



FLYING LESSONS for March 28, 2013

suggested by this week's aircraft mishap reports

FLYING LESSONS uses the past week's 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 make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any 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.

If you wish to receive the free, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net

FLYING LESSONS is an independent product of MASTERY FLIGHT TRAINING, INC. www.mastery-flight-training.com

This week's lessons:

In early February I was scheduled to provide recurrent flight instruction with a student in Ohio. Although circumstances forced me to cancel the training weekend with little notice—my nearly-student was able to schedule simulator-based training later—the pilot implored me to address a troubling issue he feels when considering the enormity of responsibility a pilot accepts when launching skyward. The pilot wrote me:

Statistically being the pilot of a single-engine general aviation [air]plane is about as safe as riding a motorcycle. To me this is an awkward fact. The gene pool of motorcyclists vs. the gene pool of GA pilots seems very different. (I own a Harley) What motivated me to study the safety of GA was this: in the last 15 months I have flown approximately 150 hours.

I believe it was *FLYING LESSONS* reader John King who, with his wife Martha, first did the math and showed general aviation's crash comparison to motorcycling. The good news is that education, training, motorcycle maintenance, following the rules of the road, maintaining a healthy respect for road conditions and visibility, paying attention to fatigue, illness and medication, and safety equipment like helmets and leathers vastly improve an individual motorcyclist's chances of avoiding injury or death while riding for a lifetime. So too can pilots educate and train, maintain and inspect their airplanes, fly within the flight and regulatory envelope, check and recheck the weather including expectations for time aloft and fuel burn, pay attention to the effects of fatigue, illness and medication, and use safety equipment such as shoulder harnesses to enjoy a long lifetime mishap-free flying.

The pilot continues:

I will share some of my experiences with you to give a sense of my aviation reality. I have 525 [total] hours, mostly in complex, high performance planes, mostly cross country. I enjoy flying and use aviation as a tool. Below I will share some of my experiences which led me to the study and practice of safety in aviation.

- I almost had a gear up landing, (the tower advised "if I wasn't going around I may want to put the gear down").

In that you are not alone. Landing Gear-Related Mishaps (LGRMs) are implicated in nearly half of all reported crashes in retractable gear airplanes. Mastery Flight Training's [three-year study of LGRMs](#) revealed that [gear-related events are not limited](#) to any one type of aircraft, and that the U.S. insurance industry consistently pays out over USD \$1 million in LGRM claims **every month**.

See:

www.thomaspturner.net/LGRM%20obserations.htm
<http://www.thomaspturner.net/LGRM%20ongoing.htm>

No matter when you extend your airplane's landing gear, whether before entering the pattern, on the downwind or abeam your touchdown zone, or if you've had to extend the gear earlier because of traffic or low-level turbulence or simply to descend in a hurry in a "dive bomber approach," double-check the landing gear position at 500 feet above ground level (AGL) on final approach.

I use full flap extension as my reminder to do several other things, in this order:

1. Full flaps
2. Full propeller(s)
3. Full rich mixture(s)
4. Verify green landing gear position indicators

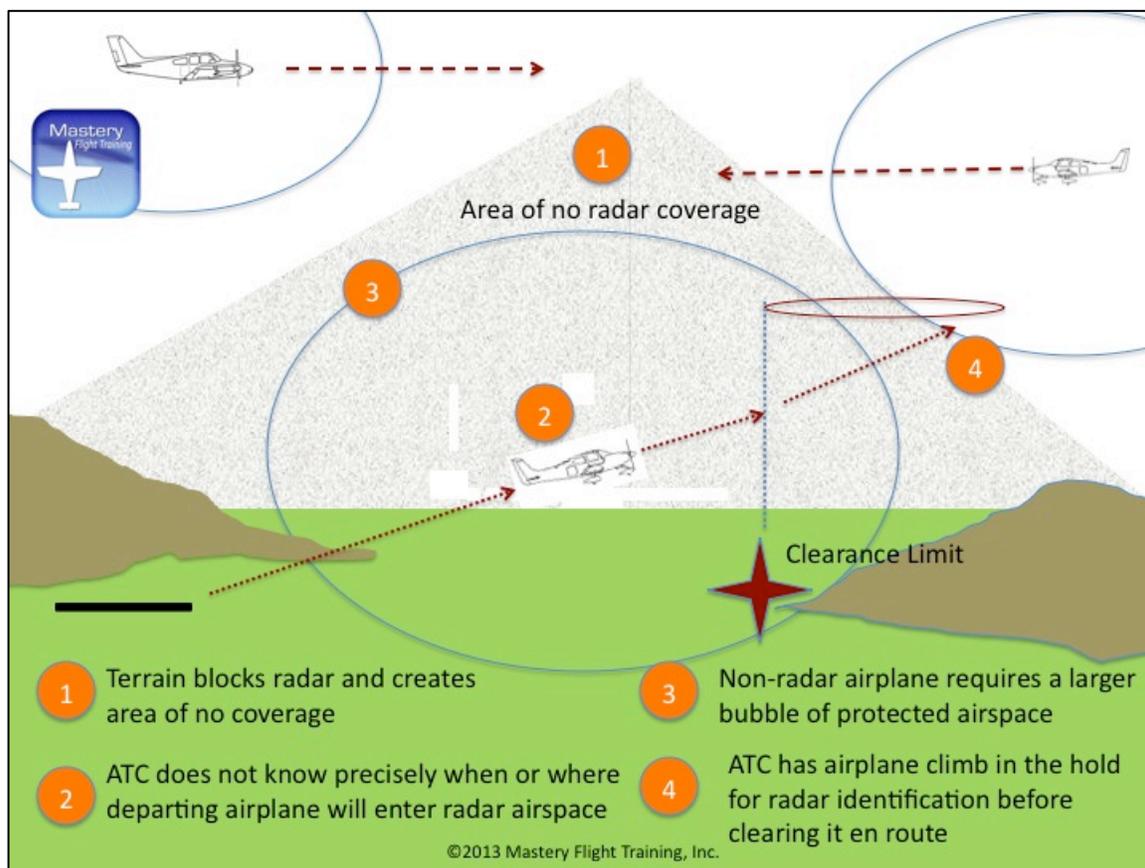
You should be able to modify that mnemonic procedure as needed to make it work for virtually any make and model of retractable gear aircraft.

If you discover the gear is not down at 500 AGL, *go around* and fly the circuit or approach correctly next time, including landing gear extension.

Do this check every time and you'll recover from any distraction or lapse in checklist procedure. Avoid touch-and-goes and refrain from making any configuration changes (including flap retraction) until you've brought the airplane to a stop on the ground. This gives you time to confirm you're moving the correct switch, and prevent an inadvertent landing gear retraction.

- Flying out of the Shenandoah Valley Regional, [in] IMC, I couldn't get picked up on radar. [I] was told to fly to the VOR and climb in the hold till they could see me. I know we should be good at this but I still can't find anyone this has happened to. (I had a good outcome).

This is a common situation I've seen (and flown) a great many times, especially flying from nontowered airports in the mountains of east Tennessee. I flew a Beech 58TC Baron from one such airport for three years. Our airport was below a fairly high Minimum Vectoring Altitude (MVA) for Chattanooga Approach's radar, because hills in the immediate area blocked radar reception near the airport. [The hills around Shenandoah Valley Regional](#) appear to present similar challenges to radar coverage. See www.aopa.org/airports/KSHD

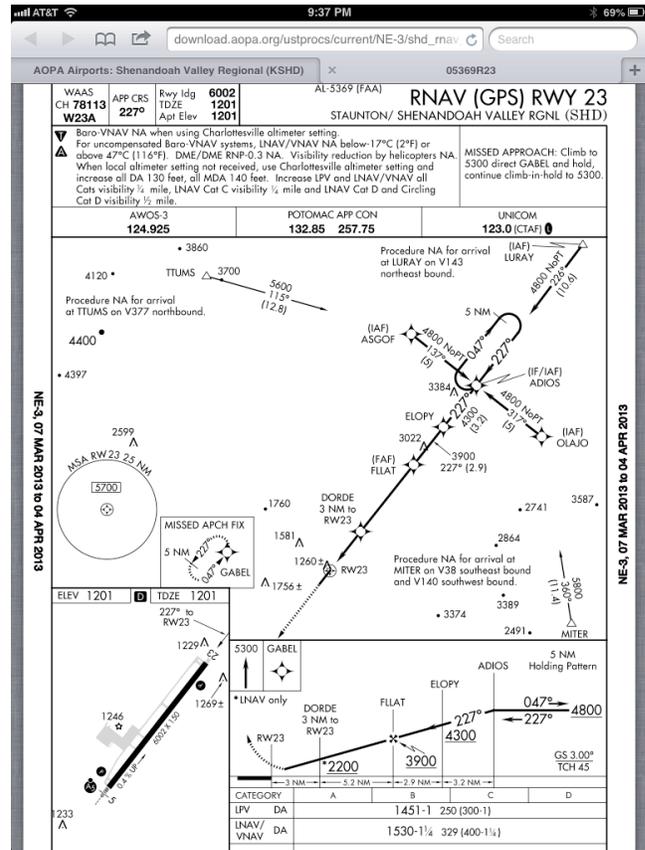
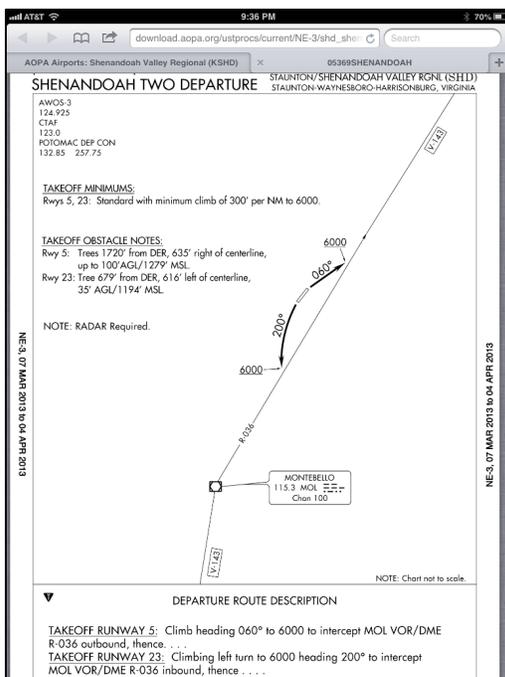


A non-radar airplane requires a larger “bubble” of protected airspace than one identified “on the beam.” This is because Air Traffic Control (ATC) has no way to know precisely where each airplane is at any one time. More importantly, when an aircraft is departing a nontowered airport without radar coverage nearly to the ground, ATC cannot predict its precise location and has no way to predict precisely where, at what altitude and/or in which direction the airplane is going.

Instead of holding an IFR airplane on the ground when other aircraft will transit the area, one common technique is to clear the airplane to depart only so far as a clearance limit, often a charted holding pattern related to a missed approach from the departure runway. The airplane will be cleared to an altitude high enough to provide radar coverage. This permits ATC to use airspace near the airport for other traffic without risking a collision. Once the departing airplane is identified on radar and its altitude verified, the controller may amend its clearance and allow the pilot to proceed along its route.

This is precisely how I was cleared almost every time I departed that east Tennessee airport. Compounding the radar blockage, the same terrain made radio communications very “iffy” until I was 1000 feet into the air or more. Very often I would disable the radio’s squelch, to be able to detect a weaker response from Approach and make radio contact shortly after becoming airborne. Usually I could confirm my position and altitude and would be immediately cleared as filed. A few times I indeed had to climb and enter the hold, once or twice doing several turns in the hold before nearby traffic moved on and my route of flight was clear.

In practice the pilot flies this sort of “*short-range clearance*” just as if he or she was flying a missed approach as depicted for the same runway, albeit starting two hundred feet or more below the procedure’s altitude at the Missed Approach Point.



Thoroughly brief the departure procedure and route to the nearby fix before commencing takeoff, then fly as if you were flying a charted missed approach procedure to the published hold, and you’ll have the proper mindset to fly a short-range clearance.

You may also find a [published departure procedure](#) from that airport that helps you safely climb to the holding fix.

U.S. pilots: The imminent closure of over 140 air traffic control towers calls for a [review of nontowered airport procedures](#).

See www.aopa.org/asf/hotspot/nontowered.html

The reader continues:

- I departed same airport into IMC and the Aspen Pro started going psycho and quit working. I got below the clouds, returned to [the] airport and had Aspen replaced.

Good on you, as my Australian friends say. As you'll see in the Debrief below, our collective ability to maintain control with the failure of cockpit automation is suspect. You did very well to safely exit IMC and make a safe landing. History shows that very frequently such a failure in the clouds rapidly turns deadly.

- The biggest eye opener was flying from Memphis with [my] family at 11,000 to stay above clouds. Flying into [my home airfield] ceiling was 800 overcast, visibility 2-3 miles. First I was cleared to a waypoint, then was given vectors and blew through localizer. [The] autopilot did something weird, [so I] disconnected the autopilot, leveled the plane and got vectors again. I intercepted [the] localizer and landed. My wife and 2 kids were with me. I'm quite sure I scared the crap out of them. The problem was, that same day a successful businessman was flying his wife and another couple back from Florida into [an airport near my home], missed the runway, crashed and killed all on board. My wife saw this [on the news] and wanted me to do some 'splaining. **She opened my eyes to the reality of flying.**

Opening pilots' eyes, to the reality of both the promise and the hazards of aviation, is the prime objective of *FLYING LESSONS*.

A two-hour flight at 11,000 feet. Does that suggest anything to you? Might you have suffered from a bout with hypoxia? Flying through a localizer, then somehow mismanaging the autopilot so it did not couple as you intended, could well be a result of partial impairment of the pilot. Do you know that altitude-related hypoxia is exposure-dependent, i.e., flying three hours at 8000 feet creates more hypoxic symptoms than flying at 8000 feet for two hours? Do you smoke, or have you ever smoked? I've read that a history of smoking adds 5000 feet to your "cabin altitude". Were you experiencing symptoms of exposure to the equivalent of 16,000 feet?

Consider wearing an oxygen saturation meter in flight to monitor your need for supplemental oxygen. First perform a control study by wearing the device on the ground to determine your baseline saturation on the surface at home. If your O₂ saturation is five percent lower than your baseline, you need to be on supplemental oxygen or immediately descend to an altitude that brings your saturation within five percent of your norm. Ask your medical examiner for more guidance about the use of O₂ meters and supplemental oxygen.

Note that O₂ monitors do not test for carbon monoxide and, in fact, read significantly higher than actual saturation when the blood is contaminated with CO. Use a carbon monoxide alarm in addition to an oxygen saturation monitor.

My hope is that I can come up with a program to build my efficiency and confidence to not become a statistic. To me, I don't see a clear path to safe, happy flying, [and] that's what I'm looking for. Since the blown localizer I have had approximately 10-15 hours of additional training. Simulator work, flights with instructors to work on things. But here is no simple, clear-cut path, i.e. a one page syllabus that guarantees safe flying. The carriers guarantee safe flying for their passengers. If I am going to be flying people I should be able to provide the same assurances.

These are the things I ponder. I know aviation is a complex undertaking. Most do it safely. However, it disturbs me when I listen to the transcripts on AOPA from intelligent, successful pilots who ultimately killed themselves in planes. Thanks for the talk, and remember as one of my instructors reminded me: the goal is to live.

My apologies, reader/inquirer, I have been working on my response to your "unified theory" request but, with my travels, I have not yet been able to edit it down to the single page you request. That, we'll address in next week's edition of *FLYING LESSONS Weekly*.

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

NO GOTCHAS



FREE QUOTE

Thanks to AVEMCO Insurance for helping bring you *FLYING LESSONS Weekly*.

See <https://www.avemco.com/Information/Products.aspx?partner=WMFT>.

Contact mastery.flight.training@cox.net for sponsorship information.

Debrief: Readers write about recent *FLYING LESSONS*:

I received a *lot* of reader mail while I was gone, all in a like mind about [the most recent *FLYING LESSONS*](#) observation that our industry has come full circle on instructional philosophy, and the need to increase time spent on transition and recurrent training in more complex airplanes than those in use when the pilot evaluation criteria were created. Frequent Debriefeer, airline and general aviation pilot David Heberling writes:

Will the new circle of training take more time?

Absolutely. How could anyone expect otherwise? The minimum hours...to apply for the Private Pilot License (40 hours) is the same as it was back in 1974 when I got my PPL. Back then, stick and rudder plus maneuvers [were] the main stay of the curriculum. Add in a few cross-countries and a tad of hood time and there you were.

The avionics in the TAAs are many orders of magnitude more complex than the old VOR/ILS and NAV/COMs ever were. **No additional time has ever been slotted into the requirements to account for the training required for those avionics.** I am sure you will hear cries of, "It is so much simpler to just follow the green/magenta line. You do not even have to think." Aha! Therein lies the rub. Learning a new language requires many hours of practicing the basics prior to advancing to more difficult material. It also requires continual use to keep that knowledge current. Learning to fly is the same way. **There is no shortcut to the advanced stuff. Leaving the basics too soon means that knowledge will soon fade.**

At my airline, we are encouraged to turn the autopilot on upon reaching 100 feet AGL on takeoff, and turning it off at 200' AGL on landing. This is the fast way to lose manual flying proficiency. I have never been a fan of this philosophy and typically hand fly more than the average airline pilot. The Air France accident in the south Atlantic Ocean has made the industry rethink this philosophy. Back when I was teaching in the late 70's and early 80's many students took more than 40 hours to get their PPL and that was without any TAAs.

Expecting people to meet the 40 hour [Private Pilot] minimum means that something is being skipped or glossed over. Flying takes more time, and more money, especially in a TAA.

See www.mastery-flight-training.com/20130314flying_lessons.pdf

Thanks, David. I'm sure you've seen the FAA's recent recommendation that airlines require their pilots to hand-fly more, for precisely the reason you state.

Reader Sam Dawson also agrees that we're asking too much by limiting our instructional time to historical levels:

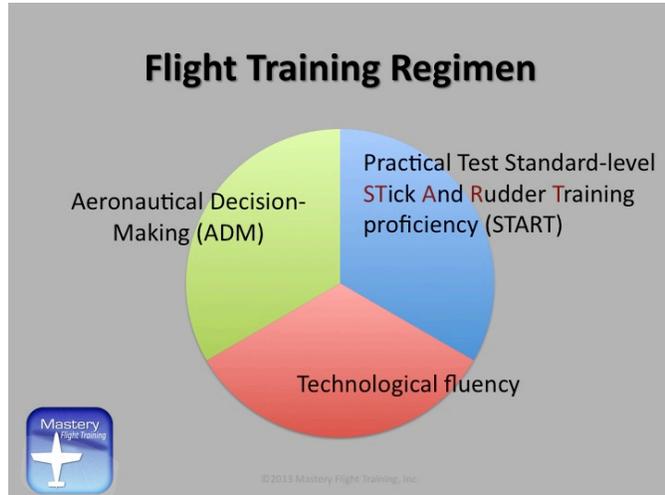
Good article on the state and future of flight training. **For some reason there has been an "either or" mentality about flight training.** CFIs will ignore the systems in an airplane and state they believe in stick and rudder skills, or we have CFIs who concentrate on the technical side but ignore the stick and rudder skills.



As you pointed out, a Cirrus is not a Champ, yet both require basic stick and rudder skills in order to be safely handled. Yet the Cirrus requires more: a pilot must be able to operate the systems in a Cirrus in order to safely pilot it.

I saw this problem several years ago with a Cessna 210 pilot who was sent to me by a FSDO to prepare him for a 709 ride due to a class B airspace bust. This pilot received a 15 hour insurance mandated check out, yet it became apparent to me very quickly that the CFI who checked out the owner of this airplane gave him NO instruction on the systems. The CFI claimed they would concentrate on stick and rudder instead. As a result the owner was not aware that his GPS had a communication function (which would have helped his pilot load in the class B airspace); he did not know how to use his GPS beyond the direct to function; he did not know his autopilot had anything other than a heading mode. Basically the CFI just sat there for 15 hours and used "stick and rudder" as an excuse for his lack of knowledge of the systems installed in this airplane.

Personally **I have been encouraging my students to get away from the "flight review" mentality** where they only see a CFI once every two years for one hour of ground and a one hour flight, and moving them toward the Wings program. [I am] encouraging them to take on line courses every few months and then see a CFI every 6 months or so.



Thank you also, Sam. Reader Ron Hyde sees this from the end-user's standpoint:

Bravo Tom! These are good observations. I fly 200 - 250 hours a year in my G36 Bonanza [Garmin G1000 equipped—ed.], and have to admit a certain amount of laziness and complacency has set in due to the reliability of the technology and the machine. I travel faster, farther, and safer with much less effort than driving a ground vehicle. However, I also have an Aviat Husky that I operate in and out of a short grass strip. I haven't really thought much about this until I read your article. I'm convinced that the two to three hours a month I spend flying the Husky are aiding my stick and rudder proficiency. And it's fun.

One other point I think worth mentioning has to do with recognizing a technical problem in your TAA aircraft, shifting your attention to your standby instruments, and not getting flustered. Unless you're extremely low on fuel in heavy IFR conditions, **you generally have several options to fly your machine to more favorable conditions.** I lost the right screen on my G1000 one night in IMC and flew a VOR/DME approach using the small inset on the PFD. Another time I lost the AHRS and Heading System in moderate rain and low IFR conditions, but used the working VOR/LOC/GS and the standby instruments to fly an ILS Approach. **If you have plenty of fuel, a well maintained aircraft, and do annual proficiency training including partial panel scenarios, the odds are in your favor.**

Thanks for your insights, Ron. Prominent Cirrus instructor Mike Radomsky adds:

Thank you for another interesting *LESSONS* column.

The whole issue of decaying Stick-and-Rudder skills across the pilot population concerns me. I fly and instruct in TAA (Technically Advanced Aircraft), mostly Cirrus, and I observe a wide array of proficiency levels among my clients. **Some who regularly fly long-distance missions in the system (IFR) using TAA don't do well when called upon to hand-fly.** With most, I can almost see the rust flakes falling off as they re-discover Basic Attitude Instrument flying, but some need plenty of remedial training. The corrosion is not limited to motor skills - **many cannot answer basic flight planning questions ("How much fuel do we expect to have when we land?") without looking at a screen.**

All of this got me wondering how my own skills are doing. So the last time I was in IMC, I clicked the Autopilot Disconnect button. This presented no immediate issue - I simply flew the same way I did years ago. But when I got a simple ATC re-route, the mental effort to process it was noticeably high. I did a poor job of monitoring the engine, fuel, weather, and so on. And it was tiring. After 15 minutes - which seemed like an hour - I was happy to turn the autopilot back on.

TAA is a power tool set, efficient in *trained hands*, but dangerous in the *wrong hands*. It allows competent pilots to use their time productively to manage the flight, which adds to the safety margin. The autopilot makes us lazy; we should by all means avail ourselves of opportunities to keep our (figurative) flying muscles supple. TAA airplanes are indeed "optionally piloted"; they should at least be "skeptically co-piloted", and periodically "plain-ol' piloted". **If we cede both control and awareness completely to the automation, we have the worst of all worlds WHEN the automation fails.**

Powerful observations from the pinnacle of TAA instruction. Thanks. Mike!

My instructional experience is very similar. Way back when I taught high-end piston pilots in a simulator-based flight safety corporation we disparaged the "gear up, autopilot on" brand of pilot. Generally they used the phrase "man in the loop" to rationalize what they saw as a superior way to fly. Trouble was, they did not (as you state) "skeptically copilot" the aircraft. My comment then applies not just to the autopilots we had at the time, but a wide array of avionics common in owner-flown transportation airplanes now: the autopilot is a very good, extremely stupid and undependable copilot. It will do exactly what the pilot tells it to do, regardless of the pilot's intent, and is likely to walk away from the job at any moment. Automated flight requires keen "mode awareness" and very active monitoring...and the ability to immediately take over and hand-fly from any situation and conditions the pilot permits the autopilot to fly.

What do you think? Let us know, at Mastery.flight.training@cox.net

"Your articles and years of emphasis on gear up and gear collapse accident avoidance are directly responsible for almost eliminating this type of accident in Australia"—Peter Gordon

It costs a great deal to host *FLYING LESSONS Weekly*. Reader donations help cover the expense of keeping *FLYING LESSONS* online. **Be a *FLYING LESSONS* supporter through the secure PayPal donations button at www.mastery-flight-training.com.**

Thank you, generous supporters

Good on you, mates!

Thank you to the pilots, instructors and leadership of the Australian Bonanza Society and its Beechcraft Pilot Proficiency Program (BPPP), held in the little country town of Cowra, New South Wales last week. This was Mastery Flight Training's fourth time presenting at the Aussie event, and the welcome gets better every time! Most of the pilots went on to complete type-specific flight training with the superb instructors of Australia's BPPP. Thanks to everyone who attended my full day of class and the first day's presentations, and made this special effort to become even better pilots.



During my Australian stay I also visited with the Australian Maritime Safety Bureau, which is responsible for all search and rescue (including aviation) for nearly 10% of the world, and the aviation leadership and forensics laboratory of the Australian Transportation Safety Board (ATSB). I'll report on very interesting *LESSONS* learned from those and more experiences Down Under in the coming weeks.

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

Personal Aviation: Freedom. Choices. Responsibility.

Thomas P. Turner, M.S. Aviation Safety, MCFI
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year

FLYING LESSONS is ©2013 Mastery Flight Training, Inc. Copyright holder provides permission for *FLYING LESSONS* to be posted on FAA Safety.gov. For more information see www.mastery-flight-training.com, or contact mastery.flight.training@cox.net or your FAA Team representative.