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a Paint Shop

Owner's Corner:
Citation CJ2+

Nontowered IFR
Departures

TWIN & TURBINE

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

DECEMBER 2021 \$3.95 US
VOLUME 25 NUMBER 12



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For ThrustSense Autothrottle
information contact Tom Grunbeck
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For sales and events contact
Larry Riddle at 610.646.0340 or
lriddle@innovative-ss.com

EDITOR

Rebecca Groom
rebecca@twinandturbine.com

EDITORIAL OFFICE
2779 Aero Park Drive
Traverse City, MI 49686
Phone: (231) 946-7770

PUBLISHER

Dave Moore

PRESIDENT

Dave Moore

CFO

Rebecca Mead

PRODUCTION MANAGER

Mike Revard

PUBLICATIONS DIRECTOR

Jake Smith

GRAPHIC DESIGNER

Marci Moon

TWIN & TURBINE WEBSITE

www.twinandturbine.com

ADVERTISING

Jenna Reid
1-800-773-7798
Jenna.Reid@VPDCS.com

ADVERTISING COORDINATOR

Betsy Beaudoin
1-800-773-7798
betsybeaudoin@villagepress.com

GENERAL AVIATION

ADVERTISING INFORMATION
Aviation.Publications@VPDCS.com

SUBSCRIBER SERVICES

Rhonda Kelly
Kelly Adamson
Jessica Meek
Jamie Wilson
P.O. Box 968
Traverse City, MI 49685
1-800-447-7367

To change mailing address,
email rhonda.kelly@vpdcs.com

Twin & Turbine (ISSN 1092-6402), 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 \$15.00; two years \$29.00. Canadian subscriptions are one year \$24.00; two years \$46.00, including GST tax. Overseas subscriptions are one year \$52.00; two years \$99.00, U.S. funds. Single copies \$6.50.

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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POSTMASTER: Send address changes and inquiries to *Twin & Turbine*, Village Press, Inc., P.O. Box 968, Traverse City, MI 49685.

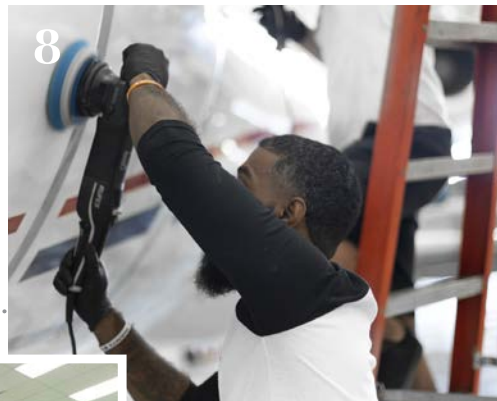
Contents

DECEMBER 2021 • VOL. 25, NO. 12

Editor's Briefing

2 Reflect and Collect
by Rebecca Groom

4 Getting Out:
IFR Departures from
Nontowered Airports
by Thomas P. Turner



8 Fox Aviation Service:
Ramping Up Ramp Envy
by Dale Smith

14 Aircraft Painting 101
by Dale Smith



20 Taking Back to
the Tailwheel
by Kevin Ware

From the Flight Deck

24 Snowflakes
Will pilots have a
"flip-flop" winter?
by Kevin Dingman



Owner's Corner

27 Blue Skies and
Talley Winds
Owner-Pilot Jason Talley

On Final

32 Life Support
by David Miller

COVER PHOTO:

Photo Courtesy of
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for free www.twinandturbine.com

Editor's Briefing

by Rebecca Groom



Reflect and Collect

As I write this, Thanksgiving is approaching, and undoubtedly we can *all* give thanks for the world returning closer to normalcy following the pandemic. We can also be grateful to work and fly (and play) in an industry experiencing immense growth in activity and sales.

I'd say we will soon welcome many new Twin & Turbine readers!

And typical of the upcoming year change, this is a time I like to recollect, reflect and invite commentary from you. Below are a few 2021 T&T highlights I wish to commemorate, then I'll open it up to you for any feedback or topic ideas going into the new year.

The purchase of our 1970 F33A Bonanza. Following months of searching, the stars aligned in February when the perfect F33A seemingly "dropped in our lap." From the moment Jared first saw the listing to the time we had a conditional offer on the airplane was about 18 hours. The airplane was officially ours within three days. The journey into aircraft ownership is one I hope you have enjoyed following from the search to the purchase to the first annual. I will continue to allow space for Jared (and partners) to provide updates and learnings along the way. Thank you again to the many of you who reached out with advice and recommendations for first-time buyers.

The launch of the new Twin & Turbine website. In June, our improved and modernized website went live. Visit twinandturbine.com and you'll find T&T's current issue, past issues, writer bios, contact information, advertising material and more. Owner-pilots can always access and read T&T (for free) across a variety of channels – print, online, digital page-turn or PDF. We constantly strive to develop and efficiently present the information you need regarding various aircraft models, training and safety, market trends and the latest industry offerings. We welcome any input you may have regarding our new digital space.

The first full year of the "Owner's Corner." Originally destined to be a series, our Owner's Corner section has proven so successful and popular that I officially stamped it as a permanent inclusion. Written by either one of our staff or the owner (you), the intent here is to stretch beyond a typical flight review and deeply explore various owner-flown aircraft through an operator's eyes. Whether it's operational nuances, maintenance know-hows or mission performance – who knows an airplane better than its longtime owner? If you would like to submit your own story/airplane for a potential 2022 feature, please send a note to my email below. Reading and seeing your stories come to life has become an absolute highpoint.

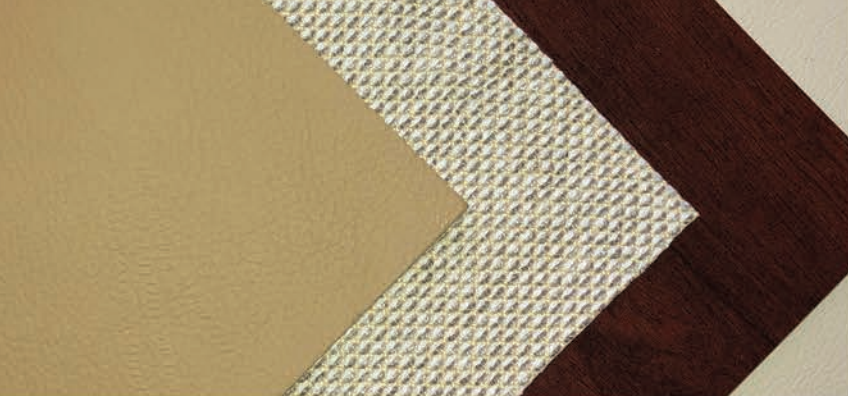
You may have also noticed a splash of unique cover stories and photography this year. Some areas we've sought to increasingly recognize are safety/real-life experiences, lesser-known facets of aviation and aircraft value – including a series covering upgrades and refurbishments.

Our talented contributor Dale Smith has interviewed dozens of industry experts on investment matters and decisions around avionics, cabins and exteriors. He does it again this issue as we talk about all things paint. You can find two articles on the subject – "Aircraft Painting 101" (details the painting process, paint care, and paint shops) and "Fox Aviation Service" (seen on the cover, and leading provider of Ceramic Pro aviation products for paint refinement and protection). Like any element of maintaining your aircraft, achieving and sustaining a quality paint finish takes homework and diligence. You will find much detail and numerous tips weaved throughout both features.

Feedback? Topic ideas? I would love to hear from you. Here's to an even stronger year in 2022.

A handwritten signature of Rebecca Groom in black ink.

rebecca@twinandturbine.com



WE JUST LIKE THINGS DONE RIGHT. THAT'S WHY WE USE STEVENS.

For Charles Parish, details matter. You see it throughout the Beechcraft Heritage Museum, where he serves as President. It's a testament to the meticulous standards of the Beech family. So, it's no surprise that when it was time to spruce up the family King Air C90, he chose Stevens Aerospace. Collaborating with our Dayton team, he finalized interior design, leathers, accents and exterior paint. "We like things done in detail," he says. "Stevens more than met my expectations."



Scan the code to see Charles Parish discussing the Beechcraft Heritage Museum, along with his newly refurbished King Air C90.



Getting Out:

IFR Departures from Nontowered Airports

by Thomas P. Turner

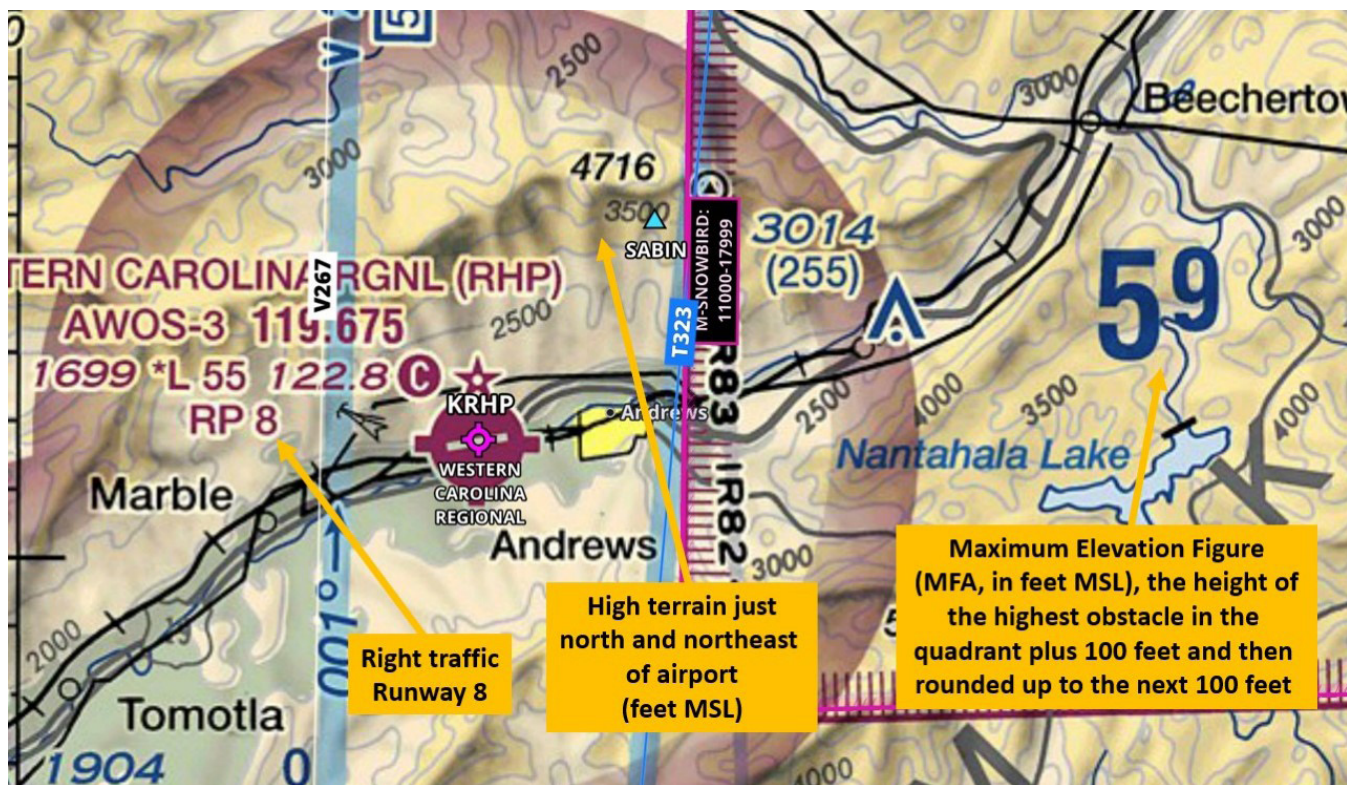


Figure 1

The National Transportation Safety Board (NTSB) recently posted its preliminary report on the double-fatality crash of a Beechcraft Bonanza in mountainous western North Carolina. Although the airplane involved was neither a twin nor a turbine, the information so far highlights a need that also affects multi-engine, turboprop and jet pilots when departing under IFR from a nontowered airport...and strategies for preventing similar tragedies. The NTSB preliminary report reads:

On October 3, 2021, about 1948 eastern daylight time, a Beech S35, N876T, was destroyed when it was involved in an accident near Andrews, North Carolina. The private pilot and one passenger were fatally injured.

The pilot, who purchased the airplane in June 2021, was performing a cross-country flight that originated at Liberty Municipal Airport (T78), Liberty, Texas, about 1234 [local time] with the intended destination of

Macon County Airport (1A5), Franklin, North Carolina. Due to weather conditions, the pilot diverted to Western Carolina Regional Airport (RHP) in Andrews.

A witness on the ramp, who was also a pilot, reported that the accident pilot entered the left downwind of the traffic pattern for runway 8 from the east and flew north of the runway; however, the published traffic pattern for runway 8 was right-hand traffic due to rising terrain north of the runway. The witness further reported that the pilot's first approach was too fast, and he performed a go-around. The pilot continued to fly a left traffic pattern and landed on his second attempt. While on the ground at RHP, the pilot purchased 60 gallons of 100 low lead aviation fuel, received a [telephone] weather briefing through Leidos, and filed an instrument flight rules flight plan to Lancaster Airport (LNS), Lancaster, Pennsylvania.

Takeoff minimums and obstacle departure procedures for RHP (an uncontrolled airport) required pilots to remain

L1

**TAKEOFF MINIMUMS, (OBSTACLE) DEPARTURE PROCEDURES, AND
DIVERSE VECTOR AREA (RADAR VECTORS)**

21280

INSTRUMENT APPROACH PROCEDURE CHARTS

IFR TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

Civil Airports and Selected Military Airports

Figure 2

(more than 3,000 feet above field elevation) well within the four-mile radius of the magenta-tinted transition area. Yet another clue, the Maximum Elevation Figure (MEF) for the quadrant is 5,900 feet MSL. MFA is the height of the highest obstacle in that quadrant

plus 100 feet – or the height of the highest terrain plus 200 feet for obstacles on that terrain that are not required to be reported to the FAA – with either of those values rounded up to the next 100 feet. Somewhere in the quadrant containing

NOV 2021

ANDREWS, NC

WESTERN CAROLINA RGNL (RHP)

TAKEOFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES

AMDT 1A 14JAN10 (10014) (FAA)

TAKEOFF MINIMUMS:

Rwys 8, 26, max. 180 KIAS 3400-2, max. 210 KIAS 3400-2½, max. 250 KIAS 3400-3.

DEPARTURE PROCEDURE:

Rwys 8, 26, procedure NA at night. Remain within 3 NM of Western Carolina RGNL while climbing in visual conditions to cross airport westbound at or above 4900. Then climb to 7000 via heading 251° and HARRIS (HRS) VORTAC R-356 to HRS VORTAC before proceeding on course.

07 OCT

Figure 3

within 3 nautical miles of the airport while climbing in visual conditions to cross the airport westbound at or above 4,900 ft mean sea level (msl). Then climb to 7,000 ft on a heading of 251° to the Harris (HRS) VORTAC 356° radial to HRS before proceeding on course. The procedure is not authorized at night.

...(ADS-B) data indicated that the pilot departed runway 8 and made a slight left turn toward the northeast. The last recorded data point showed the airplane about 3,750 ft, in a 656 ft-per-minute climb at 98 knots, on a course of 042° [a GPS direct course from airport to airport is 049]. The last ADS-B data point was located about 500 ft laterally from the initial impact with pine trees at an approximate elevation of 3,950 ft. The RHP weather at 1945 included scattered clouds at 1,400 ft, broken clouds at 3,200 ft, and 7 miles visibility in rain. Sunset at Andrews was about 1917 and the end of civil twilight was about 1941.

Initial examination of the accident site and wreckage revealed that all major structural components of the airplane were accounted for. The airplane collided with tall pine trees and continued another 600 ft before colliding with another tree. The wreckage impacted the terrain in a steep, nose low attitude and came to rest inverted. The wing flaps were found in the retracted positions; however, all three landing gear were extended. The pilot held a private pilot certificate with ratings airplane single engine land and instrument airplane. According to a witness, he had recently transitioned from a Piper Warrior equipped with fixed landing gear.

Read the Charts

Many clues to the terrain hazard are readily apparent on the sectional chart (see Figure 1). Note the field elevation at Andrews (1,699 MSL) and the “RP 8” that advised that right traffic is specified for Runway 8. The terrain just north and northeast of the airport rises to nearly 1,000 feet above field elevation almost immediately north of the airport (the 2,500-foot contour line) and to as much as 4,716 MSL

KRHP is a point where the airplane must be at least 5,900 feet above sea level to barely clear an obstacle.

None of these clues appear on the IFR Low Altitude Enroute chart, although the Minimum Enroute Altitude (MEA) on the closest airway segment is 7,000 feet. Given that it seems almost nobody uses paper charts anymore, it's easy (and no more cost) to view the sectional chart on your flight planning device. I personally use the sectional view almost exclusively on my iPad in flight, except when I'm looking for a fix on the Low Altitude Enroute to request to reroute around weather or referencing a terminal procedure for departure or arrival.

For departure, the sectional provides some clues. But for the real story, you need to use the Takeoff Minimums, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors) list (see Figure 2). This list is under Procedures and then Departure in the Airport information on ForeFlight and similar flight planning apps, it appears as a separate section in the bound instrument approach charts book. (Although I still print out approach charts prior to a flight, I haven't used the bound chart books since maybe back when we still called them approach “plates”). A “T” in a black triangle on an approach chart indicates there is guidance that may impact your departure.

The Obstacle Departure Procedure (ODP) for KRHD is very specific on how to safely depart under Instrument Flight Rules, especially in instrument meteorological conditions (IMC) or at night (see Figure 3). Departing Runway 8, remain in at least one-mile visibility and clear of clouds until 700 feet AGL (approximately 2,400 MSL). Passing 700 AGL, maintain no less than 500 feet below, 1,000 feet above and 2,000 feet laterally from clouds in at least three miles visibility to at least 4,900 MSL. Only then may you enter IMC (if already on a clearance) and proceed in a climb to the VOR, climbing in a hold at the VOR if required to reach 7,900 MSL before proceeding as cleared.

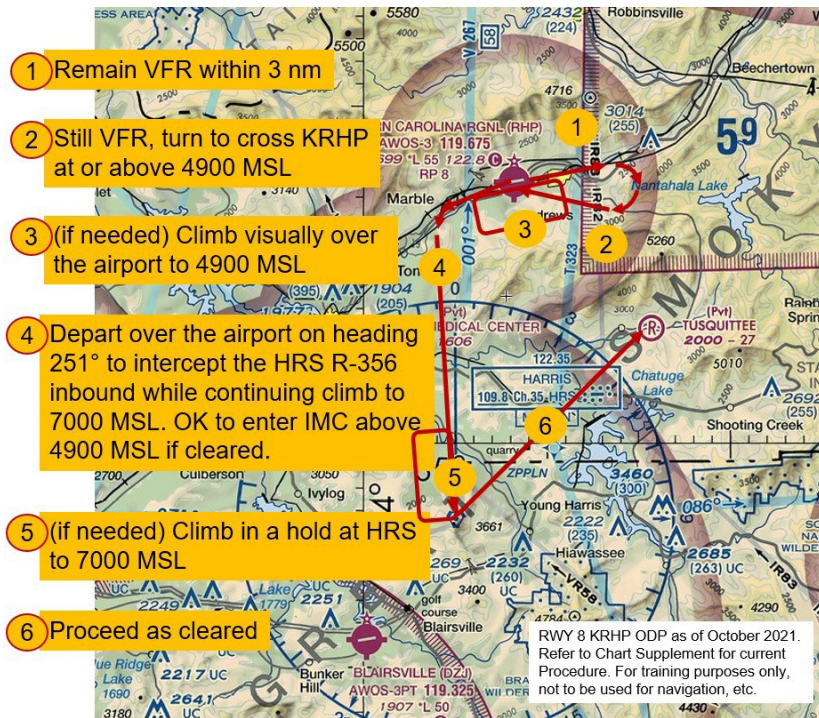


Figure 4

Jeppesen charts make it far easier to find the departure procedure. ODPs are printed on the airport charts themselves, so you don't have to go looking for them (see **Figure 4**). Until the advent of flight planning apps the


majority of my clients' owner-flown airplanes were flying with Jepp charts. But the ubiquitous ForeFlight and other tablet-based planning services have shifted most back to the government NOS charts that are included in these apps at no additional cost.

You Have Options

To be sure, flying the ODP is not mandatory unless it is specifically included in an ATC clearance to deconflict that departure with other aircraft. Section 5-2-9 of the Aeronautical Information Manual (AIM) states:

ODPs provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ODPs are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC.... Pilots operating under 14 CFR Part 91 are strongly encouraged to file and fly a DP at night, during marginal Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC), when one is available.

A pilot may choose to depart via some other route. But that choice needs to be deliberate after reading all the




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PT6A-34 / 34AG	\$ 190,000	\$ 255,000
PT6A-112	\$ 169,000	\$ 225,000

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published guidance. If a pilot intends to pick up his clearance in the air (a very risky strategy under these conditions), it's doubly important to remain in visual conditions and fly the published ODP.

To depart KRHP under IFR, ATC will likely assume the pilot will follow published ODP and will not include that ODP when issuing a clearance. If an ODP is included in a clearance, it is mandatory that it be flown. This is usually to deconflict the departing airplane with other IFR traffic in the area, not for terrain clearance. If ATC cleared the pilot "direct" to his destination (or by any other route), the clearance automatically grants the pilot authority to fly the ODP first, and when at the place and altitude where the ODP ends, then fly the cleared route. The actual departure would look very different from taking off and turning direct on course.

Instead of flying the ODP, according to NTSB's preliminary data, the pilot departed Runway 8, made a slight left turn northeast almost "GPS direct"-ly toward his destination in dark, rainy conditions. The airplane climbed through scattered clouds toward a higher, broken layer and flew more or less directly into terrain shortly afterward.

Of course, as the NTSB preliminary report points out, none of this is authorized at night. It was officially nighttime when the pilot departed on his short, final flight. According to Title 14 of the Code of Federal Regulations (14 CFR) Part 1, Definitions and Abbreviations, night is defined as the time between the end of evening civil twilight and the beginning of morning civil twilight. The end of civil twilight was seven minutes before the crash.

Getting Out

A twin or a turbine-powered airplane may have had the climb capability to safely take off and turn directly on course – perhaps. That does not remove the need to read the charts and check for ODPs, and deliberately decide whether to fly the ODP or fly a planned alternative that works at least as well. And if that twin loses an engine or a cargo door pops open, or a priority passenger announces right after takeoff that an important item was left in the FBO or rental car – or any other reason a sudden need to return to the airport occurs, the pilot needs to know how to avoid colliding with terrain.

Whether you believe it should be or not (and I believe it should, as a crosscheck), ATC is not responsible for monitoring whether a particular instrument procedure is authorized or not authorized (NA). It's your responsibility as pilot-in-command to determine how to safely depart under IFR and whether a procedure you request or use is authorized at the time. To get out of a nontowered airport under IFR, read the charts and the ODPs. **T&T**

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

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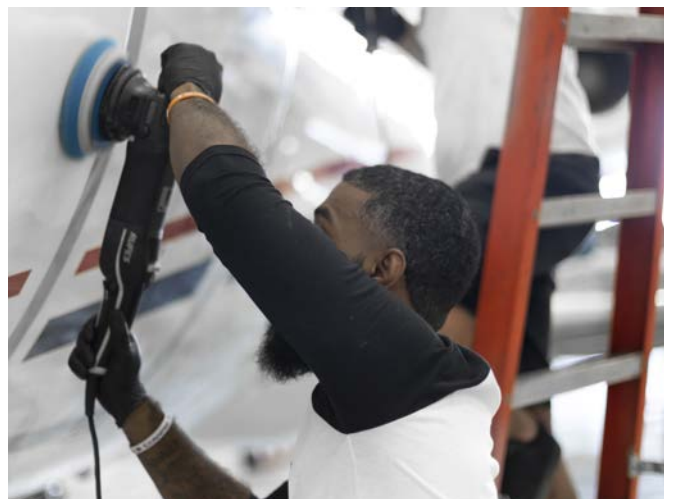
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Fox Aviation Service:

RAMPING UP RAMP ENVY

by Dale Smith

As the leading provider of Ceramic Pro USA aviation products for private, corporate and charter aircraft, Fox Aviation Service has a proven formula to help your twin or turbine look great and possibly perform better.

You're not really a "look at me" kind of person, but you have to admit that one of your biggest personal thrills is walking out of an FBO, across the ramp, and out to your airplane. You own an airplane. Really. Just how cool is that?

And because of that, you want your airplane to look as clean, bright and shiny as you can. You probably still have a copy of our popular feature "Aircraft Washing 101" in your hangar. (If not, check out our July issue). But, as great as your aircraft looks after its wash and wax, that fine shine fades all too soon. Waxes just aren't up to the harsh environments your aircraft lives in. Oh, if there were only something better than wax.

Thankfully, for those of us who do appreciate the value-adding (and ego-boosting) benefits of a shiny airplane, Lee Fox and his team at Fox Aviation Service can use a bit of airframe alchemy in the form of Ceramic Pro USA products to give your pride-and-joy a long-lasting shine.



Lee Fox isn't yet a pilot (he would someday like to learn to fly helicopters), but his grandfather instilled a love of airplanes and flying when he was young. After completing three tours in Afghanistan as an 0311 Infantry Rifleman, Fox left the Marines and decided he wanted his next "career" to be in aviation.

"In 2018, I was invited up to Conroe-North Houston Regional Airport (KCXO) to take part in applying Ceramic Pro USA's aviation products on a Pilatus PC-12 NG," Fox said. "After going through the process and seeing both the finished aircraft and acknowledging the owner's satisfaction, I knew right away I was hooked."

Not long after, he opened Fox Aviation Service based in Orlando, Florida, specializing in providing aviation paint refinement services to private and business aviation



Fox Aviation Service Founder Lee Fox.

aircraft owners. While the company will happily provide its services for all types of aircraft and helicopters, Lee said that their "sweet spot" continues to be in turboprops like PC-12s and King Airs.

"Because of the way the carbon and soot deposits from the engine exhaust travels across the airframe, turboprops are the most chemically abused aircraft out there," he

explained. "Those contaminants have a real sinister way of making even the newest paint jobs look old. And, there's the corrosive issue to deal with also. You need to keep those elements away from the metal airframe."

And on top of that, the majority of turboprops are owner-flown, so there's the pride factor at work here also.

"People think we're aircraft detailers, but we're not. We both start by washing the airplane, but from that point on, we are different in our processes and the products we use," Fox stressed. "Ours is a multi-step procedure that ends with the application of Ceramic Pro's multi-layered substrate on every square inch of the aircraft's painted surfaces."

Fox explained that their process includes a cutting/buffing of the aircraft's paint to remove any embedded dirt, carbon, and soot particles at levels that are impossible to get to using any commercial "exhaust removers." After that, the paint finish is inspected and then smoothed to remove any remaining ridges that can capture



All types of aircraft can be cleaned and coated, but turboprops often need the most attention.



contaminants later on. The next step is to tape off the windows, de-icing boots, brightwork, and clean the airframe again with a degreaser.

"Then we apply the Ceramic Pro's aviation-grade coating on all the aircraft's painted surfaces. Not once, but three to six times," he said. "The product is actually a SiO₂-based silica dioxide nano-technology that is applied in a series of very thin layers. They bond to the paint surface and then to themselves as each layer dries."

"After the layers are cured, we have created a permanent, yet flexible, 'glass shield' on the paint that has a Mohs hardness rating of 9H, which is the next hardest to a diamond (10H)," Fox stated. "Don't confuse this with the ceramic coatings you see at a carwash nor the heavily advertised spray-on 'Top Coats.' Those are not genuine ceramic, and owners have every right to view them as 'snake oil.'"

The Finish is Just the Beginning

As Fox explained, once the process is completed, the aircraft not only looks better than paint-shop fresh, the ceramic-coated exterior is protected from airborne contaminants and subsequent corrosion. In addition, according to the company, Ceramic Pro coatings are non-organic and cannot be dissolved by acids, bases and solvents. Properly applied and maintained, it will permanently remain on an aircraft or helicopter, protecting its "brand-new appearance" for years.

While the corrosion protection qualities and the "I can see myself" shine are Ceramic Pro's most obvious benefits, Fox points out that there are others that can be equally or even more important to the aircraft's owner.

"Washing takes less time and effort because exhaust soot can't build up as quickly and doesn't stick to the ceramic-like it does to paint," he said. "Also, the product's hydrophobic and hydrophilic attributes protect the paint against other corrosives like bugs and bird poop. Plus, they're easier to clean off of leading edges,

which reduces drag and saves fuel."

"Speaking of drag, let's talk parasitic drag. When you wax an airplane, you may gain a knot of airspeed, but we're told of much bigger gains with Ceramic Pro," Fox continued. "On the Pilatus PC-12s, for example, over the years owners have told us they've seen a five- to seven-knot increase in cruise speeds and lower fuel burns purely because of the slickness of the airframe."

"We don't claim any airspeed increases, but who am I to argue with the pilots who fly them all the time?" he added. "Besides, no one can argue that the airplane's ceramic shine just looks a heck of a lot better."

Interiors Need Love Too

Whether you're flying your family or paying Part 135 passengers, your aircraft's interior leads a tough life. Fox Aviation Service also offers solutions to help keep your cabin looking like it's fresh out of a refurbish.

"After completing the exterior, our operators begin working with the interior upholstery, carpeting, sidewalls and cabinetry," Fox explained. "We use Ceramic Pro's leather and vinyl treatments on all the soft surfaces. We use Ceramic Pro Textile to treat the carpets. They are specifically formulated for these materials and leave no residue nor discoloration or glossy, oily shine. Everything we treat looks and feels like it did when it was newly installed. The only difference is that if a passenger spills something on the seat, it's just going to bead up and roll off. Wine, Coke, whatever, can just be wiped right up. It makes it so easy to clean the cabin after each flight."

You Can't Try This at Home

If all the benefits that the Ceramic Pro products bring to your airplane have you wanting to rush out and buy some, well, you can't. Because of the tools and training it takes to properly lay down multiple layers successfully, trained and certified installation professionals are the only ones who can buy and apply the materials.

"When it comes to installers, you want to absolutely double-check

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Fox with owners of a PC-12 – a common type serviced by the company.

that said installer does, in fact, have aviation certification training under their belt,” Fox said. “If not, they’re just car installers, and you run the risk of having them damaging your aircraft in some way. It’s easy to find out if they’re trained.”

He also said that when it comes to any questions regarding training and certifying Ceramic Pro installers for aircraft, he’s the guy to ask.

“Along with owning Fox Aviation Service, I’m Ceramic Pro USA’s corporate aviation trainer. Any installer

in the country that has trained under me and successfully graduated has been through a rigorous course,” he explained. “It’s pass or fail, so it really pushes them to know details and processes that go well beyond if they’re doing cars or boats.”

“They need to truly understand aircraft for what they are while recognizing that safety is of the utmost importance to us,” Fox continued. “I have personally trained each of Fox Aviation Service’s installers, and our customers have full

confidence that their aircraft will be treated with the utmost care because they know I never settle for less. Maybe it’s the Marine in me.”

Fox said that he and his company take the proper preparation and application of the Ceramic Pro products so seriously that his team has been known to be wheels up from Orlando with boots on the deck in Honolulu to service a fleet of turbines in 16 hours.

“If the customer’s airplane isn’t close to Orlando (KISM) or Copiah County, Mississippi (M11), we will travel to where the aircraft is. Frequently, we go to an MRO in Boise, Idaho, as an example, to treat the aircraft while they’re in for other maintenance,” he stated. “And when there’s a logistical need, we’ve gone as far as to arrange for a contract pilot to fly the airplane to another facility so we can work on it.”

“One preferred location outside of Florida and across the southeast is Chautauqua Aviation at

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Copiah County Airport (M11), located in south-central Mississippi. It's an ideal location with plenty of hangar space, and the owner, Brent Duncan is a great friend of ours," Fox said. "Their location makes it easy and cost-effective for a lot of owners to have the work done there. We pride ourselves on a true customer-centric commitment in every phase of our operation."

The Price of the "Perfect Finish"

No doubt by now you're wondering what all this quality and attention to detail costs? Well, according to Fox, the typical price for cleaning and protecting your TBM, PC-12, or C-90's interior and exterior with Ceramic Pro's products is between \$7,000 and \$9,500. As you might guess, there are a lot of variables.

"Our process takes a great deal of time and can present a lot of challenges in terms of hangar location,

temperature, humidity, and so on. But, we are firm believers in getting what you pay for," he said. "We don't just spray something on and leave. We take the time to apply the ceramic correctly, so all each layer bonds as it should and provides maximum protection and durability."

Fox said that the final price also depends heavily on the current condition of the aircraft's finish, size and how far the owner chooses to go in terms of layers added. Obviously, heavily oxidized or mistreated paint with a lot of embedded contaminants requires a lot more pre-prep cleaning and attention. Same with a well-worn interior. But, proper preparation is critical to a good finish.

"It's not inexpensive by any means, but neither is having your aircraft re-painted sooner than it should need it," Fox continued. "We've found a way to make it extremely difficult for carbon, soot, dirt, and other contaminants to ruin your aircraft's paint.

And at the same time, keeping that paint looking new for years longer than wax or sealants ever will."

"Owners we talk to don't want to settle for anything but the best from Fox Aviation Service. We have a job to do, and we do it well," he concluded. "Our team has raised the bar across the country in terms of aircraft appearance and we don't take that lightly." **T&T**

For more information, contact
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Dale Smith has been a commercial, private and business aviation marketing and media communications specialist for nearly 40 years. He is an award-winning aviation journalist and aviation artist. Dale has been a licensed pilot since 1974 and has flown more than 40 different types of aircraft. Contact Dale at dalesmith206@comcast.net.



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Aircraft Painting 101

by Dale Smith



“Painting is easy when you don’t know how, but very difficult when you do.” – Edgar Degas, French impressionist.

Obviously, Monsieur Degas was not talking about painting airplanes when he made his famous statement. But, very he well could have been.

I think we have all witnessed plenty of examples of the proverbial “20-foot paint job.” You know, the ones that look great from a distance, then when you get up close, it’s more why than wow. Before we get into all the possible pitfalls of a poorly done paint job and how to avoid them, let’s revisit why the condition and care of your aircraft’s paint scheme are so vitally important.

“The primary goal of an aircraft’s paint is corrosion protection. Aircraft are exposed to very harsh conditions, and the paint is the only barrier between them and the airframe,” explained Mike Royals, paint manager, Stevens Aerospace and Defense Systems. “If you see damage to the paint on the form of chips or dings, they become an entry point for moisture and contaminants to attack the metals underneath.”

“Moisture gets under the paint, and the damage can spread pretty fast in many conditions,” he added. “We had

one customer come in here where they had let the paint chip off of the aircraft’s belly until it created a very serious problem.”

But, even with the most diligent attention to the paint’s condition, sooner or later, it’s just going to get too old. Over time, the prior-generation paints dry out and start to crack.

“The first sure sign that the paint has really oxidized beyond repair is that you can’t buff it out any longer and starts to crack and peel,” explained Yingling Aviation Paint Supervisor Walter Krolikowski. “You’ll also start

to see rivets popping up where the paint has come away from those areas. People try to repair these issues, but you really can't. When you get to that stage, it's really time to get the airplane painted."

Shopping for a Paint Shop

Like any element of maintaining your aircraft – and, yes, paint is considered maintenance – the first step in ensuring that the service provider you select is indeed the service provider you want is to do your homework.

"You have to research to learn the things that make a high-quality paint job different from just another paint job," explained Stevens Aerospace and Defense Systems Paint Shop Supervisor, Billy Brown. "There is a big difference in the two ends. It takes a lot more time and effort to achieve a better end. High-quality correlates to a better-looking, much longer-lasting paint job."

Speaking of "longer-lasting," Brown went on to say that a quality paint finish that has been properly maintained (see "Aircraft Washing 101" story in the July issue) should last eight- to 10-years. So, what do you look for in a shop? It can be challenging. I've not yet seen a paint shop that didn't say they provided the best quality finishes possible. That's where your research comes in.

"Experience with an aircraft's type is important, so talk to other owners of your aircraft type and see who they used," Krolikowski said. "Knowledge of particular aircraft types is key. For example, it may not seem like much, but knowing how to work around button head rivets is critical.

"Ask if they'd recommend the shop; not just their final work, but what where they like to work with? Did they finish the job on time?" added Chis Short, Yingling Aviation's vice president of operations. "How the shop works around rivets is a telling sign. Jets have flush rivets and are easier to fill and finish to look smooth."

"Regular, button-head rivets are a totally different problem. It takes a lot of time to work around them removing old paint properly. We've seen instances where another paint shop

Paint Process Overview



Old paint stripped.



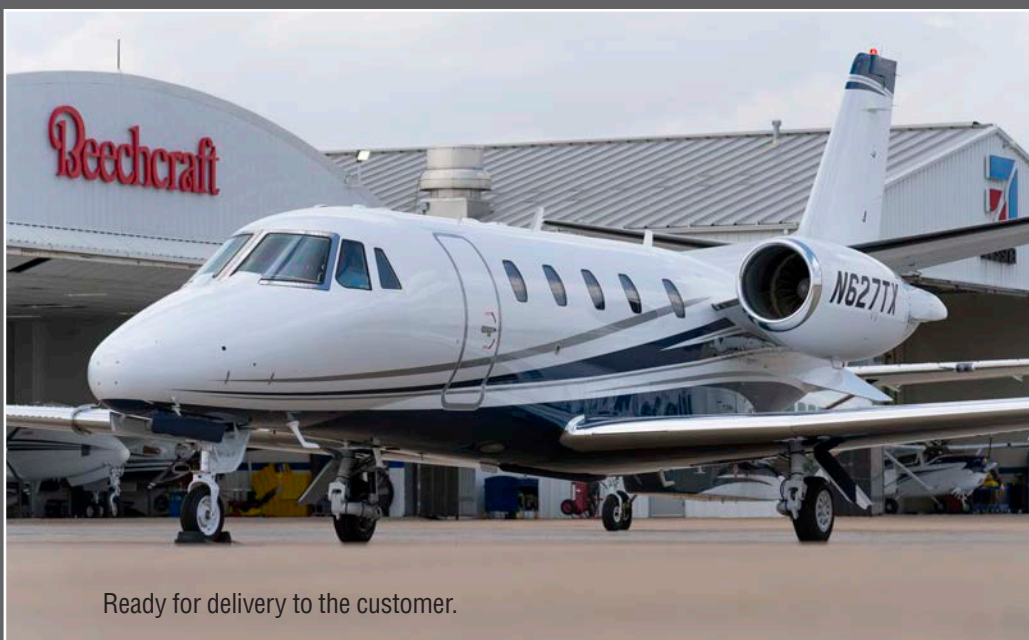
Primer coat applied.



New base coat applied.



Stripe layout in process.



Ready for delivery to the customer.

PHOTOS COURTESY OF YINGLING AVIATION

has rushed the job and mechanically sanded the heads of the button-head rivets down flat," he said. "You can't do that. It impacts the integrity of the airframe," he added. "We had to go back and replace all of those rivets. It was very costly for the owner to make those repairs."

While we're still on the subject of pre-work, Krolikowski pointed out another key differentiator was how the shop handles any overlapping seams in the aircraft's skin. A quality shop will protect these areas so that any

chemical stripper can't seep into the airframe and introduce corrosion.

"Ask if the shop covers the seams. They can take the paint off of the outside of the seam mechanically, but leave the paint inside where the seams are bonded," he said. "It adds labor time and cost, but it's important that it is done correctly."

You Get What You Pay For

Okay, so let's cut to the chase: What should you expect to pay for a high-quality paint job? Well, working with

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TOTAL MARKET COVERAGE

JETS - 17,806

CHIEF PILOTS & OWNERS

COUNT	AIRCRAFT
36	AIRBUS ACJ319
30	ASTRA 1125
32	ASTRA 1125SP
57	ASTRA 1125SPX
29	BEECHJET 400
266	BEECHJET 400A
195	BOEING BBJ
503	CHALLENGER 300
40	CHALLENGER 600
26	CHALLENGER 601-1A
121	CHALLENGER 601-3A
54	CHALLENGER 601-3R
325	CHALLENGER 604
7	CHALLENGER 800
148	CITATION 500
340	CITATION 525
318	CITATION BRAVO
187	CITATION CJ1
96	CITATION CJ1+
240	CITATION CJ2
225	CITATION CJ2+
476	CITATION CJ3
174	CITATION CJ3+
368	CITATION CJ4
189	CITATION ENCORE
74	CITATION ENCORE+
392	CITATION EXCEL
14	CITATION I
280	CITATION I/SP
445	CITATION II
54	CITATION II/SP
155	CITATION III
124	CITATION LATITUDE
247	CITATION M2
467	CITATION MUSTANG
130	CITATION S/II
323	CITATION SOVEREIGN
105	CITATION SOVEREIGN+
310	CITATION ULTRA

285	CITATION V
31	CITATION VI
122	CITATION VII
329	CITATION X
38	CITATION X+
253	CITATION XLS
301	CITATION XLS+
1	DIAMOND I
32	DIAMOND IA
16	DORNIER ENVOY 3
304	ECLIPSE EA500
75	EMBRAER LEGACY 500
100	EMBRAER LEGACY 600
53	EMBRAER LEGACY 650
247	EMBRAER PHENOM 100
328	EMBRAER PHENOM 300
80	FALCON 10
22	FALCON 100
16	FALCON 200
242	FALCON 2000
27	FALCON 2000EX
34	FALCON 20C
15	FALCON 20C-5
17	FALCON 20D
1	FALCON 20D-5
10	FALCON 20E
49	FALCON 20F
75	FALCON 20F-5
197	FALCON 50
8	FALCON 50-40
118	FALCON 50EX
178	FALCON 900
24	FALCON 900C
116	FALCON 900EX
156	GLOBAL 5000
123	GLOBAL EXPRESS
25	GULFSTREAM G-100
239	GULFSTREAM G-200
14	GULFSTREAM G-300
24	GULFSTREAM G-400
313	GULFSTREAM G-450
11	GULFSTREAM G-500
602	GULFSTREAM G-550

27	GULFSTREAM G-II
12	GULFSTREAM G-IIB
111	GULFSTREAM G-III
175	GULFSTREAM G-IV
338	GULFSTREAM G-IVSP
204	GULFSTREAM G-V
38	HAWKER 1000A
2	HAWKER 125-1A
2	HAWKER 125-1AS
12	HAWKER 125-400AS
2	HAWKER 125-600A
1	HAWKER 125-600AS
61	HAWKER 125-700A
72	HAWKER 4000
223	HAWKER 400XP
44	HAWKER 750
153	HAWKER 800A
14	HAWKER 800B
398	HAWKER 800XP
42	HAWKER 800XPI
88	HAWKER 850XP
187	HAWKER 900XP
2	JET COMMANDER 1121
2	JET COMMANDER 1121B
2	JETSTAR 731
4	LEARJET 23
12	LEARJET 24
2	LEARJET 24A
7	LEARJET 24B
20	LEARJET 24D
8	LEARJET 24E
6	LEARJET 24F
4	LEARJET 25
19	LEARJET 25B
4	LEARJET 25C
45	LEARJET 25D
4	LEARJET 28
32	LEARJET 31
182	LEARJET 31A
26	LEARJET 35
398	LEARJET 35A
21	LEARJET 36
33	LEARJET 36A

32	LEARJET 40
243	LEARJET 45
225	LEARJET 45XR
92	LEARJET 55
6	LEARJET 55B
8	LEARJET 55C
307	LEARJET 60
623	PILATUS PC-12/45
149	PREMIER I
1	SABRELINER 40
7	SABRELINER 40A
2	SABRELINER 40EL
2	SABRELINER 40R
4	SABRELINER 60
5	SABRELINER 60ELXM
68	SABRELINER 65
7	SABRELINER 80
1	SABRELINER 80SC
67	WESTWIND 1
1	WESTWIND 1123
14	WESTWIND 1124
50	WESTWIND 2

TURBOPROPS - 12,801

CHIEF PILOTS & OWNERS

COUNT	AIRCRAFT
403	CARAVAN 208
1,523	CARAVAN 208B
155	CHEYENNE I
16	CHEYENNE IA
206	CHEYENNE II
56	CHEYENNE III
38	CHEYENNE IIIA
57	CHEYENNE IIXL
35	CHEYENNE IV
235	CONQUEST I
291	CONQUEST II
38	JETSTREAM 31
63	JETSTREAM 32
52	JETSTREAM 41
37	KING AIR 100
450	KING AIR 200
17	KING AIR 200C

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62 KING AIR 350C
8 KING AIR 350ER
387 KING AIR 350I
4 KING AIR 350IER
8 KING AIR 90
6 KING AIR A/B90
76 KING AIR A100
184 KING AIR A200
34 KING AIR A90
197 KING AIR A90-1
105 KING AIR B100
1,038 KING AIR B200
107 KING AIR B200C
99 KING AIR B200GT
5 KING AIR B200SE
8 KING AIR B200T
47 KING AIR B90
302 KING AIR C90
38 KING AIR C90-1
186 KING AIR C90A
378 KING AIR C90B
76 KING AIR C90GT
88 KING AIR C90GTI
150 KING AIR C90GTX
13 KING AIR C90SE
258 KING AIR E90
173 KING AIR F90
28 KING AIR F90-1
5 MERLIN 300
13 MERLIN IIB
8 MERLIN III
22 MERLIN IIIA

44 MERLIN IIIB
14 MERLIN IIIC
3 MERLIN IV
11 MERLIN IV-A
101 MITSUBISHI MARQUISE
18 MITSUBISHI MU-2F
1 MITSUBISHI MU-2G
15 MITSUBISHI MU-2J
37 MITSUBISHI MU-2K
12 MITSUBISHI MU-2L
25 MITSUBISHI MU-2M
24 MITSUBISHI MU-2N
29 MITSUBISHI MU-2P
47 MITSUBISHI SOLITAIRE
796 PILATUS PC-12 NG
197 PILATUS PC-12/47
296 PIPER JETPROP
74 PIPER M500
92 PIPER M600
602 PIPER MERIDIAN
198 QUEST KODIAK 100
2 ROCKWELL 680T TURBO
5 ROCKWELL 680V TURBO II
4 ROCKWELL 680W TURBO II
4 ROCKWELL 681 HAWK
85 SOCATA TBM-700A
90 SOCATA TBM-700B
381 SOCATA TBM-850
121 SOCATA TBM-900
38 SOCATA TBM910
136 SOCATA TBM930
6 STARSHIP 2000A
50 TURBOCOMMANDER 1000
22 TURBOCOMMANDER 690
131 TURBOCOMMANDER 690A
135 TURBOCOMMANDER 690B
73 TURBOCOMMANDER 840

20 TURBOCOMMANDER 900
19 TURBOCOMMANDER 980

TWIN PISTON - 6,872

OWNERS

COUNT AIRCRAFT

35 BARON 56 TC
1,566 BARON 58
446 BARON 58P
118 BARON 58TC
3 BARON A56TC
335 BARON G58
158 BEECH DUKE B60
150 CESSNA 340
480 CESSNA 340A
49 CESSNA 402B
BUSINESS LINER
110 CESSNA 402C
20 CESSNA 404 TITAN
312 CESSNA 414
430 CESSNA 414A
CHANCELLOR
36 CESSNA 421
30 CESSNA 421A
335 CESSNA 421B
713 CESSNA 421C
38 CESSNA T303
100 DIAMOND D42
65 PIPER 600 AEROSTAR
3 PIPER 600A AEROSTAR
44 PIPER 601 AEROSTAR
4 PIPER 601B AEROSTAR
182 PIPER 601P AEROSTAR
21 PIPER 602P AEROSTAR
509 PIPER CHIEFTAIN
20 PIPER MOJAVE
280 PIPER NAVAJO
196 PIPER SENECA

13 ROCKWELL 520
COMMANDER
3 ROCKWELL 560
COMMANDER
11 ROCKWELL 560A
COMMANDER
7 ROCKWELL 560E
COMMANDER
6 ROCKWELL 560F
COMMANDER
12 ROCKWELL 680 SUPER
3 ROCKWELL 680E
14 ROCKWELL 680F
COMMANDER
11 ROCKWELL 680FL
GRAND COMMANDER
4 ROCKWELL 680FLP
GRAND LINER

HIGH PERFORMANCE MOVE-UP SINGLES - 5,726

OWNERS

COUNT AIRCRAFT

200 BEECH BONANZA
435 CESSNA 182
52 CESSNA 206
373 CESSNA P210N
21 CESSNA P210R
54 CESSNA T182
790 CIRRUS SR20
2,875 CIRRUS SR22
26 MOONEY ACCLAIM ULTRA
11 MOONEY OVATION ULTRA
271 PIPER MALIBU
93 PIPER MATRIX
525 PIPER MIRAGE

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The JetPen by Sherwin-Williams is an option for touch-ups and repairs.



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A freshly painted Cessna 421.

well-established and highly-respected brands like Stevens Aerospace and Defense or Yingling Aviation does come with a premium price tag. But, of course, you are getting a top-of-the-line finish. Do you want anything less than the best for your airplane?

Anyway, according to Stevens Aerospace and Defense's Director of Sales and Marketing, Phil Stearns, painting a King Air C90 will run you about \$60,000, and an Embraer Phenom 100 will set you back around \$75,000. Nothing to trifle at, but again, you know going in that you have to pay for the best.

Sure, there are much more "affordable" options, and I'd be the last one to suggest that you can't get a

quality paint job at a value price. Again, though, it all comes down to how much time and effort you're going to put into researching all of your possible solutions.

"Don't go with the cheapest option you find," stressed Julie Voisin, marketing director, Sherwin-Williams Aerospace Coatings. "Pick someone who has a really good process. Preparation of the aircraft is the key to a great finish, and if they're going to cut any corners to save money, it will be in the preparation."

Oh, and another "don't" is DO NOT put your airplane in the hands of a paint shop that has no prior experience with your make and model. As all of our experts agreed, each

aircraft type has its own peculiarities when it comes to the proper way to prep and paint the airframe. You don't want to be the airplane that the shop "goes to school on."

Will That Be One Coat or Two?

Another factor that will impact the final cost of your aircraft's repaint is what type of paint you want to use. Yes, you do have choices.

"You need to ask which type of paint the shop is going to use: the conventional, single-coat types are cheaper to buy and apply," Krolikowski explained. "Those are good paints, but you can't buff out scratches very well, and it doesn't last as long as the new, two-stage, high-solid paints do."

Of course, when he talks about two-stage paints, he's referring to the base coat/clear coat paints that have been standard in the automotive industry for a long time.

"With the base coat/clear coat technologies, the base has the color and resins to adhere to the airplane. It dries very fast when compared to the old single-stage paints," Voisin said. "Then you wrap the entire airplane with the clear coat. It's applied a bit thicker and improved, longer protection for the base color coat."

"There are a lot of advantages, but the biggest is the ease of maintaining the finish," she added. "If you get a scratch or slight ding, the clear layer is a lot easier to cut and buff out to a smooth finish."

Another benefit of the base/clear process is because the base coat dries so fast, it's easier for painters to add multiple layers of different colors and graphics. That flexibility gives owners a lot more options when it comes time to design their dream paint scheme.

Keeping Up Appearances

Okay, your airplane is looking pristine in its shiny new paint, and you want to keep it looking fresh from the shop as long as you can. As we mentioned earlier, airplanes live in very harsh environments. Dings happen.

"Make sure to get a touch-up kit when you take delivery of the airplane. It's the same color part and batch

number, so it will match better later on," Royals said. "We provide a kit with every paint job. Even if you don't put paint on the area, at least use some clear coat to keep moisture out."

If you didn't get a touch-up kit from your aircraft's painter, Sherwin-Williams has a simple-to-use solution for you in the form of its new JetPen.

"It's a real easy way to do simple touch-ups and repairs on the exterior and interior surfaces," Voisin said. "Just break the seal, shake and apply the paint to the damaged area. It's really like a very sophisticated hobby/craft paint pen."

According to the company, JetPen comes in a wide variety of popular colors and is available in epoxy primers, polyurethane topcoats, and clear coats. Even if you don't have Sherwin-Williams on your airplane, it may well be something you want to check out.

One Final Stroke...

About the only thing we haven't covered is tips on designing your paint scheme. And that, my friend, is the hardest part of the process.

Of course, while they can't help you choose colors, our experts can give you a few guidelines on designing the final paint scheme – mainly in the form of what to avoid.

"Customers often want to put stripes across the radome, engine nacelle, or access panels – things that get removed frequently for inspections and maintenance," Stearns said. "The paint along those edges gets chipped all the time, and it can be very difficult to fix them correctly."

"Aircraft like the Phenom 100 and 300 seem to have very elaborate paint schemes; metallics, pearl essences, matt finishes and such. They look great when they're freshly painted," Royals said. "But when it comes in for phase maintenance, you may have to remove 200 or 300 fasteners to get access panels off."

"You can bet that when all that goes back together, you will never get those seams and colors to look right again," he continued. "Better to avoid the problem. Good planning upfront will keep the airplane looking its best a lot longer."

No matter your ultimate design goals, an experienced team will do their best to help guide you away from pitfalls.

"There are a lot of options today. We try to educate our customers on the pros and cons of all the varying paints, paint systems and color selections selected for each project," Brown added. "Our goal is to help them make the proper selections to achieve their desired goals while ensuring the highest quality and longest-lasting finish." **T&T**

Dale Smith has been a commercial, private and business aviation marketing and media communications specialist for nearly 40 years. He is an award-winning aviation journalist and aviation artist. Dale has been a licensed pilot since 1974 and has flown more than 40 different types of aircraft. Contact Dale at dalesmith206@comcast.net.

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Taking Back to the Tailwheel

by Kevin Ware



Most of the past two decades, I have flown multi-engine and turbine aircraft, rarely flying anything with just one engine. There are reasons for this. For one, my personal airplane for three decades has two engines, plus my professional flying has almost exclusively been in turboprop or jet aircraft. But, with the onset of the COVID-19 limiting the use of the personal twin for distant travel and the concomitant but unrelated aviation insurance availability problem, I decided I should simplify my flying life and again try out single-engine airplanes.

Remembering back to a prior time, I recalled the fun I had flying taildragger airplanes of all kinds, but Cessna 180's and 185's in particular. At one time, I owned a C185 on floats and periodically put it back on wheels and flew it to the Idaho backcountry just for the fun of it. So, while still

keeping my Cessna 340, I recently started looking for a Cessna 180 or 185. It was a rather discouraging experience. I found these airplanes are now highly valued by their owners, with a sort of cult following, making a good one hard to find and much more expensive than I remembered.

My definition of a "good one" was it had to have less than 3,000 or so hours total time, all logbooks, no damage history, a factory float kit, and ideally the Continental 550 engine upgrade, plus Garmin avionics. Since they stopped making them in 1981, these airplanes have become as rare as "hen's teeth." I found many of them had been used commercially

with very high-time airframes and usually a history of one or two ground loops or other damage. Others were flown on floats on saltwater and had corrosion issues. Finally, after looking for several months, a good one showed up – not in Controller or ASO, but surprisingly in an ad on Facebook that my grandson Philip forwarded to me. Oddly enough, it belonged most of its life to a doctor of my past acquaintance and was based in nice, dry, sunny Nevada. I had my grandson make an immediate offer for me subject to inspection, which the seller accepted.

Unfortunately, the seller had relocated the airplane from Nevada to an isolated part of Alaska, so the inspection part would not be easy. But, as it turned out, Mike Rhoads, an old family friend, had a friend who was an expert C180 mechanic who just happened to be in his motor home on a fishing vacation in that part of Alaska. Mike

called him, and he agreed to leave the salmon alone for a day and inspect the airplane. A couple of days later, he sent me a ream of photos and a very positive report on the airplane's condition. Again, lucky for me, Mike and Philip had great enthusiasm for ferrying it down to Washington along the coastal route over the following week, with the only mishap being one flat tire.

Finally, with the airplane at KBVS, I got a chance to see my new Cessna for the first time and try out my old tailwheel skills. The airplane was as advertised, but the tailwheel tryout was a very ego-bruising experience.

First of all, with the tail on the ground and the nose in the air, I could not see anything beyond the engine cowl. After years of sitting in Lears, Citations and twin Cessnas, where the nose drops away to a clear view of the runway ahead, I was spoiled. So, I cranked up the seat to its limit. This helped, but I still could not see over the nose worth a darn. I then got a floatation cushion from my boat, which is about three inches thick. I sat with my headset touching the headliner, but I could see just over the engine. Forty years ago, when I was frequently flying this type of airplane, I probably would have just made S-turns, looked out the side window, and not worried about it. But, with thousands of hours in nosewheel aircraft (and perhaps the aging process), my level of acceptance for poor forward visibility was not the same. So, head bumping against the headliner, and a blue boat cushion on my seat, is my new norm.

The next thing I noticed was the airplane had a directional mind all of its own. When power was added, it caused an immediate 90 degree left turn. Quite different than the jets I



After thousands of hours in nosewheel aircraft, my level of acceptance for poor forward visibility has changed.



fly that obediently go exactly where they are pointed. This airplane seemed worse than most, probably because its original 230 horsepower engine was replaced by a Continental 550, putting out a bit over 300 horsepower – a huge increase in power. Due to the extra P-factor and torque (both of which were on the very edges of my aeronautical memory), the airplane really was like a cantankerous child heading its own way down the sidewalk and into the street. I tried adding power slowly, but it still did the same thing, only at a more gradual pace. You learn this tendency is counteracted by leading with the right rudder, but how much input is initially a guessing game. Too much, and you go off the runway on the right. Too little, and the airplane heads for the runway lights on the left. Now, having a CFI's intellectual knowledge of the how and does not really help much as the control inputs need to be done by neuromotor reflex.


Like flying a helicopter, that can only be learned with practice.

Luckily, with 300 horsepower mounted on a 1,800-pound airframe and a bunch of STOL mods on the wing, the airplane got into the air before I could get too far astray or do damage to the runway lights. But as soon as liftoff occurred, another funny thing happened. The airplane immediately went into a 30-degree bank to the left, all on its own. This happened because the torque from the clockwise turning engine, which was being absorbed by the left landing gear being solidly on the ground, was now suddenly free to rotate the airplane about its longitudinal axis in the opposite direction. After many tries, I get this under control by rolling in a fair amount of right aileron upon liftoff. Of course, that also requires fairly substantial right rudder input to keep the airplane coordinated – lots of stuff to do.

Once in the air, climbing around 65 seemed slow to the point of being foolhardy compared to the 160 knots I am used to in a Lear. But the airplane was happy with it, climbing at 1,500 or so feet per minute. Doing some slow flight and stalls seemed pretty docile, so I returned to try my luck at landing. Accustomed to much higher approach speeds, I somewhat gingerly set up the approach at 75 knots. But when nearing the runway, I was floating for what seemed like forever and somewhat up and down because I was overcontrolling in pitch. The landing turned into a series of bounces until slow enough that the wing would no longer keep the airplane in the air.



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This happened to me repeatedly for several days until I finally figured out I must be doing something wrong. So, I looked up some old Missionary Aviation Fellowship (MAF) directions I had stashed away on how to properly land these big Cessna tail-draggers. The MAF directions say get set up at 500 feet on final with full flaps, power at 14 inches, with the airplane trimmed to be hands-free at the absurdly low airspeed of 60 knots. Control the approach to the landing spot by adjusting power, keeping the pitch slightly positive. As you pass over the threshold, gradually pull the power off and flair slightly. Sure enough, this worked every time, with only an occasional slight bounce. After a dozen fairly good landings, my seriously deflated ego was slowly being restored.

But then there was the problem of directional control as the airplane decelerates on the runway. Unlike the twins and turbines I fly that all have nosewheels, a tailwheel's center

of gravity is aft of the main gear. If deceleration and braking occur in anything but a straight ahead direction, that center of gravity wants to swap places with the nose of the airplane. Landing with one foot even slightly on one brake is also bad as the airplane immediately heads toward that side and the center of gravity just encourages that further. Some very quick rudder work is required to prevent heading into the grass. Even with my best effort, my first 10 landings must have looked pretty hazardous to anyone watching. And this with a twin and turbine pilot who prides himself in staying on the white line all the time until the exit markings are reached.

With the airplane slowed down to what seemed a safe, fast walking speed, but still on the runway, I then gave attention to such things as raising the flaps and turning off the pulse lights. The flaps are controlled by a long handle located on the floor, and you have to look down to see what you

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are doing – a big mistake. I quickly found out the best thing to do is not touch anything until well off the runway and completely stopped. Anything less than being very disciplined about this will have you heading into the weeds. Even a slight puff of crosswind will grab the large vertical stabilizer and start turning the airplane while your attention is diverted.

Taxing back to the hangar also requires much attention compared to those easy jets and piston twins. Even with my feet delicately doing a dance on the rudder pedals, some wobbling along the yellow line occurred (if I had been in a car, the police might have stopped me as a possible drunk driver). But, once I reached the tiedown spot, I finally got to show off by recalling how locking one wheel casters the tailwheel, which causes the airplane to do a very nice in-place 90-degree turn, with it all lined up with the parking spot – not possible in one of those nose-wheels. I see the line crew looking at

me appreciatively as I shut the engine down. My ego continues to recover.

Getting out of the airplane I think to myself, “I can do this.” But it is a lot harder than I remember. Maybe I should just go back to twins and turbines. Or possibly when I put it on amphibious floats in a couple of months, it will be easier. I will let you know. **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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From the Flight Deck

by Kevin R. Dingman



Snowflakes

Will pilots have a “flip-flop” winter?

We all have been told that no two snowflakes are alike. But in 1988, Nancy Knight from the National Center for Atmosphere Research, using a microscope, found two that were. Can you imagine her in a freezing cold room sorting snowflakes for months? How did she even move from one flake to the next without damaging them? In modern vernacular, snowflake is used to describe a very sensitive person; someone easily hurt or offended by the statements or actions of others; sometimes inclined to flip-flop their position but not inclined to take criticism for doing so. For this story, snowflakes are ice crystals – not sensitive to anything but aircraft anti-icing equipment, liquid deicing fluids, atmospheric conditions and those molding them into snow forts, snowballs and snowmen – sorry, snow people.

“A day without sunshine
is like, you know, night.”

– Steve Martin

For all life on earth, nothing is as fundamental as the length of daylight. The tilt of earth's axis affects the duration of daylight and plays a major role in our weather. It's tilted at an angle of 23.44 degrees to the plane of its orbit, and because of this, at certain times during the orbit, it's dark longer and we get cold weather. For us aviators, it's a time of the year that produces fast-moving fronts, icing conditions, strong and gusty winds with drifting snow, and it's like, you know, winter. The term solstice comes from the Latin words *sol* (sun) and *sistere* (to stand still) because, during the solstice, the angle between the sun's rays and the plane of the equator (declination) appears to stand still. In the Northern hemisphere, the winter solstice always occurs around December 21 or 22. This year, it's on Tuesday, December 21 at 10:59 am EST and marks the official start of winter in the Northern hemisphere and summer in the Southern Hemisphere.

Winter solstice is the day with the fewest hours of sunlight during the year. Our shortest day this winter will have 9 hours and 13 minutes of daylight. In the Northern Hemisphere, the points on the horizon where the sun rises and sets advances southward each day and the high point across the sky, which occurs at local noon, also moves southward each day. At the winter solstice, the sun's path has reached its southernmost position. The next day, the path will advance northward. However, a few days before and after the solstice, the change is so slight that the sun's path seems to stay in the same place or stand still – to “solstice.” The sun is directly overhead at high noon on winter solstice along only one planetary marker: the latitude called the Tropic of Capricorn. Now that we're up to speed astronomically and understand why it's so cold and dark outside, onward to its relevance to our operations.

With the exception of the Northeast having a stormy January and a tranquil February, the Farmers' Almanac (more accurate than an Ouija board, horoscope and some meteorologists) says the rest of the continental United States will see a “flip-flop” winter with larger than normal temperature swings with a near-normal amount of snow. With the extreme weather patterns seen lately that have been attributed to climate change, their forecast seems intuitive. Winter flying can be more work for pilots: snow removal and preheating are added to the preflight list, taxi speeds are slower and low visibilities can be widespread. Temperatures in the North may cause nostrils to momentarily stick closed, and thin layers of snow will create a squeaky noise when we walk. But, compared to the hot, humid days of summer, from the airplane's anthropomorphic position, it's ideal – the kind of weather it loves: cold, dry air for the motor to breathe and tightly-packed molecules for the wings to finesse into lift.

Traveling in our airplanes exposes us to wide-ranging temperatures and weather, even without the flip-flop forecast. The biggest wintertime changes for us occur during planning and preflight: preheating motors, adding a fuel system icing inhibitor (FSII) like Prist to our jet fuel when needed, using deice fluids, calculating holdover times and selecting alternates. When inflight, we'll be monitoring fuel

temperatures and using the anti-ice equipment. On arrival, flying low visibility approaches and computing landing distances will be the norm, and we may be diverting a couple of times. You've heard it all before, but stay with me – here comes the mandatory wintertime review.

The Laundry List

Engine Oil – Check your aircraft manual for proper weight (viscosity) to be used in low temperature ranges. Warm it up before you start the motors. Use an oil cooler baffle if, and when, allowed.



Keep your plane hangared as much as possible.



Inflight anti-icing will be used more often.

Oil Breather – Assure that the breather system is free of ice. When crankcase water vapor cools, it condenses in the breather line and can freeze and clog. A number of engine failures have resulted from a frozen crankcase breather line. A clog can cause pressure to build up, sometimes blowing the oil filler cap off or rupturing a case seal, which causes the loss of the oil.

Hoses – Hose clamps, hydraulic fittings and seals: inspect all lines, flexible tubing and seals for deterioration and security.

Cabin Heater – Each year, accident investigations reveal carbon monoxide as a probable cause in accidents that have occurred during cold weather. It's critical that a thorough inspection of the heater system be made to eliminate the possibility of carbon monoxide entering the cockpit or cabin. A pressure decay test on combustion heaters is mandatory for most and a good idea for the rest.

Control Cables – Because of contraction and expansion caused by temperature changes, control cables should be properly adjusted to compensate for the temperature changes.

Oil Pressure Controlled Propellers – Propeller control difficulties can be encountered due to congealed oil. Use caution when intentionally feathering propellers for training to assure that the propeller is unfeathered before the oil in the system becomes congealed.

Batteries – Wet cell batteries require special consideration during cold weather. Test, clean and charge the battery. A healthy battery should need charging only after several weeks of disuse. If the battery is two or more years old, it will probably need to be replaced.

Wheel Wells – During thawing conditions, mud and slush can be thrown into wheel wells during taxi and takeoff. If frozen during flight, this mud and slush can create landing



Consider using an oil cooler baffle when authorized.

gear problems. The practice of recycling the gear after takeoff should be used as an emergency procedure only. The safest method is to avoid these conditions or to leave the gear extended an additional 5 to 10 seconds on takeoff when feasible.

Inspect Deicing Equipment – Check deicing boots for cracks, cuts and holes. Cycle the boot system once each week to prevent stiffening of the rubber, which can shorten boot life. Use only cleaning and performance-enhancing products approved by the manufacturer of your system.

Preheat – Use a heated hangar when available both at home and on the road. A couple of hours above 50 degrees should be good. If not, oil pan heaters, kerosene-fueled torpedo heaters and individual electric-type cylinder heaters are good. Don't leave the aircraft unattended, and keep a fire extinguisher handy. Don't place heat ducting so it will blow directly on parts of the aircraft such as upholstery, canvas engine covers, flexible fuel lines or oil and hydraulic lines.



Heavy snow will cause more preflight work.

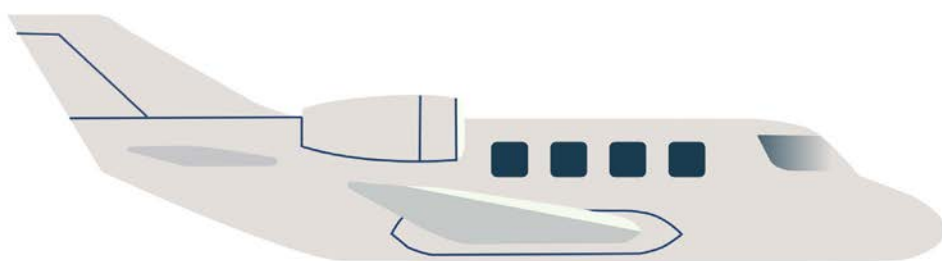
Been There, Done That

An employer once over-primed an engine and caught it on fire. I've had a wheel brake freeze, windshield heat failure, CADC probe heat failure, fuel heat failure, wing heat failure and electric heat on one blade of a three-bladed prop fail. I've seen deicing personnel accidentally skip half of my airplane, had fluid holdover times expire and minimum takeoff fuel has been reached waiting in long lines. Make like a Boy Scout and be prepared. A wintertime addition of 10 or 20 minutes worth of fuel above your summertime number is prudent. List an alternate (or two) if the weather is marginal or if the arrival airport has only one approach

or one runway – snow plowing will close runways on a regular and unpredictable basis. Be ready for holding, a missed approach and a divert. Ramps will be slippery – walk and taxi slowly. Airfield surface marking and signs may be buried, covered or obscured, making incursions more likely. Aborting a takeoff due to an incursion, especially on a contaminated runway, will exercise your judgment and adrenal glands.

This time of year, dawn comes later and dusk earlier. Light may be fundamental to life, but for pilots, so is currency and proficiency. Just because it's cold and dark, don't solstice – get out of that tilted chair in your office and go flying. Both you and the airplane need to stay aeronautically limber despite our astronomical condition – a condition that creates more work for pilots. Don't be a snowflake about cold weather – or my comment about snowflakes. Earth's 23.44-degree tilt will, after all, make it, you know, like winter. **T&T**

Kevin Dingman has been flying for more than 40 years. He's an ATP typed in the B737, DC9 and CE-650 with 25,000 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 retired from a major airline, flies the Cessna Citation for RAI Jets, and owns and operates a Beechcraft Duke. Contact Kevin at dinger10d@gmail.com.



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The entrepreneurial route was natural for Jason Talley. When asked what his aspirations were growing up, Talley said, “Looking back, I went through lots of options as potential careers and always realized that I was a self-starter and in control of my own destiny.”

His self-cultured ambitions led him to pursue a math degree at Missouri Southern State University in his hometown of Joplin, Missouri. During his undergraduate tenure, Talley was involved with creating and operating several technology companies. The efforts won him the North American Entrepreneur of the Year competition in 1998.

After graduation in 2000, Talley moved north to Kansas City. He began flight training and purchased a Beechcraft Sierra that he owned for several years. “The Sierra was my first aircraft and offered the perfect balance of easy flight characteristics and usability for a new pilot,” he said. “I still keep a photo of the airplane and me on my desk.”

The year following his relocation, Talley furthered his formal education at the University of Missouri-Kansas City

School of Law, graduating in 2004. The legal education added another dimension to Talley’s entrepreneurial tool chest, and he continues to practice to this day. Talley is admitted to the Bar in California, Missouri and Kansas, where most of his current entrepreneurial pursuits are based.

The markets he has primarily focused on throughout his career are restaurant, aviation and information technology. A few of Talley’s commitments include acting as the Chairman and CEO of Baker’s Burgers (a quick-service restaurant chain) and Broader Technology Advisor at JSSI.

Talley’s flying has spanned most of his business career. Much of his ability to successfully conduct operations across the country has been enabled by private aircraft. He noted, “I have owned a lot of airplanes over the last 21 years, including the Sierra, a partnership in a Piper Cheyenne, several Piper Malibus, a Piper Meridian, as well as several Cessna Citations.”

As his businesses expanded, so did Talley’s mission profile, leading to the purchase of a Citation Mustang. One of the reasons he initially purchased the jet was the



Outside of flying for business, Talley also owns an Aviat Husky and Robinson R66.



need to regularly fly to Albuquerque, New Mexico, from Southern California to attend BendixKing Board Member meetings. The six-seat light jet allowed him to easily fly back and forth between KSNA and KABQ a few times per month. The Mustang allowed him to fly more frequently and add more routine destinations. But a challenge that affected him and other twin and turbine operators quickly became apparent to the new jet owner.

"After purchasing the Mustang, I found that I needed a way to manage the various contract fuel cards I had," said Talley. "With the range of the aircraft and flying further across the country, it was something that had to be done."

He began to create a software, JetFuelX, that allowed pilots to easily see available fuel prices and seamlessly incorporate their desired choices into flight planning. The service made refueling business aircraft simpler.

"Aviation businesses are extremely fun, and my history has been trying to be disruptive within the industry," he said.

Talley owned his Mustang from 2013 to 2017 before business began demanding his time at more locations. Primarily, this evolving mission resulted from SierraTrax,

a maintenance tracking software firm he founded based in Wichita, Kansas. The company's roots are similar to that of JetFuelX – founded with the intentions to solve a problem. This time, Talley hoped to lessen the complexity and costs associated with maintenance tracking on aircraft, especially for Citation owner-operators.

Now needing to fly routinely halfway across the country from his home in Southern California to the "Air Capital," Talley again needed to transition to a more capable aircraft. He had been extremely impressed with his Mustang through several years of ownership and considered it a great entry-level jet, and he looked

to remain in the Cessna family due to good experiences. As such, moving into another Citation was an attractive option. After considering other available light jets, Talley decided to purchase a Citation CJ2+ in 2017.

But shortly after he acquired the aircraft, an airline's ground support equipment ran into the airplane while it was parked at Midway International Airport (KMDW). Now without an airworthy airplane, Talley had the option to consider again what he wanted to fly. But for a second time, he chose the CJ2+, this time a 2010 model.

Recounting his rationale for purchasing the aircraft, he said, "Of course the speed and range were factors, but I also liked the efficiency, modernness, and the comfort of having two engines. In addition, I was absolutely astonished by the performance in non-optimal conditions. I also liked that it had a hot wing versus the boots of some competing options."

"It was very simple to make the transition from an avionics perspective," he continued. "The Mustang had G1000 avionics and the CJ2+ has a G3000 suite, which required an STC to replace the Pro Line 21 avionics." He also noted that the flight characteristics of his newest jet are "predictable and flying the aircraft is like driving a little sports car."

Talley's first Citation type rating was the 510 series, which he received after purchasing his Mustang in 2013. When recalling this initial type rating training in the aircraft, he noted that it was "singularly difficult and made me sweat more than the California Bar Exam." But, he added that the checkout was quickly followed by sim school specific training on the model.

"The [sim school] is definitely an opportunity to explore flying with precision that all pilots of this type should have." Talley aims to go to FlightSafety International (Wichita) twice a year in order to continue being a competent pilot. Often flying with colleagues and employees aboard the light jet, he stresses the importance of ensuring a professional level of safety, even as an owner-operator.

Most often, Talley's mission takes him between California, Utah and Kansas, flying roughly 125 to 150 hours a year. With nearly 600 hours in the aircraft, he said, "The CJ2+ absolutely fits a majority of my missions, and I love it." This trip profile has increased in overall range to include routine flights to Chicago after JSSI acquired SierraTrax in July of 2021. But he currently has no intention to purchase another aircraft.

"I've learned to never say never. But my wife says that outside of the Beechcraft Sierra that I first owned, this has been the most I have ever been attached to an aircraft."

Talley has also been a Citation Jet Pilots Association board member for five years. He instantly recalled his initial research when considering a transition from a single-engine turboprop to a light jet.

"CJP is a wonderful resource, and I joined it immediately before buying my Mustang. There is a wealth of knowledge within the group, including those who have made the same jump in aircraft that you are considering. I have yet to hear of anyone who has moved up in aircraft who has regretted it."

Outside of flying for business, Talley also owns a Citabria, an Aviat Husky and Robinson R66. He often is able to mix business with flying with his family, including taking his wife of 24 years and their two teenage sons on trips. Some of the activities that they enjoy doing together as a family are fly fishing, skiing and snowmobiling. **T&T**

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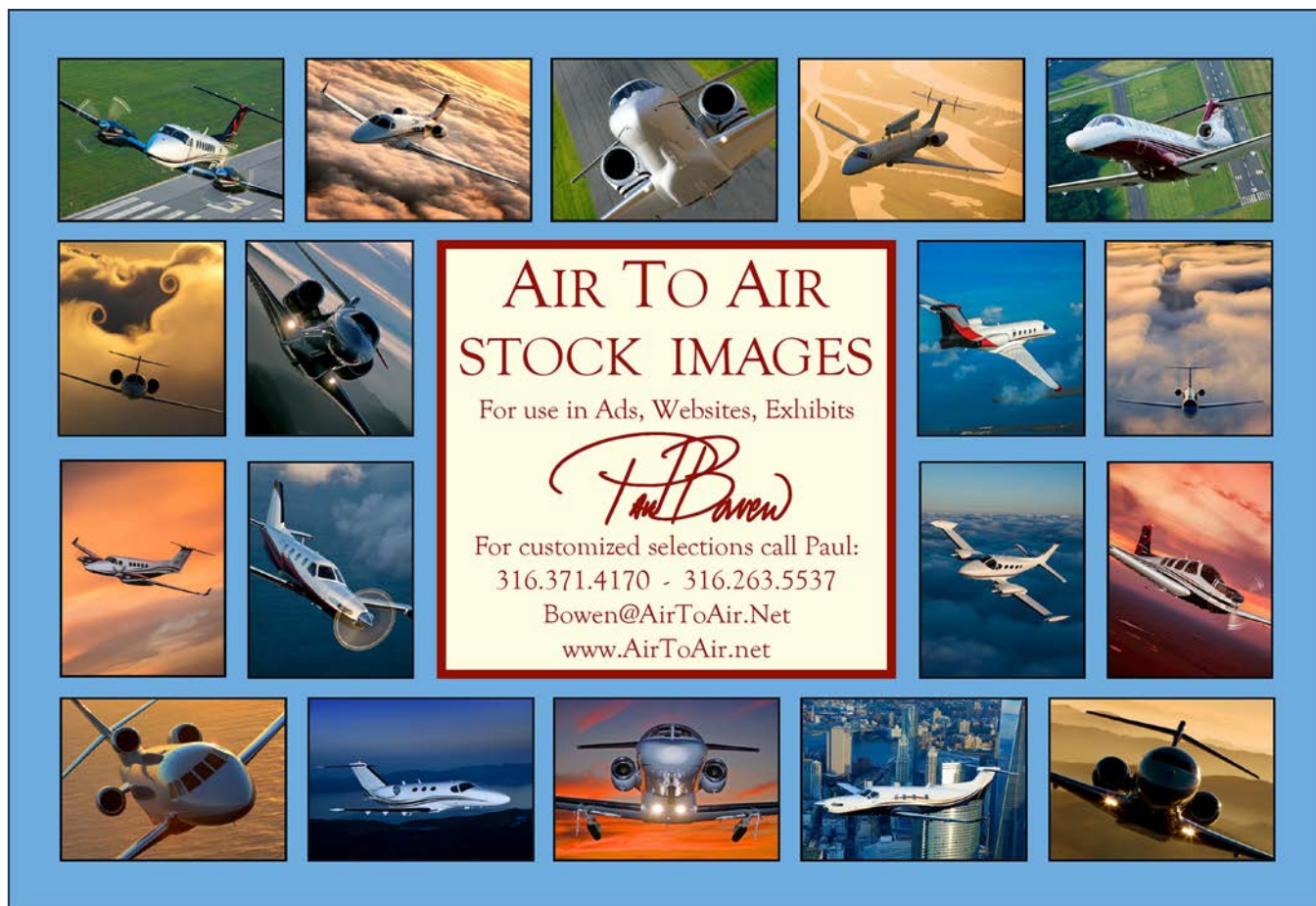


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Ad Index

1st Source Bank	13
AEA Pilot's Guide	30
Aerox Aviation	
Oxygen Systems	19
Airtex.....	26
AOPA Finance	11
CIES Corporation.....	21
Columbia Air Services, Inc.	
..... Inside Back Cover	
Covington Aircraft Engines ...	23
Factory Direct Models.....	22
Fox Aviation Service.....	
..... Front Cover	
Ice Shield/SMR	
Technologies	Back Cover
Innovative Solutions	
& Support	Inside Front Cover
Paul Bowen Photography	29
Pilots N Paws.....	30
Preferred Airparts LLC	22
Rosen Sun Visor Systems	19
Select Airparts	29
Short-N-Numbers	23
Skyway MRO Services	21
Standard Aero	7
Stevens Aerospace &	
Defense Systems	3
Turbines Inc.....	6
Veterans Airlift Command	31
Yingling Aviation.....	12

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Those of us who fly jets, especially single pilot, know the importance of understanding the use of the oxygen mask. Flying at altitudes up to FL450, we have just a few seconds after a complete loss of pressurized air to put it on before we lose consciousness. Even more frequent is the slow loss of cabin pressure and our inability to recognize the situation.

Passing out at those altitudes can have tragic consequences.

One of the most memorable accidents involved professional golfer Payne Stuart, flying as a passenger in a Lear 35 from Florida to Dallas in the fall of 1999. The Lear lost cabin pressure, and the crew and Stewart perished unconscious in North Dakota after fuel exhaustion.

In May of 2016, a Citation 501 flying at night suffered a catastrophic failure of a safety valve in the pressurization system at FL430. The cabin instantly lost pressure. The pilot reached for his mask but was unable to put it on before he passed out. Same for the passengers. The airplane descended out of control until the pilot woke up at 7,000 feet. Miraculously, he managed to safely land the aircraft, and everyone walked away. The airplane was permanently wrinkled.

Putting your mask on immediately is very important.

As I prepared a presentation for a Citation Jet Pilot's meeting on this very topic, I realized that my wife Patty might be asked if we had practiced what I preached.

"Patty, we need to go to the airport and have you don the mask to experience the discomfort," I said.

"No," she answered. My persuasive skills, however, won out.



In the hangar, Patty practiced donning the mask and trying to see the PFD (primary flight display). The mask fit very firmly as she breathed in the cool O2.

At the conclusion of our practice, and because I am cheap, I decided to shut off the oxygen to save a little money. Little did I realize that doing this would firmly lock the mask onto Patty's face.

What ensued was an "emergency" created by my stupidity.

With the mask now unmovable, Patty began screaming something like, "I can't breathe," and then a lengthy barrage of muffled words that I had not heard since high school.

I think she said something about my mother.

Vibrant colors filled her face as her lips turned slightly blue. For a split second (Patty said it was several minutes), our almost 50 years of marriage flashed through my head.

What would the police report look like, I wondered: "Completely healthy woman dies while in airplane cockpit wearing oxygen mask."

Then it occurred to me. Turn the oxygen valve back on, you idiot. Instantly, the pressure filled the mask and released its tentacles from Patty's face.


Needless to say, she was not a happy camper. She immediately texted her friend Cindy with a complete report.

"So, David took me to the airport to get acquainted with the new/old airplane and had me practice putting on and taking off the oxygen mask. Only as we finished up, he TURNED OFF THE OXYGEN, AND I WAS STILL WEARING THE MASK. You can't breathe when the oxygen is turned off, and you can't get the mask off either!"

"He's tried to kill me again!"

So much for my safety briefing.

Fly safe.

P.S. I asked Patty if she would put the mask on again so I could take her picture for this article. Note to self: Do not ask this question. 

David Miller has owned and flown a variety of aircraft from light twins to midsize jets for more than 50 years. With 6,000 plus hours in his logbook, David is the Director of Programs and Safety Education for the Citation Jet Pilot's Safety Foundation. You can contact David at davidmiller1@sbcglobal.net.

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