



# TWIN & TURBINE

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

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VOLUME 24 NUMBER 2

## AERIAL REFUELING

We Go Behind the Scenes  
of a KC-135 Mission

Garmin Debuts  
GI 275 for  
Legacy Panels

Top Turboprop:  
KA90 and  
Turbine Duke

Pivoting to a  
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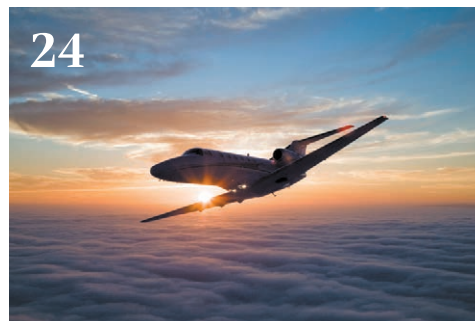
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U.S. Air Force Photo by Staff Sgt. Keifer Bowes

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# Misfueling Discussion

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"It really doesn't matter if you are the smartest pilot in the world, or have the most endorsements in your logbook, at the end of the day, it still comes down to diligently checking every box."

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I want to thank our readers who reached out to me following my December editor's briefing, "In Honor of Dr. Dan." I was moved to hear the various ways Dr. Dan's story struck a chord with you. (If you missed it, my friend and newer T&T contributor Dan Greenwald tragically lost his life last October in an accident caused by misfueling – you can find the full article on our website).

I feel it is important for us to share in both the highs and lows that come with aviation and it was comforting to hear directly from others. One reader, in particular, shared with me their own close call with misfueling and how the experience subsequently affected his fueling and pre-flight diligence. Immediately upon reading, I knew his story (and his bold reminder for other pilots) needed to be shared as a continuation of the conversation.

---

I just read the December copy of T & T and noted your editorial about Dr. Dan. I couldn't help but to respond immediately. Many years ago, I had an incident in reverse – being fueled with 100LL instead of Jet A. The consequences would not have been as dire, but the message is the same. My story follows:

I am also a surgeon (retired ophthalmologist) who has just finished a 36-year career as a private pilot (similar schedule to David Miller – I sold my last (fourth) airplane six weeks ago in November (a 2014 Citation M2)). Almost 25 years ago, we had an incident with fueling that was

brought to mind as I read the story of Dr. Dan. And in spite of whatever the FAA, FBO's, etc. do with training and color-coding, I want to say NOTHING can replace the diligence and attention to detail that is needed by the pilot himself with regards to proper fueling. This is in no way a criticism of Dr. Dan, but a real alert to every other pilot out there.

In 1995, I purchased a 1984 Cheyenne II XL, my first foray into the turbine field after flying single-engine pistons for 10 years (Saratoga SP, Malibu 310). We flew the Cheyenne for the next 20 years until we purchased a new Cessna Citation M2 in 2014.

We took a lot of time to get very familiar with the Cheyenne since it was a big transition from single pistons. I hired a local flight instructor who was trained in Cheyenne's and many other aircraft to spend a lot of time teaching and flying right seat with me until I was totally comfortable with the aircraft. One day we were meeting at the local FBO to do some air work, and I called my friend/instructor to tell him I was running a little late getting out of the office and would be about 10 minutes late. He said, "No problem, I'll get the airplane pulled out and put the fuel order in." Great.

Shortly thereafter, as I pulled up to the FBO, I noticed the Cheyenne sitting on the ramp with the 100LL fuel truck in front of it and the line crew pulling the hose out of the truck. I immediately honked my horn, flashed my lights and yelled to get their attention. One of them caught my



waving and hesitated. I told them to stop and look at the truck. They did and suddenly realized why I was alarmed. The hose was retracted and a Jet A truck was brought out. It is conceivable that the crew was so used to fueling me with 100LL for the prior 10 years that it just didn't register that this was a different aircraft for me now. The consequences of using 100LL in a turbine engine are not as severe as the reverse that occurred for Dr. Dan.

I asked where instructor Ben was as he was nowhere to be seen on the ramp. They said he was inside the FBO. I went in to look for him and sure enough, he was leaning against the reception desk with a cup of coffee, relaxed and chatting. He looked at me and asked why I looked so disturbed. Once I told him what just happened on the ramp, he was also disturbed and very apologetic as well. He agreed never to let that happen again.

For the next 25 years, and until I just ended my flying career in November 2019, I never forgot that incident. And as a result, I made a point of ALWAYS being present as my aircraft was being fueled, at least until I saw the truck and confirmed it was Jet A. Even at our local FBO where the 1995 incident occurred, I would not call a fuel order in ahead of my arrival and trust that the correct fuel source was used. We allowed time to fuel with ourselves being present before our departure. Over those years, there was one other incident where the incorrect truck was brought up initially and we caught it. This was at an out-of-town FBO.

My point in this story is that it really doesn't matter if you are the smartest pilot in the world, or have the most endorsements in your logbook, at the end of the day, it still comes down to diligently checking every box. And it starts with pre-flight planning, pre-flight inspection (including fueling) and checklists. It's a responsibility the pilot has to him/herself and passengers. If relaying this one incident I experienced would save one life in the future, it would make it worthwhile to have waited to send my first letter-to-the-editor at the end of my 35-plus year flying career. I hope you find value in this story. In honor of Dr. Dan and his legacy.

Barry D. Stamm, MD

Barry's story perfectly accentuates my goal, and what I believe Dr. Dan's goal would be, following this tragedy: shine a light on the real possibility of misfueling to prevent future accidents. The FAA and National Air Transportation Association (NATA) have taken various steps to confront the problem, but have you?

Thank you again to Barry and others for acting on their impulse to write to me. Sharing aviation stories and learning from one another is precisely the mission behind T & T.

*Rebecca Jacobs*

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# Airmail

## In Response to David Miller's "Irrational Behavior" (December)

I just read your piece in the December edition of *Twin & Turbine*. I learned to fly at age 11 in 1969 and have owned two Bonanzas and four new Barons over the course of my flying career. We took our two teenage sons all over the lower 48 in the Barons. Now they are married and we have six grandchildren – funny how that happens so fast!

Two years ago, I decided to go the turbine route and the Cessna Mustang was our first choice. We physically looked at three and made an offer on one which was rejected. In addition to the Mustang, I ran a parallel search for King Air C90GT's. After a lot of thought, it became clear that the versatility and lower operating costs of the King Air moved it to the top of the list.

So, in January, 2018 I made an offer on a 2006 C90GT, 1,750 hours TT with fresh hots, fresh phase 1-4 and an impeccable history. Fortunately, the offer was accepted and we have now flown the aircraft for over 300 hours!

Since purchasing it, I replaced the Garmin 400W with a 625/725 combo, the TDR 94's with a GTX345 and 335, and the RDR 2100 radar with a new GWX 75. The props were due for overhaul so I replaced them with the new Raisbeck swept blade props, which really improve the takeoff performance.

What we have is an honest 265 KTAS, FL250, ISA +15 aircraft that I can fill the tanks and put 1,000 pounds of people and bags in. Original paint and interior look like new.

The aircraft has been very reliable and parts have been unexpectedly reasonable. One of the Mustangs we looked at had a wing deicing boot replaced and the owner showed me a bill of close to \$20,000 for the work. When we returned home from looking at that aircraft, I called Stevens in Dayton, Ohio and asked them what it would cost to replace all of the boots on a C90GT – \$18,000! That helped seal the deal for me.

I can't say enough good things about the King Air and would be happy to share more of my experiences with you over the phone. Hope to talk to you soon. Thanks for writing in T & T, it's the first piece I read every month!

Tim Tate

---

Sounds and looks from the photos like you found a great King Air. I assume your C90A "recovery and rehab program" will be the subject of next month's column. Many MU-2 owners have installed G600's but I don't believe anyone has installed a G1000, so you made a great choice.

I considered the G600 ten years ago when Greg Mink updated a "K" model and later a Marquise, but asked myself, "How many trips have I not completed that I could have completed if I had a G600?" Because the answer was "zero," I gave myself a Stearman as a 65th birthday present and have no regrets. Sticking with steam gauges also makes it easier to transition between the two airplanes. (That's my story and I'm sticking to it).

Roy M. Kinsey

---

## In Response to Joe Casey's "Top Turboprop: JetPROP and Meridian" (December)

I really appreciated your article in the recent issue of *Twin & Turbine*. I have been an SR22 owner/pilot and am considering upgrading. Based on your article, I'd say I am a new 2020 Corvette guy and, therefore, more likely align with a Meridian (the Cirrus Perspective – G1000 is a fully integrated model and probably more my taste).

My priority has been to focus on looking at aircraft that have reached the bottom of the depreciation curve. My 2008 Cirrus will list for 10 percent more than I paid for it since it is a desirable model and sits at the bottom of its depreciation curve. When considering Meridians, do you have a viewpoint as to which vintage models have reached near their floor price?

Finally, I've also been thinking about a TBM 700C, which when equipped with an upgraded flight deck, appears to be fully depreciated and an exceptional platform. Do you have any views on the comparison of the two? I look forward to learning from any thoughts you are willing to share!

David Novelli

---

Just read your article in *Twin & Turbine* on JetProp vs. Meridian. Really nice.

I especially liked your Corvette analogy. Self-reflecting, and as the owner of a (standard transmission) 2001 M5 and a (standard) 2011 911S, very apt comparison!

Manny

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# Position Report

by Dianne White



## Keep Calm and Keep Flying the Plane

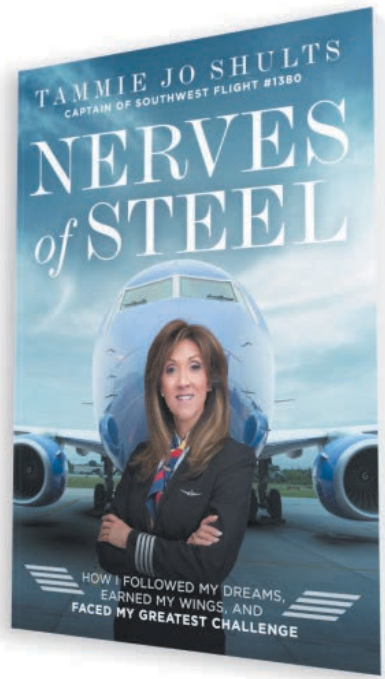
Tammie Jo Shults talks about preparation, attitude and having faith in the face of an emergency.

It was one 10-minute snippet in time that made Tammie Jo Shults famous. A Southwest Airlines captain, Shults and her co-pilot Darren Ellisor were celebrated for successfully landing their Boeing 737 after a catastrophic, uncontained engine failure at altitude caused an explosive decompression that greatly compromised the aircraft's flying characteristics. She was hailed for her calm, decisive leadership and skill in handling an emergency that's outside the normal engine-out training scenarios.

While that event created her public persona, it is far from defining the person. Everything that she learned as a kid growing up on a rural New Mexico ranch, the hard lessons she learned as a Navy career pilot flying F/A-18's and the central role that faith plays in her life shaped the person who showed up on April 17, 2018.

Last summer at AirVenture Oshkosh, I sat down with Tammie Jo to talk about her love of aviation, her career, and of course, that fateful day. She recently published a book called "Nerves of Steel" that is less about being the hero to 148 Southwest passengers, but all the challenges, victories, setbacks, people who doubted her as well as people who championed her that forged the steel within. Her story is inspiring, whether you're a young person looking up the mountain yearning for the summit, or among those who've crested the pinnacle and are now enjoying the view.

Tammie Jo grew up on a working ranch that happened to be near Holloman Air Force base, giving her a front-row view of the fighters training over her house. But it wasn't until she read Russell Hitt's book "Jungle Pilot" about Nate Saint, a missionary pilot in Ecuador, did she think about becoming a pilot herself. While finishing her biology and agribusiness degrees at Mid-America Nazarene College, she met a woman who was awarded a pilot slot with the U.S. Air Force. Inspired, she applied, but was turned down. She then decided to try the Navy and was accepted for aviation officer candidate school. That set the course for her military career, which



culminated with Tammie Jo becoming one of the first female Navy aviators to qualify in the F/A-18 Hornet. Because of the combat exclusion policy in place at the time, she instructed as well as flew training missions as the aggressor pilot. In 1995, she was promoted to Lieutenant Commander and transitioned to the Navy Reserves, where she flew the F/A-18 and EA-6B Prowler until 2001. She married fellow Navy aviator Dean Shults, and she launched her career at Southwest Airlines.

On the morning of April 17, 2018, Tammie Jo was captain for a Southwest flight from New York to Dallas. Ironically, she was not scheduled to fly that day, instead replacing her husband Dean for this leg. When a left engine fan blade separated during cruise flight, it exploded the inner containment shield, peeled back the engine cowl and pierced the left side of the fuselage. The violent depressurization partially

pulled a belted passenger out of a failed window, resulting in her tragic death.

As every news outlet reported that day, Tammie Jo Shults was able to successfully execute an emergency landing at Philadelphia International Airport. What wasn't widely reported was how badly crippled the aircraft was, and how she and co-pilot Ellisor struggled to regain control due to the tremendous airframe damage. Uncontained engine failures aren't something that is covered during training.

"The failure was sudden and very violent. The airplane snapped left and we were able to stop it passing 40 degrees. There was this tremendous shudder, so bad that we couldn't read anything," she recalled. "It wasn't just a sudden loss of thrust on one side, it was basically a barn door in a hurricane from the engine cowl that was peeled back and remained attached. Since we were at high altitude, the airplane was squirrely with the tremendous amount of yaw that was induced."

Tammie Jo also said they also were dealing with smoke in the cockpit, severed hydraulic and fuel lines, not to mention the explosive decompression caused by the fuselage breach. It wasn't until they were passing through 8,000 feet did they learn



about the passenger, with flight crew pleading for them to slow down so they could pull her back inside the cabin.

"As we got down lower, we were more of a glider than we knew. But when we added power, it was pushing us severely left to the point where I had less and less rudder authority. So, we had to pull our power back further. I didn't want to change the wing too much because of the damage, so I opted for flaps 5, which is minimal drag and optimal lift," Tammie Jo said. She added that they were still 10,000 pounds overweight and didn't have time to pull out the single-engine before landing checklist but knew instinctually the tasks that needed to be done.

"Some advice I'd give to fellow pilots would be when you are practicing emergency procedures, take the time to think about why that switch is being switched. Why is it on the memory items? What's the reason behind it?" she said. "Also, dedicate yourself to regularly practice those emergency procedures on the ground, in the sim or in the air. Habits on good days become instinct on bad days. Instincts take no time and gives you bandwidth to move on to something else that requires a little more creativity to solve."

She credits her time in the Navy for giving her the calm demeanor that was captured with her radio calls. "At first we were trying to figure out if the plane was holding together. Then I realized, hey, we're still flying so that's a good thing," she said. "It was a calm heart that produced a calm voice. You stop worrying about the 'what if,' and focus on the 'what is' and deal with it."

In addition to her military background and training, she credits something not found on any checklist. "We act on what we believe. I did believe that if this was my final hour, I'd make it my best and just pay attention to what I had to do."

Why was she compelled to write a book? She answered that it was a book that inspired her to start our aviation journey and she hopes that her story, which began decades before Flight 1380, will inspire others.

"Dreams are wonderful, but they're only the starting pistol. It's the race ahead, the work that you put in, sometimes years of work and with no promise of success, that puts you in place prepared and ready."

Tammie Jo Shults' new book "Nerves of Steel: How I Followed My Dreams, Earned My Wings, and Faced My Greatest Challenge" is now widely available from Harper Collins. She has also released an adaptation to the book for young readers ages 8 to 12. **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](mailto:editor@diannewhite.com).



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# Top Turboprop Series

## King Air 90 and Turbine Duke

by Joe Casey



PHOTOS COURTESY OF CLINT GOFF

If you've read my writings, you know that I love the PA46 series of airplanes. They are designed for the owner who craves efficiency and speed – both characteristics I find appealing in an airplane. So, it is no wonder that I really appreciate the JetPROP conversion provided by Rocket Engineering headquartered in Spokane, Washington.

I fly the JetPROP almost daily as an instructor in this tight-knit community, so unsurprisingly, I also entered the Beechcraft Royal Turbine Duke

world. The same Rocket Engineering that owns the JetPROP Supplemental Type Certificate (STC) also owns the STC for the Royal Turbine Duke. Coupled with my background in other Beechcraft models, it was a natural migration for me to become an instructor in the Royal Turbine Duke.

### Royal Turbine Duke

Rocket Engineering has a long history of taking a piston airplane with “good bones” and adding horsepower. The JetPROP and Royal Turbine Duke

are no exception. The Beechcraft Duke is a distinctive, good looking six-seat airplane that is built with Beechcraft's usual penchant for strength. Beechcraft airplanes have a well-deserved and well-respected reputation for being “over-built.” The Duke is no different.

However, the Duke has a problem – er – two problems. The piston engines on the Duke are expensive maintenance hogs.

Beechcraft's goal was to make the Duke perform, so they incorporated





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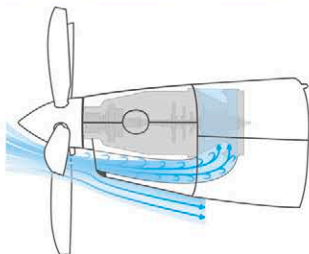


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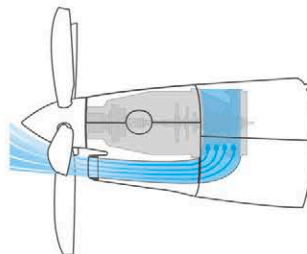
With Speed Cowl, pressure from high-velocity ram air is fully recovered at the cowl inlet and flows efficiently through the ducting to the engine plenum. This significantly increases ram air recovery to the engine plenum and boosts the climb & cruise performance.

## BEFORE: Standard Factory Pilatus Cowling



Pressure from high-velocity ram air is reduced by turbulence caused by the shank of the propeller near the spinner. Also, the spinner directs much of the airflow to the lower lip of the inlet causing additional turbulence within the ducting. The result is a significant reduction in ram air recovery to the engine plenum.

## AFTER: Speed Cowl Pilatus Cowling



Pressure from high-velocity ram air is fully recovered at the cowl inlet and flows efficiently through the ducting to the engine plenum. This significantly increases ram air recovery to the engine plenum.



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the biggest piston engines they could find, selecting the 380 horsepower Lycoming TIO-541. But, too much is asked of the big piston engine on the Duke. Just about any turbocharged piston airplane engine is really an engine that was originally designed for normal aspiration, and the turbocharging makes the engine work harder as aircraft designers seek more horsepower. In the Duke, the big turbocharged engine developed a reputation for poor dispatch reliability and expensive maintenance invoices. So, the Duke became known as a really good airplane with really expensive engines.

What's the best way to fix the piston problem on an otherwise rugged, functional and well-built airframe? Bolt on PT6s. That's what Rocket Engineering figured how to do and created the Royal Turbine Duke.

The PT6-35 engine is installed in the place of the big Lycoming and everything changes. So, how's the Turbine Duke perform? In short, the change in performance is spectacular.

Advancing the power levers of the Royal Turbine Duke is downright fun. The acceleration is brisk. No, that's not strong enough language...the acceleration is amusement-park-ride spectacular. The Turbine Duke literally leaps forward and jumps in the air. At my home airport (KJSO) with a 5,000-foot runway, I can start at one end of the runway, take off, climb and reach nearly 2,000 AGL when I get to the other end of the runway. The angle of climb is greater than my Pitts S2B, an airplane known for ridiculous performance. The rate of climb when using full takeoff power easily tops 3,000 feet per minute and is oftentimes much more in a lesser-loaded Royal Turbine Duke.

Of course, such tremendous climb comes with a steep deck angle. A "normal" climb in a Royal Turbine Duke is completed with higher airspeeds and lower deck angles. But, even so, the Royal Turbine Duke is a remarkable performer that is vastly overpowered.

Reaching the cruise altitudes in the mid-20s is easy and happens very quickly. A Royal Turbine Duke can reach FL250 in less than 10 minutes. Then, that tremendous rotate of climb is converted into forward speed, lots of

forward speed. I regularly see cruise speeds of 290 KTAS, and when the temperatures are right, I can see 300-plus KTAS.

So, with all of this good news, why isn't the Royal Turbine Duke a hot commodity on the market? Why have there been relatively few (about 20) conversions of the Royal Turbine Duke when there have been over 330 JetPROP conversions? The answer lies in the competition.

If you love efficiency, you probably will not love the Royal Turbine Duke. Basically, the Royal Turbine Duke is the exact same conversion as the popular JetPROP times two. Whereas the JetPROP burns 32 gph to obtain 260 KTAS, the Royal Turbine Duke will burn 64 gallons to cruise at 290 KTAS. The JetPROP is simply more efficient.

If you are willing to feed a twin, though, efficiency is not your thing. Power and redundancy are your thing. And the Royal Turbine Duke has gobs of excess horsepower. But, there are lots of other airplanes to consider if you like power and want six seats, and there's even another Beechcraft product to consider – the King Air C90.

### King Air C90

Admittedly, the C90 is not nearly as sexy, fast or sleek as the Turbine Duke. It won't climb as quickly, won't cruise as fast and won't turn heads on the ramp. It is a ho-hum performer comparatively, but it is a performer that has no gaps in performance. It is not the fastest, but it is reasonably fast. It doesn't carry the most, but it carries a lot. It doesn't have the best short field capabilities, but it'll easily handle most paved runways in the world. That is why the Royal Turbine Duke doesn't sell as well. The Royal Duke wins in climb rate, cruise speed and short-field performance. But, the C90 beats the Duke in every other category – and in those categories where the C90 is in second place (climb, cruise and short-field performance), the C90 is no slouch.

If you have four people and bags, want to go 800 nm routinely and you prefer a multi-engine steed, you'll probably look closely at the Royal Turbine Duke. But, you'll also look at the King Air C90. And, the C90 will carry more, have a bigger



cabin, have more seats, have a lot more availability of already-trained pilots in the local area, have a toilet and be a "middle of the road investment." It'll show up to FL250 later than the Duke and arrive at the destination later than the Duke but it is safe, reliable, big and comfortable.

Let's use an automobile analogy. What would you use as your daily driver if you could only have one vehicle? I drive a Ford F150 and I love it for its four big doors give access to a big dual cab, all the load carrying capability that I ever need, a smooth ride and decent gas mileage. It is good for just about everything I do from a long highway drive to my parents' house, going to the grocery store or carrying clients to lunch.

But, I also used to enjoy driving my Ford Mustang with the 5.0 liter 480HP V8 engine. I could leave everyone behind on a green light, zip around traffic with ease and stop on a dime. It was a bunch of fun. But, if I had bunch of stuff to carry, it might not fit. If I had more

than two people riding along, someone was cramped in the back seat. And, the road noise from the big engine could be tiresome on a long trip.

You've probably already figured it out – the C90 is like the F150 and the Turbine Duke is like the Mustang. Which is better? It depends upon your penchant.

I have several customers who simply love their Royal Turbine Duke and would never trade the performance. Interestingly, all of these owners drive a four-door truck in their everyday life, but they want a sports car when it comes to aviation. They love the climb performance that gets them above the bumps in mere single-digit minutes. And, they love going fast. The 290 KTAS in a Turbine Duke is a lot faster than the 220 KTAS in a C90. There's simply no way they'd give up those 70 knots.

### The Decision

Which should you buy? If you think "mission creep" (meaning you anticipate carrying more later in ownership) may

occur, or if you want a "herd purchase," or if you carry lots of bags, strongly consider the C90.

If you have a smaller hangar or live in the desert areas of the western United States (and want a super-fast climb to get above the bumps), or if you love raw power, strongly consider the Royal Turbine Duke.

Both are Beechcraft-strong, both are powered by a PT6 and both are great airplanes. Me? I fly both routinely and I just love the multi-engine Beechcraft products, all of them. The real question is, "Do you want an F150 or a Mustang?" **T&T**

**Joe Casey** is an FAA-DPE and an ATP, CFI, CFII (A/H), MEI, CFIG, CFIH, as well as a retired U.S. Army UH60 standardization instructor/examiner. An active instructor in the PA46 and King Air markets, he has accumulated 14,300-plus hours of flight time, with more than 5,200 dual-given as a flight instructor. Contact Joe at [joe@flycasey.com](mailto:joe@flycasey.com) or 903.721.9549.

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# Garmin Debuts the GI 275

An electronic replacement for legacy primary flight instruments.

by Rich Pickett



Garmin announced the release of a totally new instrument – the GI 275. The Garmin GI 275 is unique, having the capability to replace a number of legacy instruments depending upon configuration and installation.

The GI 275 can serve as the primary instrument for various functions, including attitude indicator (AI), attitude directional indicator (ADI), course deviation indicator (CDI), horizontal situation indicator (HSI) and engine indication system (EIS). With both touch-screen and knob controls, it is easy to manage. In some configurations, it can provide multiple functions in a single unit.

Since Garmin had legacy instrument panels in mind when they designed the GI 275, the 3.125-inch instrument is rear-mounted to reduce installation time and minimize panel customization. While the GI 275 offers an easy upgrade path for pilots with legacy instrument panels, the extensive capabilities will also be attractive to a number of other pilots who already have the latest avionics.

## Attitude Indicator

The GI 275 can serve as the primary attitude indicator (AI), replacing legacy instruments like the KI-256, one of the most popular gyro-based units. In its basic AI format, the ADAHRS-driven GI 275 provides the same functions as traditional instruments. To obtain full capabilities, you can integrate air data information and display altitude, airspeed and heading. With the addition of the options Garmin SVT (their synthetic vision offering), flight path markers are available. If you want to integrate this same instrument with your autopilot, the optional built-in interface can provide attitude information to various autopilots and provide flight director command cues. In the full-featured AI configuration, the GI 275

provides virtually all of the capabilities of much larger systems but in a smaller package.

When configured as a 4-in-1 flight instrument, the GI 275 can be used as a dedicated standby for Garmin flight displays and a backup to a variety of third-party systems. The built-in VFR GPS provides guidance on the moving map. When installed as a primary or standby instrument, a 60-minute backup battery is included with the unit.

For those aircraft operators that want even more redundancy, two ADAHRS-equipped GI 275 units can be installed for reversionary capabilities.

With so much information in such a small package, it seems it would not be very easy to view. But I had the opportunity to use the GI 275 at NBAA this past fall, and even with all of the data displayed on the instrument, the clarity was amazing.

## Navigation Guidance

In another variant, the GI 275 can serve as either a CDI or HSI. In its simplest form, it is an electronic CDI (with vertical guidance) with a bright display. The GI 275 can accommodate two GPS sources as well as two VHF navigation inputs. If you add the optional Garmin magnetometer, it becomes a powerful HSI. One of the challenges for aircraft owners with older navigators is the ability to interface with the newer displays without upgrading their systems. The GI 275 features an Omni Bearing Selector (OBS) Resolver that can work with these systems without an additional interface unit. Fewer components result in higher reliability!

With all the options and appropriate inputs, the GI 275 becomes an enhanced HSI, displaying a high-resolution moving map with terrain,



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flight plan and weather (Sirius XM and FIS-B).

### Multi-Function Display

Since the GI 275 features the same high-resolution display technology as Garmin's GTN Xi series, when configured as an MFD, it can display a wide variety of information in a very clear format. The integration and interface capabilities are broad. A variety of overlays, including terrain, Sirius XM weather and FIS-B, are available with appropriate inputs.

### Digital Primary Engine Information

The GI 275 can be configured as an Engine Indicating System (EIS) for single-engine and multi-engine piston aircraft, including turbocharged installations. Offering the complete range of engine monitoring functions, the unit can also be programmed for range limits and wirelessly transmit information and exceedances to their Garmin Pilot iOS application. In the case of a multi-engine aircraft, the installation requires two of the GI-275s.

### Summary

The Garmin GI 275 is perhaps the most versatile single-instrument that we have seen in aviation, and this article only touches on an overview of its capabilities. This new instrument also includes Garmin's Database Concierge making it is easy to manage the databases, even across multiple units.

With an initial approved aircraft list of 1,000 single-engine and multi-engine aircraft and numerous autopilot interfaces, it should enjoy widespread use. **T&T**



With 11,000+ hours of piloting more than 100 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](mailto:rich@personalwings.com).



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# AERIAL REFUELING

"Flexibility is the key to air power."



PHOTOS COURTESY OF GRANT BOYD





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by Grant Boyd

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### **13:00 Southern Missouri (25,000 Feet)**

As he intently scans the horizon and cloud layer thousands of feet below his small window, the boom operator sees a black, spaceship-looking figure fast approaching. If his search methods were not so deliberate and perceptive, the incoming object could have easily been overlooked. Seconds later, the unmistakable outline of a B-2 Stealth Bomber comes into full focus.

While a jaw-dropping sight for a civilian private pilot along for the ride, this is a regular day for the boom operators, or “booms,” of the Air National Guard’s 190th Aerial Refueling Wing based out of Forbes Field in Topeka, Kansas.

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## 190th ARW

The 190th Aerial Refueling Wing (ARW) squadron preaches, “flexibility is the key to air power.” This affirmation is evident across their overarching mission, daily correspondence, as well as deployed operations. The squadron consists of 12 KC-135R’s capable of refueling any aircraft in United States inventory, including F-15’s, F-16’s B-1’s, B-52’s and B-2’s. The group also commonly completes missions with other militaries from NATO countries (as illustrated by the Royal Saudi Air Force F-15C on the cover of this issue).

The ability to adjust and adapt their plans at any time and still complete them successfully is imperative for refueling operators. They face a variety of continually evolving factors such as geography, weather conditions, fuel needs, etc. I witnessed this notion of flexibility after recently spending a day with the 190th ARW, allowing me to experience firsthand how the group supports an evolving and complex mission both overseas and within the U.S.

## The Mission

The day began with a pre-flight brief about the 190th ARW. Like all National Guard squadrons, the group encompasses multiple missions and unique capabilities that contribute to the overall Air Force profile. But the squadron’s primary focus, primarily due to its central location within the Continental United States, is “to provide in-flight aerial refueling, airlift, and aeromedical evacuation capabilities to the United States and NATO partners during peacetime, training, contingency, and deployed operations, and most importantly indirect strategic nuclear deterrent support to all three legs of the nuclear triad.”

Quickly into the brief did the need for flexibility become clear. While initially scheduled to meet with a B-52 in New Mexico or Louisiana, this changed to a meetup with a B-1 from Ellsworth Air Force Base (AFB) in South Dakota. Shortly after this change, another one came in. We were now to intersect a B-2 Stealth Bomber off of Whiteman AFB in Central Missouri and track with it for about 45 minutes. This was set to be enough time for

the pilot flying the bomber, who was on their “dollar bill flight” (first time in the aircraft), to start learning how to hook up to our 35,000-gallon flying service station. On the conducted training flight, we carried around 50,000 pounds of fuel and didn’t offload much of it to the trailing aircraft, as it was more a familiarity mission for the pilot connecting to our 20-foot boom.

The pilots of each aircraft have the important job of finding still air and coordinating straight and level flight (at a predetermined altitude and speed). Most of the work to attach the nozzle into the other aircraft’s receptacle is then completed by the boom operator, who is seated dozens of feet behind the cockpit in the tail of the aircraft. This is a difficult and often stressful job that I learned more about on the ground.

## Flying the Boom (Simulation)

To showcase the skills needed to successfully “fly” the boom, which is flanked by an airfoil on each side, the 190th had me hop into their refueling simulator for a test “contact” prior to our flight. The “Boom Operator Simulation System,” or “BOSS,” mimics the realism of a refueling mission, much like an aircraft simulator does. The setup inside is almost identical to that of the real boom, including the three “Superman” seats, which are horizontally placed pads that allow the operator to better see the aircraft and make needed adjustments during the refueling process. While in the correct position, the plane is about 45 degrees directly underneath the operator’s eyes, where they can best see the boom extension, receiving pilot and other important reference points.

After taking the noted ergonomic position, I was told that I was going to practice in the same scenario that was to take place in the sky. The sight picture on the high-resolution simulator screen was true to what I would later see, with the boom extension and manipulation handles being so intuitive that I was able to “swish” the boom’s nozzle into the B-2’s receptacle on the first try. Beginners luck? Of course. Plus, I was operating the simulated boom on “easy mode” – totally





Simulating a test “contact” with a B-2 Bomber prior to our flight.

irrespective of the additional steps needed to transfer fuel and actually complete the mission. The simulation was just a small preview of what was to come and was not entirely like my experience shadowing Master Sgt. Nathan “Dogg” Neidhardt, who I watched do the real thing in the air.

### Back to the Mission

“Dogg,” on the other hand, knows what he is doing after 18 years of Air National Guard refueling experience. Hardly breaking a sweat during the process of connecting aircraft to aircraft in a tiring three-quarters of an hour ordeal, he expertly spoke to the B-2 crew and effortlessly guided them up and down to his fuel line. Intently focused on every shift in movement (whether it be from the KC-135R, B-2 or boom), he called out directions for any adjustments. This was his show and everyone else was to work based off his guidance.

Up front, pilots Maj. Rudy Belew (Aircraft Commander) and Maj. Thayne Heusi (co-pilot) of the Stratotanker maintained straight and level flight and coordinated with air traffic control. It was decided to amend the original plans of dropping the trailing aircraft near St. Louis and instead drop the aircraft closer to their home base in Central Missouri. This allowed the pilot to get additional “contacts” with our boom to further become acquainted with receiving fuel at a point above and past the cockpit. It typically takes new B-2 pilots several familiarization



190th ARW Pilots Maj. Rudy Belew and Maj. Thayne Heusi.

flights with the KC-135R to get up to speed with the refueling process.

Perhaps most interesting about the 190th, other than the obvious unique mission profile, is that there are only a few full-time pilots. While both pilots on my particular flight were full-time, many serve part-time. Part-timers come from their daily jobs with employers that include “every flag-ship airline and cargo carrier.” With the increasing competition for qualified pilots, the Air National Guard is heavily focused upon recruiting pilots to fill seats in just about all of their planes and draws a set of part-time pilots with diverse backgrounds.

One commonality among all pilots, however, is the ability to be agile and flexible. The 190th ARW pilots’ unofficial motto of “Semper Gumby,” or “always flexible,” describes the group perfectly. **T&T**

*Author's Note: I would like to give a special thanks to the following individuals in addition to those previously noted: Maj. Marling and MSgt. Pickert for coordinating my flight; Col. Skoda, Lt. Col. Budden, and Brig. Gen. Weishaar for information provided during the flight brief and other times; and the over 1,000 airmen, including 60 pilots, 25 boom operators and 250-plus maintenance personnel who made this flight possible.*

**Grant Boyd** is a recent MBA graduate of Wichita State University. A private pilot, Boyd is currently working toward his instrument rating, with the ultimate goal of combining his love of business and aviation with a career at a general aviation manufacturer. You can contact Grant at [grantboyd2015@gmail.com](mailto:grantboyd2015@gmail.com)

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108	CHALLENGER 601-3A
49	CHALLENGER 601-3R
286	CHALLENGER 604
9	CHALLENGER 800
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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
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141	EMBRAER LEGACY 600
67	EMBRAER LEGACY 650
221	EMBRAER PHENOM 100
264	EMBRAER PHENOM 300
73	FALCON 10
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19	FALCON 200
196	FALCON 2000
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56	FALCON 20C
14	FALCON 20C-5
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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
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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  
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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

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7 ROCKWELL 560F COMMANDER  
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# Five on the Fly

by Grant Boyd



PHOTO COURTESY OF 190TH ARW

WHO:

**Maj. Rudy J. Belew**

COMPANY:

Kansas Air National Guard

POSITION:

KC-135R Pilot and OST  
Chief of Aircrew Training

HOME BASE:

Topeka Regional  
Airport (KFOE)

RATINGS:

FAA - Commercial, Multi-  
Engine and Instrument; Military -  
Instructor/Evaluator Pilot

HOURS:

2500

## 1. *What led you to pursue a career in aviation?*

I grew up in an aviation family and began flying at the age of four with my grandfather, who was a certified flight instructor and FAA-designated examiner. I knew from then on that I wanted to be a pilot and just worked towards that goal, which led me to the 190 ARW.

## 2. *How is being a military aviator special? What opportunities does it afford you?*

Being a military aviator is unique because you are a part of a bigger overall mission. It is a constantly changing environment and rarely are two sorties (missions) the same. It has allowed me the opportunity to travel the world and meet/work with amazing people. Also, the training is second to none.

## 3. *Describe a "standard" month's flying schedule for pilots in the 190th?*

The 190 ARW flies approximately 50 local sorties a month with a mixture of day and night flights. We also have numerous trips off station to include deployments and operational missions.




#### 4. What is your most memorable flying moment or mission in the National Guard?

It is hard to pick one as there have been numerous operational missions in which we helped support fighter and bomber aircraft that then helped support troops on the ground in combat.

My most memorable non-operational sortie was when I was the Aircraft Commander on a flyover of my alma mater (Pittsburg State University in Pittsburg, Kansas) during a football game in 2018, where numerous family members and friends were attending the game.

#### 5. What advice do you have for someone considering flying for the National Guard?

If interested in flying for the National Guard, I would say find a unit and talk to the men and women that do the mission. With different airframes on different bases, each base will have unique training requirements. Talking with the individuals who already do the mission on a daily basis will give you an idea of what that is like. As far as what opportunities we have, there are traditional guard pilots and full-time guard pilots. Many traditional guardsmen fly for the guard as well as the airlines or in the corporate world. 



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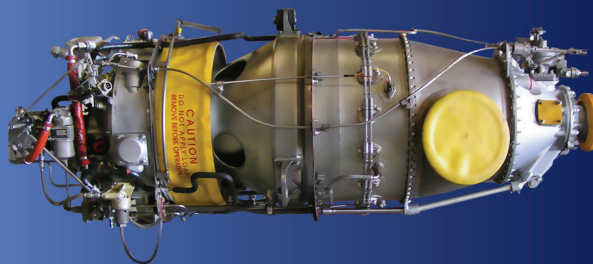
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## The Compliance Spectrum

by Thomas P. Turner



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It's a phrase found frequently in NTSB reports: "The pilot's failure to..." An (admittedly old) NTSB survey of accidents from 1978 through 1990 revealed that procedural noncompliance was a factor in 78 percent of all crashes. It's one thing to say the pilot failed to comply with a procedure. It's another thing entirely to understand why even good and well-meaning pilots are sometimes noncompliant and to develop strategies for making sure the pilot does things right.

There are five uniquely different types of noncompliance, each with its mitigations – and unfortunately, accident histories. What might cause you to forget to do something or to do something wrong? How can you recognize where you currently fall on the compliance spectrum?

### Untrained (or Ignorant) Noncompliance

#### From the NTSB:

*The pilot advised ATC he was descending. However, the airplane climbed briefly,*

*followed by a series of descents and climbs with varying airspeeds that continued for about five minutes. The pilot informed the controller he could not disengage the autopilot and requested radar vectors to return to the departure airport. While returning, the pilot said it took full forward and back control pressure to descend and climb, respectively, and he solicited and received assistance from another pilot on how to turn off the autopilot. The advice included pulling the autopilot circuit breaker, which the pilot said he did. The pilot apparently did not consult the emergency procedures for an autopilot pitch trim malfunction, which included a step to manually retrim the airplane. As the airplane turned to final witnesses saw it enter a vertical descent and impact a lake. Performance studies showed that, during the turn, the airplane was just two knots above its stall speed. It is likely the airplane experienced an aerodynamic stall.*

#### The NTSB probable cause:

*The pilot's failure to maintain adequate airspeed which resulted in an aerodynamic stall. Contributing were the pilot's misuse of the forward elevator flight control input*

*with the autopilot engaged, which resulted in the full airplane-nose-up trim; his failure to recognize and correct the mis-trimmed airplane per the emergency procedures; and the excessive control forces required to maintain control in the mis-trimmed condition, which resulted in pilot fatigue.*

One end of the compliance spectrum is what I call untrained or ignorant noncompliance. The pilot doesn't do something or does something wrong because he/she does not know the checklist or procedure exists.

The bulk of your training, and virtually all of your recurrent instruction, probably focused on stalls, steep turns, ILS approaches, takeoffs and landings, and similar skills. These are all vital, and history shows we need to train on them even more. But very little instruction and even transition training covers the design and operation of airplane systems – how the fuel system works, or dealing with electrical faults or the normal, abnormal and emergency operation of optional equipment like autopilots and electric trim. As we move into more complex airplanes, it takes



more study and practice to master the systems.

Most of what you need to know is in the Airplane Flight Manual (AFM) or Pilot's Operating Handbook (POH). In the case of optional or upgrade equipment, the vital information is in the Supplement for that equipment. Supplements mirror the AFM/POH format. Take time now, and make time at least once each year, to read Sections II (Limitations), III (Emergency Procedures), IV (Normal Procedures) and VII (Systems Description) in both the AFM/POH and every Supplement for installed equipment. Use the checklists in normal flight; quiz yourself on normal, abnormal and emergency indications and procedures, and challenge your instructor to ensure you've mastered the systems on your next Flight Review or recurrent training event.

### **Stressed Noncompliance**

#### **Another NTSB report:**

*The flight was operated by two airline transport pilots and it was the Beech 1900's first flight after replacing an overhauled*



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left propeller. Flight data recorder (FDR) data revealed that about two seconds after rotation, the left propeller rpm decreased to 60% and the left engine torque increased off scale (beyond 5,000 ft-lbs), consistent with the left propeller traveling to the feathered position and torque increasing in an attempt to maintain propeller rpm. About 30 seconds later the crew shut down the left engine and attempted to return to the departure airport. Post-accident examination revealed that the rudder trim was at its full-right limit, which would have occurred to counteract the left engine drag before its shutdown. The crew did not readjust trim when the drag was alleviated which resulted in the airplane being operated in a cross-controlled attitude for about 50 seconds, with a left bank and full-right rudder trim. Although the airplane should have been able to climb about 500 feet per minute on one engine, it slowed and descended from 300 feet in the cross-controlled attitude until it stalled and impacted terrain.

#### The NTSB probable cause:

The left engine propeller's uncommanded travel to the feathered position during takeoff for reasons that could not be determined due to impact damage. Contributing was the flight crew's failure to establish a coordinated climb once the left engine was shut down and the left propeller was in the feathered position.

I'm going to give the two ATPs the benefit of the doubt and assume they had enough multiengine and simulator experience to know to trim the airplane after feathering a propeller and to establish zero-sideslip flight for single-engine climb. Further along the compliance spectrum, **stressed noncompliance** is a condition when the pilot(s) may know what to do and how to do it, but under the pressure of the moment, fail to follow the procedure. Stressed noncompliance is the result of two things: lack of recent training on normal, abnormal and emergency procedures, and denial that an actual problem exists.

In training pilots are pessimists – we expect and look for things to go wrong, and actively check and crosscheck the

equipment and ourselves for anomalies and errors. Once the “dual received” log-book ink is dry, however, pilots are optimists – we expect things to go according to plan, and tend to think about the results of a flight (getting to destination, giving the passengers a smooth ride, etc.) and not about where we are, and what we are doing. The fix for stressed noncompliance is to train on normal, abnormal and emergency procedures regularly, review them frequently and fly the way you train – being as active a pessimist on routine flights as you are during training.

### Complacent Noncompliance

#### From the NTSB:

A Gulfstream G-IV overran the runway during a rejected takeoff. The airplane rolled through the overrun area and across a grassy area, collided with approach lights and a localizer antenna, passed through the airport's perimeter fence, and came to a stop in a ravine. The two pilots, a flight attendant, and four passengers died. The airplane was destroyed by impact and fire. The NTSB probable cause: the crew's failure to perform the flight control check before takeoff, their attempt to take off with the gust lock system engaged, and their delayed execution of a rejected takeoff after they became aware that the controls were locked. Contributing were the crew's habitual noncompliance with checklists, Gulfstream Aerospace Corporation's failure to ensure that the G-IV gust lock/throttle lever interlock system would prevent an attempted takeoff with the gust lock engaged, and the FAA's failure to detect this inadequacy during the G-IV's certification.

This crash has become the “poster child” for **complacent noncompliance**, failure to follow procedures out of a feeling that nothing can go wrong and reinforced by “getting away with it.” The NTSB's review of FDR data discovered that the specific flight crew had neglected to complete “controls free and correct” checks before takeoff “on 98 percent of the previous 175 takeoffs” in that airplane.

It's easy to think that checklist steps and procedures aren't important if you don't think there are consequences for failing to perform them. The reality is that checklists tend to get longer, not shorter, as accidents occur. The answer to reversing complacent noncompliance is to use checklists and follow procedures religiously because they were written for a reason, even if that reason has not happened to you. Benefit from the disastrous experiences of others by never skipping checklist steps, even (or especially) when you're in a hurry and more likely to miss something.

### Intentional Noncompliance

#### One more from the NTSB:

A Pilatus PC-12/45 was diverting when it crashed about 2100 feet west of the runway. The pilot and all 13 airplane passengers were fatally injured. Visual meteorological conditions prevailed. The NTSB probable cause: (1) the pilot's failure to ensure a fuel system icing inhibitor was added before flight; (2) his failure to take appropriate remedial actions after a low fuel pressure state (resulting from icing within the fuel system) and a lateral fuel imbalance developed, including diverting to a suitable airport before the fuel imbalance became extreme; and (3) a loss of control while the pilot was maneuvering the left wing-heavy airplane near the approach end of the runway.

You might argue that this was a case of ignorant noncompliance if the pilot was not aware of the need for fuel system icing inhibitor. You could say it was a matter of complacent noncompliance, not adding the icing inhibitor or thinking maintaining fuel balance would not be critical to inflight controllability. I submit, however, that the pilot knowingly departed with an overloaded airplane that was also in a probable aft center of gravity condition that reduces control authority and stall protection at slow airspeeds – that he was **intentionally noncompliant**. The Pilatus, which had seats for 10 including the pilots, had 14 people on board (including several children) and was reportedly 600 pounds

#### Compliance Spectrum

Emergency Noncompliance

Training/Ignorant Noncompliance

Stressed Noncompliance

Complacent Noncompliance

Intentional Noncompliance



over maximum gross weight when it began the flight. The NTSB found the pilot flew “over 30 minutes” after exceeding the PC-12’s maximum fuel imbalance level before beginning to divert, overflying several suitable airports. The NTSB notes the ex-Air Force and airline pilot was rated at a “very high level” of proficiency in PC-12 training that occurred about two months before the crash.

There’s not much we can do to reduce the incidence of intentional non-compliance. I doubt it would do much good to list it here anyway as intentionally noncompliant pilots probably aren’t reading safety-related articles in *Twin & Turbine*. The FAA Hotline (<https://hotline.faa.gov>) gives us a means of reporting violations of the Federal Air Regulations, but without hard evidence the FAA has nothing to go on. Tragically, most investigation of intentionally noncompliant pilots happens only after it’s too late.

## Emergency Noncompliance

There’s one more category of non-compliance, one that happens successfully: **emergency noncompliance**. 14 CFR 91.3b tells us:

*In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency.*

Emergency noncompliance is intentional, but it is the positive result of a pilot who is in command of the aircraft and the situation and does what it takes to get the airplane on the ground as safely as possible. You might call this “Catch 91.3b”: you can deviate from any rule in an emergency, but in an emergency, it’s not a deviation.

## The Compliance Spectrum

Which type of noncompliance is “worst?” Obviously, knowing the rules but (outside of an emergency) violating them anyway (intentional noncompliance) is the most egregious. It appears these outliers are responsible for a

significant number of accidents. But where can we make the greatest reduction in noncompliance events? I think the best chance comes from addressing ignorant and especially complacent noncompliance. It’s comparatively easy to learn how systems work, and how you work them, and to hold ourselves to a standard to use checklists and follow standard operating procedures. That, and practice to reduce the compliance effects of stress, seem like relatively easy strategies to make a big difference in what NTSB says is a factor in 78 percent of all accidents.

Where are you *today* on the compliance spectrum? Where will you be on the spectrum on your next flight? **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](http://www.mastery-flight-training.com).

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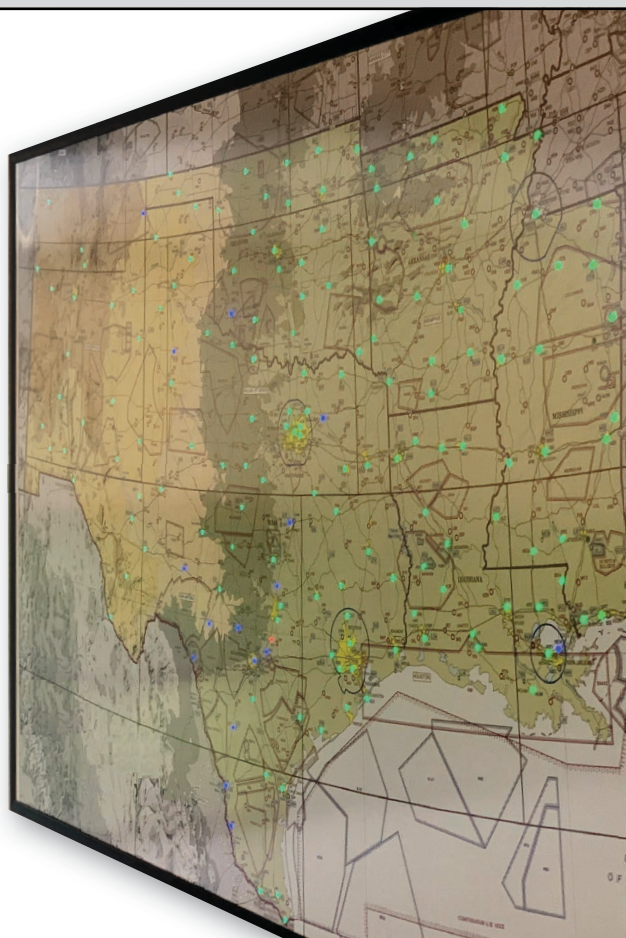
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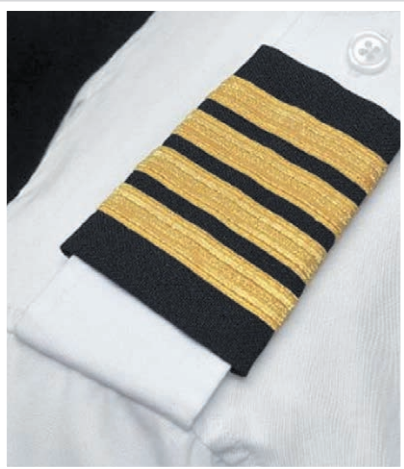
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## Turning Professional

by Kevin Ware



Every month I receive a surprising number of reader emails from pilots on the subject of turning professional. Almost all have a couple of thousand hours of flying time, a commercial license and are in their 50s or early 60s. Many are professionals in other fields such as doctors, lawyers or accountants, or have been successful in business and want to “pivot” (the word often used) into doing something else. The questions I am usually asked include: How did you personally get into doing this? What is it like to fly professionally?

And, (following a brief description of their own pilot credentials), what can I do to improve my chances of “turning professional” where I am paid to fly nice equipment? There seems to be enough interest in the topic to where I thought I would share my own story.

My piloting background is unique with a route more circuitous than most of those writing me. I started flying in my last year of high school just because I was always fascinated by airplanes and took the first opportunity I could to act on that interest. A year or so later, I had a private license and 100 hours of flight time only to realize that flying recreationally was not an activity I could afford. I either needed to figure out how to get paid doing it or I would have to quit. Luckily, I married someone very supportive of what I wanted to do. My wife and I lived in south Florida and with both of us working, we had some (not much) spare funds. The weather in Florida was always good and the flight training relatively cheap. We lived off my wife's income and I spent mine on flying. In just over a year, I had a commercial license and a CFI rating. With all of 210 hours, I got a job teaching other people

how to do what I just learned.

At that time, airline hiring required a couple thousand hours plus instrument and multi-engine ratings, and in most cases, a four-year college degree. I was building flight time as part of my job, so that was not a problem, but the college degree was a different matter. So, I enrolled in a local community college while instructing full time and finished my freshman year. But in south Florida at the time, the only university offering a four-year degree was a private institution with tuition way beyond my reach. So, my wife and I decided to return to her home area (Seattle), where I could attend a public university at much lower cost.

Within a week or so of arriving in Seattle, and with about 1,000 hours of total flight time, I obtained another job as a flight instructor. The pay was around \$4 to \$5 per flight hour, which was not bad given working at McDonalds (a job common to other college students) paid about \$1.50 per hour. Three years later, I had over 3,000 hours and was close to finishing my Bachelor of Science degree at the University of Washington. I was prime airline pilot bait, but there was a recession underway and the fish were



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not biting. United Airlines, however, went on a brief hiring spree when it unexpectedly appeared three pilots were going to be required in the front of their newly acquired 737s. I applied and interviewed with their local chief pilot. He was a very decent fatherly type fellow, with a grey mustache and grey hair. After listening to my story, he put his hand on my shoulder and said in friendly and concerned manner, "Young man, if you continue with the application we will hire you, but my advice is to first finish your degree at the UW. If we hire you now, we will base you in New York on standby, and in less than a year, we will lay you off." Moving to New York for 12 months did not at all appeal to my wife or me, and neither did getting laid off with an incomplete college degree. We decided to follow his very kind and wise advice.

As it turned out, the airlines did have a massive pilot layoff in the year that followed, and a lot of my former flight instructor buddies wound up with jobs like selling men's shoes at the Bon Marche for



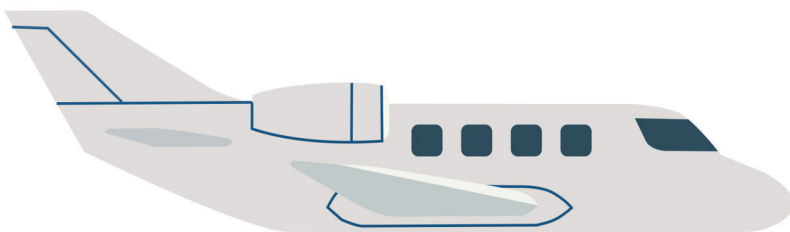
years until the airline industry finally turned around. In the meantime, I finished the B.S. degree and built another 1,000 hours of flying time. But now, with thousands of airline pilots on furlough and few non-airline pilot jobs available, prospects of flying for a living looked very dim for a long time to come. However, I had done fairly well academically with a major in psychology and a minor in chemistry – which happens to be

qualifications many medical schools like to see in their applicants. So, I applied to medical school, and to my surprise, was offered a "full ride" scholarship for the first year. I promptly accepted.

While attending medical school, I continued doing various types of Part 91 and Part 135 flying as we needed the income. Four years later, I found myself with a medical degree, 6,000 hours of flight time and a residency position for post-graduate training at a well-regarded university hospital in the Southwest. Early on during the residency, I remember working in the newborn nursery one afternoon when I heard on the radio that (what do you know) the airlines were facing a shortage of pilots and were urgently looking for applicants. I was certainly qualified and thought about it for a while, but decided not to pursue it. After four years of medical school, I was at a critical point of my medical training. Plus, they might offer me a job flying as flight engineer on a 727 only to lay me off in a couple of years.



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Three years later, I became a board-certified doctor and airlines were indeed again laying off pilots. Seven years after that, the airlines again went on a hiring spree. By then, I was in my early 30s, had 7,000 hours and nearly every rating known to man, but I was also comfortably situated as a physician, home every night and making a B747 captain's pay. I like flying all right, but not enough to be stupid about it. I stayed working as a doctor and flying a lot personally with just the occasional professional flight.

A little under 20 years went by and the practice of medicine changed in this country. An increasing number of physicians were either plain quitting or retiring early out of frustration with what had become an untenable malpractice environment and an increasingly dysfunctional healthcare system. As this was unfolding (and with our children grown), my wife and I decided to take a two-year sabbatical, move onto our boat and just go cruising. When we returned and I asked my physician friends how things were, they all said, "Stay away, it has only gotten worse." So, I got a job working internationally as a cruise ship doctor. But while home from those trips, my old dream of flying for a living began to look more and more attractive. As luck would have it, aviation was in the early stage of yet another one of its booms, with pilots being hired left and right by the commuter airlines. This resulted in a shortage of pilots qualified to fly turbine business aircraft. I was fortunate enough to find several flying jobs I could take on a part-time basis without needing to move to another part of the country. And that is how I wound up doing what I am now.

One of the questions I am often asked is, with such a varied background, how did I like returning to flying professionally? Truth is, I found it to be more enjoyable and vastly improved from when I did it earlier. The equipment is much better and easier to fly. Direct routing via GPS all across the country is now common. Downloaded weather radar makes it so you always know what kind of conditions lie ahead and on either side of your airplane. The ground services around the country have vastly improved. Flight plans can now be filed or changed easily over a cellphone. FBOs across the country have become professional service

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organizations, with transportation, hotel accommodations and catering services readily available. And finally, the position of "pilot" I find (quite strangely) is often more highly respected than the title of "doctor." All of this makes the job of flying professionally, at least in the corporate world, much more rewarding than it was previously.

The negatives still exist, however, and a lot of pilots wanting to fly professionally tend to overlook these. It is kind of obvious, but the reason why people own business aircraft and pay other people to fly them, is because they want or need to get somewhere often on short notice. They often do not know exactly when they will return, or if they might not need to add some additional destinations once the trip has begun. If the passengers need to stay somewhere for several days to a week, the airplane almost always stays at that location. The pilots either hang around or occasionally will be sent home via airline in a coach seat, then return when the airplane is ready to move. This is just the nature of the business

but it can result in a pretty tumultuous lifestyle. Living out of a suitcase, eating in restaurants, staying in hotel rooms, not being certain when you are going to return home. Waiting for passengers to return as the weather deteriorates can get tiring after a while. The pilot group I fly with likes to say, "We fly for free, but get paid to wait," and that has a lot of truth in it.

So, if you have carefully evaluated the positives and negatives and are still interested in flying professionally (maybe you are tired of your current job), what should you do now? The answer depends on your age and background. Say, if you are in your 40s, have 2,000 hours, an ATP and a multiengine rating, odds are pretty high you could be hired by a commuter type airline in fairly short order. You will fly SIC in jets like a CRJ, be gone for two weeks per month and fly a lot of legs on each trip. But it will be a lot of fun, especially initially. And because the schedules are usually well known in advance, I would highly recommend this path if you are so inclined.

However, most of the Twin & Turbine readers writing me are closer to 60 than 40. At that age, getting hired by a Part 121 carrier is less likely because the airline does not have enough time to recoup their \$100,000 pilot training investment before that pilot must stop flying for them due to the "age 65" rule. The "age 65" rule, however, does not apply to Part 91 operations, and it has been my experience that a lot of the business passengers like to see a little grey hair sitting in the front. These are good jobs that can take you to a variety of places, and the turbine equipment is a lot of fun to fly. So, if inclined to "turn professional," you should look into them. To enhance your probability of getting a job flying corporate jets, it is useful to have at least one jet type rating. A Cessna Citation type rating is a good place to start as there are so many of them in the corporate world and the training is relatively cheap. Another qualification corporate employers like to see is a CFI with considerable flight instruction experience. Flight instruction gets you accustomed to flying in the right seat and dealing with all kinds of unexpected problems that type of flying can present.

So, my advice if you are considering turning professional is have at it. At least a couple of years of professional flying will be a lot of fun, is quite achievable in the current environment, and will add greatly to your life experience and the stories you can tell your grandchildren. Life is short, so go ahead and make the "pivot." **T&T**



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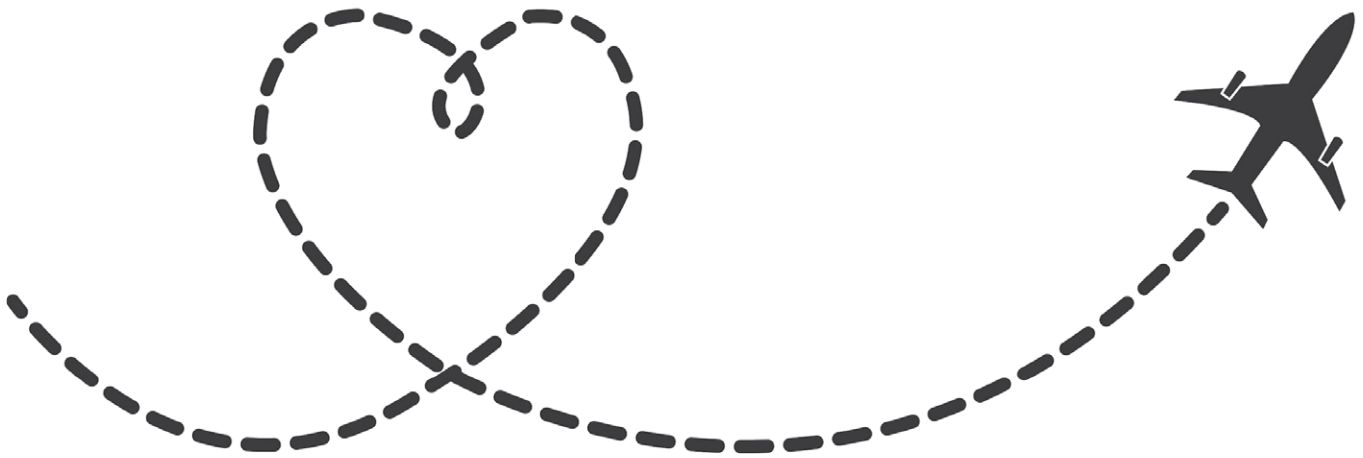
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# From the Flight Deck

by Kevin R. Dingman



## Straight from the Heart



You see this guy,  
this guy's in love with...flying.

– Herb Alpert, 1968

For some that are compensated monetarily for flying airplanes over and over (and over and over), it's easy to forget that being around airplanes once elicited very joyful emotions. Many have forgotten the epiphany when our curiosity, courage and checkbook overcame anxiety and angst and produced an emotional waterfall of achievement, pride, even love, about flying. But I haven't forgotten. The month of February belongs to the mischievous son of Aphrodite, the winged god of love, a fellow archer and aviator: Cupid. Although blind, he has wings – apparently having received a waiver from the Feds. Instead of a red, heart-shaped box of chocolates, please allow this archer to send an emotional arrow your way to refresh memories of when our love of flying was new.

We were on the crew van headed to a hotel in DFW and a guy and his wife were talking to us about how their trip to Cabo was postponed a day due to a late connection at

my carrier. The airline paid for their hotel room but they would miss one day of their vacation and the next morning's tee-time. The 60-ish man had 54 hours toward his private and was looking forward to an instrument rating and using his Cirrus to get to Cabo from Tulsa. The look in his eyes when he talked about his flying future said it all. Do you remember the moments in your own life when curiosity and courage overcame anxiety and angst? The times in which your persistence was rewarded with appreciation, ability, understanding and wisdom?

Like learning to ride a bike (Dad taught me), that first day of school each year (Parchment, Mich. – the smell of new books and pencil-sharpener shavings), the first head-first dive (at the YMCA), a first kiss (Darcy Daley, fourth grade), riding a high-speed roller coaster (The Blue Streak at Cedar Point) starting college (WMU) or signing for a loan (1976 Honda Civic)? And don't forget our



macho-curiosity: lighting firecrackers (Black Cat), smoking a cigarette (Camel) and the first overindulgence (Southern Comfort). How about driving a car (1969 Mustang), soloing an airplane (1969 Mooney Cadet), your first snap-roll (C-150 Aerobat), first jets (T-37, T-38, F-16) and that first type rating (B-737)? Airplanes have always been there for me and keeping my fingers in the GA pie nourished a love of flying and kept the passion for flight alive.

## You Make Me Feel Brand New

– The Stylistics, 1973

Have you noticed lately the way you feel as you push the throttles up, rotate the nose and retract the gear? No, probably not. Because it's a busy and critical time in our flight and we have little room for romanticism. The only time that we can completely let go of our type A, left-brain PIC persona in order to savor our type B, right-brain romantic is when we're along for the ride without the responsibility of being in command. That's just the way we're wired. The Cirrus guy and my airline passengers remind me of how awestruck and amazed folks are at the mysterious and magical marvel of the noise, speed, sensations and technology as the ground speeds by then falls away. The same applies to approach and landing. Turbulence can cause the plane to rock-and-roll down final, half-mile forward visibility is zero out the side windows and yet the brilliant, cunning and skillful pilot greases it on as if in control of Mother Nature herself. When seeing the reaction and emotions that people have about pilots, it brings back memories. You know, before we became a brilliant, cunning and skillful pilot controlling Mother Nature. It helps me remember that being a pilot is not an everyday, run-of-the-mill vocation.

### Existentially Speaking

I don't really have any marketable skills other than being a pilot. Perhaps it's all I know how to do because it's all I've ever wanted to know how to do. My first flight was during the same week that I started kindergarten and I never looked back. Many vocations don't define who you are. Folks go to work, do their thing, go home and then do other, more important or fun stuff. Many of the pilots at my carrier feel this way. While I may have a plethora of "guy skills" and enjoy family, friends, hunting, golf and building things, flying is who I am. At the airline, my airport, at the post office, the bank, the auto repair shop, lawn mower shop, in church, heck, everywhere I go; I'm "that airline pilot Duke guy." Flying defines who I am. Maybe it defines you as well.

Some might consider this a sad state of affairs, devoted to and coveting such a mechanical endeavor. But I'm certain that flying facilitates an uncommon appreciation



Airplanes have always been there for me, from my first airplane to my military years to today.



for physics, even astrophysics, geography and meteorology. And there are opportunities to not only think and observe the world existentially (a nod to Kierkegaard, Sartre and Nietzsche), but to routinely exercise all five senses (including taste if you count the crew meal) often with life-or-death consequences (especially if you eat the crew meal) if we misinterpret or mishandle the airplane. The challenges and rewards are mentally, physically, even metaphysically, substantial. Perhaps it's these challenges coupled with our high intellect, natural good-looks and poorly disguised modesty that allows us to contemplate the meaning of life from altitude. After all, we have all had that "reached out my hand and touched the face of God" moment a few times. Those with nihilistic delusions needn't fret, your own reached-out-my-hand epiphany will come.



Not just a vocation. Sharing the passion with sons and daughters.

## Losing Our Superpowers

Imagine how you would feel if we could remove the FAA, check rides, flight physicals and large expenses from the flying equation. What all pilots are faced with is a complex decision matrix of function, utility, capability and cost. Add in our ability to jump through physical, mental, financial and regulatory hoops and our personal requirements of an airplane in order to fly. Despite the challenges that we can't change, pilots from all walks of life negotiate these hurdles and successfully dance the skies on laughter-silvered wings. I've talked to a few of my airline captain friends that have retired. Apparently, it's a traumatic transition as you become a powerless mortal and lose your influence over the development of mankind. Once flying has saturated your life and defined who you are, often the transition to a non-PIC life results in a dangerously lugubrious shadow being cast over all other activities.

But some have a resurrecting outlet for their passion for flight via GA. And a surprising number of retired airline pilots elect to continue with Part 135 and fractional type flying. Some even resort to, gasp, simulator instructing in order to keep their fingers in the pie and hand on the throttles. This past December, I completed my last R-18 (maneuvers validation) recurrent training, and in the

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same month, my last Part 121 line-check. I will have one more R-9 (Line Oriented Flight Training) recurrent training session and three more class one physicals before I retire from my carrier. I don't anticipate losing the Duke for a handful of years, but as my skills deteriorate due to age, I'm sure that day will come as well. On that day, who is the airline pilot/Duke guy if he is retired from the airline and has no Duke? I'm starting to allow these count-down-realities to creep into my head and heart as the day that I will be stripped of my superpowers approaches.

## Most of All, I Love How You Love Me

– Bobby Vinton, 1968

As a mental-method to help understand inanimate, mechanical aircraft systems and why they act and respond the way they do, readers of this column understand the use and value of anthropomorphism. So, you shouldn't be shocked to hear me say that I'm glad that airplanes like me. I've had a few close encounters but they were not of

the Third Kind and there was no malice in the airplane's heart. Perhaps this is because the planes that I've flown, most of all, love how I love them. Buried by check-ride-itis, finances and the anxieties of life, the joyful emotions from that first bike, our first kiss and the thrill of flight are still in there – we just have to let them out. This Valentine's Day, in order to let them out and acknowledge our feelings towards aviation, make sure that you get the airplane you love something nice. Something that it really wants. And while you're at it, get something for your significant other – the one that understands your airplane affliction and tolerates the look on your face when you and the airplane are together. Happy Valentine's Day, my friends. **T&T**

**Kevin Dingman** has been flying for more than 40 years. He's an ATP typed in the B737 and DC9 with 24,000 hours in his logbook. A retired Air Force major, he flew the F-16 and later performed as an USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke. Contact Kevin at [dinger10d@gmail.com](mailto:dinger10d@gmail.com).

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# Graduating from the Academy

"My airspeed is decreasing below 90 knots and the airplane is climbing even though we are in level flight," I yelled to Larry Barna, my sim instructor. "I am going to switch the ADC (air data computer) to number two."

"Dave, remember when you flew a Baron," replied Larry. "You don't have an ADC problem. Your static system has iced over. You need to pull on that little red lever by the copilot's seat to activate your alternate static air source."

That was one of the many things I had forgotten after flying jets for the last 13 years.

I had a lot to learn about flying a C90. But King Air Academy (KAA) in Phoenix was a great place to start. After deciding that a King Air with a Garmin G1000 system was a must for me, I went looking for simulator training with similar avionics. And while the "big box" groups like FlightSafety and TRU (now combined into FlightSafety Textron Aviation Training) do a great job on late model and in-production airplanes, there are few motion-based options for 25-year-old King Airs. Especially ones with upgraded autopilots and avionics.

A search on [www.beechtalk.com](http://www.beechtalk.com) led me to KAA. Their claim is that they will train you on any airplane as long as it is a King Air. I flew to Phoenix to find out how much I had forgotten since owning a C90 over a decade ago.

It turns out, quite a bit.

But KAA was ready for me. Their training philosophy was developed by Tom Clements, known in King Air circles as the guru of Beech turboprops. His 385-page book has more operational data than you would ever need. When he speaks, everyone listens.

Ron McAlister, a B200 owner-pilot, and Kevin Carson, operations expert, decided to team up with Tom to create a business dedicated to the needs of King Air owners. Big things like providing simulators nearly identical to the airplane you are flying. And little things like providing lunch every day at their Deer Valley (KDVT) facility so clients don't have to wander the streets of Phoenix looking for a place to eat. More time in the building translates to more learning time.

And I needed lots of time.

The workload on a turboprop is definitely higher. Most don't have computer-controlled power management (FADEC). Fuel systems are more complicated and pressurization management is more involved. There are multiple engine and propeller operating checks. But there is something satisfying about those two big Pratt & Whitney engines hauling a useful load 45 percent more than my Mustang.

Just 80 knots slower.

I expected the simulator to be less realistic than what you find at the jet schools, but I was pleasantly surprised at the visuals and motion possible today. So realistic in fact that I experienced my first simulated bird strike including blood and guts on the windshield.

In a rush to shut down an engine and feather the propeller, I was able to land with a nose wheel retracted in KAA's sim just as easily as I do in the sims costing millions more. Something must be working with their business model. KAA has four sims and two more on order. They encourage in-airplane training as well. All in all, it was five days well spent.

Now, if I could just remember how to lower the gear.

Fly safe. 



**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](mailto:davidmiller1@sbcglobal.net).



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