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Owner Pilots: A Breed Apart

In light of NBAA taking place this month, I asked my father Randy Groom to recount some of his personal experiences and observations after selling business aircraft for 30-plus years. Below he addresses types of customers, business aviation trends and the common themes that tie owner pilots together.

One of the best parts of my job was meeting and getting to know the incredible variety of customers that bought our products. During my career, I sold to corporate customers, military and government buyers, charter operators, fractional share companies, air ambulance companies and owner pilots. Looking back now, I can say without a doubt that selling to owner pilots brought me more pleasure, and more interesting experiences, than any other type of customer.

The owner pilots I dealt with were from all different backgrounds – many of them entrepreneurs whom started their businesses in their basement and nurtured them into to fantastic successes. Others were business leaders with a love for flying that managed to work their way into the cockpit. There were assorted doctors, lawyers, farmers, ranchers, race car drivers and team owners, financial wizards – and a lucky few with inherited wealth.

As many of you know, the purchase of an aircraft is an intimate process, with the buyer and seller often coming to know each other very well. As such, I'd like to share a few observations I've made about owner pilots and their segment of the industry.

- 1. Experience levels vary widely** – Quite a few of my customers were relatively new pilots who were rapidly moving up in aircraft complexity and capability. Often we had King Air buyers who had moved up from a single-engine Cessna or Piper into a Bonanza, then into a Baron, ultimately graduating into turbines in a matter of a few years or less. On the other hand, we sold to many owner pilots with 5,000, 10,000 or even 20,000 hours experience as was the case with several retired airline pilots.
- 2. The majority use their aircraft for business** – Almost all of my customers legitimately used their aircraft for business at least half of the time. Race car drivers used their airplanes to go to the races. Business leaders and entrepreneurs used their airplane to support and grow their business. One of the more unique uses I came across was a customer of mine who was a professional pig auctioneer. He used the airplane to travel to and from pig auctions. (During my demos with him, I attended a few pig auctions myself, and upon my return always felt the immediate need to shower).
- 3. Over time, safety has become an increased focus** – Many of my customers have always been adequately focused on safety, but unfortunately there were many exceptions as well, especially in the 1980s and 90s. More than once I felt that a customer did not properly separate his mind from his business when he got into the cockpit. I will never forget when one new King Air C90B buyer accepted a cell phone call while in the traffic pattern (that call didn't last long, I removed his phone from him). But I have to say, the owner flown group's focus on safety seems to have improved over the last few decades. Much of this has likely been driven by the aircraft manufacturers, owner groups and insurers promoting, and often requiring, professional training, but also partly due to the internet with the incredible availability of safety forums and seminars.
- 4. They've experienced phenomenal growth via 'The Cirrus Effect'** – I must give credit where credit is due. No company has done more to contribute to the growth of the owner pilot population than Cirrus. With more than 7,000 aircraft built over the past 18 years, the company has helped to swell the ranks of enthusiastic new pilots. Cessna, Beechcraft, Pilatus, Piper and TBM have all benefited from that upwardly mobile population, as many have moved up from their Cirrus into turbine aircraft. Cirrus may well keep more in their family with the introduction of their Vision Jet, but I'm sure many will keep climbing up the ladder of aircraft capability.
- 5. It's always about passion** – One trait that all owner pilots share is a passion for flying. Selling to them was always a joy because it wasn't entirely focused on technical details and cash flows. There was more about the pure pleasure of flying, the handling characteristics of the airplane, the thrill of learning how to master a more complex machine. And in the process of those sales, I often learned a lot about the buyers and how they became so successful. Sometimes I got to meet their families and stay in their homes. Our demos would take us to some interesting places ranging from NASCAR races, to remote business locations to islands in the Bahamas or private ranches in Brazil. More often than not, owner pilots are as passionate about life as they are their aircraft and flying.

As I look back on my career, I am amazed how fortunate I was to have met and got to know such a wide range of fascinating owner pilots. I stay in touch with many of them as we remain close friends. I feel lucky to have had the opportunity to play a role in their aviation progression. And it is my hope that the industry continues to inspire and attract more customers into discovering how General Aviation can bring both joy and productivity into their lives and businesses. 

I could not agree more. Thank you for providing your unique insights as many of the readers of T&T are at the heart of the owner-pilot category you speak of. It is my hope this publication remains a valuable resource for this group, continuing to foster their undeniable passion.



Airmail

In Response to the Editor's Briefing (August)

I had the pleasure of reading your Editor's Briefing titled "Like Father, Like Daughter(s)," Rebecca, as well as Dianne's interview with your father for the "Five on the Fly" feature. Coming from a family highly involved in the aviation business myself, I felt the connection and pride you so eloquently wrote (and feel) with/about your father. Both my brothers and I have immense pride in our father's 60+ years of aviation accomplishments.

Additionally, both siblings "caught the bug" and are also in the aviation industry. Though I never followed directly in my father's footsteps by getting my own pilots license, I am thrilled to now be working in the aviation industry and supporting Bye Aerospace. Thank you again for your article(s). I very much appreciate them.

Christina Washburn • Englewood, CO

In Response to Scott Kraemer's "The Speed of the Stupid" (August)

Scott - it was nice seeing you are still alive and sharing valuable stories that benefit those of us who love peanuts from the left seat. You shared that story with me before, but reading the whole story was entertaining and certainly a lesson for all of us.

James Stowers • Kansas City, MO

In Response to Kevin Ware's "The Flying Black Cadillac" (July)

I look forward to your articles in *T&T* every month. I just finished "The Black Cadillac" and felt compelled to write. I really got a kick out of this one. I think we can all admit to some youthful stupidity at some point in our lives. Thanks for brightening my day - keep them coming.

John Ewald • New Braunfels, TX



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The Hero's Honor They Deserve



“Who’s your hero?” That inquiry is one of the go-to questions journalists (like me) often ask when interviewing someone for a profile. It not only provides insight into one’s personality and motivations, it reveals the qualities or traits the person values most.

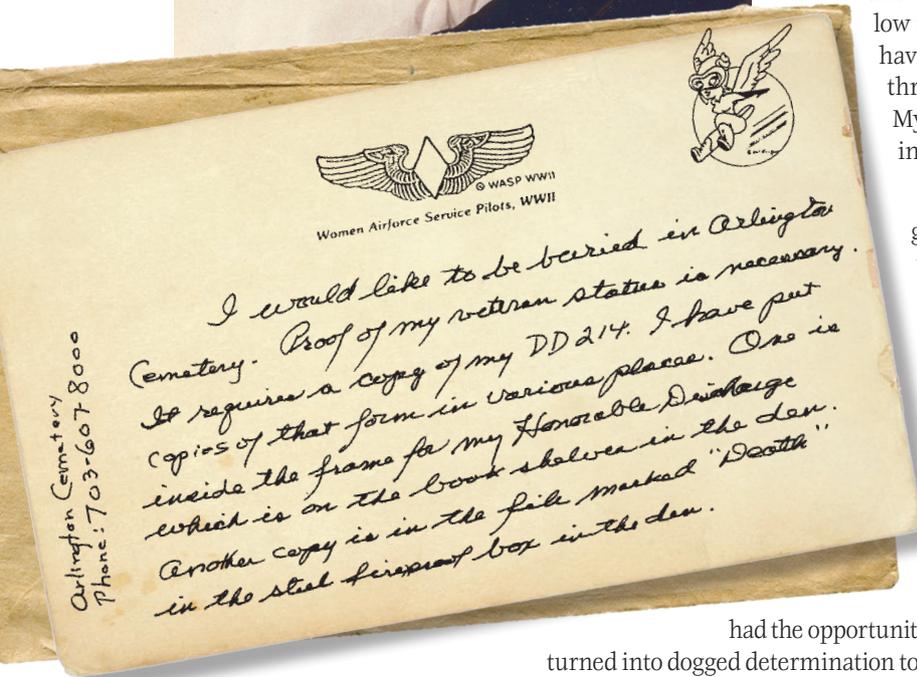
For Washington attorney Erin Miller, the answer to that question is quite simple. Her hero is her grandmother, Elaine Danforth Harmon, who taught her what it means to be a self-reliant, resilient woman who can stand tough in the face of adversity.

“Growing up, I admired my grandmother’s independence and enthusiasm about life. She often encouraged me to follow my own path in life. I also admired how she was tough, having come of age during the Great Depression and lived through World War II, but also generous, kind, and polite. My grandmother loved the United States and tried to instill in me the same love of country.”

There was another reason Miller – and many others – greatly admire her grandmother. Harmon was one of 1,100 women who served as pilots in the U.S. Women Airforce Service Pilots (WASP); women who answered the call to serve their country during WWII and did so despite tremendous difficulties and little acknowledgement after the war ended. After training with other WASPs at Avenger Field in Sweetwater, Texas, Harmon was sent to Nellis Air Force Base in Las Vegas to work with male pilots on refreshing their instrument skills. During her service, she flew the PT-17 Stearman, BT-13 Valiant, the AT-6 Texan and the B-17 Flying Fortress.

I met Miller at EAA AirVenture this past summer, and had the opportunity to learn how her love and admiration of her grandmother turned into dogged determination to grant Harmon’s last request to be laid to rest at Arlington National Cemetery. In 1975, Harmon was among the WASPs who testified before Congress to lobby for full veterans’ rights, which finally became reality in 1977. Then in 2002, the WASPs were granted eligibility for Arlington honors, but that ruling was reversed by the Army in 2015. Despite receiving the Congressional Gold Medal for their service in 2010, they were once again remanded to second-class status. After Harmon passed away April 21, 2015, Miller and her family saw this fight to honor Harmon’s burial request as a symbol to make difference once and for all on behalf of all WASPs.

“Obviously, I wanted my grandmother to be laid to rest at the cemetery of her choice. But part of what motivated me was knowing that she had been fighting, along with her WASP colleagues, to be recognized as equals in veterans’ law since World War II, and the fact that she was no longer here meant that someone had to carry on that fight and I was honored to do so. Additionally, there were still other members of the WASP alive, and regardless of whether they ultimately choose to be laid to rest at Arlington National Cemetery, my family and I wanted to fight to ensure that they knew



Arlington Cemetery
Phone: 703-607-8000

“The WASPS were forgotten for 35 years, and it really bothered me. These women that were in the first [WASP training] classes, they needed some recognition, so that’s why I like getting the word out that these women existed and did something great.”

- Lt. Elaine Danforth Harmon, U.S. WASP, in a 2004 oral history interview for the Veterans History Project, Library of Congress

that they were recognized as equals before they died. They, like me, were under the impression that the legislation in 1977 had granted them equal veterans rights but in fact it was a law limited to only part of the federal government,” she explained.

Miller started with a grass-roots social media campaign. After several weeks of promoting a petition on Change.org, Miller said “the ground began to shift.” Thousands of signatures poured in and the mainstream media began publishing and airing stories about Harmon and Miller’s fight.

Miller then spent months visiting the offices of Congressmen and women to press her case. Finally, Rep. Martha McSally of Arizona, a retired Air Force colonel, sponsored legislation that would grant full veteran status to the WASP. Despite the polarization in Congress, the House of Representatives unanimously passed H.R. 4336, and President Obama signed it into law May 20, 2016. Because it was so important to Miller that the situation was made right for her grandmother, Miller tattooed “114th Congress, 2nd Session, H.R. 4336” on her forearm as her own personal way of celebrating the victory.

On Sept. 14, 2016, Elaine Harmon’s remains were laid to rest with full military honors alongside her fellow veterans.

Miller has written a soon-to-be-published book entitled “Final Flight, Final Fight,” which recounts the story behind the struggle to gain acceptance of the WASPs at Arlington, as well as recounting Elaine Harmon’s life, especially the last few years before she died. “In the book, I would like readers to get a sense of why it was important to her that this issue be resolved. I would also like to try to convey to people how to resolve a problem like this via Congress and what it feels like to go through this process,” she said.

NBAA has announced it plans to present its Meritorious Service to Aviation Award to the WASP at its 2018 Convention. Erin Miller will be accepting the award on behalf of all WASP pilots, in recognition of her success in finally gaining inurnment rights at Arlington for these patriots. If you are planning to attend NBAA-BACE, you won’t want to miss it.

America, who’s your hero? Answer: Elaine Harmon and other brave, accomplished WASP pilots. Thank you all for your service to our country. 

*Dianne White can be contacted at
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NBAA 2018 Preview

by **Rebecca Groom Jacobs**

Business Aviation's biggest event of the year is quickly approaching. The 2018 NBAA Business Aviation Convention & Exhibition (NBAA-BACE) will be held Oct. 16-18 in Orlando, Florida. The event will feature a wide selection of education sessions, keynote speakers and exhibitors showcasing the latest and greatest in business aviation products.

This year, NBAA is promising its largest and most diverse lineup of business aircraft. Approximately 110 fixed-wing aircraft will be on display between the main outdoor static display at Orlando Executive Airport (ORL) and the indoor static display on the Orange County Convention Center (OCCC) exhibit floor.

In addition, 50 education sessions are planned throughout the week, covering areas like operations, human resources, business management and leadership. The Innovation Zone, dedicated to hot industry topics, will feature discussion on technologies like remote-piloted VTOL aircraft, electric propulsion and artificial intelligence. Panel discussions will also highlight young professionals among the industry and explore strategies for developing young talent.

For owner pilots, NBAA 2018 has a number of relevant educational seminars. Here are a few sessions to take note of.

Monday, October 15

Single-Pilot Safety Standdown

Time: 9 a.m. – 2 p.m.

Single-pilot business aviators will have the opportunity to expand their knowledge and skills, while exploring practical tips to enhance operational safety and risk mitigation. Scheduled presentations include: a detailed analysis of single-pilot business aviation accident data; interactive discussions on mitigation best practices and leadership briefings from NBAA President and CEO Ed Bolen, Aircraft Owners and Pilots Association (AOPA) President and CEO Mark Baker and Experimental Aircraft Association (EAA) CEO and Chairman Jack Pelton.

Small Operator Symposium

Time: 2 p.m. – 5:30 p.m.

The inaugural Small Operator Symposium will specifically address issues facing operators with two airplanes or less. In the “Do You Like My Hat” session, the discussion will focus on the many roles played by someone managing a small flight department. The “Scaling the SMS Mountain” session will look at where small flight departments can learn how to properly address safety issues on a practical basis, and how a safety management system can help an operation of any size.

Tuesday, October 16

Real Stories of Loss of Control: When Upset Training Saved Lives

Time: 2:30 p.m. – 3:30 p.m.

Hear true stories of aircraft in-flight upsets and how upset prevention and recovery training (UPRT) has helped pilots avoid catastrophe. Learn about contributing factors to loss of control, advantages and disadvantages of both in-aircraft and simulated UPRT, and how to create a persuasive business justification for your company to invest in this critical training.

Meet the Regulators

Time: 2:30 p.m. – 3:30 p.m.

Join for a discussion with FAA, DOT and DHS representatives for insight on timely topics relevant to business aircraft operators. Past topics at this session have included sharing safety data, FAA compliance philosophies and upcoming avionics mandates.

General Aviation 2025

Time: 3:00 p.m. – 4:00 p.m.

The convergence of technologies, such as electric propulsion and artificial intelligence, is shaping the future of transportation. This session will explore the challenges and benefits

these game-changing technologies present, and look forward to how they will affect the next generation of general aviation aircraft.

Wednesday, October 17

Friends & Partners in Aviation Weather

Time: 1:00 p.m. – 5:00 p.m.

Day one of two, this meeting gives aviation weather information providers an opportunity to hear directly from the user community about their most important short- and long-term weather-related issues. 

NBAA-BACE Exhibit Hours

Exhibit Halls and Indoor Static Display of Aircraft

- • • • Tuesday, Oct. 16 • 10 a.m. – 6 p.m.
- • • • Wednesday, Oct. 17 • 9 a.m. – 5 p.m.
- • • • Thursday, Oct. 18 • 9 a.m. – 4 p.m.

Static Display of Aircraft at Orlando Executive Airport

- • • • Tuesday, Oct. 16 • 9 a.m. – 6 p.m.
- • • • Wednesday, Oct. 17 • 9 a.m. – 5 p.m.
- • • • Thursday, Oct. 18 • 9 a.m. – 3 p.m.





PHOTOS COURTESY OF NBAA

by Dianne White

2018 NBAA-BACE: Optimism and Opportunity

A conversation with NBAA's Ed Bolen

With only days remaining until the kick-off of the 2018 NBAA-BACE Convention & Exhibition, the business aviation community prepares to gather for three days of impactful, educational and thought-provoking keynote speakers, forums and exhibits. In addition, safety, emerging technologies and a focus on the emerging young leaders in business aviation will be among the major themes. All of this will take center stage at the upcoming convention scheduled for Oct. 16-18 in Orlando.

Last month, *Twin & Turbine* caught up with NBAA President Ed Bolen to discuss issues facing business aviation as well as what we can expect at this year's convention.

Twin & Turbine: *The Trump Administration's push to spin off U.S. air traffic control from the FAA to a so-called government-chartered nonprofit board was a difficult battle, and it was ultimately defeated. What's the key to ensuring the issue is not resurrected?*

Bolen: Fifteen months ago, President Trump held a press conference at the White House and said that his administration wanted to push for so-called privatization of our air traffic control system. Congressman Bill Shuster, chair of the House transportation and infrastructure committee, also was there and the White House effectively at that point were endorsing the Shuster bill, which effectively handed over ATC to an entrenched group of special interests.

As we now know, it was not privatization, but it was labeled as privatization. At that point, our community rallied like it had never has rallied before. It wasn't just the business aviation community, but the entire general aviation community came together to say that we wanted to modernize our system, not privatize it. Spokespeople such as "Sully" Sullenberger, astronaut Jim Lovell, and former Blue Angels and Thunderbirds pilots – people whose integrity and authenticity could not be impeached – came forward to speak out. Also speaking out were business leaders who not only run world-class businesses, but are also pilots. Mayors from around the country were engaged.

But mostly it was our community. We were seeing that our members were sending emails and making phone calls to Capitol Hill in record numbers. It had an effect. So as a result, this past spring



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Chairman Shuster announced that he was going to bring a bill to the House floor that did not contain the ATC so-called privatization. He stripped that provision from the bill and it passed the House overwhelmingly.

In the Senate, the FAA reauthorization bill is pending. They are working to try to bring it to the floor but the Senate calendar is very congested. So, my guess is when this article comes out the legislation will not have passed both the House and the Senate. I'm expecting FAA reauthorization will be extended from September 30th to December 31st, which would allow the lame duck Congress to take up the issue after the mid-term elections.

I think the good news on extensions is the sky doesn't fall in. But clearly a long-term reauthorization bill provides stability, creates a North Star for us to navigate by. The so-called privatization has been a distraction to getting a long-term FAA bill. I'm hoping that we can now put that to the side and get a long-term bill passed for three, four or five years. At this point it certainly looks as if the ATC privatization has been fully vetted and rejected. So we would hope it doesn't resurface in a lame duck session. But, obviously, we're going to remain very vigilant. There continues to be some people speaking positively about ATC privatization. We know that if we call on our community to respond they will.

Twin & Turbine: Mid-term Congressional elections are a big focus in the United States. How could the outcome potentially impact business aviation?

Bolen: Over decades we have seen that although different parties can be in charge of the House or the Senate, there is no one party that is consistently better or worse for business aviation. We have been able to find champions on both sides of the aisle and in both chambers that have been important at helping us get our message out. Sometimes those members are pilots, and that can be helpful.

Business aviation is not a partisan issue; it's an awareness issue. So, what we've been doing for the past several years is try to build a strong general aviation caucus in both the House and the Senate that helps us identify those people who understand our industry and are inclined to support it. Whatever the outcome of the elections are, we will be reaching out to our community asking them to help us build strong GA caucuses. We'll be relying on champions to help rally support and do some of the member-to-member outreach. But obviously elections have consequences so we'll see what changes,

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if any, happen in the House and in the Senate and we'll respond accordingly.

Twin & Turbine: *What other key issues is NBAA focused on right now?*

Bolen: One of the things that we did at our NBAA Regional event in northern California was work with the Northern California Business Aviation Association on a career day to address the issue of attracting and retaining talent. It'll obviously be a big focus at the NBAA-BACE in Orlando where we also will be holding a career day. In addition, we're very focused on promoting the top "40 Under 40," which shines light on young professionals who are making an impact on our industry. Everyone on both sides of the aisle in Congress, the airlines, and general aviation, want to attract talent into the aviation-aerospace industry. It's becoming a national priority and we certainly want to facilitate that.

Twin & Turbine: *Given the strong U.S. economy and business aviation's positive market indicators, what are your expectations for this year's convention?*

Bolen: At regional and industry events throughout the year, we have felt a sense of optimism and opportunity. This year's show will be focused on the changes that are taking place in the market and the exciting technologies and emerging trends that are feeding it.

We've got dynamite keynote sessions focused on new technologies, leadership and developing the next generation of business aviation leaders. In the technology realm, we will hear from the president of Uber Elevate who will talk about their vision for urban mobility vehicles. In addition, we'll have panel discussions that feature a lot of these emerging innovations and concepts.

Highlighting our theme on leadership development, Pamela Nicholson and Christine Taylor, the CEO and COO of Enterprise Holdings respectively, will lead a panel discussion and talk about their leadership of one of the country's most well recognized and successful companies.

NBAA's Young Professionals in Business Aviation (YoPro) has a full slate of events and programs. There will be a panel discussion titled "Young Professionals: Changing the Face of Business Aviation" to discuss how the industry can effectively bolster both its workforce and clientele by

engaging young professionals. Further, a few top "40 Under 40" rising leaders who will discuss their pathways to success, practical strategies for developing young talent and the value of building industry connections. We'll also host the annual YoPro Networking Reception.

We want to capture that enthusiasm and excitement, put it on display, combine that with kind of our challenges of attracting workforce. We just think it's going to be a magnificent event that takes place at kind of a key moment in the history of our industry.

Twin & Turbine: *NBAA-BACE features several safety events that will be particularly beneficial to the owner-pilot or single-pilot operator. Can you preview what attendees can expect?*

Bolen: NBAA-BACE will hold two significant safety events: the Single-Pilot Safety Standdown on Oct. 15 and the NBAA National Safety Forum on Oct. 18. At the safety stand-down, we will feature expert speakers and highly respected single-pilot aviators who will share their knowledge and offer practical information on operational safety

and risk mitigation. You'll hear from AOPA President & CEO Mark Baker and EAA CEO Jack Pelton, both businessmen, aviation industry leaders and accomplished pilots.

At the Safety Forum, we will focus on technologies that can help a pilot recognize they are moving toward an unsafe event. We will also talk about the physiology and psychology that affects human performance, airmanship, fitness for duty and the relationship between professionalism and aviation safety.

Both of those events will help us make sure people recognize the value of safety to our industry and see how people and companies are addressing those issues. These events will underscore how we as a pilot community can work together to constantly advance and enhance safety for our industry. **T&T**

Dianne White is an editor-at-large for Twin & Turbine Magazine. Previously, she was the editor-in-chief of T&T and she currently is the Executive Director of the Malibu M-Class Owners & Pilots Association. You can reach Dianne at editor@diannewhite.com

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The Difference Between Good and Bad Decisions

by Thomas P. Turner

Consider yourself in this situation: You're receiving your Flight Review in your own airplane. You're in the traffic pattern to a runway that is not terribly short, but your performance calculations reveal to be close to the minimum length you personally accept under the day's conditions. There's a 30-foot tall line of trees on the approach end of the runway fairly close to the end of the prepared surface. You notice on the instrument approach plate that the LPV glidepath and the visual glide slope are "not coincident," a hint of obstacles to visually avoid on short final once below Decision Altitude if you were flying the approach. You're very familiar with and current in your aircraft, and very comfortable flying with the flight instructor conducting your review. As you make the turn onto final approach, it's apparent that you will easily clear the trees, but that you're too high to touch down on the first portion of the short runway. *What do you do?*

If you're like most pilots with whom I fly as an instructor, you'll apply power and begin a bailed landing (go-around) climb. Return to pattern altitude, re-enter the downwind and try again.

Now consider *this* scenario: You're flying into a tower-controlled airport at the end of a long flight with your family to a favorite vacation getaway. The airplane is heavy with baggage, with the center of gravity well within limits but further aft than what is usual for you. The weather is fine and you're on downwind in a visual pattern to land. About the time you are abeam your touchdown spot, the tower controller asks you to fly a tight base to land ahead of a regional airliner that's on a five-mile final. *What do you do?*

Watching many airplanes that are in a bad position for landing over the years, my impression is that most pilots will attempt to make the landing. They'll throw out the flaps and landing gear, as appropriate, and bank steeply to dive at the runway. Often this results in an excessive rate of descent that threatens a damaging, hard landing. Other times, excessive speed builds in the descending turn and puts the airplane over the threshold flying far too fast, causing it to float a long way during the flare and threatening to make the aircraft go off the far end of the runway.

Another Scenario

While performing your Before Takeoff checklist, you notice that switching to the left magneto on your left engine provides a roughly 50 rpm drop from the "Both" switch position, but selecting the right magneto causes the rpm to drop 225 rpm and for the engine to run roughly, with the tachometer needle



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bouncing up and down. Thinking some of the engine's spark plugs may be fouled from combustion deposits, you select both magnetos, advance the power slightly and lean the mixture aggressively to increase the cylinder temperature and burn off the deposits. After about a minute, you re-do the magneto check. You find the left mag alone gives a 50 rpm drop, as before; the right magneto alone runs much more smoothly, but still gives about a 150 rpm drop and the tach needle still bounces a bit. *What do you do?*

My impression – based on 30 years of flight instruction and my own tendencies when faced with seemingly minor issues that appear to have at least partially corrected themselves – is that on a training flight most pilots would reluctantly call off the flight and taxi the airplane back to the mechanic's hangar. But outside of an instructional environment, I believe most pilots would mentally latch onto the minor improvement seen after aggressively ground-leaning. They'd rationalize that the problem was only a little carbon on the plugs, and that the heat and power of takeoff and climb would burn the rest off. I'd be tempted to make this rationalization myself. After all, it's running fine when both mags are selected, they'd think, and it got better with only a short exposure to a little extra heat during ground-leaning. What could go wrong?

What's the Difference?

A balked landing is a normal part of a required Flight Review. If you don't put yourself in a position to require a go-around while flying with an instructor, the instructor is going to have to manufacture a reason to see you practice the balked landing maneuver. We *expect* to have to fly a balked landing now and then during a training flight. A go-around is considered *routine* in a training environment. But we almost never go around outside of instructional flights.

A magneto check is a normal part of every departure, but we almost never see a bad magneto check. We know there's a "trick" of running the engine at moderate power with the mixture significantly leaned to burn off combustion deposits, and if that trick works – even a little – it reinforces that even more heat should result in even cleaner plugs. So, in normal operations pilots are conditioned to rationalize a takeoff following a bad magneto check, something they would probably never do with an instructor observing their actions.

In our day-to-day flying, we're far more focused on meeting the objective of making it to the planned destination. Anything less is "failure." Further, we want to tackle unusual situations and overcome obstacles between us and our objective – it's in our psyche as a pilot to solve problems and attain goals. A systems discrepancy is a problem to be solved. A request from a controller becomes a challenge, one that we naturally try to master.

Here's the difference: While a situation in training usually prompts a pilot to make one decision, a similar scenario in everyday flying tends to make pilots make a different decision. More succinctly, in training pilots are *pessimists* – we expect and look for problems, and make conservative decisions based on what provides the *safest* outcome or one. In non-instructional, "normal" flying, pilots are *optimists* – we assume things will always turn out well, and may even get better. We make decisions that we feel will result in the *expected* or most *convenient* result,

which usually means continuing as planned to the intended destination or “rising to the challenge” when prompted to do something unusual or that requires advanced skill.

I'm convinced that the difference between good decisions and bad ones is *mindset*, or the proper outlook toward the conduct of a flight. Pilots look for trouble during instructional flights (pessimists) and make decisions based on getting out of that trouble. In all other flying, pilots tend to ignore trouble even when it is blatantly obvious, or they assume that things will get better whether there is evidence to support it or not (optimists). Balked landings, getting a mechanic to check out an indication before you fly, diverting because of weather, failing to run a checklist you'd use with an instructor or evaluator at your side... any number of other decisions you must make every time you take up the mantle of Pilot-in-Command are not limitations on your day-to-day flying, they are additional options you have available to help you master your aircraft and to keep your passengers and yourself safe.

We all just need to be a little less optimistic when we fly. You've probably heard it before, but the adage is true: To make good decisions, train like you fly, fly like you train. 

Thomas P. Turner is an ATP CFII/MEI, holds a master's Degree in Aviation Safety, and was the 2010 National FAA Safety Team Representative of the Year. Subscribe to Tom's free FLYING LESSONS Weekly e-newsletter at www.mastery-flight-training.com.



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The Big Things About Little Engines

*Bigger, faster, stronger...it's always better, right?
Well, maybe so and maybe no.*

by Joe Casey

In aviation, smaller can bring some real benefits if there are size constraints. The airplane that can't fit in your hangar will not do a lot of good. And parasite drag is directly commensurate with the size of the object being hurled through the air. The only thing that overcomes drag is thrust, and thrust can cost you a bundle. So, smaller can be better from an efficiency standpoint.

Consider faster. Faster sure seems better, but those 30 extra knots that your next "dream airplane" may provide can come at an exponential cost. Not only do the bigger engines require more fuel, they also have a larger engine reserve cost (the engine overhaul cost divided by the TBO expressed in a cost per hour). Speed is expensive.

Stronger also appears better, but strength usually brings his "best friend" weight along for the ride. And weight is not a friend in aviation if you are interested in a good climb rate, fast speed or higher useful load.

Yet, the market almost always prefers bigger, faster and stronger. And a premium is frequently paid by those who simply gravitate to the biggest, fastest and strongest. But herein lies an opportunity for those who choose to actually analyze their mission, do the math and approach an airplane purchase without bias. In the world of aviation, there is oftentimes a better deal found in smaller, slower and weaker options, especially when aircraft engines are considered. A puffed-out chest in the airplane buying process can end up costing money for no other reason than feeding an ego.

Let's consider a practical example. I fly both a -6 powered King Air B100 and a -10 powered King Air B100 regularly. The engines are the exact same design, but the -6 engine is slightly smaller, developing less thrust at higher altitudes. I keep very accurate data for both airplanes and fly both

over 100 hours per year. What's the difference? At the end of the analysis, the difference is 14 knots of cruise speed (262 KTAS vs. 248 KTAS), two minutes of climb to FL230, five-minutes on a 400 nm flight, 10 gallons/hour in fuel burn and no change in payload. But, any -6 powered King Air B100 will cost hundreds of thousands less than the -10 variants.

Consider the JetPROP. The most popular engine on a JetPROP is a PT6-35 engine, but a PT6-21 version is also available. The -35 version probably outsells the -21 version by a 10-to-1 ratio but the differences are relatively minor: 17 KTAS (260 KTAS vs. 243 KTAS) of cruise speed, 3 gallons/hour (32 gph vs. 29 gph) in fuel burn and the time to climb to FL270 is only about a three-minute difference. But, the -21 JetPROP can be purchased for \$90,000 less (on average). Personally, I think the -21 JetPROP is one of the best values in the PA46 world, mainly because it can be purchased at a lower price point and it still flat-out performs.

And, what exactly is the difference between a Continental 520 and a Continental 550 engine? The difference is in the stroke of the piston. A 550 engine has a 4.25-inch stroke and the 520 has a 4-inch stroke. However, both engines produce the same amount of horsepower as the 520 engine has a higher manifold pressure limit. So, the 550 engine breathes a bit better at high altitude, but the 520 is still a remarkable engine that serves many owners on many airplanes well. Still, the 550 version of any airframe will sell better than the 520.

My point in all of this is to consider the value that is found in an airplane that has the smaller engine. Most buyers in a particular category will dismiss the small engine airplanes purely based on "numerical prejudice," meaning they simply feel that the bigger number must mean that it is "better." The bigger number does not mean it is better, it just means it is different. If you are a buyer of a twin or turbine airplane, I recommend taking a serious look at the smaller engines because a deal can oftentimes be found.

For instance, if you want a King Air 90, you'll find lots of examples on the market, but the best deals are found on

an earlier King Air 90 with the PT6-21. Yes, the versions with the bigger engines will go a little faster and climb a little quicker, but the small engine versions can be bought for a song and they "sip" fuel compared to the bigger engines. The fuselage size, panel real-estate and cabin differential pressure are all the same. The wise owner of the smaller-engine version can smile all the way to the bank.

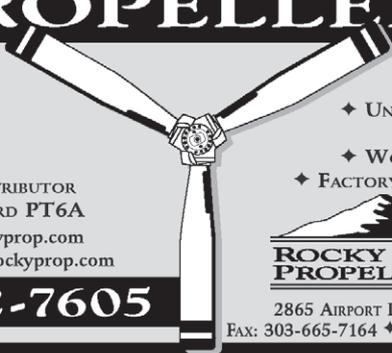
Most popular flight planning software (FltPlan.com, Foreflight, etc.) even have profiles set up for the various engines on the various airframes. Whenever I

help a customer purchase an airplane, I always create a spreadsheet with the most common flights and contrast the block-to-block times and the fuel burn expectations. The difference is usually negligible.

One other interesting thing about the smaller turbine engines: they usually develop similar torque at low-density altitudes. This translates into the nearly identical ground rolls on takeoff, and the initial climb rate is also almost identical too. Since both the larger and smaller engines have similar max torque

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Using Flight Planning Software for Performance Comparisons

Winds Aloft HELP	FL280 ISA(-41) Comp	FL260 ISA(-37) Comp	FL240 ISA(-33) Comp	FL220 ISA(-29) Comp
KCOS0500	288/017 +14 -016	297/013 +15 -012	297/008 +16 -008	294/010 +16 -009
KCOS0400	277/021 +14 -017	282/019 +15 -017	286/015 +16 -014	296/014 +16 -013
KCOS0300	268/029 +13 -022	276/026 +14 -021	285/019 +15 -017	297/018 +15 -017
KCOS0200	282/029 +10 -026	290/024 +12 -022	297/019 +13 -019	302/018 +12 -018
KCOS0100	293/023 +09 -022	296/018 +10 -018	296/015 +11 -015	300/016 +11 -016
Avg. Trip Winds=>	-21 Headwind	-18 Headwind	-15 Headwind	-15 Headwind
FLT TIME==>	ABOVE MAX ALT.	3:08(+00) 232TAS	3:04(-04) 235TAS	3:03(-05) 234TAS
Fuel Burn==>	---	96.0 Gal.	98.3 Gal.	101.1 Gal.

-21 JetPROP

Winds Aloft HELP	FL280 ISA(-41) Comp	FL260 ISA(-37) Comp	FL240 ISA(-33) Comp	FL220 ISA(-29) Comp
KCOS0500	288/017 +14 -016	297/013 +15 -012	297/008 +16 -008	294/010 +16 -009
KCOS0400	277/021 +14 -017	282/019 +15 -017	286/015 +16 -014	296/014 +16 -013
KCOS0300	268/029 +13 -021	276/026 +14 -021	285/019 +15 -017	297/018 +15 -017
KCOS0200	282/029 +10 -025	290/024 +12 -022	297/019 +13 -019	302/018 +12 -018
KCOS0100	293/023 +09 -018	296/018 +10 -018	296/015 +11 -015	300/016 +11 -016
Avg. Trip Winds=>	-20 Headwind	-18 Headwind	-15 Headwind	-15 Headwind
FLT TIME==>	ABOVE MAX ALT.	2:54(+00) 252TAS	2:56(+02) 244TAS	3:00(+06) 236TAS
Fuel Burn==>	---	95.4 Gal.	94.5 Gal.	95.3 Gal.

-35 JetPROP

Most popular flight planning software has profiles set up for the various engines on the various airframes. This makes it easy to contrast block-to-block times and fuel burn expectations among different engines. In this example, I have used FltPlan.com to compare the -21 and -35 JetPROP (under the same conditions) in a flight from KSJO to KCOS. As you can see, the difference in performance is negligible.

available values, the difference in power is only seen when the engine becomes “temp-limited,” meaning that the limit of power available is limited by the ITT, not torque.

Every turbine driver knows that an engine will become temp-limited at a certain altitude (dependent upon temperature), and the smaller engines will become temp limited at a lower altitude. It is only then that the difference in torque between the larger and smaller engine becomes apparent. As an example, the -6 powered B100 I operate will develop the same torque as the -10 when departing my home airport (KJSO, 670 ft. field elevation). Both airplanes will takeoff equitably, and both will climb equitably through about 10,000 MSL. However, the -6 version will become temp limited earlier than the -10 version, and then the -10 version will develop more torque for the rest of the flight, climbing better and cruising faster.

The altitude where the engine is temp-limited becomes critical for the pilot who operates from high-density altitudes. I’ve departed Santa Fe, New Mexico (KSAF, 6,348 ft. field elevation) in the summer heat and was temp limited on the takeoff roll in the -6 powered B100. Had I departed on that same day in the -10 powered B100, I probably would not have been, and the takeoff performance and climb would certainly be better with the bigger engine. So, if you operate out of high-density altitude airports, you might be one of the few who would want to more strongly consider the bigger engines available on a particular airframe.

But there is a catch here. Remember, what comes around goes around...if you purchase that smaller-engine airplane for a lesser price, the market will almost always want to pay you a smaller price when you sell, and there will be fewer buyers for that smaller-engine airplane when you do sell. My advice? Seek out

the best example of whatever type airplane you wish to purchase and nearly disregard the type of engine. Find the one with the right avionics, nice paint/interior and excellent maintenance pedigree. If that airplane happens to be a small-engine version, great! There will be some wonderful efficiencies that you’ll grow to appreciate.

Stay tuned for my next article where I will explore the reverse: why bigger engines are worth considering. 

Joe Casey is an FAA-DPE and an ATP, CFI, CFII (A/H), MEI, CFGI, CFIH, as well as a U.S. Army UH-60 standardization instructor/examiner. An MMOPA Board member, he has been a PA46 instructor for 16-plus years and has accumulated 12,000-plus hours of flight time, 5,500 of which has been in the PA46. Contact Joe at: www.flycasey.com, by email at joe@flycasey.com, or by phone at 903.721.9549.

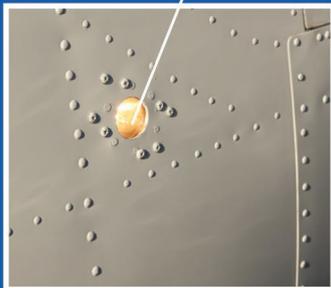
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481 PIPER MERIDIAN
3 ROCKWELL 680T TURBO
5 ROCKWELL 680V TURBO II
5 ROCKWELL 680W TURBO II
4 ROCKWELL 681 HAWK
98 SOCATA TBM-700A
68 SOCATA TBM-700B
292 SOCATA TBM-850
102 SOCATA TBM-900
5 STARSHIP 2000A
70 TURBOCOMMANDER 1000
38 TURBO COMMANDER 690
140 TURBOCOMMANDER 690A
139 TURBOCOMMANDER 690B
79 TURBO COMMANDER 840
24 TURBO COMMANDER 900
56 TURBO COMMANDER 980

Twin Piston - 6,507

Owners

Count	Aircraft
37	BARON 56 TC
1433	BARON 58
2	BARON 58 PA
345	BARON 58P
108	BARON 58TC
3	BARON A56TC
321	BARON G58
188	BEECH DUKE B60
162	CESSNA 340
520	CESSNA 340A
70	CESSNA 402B
	BUSINESS LINER
133	CESSNA 402C
24	CESSNA 404 TITAN
247	CESSNA 414
357	CESSNA 414A
	CHANCELLOR
43	CESSNA 421
38	CESSNA 421A
335	CESSNA 421B
607	CESSNA 421C
53	CESSNA T303
106	PIPER 601P AEROSTAR
24	PIPER 602P AEROSTAR
442	PIPER CHIEFTAIN
314	PIPER MERIDIAN
25	PIPER MOJAVE
315	PIPER NAVAJO
13	ROCKWELL 500 SHRIKE
24	ROCKWELL 500A SHRIKE
77	ROCKWELL 500B SHRIKE
44	ROCKWELL 500S SHRIKE
5	ROCKWELL 500U SHRIKE
12	ROCKWELL 520
	COMMANDER
5	ROCKWELL 560

COMMANDER
11 ROCKWELL 560A
COMMANDER
7 ROCKWELL 560E
COMMANDER
7 ROCKWELL 560F
COMMANDER
13 ROCKWELL 680 SUPER
3 ROCKWELL 680E
14 ROCKWELL 680F
COMMANDER
14 ROCKWELL 680FL
GRAND COMMANDER
6 ROCKWELL 680FLP
GRAND LINER

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Count	Aircraft
225	BEECH BONANZA
429	CESSNA 182
54	CESSNA 206
393	CESSNA P210N
21	CESSNA P210R
52	CESSNA T182
1	CESSNA T206
782	CIRRUS SR20
2920	CIRRUS SR22
238	PIPER MALIBU
104	PIPER MATRIX
449	PIPER MIRAGE

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Attitude: The Theory of Everything



by **Scott Kraemer**

After having flown with hundreds of pilots over the years, I've noticed huge variations among the group as it pertains to each individual's innate ability, dedication to precision and attitude toward their continued education and thorough training.

While some pilots are truly naturals when it comes to stick and rudder, others are masters of the technical aspects and easily spout chapter and verse regulations or procedures. Some are a jack of all trades, but maybe masters of none. But the pilots who lack good judgement are the hardest to teach and often require unfortunate hard knocks (with possible drastic consequences). Undoubtedly, training and learning is an individual sport. But in the intellectual arena of pilot training, there are many variables regarding teaching and learning effectiveness that often boils down to having not just the right stuff, but the right attitude.

From my first introductory flight, my naive fascination grew rapidly from a romantic allure to the realization that flying professionally was a huge physical and intellectual gauntlet. In the beginning, I might have been attracted to flying as someone once told me that girls dig pilots? At the time, a motivating factor but not as true as I'd thought. With my ego bruised, I realized my degree of ignorance and naiveté regarding the art of flying was nothing less of inept. There was just so much to know and learn!

But undaunted, I jumped all in. I truly had a thirst for aeronautical knowledge. With student loans mounting, notably a small price to pay toward an investment in self-preservation, I had my eye on a potential future career. Idealistically, I was hooked on the romance of flying with a cocky, "I can do this." But those notions dissolved with time as I began to realize "cocky kills" and your only armor is doing the work, checking the boxes and practicing to perfect your skills.

When I passed my first check ride, I remember my examiner quoting the old prophetic cliché, "Congratulations, you now have a license to learn." So, it was official. I was a neophyte with a license to fly a loaded gun. In my novice view, the "license to learn" mantra hit home as a true revelation. It was a reality check that this vocation absolutely demands an exceedingly high degree of enduring

commitment, honed skills, time and a lot of money. Plus, I realized that hoping to be a lucky pilot flying on a “wing and a prayer” was no way to succeed long-term. Training would be key and over the years, I have seen pilots approach the training arena a number of ways.

There are the pilots who complete the bare minimum to keep legal. Maybe they are overly cost-conscious and wish to devote minimal finances and time to it. For others, it might be an annoying necessity to meet their employer's requirement and they'd rather be home mowing the lawn. For nervous pilots, they absolutely dread being put on the spot, fearing they might fail miserably. Or for those who anger easily and are prone to fits of rage when things don't go right, a possible NTSB investigation looms in their future. For the feebly skilled, they of course fear having to perform under an instructor's scrutiny only to be found inadequate.

I have found the best of the best in the business are those individuals who embrace, explore and recognize their own weaknesses and actually invite a training situation challenge. You could hit them in the head with a frying pan when the red lights come on and they would remain cool, calm and collected. Much of my own growth in this vein came from flying with and learning from highly experienced old dog pilot mentors. Once when my head was in the wrong place, my mentor quoted the old saying, “There are old pilots and there are bold pilots, but there are no old bold pilots.” Positively true words to live by. (This same pilot also gifted me a plaque that hangs above my bar at home. The plaque reminds me of the “8-hour bottle to throttle” rule. Equally important words to live by.)

Hopefully, we're all in this to fly by the book with time learned skill, precision and safety-oriented judgement. Just as important is self-reflection of your own inadequacies. The over and under of it turns out to be a personal choice. If you fly as an owner-pilot either for business or pleasure, you likely train to be legal where a biannual flight review, instrument competency check and/or multi-engine review will suffice. That's great if your review and training session is led by a true professional instructor. But make sure you're not just doing the minimum.

Attaining quality, professional training from a credible source is imperative. Pilots beware of the shade tree instructor and logbook pencil whipper. Though they may make you legal, are you truly safe and proficient? To avoid this debacle, I highly recommend you train like a professional with professionals. Oh, and clear your head of business pressures prior to setting foot onto the tarmac. Remember, show time requires a thorough preflight and a sterile cockpit in flight.

I personally think that training through a formalized training institution equipped with simulators and classroom learning sessions is by far the best insurance policy you can ever buy. Additionally, your positive attitude and work ethic plays as big of a role in how effective you are at being a safe pilot. My fortune in training came from working with experienced high-time professional pilots, plus being employed by a company that invested heavily in each of us as line pilots. Also, without revealing names, I met all kinds of training-resistant, unexceptional pilots along the way, full of excuses regarding their deficiencies. I did not want to be one of those guys.

Examples of the potential terror in the skies include: the pilot who complains incessantly about having a late-night simulator time – *get over it*. Or the one who feels that ground school doesn't need to teach us how build a plane – *it helps to understand the nuts and bolts*. Or, he or she that brings up unrelated or personal problems to a training session – *leave it at the cabin door*. Or, once he or she learned

the system was “automatic,” they needed to know no more about its interworking's. Or, “this simulator just doesn't fly like the real airplane” – *I say “duh” to that one*.

The worst, however, is the pilot who is an emotional wreck and brings personal negative baggage to work. This leads to their getting angry and upset when not doing well or when things don't go their way. Beware the angry bird I say; they'll hurt you with their petty anger. Whatever a pilot's excuse or particular inadequacies, all of these distractions are avoidable if you're dedicated to being the best you can be and a true professional – paid salary or not. Professionalism is a personal choice and leads to better than average judgement and safety.

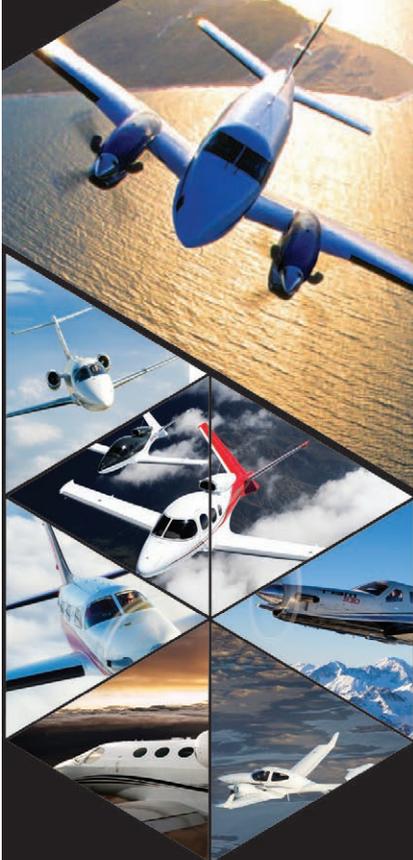
In reflection, judgement is not genetic but a learned persona. From my initial training, all the way up to formal Flight-Safety courses (plus actual flight experience), I remember times when I felt undertrained and then sometimes over trained. Undertrained was the easier one to fix. One more crosswind landing; an extra sim session; read the book; memorize memory items; talk to experienced pilots; etc. But over trained was a unique situation that typically was born out of situational fear.

Sometimes I found myself spring loaded in the ON position for a maybe emergency. I was so proud that I had memorized the checklist that I would unwittingly race through a checklist procedure at lightspeed. But speed can kill and inadvertently create an even worse problem. Grab the wrong switch;



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turn the fuel off; push or pull the wrong flight control; etc. I highly recommend taking a more calm and methodical approach to an emergency diagnosis. As an example, if you run a gas tank dry (not recommended) and the engine quits, you change to what you believe is the fuller tank but it seems to take an eternity to re-ignite. So, you panic and assume you're somehow out of fuel. You then aggressively move to completing the entire emergency ditching procedure and hastily shut the fuel off when in fact, a few more seconds of "wait and see" would have kept the motor(s) running. It happens by the way, and it can create a real-time emergency. Thus, proving haste indeed makes waste.

Meditate on this: ongoing training is a privilege to embrace with an open mind and positive attitude. Knowing your aircraft and your limitations before you slip into any cockpit is key. On one occasion, when I'd lost focus of what's most important in any career, a close pilot friend pulled me aside and said, "What you do for a living does not define you as a human being – how you do your living does."

Training is a very personal evolutionary journey that improves your safety consciousness, situational awareness and enhances your total appreciation of flying. After all, there's a lot to lose by not being well-equipped for any mission and far more to gain by being prepared. **T&T**



Scott Kraemer is a 35+ year veteran in the business aviation industry, with 27 of those years spent in the sales and marketing department at Beechcraft Corporation. Scott holds a Commercial Pilot License and has logged over 7,000 hours in more than 50 aircraft models. Presently, Scott is an Executive Director for Holstein Aviation specializing in aircraft acquisitions, sales and consultation. You can contact Scott at jscottkraemer@gmail.com.



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1. Can you describe your start at Beechcraft? What about the products/brand kept you hooked for 34 years?

When I started, Olive Ann Beech was still there. When you came to the factory to pick up your new airplane, the highlight of the day was lunch with the Grand Dame of our industry. She brought a touch of elegance to the process and made sure each customer knew how much they were valued. Also, we were a very tight Beechcraft family. It was a work environment that is hard to duplicate today.

The typical customer buying a new King Air was a small businessman who took a huge risk somewhere along the way. Picking up their new airplane was a proud moment for them. The quality of those customers, many of whom remain friends today, made it easy to want to stay hooked that long.

2. In your opinion, why is the King Air still a success today - more than 50 years after its introduction?

Because Walter and Olive Ann got it right when they focused on cabin comfort. Most new designs today are moving the focus back to the cabin at the expense of some performance. Embraer, HondaJet and the new designs from Textron all are coming to market with this mindset. Today, if you can tout the bigger cabin cross-section, flatter-floor and larger entry door, you stand a very good chance of being the market leader in your segment. Top speed (Lear, Citation X) has given way to cabin comfort, and that is what the King Air has always been about.

3. What led you and Co-Founder, Tom Bertels, to form Partners in Aviation (PIA) in 2016?

One beer too many, like any good idea. Tom's expertise was messaging to the aviation industry while my experience was working with successful entrepreneurs who saw the need for an aircraft, but struggled with cost justification of sole-ownership. It wasn't that they couldn't afford the whole airplane, it was that it didn't make good business sense for the amount of flying they required. Some dabbled with supplemental charter but most saw that as a poor use of their investment. Partnerships made the most sense mathematically, but there was no easy path or well-defined structure.

We wanted to build a company whose sole purpose was matching two regionally-based operators to split the acquisition and fixed costs of aircraft ownership – to become a kind of “match-dot-com” for business aircraft. With the help of experts in aviation tax, law and management, we worked to redefine DIY partnership into managed co-Ownership. This program differs from standard partnerships in four major areas: how you own it; how you share it; how you exit it; and how you are protected, both legally and financially. It borrows from the fractional industry by providing autonomy between Co-Owners, logical exit options and access that rivals sole-ownership – but at a much lower per-hour cost.

4. Who is the primary audience for PIA's managed co-ownership model?

We cater to operators flying from 75 hours up to 200 hours per year. The majority fly between 100 and 150 hours annually. For those flying less than 75 hours, charter, jet-cards, and fractional-membership programs work best. Above 200 hours, sole-ownership makes sense. But for those flying around 100 to 150 hours/year, co-ownership offers the lowest cost-per-hour. We have matched two owner-pilots, two back-seat riders and owner-pilots with back-seat riders, so our audience includes owners who turn right or left when they enter the airplane.

5. What is one of your all-time favorite flying memories?

When we started flying and demonstrating the Starship which, while not a marketing success, was an amazing airplane in its own right, we would become “the show” at any airport we flew into. People would stop what they were doing and come over to get a closer look. One day we flew into a small airport in Ohio that was in the middle of Amish country and locals literally came walking out of the corn fields to see this machine that had just flown over their community. It was like a scene out of Field of Dreams. 



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Garmin Upgrades the Venerable Citation Excel/XLS

by Rich Pickett

Operators of the Cessna Citation Excel and XLS (CE560XL) will soon have a great opportunity to upgrade their airplanes with the latest avionics technology. Garmin is in the final stages of certification of the G5000 avionics suite for the Excel and XLS, which they expect to be completed in Q1 of 2019.

The Excel, with Honeywell Primus avionics, was certified in 1998 and 308 models were produced before performance and other upgrades resulted in the XLS in 2006. Cessna then sold 330 models of this version before the latest factory version, the XLS+ rolled out in 2008, featuring the full Rockwell Collins Pro Line 21 avionic suite. The G5000 upgrade is a total replacement of the avionics in these models, including the autopilot. Based upon the popular Garmin G3000/G5000 series, this Garmin upgrade offers operators vastly improved situational awareness and the ability to access RNAV/GPS approaches with lower minimums, thanks to the inclusion of WAAS and PBN/RNP 0.3 LPV/APV approach capabilities.

The package also includes the integrated digital Garmin Automatic Flight Control System (AFCS). In addition to the obvious advantages of an integrated auto-flight system such as precise steering and fault detection, the Garmin AFCS offers Emergency Descent Mode (EDM), first found in the Citation Mustang and Embraer Phenom 100. If the aircraft experiences a loss in pressurization at high altitude, the autopilot will switch to heading mode, turn left 90 degrees from the current course and descend to 15,000 feet. (Note, since the 560XL does not have autothrottles, the pilot still has to reduce the power to idle to complete the emergency descent procedure, however it does make the process easier.)

No new avionics upgrade would be complete without ADS-B Out and WAAS. While ADS-B In is not available at this time, with the increased processing capability of the G5000, multiple SiriusXM weather products can be displayed simultaneously on the displays if operators choose this option. This upgrade also includes the Doppler-enabled Garmin GWX 75 weather radar in the package. If the owners wish to have the latest in Garmin weather detection, an optional upgrade is the Garmin GWX 80 Radar which provides a 3D scanning of potential precipitation hazards as well as hail, lightning and wind shear prediction. This upgrade will be available after the STC is completed.



Garmin's G5000 upgrade is a total replacement of the avionics in legacy Citation Excel/XLS aircraft.

The integrated autopilot system controller is located where the annunciator panel was before. This is possible since Garmin has integrated all of the annunciator features, and engine instruments into the displays. All messages and engine information now appear on the displays with the integrated Engine Indicating and Crew Alerting System (EICAS), providing pilots easy access to the status of their engines as well as advisory, caution, and warning messages. In addition, the battery emergency bus now powers the pilot's PFD, MFD as well as other components.

Garmin offers multiple communication enhancement options to meet various operational requirements. With the increased use of Link 2000+ and CPDLC (Controller Pilot Data Link Communications) many operators upgrading to the G5000 in the Excel/XLS will probably choose this communication option, or the simpler package that omits CPDLC however it does provide PDC (Pre-Departure Clearance) and digital ATIS capability and other functions.

Operators upgrading will also probably opt for the \$35,000 Awareness and Protection (A&P) package that includes Synthetic Vision Technology (SVT), Garmin's SurfaceWatch, Underspeed Protection and the Flightstream 510 wireless connectivity card. The Underspeed Protection (USP) is a unique feature and provides active airspeed management with the autopilot, as well as enables fully coupled go-arounds on approaches.

Most new avionics suites offer pilots a way to wireless communicate between their Personal Electronic Devices (PED) and the panel. The Garmin Flight Stream 510 included in the A&P package is essentially a special purpose SD card which has both Wi-Fi and Bluetooth connectivity. Wi-Fi is used for database updates and Bluetooth is used for sharing of traffic and weather with up to two mobile devices when connected to the G5000 avionics suite. It fully supports all of these features on Garmin's Pilot app and some of the features with other third-party applications such as Foreflight.

Excel owners can expect to spend approximately \$500,000 for this upgrade package, plus options. Early adopters have received additional warranty upgrades and database subscriptions, however even if owners didn't get a chance to take advantage of early commitments, they still receive three years of warranty.

This upgrade, which also saves 200 pounds when the legacy avionics are removed, is a great option for Excel and XLS owners. Garmin has been working alongside Textron Aviation

on the STC, which will be available at Textron Service Centers and a number of other Garmin dealers. Stay tuned for an in-flight review in the coming months. **T&T**

Since receiving his private pilot's license in 1977, Rich Pickett's passion for flight has only intensified. President of Personal Wings, Inc., Rich is the former chief information officer for San Diego State University. With more than 10,000 hours in the logbook he holds ATP, CFII SMEL, AIGI, commercial SES and glider ratings. His type ratings include Citation 500, 510S, 525S, Eclipse 500S, the Aero Vodochody L-39 and L-29, and SIC on the DA-10. He serves on the NBAA Citation Technical Advisory Committee.



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Old Dogs & Old Airplanes

by Kevin Ware

Airplanes can be like an old hunting dog – very much liked and appreciated, but after years of faithful service, they regrettably need to be “put down.” This was recently the case with our old Lear 35.

Knowing it was to be our Lear 35's last trip before its final flight to the “vet's office,” fellow pilot Rick and I conducted a sort of airplane “memorial service” on a return trip from Spokane. For a moment, I thought I might even need to hand him a Kleenex to wipe his tears as we discussed all of the places we had travelled in this particular airplane. But of course, the airplane had no idea what its future held, so with an empty cabin and a light fuel load, it performed more like a young greyhound versus an arthritic old hunting dog. We zipped up to FL360 at 5,000 feet per minute, went two miles above the cloud layer and settled into a cruise at Mach .78. All of this was easily accomplished as we reflected on the flights we had taken in the airplane.

Just the previous week, we were in Minden, Nevada (KMEV) ready to depart with the airport surrounded by thunderstorms and lightening, making an IFR departure along the mountains impossible. Airline traffic out of nearby Reno was delaying departures left and right, but while sitting in the Lear 35, we could see an area of blue sky and sunlight to the southwest along with a clear but narrow visual corridor. It was nowhere near the published IFR departure routes, but the only thing required to depart VFR was the ability to climb at a good 5,000 feet per minute after takeoff in order to clear the mountains and remain in visual conditions until reaching FL180 and coordinating IFR with Oakland Center. We knew the old Lear could handle it so after advising Reno Departure of our intentions, we took off VFR. Four minutes later, we were climbing through 17,000 feet, 10 miles west of Lake Tahoe in bright sunlight – well clear of the thunderstorms back on the east side of the Sierras. We gave a pilot report to Oakland Center, were told we were the only traffic that had departed and promptly got our IFR our clearance back to Portland, direct no less.

We reminisced about other trips like Valdez, Alaska in the middle of a freezing winter snow storm. Ice was on the runway and braking was so minimal that we had to keep the reversers armed until shut down. A week after that, we took a trip to intolerably hot Palm Springs, with its high-end hotels, pools and golf courses. The old airplane took us to these places of extreme contrast without a single complaint. Hot or cold, it was always patiently waiting on the ramp ready to go. But, in spite of its continued performance and attractive appearance that made the cover of *Twin & Turbine* in 2013, it was time for the old cover girl to permanently be put away.

The problem with airplanes as they age is that although they can still fly fast and high, they need more and more trips to the “veterinarian.” Their avionics can become very outdated and prohibitively expensive, if not impossible to fix. In a 1980 Lear 35, there are no glass screens, autopilots with altitude pre-select, or even a flight director on the

co-pilot side. And parts for that equipment are almost impossible to find. Another sign of age is the fuel control panel. Lots of tiny switches with the same white cover and located on the center console such that in order to make any changes, you must take your eyes off the instrument panel for an inordinate amount of time. Plus, you have to be very careful about what changes you make because hitting a couple wrong ones can easily result in the engines shutting down due to fuel starvation. Then of course there is the solitary fuel gauge with its rotating selector to tell you how much is in each of the five tanks. Even old piston twin Cessna's have more fuel gauges than that.

Another quick sign of age is the required paper performance charts. In a jet aircraft, the speeds for takeoff, approach and landing all vary with the aircraft's weight, runway condition and temperature. Aircraft of more modern vintage have computer systems onboard to calculate these numbers. But those like our old 35's vintage just has a bunch of charts and tables, all in very small print from which the pilots need to glean the appropriate information. Typically, it is pretty simple because we create our own smaller versions of the tables for the most common conditions. But depart slightly from those, and it is time to dig out the long-eroded 4-inch-thick flight manual and turn to the pages in the back, which often seem thinner than those of an old bible.

Back in the cabin, refurbished upholstery may give passengers a false sense that the airplane is not that old, but there are strong hints to the contrary – like when the only baggage area is behind the aft cabin seat. This means everything must be boarded through the cabin door and hauled aft along the narrow corridor. The rear seatback then needs to be tilted forward by releasing a hidden handle that is old engineering even by the standards of a 1955 Chevy. Once all of the baggage and passengers are boarded, then the cabin door itself has to be closed with a most cumbersome locking procedure. It involves lifting the heavy lower door via a T-handle, bringing down the upper one, running a small electric motor controlled tightening device, then throwing the door handle into

the locked position and finally running the locking devices motor backward to release that lock. Pilots avoid being the last to board simply because of the door closing challenge.

And you better hope that after closing the door, none of your passengers decide

they need to make a bathroom trip for the remainder of the four-hour flight. Not an option in these old “plumbing free” jets. Astute passengers know about this and cut back on fluid intake the night before. For the less sophisticated passengers, the pilots learn to discreetly have a couple of old plastic coffee containers



onboard. In the older airplanes, you also hope your passengers came dressed for the conditions...it can be too hot or too cold depending on where they sit. Given the air distribution system, one might be feeling just fine, while his fellow passenger feels as though they are either in a sauna or deep freeze. Smart passengers board with a variety of clothing options at hand.

Often, the unlucky passenger sitting behind the cockpit gets the duty of dealing with the onboard hot coffee dispenser – a task which should have its own full page

checklist. The problem in an old airplane like the Lear 35 is the coffee spout has a button on the end that opens the valve to allow the coffee to run out via gravity. The distance from that button to the cabinet door is just fractions of an inch when the door is closed. While pouring coffee, if the container and coffee spout get moved just a tiny bit and the cabinet door is closed, it can press the button and over the next half-hour, two quarts of potentially corrosive coffee will silently leak out onto the carpet and down into hidden fuselage spaces containing complex (and difficult

to replace) electronic parts. For some reason, whenever this occurred on a trip, the frustrated mechanics always seemed to blame the co-pilot. One of the few persons in a Lear 35 that cannot even see or reach any part of the coffee system.

By comparison, the other Lears and Citations we have in the hangar are a good 20 years newer. They have single-point refueling, glass gauges for each tank, nice baggage compartments outside the cabin, simple door mechanics and a flight management system which completes all of the pre-takeoff speed calculations on large computer screens. Not to mention, the coffee dispenser is designed such that anyone can operate it without spilling a drop, the cabin temperature is individually zoned, and finally, there is a nice bathroom in the aft end with both hot and cold running water. In spite of these nice amenities however, we still have an affinity for the old Lear, just like one might have with a faithful old dog.

So, after returning from our Spokane flight, we did our best to avoid the hangar the next morning. We almost felt like traitors as a strange crew showed up and flew the old Lear away to a place from which it will never return. It turns out the engines will be removed and sold separately, then very slowly it will be surgically dissected for its parts, with any unwanted remains finally being melted down – sort of an airplane cremation.

Inanimate object or not, as the airplane left, we felt similar feelings as if we were watching our old dog enter the vet's office for its final time – very sad and just a bit guilty. 



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Kevin Ware is an ATP who also holds CFI, MEII and helicopter ratings, has more than 10,000 hours and is typed in several different

business jets. He has been flying for a living on and off since he was 20, and currently works as a contract pilot for various corporations in the Seattle area. When not working as a pilot he is employed part time as an emergency and urgent care physician. He can be reached at kevin.ware2@aol.com.



From the Flight Deck

by Kevin R. Dingman

Guppy Maximus

The Boeing 737 MAX: Guppy or Sardine?



PHOTOS COURTESY OF BOEING

Almost two years, several flight physicals and a few check rides ago, I reluctantly transitioned from the left seat of the Mad Dog to the left seat of the Guppy (see “Guppy School,” *T&T* Jan., 2017 and “In the Groove,” *T&T* Jun., 2017). The latest iteration of the long-lived line of the B-737 Guppy is called the MAX and you’ll likely not hear it called the “Guppy” anymore. The original 737-100’s signature, short and plump “guppy” namesake no longer describes its profile.

The length is now proportional to the girth as the MAX is the longest bodied variant of the venerable airliner to date. It can be recognized by downward projecting winglets called scimitars (sim-it-tars; for better aerodynamic efficiency), the not-as-flat on the bottom, large diameter Leap 1B engine inlets (for 15% better fuel efficiency), the scalloped trailing edges of the engine cowls (for noise reduction), a longer tail cone as well as the longer fuselage. While these are all great improvements for pilots and profitability, some contend that it’s not so nice for passenger comfort – more on this in a bit.

The Airframe

According to Boeing, the new 737 MAX scimitar winglets are the most efficient ever designed for a production airplane. The combination of advanced design and manufacturing techniques allow for natural laminar flow and delivers the greatest contribution to improved fuel efficiency of any winglet. The fly-by-wire spoilers incorporate automated maneuver load alleviation for certain flight conditions, emergency descent speed brake assist logic that allows extension beyond the normal in-flight range and an automated landing attitude modifier program for flight deck perceptions similar to previous 737’s; including tail strike prevention during takeoff and landing. There are also new struts and nacelles for the heavier engines, a beefier main landing gear and supporting structure and thicker fuselage skins; all resulting in a 6,500-pound increase in the MAX 8’s EOW (empty operating weight).

Any handling differences due to engine thrust line and airframe changes are tuned out by the flight control system in order to maintain the same type certificate. There were no major modifications for the 737 MAX flight deck as Boeing wanted to maintain commonality with the 737 NG family. The main avionics change is the addition of four 15.1-inch landscape liquid crystal displays supplied by Rockwell Collins, as used on the 787 Dreamliner and the HUD uses a new software version which is also being retrofitted on earlier versions of the NG. Sticker price: \$110 million.



Motoring by the Numbers

CFM International, Leap 1B, Twin Spool, 68" diameter intake, high bypass turbofans producing 27,900 lbs. thrust each. Compressor: 1 fan, 3-stage low pressure and 10-stage high pressure compressor, 22:1 ratio. Combustor: second generation, twin-annular, pre-mixing, swirler combustor. Turbine: 2-stage high pressure, 7-stage low pressure. Overall pressure ratio: 50:1. The fan has flexible blades manufactured using a resin transfer molding process, which untwist as the fan's speed increases. The motor also incorporates BRM (Bowed Rotor Motoring). When an engine cools, air rising to the top causes uneven cooling of the core shaft and the shaft will bow. After the engine start switch is moved to GND, the EEC (Electronic Engine Control) performs Bowed Rotor Motoring. BRM will be active from 6 to 90 seconds

and MOTORING will be displayed on the N2 gauge between 18-24 percent. The only inconvenience this presents, other than a lengthy start cycle, is getting "Sister Christian" (Motoring - what's your price for flight?) by Night Ranger stuck in your head as you stare at the motoring icon. Compared to the NG's CFM56 engines, these features result in 15 percent less thrust specific fuel consumption, 20 percent lower carbon emissions and 50 percent lower nitrogen-oxide emissions. Price tag per engine: about \$14.5 million.

Do These Engines Make My Fuselage Look Fat?

It's not uncommon for airplanes to be quite functional while having very little ramp appeal. The Shorts 360, Piper Apache and 737-100 Guppy come to mind. I'm slightly biased since I own and operate the sexiest airplane ever built by human hands (except for perhaps the

P-51D Mustang, F4U Corsair and T-38 Talon). So for those who have owned, loved or flown any of the previously listed, "un-handsomely-fine" aircraft, I mean no disrespect. Not only was the original 737 fuselage disproportionately short, plump and un-handsome, but the small diameter engines on the original -100 model accentuated the impression of excessive fuselage girth. With a five-foot longer, slender looking body and larger jugs hanging from the wings, the proportions of the MAX are more, well - shapely. While aesthetically pleasing, the fuselage stretch did not come without compromise. Its design necessitated some Disney-like Imagineering including moving the engines higher and forward, auto-assisted control of pitch during lift off and in the landing flare to prevent tail strikes, a re-lofted and re-contoured tail cone and a taller nose gear assembly for engine cowl clearance. All this to make a shapelier airplane you ask? We can dream, but no. Next to the dollar-sign shaped sugar plums dancing in their heads, the marketing folks dreamed of more fuel-efficient engines propelling a long fuselage full of lots and lots of paying passengers, to places far, far away. I don't fault them because that's their job and it's the paying passengers that make the mortgage payment on a great looking Duke. Unfortunately, for the profitability thing to work, marketing needs us to carry lots and lots of people all on the same airplane - this means adding more seats.

Size Matters

Responding to the profitability conundrum and competition from the Airbus A321neo in September 2014, Boeing launched a high-density version of the 737 MAX: the MAX 200. Named for seating up to 200 passengers in a single-class high-density configuration with "slimline" seats. Variants of the MAX have passenger seating numbers similar to airline ticket prices in that it's difficult to know which number is the real number due to configuration variables and marketing spin. But published numbers say the MAX-7 version to the MAX-10 version have a seating capacity ranging from 138 to 230 passengers with a maximum takeoff weight ranging from 177,000 pounds to 194,700 pounds. In order to squeeze in that much payload, some

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Jenny Craig life-changes occurred to our plump little Guppy. In the *T&T* story about my transition to the Guppy, I said of the 737NG (Next Generation): "...not that it matters to the ladies, but there is little room to stand straight-up, guy fashion, in the forward lav – the one us folks at the pointy-end use." Unfortunately, the lavatories in the MAX are even smaller than the NG. So small that you must decide before entry if you will go in facing frontwards or backwards. For us guys, doesn't that kind of telegraph which "business" we are about to undertake? Also, since there is zero maneuvering room once inside the lav, for those that elect to go in backwards, pulling down one's britches before entering and after exiting seems socially questionable if not liberating. We have actually had passengers that required assistance in extrication once they had shoehorned themselves into the loo and onto the throne, pants down being another conversation.

Does This Seat Make My Butt Look Big...ger?

There is also a well-publicized uproar over less seat pitch, seat width and tighter

spacing between rows of seats. Some creative "geometry-engineering" with the tail cone, seat spacing and fewer galleys created the additional space for more of those seats of which the marketing folks dreamed. The less-publicized result born of the sardine-liner arrangement is a policy that if you can't put down the armrests on both sides of your seat due to your Guppy-like-girth, then you have to pay for the additional adjacent seat(s) in order for them to remain unoccupied. For skinny folks that have endured "encroachment" from adjacent Guppy-like passengers, this seems a fair, welcome and most excellent strategy. But we have yet to determine if the PC police and public opinion will abide by such a transparent bias against those of us whose center sections are more aggressively influenced by gravity, particularly when in a seated position.

Fly Like You Stole It

How does it fly? I can't tell you because I haven't flown one yet. But I have flown the B-727, DC-10, MD-80 and a couple older flavors of the Guppy. I expect the MAX flies like a typical airliner: a huge, heavy, smooth but sluggish GA airplane

that most pilots, mechanics, fuelers and baggage handlers could fly – with or without permission. The consensus among those waiting for a crack at the jet is one of anxiousness. We all hope to fly with a pilot that has flown the airplane already rather than someone that has not. Fortunately, everyone I've talked with that has flown the MAX say that it's the same as the NG with the only noticeable difference being BRM and learning the new location of old switches. It looks quite shapely and I'm excited to get my hands on one. And since I don't have the \$110 million, I'll be sure to get company and ATC permission before I take it around the patch. **T&T**

Kevin Dingman has been flying for more than 40 years. He's an ATP typed in the B737 and DC9 with 23,000 hours in his logbook. A retired Air Force major, he flew the F-16 and later performed as an USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke. Contact Kevin at ding10d@gmail.com.

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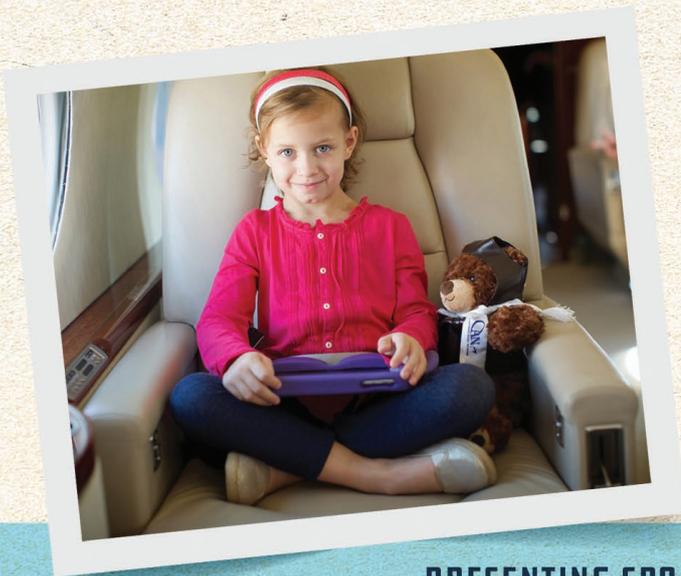
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Stress Test

Hello sim tech, this is Dewaine, instructor in the M2 sim. We have all sorts of problems here. The simulator is frozen, airspeed is inoperative and we need a reset.”

Such was the situation Larry King and I found ourselves in on day three of our recent recurrent in Wichita. Our planned 6 p.m. departure from the service center seemed a long shot now as the sim seemingly had a different plan for us.

Soon, a perky technician poked her head inside the monster and said she would make it right. We took a break and within ten minutes, all was well. Until it happened again.

We both began to envision another day in Wichita. We telepathed expletives.

Minutes later, however, we were back in the simulated air. I finished my two hours. Now behind the time allotment, Dewaine suggested we switch seats and keep going. Six-foot-four Larry attempted to comply and got his foot stuck in the red emergency stop button buried in the center console. Lights flashed, bells rang and we quickly settled to the ground in a simulated simulator emergency descent.

“Ah, sim tech, this is Dewaine again. You are not going to believe what is going on here,” he barked into the phone. More delays.



Against all odds, we actually finished on time. We were tired and spent from the distractions, and ready for home. All we had to do now was drive to the Cessna service center, do a thorough preflight on Larry's M2 and return to Dallas. Or so we thought.

“Looks like a few cells west of Dallas that we should be able to deviate around,” commented Larry as he reviewed his ForeFlight app.

The destination forecast predicted scattered thunderstorms and 10-mile visibilities. But as we checked all the switches in the M2, my phone started buzzing. A Cessna 172 had just crashed on takeoff from Addison, injuring three. And 16 more were hurt in a wind gust at an outdoor concert 70 miles north of Dallas. Within minutes, massive storms began developing right over north Texas.

I counted 34 aircraft holding into DFW and DAL on FlightAware. Ground stops were issued for all inbound aircraft. Surface winds at Addison were 90 degrees to the active at 21 gusting to 49. I decided to get a local weather report.

“I just got soaked going to get tacos,” reported my wife Patty on the phone.

Larry and I decided to wait it out for a couple of hours and then depart. Sitting in the M2 cockpit, we had a marvelous weather department right in front of us; NEXRAD, pilot reports, SIGMETS, lighting strikes, tops, cell movement, TAF's METAR's – you name it.

It was clear that we could make it home after a three-hour delay, but at what cost?

Finally, it dawned on me. “Larry, let's think this through. We are exhausted. We just spent 10 hours in ground school and training. We won't be home until midnight. I want to get home as much as you, but I think we should punt and try this tomorrow morning.”

“But did you see the line of weather building in western Kansas?” Larry asked. “It's forecast to be in Wichita tomorrow morning.”

Despite this concern, we agreed that fighting the weather in the daylight, fully rested, was the safer decision. While second guessing our decision, we dragged ourselves back to the rental car, found a couple of rooms near the airport and called it a night.

Indeed, as the picture illustrates, we were very busy the next morning. But safe.

Fly safe.

With 6,000-plus hours in his logbook, David Miller has been flying for business and pleasure for more than 40 years. Having owned and flown a variety of aircraft types, from turboprops to midsize jets, Patty and David currently own and fly a Citation Mustang. You can contact David at davidmiller1@sbcglobal.net.

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