# TWIN & TURBINE

FOR THE PILOTS OF OWNER-FLOWN, CABIN-CLASS AIRCRAFT

OCTOBER 2019 $3.95 US
VOLUME 23 NUMBER 10


## Fuel Talk

A Review of Fuel Strategy and Tactics

Top Turboprop: KA90 vs. KA200

Designing Custom Instrument Procedures

NBAA-BACE 2019 Preview: Las Vegas


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**COVER PHOTO:**
Cessna 340
*Photo Courtesy of Paul Bowen Photography*

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# Editor's Briefing

by **Rebecca Groom Jacobs**

# Words from the FAA Deputy

I write this column as I return from the 2019 Citation Jet Pilots (CJP) Convention in Colorado Springs. Each year, the multi-day event offers a full schedule of seminars, exhibitors and speakers surrounding Citation ownership. This marked my second time attending the convention, and I again leave feeling inspired after three full days with such a passionate group of owner-pilots.

Included in the lineup of guest speakers was FAA Deputy Administrator Dan Elwell. Elwell served as Acting FAA Administrator from January 2018 until August 2019 and now works alongside recently appointed FAA Administrator Steve Dickson. The two are responsible for the safety and efficiency of the largest aerospace system in the world, which operates more than 50,000 flights per day and employees more than 47,000 people. Elwell also oversees the FAA's multibillion-dollar NextGen air traffic control (ATC) modernization program as the U.S. shifts from ground-based radar to satellite technology.

CJP CEO Andrew Broom interviewed Elwell on a variety of topics including aircraft equipage, training, automation, airports and technology. While he tailored some of his responses to the CJP community, I feel much of the information is relevant for the owner-pilot community as a whole. Below are a few excerpts from the interview.

**Broom:** "How is everything coming along with ADS-B mandate just around the corner?"

**Elwell:** "We're looking good, though the piston rates in GA are really low. Come January 1, there is a certain percentage of the piston population that might run into issues. But the CJP community and business aviation community has never been a concern. In fact, they basically led the way. Related to this topic, we are also developing what we call the minimum capability list (MCL) that will be more voluntary. Though not a mandate, if the MCL is socialized and adapted throughout all the centers, we will get a lot closer to the efficiency that we are all seeking through Next-Gen."

**Broom:** "Having trained in three different types of aviation – military, commercial, civilian – what recommendations could you relate to this group from your training experience?"

**Elwell:** "That's a tough question because unfortunately, the amount of training an individual does has economic considerations and constraints. But if those constraints were set aside, I'd say accomplish every course of study and area of study that you possibly can. Focus on where you fly most, what you fly most, what you do most – and like in any profession, be at the top of your game as far as continuous learning and understanding the latest tools and technology out there."

**Broom:** "What can we learn from the recent limelight on automation?"

**Elwell:** "Man's interface with the machine has been around since the Wrights; it just now takes on a different aspect with automation. There is absolutely no doubt automation is the primary conduit to increased safety in recent decades. But there is also no doubt if the operator does not maintain flying skills and relies too heavily on automation, that has consequences. In the incidents with the Boeing 737 Max, there is more to those accidents than has been in the public space, simply because final reports have not been released…but that interface between automation and manual flying and experience is huge. Automation is there to make the pilot's job easier and handle 98 percent of anything that can go wrong. The problem occurs when the pilot ends up having to deal with the 2 percent that not even the engineers could have foreseen going wrong."

**Broom:** "How can we work together on improving the efficiency of ATC, specifically in the crowded airspace in the Northeast?"

**Elwell:** "The Next-Gen Advisory Committee is all about efficiency and modernization of NAS (National Airspace System) and ATC. We have representation from every sector of the ecosystem and the number one priority is the Northeast corridor. The fact of the matter is there are too many airplanes in a confined airspace at one time. For situations like this, in my experience as a pilot, the operator can do more for the efficiency for his or her route than anyone else. Be aware of the best times and routes to file; be respectfully collaborative with ATC. The best tool for efficiency today is you – the pilots."

When asked what CJP can do to make his job easier, Elwell responded, "At the end of the day, we are a safety agency. The safer you are as an individual pilot, and the more you can be advocates for your place in the ecosystem, the better and safer the system will be." A sentiment we can all stand by. T&T

# Airmail

## In Response to Kevin Ware's "The Problem with Juneau" (August)

Your article brought back 52 years of memories of flying into Juneau. I started in a Connie in 1967, then a B-720, and finally many years in a B-727. Back then there was no DME on the LDA approach, only the crossing radials of SSR and Point Retreat NDB which isn't depicted anymore. Alaska Airlines 727s met their end along with 117 passengers west of present day Dibol INT in 1972 because they relied on the inaccurate SSR VOR radials for a step down. PNA's and Western's approach plates had NDB and VOR crossing radials that had to be met before we stepped down. The DME was installed two weeks after the Alaska crash even though we all had been asking for it for years.

As we were limited to a 10-knot tailwind takeoff on Runway 26, we would take off on Runway 8 with a special after takeoff procedure to get out of the mountains. If you look at your picture in the article where you have four red terrain spots shown, we would take off on Runway 8, suck up the gear, pull the power to 50 percent, immediate left turn up Lemon Creek (which is between the two red spots on the left of your picture), fly 20 seconds at V2 +10, staying below 800 feet VFR. Then a 30-plus degree bank to the right and come out Lemon Creek, start climbing, and intercept the LDA outbound to Barlo and then SSR. Quite a departure!

A few years back, I took the 340 up to Prudhoe Bay for a sightseeing trip and stopped for an hour at Juneau. I didn't know a soul. We then flew VFR all the way to Fairbanks and to Prudhoe Bay the next day. There isn't much to see up there, but I had not seen it in daylight as we always flew the 727 up there during the winter when it was dark.

Great article Kevin.

Dick Welsh

I just read your article in Twin & Turbine and found it very informative and interesting to read. We just got back from a trip to Ketchikan and we are planning another trip up there to Sitka soon. I haven't been to Juneau yet, but I appreciate your insight on the local area and the difficulties that one might face trying to get in there. Great job!

Christopher Brewer

## In Response to David Miller's "Saying Goodbye to My Mustang" (August)

I just read your article "Saying Goodbye to My Mustang." As pilots, we become attached to our airplanes. We recently sold our CJ2 and even though I didn't own it, it was mine. My boss even thought so (to some degree). I understand exactly how you feel and hope there is another trusty friend in your aviation future. Keep up the good work. I enjoy your articles.

Andrew C. Jackson

I was hoping to run into you at the Annual Convention to commiserate plane decisions, but had to cancel due to a family conflict. It sounds like we have the same issues – declining time, lower income, but a love for the Mustang. I think I've solved the solution by finding a partner in mine that has a similar situation, but every potential plane partnership has fizzled for some reason or another.

I am going to hang on as long as I can, but expect that I'll follow your footsteps (but at least I never stepped up!), and probably buy a jet card and beg my way back into my old Bonanza! Good luck and I hope to see you and Patty soon.

Doug Hynden

I have been reading your column in T&T for years and have always viewed it as a highlight of the magazine. Other commitments have denied me the pleasure of reading & recently, so it was with great surprise and sadness that I learned this morning, for the first time, of your decision to part with your Mustang.

All of us will be there someday. I think I can speak for all owner-pilots when I say that your fate is the lurking threat, the demon in the room, which we all most dread. For my own part, I have spent a fair amount of my personal and family wealth on aviation and have never regretted a penny, or a minute, of it. Nor has it ever made me a profit.

I am very sorry to hear of your decision and wish to offer you my condolences. But I also wish to proffer my immense respect for the maturity and discipline which your willingness to make that decision exhibits. The ability to make tough choices was doubtless the reason you acquired the means to have the Mustang experience in the first place. I am decidedly less certain that I will exhibit similar maturity when my time comes. Thanks for the memories.

William Blatter

by **Dianne White**

# The Spark


Whenever I am interacting with owner-pilots, I'm interested in hearing how they became interested in flying. I find it fascinating to learn how people with diverse backgrounds discovered aviation. Research has shown people find their way to the left seat three primary ways: Would-be pilots are introduced to aviation by a parent, relative or friend who flies. Others are drawn to flight by some unexplainable inner force that quietly and incessantly beckons them; an epiphany of sorts. And for others the spark of interest came through exposure at school, scouting, or other organized opportunity.

I would add a fourth to the list: For some, they learned to fly because aircraft can be a powerful business and lifestyle tool; an incredibly efficient way to get from point A to point B. They appreciate the benefits they gain through flying but have no burning passion.

I would venture that my last category represents the minority group among pilots. While there is no singular path that brings each of us to that moment when we first break free of earth's surly bonds, the majority of pilots share a common passion. Why else would we endure hour after hour grinding around the pattern, perfecting our skills? Sweating under the hood while your instructor fails your primary flight instruments and still expects you to nail that ILS?

For me personally, the answer is straightforward. I grew up around an airport where my mother kept her plane. It seemed inevitable that I would fly. But for my mother, it wasn't inevitable; it was improbable. How did she – in 1962 at the age of 19 – end up at a rural municipal airport taking a flying lesson? No one else in our family was a pilot. Certainly, gender roles were more strictly defined in the 1960s. In fact, before my mother arrived, there hadn't been a single woman pilot in her small Missouri town. But something about that airport and those brightly painted Aeronca Champs and Piper PA-12s lit a fire inside her. As they say, wild horses couldn't have kept her away.

The path wasn't easy. She summoned the courage to call her high school science teacher who flight-instructed in an old Cessna. He told her if she could get a third-class medical certificate, he'd consider teaching her. Thinking he would never hear from her again, he was surprised when she called a week later to report she had her medical. Still skeptical, he took her up and did a number of maneuvers to see if she would be scared or sick. At the end of the lesson, she surprised him again by asking for another lesson. After eight and a half hours, she soloed in an Aeronca Champ. She went on to earn her private and commercial tickets and became the proud owner of a succession of aircraft.

So, I asked her, what was it that gave her the passion to pursue flying, especially considering she had no role models to follow or previous exposure to aviation? Her answer: "I went to an air show and watched Marion and Dewayne Cole perform the most amazing stunts. Then I convinced my father to let me

take a ride in a plane. I came away mesmerized and resolute that this is what I wanted to do."

She continued, "I was never discouraged to try new things and pursue my dreams. When I told my dad I wanted to fly, he said, 'do it,' although he knew very little about airplanes. And when I soloed, he was there cheering me on."

Nineteen years ago, I took my two daughters to their first Oshkosh. In an article I wrote for Twin & Turbine then, I wrote: "As we walked among those amazing flying machines, I couldn't help but sneak peeks to see if the seeds of interest were beginning to germinate. Only time will tell if that interest will blossom into passion."


Today, both daughters love aviation, but the oldest we discovered, had a love that did blossom into a passion for flight. As I write this in early September, this daughter (and granddaughter), with an aeronautical engineering degree from the Naval Academy and a private pilot certificate in her pocket, just learned that the Navy has selected her to fly jets, meaning the T-45 now and perhaps the F/18 Super Hornet after that.

She confessed to me recently that it didn't all click for her until she got to Corpus Christi and began flying the Navy's T-6B. After weeks of studying, briefing and dual instruction, it was time for a series of solo flights. "Once I got in the air, it all changed. It's so motivating to know that I know every aspect of the airplane and to be in complete command of it. This, to me, is flying."

I recently received the 2019 edition of *Aviation for Girls*, an annual magazine produced by Women in Aviation International and distributed on WAI's Girls in Aviation Day. The goal of the magazine is to provide the girls with information that will inspire them to explore aviation further, both as a career and as a lifestyle. I was struck by the wonder and excitement captured in the young girl's face featured on the cover. Perhaps the spark of passion has been ignited – I hope so!

Regardless of what brought you to the left seat, we all owe it to the future of general aviation to open as many doors as possible for the next generation. This is a world of distractions and social media obsession, but it's also a time of great opportunity. All it takes is someone to pull up the hangar door and show them the way. T&T

**Dianne White** *is the executive director of MMOPA and editor of MMOPA Magazine. For a total of 14 years, she was editor of Twin & Turbine and has worked in the business aviation industry for nearly 30 years. She also serves on the board of directors for Angel Flight Central. An active multi-engine, instrument-rated pilot, Dianne lives in the Kansas City area and can be reached at* **editor@diannewhite.com.**


Anyone who has read my writing knows that I absolutely love the King Air lineup of airplanes. Rugged, reliable and easy to fly and maintain. And today, there are many types of King Airs serving in a multitude of general aviation and military roles, each with specific abilities and associated costs. The highly successful King Air 90 spawned the 100 series, which spawned the 200 series, which spawned the 300 series.

When filtering between the various models, how should one decide which one is right for their mission and budget?

# Top Turboprop Series:

## Pre-Owned King Air C90 and King Air 200

by **Joe Casey**

PHOTOS COURTESY OF CLINT GOFF


For this discussion, let's assume you have a $500,000 to $800,000 budget, routinely fly six passengers with bags, and travel less than 1,000 nm on your bread-and-butter flights. There are several airplanes you might consider, but two that will probably make your shortlist are the King Air 200 and the King Air C90. I fly both frequently, so I thought it would be good to leap into the gap and relate my thoughts.

The King Air 90 first appeared in the mid-1960s and quickly became a workhorse for business and private aviation. Normally configured with seven total seats (two crew seats, four in club seating, and a belted toilet), the King Air 90 can haul a load. The basic fuselage has not changed greatly over the years, but Beechcraft has added bigger engines (E90/F90/F90-1), upgraded avionics and a gorgeous tricked-out interior as the years have progressed. With more than 3,100 airframes built in the long production run (over 50 years), there's no doubt that the 90 series is well-liked.

The King Air 200 boasts a larger cabin (two crew seats, seven cabin seats, and a belted toilet), has bigger engines (PT6-42) and larger wing (more fuel), and a large aft storage area. The 200 series is easily the best-selling turboprop of all time (more than 3,800 built since 1972), with Textron Aviation continuing to roll the latest King Air 200 series (King Air 250) off the line today. The past has been great for the 200 series, and the future looks even brighter for this completely capable airplane.

When contrasting the two, the 200 is bigger, faster and carries more, but it also costs more to purchase and feed. So, do the advantages of the 200 outweigh the cost efficiencies of the 90? Which one should you buy if you have six-person/1,000 nm mission and budget under $1 million? Let's explore some of the nuances before answering that question.

To me, one of the greatest advantages of the King Air 200 over the King Air 90 is pressurization. The 200 has a maximum differential pressure of 6.5 psi while the 90 sits at 4.6 psi. While those two numbers may not seem dramatically different, the practical application means that a 90 will rarely be operated at FL230 (or above) because the cabin pressure will be over 10,000 ft. "Home" for the 90 is the upper teens and lower 20s, so the cabin altitude is kept lower. On the other hand, the 200 can fly at FL280, just under the RVSM limit, and still have a cabin altitude under 7,000 MSL. Big deal? You bet!

Remember, the effects of hypoxia are exponential, and you'll arrive at your business meeting after a long flight feeling much better if you flew that long flight at a 3,000-foot lower cabin altitude. Plus, at FL280 there's rarely a structural icing challenge because the outside air temperature (OAT) is simply too cold for structural ice to develop. FL280 also allows the pilot to get on top of more weather.

There's also a difference in the landing gear between these two airplanes. The 90 has a single large tire on each

landing gear trunnion, and the 200 has dual axles on each main landing gear trunnion. While both are rugged and strong, if a 200 pops a tube/tire on landing, there is the ability to taxi off the runway to a maintenance hangar for repairs. If the 90 pops a tire, that's where that airplane will sit until a maintenance provider can clean up the mess.

There's also a significant speed difference. A stock C90 will cruise around 225 KTAS at the high teens/low 20s, but the 200 will cruise about 275 KTAS at its normal cruising altitude of the upper 20s. Fifty knots in cruise is a big deal. I usually preach how the difference in cruise speed is not a big deal, but when it is nearly a 20 percent increase in speed, I make an exception.

Another serious purchase consideration: the footprint. The King Air 200 is taller and has a wider wingspan than the 90. On my airport, there are several hangars that will easily handle a 90, yet could not fit a 200. So, make sure that you've got the hangar space available to hold the bigger airplane. The bigger footprint also means that ramp fees at away-from-home airports will be more. Bottom line: A 200 will cost more to store when not flying. Both the 200 and the 90 are airplanes that should not sit outside subjected to the elements. Hangaring is a necessity.

Having illustrated some of the differences, there are some striking similarities. The "feel" of the cockpit is about the same in both airplanes. While the 200 does have a bigger cockpit, the space for the pilot is about the same, and there are many exactly-the-same parts such as the seats, rudder pedals, windscreen size and yokes. The pilot experience in both airplanes is very good, with plenty of room for the tall/wide pilot, the short/thin pilot, and everyone in between.

Another similarity is the range and fuel burn for a mission. Both airplanes will take six people about 1,200 nm on a full load of fuel. The 90 will burn slightly less fuel overall, but not by a significant margin. The 200 will burn more fuel per hour, but it is going faster, flying higher and will arrive earlier – allowing the fuel burn for most missions to be reasonably close.

The training requirements are identical (neither need a type rating), and the maintenance requirements and costs are nearly identical. Both are upgradeable with a plethora of now-available STC upgrades on the market, both have support from the factory, and both are reasonably easy airplanes to fly.

What is more, any King Air will have the all-important belted lavatory. I've found the toilet on the 90 and 200 to be a real necessity for true passenger comfort. Although the toilet portion of the lavatory seat is rarely used, it is reassuring to know it is available. While the seat forces the occupant to sit sidesaddle, there's plenty of legroom and comfort if you can get past the stigma associated with its location.

Which one will cost more to acquire and operate? The cost of a C90 born in 1980 with mid-time engines, decent avionics and acceptable aesthetics will cost about $500,000. The same year model 200 will cost about $750,000 ($250,000 more). But, I contend that a 200 and a 90 can be operated for about the same cost per mile, which is the real

barometer for operating costs. The 200 will have a higher fuel burn/hour, engine reserve/hour, and cost/hour, but it'll get more done in that hour and end up costing about the same on a trip basis, or annual basis.

So, which King Air should you purchase – the 200 or the 90? If you can afford the additional acquisition cost, access a large hangar, and don't mind flying with some empty seats, I suggest the 200 because it is a more capable airplane. The pressurization, additional cabin space and speed are welcome benefits. And, there's another reason that few buyers consider in their purchase decision: mission creep.

Mission creep happens when an owner buys an airplane and then realizes that tool can be used for more missions than originally intended and operates the airplane more than expected. If you carry six people for your routine flights, the probability is they'll want to bring their friends and you'll end up filling more seats if those seats are available. And, we've all got those friends and family members who just don't understand your request for them to "pack light" and show up with a large suitcase for an overnight trip. Whatever you think you are going to do with your airplane, it is best to assume you will end up doing more. If you have a 200 in the hangar, you'll be ready when mission creep occurs.

So, if you choose a 90, great! It is a wonderful airplane that will serve you well. But, the 200 is a more capable airplane that will cost about the same to operate. Whichever you choose, know that you are buying a fabulous airplane that will serve you well. T&T

*Stay tuned for the next "Top Turboprop" comparison in the November issue.*

**Joe Casey** *is an FAA-DPE and an ATP, CFI, CFII (A/H), MEI, CFIG, 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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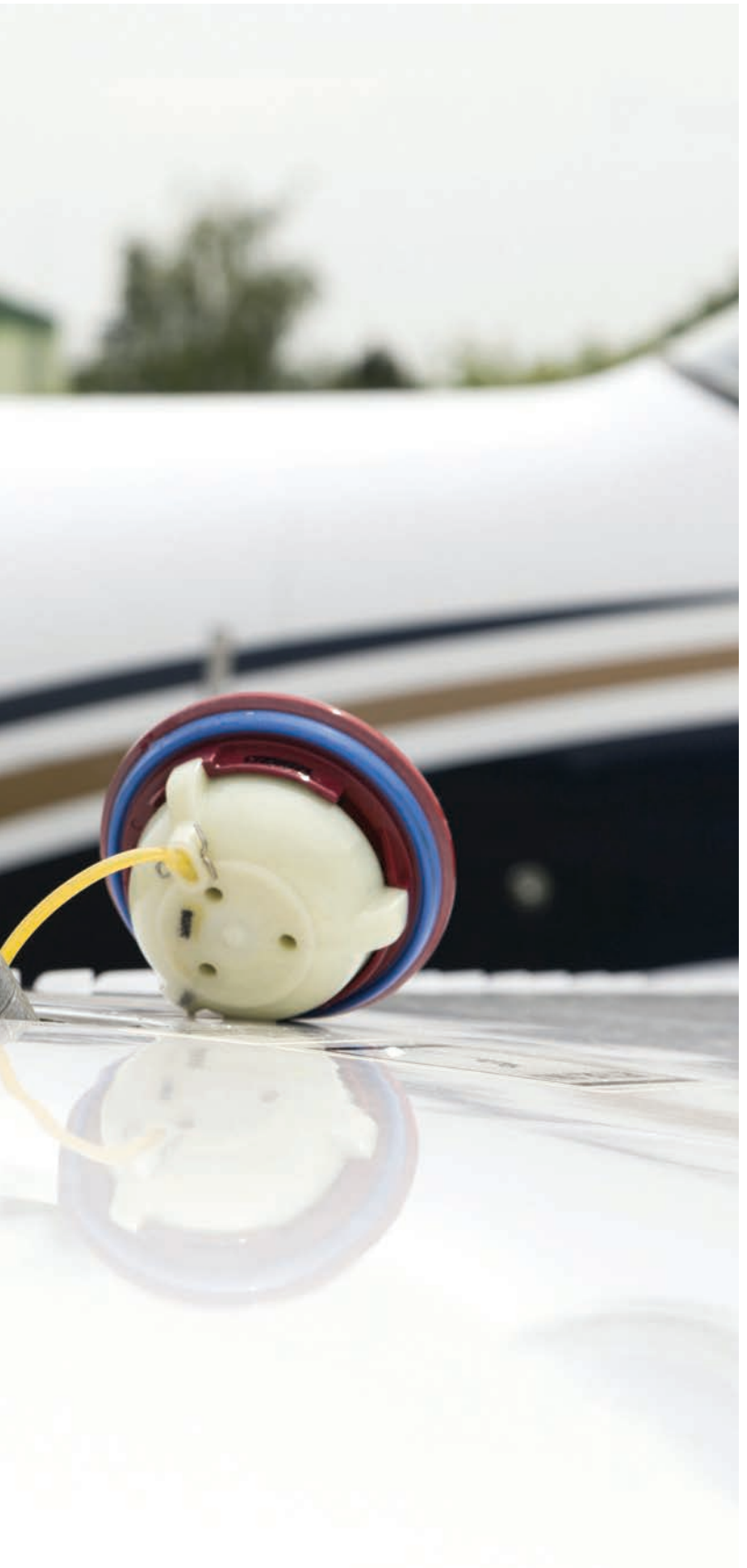

# Let's Talk Fuel:
## Strategy and Tactics

by **Thomas P. Turner**

*From recent NTSB preliminary reports:*

A Piper PA46-310P was substantially damaged during a forced landing while on approach to Poughkeepsie, New York. The pilot and two passengers were seriously injured, and one passenger sustained minor injuries. The airplane came to rest upright among trees and brush. The was no evidence of fuel, no fuel spillage, and no odor of fuel.

A Beech Baron impacted terrain 0.25 mile north of Chadron Municipal Airport, Nebraska. The pilot, pilot-rated-passenger, and one passenger were fatally injured, and the airplane sustained substantial damage. The fuel tanks breached due to impact, and there was no evidence of a fuel spill underneath the airplane. About 3 ounces of fuel was found in the right fuel strainer assembly. One ounce of fuel was found in the left engine-driven fuel pump supply line.

The final investigations may determine more about why these airplanes ran out of fuel. Clearly, neither of these pilots took off expecting their airplanes to run out of gas and crash. Both tragedies suggest we take another look at fuel management – both fuel strategy and fuel tactics.

## Fuel Strategy

Strategy is an overall plan for success. The strategy is to fuel the airplane so that it is within weight and balance limits with enough fuel to arrive at your intended destination with an adequate reserve. There are two major decisions associated with deciding your fuel strategy.

**Fuel weight:** This does not always mean taking off with the tanks full, or even putting in as much fuel the payload permits to remain below the airplane's maximum gross weight. For example, the single-engine performance of a twin – even a turbine twin or jet – increases dramatically with a relatively small reduction in airplane weight. As little as 100 pounds reduction in total weight can change a piston twin's single-engine climb rate from 250 feet per minute to 400 feet per minute or better. That's a substantial real-world improvement, especially since you're traveling more than a mile and a half across the ground for every minute of that "blue line" climb. Even in a heavy single, it may be advantageous to load less than the maximum amount of fuel possible to improve takeoff and climb performance.

**Reserve fuel:** Once you know how much fuel you'll have aboard the airplane, determine the time you can remain aloft with an adequate fuel reserve. "Adequate" can range from the barely legal VFR or IFR minima to a more conservative personal minimum. For example, I use one hour of fuel remaining at destination or alternate – even more if the weather is IMC.

This seems backward from the way most pilots plan a flight, which is to decide on a destination and then plan the fuel load. I agree that's where fuel planning starts. A necessary crosscheck, though, is to express the fuel aboard in terms of time (not distance) aloft. You're not looking for a number of miles to tick by as you fly, you're watching the clock and putting the wheels on the ground before you begin using your fuel reserve. You may have to adjust the destination to the fuel load, not the other way around.

How much fuel does your airplane burn? Most pilots answer by citing the cruise fuel burn, but most airplanes burn a lot more fuel during climb, fuel that you may not make up in descent. A turbocharged piston-twin may cruise at 28 total gallons per hour but burn 70 gallons per hour in climb. The first quarter tank of fuel seems to go by fast in a lot of airplanes. Include this real-world fuel burn in your computed fuel time.

You've developed a strategy: fuel on board, how much fuel reserve you'll require, and how long you can stay aloft. Confirm the amount of fuel you expect is on board, set your totalizer, crosscheck traditional fuel gauges, and prepare to put your strategy into practice.

## Fuel Tactics

Tactics are the techniques you'll use to pursue your fuel strategy. The modern cockpit makes it easy to "get tactical" with your fuel. But it also can lull you into a false complacency. To pursue your fuel strategy, use all of the tactical tools at your disposal, old and new.

**Fuel burn:** Engine monitors provide the means to methodically set power and adjust fuel burn to get desired results. The result is often different from the charts in the Flight Manual, meaning you may have to adjust other performance expectations derived from other charts as well.



Some countries require fuel gauges be calibrated periodically and the results placarded. Here's an example from an Australian-registered Beech Baron. Australia's Civil Aviation Safety Authority (CASA) requires fuel gauges to be calibrated every four years and the results placarded. Not only does it give the pilot precise fuel information in flight, it also proves that it is possible for airplane fuel gauges to read accurately.

**Fuel quantity monitoring:** Pilots put great store in digital fuel monitors, or totalizers. Their faith is warranted, but there are also limitations. Fuel totalizers:

- … are only as good as the data input into them. Many fuel exhaustion events are presaged by the pilot inputting the amount of fuel he/she thought was put into the airplane but was not – a reminder that pilots should personally watch fueling operations whenever possible.
- … must be calibrated properly. When you fill the tanks, check the amount the totalizer says should be loaded to check its accuracy. If there's more than a couple tenths of a gallon difference you may want to have the calibration checked.
- … display how much fuel is remaining (assuming data input is correct), but not where it is located. Pilots need to track the distribution of fuel between tanks by different means.
- … tell you how much fuel has gone through the transducer, but they cannot detect if any is leaking out another way such as venting through a poorly sealed fuel cap.

Old-fashioned fuel gauges are a necessary "sanity check" to monitor fuel level and the distribution of fuel between tanks. Further, if there is a discrepancy between the totalizer reading and the fuel gauges, don't dismiss the old, analog technology. Only traditional fuel gauges actually sense what is (or isn't) in the tanks. If the indicated level is lower than expected, believe it and act accordingly. Use a totalizer and fuel gauges together. Can you really believe fuel gauges? See the sidebar within this article.

**Time updates:** Frequently check not only the current fuel state, but the amount of time left in the tanks before you reach into reserves, and the time to destination. Calculate the amount of time remaining in the tanks when you expect to arrive, and begin making plans to stop for fuel now if the time in the tanks at the end of your flight will be less than your "adequate reserve."

More considerations for cruise flight fuel tactical review:

As you pass checkpoints or GPS distances remaining, check actual fuel

# Fuel Gauges. Can You Trust 'Em?

Probably no other airplane system is so universally discredited by pilots than the fuel quantity indicators. There's a widespread misconception that fuel gauges are "only required to be accurate when there is no fuel in the tank." Guess what – this is wrong.

Where does that "only accurate when empty" misconception come from? It's from a partial reading of 14 CFR 23.1337, the Federal regulation concerning certification of fuel indicating systems. True, 23.1337(b)(1) says this:

*Each fuel quantity indicator must be calibrated to read "zero" during level flight when the quantity of fuel remaining in the tank is equal to the unusable fuel supply determined [during aircraft certification]."*

That's the passage often quoted alone, out of context, when making the claim that fuel gauges are not accurate at any other time. Some airplane owners use this to conclude that it's useless (and not necessary) to invest time and money into calibrating gauges that do not indicate properly. But as I said, this is quoted out of context.

## The Real Requirement

The first part of 23.1337(b) tells us:

*There must be a means to indicate to the flight crew members the quantity of usable fuel in each tank during flight. An indicator calibrated in appropriate units and clearly marked to indicate those units must be used (emphasis added).*

The regulation stops short of saying the fuel gauges must be calibrated precisely to their marked levels. However, conditions where gauges are noncompliant and must be repaired include: When a gauge does not indicate a steady reduction in fuel level as fuel is burned from the tank; A gauge indication stops at some point then shows an increase before again indicating a fuel level drop; Does not indicate approximately "Full", "3/4", "1/2", "1/4", or "E" when your calculations or a fuel totalizer say that they should.

What about airplanes certificated to the old Civil Air Regulations Part 3, the body of regulations later superseded by FAR 23? Are these airplanes' fuel gauges required to be accurate too? CAR 3.672 addressed fuel quantity indicator requirements, and read very much like the later Part 23 requirements:

*CAR 3.672 Fuel quantity indicator. Means shall be provided to indicate to the flight personnel the quantity of fuel in each tank during flight. Tanks, the outlets and air spaces of which are interconnected, may be considered as one tank and need not be provided with separate indicators. Exposed sight gauges shall be so installed and guarded as to preclude the possibility of breakage or damage. Fuel quantity indicators shall be calibrated to read zero during level flight when the quantity of fuel remaining in the tank is equal to the unusable fuel supply as defined by CAR 3.437.*

Like the first portion of 23.1337(b), the certification standard of CAR 3 airplanes requires that the fuel quantity indicators be accurate in flight as well as at the "zero usable fuel" level.

Active general aviation pilot and retired TWA captain Tom Rosen, speaking at an American Bonanza Society convention a few years ago, had a great point: "It's less important to know when your fuel tank is empty, than it is to know accurately when it is only one-fourth full. This gives you time to do something about fuel state before anything becomes critical."

If your airplane's fuel gauges aren't accurate and reliable, fix them. Not only is it required by the regulations, it's also an important component of fuel monitoring that helps prevent all-too-frequent fuel management-related crashes.

burn against anticipated. Recalculate fuel remaining at destination if your actual burn exceeds what you predicted to that point.

As you did during climb, glance out at the fuel caps or fuel vents occasionally if they're visible from the cockpit, and the wing or structure behind caps and ports to discover if fuel is siphoning overboard in the slipstream. Land if you note any leaks.

Follow precise mixture leaning procedures to get the best fuel flow for your mission, whether it be a fast trip, an endurance run or some compromise between the two.

Compare fuel gauges and totalizers to your calculations and a clock in a regular fuel crosscheck. If the fuel gauges read lower than expected, land and reconfirm the fuel onboard.

Recompute reserves often enough you can easily land early if needed.

Use an alarm or timer to remind you when to switch fuel tanks, if the airplane requires.

Reduce power and cruise slower for longer endurance, if needed.

Don't "hope" the ground speed will improve, or think you'll "make it up in the descent." Fuel exhaustion events often end up within a mile or two of the intended destination when the pilot thinks he/she has enough to make it.

Make the decision early to land for fuel if you cannot determine the amount of fuel remaining, or if your computed reserve at destination slips below your minimums. "I might have been able to make it nonstop" is a much more desirable post-flight reflection than "I almost made it."

If you think you have enough fuel, you don't have enough fuel. You need to know. The only way to know for sure is to enact a fuel strategy, then approach it tactically to meet your strategic goals. T&T

**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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# Five on the Fly

by **Dianne White**



WHO:
## Daniel Cheung

COMPANY:
Aviation Tax Consultants

POSITION:
CPA, Aviation Tax Planning Expert

HOME BASE:
Columbus, Indiana and Scottsdale, Arizona (SDL)

1. *What does Aviation Tax Consultants do and what is your role?*

   ATC works with business aircraft owners to structure their ownership to be tax efficient and at the same time compliant with federal and state tax laws and FAA regulations. We work closely with our client's existing advisors and we are focused on all aircraft related compliance matters.

2. *Describe an average day for you at ATC.*

   Whether I am in the office or on the road, I spend most of my time on the phone speaking or corresponding on emails with clients, CPA's, prospects and aircraft salespersons. I spend a significant amount of time traveling and networking with business aviation professionals around the country. For a tax accountant handling tax return preparation and research, to work in this great GA community is something I never imagined! I love the tight-knit nature of the general aviation community and the talented folks from all walks of life who are involved.

3. *The tax landscape has changed dramatically in the last two years. What changes in the tax code have especially benefitted aircraft owners?*

   It would be the expansion of bonus depreciation in December 2017 to include new or pre-owned aircraft. This change benefited the pre-owned aircraft segment tremendously with a tax incentive that has been reserved for factory new aircraft in the history of bonus depreciation.

   The longer-term impact, however, is the creation of much greater interests across the business aircraft market, which ultimately helps new aircraft sales.

4. *For the individual or company looking to upgrade or purchase a business aircraft, why is it important to work with an aviation tax planning expert before inking the purchase contract?*

Business aircraft owners operate in a unique compliance environment – the confluence of federal income tax laws, state sales and use tax laws, and Federal Aviation Regulations.

Our understanding of how the myriad of regulations interact with each other, or the non-interaction of some regulations, and our experience working with these different government authorities, offer our clients and their advisors a critical perspective in formulating an ownership structure that is tax efficient and in full compliance of these regulations.

5. *Looking into your crystal ball, what are the top tax issues or changes the aviation industry will face in the next two years?*

We do not see any drastic change in the tax laws relating to business aviation prior to the next election cycle in 2020. The election results, and how the economy performs in the next twelve months, will certainly bring about changes to tax laws affecting general aviation aircraft. T&T

# Designing the Approach
## Customized Instrument Procedures

by **Rich Pickett**

Photo Courtesy of Tigre Pickett

You are cleared for the RNAV RWY 19R approach at Dulles (KIAD) flying the LPV. At LAUGH waypoint, you are at 3,000 MSL and start your descent on the glide path. The METAR shows a ceiling of 300 AGL, just above minimums. You break out of the clouds just before the DA of 478 and land. As pilots, we know of the work it takes for ATC to help us land safely, but are mostly unaware of what it takes to create the instrument procedures themselves. The United States alone has 12,000 instrument approaches, 7,200 of them based upon GPS. Each one goes through a detailed design, test, implementation and maintenance process.

GPS-based approaches are increasing at a rapid rate due to the lower cost and relative ease of design and certification in comparison with VOR or localizer-based approaches. Even with a large number of approaches available, we can always use more, especially at smaller airports, heliports and private landing facilities. As capabilities of satellite-based navigation increase, so do the possibilities for pilots. One of the newest options are curved Radius-to-Fix (RF) approaches, with each leg defined by a radius, arc length and fix. These approaches offer pilots the capability to maintain very precise tracking along curved paths when using approved GPS navigation systems. The first such approach was established at the Ronald Regan Washington Airport (KDCA) in 2003. Another example is the RNAV (RNP) RWY 31 at Palm Springs (KPSP). In order to utilize these approaches, both aircraft and aircrew must be authorized.

The complicated designs are created by the FAA and other government agencies worldwide, along with a small group of private companies. Hughes Aerospace, based in Houston, falls into the latter group. Hughes possesses certifications from the FAA as a Public Part 97 Air Navigation Service Provider, certificated to design, implement and maintain a wide variety of Instrument Flight Procedures (IFR) – particularly satellite-based navigation such as LPV approaches, RNAV SIDs and STARs. Additionally, Hughes Aerospace is certificated by ICAO and several other government regulators worldwide. Hughes not only designs instrument procedures for public airports but they develop and maintain them for private airports and heliports as well.

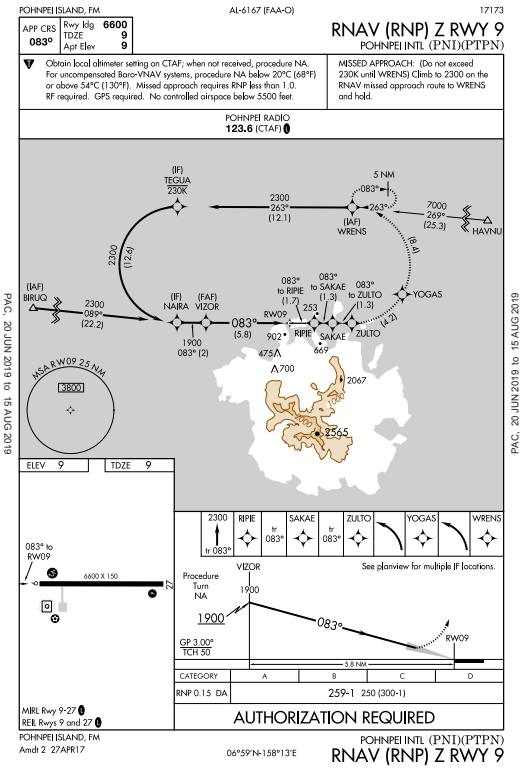
I reached out to Chris Baur, president and CEO of Hughes Aerospace, to discuss instrument procedure design. Chris, an experienced pilot with both fixed-wing and rotorcraft flight time in the military and civilian arenas, has been designing instrument procedures for more than 10 years around the world.

## Approaches for Private Airports and Heliports

For private landing facilities such as residential airparks or medical heliports, an instrument procedure dramatically increases the utility and safety. In many cases, a satellite-based procedure is the only solution, especially in environments where terrain and obstacles prevent the development of other approaches. Performance-Based Navigation (PBN) procedures can be designed with either linear or non-linear (also called trajectory-based) flight paths that can provide lower minimums.

With increasing population density surrounding airports and heliports, custom procedures can also help mitigate the noise impact on the surrounding community. Hughes Aerospace has worked on a number of these solutions over the last 10 years.

The design and implementation processes are complex, starting with remote site analysis, which uses a variety of data sources from topographical and aerial




Chris Baur with Hughes Aerospace was instrumental in the design of a public complex RF approach at Pohnpei International (PTPN) in the Federated States of Micronesia that includes radial-to-fix segments on both the final and missed approach portions of the RNP RWY 9 procedure.


A 3-D map from a site inspection in Calexico, California.

surveys to local planning documents. All procedure designs then require a detailed on-site survey. After the initial design, and coordination with the FAA and other agencies, the procedures must then be test flown. Hughes Aerospace uses their own Piper Meridian and Robinson R66 as the test platforms, flying the approaches to verify they meet requirements. Once the testing is complete and the procedure approved, Hughes coordinates the publication of the data in the databases, and in the case of private operators, the issuance of the full-color geo-referenced procedure.

In order for the procedures to be active, they must be monitored daily, including managing the NOTAM service for any changes or variation in service levels. For the majority of approaches that are managed by the FAA, it is their responsibility. For those custom designed for private operators, Hughes Aerospace provides these services.

## Behind the Scenes Look

I recently accompanied Chris on a site inspection for a heliport in Calexico, California – only a few miles from the airport (KCXL) and a stone's throw from the United States/Mexico border. Chris and his team already completed initial design work remotely, and the mission this visit was to confirm obstacles and obtain the most accurate data on the helipad and surrounding area.

We flew from Montgomery Field (KMYF) to Calexico in my Eclipse 500 for the site evaluation. The initial ground survey included mapping the obstructions in the local area with high precision, including their latitude and longitude as well as height. Next was the inspection of the landing site itself. Chris made precise measurements of the helipad, then proceeded to use a small UAV to map the location in detail.

I previously owned a photogrammetry company and it was fascinating to see Chris utilize the latest generation of high-resolution technology. The UAV was the perfect aerial platform for this work, flying a precise pattern to assist Chris and his team with creating an accurate 3-D map of the heliport and surrounding areas. This data can then be combined with their other sources to develop the precise paths for the instrument procedures. Each site offers new challenges. This one, in particular, had the Mexico border, large communications towers, as well as buildings near the helipad.

Hughes Aerospace will take this data to design the instrument approach and departure procedures for their customer. And the work won't stop after the FAA approval since they must monitor and maintain the procedures for as long as they are active.

The next time you are briefing for your instrument approach, or reviewing a departure or arrival procedure, remember that aviation professionals created each one of those altitudes, headings, speeds and notes with an attention to detail – and one focus – safety. T&T

*After 11,000 hours of piloting more than 90 aircraft models,* **Rich Pickett** *still has a passion for flying. Rich holds an ATP, CFII SME, SES, glider licenses, and type ratings in the L29, L39, Citation 500/510s/525s, Eclipse 500S and DA10. His company, Personal Wings, provides training, mentoring and aircraft services. You can contact Rich at* **rich@personalwings.com**.

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| 26 | ASTRA 1125 |
| 30 | ASTRA 1125SP |
| 49 | ASTRA 1125SPX |
| 33 | BEECHJET 400 |
| 226 | BEECHJET 400A |
| 117 | BOEING BBJ |
| 371 | CHALLENGER 300 |
| 53 | CHALLENGER 600 |
| 31 | CHALLENGER 601-1A |
| 108 | CHALLENGER 601-3A |
| 49 | CHALLENGER 601-3R |
| 286 | CHALLENGER 604 |
| 9 | CHALLENGER 800 |
| 163 | CITATION 500 |
| 279 | CITATION 525 |
| 261 | CITATION BRAVO |
| 150 | CITATION CJ1 |
| 82 | CITATION CJ1+ |
| 188 | CITATION CJ2 |
| 170 | CITATION CJ2+ |
| 364 | CITATION CJ3 |
| 123 | CITATION CJ3+ |
| 273 | CITATION CJ4 |
| 151 | CITATION ENCORE |
| 55 | CITATION ENCORE+ |
| 305 | CITATION EXCEL |
| 18 | CITATION I |
| 248 | CITATION I/SP |
| 437 | CITATION II |
| 57 | CITATION II/SP |
| 154 | CITATION III |
| 86 | CITATION LATITUDE |
| 191 | CITATION M2 |
| 377 | CITATION MUSTANG |
| 123 | CITATION S/II |
| 256 | CITATION SOVEREIGN |
| 76 | CITATION SOVEREIGN+ |
| 234 | CITATION ULTRA |
| 232 | CITATION V |
| 27 | CITATION VI |
| 97 | CITATION VII |
| 249 | CITATION X |
| 29 | CITATION X+ |
| 208 | CITATION XLS |
| 229 | CITATION XLS+ |
| 1 | DIAMOND I |
| 38 | DIAMOND IA |
| 5 | DORNIER ENVOY 3 |
| 227 | ECLIPSE EA500 |
| 59 | EMBRAER LEGACY 500 |
| 141 | EMBRAER LEGACY 600 |
| 67 | EMBRAER LEGACY 650 |
| 221 | EMBRAER PHENOM 100 |
| 264 | EMBRAER PHENOM 300 |
| 73 | FALCON 10 |
| 20 | FALCON 100 |
| 19 | FALCON 200 |
| 196 | FALCON 2000 |
| 22 | FALCON 2000EX |
| 56 | FALCON 20C |
| 14 | FALCON 20C-5 |
| 21 | FALCON 20D |
| 2 | FALCON 20D-5 |
| 31 | FALCON 20E |
| 9 | FALCON 20E-5 |
| 65 | FALCON 20F |
| 58 | FALCON 20F-5 |
| 178 | FALCON 50 |
| 7 | FALCON 50-40 |
| 93 | FALCON 50EX |
| 152 | FALCON 900 |
| 24 | FALCON 900C |
| 104 | FALCON 900EX |
| 176 | GLOBAL 5000 |
| 128 | GLOBAL EXPRESS |
| 19 | GULFSTREAM G-100 |
| 202 | GULFSTREAM G-200 |
| 9 | GULFSTREAM G-300 |
| 22 | GULFSTREAM G-400 |
| 288 | GULFSTREAM G-450 |
| 8 | GULFSTREAM G-500 |
| 500 | GULFSTREAM G-550 |
| 54 | GULFSTREAM G-II |
| 21 | GULFSTREAM G-IIB |
| 120 | GULFSTREAM G-III |
| 165 | GULFSTREAM G-IV |
| 283 | GULFSTREAM G-IVSP |
| 170 | GULFSTREAM G-V |
| 33 | HAWKER 1000A |
| 5 | HAWKER 125-1A |
| 6 | HAWKER 125-1AS |
| 4 | HAWKER 125-3A/RA |
| 11 | HAWKER 125-400A |
| 13 | HAWKER 125-400AS |
| 12 | HAWKER 125-400B |
| 9 | HAWKER 125-600A |
| 3 | HAWKER 125-600AS |
| 95 | HAWKER 125-700A |
| 59 | HAWKER 4000 |
| 184 | HAWKER 400XP |
| 34 | HAWKER 750 |
| 170 | HAWKER 800A |
| 33 | HAWKER 800B |
| 336 | HAWKER 800XP |
| 39 | HAWKER 800XPI |
| 83 | HAWKER 850XP |
| 158 | HAWKER 900XP |
| 6 | JET COMMANDER 1121 |
| 3 | JET COMMANDER 1121B |
| 8 | LEARJET 23 |
| 15 | LEARJET 24 |
| 1 | LEARJET 24A |
| 11 | LEARJET 24B |
| 28 | LEARJET 24D |
| 11 | LEARJET 24E |
| 7 | LEARJET 24F |
| 10 | LEARJET 25 |
| 35 | LEARJET 25B |
| 8 | LEARJET 25C |
| 85 | LEARJET 25D |
| 4 | LEARJET 28 |
| 26 | LEARJET 31 |
| 161 | LEARJET 31A |
| 30 | LEARJET 35 |
| 350 | LEARJET 35A |
| 13 | LEARJET 36 |
| 32 | LEARJET 36A |
| 29 | LEARJET 40 |
| 186 | LEARJET 45 |
| 166 | LEARJET 45XR |
| 92 | LEARJET 55 |
| 4 | LEARJET 55B |
| 12 | LEARJET 55C |
| 253 | LEARJET 60 |
| 462 | PILATUS PC-12/45 |
| 108 | PREMIER I |
| 6 | SABRELINER 40 |
| 17 | SABRELINER 40A |
| 3 | SABRELINER 40EL |
| 1 | SABRELINER 40R |
| 21 | SABRELINER 60 |
| 17 | SABRELINER 60ELXM |
| 2 | SABRELINER 60EX |
| 58 | SABRELINER 65 |
| 13 | SABRELINER 80 |
| 6 | SABRELINER 80SC |
| 66 | WESTWIND 1 |
| 4 | WESTWIND 1123 |
| 27 | WESTWIND 1124 |
| 63 | WESTWIND 2 |

## Turboprops – 11,605

**Chief Pilots & Owners**

| Count | Aircraft |
|---|---|
| 369 | CARAVAN 208 |
| 1208 | CARAVAN 208B |
| 32 | CHEYENNE 400 |
| 131 | CHEYENNE I |
| 13 | CHEYENNE IA |
| 251 | CHEYENNE II |
| 56 | CHEYENNE III |
| 37 | CHEYENNE IIIA |
| 51 | CHEYENNE IIXL |
| 23 | CHEYENNE IV |

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| 253 | CONQUEST II |
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| 57 | JETSTREAM 32 |
| 60 | JETSTREAM 41 |
| 25 | KING AIR 100 |
| 484 | KING AIR 200 |
| 21 | KING AIR 200C |
| 17 | KING AIR 200T |
| 197 | KING AIR 250 |
| 173 | KING AIR 300 |
| 9 | KING AIR 300LW |
| 554 | KING AIR 350 |
| 64 | KING AIR 350C |
| 354 | KING AIR 350I |
| 16 | KING AIR 90 |
| 10 | KING AIR A/B90 |
| 63 | KING AIR A100 |
| 209 | KING AIR A200 |
| 48 | KING AIR A90 |
| 104 | KING AIR A90-1 |
| 93 | KING AIR B100 |
| 854 | KING AIR B200 |
| 99 | KING AIR B200C |
| 8 | KING AIR B200CT |
| 91 | KING AIR B200GT |
| 4 | KING AIR B200SE |
| 21 | KING AIR B200T |
| 77 | KING AIR B90 |
| 329 | KING AIR C90 |
| 34 | KING AIR C90-1 |
| 191 | KING AIR C90A |
| 351 | KING AIR C90B |
| 80 | KING AIR C90GT |
| 89 | KING AIR C90GTI |
| 150 | KING AIR C90GTX |
| 12 | KING AIR C90SE |
| 242 | KING AIR E90 |
| 156 | KING AIR F90 |
| 25 | KING AIR F90-1 |
| 61 | MITSUBISHI MARQUISE |
| 1 | MITSUBISHI MU-2D |
| 22 | MITSUBISHI MU-2F |
| 16 | MITSUBISHI MU-2J |
| 33 | MITSUBISHI MU-2K |
| 10 | MITSUBISHI MU-2L |
| 18 | MITSUBISHI MU-2M |
| 17 | MITSUBISHI MU-2N |
| 24 | MITSUBISHI MU-2P |
| 36 | MITSUBISHI SOLITAIRE |
| 616 | PILATUS PC-12 NG |
| 146 | PILATUS PC-12/47 |
| 215 | PIPER JETPROP |
| 68 | PIPER M500 |
| 79 | PIPER M600 |
| 794 | PIPER MERIDIAN |
| 201 | QUEST KODIAK 100 |
| 2 | ROCKWELL 680T TURBO |
| 5 | ROCKWELL 680V TURBO II |
| 5 | ROCKWELL 680W TURBO II |
| 4 | ROCKWELL 681 HAWK |
| 96 | SOCATA TBM-700A |
| 68 | SOCATA TBM-700B |
| 283 | SOCATA TBM-850 |
| 100 | SOCATA TBM-900 |
| 33 | SOCATA TBM910 |
| 111 | SOCATA TBM930 |
| 5 | STARSHIP 2000A |
| 68 | TURBO COMMANDER 1000 |
| 30 | TURBO COMMANDER 690 |
| 132 | TURBO COMMANDER 690A |
| 136 | TURBO COMMANDER 690B |
| 81 | TURBO COMMANDER 840 |
| 24 | TURBO COMMANDER 900 |
| 52 | TURBO COMMANDER 980 |

### Twin Piston – 6,320 Owners

| Count | Aircraft |
|---|---|
| 34 | BARON 56 TC |
| 1412 | BARON 58 |
| 2 | BARON 58 PA |
| 339 | BARON 58P |
| 108 | BARON 58TC |
| 3 | BARON A56TC |
| 332 | BARON G58 |
| 186 | BEECH DUKE B60 |
| 163 | CESSNA 340 |
| 507 | CESSNA 340A |
| 58 | CESSNA 402B BUSINESS LINER |
| 130 | CESSNA 402C |
| 24 | CESSNA 404 TITAN |
| 244 | CESSNA 414 |
| 352 | CESSNA 414A CHANCELLOR |
| 39 | CESSNA 421 |
| 34 | CESSNA 421A |
| 319 | CESSNA 421B |
| 596 | CESSNA 421C |
| 50 | CESSNA T303 |
| 110 | DIAMOND D42 |
| 108 | PIPER 601P AEROSTAR |
| 24 | PIPER 602P AEROSTAR |
| 515 | PIPER CHIEFTAIN |
| 25 | PIPER MOJAVE |
| 308 | PIPER NAVAJO |
| 208 | PIPER SENECA |
| 12 | ROCKWELL 520 COMMANDER |
| 4 | ROCKWELL 560 COMMANDER |
| 11 | ROCKWELL 560A COMMANDER |
| 8 | ROCKWELL 560E COMMANDER |
| 7 | ROCKWELL 560F COMMANDER |
| 13 | ROCKWELL 680 SUPER |
| 3 | ROCKWELL 680E |
| 15 | ROCKWELL 680F COMMANDER |
| 12 | ROCKWELL 680FL GRAND COMMANDER |
| 5 | ROCKWELL 680FLP GRAND LINER |

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| Count | Aircraft |
|---|---|
| 219 | BEECH BONANZA |
| 438 | CESSNA 182 |
| 56 | CESSNA 206 |
| 389 | CESSNA P210N |
| 21 | CESSNA P210R |
| 54 | CESSNA T182 |
| 818 | CIRRUS SR20 |
| 2991 | CIRRUS SR22 |
| 28 | MOONEY ACCLAIM ULTRA |
| 10 | MOONEY OVATION ULTRA |
| 238 | PIPER MALIBU |
| 104 | PIPER MATRIX |
| 441 | PIPER MIRAGE |

**39,146 TOTAL AIRCRAFT**

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# NBAA 2019 Preview

by **Rebecca Groom Jacobs**


PHOTO COURTESY OF NBAA

Business aviation's biggest event of the year is just around the corner. The 2019 NBAA Business Aviation Convention & Exhibition (NBAA-BACE) returns to Las Vegas October 22-24. Last year, the event attracted around 1,000 exhibitors and attendees representing all 50 states and 90 countries.

In addition to dozens of education sessions, the convention will feature a variety of keynote speakers and products on display in the exhibit hall and static display. Included in the speaker lineup is recently appointed FAA Administrator Steve Dickson. Dickson will give two presentations on October 24: The first with high school students at the show's Careers in Business Aviation Day. And the next during the NBAA-BACE National Safety Forum, where he will provide his perspective on business aviation safety.

"We are honored Steve Dickson will be with us to inspire young people about the aviation careers awaiting them in science, technology, engineering, math and beyond," said NBAA President and CEO Ed Bolen. "We are equally pleased that he will be a part of the day we set aside at our convention each year to redouble our focus on safety, our industry's highest priority."

Debuting at the show this year is the New Product Showcase, described by NBAA as "a comprehensive presentation of business aviation's newest and most distinct products." On Oct. 22 from 1-2 p.m., 11 companies will present a product either new-to-market or about to be launched. Each of the exhibitors featured in the showcase will have 5 minutes to present a video or PowerPoint, giving the audience a peek into some of aviation's latest innovations.

The following 11 companies will be presenting at the New Product Showcase:

- Aero Crew Solutions
- AeroLEDs, LLC
- ALLProtect for Aviation
- Avinode
- CCX Technologies
- Foreflight
- Gogo Business Aviation
- Jeff Bonner R&D, Inc.
- Scott International Procedures
- Textron Aviation
- Thales

For owner-pilots planning to attend this year's convention, we have compiled some of the most relevant education sessions – pulled directly from the agenda found on the NBAA website (nbaa.org).

## Monday, October 21

### Single-Pilot Safety Standdown
**Time: 9 a.m. – 1 p.m.**

The demands of piloting a sophisticated aircraft while running a successful business presents significant operational challenges that requires a continuous journey of learning that goes beyond bare-minimum qualification and currency. Just as you need keen insight to make informed decisions to succeed in business, so too you need emphasis on Aeronautical Decision Making (ADM) and Airmanship to safely and efficiently employ your airplane as a business asset. Learn key methods, techniques and resources to go beyond mere proficiency and take you on the path to mastery of your business aircraft.

### Small Operator Symposium
**Time: 1:30 p.m. – 5:30 p.m.**

Small flight department managers have to juggle more than just simply flying the airplane. The Small Operator Symposium (SOS) is a half-day event focused on small flight department management and operations. Small flight department managers will have the opportunity to participate in audience-engaging sessions on how to manage the many responsibilities of operating and managing an aircraft from maintenance, to safety management including finding safe and reliable contract help. Subject matter experts will lead the discussions with ample time for open town-hall style Q&A and interaction with the audience.

## Tuesday, October 22

### A Collective Approach to Stopping Loss of Control Inflight
**Time: 10:30 a.m. – 12:00 p.m.**

Despite regulatory guidance and focused risk mitigation training, Loss of Control Inflight (LOCI) remains the leading cause of fatalities in all sectors of aviation. So, what can we do differently? This guided interactive workshop will ask attendees to take an active role in questioning conventional wisdom surrounding LOCI mitigation and recovery. Led by experts in Upset Prevention and Recovery Training (UPRT), attendees will analyze a hypothetical Safety Management System through a question and answer approach that encourages creative thinking and energetic debate, with a goal of forming group consensus about solutions to this grave issue.

### Safety and Training in Part 135 Operations
**Time: 10:30 a.m. – 12:00 p.m.**

Hear from FAA, NATA, NBAA and NTSB about training and safety in part 135 operations. Learn why Improving Part 135 Safety was recently added to NTSB's most wanted list, what is being done to combat illegal charter operations, and efforts underway to improve safety, including an in-depth review of the Standardized Curriculum Advisory Circular expected to be released shortly before NBAA-BACE.

### Meet the Regulators
**Time: 2:30 p.m. – 3:30 p.m.**

This always-popular session will feature key personnel from the FAA and other Federal government agencies that regulate the business aviation industry. After brief presentations highlighting

recent and upcoming regulatory developments, attendees will have an opportunity to ask questions about aviation policy matters impacting their operation and the industry as a whole.

**Bring on the Future: AI, Urban Mobility and Business Aviation**
**Time: 4:30 p.m. – 5:30 p.m.**

What once was speculation has become fact: the future of aviation will be driven by artificial intelligence and eVTOL machines moving people within cities. These technologies bring seemingly unlimited potential for reshaping how we interact with the world. How can business aviation safely harness the power of game-changing technologies to produce tangible results and increased revenue? Are there potential unintended consequences to consider? In this ripped-from-the-headlines session, our panel of widely respected experts will cut through the hype to give you a common sense look at what AI and eVTOL aircraft mean for the future of the industry.

Photo Courtesy of NBAA

## Wednesday, October 23

**Plane Cents: Increasing Your Aircraft's Life Cycle**
**Time: 9:15 a.m. – 10:15 a.m.**

As aircraft age and go past warranty, obsolescence of parts, maintenance and engineering support are facts of life that generally limit the aircraft's life cycle. But what if you could prolong that life cycle, delivering increased value on your investment? A must-attend session for managers and maintenance personnel, this session will discuss methods and practices to help with aircraft sustainment beyond warranty, including approaching aircraft modifications with longevity in mind and opportunities to implement repairs on the aircraft to keep it operationally relevant into the future.

**Friends & Partners in Aviation Weather (Day 1 of 2)**
**Time: 1:00 p.m. – 5:00 p.m.**

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. Don't miss this chance to participate in discussions that will motivate action on these important topics.

**Sustainable Aviation Fuels: The Future is Now**
**Time: 2:00 p.m. – 3:00 p.m.**

Sustainable alternative jet fuel is now available and federally approved for use in operations. But contributing to environmental stewardship in a tangible way, what is the incentive for operators to consider this technology when making purchasing decisions? Our panel of subject matter experts will set the record straight, honestly discussing benefits and potential drawbacks of this exciting movement, as well as break down technical elements of SAJF and its approved process for daily operations.

### NBAA-BACE Hours Exhibit Halls and Indoor Static Display of Aircraft

Tuesday, Oct. 22
10 a.m. – 6 p.m.

Wednesday, Oct. 23
9 a.m. – 5 p.m.

Thursday, Oct. 24
9 a.m. – 4 p.m.

### Static Display of Aircraft at Henderson Executive Airport

Tuesday, Oct. 22
9 a.m. – 6 p.m.

Wednesday, Oct. 23
9 a.m. – 5 p.m.

Thursday, Oct. 24
9 a.m. – 3 p.m.

## Thursday, October 24

**Friends & Partners in Aviation Weather (Day 2 of 2)**
**Time: 8:00 a.m. – 5:00 p.m.**

(See description from Day 1).

**NBAA National Safety Forum**
**Time: 9:00 a.m. – 1:00 p.m.**

Join NBAA for its fifth annual National Safety Forum on Oct. 24 in Las Vegas, NV. This premier business aviation safety event will focus on the pursuit of excellence in airmanship while operating in our ever more automated world. As noted in several recent mishaps, maintenance and improvement of these skills continue to be critical when automated systems malfunction. Our expert speakers and panels will be conducting a detailed examination of what defines excellence in airmanship, including basic "stick and rudder," effective CRM, automation management, and decision points on when to disengage automated systems, as well as how to set up an effective continuing airmanship education program for your team. T&T

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# Just Plain Magic

by **Kevin Ware**

I am standing well away from the operations area of our airport in the middle of a huge meadow of tall yellow grass, with most of the green stalks having long ago given themselves over to the inevitability of fall. A shaft of sunlight is occasionally shining through the broken to overcast cloud layer about 2,000 feet above my head. And about 100 yards away a coyote is stalking a field mouse, occasionally giving me a worried glance to see if my presence might interfere with his activity. Circling above the coyote are a couple of noisy seagulls, wondering about possible leftovers from the coyote.

Out in the distance, and far away from the wildlife, I can hear a single-engine piston-powered airplane starting on its takeoff run. Shortly after that, it passes through my line of sight just some 20 feet above the runway. I strongly suspect that the pilot, if he can see me at all, has no idea the importance of the aviation equipment I am out here looking at. Until several years ago, I would not have known myself. But what I and three others are doing out in the middle of this mouse habitat, is checking the accuracy of our airport's AWOS (automatic weather observation system) – the magic of which we pilots are often oblivious to (until it doesn't work), even though it has made a huge difference to the safety and efficiency of how we fly.

A good example is a flight I was on about 10 years ago, where we wanted to depart the Chicago area for our home airport (BVS) in western Washington. It was nighttime and the weather in Chicago was not too bad, however, an occluded front was moving through our destination. Weather at all of the local airports was frequently going below IFR approach minimums. Company policy (quite reasonably) required that we know the weather of our arrival airport before filing the flight plan. So, using the old fashion call-in system to the FAA's contracted weather briefer, we made the inquiry only to be told the current weather at our chosen destination was not available. The employees of the airport who provide the weather had already gone home for the day. We had two choices – delay the flight until the weather was available in the morning, or file to a different airport some 50 miles away, which did have weather available until midnight. A big problem was all of our cars were at our planned destination. So, rather than get stuck somewhere 50 miles from home looking for a late-night pickup from an overbooked motel, we chose to spend the night in Chicago.

Was that an expensive inconvenience to our passengers who had business to conduct the next day? You bet. And all because we simply did not know the weather of the arrival airport. When we got home, I began to study the effect this lack of information was having on the operations and economics of our airport. It turned out what we had experienced was a regular event during the winter months, when nights are long and weather poor. The cost to the airplane operators from all the displaced or delayed flights was enormous, and it also affected the reputation of our airport as a well-equipped and business-friendly place to fly.

As it happened, there was a technology evolution going on at the time to resolve the problem. Various companies had designed equipment that would automatically measure ceiling elevation and type, altimeter settings, wind direction and speed, temperature, dew point and visibility. It then automatically put it on the national aviation weather reporting system, or convert it to an electronic human voice and transmit the information over a discrete (AWOS) frequency. Within a year our airport had the equipment installed, with all its funny looking antennae out in the meadow, where it did not in the least disturb the lives of the coyotes and mice.

Just two weeks ago, I was returning again from the Midwest, leaving after our passengers completed their business and ate a late dinner. There was a moist onshore flow over the Pacific Northwest, with temperature and dew points gradually closing and fog predicted as the night wore on. From our cell phones no less, we dialed up the weather at KBVS on ForeFlight, found the AWOS reported visibility to be 3 miles and ceiling 1,500 feet, but with the temperature and dew point closing. With that information in hand we were legal enough to depart by company policy but were nevertheless concerned that by the time we arrive 3 hours later, the dreaded fog might make the area below minimums. As we headed west at FL450, however, the AWOS continued to provide real-time weather information via text on our iPads. Finally, at 11 o'clock at night, within 100 miles or so


The cloud detection system seen here works based upon reflections from lasers that point vertically and reflect the light back. The time it takes for the light to return, and how steady the return, determines the height and type of cloud layer.

A careful check of all wiring is completed by an FAA inspector during the inspection of an airport's AWOS.

of our destination, we tuned in the discrete AWOS frequency and heard an entirely artificial but calm and assuring male voice state that the visibility was now 2 miles, winds calm, ceiling 800 and temp/dew point within 2 degrees of each other – all well within our minimums for the GPS approach we intended to make. As we pulled the power back and started down, I could not help but think about the magic of it all, and how much safer flying had become over the past decade with the kind of weather reporting now available 24/7 from most airports.

In reflecting about the trip, I started wondering about how exactly the system works so reliably year-round, without a need for days off, and what was required to make sure it was maintained and working accurately. And that is what led me to stand in the middle of the meadow, glancing between the coyote and one of the technicians 30 feet up on the antenna. How the system works and is maintained is both ingenious and simple.

The cloud detection system works based upon reflections from lasers in a metal box that point vertically and reflect the light back. The time it takes for the light to return, and how steady the return, determines the height and type of cloud layer. But then you wonder what happens when one of those seagulls fly directly over on a bombing run and hit the glass covering the laser. When this happens, the sudden decrease in light turns on a fan, which blows a strong blast of air across the glass and removes the bird's donations. The FAA requires that this mechanism is checked annually to ensure the automatic bird poop blasting fan is actually working. Fortunately for us, the test does not require handling bird droppings. To test for it, all we had to do was tape some white paper across the glass then watch to see how the machine reacted. Sure enough, the machine decided the seagulls visited and the fan came blasting on. The next test was to see if it would turn itself off once its bird poop cleaning job was done. So we removed our taped paper and again waited to see what would happen. After considering it for a while, the machine shut the fan off. Test completed and carefully documented by the present FAA inspector.

The device to test AWOS temperature and dew point was a surprisingly simple handheld instrument, comprised of two mercury thermometers mounted side by side in a small tray which you could spin by hand. One of the thermometers had a small cotton sock over the mercury end while the other was uncovered. The test involved soaking the sock with some bottled drinking water we brought with us, then spinning the device until the sock dried off. This boring task was naturally assigned to the most junior of the testing crew, namely myself. After spinning the thing out in the middle of the pasture for what seemed like an eternity, the two thermometers were carefully inspected with the wet one being about 3 degrees lower than the dry one. This, of

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course, occurred because the evaporation of the water on the sock cooled that thermometer more than the adjacent one. This high-tech data was then compared to what the AWOS was showing and matched almost dead on. This also was dutifully recorded by the FAA inspector.

Our next test was to measure the accuracy of the wind speed impellor and vane at the top of the tower. For this test, our more athletic member climbed the tower, removed the impellors from the wind speed measurer, and connected it to a battery-driven drill motor that ran at a very specific speed. Providing the computer on the AWOS showed a wind speed that matched the known number for that RPM, that test also passed.

The wind vane was much simpler. It only needed to be determined if it rotated freely and if its direction was accurate. We determined direction by hauling out our cell phones, going to the APP that shows compass direction, then making sure what the vane was pointing at reflected the number on our phones. A careful inspection of all the wiring followed, and it was noted there was some corrosion on the endpoint of one of the co-ax cables. The FAA inspector looked at this closely and said it would need to be replaced, but the system would remain approved until this was done.

During our testing, several airplanes arrived whose pilots had no doubt checked the airport's weather before taking off. And based upon what this equipment in the middle of a field was showing, filed the flight from halfway across the country.; the pilots oblivious to the magic of it all.

Next time you see a small antenna farm out in the middle of the grass somewhere on your airport, don't just wonder why some bureaucratic dingbat allowed those obstacles to be installed there. They serve a purpose that benefits us all, and we often take the system for granted, and the people that maintain them. From anywhere in the world, we can know exactly what the weather is at our home airport just by looking at our cell phone. Times have indeed changed from a decade ago, and what we have now is, by comparison, just plain magic. T&T

**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**.

# Recognize and Recover

## Proficiency in airmanship maneuvers is key to avoiding the dreaded stall/spin.

by **Brian Smith**

PHOTO COURTESY OF CLINT GOFF

Recognize and recover. That's a phrase my first flight instructor taught me, and it's a tool I've used ever since. He used it to impress upon me how important it was to hear, feel and understand (recognize) an impending stall and anticipate my response using pitch and power to recover. The ability to recognize and recover means you will never let a stall develop into an unintentional spin.

I always pass this lesson on to my students, but I do it with an added twist to the word recognize. I teach them to recognize any maneuver we are about to undertake as an everyday aspect of flying.

Let's take the dreaded stall, for instance. The first time we approach a stall, I tell my student that what we are trying to accomplish is nothing more than a landing in the sky. The following series of stall maneuvers we practice effects a virtual landing that everyone loves to do:

1. Configure the airplane without losing altitude until you have configured $V_{so}$ 10 knots above a stall;
2. Make your clearing turn (slow flight);
3. Point the nose 3 degrees down (glide slope) on a heading;
4. Pull the power;
5. Round off and hold the plane off the invisible runway, watching airspeed bleed off until you hear the stall horn (squeezing right rudder for left turning tendency as speed slows) and squeezing back-pressure (flare) into the stall horn for a perfect landing (sorry, I mean coordinated stall). And what do you recover with? You guessed it: Pitch (push), Power (full), Gear/Flaps up (slowly with positive rate.)

## Takeoff Stalls, Steep Turns & Go-Arounds

Here's a situation where the power-on stall can be compared, quite simply, to an over-rotation during takeoff. It's during touch-and-go that we see students pull back, regardless of airspeed, and stall back to the runway. So, let's use "recognize and recover" to simulate a takeoff with too much back pressure.

With take-off configuration $V_s$ 10 knots above a stall or rotation speed and without losing altitude, complete clearing turns (slow flight). Depending on your plane, add full power and pitch up 8-10 degrees (trainer) or pitch up 8-10 degrees and add 75 percent power (high performance.) You will recognize the stall warning and inboard wing stall shudder and feel the heavy pressure on flight controls, signs that tell you your altitude is dropping rapidly. This recover is simple: Pitch (push) to get the wings flying again.

Steep turns are where the rubber meets the runway. If you can get your plane to stay at 45 degrees of bank and +/- 10 knots while siting the nose on the horizon with trim and a touch of power, take your hands mostly off the yolk while making minor inputs (nose rising, increase bank; nose dropping, decrease bank), thus maintaining altitude, bank, and airspeed. Congratulations, you PASS!

This maneuver is mostly dependent on airspeed because stall speed goes up with bank. If we can do a safe

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45 to 60-degree steep turn, there is no reason why anyone should stall and spin on base to final.

We all teach how important go-arounds are. If you overshoot a runway on final, especially with a crosswind that is pushing you on base, simply use "recognize and recover" to turn your overshoot into a go-around. Realistically, what should be a go-around is often a pilot's attempt to compensate and land no matter what. And because no amount of training seems to counter this, I make sure my students are aware of what they're doing by correlating steep turns and base with final turns. We know we can complete a steep turn safely with sufficient airspeed. But what many pilots don't know is why an overshoot base-to-final correction of only 30 degrees of bank and full bottom rudder (skid) can and will kill them.

We teach to limit bank (less than 30 degrees) in the pattern for good reasons: mainly, to keep stall speed as low as possible. But what most pilots seem to come away with is "never turn more than 30 degrees, no matter what." This gets people in trouble because they can't fix the overshoot with only 30-degree bank, so they keep adding rudder to the turn until they are in a skid and feeling like they're descending. Then they add back-pressure, slow to a stall, and spin.

I make it a point to tell my students I would rather see a 45-degree coordinated turn well above the increased stall speed, than a 30-degree turn with full bottom rudder leading to a spin any day, and I instruct/talk about it during steep turns.

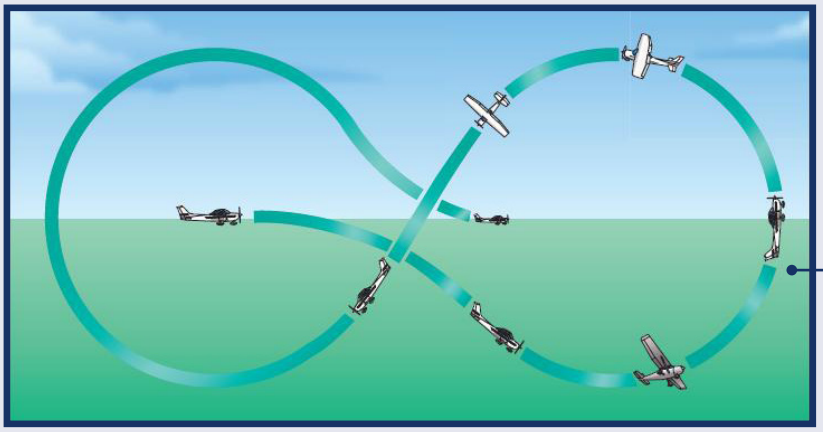
## Lazy Eights & Chandelles

Lazy Eights are great for teaching opposite rudder control for slips to landing. The top of a left-turning lazy eight actually needs right rudder to stay coordinated in a left-hand turn; how cool is that? Understanding how to fly with your feet during take-off and landing is a must, and lazy eights help bridge that connection.

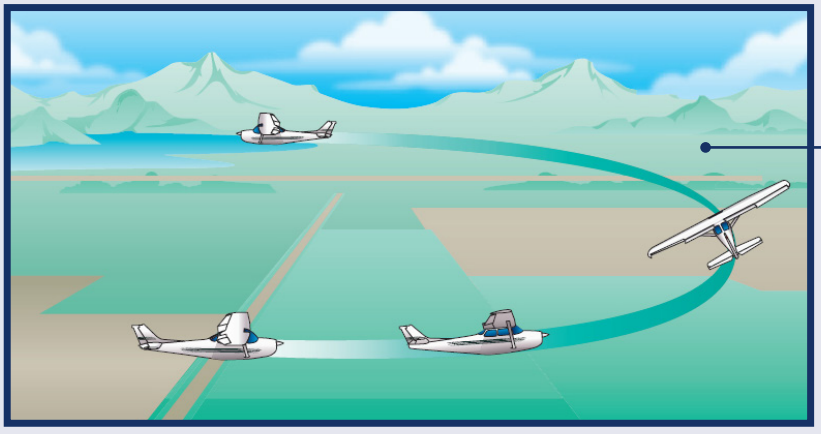
Last but not least, Chandelles are performed as the fastest way to avoid terrain, so let's visualize a mountain top coming out of the fog and performing the following maneuver: bank (30 degrees); power (full trainer/75% high performance); pitch 8-10 degrees (Vx takeoff); with a 180 degree turn, finishing 10 knots above stall warning and holding for 5 seconds.

Just like mnemonics and acronyms help learning, visualization of every day flying techniques helps us hone our flying skills so we can call upon them if anything out of the norm should arise. During any phase of flight, you can Recognize and Recover. T&T

**Brian Smith** *is a second-career CFI who specializes in finding PA46 piston aircraft and training his clients to fly them. He also teaches new pilots at his local Part 141 flight school. He owns Aerosmith Aviation in Kennesaw, Georgia. You can contact Brian at* **brian@flyaerosmithaviation.com.**



The **Lazy Eight** is a maneuver that is designed to develop the proper coordination of the flight controls across a wide range of airspeeds and attitudes.



A **Chandelle** is a maximum performance, 180-degree climbing turn that begins from approximately straight-and-level flight and concludes with the airplane in a wings-level, nose-high attitude just above stall speed.

Source: Airplane Flying Handbook

*Editor's Note: This article originally appeared in MMOPA Magazine.*

by **Kevin R. Dingman**

# True Confessions

## Telling Passengers the Inconvenient Truth

*"If you're faced with a forced landing, fly the thing as far into the crash as possible."*

– Bob Hoover

Without a doubt, October is my favorite month of the year. Fall brings the change of colors, crisp temperatures, the smell of burning leaves, the sound of migrating geese and the holiday of horrors: Halloween. While an admirer of the season, I'm not a fan of the grisly facets of All Hallows' Eve – even when narrated by Vincent Price. But the ghoulish holiday does present a timely pretext to discuss what we tell our passengers before things turn dangerous or disastrous.

## A Timely, Truth-Telling Factoid

We spend vast amounts of time and money celebrating the macabre traditions of Halloween (close to $2 billion). And the latest rumor is that it's the second most popular holiday of the year next to Christmas. But this is fake news; it's not true. Second place spending and popularity goes to an event that's not even a holiday: Back-to-School. Who says the U.S. is falling behind in education? Then you have Mother's Day, Valentine's Day, Easter, Father's Day, the Super Bowl and then Halloween. We spend more on our Mothers than our Fathers or sweethearts. Also, more on Easter baskets than for Fathers. The Halloween popularity rumor is not true; it's low on the holiday totem pole. The correlation to aviation in this truth-telling factoid is coming. Remember, it's a "timely pretext."

## Good Fun?

Halloween originated with the ancient Celtic festival of Samhain, where people would light bonfires and wear costumes to ward off ghosts. The evening before was known as All Hallows Eve, and later Halloween. Halloween has evolved into trick-or-treating, pumpkin carving, parties, costumes and eating candy. It's also the holiday in which we say and do ghoulish things in an attempt to elicit fear, apprehension, shock, surprise and to exercise the adrenal glands of others – all in good fun of course, and more often perpetrated by males. While I have seen GA pilots attempt said good fun with aircraft systems in order to startle or scare passengers, such fiendish and foolish actions are in direct conflict with our professional persona when we operate an airplane. Calm and boring is the way we want our flights to proceed – no drama, no shock, no fear, no surprises and definitely no blood and guts. But when Halloween-like dangers become a reality, how much truth should we tell passengers about airplane issues? Things like dangerous weather, diversions, fuel leaks, fires, equipment deficiencies and component failures? Before we get too grave, here is a warm-up tale about presenting passengers with the inconvenient truth.

## A Servant of The Traveling Public

While not dangerous or disastrous, the following incident highlights the reactions, this one irrational, that our passengers may exhibit when we tell them the truth. While not as funny as the "stiff-drink" affair (see "Say What?," T&T July 2019) and more about the selfish state of mind in which we may find people, this tale is also from an FA and a true story. Picture if you will, an intelligent, diligent and well-presented female crew member. Normally a gentle, delicate and humble young lady, this flight attendant is. An attentive servant of the traveling public tasked to ensure passenger safety but pushed, not by a full moon but an irate and irrational traveler, into revealing the werewolf portion of herself. The portion where polite patience turns to engulfing exasperation (cue Vincent Price laughing in the background).

## Her G550 Was at the Cleaners

The story takes place on a flight from RSW to ORD and involves a lady passenger that was connecting on a flight to Spain from ORD. Keep in mind, a lot of folks from RSW travel with their Pekinese pocket-puppy and only use public transportation when their G550 is at the cleaners. The weather in Chicago was absolute crap, and after some holding, the captain announced that the flight would divert to Milwaukee. Oh boy, the lady and her dog would have none of that. Standing up in her seat (the lady, not the dog), she began her rant: "I need to get to Chicago for my flight to Spain." The mild-mannered FA approached and responded, "We have to divert to Milwaukee ma'am – the weather in Chicago is too bad to land." Pounding with both hands on the back of her seat and in unison with her words, she responded: "That's unacceptable. We-have-to-go-to–Chicago – period." At this point, passengers sitting plus or minus a couple of rows were staring with trepidation as the confrontation escalated in intensity and animation. With waning patience, the FA said, "I'm sorry, but this plane is already on its way to Milwaukee." The passenger then added foot stomping to her hand pounding and shouted, "No-it-is-not! Tell the captain we have to go to Chicago!" A low growl confirmed the dog's agreement. The FA apparently needed to use different words. These weren't working on the lady or the dog.

## A Huge Ball of Fire

The lady's tantrum was finally cut short when the flight attendant calmly and quietly let fly with the unrestrained truth: "Ma'am, sit down right now. We have to divert to Milwaukee because we need more fuel. If we don't, we are going to run out of gas, crash into the ground, burst into a huge ball of fire and we will all die – and your little dog Toto too." Even a meek, mild and humble servant of the people must

Talk to your passengers before and after these come on.

sometimes explain things, um, plainly? And I just threw in the little dog Toto thing – couldn't resist. Halloween and all.

The lady passenger began to grasp the seriousness of the situation while simultaneously realizing she had acted foolishly, influenced by not only the truth but the chuckling of other passengers. This is a prime example of why the PIC needs to anticipate the variances in psyche and the issues of which passengers worry. Before sitting in the left seat of an airliner, we have many years to witness both inflight and ground issues and to see how a well-seasoned PIC explains things to the passengers. Over the years, I've seen the varied reactions folks have to bad news. And the whole telling-truth-thing sometimes doesn't work as well as we might contemplate, so be ready. And you probably want to skip the crash into the ground and fireball parts.

My pilot-friend and fellow writer Dick Karl was an oncology surgeon. Before becoming a steely-eyed jet pilot, he spent his career giving bad news to his patients and then progressively more dire news each time they met. A while back, I read "Being Mortal" by Dr. Atul Gawande. It discusses nursing homes, hospice and the modern-day process of dying. A portion of the book talked about various techniques the physicians could employ in discussing this process and the painful decisions. It described three general approaches:

1. Dr. Information: Just the facts, ma'am. Only clinical facts and procedures are discussed.
2. Dr. Know-it-All: This is what we found wrong with you, this is what I think about it, and this is what we're going to do about it. This type of discussion isn't a discussion at all; it's a briefing.
3. Dr. Interpretative: These are our options based on your expectations and desires: What is important to you? What outcome do you want and what are your expectations?

As the PIC, we like to tell the truth, but as you saw with the lady and her puppy, sometimes even a simple truth like a diversion can ignite a secondary fire.

## You Can't Handle the Truth!

As pilots, we pretty much have only the "Dr. Information" and "Dr. Know-it-All" approaches available when interacting with our passengers. We tell the folks the situation and let them know our plan – it's a dictator briefing, not a committee meeting. Imagine if we gave our passengers bad news then progressively worse news in the fashion of a surgeon each time we met: "Since we flew together last week, I've had a weather consultant interpret the TAF chart and the mechanics from our group presented their findings. We had hoped for a remission but the terminal weather is, well, terminal. There is a good chance that one of the right engine fan blades is developing a stress fracture. And even treated with $80,000 per-once fix-it stuff from the airplane-pharmacy, the crack is likely to progress. We also have an occluded fuel line. We're taking a fuel thinner to help keep the fuel flowing but it's possible that our left engine will have a convulsive seizure due to the occlusion. If one of the motors goes into arrest, we can come back to the airport but this fog is going to get worse." It makes me glad I'm a dictator and not a surgeon trying to explain the details of flying airplanes.

*My experience is that even though sometimes frightening, passengers want the truth.*

## Passengers Want the Truth

No matter from which side of the cockpit door you toil, we all do our part in dealing with passengers. But the non-pilot public absorbs information more readily when delivered by the PIC, especially if we throw in a bit of candy. The recent Citation runway accidents (Citation Excel at OVE – 6,020 ft. runway, and a Citation Latitude at 0A9 – 4,529 ft. runway) highlight the need to talk to our passengers just like we do at the airlines about emergency exits and following the instructions of crewmembers. When you talk to non-pilots, take a moment to consider the audience. My experience is that even though sometimes frightening, passengers want the truth. Most folks are amazed by what we do and though intelligent, have no clue how we do it. It may be best to under exaggerate and soften the facts in order to lessen their anxiety while presenting the truth. Even during Halloween, try not to scare the crap out of them. Or their dog. 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 organiz tion Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke.Contact Kevin at* **dinger10d@gmail.com**.

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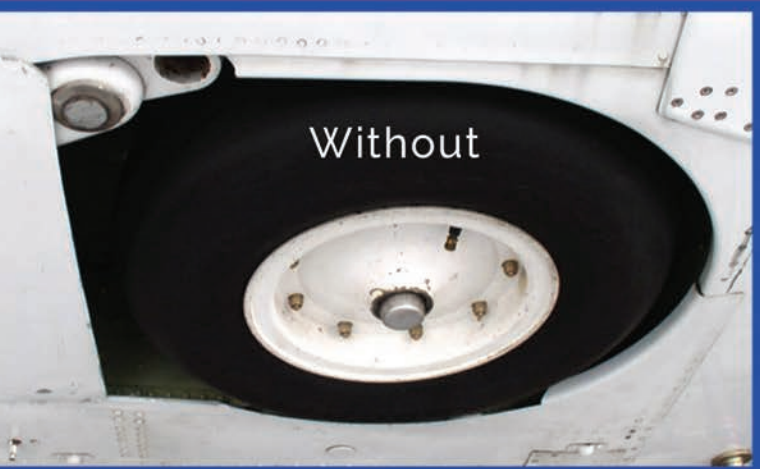



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# En Route

## New Cowling System Introduced for the PC-12

American Aviation, Inc. and Edmo Distributors, Inc. recently announced a new ram air cowling system for the Pilatus PC-12 called Speed Cowl. The system received an FAA Supplemental Type Certificate at the end of July.

"Speed Cowl vastly improves ram air recovery to the turbine engine intake. This results in higher available torque at the same ITT settings, which significantly improves engine performance," said Tim Gump, president of Edmo. "With Speed Cowl, PC-12 owners can now unleash the additional power that is available from their Pratt & Whitney PT6 engine."

Edmo reports that during flight tests, the true cruise airspeed was shown to increase by up to 18 knots at FL280. Also, time to climb above FL180 was reduced due to increased available torque. Performance improvements vary based on altitude, outside air temperature and ITT settings. For more information, visit *info.edmo.com/speedcowl*. T&T

## First Embraer Praetor Delivered in the United States

VanAllen, a business aviation consulting firm, delivered the first Embraer Praetor 600 in the U.S. VanAllen conducted the pre-delivery inspection in Brazil, with the acceptance and delivery taking place in Melbourne, Florida.

"Over the past two years, VanAllen has delivered nearly a dozen Embraer products to its clients," said Jeff Agur, CEO of VanAllen. "We are excited to be a part of this milestone and see the continued evolution of the Embraer product line."

"We are very pleased to deliver the first U.S. Praetor 600 to VanAllen's customer, who certainly will enjoy the highest level of customer experience with the aircraft's superior performance, technology and comfort," said Michael Amalfitano, president and CEO of Embraer Executive Jets. T&T

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# En Route

## SierraTrax Unveils Maintenance Bidding Service

During the Citation Jet Pilot's convention, SierraTrax unveiled "Maintenance Marketplace" – a service that allows aircraft service centers to submit bids on upcoming work indicated by the SierraTrax database. Customers can opt-in to anonymously share their aircraft records and receive proposals from maintenance shops, allowing them to compare quotes from several providers on standard inspections.

"We are excited to launch our Maintenance Marketplace and believe that it will, over time, have a transformative effect on how turbine aircraft owners select their maintenance providers," said Jason Talley, CEO of SierraTrax. "The service provides an easy way for maintainers to drive business to their facilities, and at the same time, it allows our customers to equitably compare the value of competing proposals without sales pressure."

SierraTrax offers aircraft maintenance tracking starting at $99 per month. For more information, visit *sierratrax.com*. T&T

## Western Aircraft Authorized on Williams FJ44 Engines

Western Aircraft announced it is now authorized to work on Williams International FJ44 engines for the various models of Cessna Citation Jets.

This new Williams FJ44 engine authorization allows Western to work on Cessna 525, 525+, 525 A, A+, B, C and M2 models. Western Aircraft is already a Williams Authorized Service Facility for the Pilatus PC-24.

"We are excited to add Citation models to our authorization for Williams FJ44 engines," said Jody Harris, director of aircraft services at Western Aircraft. "It's another way to provide quality customer service to our Cessna customers." For more information, visit *westair.com*. T&T

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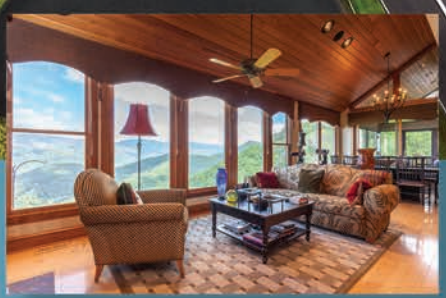
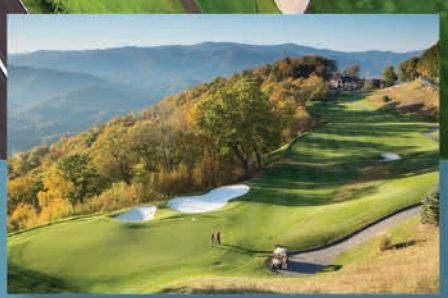
# Mountain Air





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# Trains, Planes and Automobiles

Sometimes we forget just how lucky we are to own an airplane. Having sold my Mustang a few months ago, I now remember. As you may recall, I have access to Larry King's M2, but he took my airplane (okay, his airplane) on a round-the-world journey several months ago, and I am relegated to airline travel.

My, how I miss my airplane!

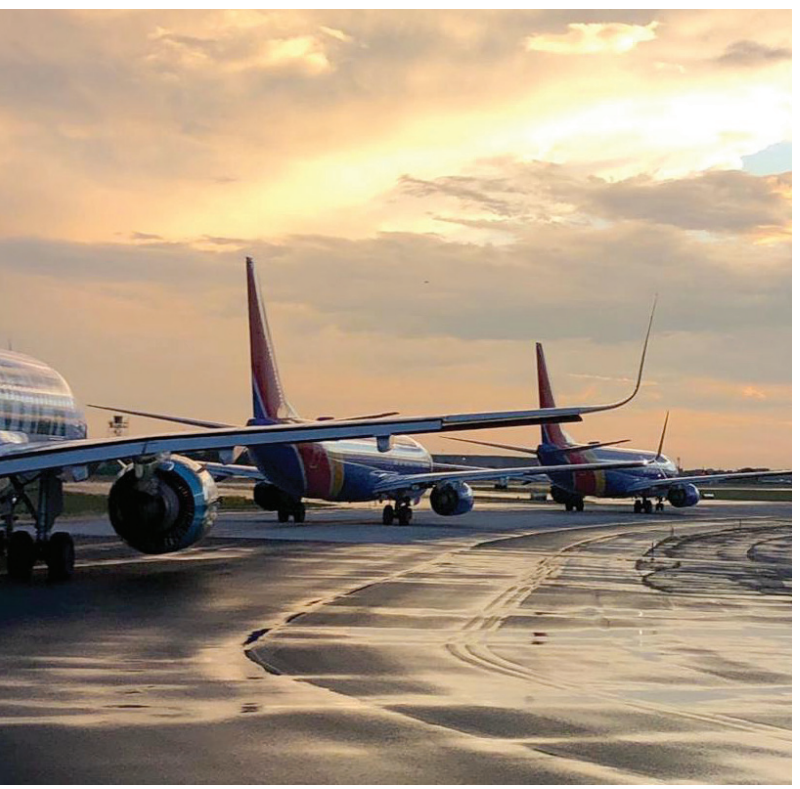
While the airlines do a remarkable job of safely moving millions of folks around the country, it can be a grueling experience. Here's a look at several recent flights.

April. I depart for Wichita on American. We arrive at an empty Wichita ramp at 8 p.m. After pulling up to the gate, the jet bridge won't move. Thirty minutes later, the crew decides to move the airplane to the next empty gate. However, there is no one available to drive the tug. More delay, then we finally "arrive."

A few days later on the return, the plane is three hours late departing. A nine-year-old girl sitting behind me tries to throw up five times. And the lady sitting beside me coughs the entire trip.

I got free water and what appeared to be a cracker.

In June, I set my personal record for the most number of mechanized modes of transportation to reach my destination: eleven. I had been invited to speak at the Citation Jet Pilots' regional meeting in Mackinaw Island, Michigan. A simple destination if you have your own airplane, but not so easy if you don't.



1. A cab from home to DFW.
2. An elevator up to security.
3. A Delta Airbus to Detroit. The new Airbus decided it would not accept fuel from the hose, causing a 40-minute departure delay. I now know when you see three guys wearing yellow vests in the cockpit, it is not going to go well.
4. A moving sidewalk in Detroit to find the next gate.
5. A tram to connect to the flight which, I missed due to the delay in Dallas.
6. An escalator to take me to the rental car line for "plan B."
7. A bus to take me to the remote rental car lot.
8. A Hertz rental car which I drove for 5 hours to Pellston, Michigan because I missed the Delta connection.
9. Another cab from the Pellston airport to the Mackinaw ferry dock.
10. A boat from Mackinaw to Mackinaw Island.
11. A horse-drawn carriage from the island dock to the hotel (no motorized vehicles allowed on the island.)

The trip from my house in Dallas to the hotel in Mackinaw took 12 hours and 45 minutes. Some of the CJP members flew directly to the island's 3,500-foot strip less than a mile from the hotel. They own their own airplanes!

Fearing that I might again miss the connection on the return to Dallas, I literally ran with luggage in tow almost a mile to the connecting terminal in Detroit. I made it with 6 minutes to spare, which allowed me time to dry off from the sweat-soaked sprint.

On the return to Dallas, I got to rub elbows with the beefy guy sitting next to me. Crawling over him on the way to the men's room as he slept, I tripped on his leg and went flying into the aisle. We are not friends anymore.

I think I am going to buy another airplane.

Fly safe. T&T

**David Miller** *has owned and flown a variety of aircraft from turboprops to midsize jets for more than 50 years. With 6,000-plus hours in his logbook, David is a member of the Citation Jet Pilots Safety Committee and writes and speaks on aviation topics. You can contact David at* **davidmiller1@sbcglobal.net.**

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