

# Thomas P. Turner's Mastery of Flight

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## FLYING LESSONS for May 2, 2024

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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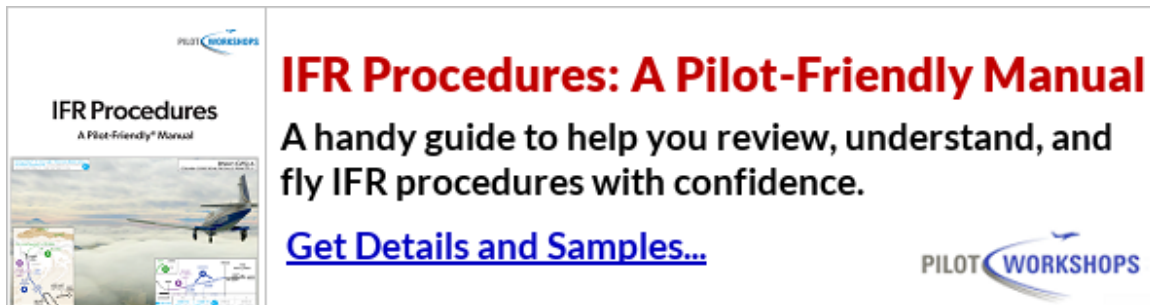
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### This week's LESSONS:

Several FLYING LESSONS readers wrote in response to [last week's LESSONS](#) that resulted from my thunderstorm-driven abort and return to base. Let's read their experiences and insights by going straight to the Debrief.

See <https://thomaspturner.com/wp-content/uploads/2024/04/2024.0425-FLYING-LESSONS-1.pdf>

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### Debrief: Readers write about recent FLYING LESSONS:

Reader and retired TWA captain Tom Rosen writes:

**Airline:** [I] never returned to point of departure except for a mechanical or emergency issue. Diverted to alternate many times due to poor weather at destination, usually after a long hold or it was obvious we weren't going to be able to land.

**Bonanza,** over 50+ years: During the first 20 or so years and 1,500+ BE35 hours, and lacking experience, judgement or poor weather forecasting, I usually launched but occasionally diverted to one of my "back pocket" out airports. Often spending the night or even two before proceeding to destination. Probably six or so times during those years. After learning from those experiences, and with GPS and far better forecasting available, the situation greatly improved. I can't recall landing short of destination with an unplanned overnight due to weather. The forecasts were so good that I usually simply adjusted my departure day or time to avoid the stress of dealing with weather. But I still have at least one, if not two, "sure outs" in my pocket when weather is involved.

**Fuel.** I have to mention fuel. I always have a minimum quantity of fuel onboard that I want to land with. The quantity depends of the forecast at destination. While enroute, if I see that I'm going to be short of that quantity (could be an hour or more out), I divert to an airport before passing the last suitable fuel source. I NEVER overfly the last fuel available airport if I am going to be short of my minimum fuel at destination. Sounds like a no-brainer, but fuel exhaustion is one of the most common causes of engine stoppage in GA.

**Autopilot.** In the beginning of my BE35 operations in 1970, I never had an autopilot in the three 35s that I owned. Always hand flew them, sometimes for as long as seven hours non-stop. Even IMC for short periods of time. Never had a problem even with charts all over the cockpit. But when I got into my late 50s I purchased a S35 with a nice autopilot and it was sure much easier and safer using it for longer flights.

**To hand fly in IMC you really have to be on the top of your game** and until you KNOW you are there, avoid extended IMC unless you have help (AP or qualified co-pilot. You have to analyze the conditions expected on the upcoming flight, and make a decision if you can do it without an autopilot. And even if you have an autopilot, *what if it fails* enroute? You must be capable to deal with that situation, whether it means to continue to destination or divert.

**Diverting must be thought about like a missed approach. On every flight plan to have to do one,** and if [you] don't, then land and have a happy day.

Great insights. As we've discussed many times before you and I are in agreement on many topics, especially fuel strategies to avoid fuel starvation or exhaustion. Job duties prevented me from departing a day early as you suggest, so I had to deal with the conditions that morning. Thank you, Tom.

A frequent Debriefing who nonetheless asks to remain anonymous writes:

I've turned around many times. I will be curious if the responses you get are somewhat self-selecting, akin to the concept of the "unreachables." People reading your post(s) are probably more likely to have done so than those who roll the dice, live to tell about it, and then normalize that behavior.

I've had almost nothing but thoughtful and positive comments. One person called me out on FaceBook, saying others had flown across the route (but not saying *when*—had I been 10 minutes earlier the gap may still have been wide enough for me to get through like I have so many times before). Anonymous continues:

First time I ever turned around was for a spiking EGT [exhaust gas temperature] on my JPI [engine monitor] as I leaned at cruise. I suspected a clogged injector and moved the mixture several times to confirm my theory. I was headed to a funeral and had every reason to continue on but decided it wasn't worth it.

**The number of weather-related turn-arounds are too numerous to mention. It's the nature of summer flying,** as far as I'm concerned. I think I've only been stuck one time for an overnight (due to weather) at an unexpected city. Most times I've been able to wait for an hour or several hours and let the weather move on and off I go on my way, maybe with a diversion of even a few hundred miles but so what...

That's my experience also, Anonymous—diversions and delays *are* in the nature of summer flying. Winter, spring and autumn, too. Thank you.

Reader Dan Drew adds:

After 40 + years of "the weather is bad but I must go anyway" albeit I had "real" radar, a copilot, speed, [and] dispatchers to give me updates, now I "Don't Have to GO!" but I still remind myself that I am not in a Boeing or Douglas Jet. After the ABS Instructor Crosstalk in Tullahoma [last year], I took off in front of you and went to 10,000 feet and after a while got permission from Center to deviate as necessary. I was weaving and bobbing amongst buildups and was well south

of my straight-line route. Any altitude less than 10,000 [feet] would have been much more difficult. I heard you divert into a Tennessee airport (which I probably should have done) but I was able to *see* the weather with my Mark 1 eyeballs (we always said “*One Peek beats a 100 Sweeps*”). As a career pilot and with a son that is flying in this stuff all the time, **I still watch weather every day** and was looking at what you were and totally agree with your decision making. Our planes are wonderful fast machines but a deviation in a jet of a few hundred miles is really nothing in the total time involved...in a Bonanza [or almost any piston airplane] it is a BIG deal. Your write-up is a great *LESSON* in aeronautical decision making and I will retain it for my students...and me.

Now to answer your questions.

1. **Similar weather?** Many times
2. **Turnback due to weather?** Yes - *better early than late* because if you wait too long then you have to fly through it again.
3. **Unplanned diversions?** Yes, had to land a Twin Otter in Lufkin, TX, due to heavy weather and running low on fuel. Center couldn't see us to help and our radar was very good as long as it wasn't raining on it. Then it was only good for about five miles...but in a Twin Otter that gave you a minute or two to choose a route.
4. **Working autopilot?** Without a copilot **an absolute must due to fatigue**. That can change if the good weather is close and the flight isn't too long.

Thank you, Dan. Reader Art Utay continues:

I've never "*flown 75 miles or so then decided to head back from whence you came.*" **If the weather was looking that bad along my route, I wouldn't launch.** However, I've had numerous occasions where ATC has told me I was approaching bad weather and I've elected to land ahead of the storm and hunker down until it was safe to fly.

A most memorable trip was flying from Hartford, Connecticut to McKinney, Texas during the week of the Joplin [Missouri] tornado (circa 2011). ATC kept painting wave after wave of nasty fronts moving west to east. **My wife and I would fly for an hour or so, land, wait out the passing front then continue westward.**

At one point, ATC called up, warned me of approaching weather, and diverted me to Texarkana. Never before (or since) in my 40+ years of flying, **has ATC told me where to land.** I put my borrowed Mooney M20E down at KTXK in 25 knot direct crosswinds (an exciting moment) and we were met in the FBO by a group of American regional jet pilots. American's dispatch at DFW had apparently told everyone to get as far away from Dallas as they could due to a particularly nasty front approaching the airport. A few hours later, the RJ pilots' phones began going off. American's dispatch office was screaming for their planes to get back home as people were piling up in the terminal.

Seeing as it was safe to fly, we taxied out behind the conga line of jets, waiting for my IFR clearance. I finally got it as we were approaching the runway hold line. However, the clearance was so complicated, I couldn't follow it, even having had my IFR ticket for almost 25 years. At the time, I was using NOS paper plates, and I was overwhelmed with the 60+ pages of arrival routes. I called the tower and explained my situation. They said hold on and in a few minutes they came back with the following comment: "*We talked with Dallas Approach - no one understood your clearance. We'll give you vectors into McKinney.*" **The weather on this last leg was excellent.**

I've frequently flown as close to a line of storms as safely possible (which includes time to land, taxi in, and get the airplane into a hangar if possible or tie it down if not), then sat it out on the ground. Sometimes that requires an overnight stay, especially if I'm well into my personal **12-hour duty day** (alarm clock to engine shutdown) when the encounter occurs. **I would not have launched last week either** if all indications, including three-minute old radar and a couple of Pilot Reports, did not report the wide gap in the storms was still there when I took off. I flew until I **found I could not maintain visual separation** from the cells as I got closer to the line, and ATC

told me I had “extreme” precipitation for over 100 miles along my route of flight—a situation **not** included in the forecasts or radar and observations just before I began my flight.

It's ironic at ***how nice the weather can be a short while after a line of heavy thunderstorms.*** Thank you, Art.

Instructor and past corporate jet pilot Charles Lloyd adds:

Obviously, Tom, you made the right decision. I had a similar experience in the days before ADS-B and SiriusXM Weather. I commuted between SN65 (Waltanna) near Wichita, Kansas, to KDTO (Denton, Texas) then drove to Dallas, my domicile, for a major Aircraft Shared Ownership flight operation. It was down one week for 7 days flight duty and back the next week at the end of duty. I did this in a tricked out (for the time) 1966 Cessna 182 Skylane. Started with Garmin 430 added a 530 with STEC Autopilot and a Stormscope in the right panel. This was before the days of ADS-B, SiriusXM Weather and WAAS. I added each one shortly after their announcements.

[I] departed Waltanna headed for Denton and [the] weather briefing was not too bad but expect some scattered buildups south of OKC [Oklahoma City, Oklahoma]. There were few articles on Stormscope interpretation in the '90s, but I found a few there were filled with factual information on usage. The secret was to go where there were no dots showing on the screen.

South of Oklahoma City I started to see buildups and a solid line of dots on the Stormscope from left to right in front of me. This line appeared to be over the Arbuckle Mountains between Paul's Valley, OK (KPVJ) and Ardmore, OK (KADM), and generated weather with a wind from the south. Even though these mountains were only about 1,000 feet high. It was time to get on the ground and look at the Paul's Valley FBO's briefing room weather display. What I saw was a line that continued to the southwest just south of Wichita Falls, Texas. I could divert to Wichita Falls and rent a car to make to Dallas for duty the next day. I filed for Kickapoo Downtown and was on my way.

About halfway to Wichita Falls, there was a large opening in the Stormscope discharges on my left toward Denton. The cloud formation was still dark gray. The Stormscope theory was since lightning discharges indicated turbulent conditions and no discharges, no turbulence. **I asked ATC for a 90-degree turn to a take a look.** The sky was dark, but VMC prevailed as I passed through the line to my left and right in smooth air.

The result was having a plan B that turned into a chance for Plan C. In those days, the ops rule was ***Eyeballs and a Stormscope.*** Later I added a GTS 330 to get the precursor to ADS-B traffic within 60 miles of an approach control radar facility, and then SiriusXM Weather came along as is a great strategic planning tool to stay well clear of all significant weather supplemented by the Stormscope with the eyeballs as the primary aid.

As far as [the] autopilot not working, my operations procedure was no IMC flights longer than one hour or get on the ground within one hour for in flight failure.

**I wouldn't have taken off into an 800-foot ceiling knowing the autopilot was inoperative** either, but it passed the preflight test on the ground. Even in this era of lightning detection and weather data uplinks, visual contact (“eyeballs”) is my primary storm avoidance tool. As I said before, ***I turned around when I learned I would not be able to visually avoid storm cells.*** Thank you, Charles.

Reader Dennis O'Donnell writes:

That was a well-written post, Tom. Best description I've read in some time of the world closing in and your measured response. **It's too easy to believe thorough planning for conditions that existed before takeoff still apply with a little improvisation once they start to deteriorate.** I've tried to outrun or outclimb rapidly changing weather only to find the safest course was to “nearest.” It can be a fuzzy line choosing between pushing on and a prudent return but ***the clock is ticking.*** The options decrease as the odds change. Thanks for the reminder.

I think you nailed a key point. restated thus: **Plan your flight and fly your plan**, but part of your planning is to **identify options**, and part of flying your plan is to **exercise them without hesitation** when needed. Thank you, Dennis.

Retired Air Force and airline pilot John Scherer relates his experience:

Hi Tom, great article! I turned around once in the T-37 [USAF trainer jet]. I was flying with the squadron commander and we were headed to El Paso, Texas from Lubbock, Texas. A bunch of T-38's [Air Force advanced trainer jets] were ahead of us and they were climbing into the 40,000 foot altitudes. The T-37 was limited to 25,000 feet. The picture ahead was very bad. We turned around and landed back at Reese AFB, Texas (just west of Lubbock). That was 1977 and I remember it like it was yesterday.

Fast forward to 1981. I was now a T-38 instructor pilot and was flying from Ellsworth AFB, South Dakota (rear Rapid City) to Reese AFB, TX. There were thunderstorms in the Texas Panhandle. I request[ed] climb to FL450 [approximately 45,000 feet]. I was in and out of the cirrus. Center was helping me with weather avoidance. I broke into the clear around Amarillo [Texas] and looked to my right. About 40 miles away were thunderstorms that looked like they reached 60,000 feet.

In the T-38 (no radar, long before cockpit downloaded weather radar) the best and only way to stay out of thunderstorms was VISUAL avoidance. Since we could climb to the mid 40,000s, that worked almost all the time. I have 2,000 hours in the T-38 and **that cardinal rule (visual avoidance) worked**. Thanks for your article that taught us all.

I mentioned last week that, soon after I turned around toward home, ATC told me an Air Force jet had also just turned around in that same area. That jet was a T-38. Thanks, John.

Reader and well-known flight instructor Mark Boguski continues:

In my early days of being an Instrument rated Private Pilot, I made a trip to Colorado to participate in the Boulder Bolder 10K run. My 21-year old son had generously agreed to come along with me to make sure I didn't die from a heart attack during the run. When it came time to depart Front Range Airport (KFTG, now KCFO) back to Kansas, the weather briefing showed a line of thunderstorms over western Kansas. This was in the pre-ADS-B days so **I was reliant on what I could see out my window** and what ATC could vector me around to navigate around any storms.

Soon after taking off from KFTG I was in the soup at 9000 and ATC advised there was a line of thunderstorms along my flight path and **asked my intentions**. **I requested vectors** as required to navigate around the storms. During my IFR flight training I had been vectored around isolated storm cells and areas of heavy precipitation on numerous occasions, so **I naively expected they would be able to do so now**.

ATC quickly came back and said they were **not going to be able to do that** given the extent of thunderstorms and that **I should select an alternate** destination. I elected to return to KFTG and they gave me a new routing back. We spent another night in Denver, had a wonderful steak dinner and returned to Kansas the following day without the thunderstorms.

My IFR **inexperience and blind faith** that ATC could vector me around the storms proved to be an important learning experience. I learned to be much more careful in my preflight planning and cautious when convective activity is forecast.

Some of my nicest flying destinations have been weather diversions; some of my nicest flights were the morning after a line of heavy storms had passed. Thank you, Mark.

Reader William Eilberg asks the question I've been asking myself:

With regard to the situation described in "None Shall Pass", I would not have even considered taking off under those conditions. With all due respect, **I think you had a bit of a case of get-there-itis**. I do not mean to say that my aeronautical judgment is better than yours. We are all subject to this kind of pressure.

I have been flying for over thirty years. I am not a bold pilot, and that is how I have become an old pilot. I have taken chances in the past which I would not do now.

Thank you for your excellent newsletter.

Thanks for pushing me out of my echo chamber, William. I ask myself these questions in **my standard self-debrief** after every flight:

- What went right?
- What went wrong?
- What would I do differently next time?
- What did I learn from this flight?

As I stood in the hangar waiting for the extreme-level rain to slacken, first I listed why I started the challenging trip in the first place:

1. Weather products observations and forecasts, and my knowledge of thunderstorm development and movement, all confirmed there appeared to be a window of opportunity to fly through what was before takeoff a 100-mile wide gap in the storms.
2. Pilot reports supported that I would be well above the clouds at my planned 9000 foot cruising altitude, permitting me to visually see and avoid cumulonimbus clouds by no less than 20 miles, deviating as necessary around buildups.
3. Conditions between my point of departure and the line of storms were storm-free, giving me options to divert before reaching the line if needed.
4. I'm instrument current and use simulator and in-flight hand-flying regularly to maintain a high level of proficiency.
5. I have multiple sources of weather data in the cockpit for strategic weather planning before "going tactical" around clouds by visual avoidance.
6. The airplane is well equipped, well maintained, and a type with which I am highly familiar and experienced.
7. I felt an obligation to the organizer of the fly-in to deliver my presentation the next morning, and to my employer to "show the flag" at the event, by making every effort safely possible to complete the trip in time.

I'm very aware that the list above is a [hazardous pilot attitudes](#) trap. If I have an accident someone is going to point to this list online and say I was "macho" or "anti-authority" or "resigned" or "impulsive," or felt I was "invulnerable," and that my own list proves it. To an extent ***pilots need a bit of each of these attitudes to be able to confidently and safely command and control an aircraft.*** The trick is to constantly find objective ways to confirm they are all positives, and not become complacent or rationalize my/your proficiency and the airplane's airworthiness.

See [https://www.faa.gov/gslac/ALC/course\\_content.aspx?cID=723&sID=1448&preview=true](https://www.faa.gov/gslac/ALC/course_content.aspx?cID=723&sID=1448&preview=true)

**What went right?** I flew well. Except for the autopilot the airplane performed well. My plan, to shoot for the gap but divert well before entering storms, worked. I took off thinking (and even telling three people at three different times before departing) I would land short of the line at Topeka, Kansas if the gap in the line closed, and wait it out there. I made the decision to divert almost immediately when I found I could not maintain visual separation when approaching the line. When I decided to divert conditions were deteriorating to the point it looked like there would be no option to get through all day (which proved to be correct)—I didn't feel locked into my back-up plan but returned home, still a safe option. Flying the approach into my home airport I knew flying east about 30 miles to a nearby airport with better weather and approaches I regularly fly with students was my "out" should I miss the approach with storms approaching from the west.

**What went wrong?** The autopilot (actually the electric trim) failed. Forecasts and even very recent pilot reports aside, I was not on top of clouds at 9000 or even 11,000 feet. The gap in the line of storms filled in rapidly. Unforecast thunderstorm cells formed west of my home airport when I decided to return. The ceiling at my home airport was much lower than forecast when I returned.

**What would I do differently next time?** I would have rearranged or canceled meetings the day before and taken work with me to do at destination and make the flight a day earlier (the fly-in organizer even offered to pay an extra night for me to do so, but too late in the day for me to make arrangements). Alternately I would have booked airline tickets, although the organizer—and my employer—wanted me to display the company airplane at the event. I would have diverted back to the home airport as soon as the autopilot malfunctioned. I might have called no-go before taking off, anticipating the gap in the line of storms *might* not hold even with my solid-gold “out.”

**What did I learn from this flight?** I had the discipline to make the inflight “no-go” decision immediately when I found my primary avoidance tool—visual avoidance—was not available. Temptation is great, at least it is for me. The accident record suggests virtually all weather mishaps involve a pilot going somewhere he/she should know not to go but trying it anyway. I’m no less susceptible but I had it in me to “just say no” when the situation required...which was well before entering the threat area, **not** only after I found myself in trouble.

Airline and charter operators are not permitted to begin an instrument approach unless the airport has official weather reporting and the reported conditions are at or above approach minimums at the time the approach begins. Private, noncommercial operators have the authority to fly an approach without weather reporting or when conditions are below minimums; it’s arguably no less safe provided **the pilot flies the procedure precisely as charted**, including **beginning the missed approach immediately and correctly** at or before the Missed Approach Point if landing criteria are not met. **Fly down, don’t see the ground, fly back up again.**

My strategy aiming for the gap in the line of storms was like a horizontal approach procedure: like an instrument approach, safe as long as I flew it as I “charted.” Approach the line at an altitude where I can visually deviate around cells while maintaining no less than 20 miles separation from each. Turn around if I am not able to visually avoid cumulonimbus clouds by at least that much, and do it right away, well before I’m 20 miles from the storms if it’s obvious I won’t be able to maintain visual separation. The key is to **plan the flight and fly the plan, including alternatives. No eyes, no storm-filled skies.**

After I had the airplane bedded down in its hangar and while I waited for the rain to slacken enough I could get to my car without being completely soaked, I posted a screen shot of my flight track and a short description of my flight on FaceBook. My sister in Ohio replied, “I’m glad you’re safe.” Without really thinking about the gravity of my response I replied, **“I was always safe. I decided to keep it that way.”**

I plan to live up to that response on every flight. I hope you do, too.

More to say? Let us learn from you, at [mastery.flight.training@cox.net](mailto:mastery.flight.training@cox.net).

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