

TWIN & TURBINE

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

MAY 2018 \$3.95 US

VOLUME 22 NUMBER 5



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COVER PHOTO

Courtesy of TRU Simulation + Training

Issues of Twin & Turbine are available for free
www.twinandturbine.com

Twin & Turbine (ISSN 1945-6514), USPS 24432 is published monthly by Village Press, Inc. with advertising offices located at 2779 Aero Park Drive, Traverse City, Michigan 49686. Telephone (231) 946-3712. Printed in the United States of America. All rights reserved. Copyright 2016, Village Press, Inc. Periodical Postage Paid at Traverse City, MI.

SUBSCRIPTIONS: *Twin & Turbine* is distributed at no charge to all registered owners of cabin-class aircraft. The mailing list is updated monthly. All others may subscribe by writing to: *Twin & Turbine*, P.O. Box 968, Traverse City, MI 49685, or by calling 1-800-447-7367. Rates for the United States and its possessions follow: one year \$29.95; two years \$52.50. Canadian subscriptions are \$15 per year additional, including GST tax. Overseas subscriptions are \$30 per year additional, U.S. funds. Single copies \$3.95.

ADVERTISING: Advertising in *Twin & Turbine* does not necessarily imply endorsement. Queries, questions, and requests for media kits should be directed to the Advertising Director, *Twin & Turbine*, P.O. Box 968, Traverse City, Michigan 49685. Telephone 1-800-773-7798. Website: www.twinandturbine.com.

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Aviation & Gender: Imagining a Day When it Doesn't Matter

On April 17, Southwest Flight 1380 experienced a catastrophic engine failure, which resulted in the crew making an emergency descent and landing at Philadelphia. In the wake of the incident, Captain Tammie Jo Shults has been applauded for her professionalism and cool-under-pressure handling of the situation. Thanks to social media and widespread access to the ATC recording, the story of the “badass” former Navy pilot saving the day received extensive coverage in the news. I would imagine she is surprised and perhaps bemused by the attention heaped on her in the aftermath. One of the first U.S. Navy F/18 female pilots, she did exactly what a highly trained pro would do when faced with an engine failure, rapid depressurization, and damaged airframe. Gender had nothing to do with it; training and experience did. I hope every little girl who looks up when a plane flies over now knows the name Tammi Jo Shults.

A question I'm asked often: why aren't there more women in aviation? In the United States, while women make up about half of the overall workforce, professional female pilots represent about 5 percent of the pro pilot ranks, a stubborn statistic that has barely moved since I soloed in the early 1990s. In STEM fields, women are more prevalent: more than half of medical school students are women and engineering is attracting an increasing percentage. The barriers to the flightdeck, whether explicit or implicit, are real, and we all have a responsibility to keep chipping away at it. Sadly, in 2018, I still experience bias as a professional in this industry and when I fly. Just last week while on a trip, I asked an FBO customer service rep how they were coming on the fuel order for N*****, as it appeared every aircraft was receiving service but mine. The rep snapped back, “We're waiting for the pilot to get here to confirm it.” When I replied that I was the pilot, the CSR said incredulously, “Really!?” A young male pilot standing nearby, clearly embarrassed for me, leaned in and whispered, “Sorry.”

What's my remedy? Do everything I can to encourage young women pursuing careers in aviation. Also, raise strong daughters who believe the sky is not the limit, including a Naval Academy aeronautical engineer who is on her way to becoming a “badass” Navy pilot.

Introducing T & T's New Editor: Rebecca Groom Jacobs

More than 20 years ago, Bob Goff, then the conceiver, owner and publisher of *Twin & Turbine* approached me about becoming the editor of the industry's only magazine focused on the accomplished owner-pilot flying cabin-class twins and turbine aircraft. At the time, I was a young woman armed with a journalism degree, instrument rating and about 10 years of professional experience writing for Beechcraft, Learjet and several other general aviation companies.

To be hired as editor of a prominent business aviation magazine was nirvana. Looking back, I have to give huge credit to Bob for not only having confidence in my abilities, but to hire me when there were few, if any, women at the helm of any aviation publication.

Now it is time to turn the page once more. On April 1, I accepted the position of executive director of the Malibu/M-Class Owners & Pilots Association (MMOPA). With the current director retiring, and having served as its magazine editor since 2016, it was a fantastic opportunity to put my business knowledge, aviation experience and marketing acumen to work for one of the preeminent owner-pilot groups in the industry.

I am pleased to share that **Rebecca Groom Jacobs** will be assuming the role of editor, starting with the June issue. Raised around general aviation, Rebecca comes with an impressive background in the industry. While still in college, she learned to fly in a Piper J-3 Cub. Following graduation, Rebecca began her professional career with Piper Aircraft. It was during this time that Rebecca uncovered her passion and talent for writing. She was tasked with creating copy for Piper's website, direct mails, and advertisements.

In 2014, Rebecca joined Sullivan Higdon & Sink, an aviation-centric advertising agency in Wichita, KS, where she worked with major OEMs, most notably Textron Aviation. In addition to providing strategy and branding input, she headed the team's press relations and social media efforts. During her tenure there, Rebecca completed projects with Cessna, Beechcraft, Piper Aircraft, Doc's Friends, Pratt & Whitney and several others.

Over the last year, Rebecca has been a key contributor to *Twin & Turbine* and has demonstrated her passion for aviation and our readership. I am honored to pass the baton to such a capable and talented writer and editor. What's exciting for me is that Rebecca is close to the age I was when Bob Goff first hired me. It is rewarding to pass the baton to someone (and a female pilot to boot) who will bring professionalism and energy to the pages of this magazine.

I hope to continue to write for *T&T*, as I remain forever loyal to this magazine, its readers and its mission. Thank you again for your support through the years.

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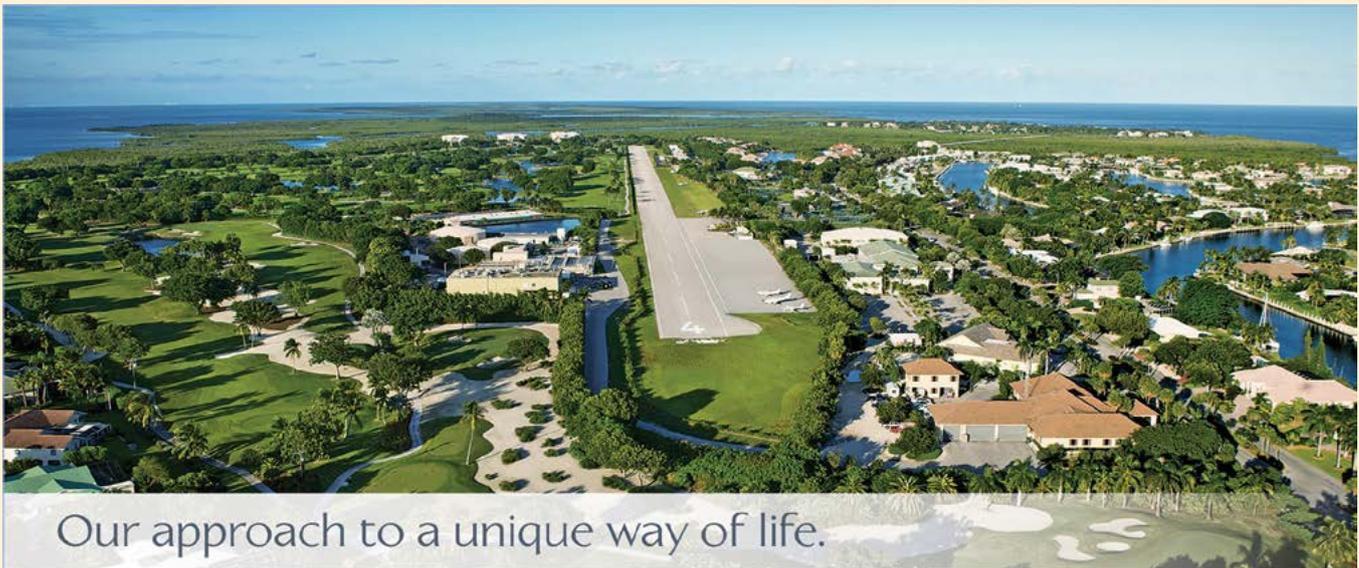
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In Response to Kevin Ware's "Higher Minimums"

Even though I now have many more hours than I had 20 years ago, my personal minimums have gotten higher. I would have thought just the opposite would have happened. And when I carry family, those minimums are higher yet.

The bottom line is that we all want to be safe but that line between safe and not so safe can be elusive when you have a flight planned. That safe line is never elusive when reading an accident report.

Again, thanks for the article.
Allen Yourman

Bravo! I always enjoy your articles in *T & T*. This might be the best. Even though I'm not an airline or Part 135 guy, I have been flying for 35 years

with an ATP and 2,500 hours. Having a wife and children on board always pushes me into all the same "modes" you write about.

Thanks...I always thought it was just me.

(Name withheld on request)

More on the FRAT

I enjoyed your Editor's Briefing column about the MMOPA FRAT in the April issue of *Twin and Turbine*. You may be interested to know that MMOPA developed their FRAT by modifying the one our group developed in 2011.

We've had great success with our FRAT. I'm convinced it has made our flying safer and possibly even saved some lives. We surveyed our membership and found 24 percent our members use our FRAT and the vast

majority of them say it's made their flying safer.

What I find really resonates with people is the idea of considering the FRAT as a "Risk Meter." We shouldn't take off with the Risk Meter in the red any more that we would take off with engine temps in the red. A Risk Meter in the red says, "a lot of pilots have died attempting a flight like the one you are about to make." The flight risk factors come straight from the accident reports.

Great work at *T & T*. I look forward to it each month.

Bob Thomason
President, Twin Cessna Flyer

Editor Dianne White responds: Thank you Bob! In the pursuit of brevity, I did not mention that The Twin Cessna Flyer airframe-specific FRAT served as the genesis for MMOPA's FRAT. It is the goal of both organizations that more pilots add the FRAT as part of their flight planning routine.

In addition, I would like to expand on a statement regarding the birth of MMOPA. While the MMOPA was in the formative stages, it was several individuals (some also MMOPA members) and Piper dealers who formed the Malibu Coalition to quickly raise \$75,000 and hire former FAA Administrator Langhorne Bond to fight the airworthiness directive that threatened the PA46 fleet. Piper Dealers Muncie Aviation and Skytech were the two largest single contributors to the fund. The Coalition participated in the entire NTSB review, which culminated with an NTSB public hearing that effectively exonerated the aircraft. The funds that remained in the Coalition upon the completion of its mission were donated to MMOPA and the Coalition was disbanded.

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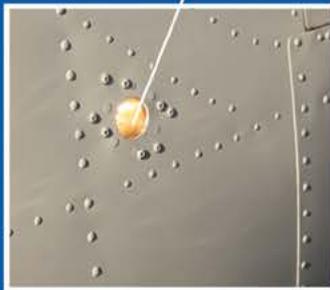
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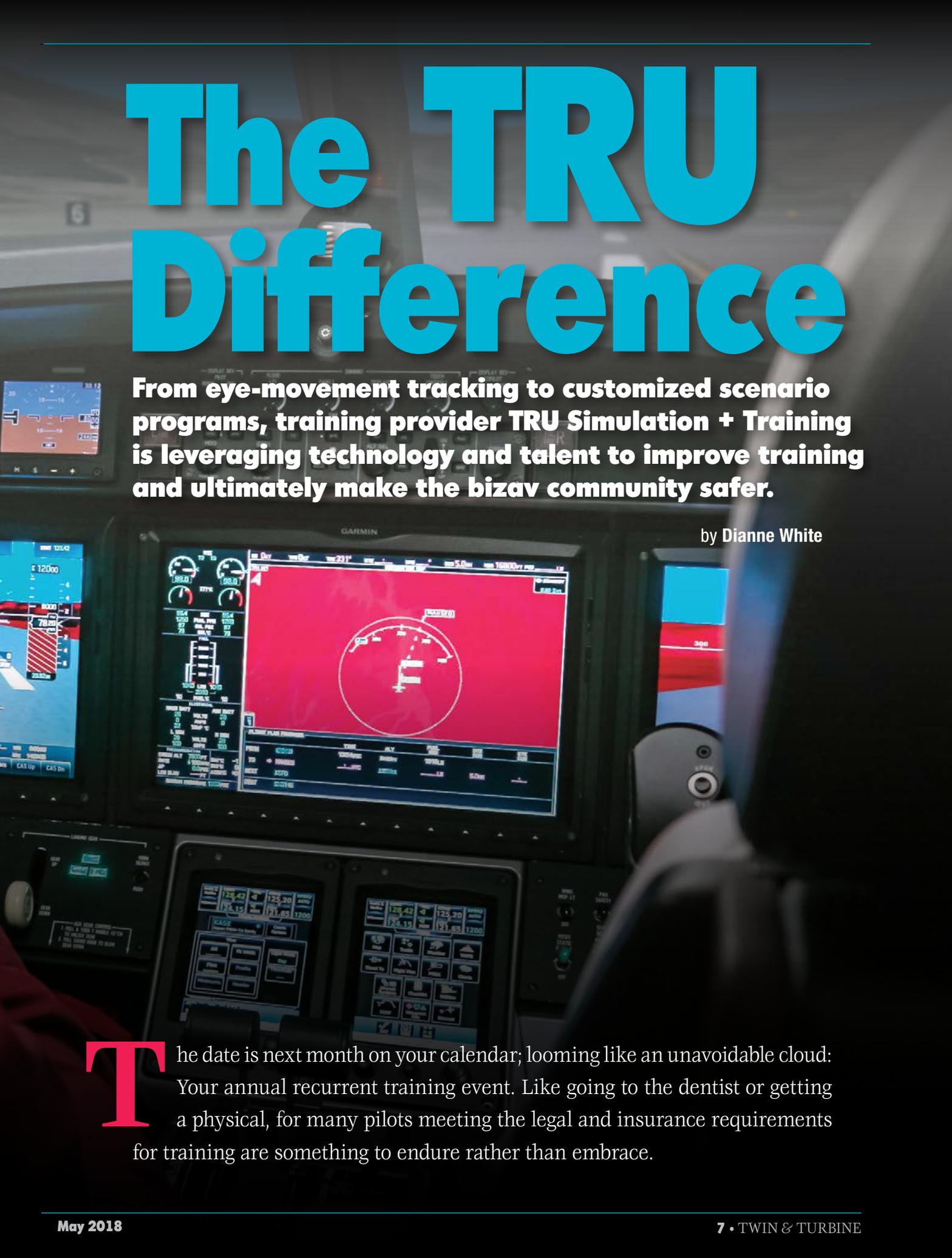


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The TRU Difference

From eye-movement tracking to customized scenario programs, training provider TRU Simulation + Training is leveraging technology and talent to improve training and ultimately make the bizav community safer.

by Dianne White



The date is next month on your calendar; looming like an unavoidable cloud: Your annual recurrent training event. Like going to the dentist or getting a physical, for many pilots meeting the legal and insurance requirements for training are something to endure rather than embrace.

But what would training look like if it not only helped you meet the minimum standards, but was customized to help you develop the skills to be the safest, most proficient pilot in the aircraft you fly? What if, in addition to reinforcing emergency and system failure procedures, you were able to focus on scenarios based on actual events that have led pilots of your particular aircraft type to trouble?

TRU Simulation + Training was born of the idea that training should be anything but cookie-cutter. Their Tampa facility is now the company's largest with seven programs available, including all the Citation 525 variants except the CJ4 (although they do offer CJ4 online ground school), Citation Latitude, Sovereign+, and the Beechcraft King Air 90/250/350. Even as they have aggressively added programs, they continue to perfect their cutting-edge teaching approach and develop new technologies to improve the training experience and ultimately make pilots more skilled, well-rounded and ready for real-world flying.



Citation clients who return for recurrent can experience an even more customized approach to their training event. In addition to ensuring they meet the requirements of the 61.58 check, TRU has developed a set of enrichment training add-ons that will further enhance pilots' skills and decision-making.

Citation-Focused, Single-Pilot Minded

With the M2/CJ3+ being one of its most popular programs, especially among owner-pilots, TRU-Tampa has trained nearly 200 pilots in those aircraft. As the M2 is the entry-level jet within the Citation family, the typical owner-pilot is often moving up from a turboprop with limited multi-engine turbine time. For most, this is their first type rating.

The company has put together an effective formula that involves online and/or classroom ground school, flight training devices and full-motion Level D simulators. The company offers the choice of completing the ground school through an online course or participate in a live classroom setting.

"For our initial type rating programs, we have invested a lot of money in providing extremely realistic flight training

devices, called Integra. It is the full-flight cabin with a different visual system but the same control loading, same flight dynamics, and same avionics components as the real aircraft," said David Smith, vice president of training centers.

Smith said the way the FTD's are implemented are what sets TRU apart from all other training providers. "Our customers aren't going to get a 40-hour lecture watching an instructor talk and point. We conduct half of our ground school content in the FTDs. There is no substitute for the tactile feedback, which then turns into good habits that transfer into the aircraft.

"For the clients who are owner-operators or first-time type rating clients, it's a significant relief in that they feel more prepared in their first full-motion session. They have already worked in a high fidelity, nearly identical device for quite a while before that point."

The ground school material is taught and reinforced through the use of the FTD. According to Smith, the way clients learn the ground school content most effectively is in the context of the cockpit. In the morning, students learn the systems, see the schematics, and they are exposed to the emergency situations, procedures and failures that are relevant to that set of systems. Then they go right into the FTD in the afternoon to perform the basics of that system's function and also some of the emergency checklist. They see right away how it all relates to the operation of the aircraft.

"That's the magic - you connect theory to the true operational environments," said Smith.

To further perfect the FTD and simulator experience, TRU regularly invites Textron Aviation demonstrator pilots to provide feedback on ways to make the sims more realistic.

"Because they are so proficient in the aircraft, if you have a button that clicks the wrong way, they will catch it. That is feedback we value to help us hone in the accuracy. That improves the 'stickiness' of the learning," Smith added.

Beyond the 61.58

Citation clients who return for recurrent can experience an even more customized approach to their training event. In addition to ensuring they meet the requirements of the 61.58 check, TRU has developed a set of enrichment training add-ons that will further enhance pilots' skills and decision-making. Developed in partnership with the Citation Jet Pilots Association, this enrichment content satisfies one of the key requirements for the association's Gold Standard Safety Award program.

"We walk them through scenarios that are either directly from an accident report or involve a heavy infusion of causals related to accidents in the light jet market. Unfortunately, there is a wealth of examples, such as improper automation management, difficulty coping with adverse weather, or physical switches that are flipped in the wrong order at the wrong time because of high stress in the cockpit. All of those have resulted in fatal accidents and near misses," Smith explained. "It's a win-win for everyone: the legal and insurance requirements are satisfied and the pilot leaves with knowledge

Safe and Proficient

M2 Owner Ken Kemna Credits TRU for Making His First Type Rating a Rewarding Experience.

Kemna started his flying career 14 years ago as he and his wife began decided to step back from the day-to-day operations of their automobile dealership group and expand their consulting business.

“It was our intention that by flying, we could be home more and not be traveling all the time. As it worked out, we traveled a great deal but ultimately decided to buy more businesses rather than consult. However, an addiction to flying was the result,” he said with a chuckle.

The Kemna’s owned a succession of aircraft starting with a Cherokee 6, a Piper Saratoga, two Cirrus, three Meridians, and finally their current aircraft, a Citation M2.

The Kemna’s took delivery of their aircraft in 2017. “We fly mostly for business. We have offices in Iowa and Florida, and the M2 can always do the leg south and many times north as well. We also fly from Iowa to Vegas, California and the East Coast for business. We have always flown 200 to 300 hours a year, and this year is no exception,” he added.

Although he had thousands of hours and plenty of turbine time under his belt, Kemna admitted to feeling some trepidation about undertaking his first type rating.

“Although I had extensive Garmin G1000 experience and turbine time, there is always a fear when going for a type rating,” he said.

Kemna arrived at TRU Simulation + Training in March of 2017, ready to undertake the 14-day training course. What he found far exceeded his expectations.

“I have trained in many simulators in the past and found that they did not operate as designed or as the airplane actually handles. You are never sure you were getting a true experience. The TRU Simulator is built on-site at Tampa where they do the M2 training. These techs are working all the time making certain the simulator is not only operating properly but changing the programming to constantly make it real world,” he said. “Flying the TRU M2 simulator was so realistic, one almost forgets it is a simulator.”

The instructors at TRU also impressed him: “They were caring, kind and very disciplined. With that said, and though they needed to follow the syllabus, they did consider one’s experience and needs. Thus, they spent time working on areas I needed to be more proficient. From day one I was comfortable with every instructor I worked with.”

During the course, Kemna became adept at handling a wide variety of operational environments, as well as handling emergency and abnormal situations. “Many believe training in the actual airplane is a key piece of training, and that may be true. However, what I really want are the events I could never experience or simulate in the airplane. The sim training gave me the confidence to know what I need to do and when. I will always do recurrent simulator training.”

Now a year later, Kemna was looking forward to his recurrent training at TRU. “They make very certain I not only achieved the targets, but that I mastered them. They focus on sending out a safe pilot, not in just going through the syllabus. I leave TRU being a true jet pilot.”



Ken and Vicky Kemna with their Citation M2

and abilities they didn't have before. It's continuous learning, not just a refresher of what they learned in the initial type training.”

Investing in Technology & Talent

TRU is investing research and development into new technologies that will make training even more effective for pilots. For example, they have implemented new technology

with one of their FTDs that allows the study of the pilot's eye movement, including his or her scan, movement and the lingering. This allows instructors to see habits that are potentially undiagnosed, good or bad.

“You see tunnel vision as a part of many accidents throughout history, where a pilot focuses on one CAS message, light or malfunctioning instrument,” Smith said. “We are spending time studying the innate habits of our customers



The M2/CJ3+ is one of TRU's most popular programs, and TRU-Tampa trained nearly 200 pilots in those aircraft. The company has put together an effective formula that involves online and/or classroom ground school, flight training devices and full-motion Level D simulators. The company offers the choice of completing the ground school through an online course or participate in a live classroom setting.

and recommending awareness about habits they may not even be aware of."

The company is also investing in talent and has set a high standard for the instructors they hire." We are very discerning

in who we hire. When a client comes in, they want to know the guy or gal who's teaching has a background operating that aircraft. We spend the money and extra time in the recruiting process to find people with that background. After they are hired, we match them with contract flying opportunities with private owners or corporate operators to keep them connected with the aircraft. That makes a big difference in the quality of the instruction," continued Smith.

TRU also has a partnership with sister company Textron Aviation where TRU instructors can get experience flying the real aircraft, often before it is even certified. For example, TRU has a crew tied into the Longitude program and will be flying the aircraft to gain knowledge, experience and relevance before the startup of the training program.

From investing in R&D to developing innovative training programs and techniques, TRU is committed to much more than training clients to pass a check ride. Instead, they look to bring its clients, especially those who operate single-pilot, effective training experiences that will make them better pilots and in turn will make a measurable impact on the light jet safety record.

"What is exciting is tailoring and developing programs that turn a lightbulb on for a client. That's the stuff that gets me excited about our business, and our teams are laser-focused on bringing those to market," said Smith. 



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Completing the Circle

An Accident Analysis & What We Can Learn From It.

by Tom Turner

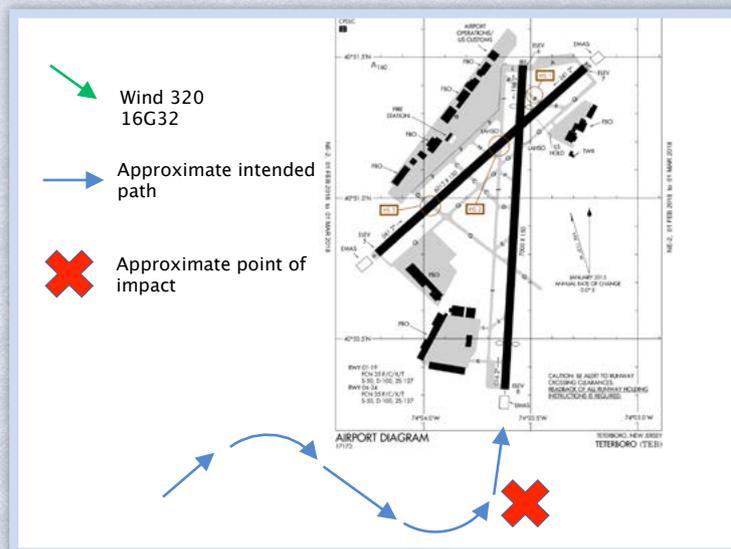
The May 2017 crash of a Learjet 35 at New Jersey's Teterboro Airport has much to teach us regardless of what we fly. The National Transportation Safety Board reports:

A Gates Learjet 35A departed controlled flight while on a circling approach to Runway 1 at the Teterboro Airport (TEB), Teterboro, New Jersey, and impacted a commercial building and parking lot. The airplane was on a Part 91 positioning flight and was destroyed by impact forces and post-crash fire. The captain and first officer died; no one on the ground was injured. Visual meteorological conditions prevailed. The flight departed from Philadelphia, PA, about 1504 and was destined for TEB. The accident flight was the crewmembers' third flight of the day.

The IFR flight plan to TEB planned a 28-minute flight at Flight Level 270. After departure about 1504 (local time), the flight was cleared to climb to 4,000 feet. The flight reached a maximum altitude of 4,000 feet MSL. About 1515, the flight was cleared to descend to 3,000 feet. The New York Terminal Radar Approach Control (TRACON) cleared the flight for the TEB ILS Runway 6 Approach, circle to land Runway 1. TRACON instructed the flight contact TEB Tower about nine miles from the airport; however, the flight did not check onto the tower's frequency until four miles from the airport. ATC cleared the flight to land on Runway 1 and issued the TEB winds of 320 degrees at 16 knots, gusting to 32 knots.

The flight did not start its right circling turn until it was less than 1 mile from the approach end of Runway 6. According to the tower, aircraft typically start the right turn at the final approach fix, which is located 3.8 nm from the approach end of Runway 6.

A TEB controller observed the airplane bank hard to the right and he could see the belly of the airplane with the wings almost perpendicular to the ground. The airplane then appeared to level out for



just a second or two before the left wing dropped, showing the entire top of the airplane. Other witnesses also reported that they observed the airplane in a right turn with the wings in a high angle of bank. Some witnesses described seeing the airplane's wings "wobbling" before the left wing dropped and the airplane descended to the ground. Security video cameras installed at numerous commercial buildings also captured the last moments of the flight, showing the airplane at high angles of bank. One security camera showed the airplane in a steep right wing low, nose down attitude at impact.

There are many lessons promoted by this event, two specifically I want to draw from this example. The first comes from the NTSB excerpt above. 14 CFR 91.175 tells us that flight below Decision Height (DH), Decision Altitude (DA), or apropos to the Learjet's circle-to-land maneuver, Minimum Descent Altitude (MDA), is permissible only when "...the aircraft is continuously in a position from which a descent to a landing on the

intended runway can be made at a normal rate of descent using normal maneuvers..." (emphasis added).

Although "normal maneuvers" is not defined, banking excessively in the traffic pattern is not usually considered "normal." The need to bank so steeply should prompt the pilot(s) to level the wings, then execute the missed approach procedure as applicable to the aircraft's current location in the circle-to-land maneuver.

Lesson 1

The first takeaway from this report: Keep bank angle shallow close to the ground, even (especially) if in a circle-to-land or other visual maneuver. If your flight path, the wind or any other factor would require a steep bank or other unusual maneuver to establish or maintain alignment, use that need as a prompt to break off the approach—using normal flight maneuvers.

Lesson 2

Media commentaries about this report centered on crew qualifications,

especially that of the First Officer. The NTSB docket (detailed report) states:

Within the [aircraft owner's] operation, SIC [Second-in-Command] pilots were ranked on a 0 to 4 scale and restricted as to the type of flying they were allowed to perform so as not to overwhelm them before they were ready. In order to be allowed to fly as SIC on empty legs [positioning flights], the right seat pilot of the accident aircraft would have been required to hold a rating of SIC-2. On the day of the accident, he was rated as a "0" and as such should not have been [Pilot Flying] of the aircraft at any time.

Both the Captain and the First Officer appear to have been qualified for their respective roles, at least as far as the FAA is concerned. The "0-4" rating scale discussed in the NTSB docket is a company policy, not an FAA rule...unless, perhaps, it is written into the charter operator's FAA-approved Operations Specifications (OPS-SPEC), and that OPS-SPEC was required to be in force not only while the carrier engaged in Part 135



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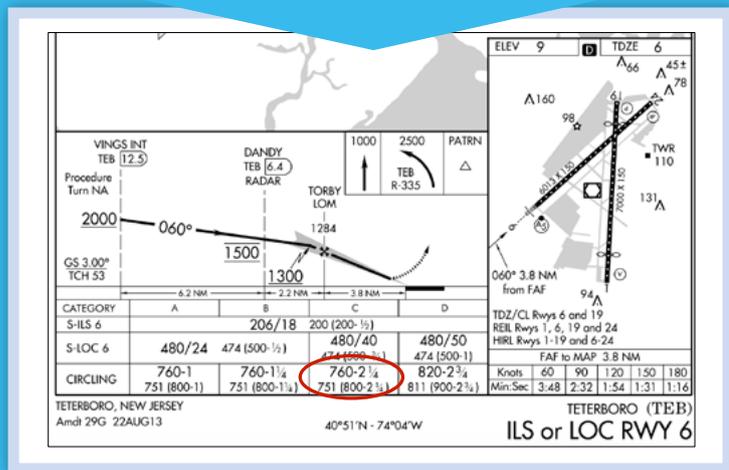
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Visual or IFR?

The TEB tower controllers mentioned that previous aircraft started the circle at 3.8 miles. This is outside the obstacle-protected area for any category aircraft. This fact raises the question: is it now a visual approach? Are all circling maneuvers visual?



Assuming the Lear 35 approaches at CAT C (121-140 knots ground speed) or even CAT D (141-165 knots ground speed), then beginning the circling portion of the maneuver about 3.8 nm from the runway would not be authorized. It would be if the Lear was flying at 166 knots ground speed or greater, but I don't think even a Lear 35 is routinely that fast in a circle-to-land maneuver.

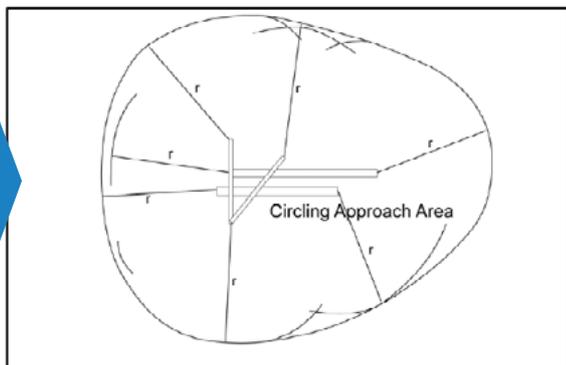
Conditions at the time of the accident were 5,500 scattered, visibility 10 miles; in other words, good VMC. Therefore:

- If ATC cleared the pilot for the circling approach, even though that portion of the flight was in VMC, the pilot is obligated to adhere to the circling altitudes and radii to comply with that clearance. That said, the pilot is also required to miss the approach if he/she cannot descend below Minimum Descent Altitude (MDA) using "normal maneuvers," which is not strictly defined but using a "reasonability test" does not include low-altitude near-knife edge maneuvering like the accident airplane was observed to do.
- The circle-to-land portion of a circling approach must be done with visual contact with the airport, but conditions do not have to be VMC, only the minimum visibility published for that approach and clear of clouds. It is an Instrument Flight Rules procedure that requires outside visual contact to perform. So, the circle-to-land maneuver is a visual procedure, but not a VFR procedure.

Circling Radii: Not What You Might Think

The rules about protected airspace in a circle-to-land maneuver are probably different than you learned when you earned your instrument rating or ATP. Since 2012, the radius of the protected area centered on the ends of the runways changes with changes in altitude above Mean Sea Level.

Although the circling radius is based on the aircraft's ground speed, this takes into the account the higher True Airspeed for a given indicated airspeed at a higher altitude. It may seem academic (after all, even longer radii than you originally learned apply at higher elevation airports), but the "most correct answer" is no longer a single protected airspace radius for each approach category listed on an instrument approach chart.



STANDARD CIRCLING APPROACH MANEUVERING RADIUS
Circling approach protected areas developed prior to late 2012 used the radius distances shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category. The approaches using standard circling approach areas can be identified by the absence of the symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
All Altitudes	1.3	1.5	1.7	2.3	4.5

EXPANDED CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS
Circling approach protected areas developed after late 2012 use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude. The approaches using expanded circling approach areas can be identified by the presence of the symbol on the circling line of minima.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

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(charter) operations but also when on positioning flights between passenger-carrying gigs.

This brings us to the second takeaway from this example: personal minimums are only useful and valid if we adhere to them all of the time, not just when it is convenient. The charter operator's SIC rating session is essentially the same as a personal minimum any operator (or individual pilot) might put on him- or herself.

I've been tempted to land with 45 or 50 minutes of fuel remaining on board instead of my personal one-hour minimum. I've looked at a cloud layer just a little below circling minimums for the runway in use, and really wanted to take off. I've had to fight off a "go" mentality for a late-day departure when I've been awake for more than 12 hours. Yet, each one of these flights are perfectly legal. The limitations are my own - my personal minimums.

You probably have some personal minimums of your own. They come

from your own experience - something you did or did not do, and you learned better - or from reading or hearing the experiences of other pilots. Personal minimums are a very good thing. But you have to use them even when you don't want to. In fact, that's the whole idea of personal minimums. They're the voice of reason and logic, when you're most tempted to make decisions emotionally, often when you have insufficient information with which to choose.

I'm pretty sure the Learjet pilots' employers would have made its "0-4" rating rule clear to the pilots in their new-hire training and when upgrading to Captain. The pilots probably knew better than to do a lot of what it appears they did that inexorably led to their deadly loss of control. If the crew had only followed the two limitations, one regulatory about maneuvers below MDA, the other personal, the company OPS-SPEC requiring the Captain to fly the approach, that decision might have been enough to save their lives and prevent all that destruction.

Accident causation has been likened to a chain of decisions or a chain of events. It has also been modeled as layers of Swiss cheese: Each layer is the chance to block an accident path, if the "holes in the cheese" don't line up. All it takes is to break a critical link in that chain or to move the cheese: to make and act on a decision that manages the risk to prevent a crash. Personal limitations are your means of reversing trends that might lead to an accident. Just follow the rules - the FAA's and your own - and you probably won't get hurt. **T&T**

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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.



GFC 600 certification is underway for the Cessna 340.

Garmin GFC 600

New autopilot is a retrofit game-changer.

by Joe Casey

Bottom line: I really like the GFC 600 autopilot! My impression is that the GFC 600 will be the industry-standard retrofit solution for the *Twin & Turbine* fleet in record time. It is smooth, precise, interfaces easily with the pilot, and has a bunch of neat features that dramatically improve safety. I may sound like a salesman from Garmin with this article (not accurate...I received nothing from them!), but I think this autopilot deserves the praise I'm about to pour on it. Yes, it's that good.

Although Garmin has yet to start an STC program for some *Twin & Turbine* airplanes, they have acknowledged there is demand and have placed many *T&T* aircraft on the list of airframes they plan to focus on in the next 12 months. So far, they have certified the GFC 600/500 on the Beechcraft Baron B55, Bonanza 36, A36 and A36TC, and Cessna 182. Programs currently in progress are the Baron 58 and Cessna 340. And on the agenda are several of the Cessna 400-series twins, the Socata TBM, and the PA46 Malibu/Mirage/JetPROP aircraft.

Editor Dianne White and I were both then invited to fly one of the first airplanes to have the GFC 600 installed: N452C, a 1999 Bonanza A36 owned by Tom Haas. Tom also owns Park Rapids Avionics in Park Rapids, MN (www.parkrapidsavionics.com), a prominent Garmin dealership that was selected to help launch the GFC 600. Some may remember seeing N452C at AirVenture Oshkosh last summer. It was on static display and Tom is justifiably proud of his fine aircraft. It is not only equipped with the GFC 600, but also dual G750's that feed a G500 display. The panel was completely new (literally built for this amazing avionics suite), and this airplane is exemplary in every way.

I arrived on a cold early-spring morning with clear skies and light winds. It was a perfect day to test out the GFC 600. Tom graciously allowed me to fly left-seat on the flight. We flew around the Park Rapids, MN area testing the functions of the autopilot in just about every regime of flight, and also flew several approaches. Interestingly (it seems so to me), I pushed the autopilot on shortly after takeoff and I didn't have to touch the controls again (even through several approaches with go-arounds) until 200 feet above the touchdown zone elevation on the final approach to landing.

GFC 600 Certification Programs Planned to Begin in the Next 12-months:

Cessna 414
Model: 414A
Cessna 421
Model: 421C
Cessna Grand Caravan
Model: 208B
Piper PA-46
Models: 310P, 350P*
Socata TBM
Models: 700, A, B, C1, C2, N (TBM 850)

Please note that G1000 equipped aircraft are excluded from the list above.



Some features of the GFC 600 that I came to appreciate as it relates to the *Twin & Turbine* market:

Ease of Operation

For any pilot that currently operates Garmin equipment, the GFC 600 will be super-intuitive. Any pilot current with the G1000 (which has the GFC700 autopilot) will find the GFC 600 nearly identical operationally (although the buttons are in different places). For any pilot flying other equipment, the GFC 600 will have an incredibly short learning curve.

Go Around Button

This is probably my favorite safety feature on the GFC 600. Safety feature? Yes, I think it is a safety feature! In recurrent training, I see the Go Around fumbled by many pilots, and the GFC 600 makes the Go Around easy.

Simply push the Go Around Button on the throttle/power-lever and the autopilot switches both pitch and roll modes by pitching smoothly up and establishing wings level. The pilot then advances the throttle/power-lever and cleans up the airplane. The autopilot never disengages throughout the maneuver. I was amazed at the simplicity of a Go Around with the GFC 600.

Integration with the G500

I've found that making autopilot mode changes on the G500 is less-than-intuitive. Most are "left-handed" operations (which conflicts with the left hand flying the airplane), the buttons are either "pressed once" or "held" (and many pilots choose the wrong action), and the G500 displays the difference between HDG and GPSS Modes poorly (all of this will make sense if you operate a G500).

With the GFC 600, all of that changes. To change pitch or roll modes, the pilot pushes buttons that are clearly marked on the face of the GFC 600, not the G500. But the G500 interfaces with the GFC 600 and all is very seamless.

Easy-to-Read Display

The left side of the GFC 600 displays the "roll mode" and the right side displays the "pitch mode." Being easy to read, I sifted through the various modes quickly, not once being confused.

Small Size

The GFC 600 easily fits in your hand and is super-light. It will take up very little panel real estate and might add useful load.

IAS Mode

I think the IAS Mode is the best mode for a safe climb. It virtually eliminates the potential for a pilot to stall the airplane in a climb. In many of the other autopilots in the *Twin & Turbine* fleet, the only mode for climb is V/S or pitch-attitude mode. But, the pilot then must control that vertical speed or pitch attitude accurately or the autopilot could pitch the airplane to an excessive angle of attack and potentially stall the airplane. While in IAS Mode, if the pilot mismanages the power the rate of climb suffers, but the airplane never approaches the stall. Many of the T & T aircraft in the current fleet, especially older airframes, have autopilots that do not have IAS mode. To me, this feature makes the GFC 600 upgrade worth the upgrade if you are flying an autopilot that only has V/S or pitch-attitude mode for the climb.

Under-speed Protection

As the aircraft slows to the bottom of the white arc on the airspeed indicator, the GFC 600 will release some back pressure on the yoke and allow the airplane to "mush" at a slow speed, but not stall. I tested this feature and found it to be a possible life-saver in case a pilot became completely distracted. For now, it's the nearest thing available in the market that could be described as "stall protection."

Garmin is appropriately careful to call it "under-speed protection" as opposed to "stall protection." but I can see some situations where this feature could be a true life-saver by avoiding the stall. In many other autopilots in

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the *Twin & Turbine* fleet, there is no “under-speed protection.” A few will automatically disengage the autopilot if the stall horn sounds; on the others there is no disengagement at all. In these autopilots it will hold back pressure in the stall, which almost assuredly results in a deadly spin. In my opinion, this feature is the primary “safety feature” of the GFC 600, and probably makes the GFC 600 worth considering for upgrade even if only for this feature.

Stability Protection

While hand-flying, I performed Steep Power Turns (the FAA maneuver required on most practical tests) at 45 degrees of bank. As the steep bank is sensed (even if the autopilot is OFF), the roll actuator applies pressure or “nudges” the controls back to a more level attitude. It’s not over-bearing, and the force can be overridden. But, it is a nice feature that could help a pilot avoid an unusual attitude. For those who have driven late-model cars with “lane protection,” it’s similar.

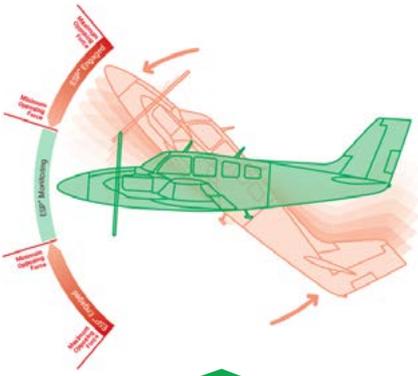
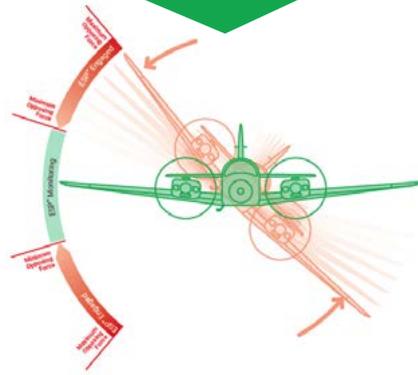
The Blue Button

This feature works well. In just about any regime of flight, the blue “level” button can be pushed, and the autopilot automatically engages and rolls the airplane to wings-level and pitches to hold altitude.

To be completely forthright, I’m lukewarm about this feature because I think it gives a pilot the illusion that the autopilot can “save the day” in any situation, and that is simply not accurate. If the airplane truly does enter into a “loss of control” situation, the pilot needs to fly the airplane, not trust the Blue Button to save the airplane. But, there are situations where the Blue Button could help (such as a non-pilot passenger taking command of the airplane with an unresponsive pilot), and I’m glad to have it available.

Certification Forthcoming?

At press time, Garmin has yet to announce exact dates to start the certification program for the list of targeted aircraft, although several are planned to begin it in the next 12 months. When it becomes available, should you consider upgrading? Answer: Yes! For any airplane without IAS Mode or any airplane that only has pitch-attitude mode for climb, the GFC 600 upgrade will be a no-brainer. Aside from all of the safety features (which are each in itself a



With the autopilot engaged, GFC 600 also provides overspeed and underspeed protection. In a high airspeed situation — for example, if you’re descending and your aircraft is approaching VNE or VMO — the system will increase the aircraft’s pitch attitude, preventing a further increase in airspeed and potential structural damage. Likewise, at the other end of the speed spectrum, GFC 600 provides underspeed (stall) protection. For example, in the event the pilot does not immediately advance the throttle to full power, with the autopilot engaged while flying a missed approach sequence, the autopilot will help prevent an aircraft stall by reducing pitch attitude and provide the pilot with an “airspeed, airspeed” audible alert.

good reason to upgrade), the GFC 600 is quite simply a far superior autopilot. In fact, I think the GFC 600 will resurrect some aircraft that have lagged in the marketplace due to older avionics and allow them to trade at levels that will be much more representative of their true value.

For the pilot of an aircraft that already has a recent “Garmin panel,” I also think an upgrade is worthy of



Integrated “smart” servos incorporate digitally controlled speed and torque limits on these inputs allow faster, crisper and more powerful response. The servos incorporate brushless DC motors and a gear train that eliminate the need for a mechanical slip clutch. The servos also provide virtually no control system friction with the autopilot turned off, decoupling the motor drives so you can hand-fly with ease.

consideration. If that “Garmin panel” has the latest and greatest GTN’s (G750/G650) and a great display (G500/G500TXI), the GFC 600 upgrade will “complete” the panel to a best-of-breed variant that makes real sense. If your panel is a “Garmin panel,” but has older Garmin equipment (G530/G430) and a vacuum-driven attitude indicator, the decision will be much harder to make. I’d probably only upgrade to a GFC 600 if the rest of the panel were to also receive an upgrade, which will increase the scope of work (and cost).

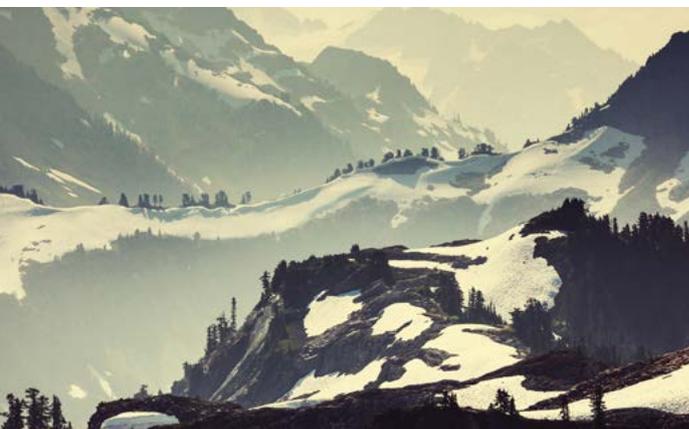
Already available in a few *Twin & Turbine* aircraft, I suspect the GFC 600 will be available in many more in the next year. When it does, I’ll be one of the first to get in line. It’s going to be a game-changer! **T&T**

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



It's All About the Ice

by Kevin Ware



Ice is a difficult hazard to predict. But in the Pacific Northwest with its high MEAs, frequent IFR conditions, cloud tops that rise well into the flight levels, and generally strong westerly winds aloft complicate the how to handle the ice problem.

For some reason, you long ago quit making saliva. Your mouth is so dry it is hard to swallow. Your hands are cold, but at the same time strangely wet with sweat, as are your ears under the Bose headsets. And finally, if all these symptoms of stress were not enough, you just realized a very urgent need to urinate.

The C414 you are flying is at FL180 eastbound over the mid cascades and no longer climbing even under full power. You can see little outside because even the side windows are partially iced over. The four passengers in the back are sipping coffee from a green Aladdin thermos, chatting about their construction project and seemingly not in the least worried about anything. You start to wonder if you should have ever got involved with this professional pilot thing to start with and desperately want to be on the ground.

In the Pacific Northwest during the winter months, this experience happens all too often to pilots who have just started flying professionally, or pilots in their own aircraft and not familiar the area. Ice is probably the most difficult hazard to predict. But high MEAs, frequent IFR conditions, cloud tops that rise well into the flight levels, and generally strong westerly winds aloft complicate the how to handle the ice problem. Over the years I have flown a variety of different aircraft in this setting. Without question those that have caused the driest mouth experiences and the most careful decision-making are pressurized piston twins.

Now, that may seem kind of odd given those aircraft bring benefits to the table that non-pressurized, and not turbocharged aircraft are lacking. But that is precisely the problem. The pressurized piston twins are just “good enough” to get you in real trouble. Trouble you would readily recognize and not go anywhere near in less capable aircraft (say a C182 or C310), and those that a CJ or Lear would just blast right through on the way to FL410 without any problem at all.

Using a stressful flight from Seattle (BFI) to Boise (BOI) from the distant past as an example, what follows are some of the thought processes and techniques I have learned from others (and also regrettably from bad personal experiences), in 10,000 hours of this kind of flying. Given I am still

here to write the story, they must work pretty well.

It was mid-December and over the past several days there had been the typical winter low pressure system moving into the Washington State from the Gulf of Alaska. The weather at BFI was 1,400 overcast, visibility 3 in light rain. Temperature on the surface was 43 degrees F, and wind was 110 at 12. BOI reported a 1,500 overcast, visibility variable from 1 to 4 miles with occasional blowing light snow and a 28 degrees F surface temp. En route weather showed tops in the Seattle area at 17,000. Over the Cascades they are at FL210, and at BOI 10,000 feet. Winds aloft were from the west at 30 knots at 10,000 feet, and 50 knots at FL180. And as usual, light to moderate rime icing in clouds was forecast for the entire route, and pilot reports were confirming the forecast.

The flight distance was 350 nm, which given a TAS of 210 knots, plus a tailwind of about 60 knots, would take just under 1.5 hours in the C414. The airplane easily carries four hours of fuel plus the passenger load. Seemed like a pretty easy trip and not knowing any better, we filed IFR BFI direct to BOI just like we do in

the summer. Off we go. Some 20 minutes later, we are climbing eastbound on our direct routing to BOI with a TAS of 140 knots, and ground speed of about 200 knots. We have covered some 65 miles since takeoff, placing us well over the Cascade Mountains and be somewhere in the mid-teens on altitude.

We were right in the middle of the worst icing conditions, and the real sneaky problem we now faced is the combination of winds aloft, cloud tops of FL210, degraded aircraft performance and our position in the middle of the Cascades. The airplane will get up to FL210, but even on a good day and without any ice on the airframe, the climb rate in a pressurized piston twin will drift down to some 400 to 500 fpm once in the flight levels. With cloud bases at 1,500 feet, and the freezing level starting at about 6,000 feet, this means that as a minimum, we would be spending a good 30 minutes either accumulating ice, or with it clinging to the airframe. Seeing that is what caused our saliva production to stop.

Now, we were taught that even in a FIKI (flight into known ice) approved aircraft, the best strategy when encountering ice is to immediately do something to get out

of it. The simplest option when over flat country is to just descend into warmer air, but we were over mountains, and so that was not possible. Another option was to climb above the icing layer as fast the aircraft can. The layers where ice accumulation is at its worse, are usually only 3,000 to 4,000 feet thick, but at 400 to 500 fpm that is going to take a long time. And, even with all de-ice equipment working, residual ice on the aircraft could slow the climb rate down to nearly zero, so it was quite likely we simply don't have the ability in this pressurized, piston-powered aircraft to "out climb" the ice.

Finally, the last option we are taught way back when, is to simply turn around. But given the winds aloft, that solution can be a death trap. To get back where we came from just 20 minutes ago with our tailwind and a groundspeed of 200 knots will now take nearly 45 minutes given the 60-knot wind from the west, plus the airplanes degraded performance. There was a fatal accident in the NW some years ago, wherein the groundspeed problem alone precluded the pilot from reaching warmer air and lower terrain before his impossibly iced-up twin, still

Continued on Page 22

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100	LEARJET 25D
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167	LEARJET 31A
33	LEARJET 35
380	LEARJET 35A
13	LEARJET 36

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7	SABRELINER 40
19	SABRELINER 40A
2	SABRELINER 40EL
1	SABRELINER 40R
24	SABRELINER 60
1	SABRELINER 60AELXM
19	SABRELINER 60ELXM
3	SABRELINER 60EX
68	SABRELINER 65
15	SABRELINER 80
6	SABRELINER 80SC
75	WESTWIND 1
5	WESTWIND 1123
32	WESTWIND 1124
65	WESTWIND 2

Turboprops - 10,774

Chief Pilots & Owners

Count	Aircraft
7	ADAM A500
356	CARAVAN 208
1,202	CARAVAN 208B
2	CARAVAN II
32	CHEYENNE 400
132	CHEYENNE I
13	CHEYENNE IA
264	CHEYENNE II
58	CHEYENNE III
38	CHEYENNE IIIA
57	CHEYENNE IIXL
21	CHEYENNE IV
178	CONQUEST I

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 68 JETSTREAM 32
 61 JETSTREAM 41
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 510 KING AIR 200
 20 KING AIR 200C
 19 KING AIR 200T
 146 KING AIR 250
 181 KING AIR 300
 11 KING AIR 300LW
 564 KING AIR 350
 57 KING AIR 350C
 286 KING AIR 350I
 19 KING AIR 90
 11 KING AIR A/B90
 70 KING AIR A100
 214 KING AIR A200
 58 KING AIR A90
 106 KING AIR A90-1
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 156 KING AIR F90
 25 KING AIR F90-1

7 MERLIN 300
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 21 MERLIN III
 28 MERLIN IIIA
 45 MERLIN IIIB
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 5 MERLIN IV
 9 MERLIN IV-A
 9 MERLIN IV-C
 66 MITSUBISHI MARQUISE
 1 MITSUBISHI MU-2D
 26 MITSUBISHI MU-2F
 18 MITSUBISHI MU-2J
 33 MITSUBISHI MU-2K
 11 MITSUBISHI MU-2L
 18 MITSUBISHI MU-2M
 18 MITSUBISHI MU-2N
 25 MITSUBISHI MU-2P
 39 MITSUBISHI SOLITAIRE
 519 PILATUS PC-12 NG
 149 PILATUS PC-12/47
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 5 ROCKWELL 680V TURBO II
 5 ROCKWELL 680W TURBO II
 6 ROCKWELL 681 HAWK
 101 SOCATA TBM-700A
 70 SOCATA TBM-700B
 293 SOCATA TBM-850
 101 SOCATA TBM-900
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 73 TURBOCOMMANDER 1000
 37 TURBO COMMANDER 690
 141 TURBOCOMMANDER 690A
 144 TURBOCOMMANDER 690B
 83 TURBO COMMANDER 840
 26 TURBO COMMANDER 900
 55 TURBO COMMANDER 980

Twin Piston - 6,961

Owners

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112	BARON 58TC
3	BARON A56TC
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176	CESSNA 340
531	CESSNA 340A
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29	CESSNA 404 TITAN
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363	CESSNA 414A CHANCELLOR
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Owners

Count	Aircraft
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59	CESSNA 206
412	CESSNA P210N
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54	CESSNA T182
1	CESSNA T206
751	CIRRUS SR20
2,905	CIRRUS SR22
241	PIPER MALIBU
468	PIPER MIRAGE

38,967 TOTAL AIRCRAFT

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TWIN & TURBINE

Continued from Page 19

descending even at full power, crashed into a mountainside.

The only remaining option was to do exactly what we were taught NOT to do, which was fly on straight ahead, taking advantage of the tailwind to get us over the crest of the Cascades on over lower terrain as soon as possible. Looking out of the nearly iced-over side window, ice was rapidly accumulating on all parts of the airframe we can see, making proceeding on a very precarious and difficult choice to make.

You only have a neophyte experience once before you learn there are some very effective strategies that can be used to avoid this situation from ever presenting itself.

One of the most basic procedures is to make sure the airplane is well above the icing (that is on top of the clouds), before departing the safety of sea level terrain. To implement this procedure, on the first call to departure control once off BFI request vectors "for ice avoidance" that keep the airplane over or near Puget Sound until it is on top. Upon hearing that request, the controller would probably extend the departure

leg to the NW, and then clear the aircraft direct to back SEA then to the flight plan route. Most departure controllers in the Northwest understand the ice problem and are very cooperative in helping the pilot avoid it. The "ice avoidance" request, however, needs to originate with the pilot. Making such a request is the professional thing to do as it shows you are planning well ahead of the aircraft.

If ice is encountered that stops airplane from climbing while still over sea level terrain, you can always quite safely descend to nonfreezing conditions without hitting anything, and without even requesting much special handling from ATC. When flying near or over salt water on the West Coast, it is helpful to know that ocean temperatures from the Gulf of Alaska to Northern California rarely are colder than 45 degrees F. This "heat source" almost always produces ice-free air below 3,000 or 4,000 feet when over or near salt water, and the MEAs over that water are typically well within those altitudes.

The next question is given the conditions, what should your flight plan route actually be. Clearly the direct one chosen on the above flight was not wise.

The lowest mountain crossing MEA is 6,500 and involves using V2 from SEA to BEEZR intersection, and from there direct to Yakima (YKM), but it is slightly out of the way. An alternative would be to use V4 from SEA to YKM, which is direct but with an MEA of 10,000 feet. From YKM, V4 goes more or less direct to BOI with MEAs on the order of 9,000 feet. When it was new and the C414 airframe was ice free, the book says it could maintain 14,000 feet on one engine. But there are lot of "ifs" in there, so the best route would be the one with the lowest MEA, which is V2, SEA, BEEZR, YKM. The direct route at least from SEA to YKM would not be advisable as the MEAs and terrain are much higher.

So even with a route plan that takes the airplane over manageable single-engine MEAs you still really want to be above the cloud tops before proceeding eastbound. But sometimes, regardless of forecast, the cloud tops exceed the altitude capability of pressurized piston-powered airplanes. If this happens while still over sea level terrain, the flight to that point would had to have been pretty much ice-free in order for me to feel comfortable continuing eastbound and



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away from the safety of the lower terrain and warmer temperatures below. If we had been fighting ice all the way up, and were unable to get or stay on top, even though in a de-iced and turbocharged and pressurized airplane, the best thing for an experienced, mature and professional pilot to do is call it a day and simply not go further east. When operating in the Pacific Northwest there is a rule in this regard that is helpful to remember: "With winds from the west, do not proceed eastbound until certain there will be no need to return."

Finally, after managing to cross the Cascades and approaching BOI, we need to do some ice-related descent planning. Given the 28-degree temperature at the surface, some ice should be expected during the descent, and if that ice was bad enough, it could force the airplane all the way to the ground even with the FIKI system running full blast. For this reason, I would not want to start my descent from "on top," until relatively close to BOI and would so notify the controller.

Before starting the descent, I would make sure the cabin pressure rate controller was set to no more than 500 feet per minute and would plan on a good 1,000 foot per minute aircraft descent all the way to the final approach point, keeping the TAS up at high cruise and the engines warm by carrying power.

One of the reasons for the high airspeed is that air moving across the wing is warmed a bit from higher speeds. Sometimes just a 20-knot change in TAS will stop ice from forming in conditions that are otherwise identical. The lower angle of attack will also help prevent ice from forming on the bottom of the wing where you can't see it. Another reason for the high descent rate is it means the airplane will pass through whatever icing layers exist much more quickly. Basically, if we encounter cloud tops on the way down at the forecast 8,000 feet, and the altitude at the IAF (initial approach fix) is say 4,000, we would spend no more than a total of 3 or 4 minutes in the potential ice.

Now all we have to deal with is the final approach and landing. In spite of our careful "ice avoidance" descent, it is possible that with the 28-degree temperature on the ground at BOI, whatever ice accumulated on the aircraft could still be present upon landing. Making sure windshield de-ice is working is important in these conditions. Even in a FIKI airplane with

boots and hot props all working, ice tends to stick to the wing in areas you cannot see, raising the stall speed by an unknown amount. For this reason, keep the airspeed higher than normal until close to the runway. In these conditions, a pilot with a professional mindset would only flight plan into airports with long runways (BOI has 10,000 feet).

Additionally, some inquiry as to braking conditions is in order before landing. If we had departed a wet runway at BFI and then climbed into freezing conditions, it's also possible the brakes could be frozen and will not work initially after landing. Some turbine aircraft such as King Airs have a special hot air hose to the brakes for this very reason, plus the ability to reverse either the propellers or the engine thrust, piston twins do not, so you have to be extra careful.

After landing and getting clear of the runway, our problems are not yet over. In the winter there can be piles of snow that can be a problem for low wing twin-engine aircraft with their propeller blades sweeping less than a foot above the ground. So even if we know exactly where to go, if there is any question about the best route to take the best procedure is to just ask for progressive taxi instructions.

When finally arriving at the FBO and taxiing toward that lineman with the orange wands, keep your right hand on the mixture controls. You never know if a patch of ice will magically appear under your main gear just as he waves you to a stop.

After all we have been through on this trip, scaring the line guy would be a bad way to end the day. **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.

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by **Rebecca Groom Jacobs**

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Engine Land,
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1. Can you describe your role at Mid-Continent Instruments and Avionics?

I have worn several hats over the course of my nine years. Some of my core responsibilities include customer visits, tradeshow, program development and flight testing. A recent focus of mine is expanding relationships with aircraft manufacturers and our distribution network. I use insight from those relationships to develop new product and service programs for customers all over the world. For fun, I recently calculated the total number of miles I have traveled for work and found the distance is equivalent to circling the Earth 18 times!

2. What inspired you to pursue a career in the general aviation industry?

I was inspired at a young age, soon after my family moved to Wichita, Kansas (the “Air Capital of the World”). At first, I planned to be an astronaut, but over time realized flying airplanes was what I wanted to do. So, I attended Kansas State University, completed the flight program and became a CFI. My dad is also a pilot and recently retired from a decades-long career in aviation. For years, I promised myself I was going to get my dad flying again (he had put flying on the backburner while raising a family). That day finally came. Thirty-two years after his last logbook entry, I signed my father’s logbook as his flight instructor. It was an amazing day for both of us.

3. Mid-Continent Instruments and Avionics manufactures more than 20,000 units per year. What are some of the company’s most popular products?

Mid-Continent has a 54-year history. A few examples of our innovative achievements and industry-firsts include the 4300 Series Lifesaver Gyro, MD302 Standby Attitude Module (SAM) and True Blue Power lithium-ion aircraft batteries. Personally, I have an affinity for SAM as I was involved throughout the product’s conception, including flight testing for functionality and software changes. In terms of product popularity, we recently surpassed selling 30,000 True Blue Power USB charging ports. They are well received by the industry and are one of the highest-powered, TSO-certified, USB charging ports on the market.

4. *What is the True Blue Power product line?*

The True Blue Power product line includes USB charging ports, power inverters and converters, emergency power supplies and advanced lithium-ion batteries. Several products are engineered with Nanophosphate lithium-ion technology, which delivers smaller, lighter products that are less than half the size and weight of legacy units. True Blue Power products can be found in turbine aircraft from nose-to-tail powering personal electronics and entertainment systems, coffee makers, microwaves, lighting, outlets, special mission and emergency equipment. The list of lithium-ion, engine-start battery STCs continues to grow..

5. *The avionics scene is rapidly changing. What happenings or trends do you envision occurring in the marketplace over the next decade?*

The biggest buzz right now is connectivity. There is a growing demand for the use of personal electronic devices in-flight, especially solutions that don't involve additional service plans. Bluetooth capabilities are becoming more and more common in new avionic systems. I also envision an evolution of autopilots that will adjust course for best routing, traffic and terrain. This would greatly reduce the workload for both pilots and controllers. And we can't forget the rapidly expanding UAV market pushing to share airspace. A new round of "see-and-avoid" technology could find its way into GA aircraft.

Rebecca Groom Jacobs can be contacted at rebecca@twinandturbine.com.

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From the Flight Deck

by Kevin R. Dingman



Big Foot Flies Again

Landing currency: category, class and type

While recuperating from rotator cuff surgery, my landing currency was about to expire. That hasn't happened since I first learned to fly. You know, back when we shared the pattern with pterodactyls. As my flying skills withered post-op, I wrote at the hangar office while listening to Clapton and Chicago. Taking short breaks, I played the keyboard (should I admit to singing?), video poker and rearranged stuff in the hangar. It's common for aviators to talk to their planes so, when no one was around, I exercised my anthropomorphic right to whisper sweet-nothings to the Duke.

I also reviewed manuals and chatted with fellow airport bums about all things aeronautic, including landing currency. I wondered how well I would land the Duke and 737 once I finally got back into the air and hoped that it would happen before the landing currency reaper came for me, or the neighbors overheard my singing.

Warning, Warning Will Robinson

GA currencies aren't monitored by my employer, but Part 121 requirements are tracked very closely. And just like when they kicked me off the Super 80 and sent me to the 737, the automated system responded to the approaching event. The automated message interrupted my writing and Chicago's "Questions 67 and 68," but at least this time the computer said please:

WARNING THE FOLLOWING IS ABOUT TO EXPIRE

*****737 LANDINGS ** 28 DAYS. PLEASE CONTACT YOUR FLEET TRAINING SCHEDULER. COMPUTER GENERATED MESSAGE.**

That was sweet. Robbie the Robot (Forbidden Planet, 1956) looking after me like that. But a warning? Our flight manuals are chockfull of warnings, cautions and notes, each stressing critical information or describing varying degrees of awfulness. A warning typically portrays possible injury, death or serious damage to equipment. But going non-current at the airline isn't a catastrophe, so why issue a "warning?"

Because, yes it IS a catastrophe. I asked my 737 check airman buddy and fellow Michigander Jim Kause to shed light on the approaching awfulness.

He explained that if your landing currency expires, before you can return to "line" flying, you are stripped buck-naked, shanghaied to DFW and sucked into the black hole of disaster in a simulator. Well, he may not have said exactly those words, but they were inferred. By going to the schoolhouse and flying the sim with an examiner for two hours of dial-a-disaster approaches, crosswind landings and single-engine drudgery, you can regain landing currency without flying the real airplane. This is not a stress-free option by any stretch, especially when naked.

Perhaps the question about Robbie's warning was rhetorical: We do indeed risk serious injury if we go non-current at the airlines: serious psychological injury. Managing the Part 121 return-to-work date is therefore critical in order to get "real" landings and to thusly avoid the blood-pressure raising, life-sucking gravity well at the Flight Academy.

I decided to fly the Duke as soon as my repaired shoulder would allow, which gives me category and class landings plus a preliminary warm-up for the big iron. And to then ask my Chief Pilot Tim to send me out on a trip in order to get landings in type before the company Death Star cleared the



Big Foot is no legend. Like oil and water, this was a poor choice of footwear for flying.

horizon. The currency requirements in the FAR's are what matters to our legality, license, livelihood and perhaps to our lives. Here's a quick reminder of the category/class/type rules that keep our butts out of a black hole, and our certificates safe from the Empire.

FAR 61.57

No pilot may act as pilot in command of an aircraft carrying passengers unless that person has made at least three takeoffs and three landings within the preceding 90 days in an aircraft of the same category (airplane, glider, rotorcraft, balloon), class (SEL, MEL, helicopter) and type (C-525, G650, B-737) if a type rating is required, and if tailwheel airplane, the landings must be to a full stop. Night currency also specifies category, class and type and the three takeoffs and landings must be to a full stop during the period beginning 1 hour after sunset and ending 1 hour before sunrise. Night currency requirements can be waived if using qualifying simulators and continuous participation in certain approved training programs.

And while we're discussing currency, here are the instrument proficiency requirements:

A person may act as PIC under IFR or in IMC if within the six calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an airplane, powered-lift, helicopter, or airship, as appropriate, for the instrument rating privileges

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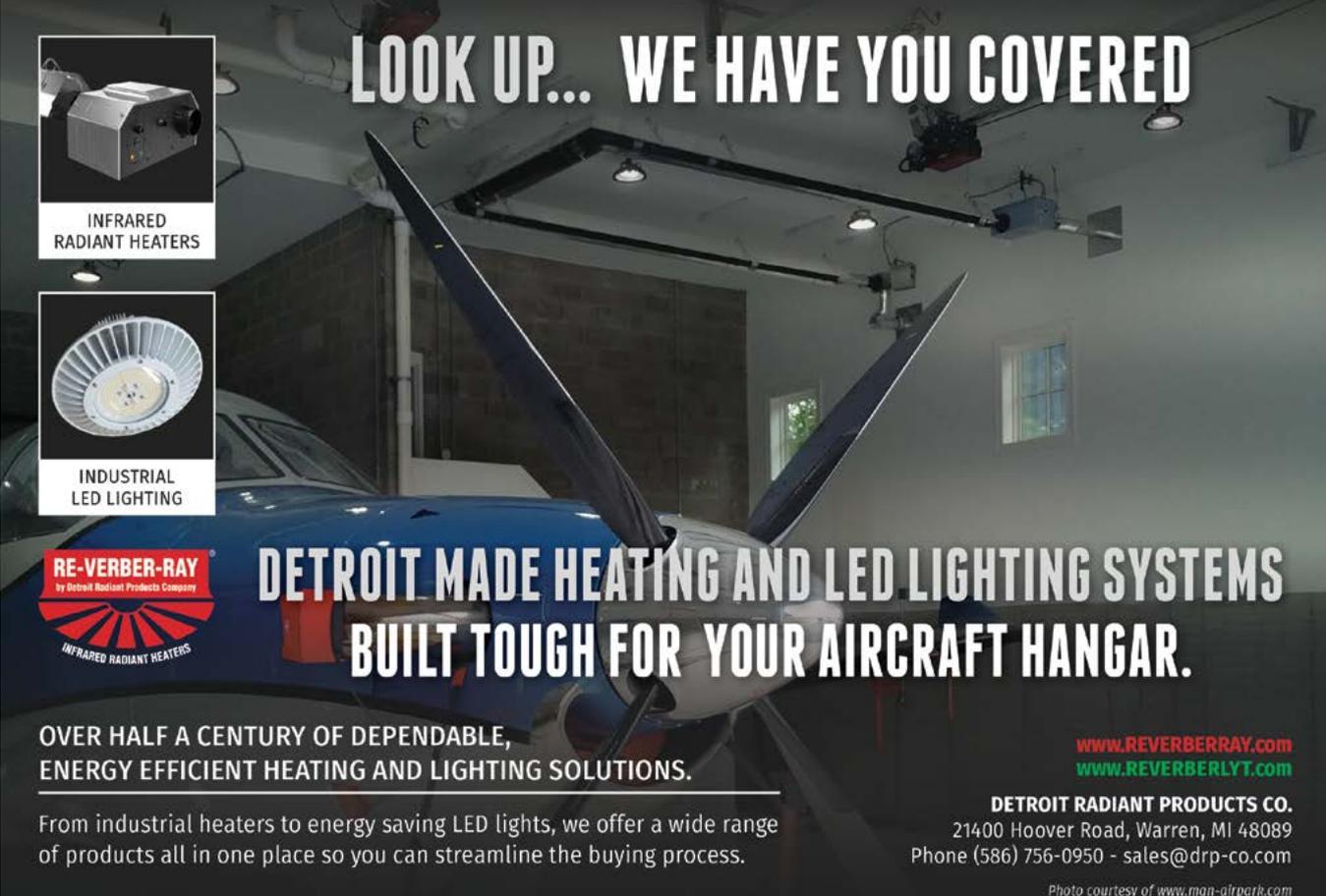


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to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following: six instrument approaches, holding procedures and tasks, and intercepting and tracking courses through the use of navigational electronic systems.

If we experience some down-time, it's a good idea to keep our head in the game by reviewing these rules as well as our airplane specific operational procedures and techniques. We used to call it "chair flying."

Chair Flying Revisited

If we don't fly much or don't think about it much, our perceptions can get rusty, especially the landing "sight picture." I have the luxury (or the handicap) of thinking about flying a lot. But I've discovered that longing not only makes the heart grow fonder, but it makes the brain remember longer. Thus, talking to your airplane and gossiping with fellow airport bums notwithstanding, reviewing policies, procedures and flying techniques in our mind while not flying, chair flying can help us to stay in or ease us back into the groove.

But chair flying doesn't exercise our hand-eye neural pathways quite like the real thing. Three takeoffs and landings are a way to re-stimulate those pathways. But how exactly did the three takeoff and landing regulatory epiphany occur anyway? Why three? Did a study conclude that three takeoffs and landings in 90 days were the right numbers? I'm convinced it was mostly a subjective decision. But a good one because we



Stay off the brakes, or else!

all need repetition to stay sharp, even a high-time airline pilot and Duke aficionado returning to the air that didn't follow the checklist and made a poor choice in footwear.

A Not-So-Glorious Return

When I flew the Duke for the first time after surgery, I made a couple of mistakes. No, I didn't forget the gear or sing over the radio. In order to verify that the fuel crossfeed system components are working properly, and to maintain fresh fuel in the cross-feed lines, the before-takeoff checklist has you put both fuel selectors in cross-feed then individually shut off the left, then the right electric fuel pumps. Next, you watch for the opposite, fuel low-pressure light to illuminate. After the test, you switch the electric pumps back on and move the fuel selectors back to the normal position. I forgot to move the valves back to normal and took off with both valves in cross-feed. It doesn't cause a problem unless the previous fuel pressure tests failed, but cross-feed is not the correct position for takeoff.

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After Big Foot returned to the Guppy's flight deck, First Officer Steve says, "No cord showing here!"

I also wore my large work boots and apparently a toe brake was depressed during one of my touch-and-goes, thereby causing a multi-cord thin spot on the right main tire that even Rogaine could not hide. So, instead of a glorious return to the air reciting sweet-nothings to the Duke, I found myself grumbling expletives about tread wear and a hurried checklist. Two weeks later, B-737 first officer Steve Price helped to ensure that Big Foot's return to the Big Show was enjoyable and uneventful with no cross-feed issues or balding tires; only sweet landings for hundreds of passengers and sweet-nothings for the Guppy.

Solo: The Loneliest Number

From Latin *solus* "alone." When the pilot is the sole occupant of the aircraft.

After a stable approach, landing an airplane is all about where we perceive the ground to be while in the flare. In the Duke it's about four or five feet, and in the 737 it's a little over twice that distance. If we can remember the picture from the last time we flew, then one landing should do it. But landings number two and three are always better than the first, so maybe there's something to that three-landings-to-get-current thing after all.

Like sharing a great meal after hours of painstaking preparation, landing is unquestionably one of the most rewarding parts of flying, especially when shared with passengers – unless we pork it. And a porked landing is the reason we should fly with an instructor or solo if we're rusty or non-current. "One" may be the loneliest number (Three Dog Night, 1968), but being the sole occupant of the aircraft allows us to practice those landings in solitude. And since we don't want our passengers to experience that first potentially embarrassing, burned-the-turkey dinner landing or hear us mumbling expletives, it's good that we fly alone. And then, rather than expletives about the wind, weather, runway and messed-up checklists, they can witness a great landing and hear us whisper sweet-nothings to the airplne. **T&T**

Kevin Dingman has been flying for more than 40 years. He's an ATP typed in the B737 and DC9 with 23,000 hours in his logbook. A retired Air Force major, he flew the F-16 and later performed as an USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke. Contact Kevin at dinger10d@gmail.com.

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En Route

Daher Debuts New G3000 Features for TBM 930

most modern cockpit technology available to optimize their flight operations,” Senior Vice President of the Daher Airplane Business Unit Nicolas Chabbert said. “Working together, our teams were able to integrate, test and certify this major update in just a few months.”

New functions available with the flight deck’s latest software version include:

- Surface Watch, which helps the pilot maintain enhanced situational awareness in the airport environment;
- Baro VNAV, allowing approaches with vertical guidance when Wide Area Augmentation System navigation is not available;
- Visual approach to assist the TBM pilot in performing visual approaches on non-controlled airports with vertical guidance.

Symbology also is improved with the current software version. A TBM

silhouette on charts and maps allows instant identification of positioning, while informative messages of the crew alerting system are now displayed in white for easier distinction from caution (yellow) and warning (red) messages.

Connectivity also reaches a new level with the implementation of Garmin’s Flight Stream 510 Wi-Fi and Bluetooth linkup system to mobile devices running Garmin Pilot, Foreflight or FltPlan Go apps.

Other new features on the Model Year 2018 aircraft are tailored for improved pilot interface. This includes backlighting on the cockpit’s central console to provide enhanced visibility at night for the manual trim, power lever, flaps lever and override controls. Additionally, a high-fidelity microphone has been incorporated in the pilot’s oxygen mask for clear communications with air traffic control when the mask is in use. **T&T**



Daher has introduced the latest features and functionality on Garmin G3000 all-glass integrated flight deck configuration for TBM 930s, the high-end model in Daher’s very fast turboprop aircraft family.

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En Route

Lightspeed Offers Gift Card Give-away

Lightspeed Aviation has announced that it will put \$14,500 worth of gift cards in the hands of 100 lucky pilots this spring. By registering a Lightspeed Zulu 3 headset, participants are automatically entered into one of four drawings to take place between April 17, 2018 and May 29, 2018. Each winner will be awarded a gift card with a value ranging from \$100 to \$1,000. The winners will be posted at LightspeedAviation.com/fuel at the conclusion of each drawing.

“We were looking for a way to inspire pilots to get out and do some spring flying after this particularly long and cold winter,” said Teresa De Mers, executive vice president at Lightspeed. “The FUEL Your Need For Adventure promotion provides a fun incentive for pilots to update their headset and encourages flying.”

Details on the promotion, as well as the results of the bi-weekly drawings can be found at LightspeedAviation.com/fuel. 



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A Change in the Wind

I have been flying long enough to have seen a remarkable evolution in flying. From renting a vacuum-gauge Cherokee 140 for \$10 an hour (\$5 more if you wanted an instructor) to Cirrus and Cessna products with avionics more capable than some air carriers. Simulators have evolved also. The “Link” multi-engine box I used in the 1970s featured partial motion. “Partial” is a strange descriptor. Like in, “When we found the body, he was partially breathing.” The old Link trainer bucked to and sometimes fro.

During one session, after a rather hard landing, the instructor said I had crashed the sim. “Do you reset something now,” I asked. “No, son,” said the crusty instructor. “You broke it.”

An hour later, we were back to bucking.

Today, full-motion level D electric and hydraulic monsters can realistically simulate more than I care to experience. I estimate that I have died at least six times over the 40 years I have been training in a simulator. Even though my record in the airplane is better, I’m still impressed with the realism that a simulator can produce.

But the actual training requirements and regimen in either the airplane or the simulator has changed little with the times.

My current 61.58 check is more of choreographed dance to fill in the boxes than a real learning experience. That is not the fault of the training companies. The FAA mandates exactly what we are supposed to know and exactly how we are supposed to show it during our checks. And every few years, an accident will require a new item to be trained and tested on, the most recent being high-altitude stalls.

Some of the training is valuable, some fairly worthless. One of the major Part 142 schools has a very involved scenario where you practice taking off from Memphis with an RVR of 600 feet. You actually taxi your airplane by following a simulated “truck” on the taxiway, report to ground control when you arrive at some silly place called “pink spot seven” and wait for the tower to clear you for takeoff, but not before they turn off a row of flashing red lights just short of the runway.

This whole package takes about 30 minutes of my two-hour sim session.

I don’t know about you, but I have no intention of ever taking off with an RVR of 600, much less at night between FEDEX heavies at Memphis. What I need to learn is how to evaluate the risk of landing on contaminated runways, or how to fly my airplane with multiple avionics failures, or how to professionally brief a takeoff, approach, and landing.

Help for pilots like me is now available.

FlightSafety is offering a series of two hour “Extended Training Scenarios.” These simulator-based Citation courses are in addition to the annual 61.58 training and they are free to full-service customers. Courses include:

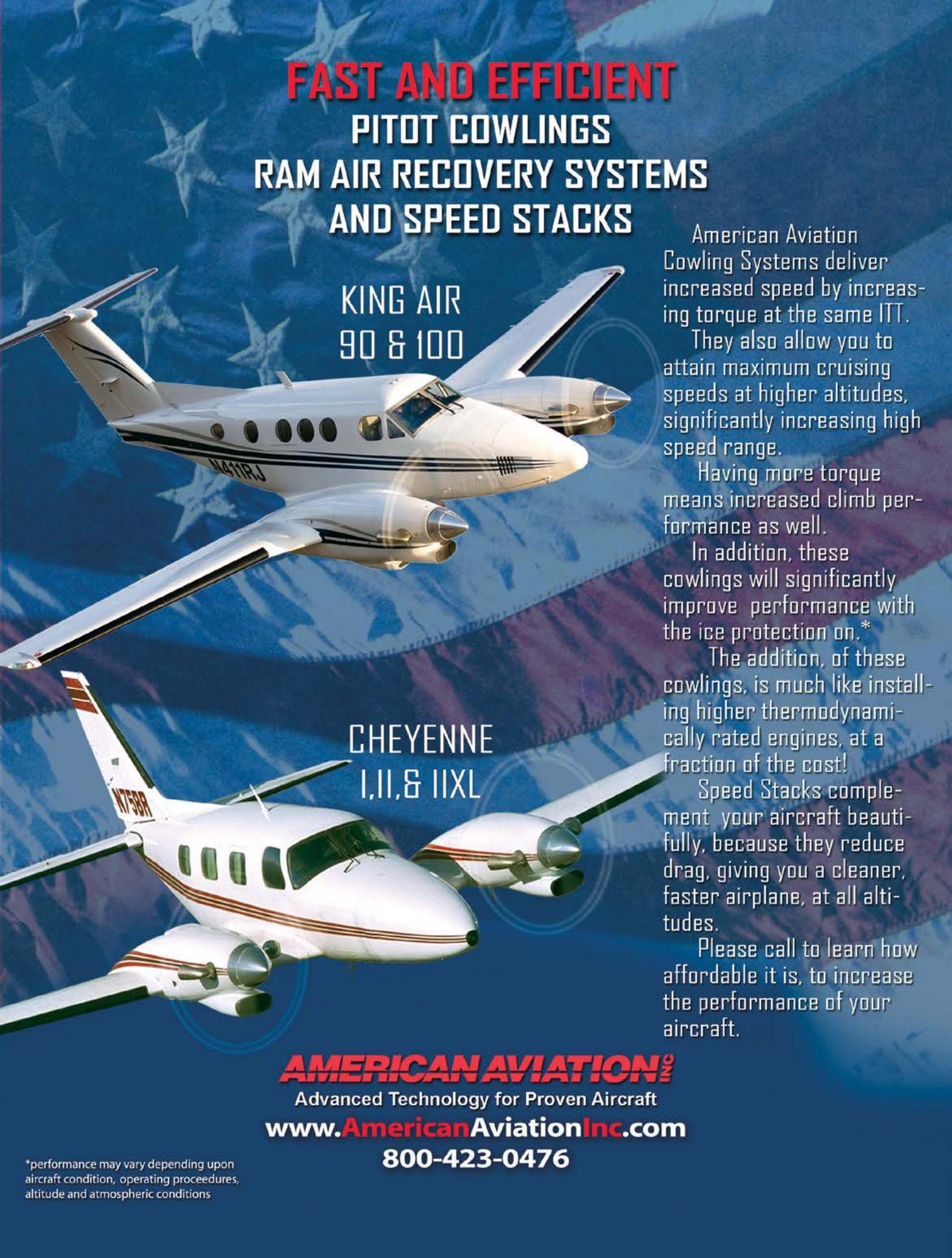
- Decision making: go/no go
- Departure and approach performance planning
- Inadvertent severe icing encounter
- Approach plate analysis and landing
- Use of minimum descent altitude (MDA) as decision altitude (DA)
- Single pilot LOST
- High density traffic

TRU Simulation + Training also offers additional enrichment courses for single-pilot Citation operators.

I am heading to KICT for Mustang recurrent this month and will have a review of one of the courses soon.

Fly safe. 

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



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