried out and I have professional obligations I can't ignore. In these cases too I always ask for the tanks to be completely filled so I can verify the fuel order was completed as I requested. That said, virtually all of the time I'm there when fuel is added. Thanks, Art.

Australian instructor Edgar Bassingthwaighte adds:

> On fuel level checks: I always lifted the fuel caps before boarding, and also on intermediate stops did a brief walk around to check the aircraft was clean. Of course on many aircraft with caps well outboard on long tanks you won't see anything unless full. So my motto was: **Never completely believe your fuel gauges unless they say "Low" (or "Empty"). In that case assume they are 100% accurate!**

Also very wise. Thank you, Edgar.

Reader John Majane continues:

> I never let my plane be fueled without being there. The main reason is with the old Bonanza they will **fill the aux[iliary] tanks and overlook the mains**. The other reason is to ensure it is **fueled correctly** and **damage free**. If I have to leave after landing I take care of refueling when I come back. It is just a good habit. I always visually check the tanks for quantity even though in 99% of the cases I am the one who refueled when last used. **When I was a line boy I was kind of surprised at how many pilots didn't check the fueling process**.
>
> Also I always checked first to **make sure the ignition keys were out** of the ignition switch. I cannot tell you how many times a pilot left plane with the mags on.

Yes, with more than a simple left wing/right wing fuel tank system there is much more chance for error that the pilot must help prevent. Great advice about the magneto switches also. Thanks, John.

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

See https://nafimentor.org/

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

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Thanks also to these donors in 2025:

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