

TWIN & TURBINE

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

MAY 2019 \$3.95 US
VOLUME 23 NUMBER 5



King Squared

Inside the First King Air 350i King Ranch

Recognizing Your
Radar Limits

Great Getaways:
Little Traverse Bay

Tips for Flying
Internationally



WINNING COMBINATION.

CITATION CJ3+

By stepping up, you stand to gain everything. The best performance, the lowest DOCs and the most standard features in the light-jet segment.

U.S. +1.844.44.TXTAV | INTERNATIONAL +1.316.517.8270 | CESSNA.COM

© 2019 Textron Aviation Inc. All rights reserved.



TEXTRON AVIATION

EDITOR

Rebecca Groom Jacobs
(316) 641-9463
rebecca@twinandturbine.com

EDITORIAL OFFICE

2779 Aero Park Drive
Traverse City, MI 49686
Phone: (316) 641-9463

E-mail: rebecca@twinandturbine.com

PUBLISHERS

J. Scott Lizenby
Dave Moore

PRESIDENT

Dave Moore

CFO

J. Scott Lizenby

PRODUCTION MANAGER

Mike Revard

PUBLICATIONS DIRECTOR

Jake Smith

GRAPHIC DESIGNER

Marci Moon

TWIN & TURBINE WEBSITE

www.twinandturbine.com

ADVERTISING DIRECTOR

John Shoemaker
Twin & Turbine
2779 Aero Park Drive
Traverse City, MI 49686
Phone: 1-800-773-7798
Fax: (231) 946-9588
johns@villagepress.com

**ADVERTISING ADMINISTRATIVE
COORDINATOR &
REPRINT SALES**

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

**ADVERTISING ADMINISTRATIVE
ASSISTANT**

Erika Shenk
Phone: 1-800-773-7798
erikashenk@villagepress.com

SUBSCRIBER SERVICES

Rhonda Kelly
Diane Smith
Jamie Wilson
Molly Costilow
Kelly Adamson
P.O. Box 968
Traverse City, MI 49685
1-800-447-7367

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.

MANUSCRIPTS: *Twin & Turbine* assumes no responsibility for unsolicited manuscripts, photographs, or art work. While unsolicited submissions are welcome, it is best to query first and ask for our Writer's Guidelines. All unassigned submissions must be accompanied by return postage. Address queries and requests for Writer's Guidelines to the editor.

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

Contents

MAY 2019 • VOL. 23, NO. 5



Editor's Briefing

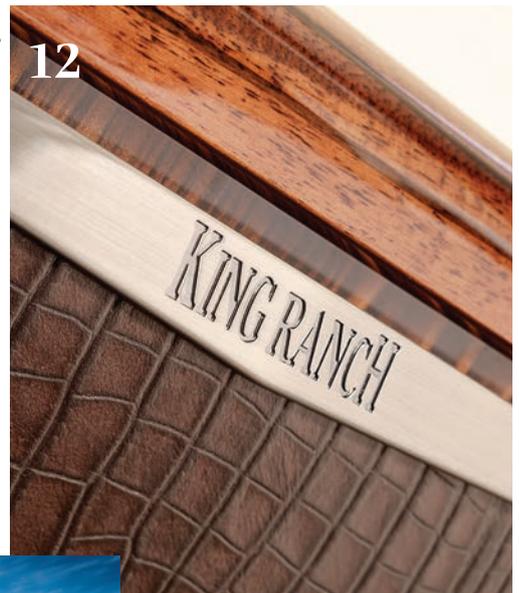
- 2** Fun in the Sun
by Rebecca Groom Jacobs
- 3** Airmail
- 4** Tornado Alley
by Dianne White
- 6** Great Getaways:
Little Traverse Bay
by Grant Boyd

-
- 8** Radar and Drift
by Joe Casey

- 12** Beechcraft King Air 350i
King Ranch Edition
by Rich Pickett

- 20** Five on the Fly: Five
Questions with Interior
Specialist Jo Kimbell
by Rebecca Groom Jacobs

- 22** International Airspace:
What You Should Know
by Rick Gardner



-
- 24** Imaginary Controls
by Kevin Ware

From the Flight Deck

- 28** Max Mania
by Kevin Dingman

On Final

- 32** Just a Tire
by David Miller

COVER PHOTO:

King Air 350i King Ranch
Photo Courtesy of Textron Aviation

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



Editor's Briefing

by Rebecca Groom Jacobs



Fun in the Sun

Last month, I attended the 45th annual Sun 'n Fun International Fly-In and Expo (SNF) in Lakeland, Florida. With 200,000 guests and 500-plus exhibitors, SNF is aviation's second-largest airshow, falling in line behind EAA AirVenture (Oshkosh). And while I am long-time regular at AirVenture, this was only my second visit to SNF. I excitedly returned to the show, remembering it fondly as the first airshow I worked professionally after entering the aviation industry.

At the time (2013), I was a marketing assistant at Piper Aircraft, which is headquartered a mere two-hour drive away from Lakeland in Vero Beach. Leading up to the show, I worked closely with the marketing manager in charge of planning the event, quickly learning there are an inordinate number of moving parts involved when preparing for a trade show – equipment bookings, contract signings, insurance documents, marketing materials, merchandise, arranging of industry meetings, development of work schedules – along with what seemed like a thousand other tasks.

Exhibiting was no less demanding. I spent the week at the show helping with setup, selling and stocking merchandise, assisting our dealers and speaking to show attendees. I can tell you one thing – there is a lot of work that goes into these shows (and a lot of steps recorded on my Fitbit!). It was an eye-opening and fun experience to see firsthand what happens behind the scenes. My recent return to SNF was the opposite. Free from assisting in a booth, I was able to stroll the exhibits, take in the incredible aircraft displays and meet with industry friends and colleagues.

Show highlights included performances by the GEICO Skytypers, Aeroshell Aerobatic Team, Patty Wagstaff, Michael Goulian and the ever-popular U.S. Navy Blue Angels. The warbird area was crowded with enthusiasts, with one of the main attractions being the long-awaited appearance of the XP-82 "Twin Mustang" (pictured). It truly is a spectacular sight in person.

In addition to typical airshow fun, aviation education is a core focus of SNF. The show hosts more than 300 forums over the course of the week, as well as hands-on workshops, seminars and museum tours. The show is also the largest fundraising event for the Aerospace Center for Excellence (ACE). ACE is a leader in STEM-related and aerospace education through its various learning centers, outreach programs and scholarships. SNF annually raises over \$2 million for ACE, enabling the delivery of STEM-related education programs to more than 40,000 local youth each year.

Sun 'n Fun is a fantastic way to kick off airshow season, and I looking forward to heading back to Florida next April.

A handwritten signature in black ink that reads "Rebecca Groom Jacobs".



The XP-82 Twin Mustang made its debut at Sun 'n Fun.

Airmail

In Response to Kevin Ware's "Cheap at Any Price" (February)

"Cheap at Any Price" was laugh out loud funny! I have made it now 20 months without riding a commercial airline. It is cheap transportation, but it is no fun.

I met you at a TTCF Convention a couple of years back. You did a presentation on flying into a short field with the Cessna 340. I do not recall the location, but I do recall your presentation well.

I had a 14-year love affair with my 1980 C340. I am now at the end of my second year loving my TBM; a different type of affair but a lovable airplane (less intimate as it never breaks). I always enjoy your columns. Thanks for writing them.

Jim O'Day

I got a kick out of your article in Twin & Turbine. I especially liked the description of you taking your seat on a commercial flight. I have experienced the same and I am a small frame person.

I was changing planes in Atlanta last month when sitting next to a fellow who just went through the same, and he addressed the overreiter letting him know it wasn't his fault that he ate himself out of a seat.

We just sold our company plane and I can't wait to get the upgrade and hoping that will happen soon. Thanks for the story that I will force my wife to read. Fly safe.

John Fontaine

I just finished your article, "Cheap at Any Price." That is the best (worst?) description of airline travel I've read. Thanks - you just killed my idea of retiring early and flying a corporate gig. After years of personal travel via general aviation, there's no way I could handle the airline side of corporate flying. I guess you did me a favor. Great article. Keep them coming.

John Ewald

DISCOVER THE DIFFERENCE, WELCOME TO THE NEW RTC!



RTC

BOOK NOW
RECURRENT TRAINING:
KING AIR
TWIN CESSNA
PC-12 LEGACY
TWIN PIPER

833-471-2725

**SIMULATOR
BASED TRAINING**

WWW.RTCPILOT.COM/TWINTURBINE

©Aeronautical Systems Engineering, Inc. All Rights Reserved.

FAA APPROVED · EASA* APPROVED · GARMIN TXi EIS APPROVED



**Who Said, You Can't
Trust Your Fuel Gauge?**

With over 23,000 magnetic fuel senders in service, CiES fuel senders exceed 60,000 hrs. mean time to failure (MTTF) - making our fuel quantity senders one of the most reliable aviation systems in existence. Starting at \$435 per sender.

CALL (541) 977-1043
VISIT ciescorp.com

* EASA approval through our partnership with Aerospace Logic.



**CD AVIATION
SERVICES**

Exceptional service for "Plane" people.

Focused on the TPE331 Engine



Services provided for the TPE331

- Complete Overhaul • Hot Section Inspections •
- Gearbox Inspections • Repairs •
- Complete Test Cell Service • 24 Hour AOG Field Service •

***FAA Diamond Award Recipient**



www.cdaviationservices.com | 417.206.2327



Position Report

by Dianne White



Tornado Alley



A low-pressure “bomb cyclone” was straddling the Midwest. A dry line extended through central Kansas into Oklahoma. Ahead of the dry line, southerly winds were howling at 22 gusting to 45 kts. By early afternoon, a line of thunderstorms had formed along the dry line and were racing eastward at around 40 mph. By late afternoon, near-gale force winds were howling and torrential rain resulted in severe flooding along the Missouri River valley.

Ahhh...Kansas in springtime. Tornado Alley – which includes a wide swath of Texas, Oklahoma and Kansas – is the place where so much nasty convection is found in the spring and summer. Having lived in the Midwest my whole life, I’ve witnessed my share of crazy weather. When traveling and the question comes up regarding where I live (the answer is Kansas), the inevitable next question is: “How many tornados have you seen?” The answer is, “Thankfully none, although one did destroy my airplane in 2017.”

As a pilot, timing a flight near an area of active weather takes careful analysis of situation using multiple sources of information and using all the tools in your cockpit toolbox. Understanding how convective weather works can help you plan your flight with a higher likelihood of success, as well as safety. Furthermore, it may help you decide whether the airplane is better off left in the hangar.

One of my favorite weather books is written by Tom Horne, an aviation author, called “Flying America’s Weather.” Tom wrote the book because he believed if pilots understood the larger climatic forces that affect a particular region, they would be able to interpret and even anticipate the weather along their intended route of flight.

So why we do get so many strong thunderstorms in the Midwest? One big reason, according to Horne’s book, is because the

leeside of the Rockies tends to serve as the breeding ground for low-pressure systems. As they move east, they get stronger. The second reason is the low-level jet streams often shoot northward out of Texas carrying warm, moist air from the Gulf of Mexico. This low-level jet is most evident in advance of cold fronts common during the transition from winter to summer.

Third, the high-altitude jet stream that cycles around large upper level troughs can impart lifting and destabilizing forces to the air beneath them. In other words, the high-level jet delivers cold air over the warm, moist, Gulf-fed air masses in the lower levels, creating an environment ripe for convection.

Lastly, within the jet’s core of strongest winds is something called ageostrophic flows. Normally, air moves with the isobars. As you probably guessed, ageostrophic flow is air that flows across isobars toward low pressure. As a result, the low deepens. At the surface, they are contributing factor to squall lines and fast-moving cold fronts.

If you take a look at the 500 mb (high altitude) and surface maps during the period leading up to a severe weather outbreak, you’ll notice that the surface low is most likely located in the southeast corner of the trough aloft. If this scenario develops, you can look for the surface low and front to intensify below the leading edges of the trough aloft.

One term you may see in aviation weather products is CAPE, or convective available potential energy. CAPE is a measure of the positive buoyancy of a rising parcel of air, calculated from the temperature and moisture structure of the atmosphere. Basically, a type of stability index. Measured in joules/kilogram, CAPE is typically 2,000 to 5,000 on severe storm days, however anything over 1,000 is significant. The bigger the CAPE number, the greater the instability present, and the greater likelihood there will be strong thunderstorms.

Understanding how convective weather works can help you plan your flight with a higher likelihood of success, as well as safety. You may decide the airplane is better off left in the hangar, unless, of course, the tornado finds your hangar instead.

Another term you might see is storm-relative helicity, which gives a measure of the rotational potential of a thunderstorm updraft. This gives forecasters an indication of an environment that is favorable for supporting the development of thunderstorms with rotating updrafts, a precursor to super-cell thunderstorms and tornado development. For mesocyclone development, storm-relative winds typically have speeds greater than 20 knots and turn clockwise with height by at least 90 degrees in the lowest three kilometers of the atmosphere. Values of helicity greater than +150 are considered significant, although there is no "magic" value that indicates whether a rotational thunderstorm will develop.

Since we're talking about Tornado Alley, here are some fascinating facts about this destructive weather event. (Courtesy of Horne's "Flying America's Weather") Tornadoes tend to form between 4 and 8 p.m. and most form when surface temperatures are between 65 and 84 degrees Fahrenheit. The 700-plus observed tornadoes each year in the United States last on average of about a half-hour and their average ground track is six miles.

Tornadoes also tend to form in groups, and some of them can be very large. Once they're on the ground, they tend to move along at 25 to 45 mph southwest to northeast. They have an average width of 400 yards, although its width can be much less at the surface.

And finally, more than half of all observed tornadoes occur in - you guessed it - Tornado Alley. Although, as Dorothy says, there's no place like home, I am good with sustaining my "no tornado witnessed" record. **T&T**

Dianne White can be contacted at editor@diannewhite.com

Your Beechcraft Parts Source



www.selectairparts.com



New • Overhauled • Used



"Call Us. We Speak Beechcraft!"
1-800-318-0010

Int'l: 540-564-0010
Email: sales@selectairparts.com

P.O. Box 219
Weyers Cave, VA 24486



TURBINES INC.

**- 30-Day PT6 Overhaul Turn Time -
CHALLENGE ACCEPTED**

turbinesinc.com | facebook.com/turbinesinc | 812.877.2587 | turbines@turbinesinc.com

Great Getaways: Little Traverse Bay

by Grant Boyd



PHOTOS COURTESY OF JOSEPH WORTMAN



What could potentially be described as the “Martha’s Vineyard of the Midwest,” the Little Traverse Bay area of northern Michigan is our next great getaway. At approximately 45 square miles, Little Traverse Bay is Lake Michigan’s fourth largest bay, behind Green Bay, Grand Traverse Bay and Bay DeNoc.

Notable towns comprising the Little Traverse Bay Area include Charlevoix, Bay Harbor, Petoskey, Traverse City and Harbor Springs; many of which have names originating from the region’s native Indian tribes. Each offer a unique, charming downtown with great shops and restaurants, as well as a wide array of outdoor recreational activities. An added bonus for pilots flying in is spectacular water views.

Activities and Amenities

From hiking, biking, sailing and golfing, Little Traverse Bay attracts a large number of summer gatherers every year and is often found featured in travel blogs and magazines. Though a popular summer destination, the area is equally as enjoyable during the winter months. The first few months of the year are a great time to take advantage of the nearby skiing (downhill and cross-country) and snowmobiling options.

Dotting the Lake Michigan coastline are numerous options to stay including lakefront cottage rentals, hotels, resorts and condo-style lodging. As an inlet to one of the world’s largest lakes, it’s no wonder that the area offers numerous water-related activities both residents and visitors find appealing. Boating is especially popular with hundreds of yachts, sailboats and fishing boats floating around the bay at any given time.

One of the best-known marinas in the region is Bay Harbor Lake Marina, which has been named both one of the “10 Best-Family-Boating Resorts” by Boating Life and one of “The Top Ten Ports in North America” by Motor Boating Magazine. The marina has a central location and is a quick boat ride from Beaver Island, the largest island on the lake with its own share of fun activities (such as notable viewing of the Northern Lights in the late summer).

Aside from leisure boating, the Little Traverse Bay offers world-class fishing with bass, steelhead and trout inhabiting the waters. Beyond the Great Lake, the towns’ rivers, streams and lakes also have a wide array of fish to keep any angler occupied during their stay.

North of the bay is Mackinac Island, a throwback to the 19th century with horse and buggy transport. The town offers many things to do, but perhaps the most popular pastimes revolve around the variety of historical landmarks such as Mackinac Island State Park and Fort Mackinac. And though the town is reminiscent of the past, the island has various accommodation options, fine dining and an airport (MCD).

Joe Wortman, a PC-12 pilot, frequents the Little Traverse Bay Area from his home near Detroit and says, “There is something special and unique about northern Michigan, with more things to do than there are days in the year. It is certainly well-suited for those who like to be outdoors.”

Off the water, visitors to Little Traverse Bay can be found zip lining, attending live concerts, biking, apple picking and golfing. Each activity takes advantage of the bay’s beauty,

notably the Bay Harbor Golf Club designed by famed golf architect Arthur Hills. Hills molded the picturesque landscape into a beautiful 27-hole course commonly referred to as the "Pebble Beach of the Midwest."

An overview of the region is certainly not complete without mentioning its admired food and drink scene. Whether it be cafes, steakhouses, sandwich shops or dessert places, the small towns along the coast have a wide array of options to meet any foodie's taste. There are also dozens of microbreweries and wineries around the bay, with companies offering assorted packages to tour vineyards and sample the diverse options. Additionally, farmer's markets are commonly sighted during the summer and early fall months.

Flying into Little Traverse Bay

Pilots have several airports to choose from when embarking on their northern Michigan adventure. One popular option, located in Harbor Springs, is Harbor Springs Municipal Airport (MGN), which sits feet away from the water of Lake Michigan. The non-towered airport has a 4,157-foot by 75-foot lighted asphalt runway (10/28), 100LL and Jet A fuel, a courtesy car, as well as tie downs and instrument approaches. A 10-acre portion just north of the airport houses Harbor Springs Airpark. The residential airpark sports 10 one-acre home lots with houses built in beautiful northern Michigan architectural style.



Another landing spot for aviators is the Pellston Regional Airport of Emmet County (PLN), which has two runways – Runway 14/22 (6,513-foot by 150-foot asphalt) and Runway 5/23 (5,401-foot by 150-foot asphalt). The latter is a popular alternate due to the extra runway and additional instrument approaches. The airport too has all requisite fuel, tie-down and ground transportation resources needed for those deplaning to get away for a few hours, or days, and explore what makes Little Traverse Bay Area a truly great getaway. **T&T**

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

THE INNOVATIVE SOLUTION TO UV, HEAT & GLARE IN THE COCKPIT

- ✔ **Protects pilots 99.9%** from UV and solar radiation *while flying!*
- ✔ **Reduces pilot fatigue & eye strain** caused by sun exposure in cockpits
- ✔ **No STC needed** - installs/removes in seconds

DEALERS WANTED

JETSHADES.COM | info@jetshades.com
401.649.0443

SPEED & RELIABILITY
JUST LIKE YOUR AIRCRAFT

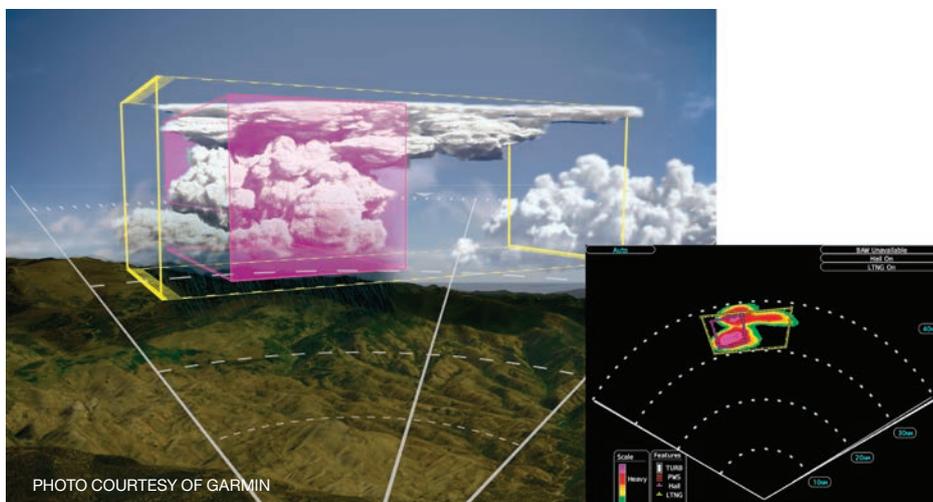
Aviation Insurance Resources®

877-247-7767
WWW.AIR-PROS.COM

PILOTS PROTECTING PILOTS

Radar and Drift

by Joe Casey



Radar and drift. I bet you've never heard those words used in the same sentence. Fading, attenuating and even marching are interesting words occasionally used with the term "onboard radar" – but drift? Yes, drift has an important meaning when it comes to using onboard radar. However, my contention is not that the radar itself drifts, but that our use of onboard radar can drift. Let's explore.

The Meaning Behind Drift

Drift is an interesting word. We use it frequently in aviation, but mostly in relation to a takeoff or landing as in "I drifted off centerline." Or on a cross-country, I might "drift off course." Or during an IFR flight, a pilot might "drift off altitude by 100 feet." In each of those situations, there was a standard (centerline, course, altitude) and drift means an unintentional movement from that standard. Drift is an enemy to aviation and one that every pilot needs to keep a sharp lookout to avoid.

During refresher training, there's another form of drift that I intentionally look for – drift from known standards and practices. You've probably heard this before: "I used to do it this way, but I started doing it that way." I see it often when pilots of one particular airframe talk to a pilot (or well-meaning, but uninformed CFI) who operates a different type of airplane. Practices that work well for one airframe may not work well for another. When these practices

are errantly transferred to the different airplane, drift occurs. I see it frequently in refresher training, and it's one of the reasons that every twin and turbine pilot should pursue type-specific training, not just training from a local CFI. The CFI may be highly-competent yet does not know much about the specific airframe you operate.

So, how do drift and onboard radar fit in the same sentence? The connection lies in defining the standard from which drift can occur. When it comes to thunderstorms, the standard is every pilot should remain 20 miles from thunderstorms and should not drift closer. But here is an example of how drift can still happen.

Drifting Too Close

A few years ago, I flew in an MU2 Marquise with a veteran airline and commercial pilot. Our flight was from Montreal, Canada back to Texas, and after flipping a coin, it was determined that I was to be the left-seater for this long flight. Draped across much of the United States on this summer afternoon were splotches of slow-moving thunderstorms, and inside some of the bigger splotches were some fairly intense cells. We climbed up to the smooth, clear skies at FL260, well on top of everything except for the convective stuff punching through the haze layer. We settled down to what appeared to be an easy flight.

About two hours in, we started receiving the normal calls from ATC advising

of "scattered moderate to extreme cells from our 10 o'clock to 2 o'clock," along with the usual "cleared to deviate right and left of course, advise when direct destination." There were plenty of holes in the scattered cells, so my veteran pilot slipped off to the empty cabin for a short snooze (yes, the MU2 is a single-pilot airplane).

I then fired up the onboard radar, had downloadable radar on the GTN750, and contrasted everything against what my eyes were seeing through the front windscreen. I remained in the clear, smooth air and weaved around scattered cells somewhere over Indiana. Picture a rather boring flight with the autopilot on HDG mode and my guiding the airplane along through the cumulus valleys. Nothing to it. We've all been there – 5 degrees right, 10 left, just a little touch of the heading bug back and forth.

After about 30 minutes or so, my bored friend woke up and stuck his head in the cockpit to "check in" and see our progress. He looked out the left window and said frightfully, "What are you doing? That's a thunderstorm right there!"

Rather offended, I showed him the radar showing that we were in the clear, and I pointed to the blue sky that dominated the front windscreen. He merely pointed to the cell not too far out the left window and said, "You are crazy!"

He plopped down in the right seat, belted in, and told me my risk meter was broken. Of course, I took serious offense,

sulked quietly, and turned the heading bug 5 degrees more right. There was no turbulence, nothing that would have even awoken a sleeping passenger, but he was right. My risk meter was broken. I had drifted from a position of being respectful of thunderstorms in my early years in aviation to a point that I was willing to go between cells, cut corners around cells, and generally “just get too close.” I had appropriate confidence in my ability to operate onboard radar and stay out of the convection (and associated updrafts and downdrafts), but the convection is only one threat on the long list of threats a thunderstorm can provide. The threat of lightning and hail are ever-possible with any thunderstorm, and distance is your best friend when avoiding these enemies. The FAA standard to remain 20 miles from any thunderstorm had faded through many “uneventful close encounters” with cells. I had drifted from that standard to the point where I got comfortable and flirted with disaster.

Want proof that being close to a thunderstorm is no good? There are three PA46 owners I know who have sad tales to tell from thunderstorm experiences in 2018. These are certainly lessons you want to learn from others' mistakes as opposed to your own.

Lessons Learned

The first is a Meridian owner who flew about five miles from “a small storm that didn't look like much at all.” The flight seemed normal, and no one onboard noticed anything unusual in flight, but upon landing it was apparent that lightning entered at a prop tip and exited via a static wick on the tail. While initially appearing to be minor damage with minor ramifications, the extent of the financial and scheduling pain was soon felt.

Due to the lightning strike, the engine had to be removed from the airframe and disassembled so the parts could be demagnetized. This took four months, and even though insurance paid for part of the invoice, there were still large costs associated with “betterment” – a really nasty word in the insurance industry for any airplane owner who doesn't keep large amounts of cash-reserve.

The second story is of a JetPROP pilot who flew in the clear between two cells at FL270. He remained in the clear, but then heard some unusual sounds while in

flight. Upon landing, there were dozens of pockmarks in the leading edges of the wings, tail and nose area. Hail had been thrown from the storm and he flew through the onslaught. The airplane will fly again but with lots of repairs, \$30,000 in new deice boots and a newfound appreciation of the power of a thunderstorm by the pilot.

The third owner story is a Malibu pilot who never even knew something happened. But during the airplane's annual, the entry and exit wounds of a lightning strike were discovered. The airplane

was repaired, but “avionics gremlins” continue to show up a year after the suspected day of the strike.

Each of these airplane owners will suffer the most financial loss when they try to sell their airplane. Buyers of airplanes are justifiably wary of airplanes that are damaged by lightning or hail. Damage history significantly lessens the value of an airplane.

Needless to say, the owners now steer clear of thunderstorms and would relate that the downtime, financial loss and heartache was absolutely not worth

Short-N-Numbers.com

We specialize in US aircraft registration numbers with 3-digits or less

Examples: 1K, 3C, 22W, 50G, 8MG, 3CC, 1VM, 4GS, 400, 510

Over 1,000 N-numbers to choose from



You should see what you are missing !

New at Rosen Sunvisor for 2019

- **STC'd Robinson Helicopter Visor System**
 - **Crew Plus Shade Systems**
 - **Canopy Retractable Shade Systems**
- **Rosen iPad Mount System, New Improved Design**

WWW.ROSENVISOR.COM

800-284-7677



the few minutes saved by skirting a thunderstorm. It is simply not worth it. You might get away with it once, twice or a hundred times, but if you play with snakes, the snake will bite somewhere along the way – and the strike could be deadly. And a thunderstorm is no garter snake; it's an emotionless viper full of deadly venom.

Closing Thoughts

While I'm a big believer in onboard radar, I'm not a believer of using onboard radar to skirt a storm. The pilots who "go tactical" should avoid the most potent of the deadly venom (storm convection), but going tactical can lure you close enough

to the storm so that lightning and hail can ruin your day, your airplane or even your career if you are a professional pilot.

If you have onboard radar in your airplane but don't know exactly how to use it, don't even think about going tactical near a thunderstorm. In my experience as a long-time instructor in the twin and turbine community, most pilots do not know how to properly operate onboard radar. Some have been to a classroom-only radar class, but the vast majority have not experienced years of mentorship by a true radar veteran (like most airline/military pilots), and don't have the experience to roll the dice around thunderstorms.

Operating onboard radar is an art and a science. You need to understand how it works, and you also need the real-time experience to make it tell you where the deadly snake lies. If you blunder into a thunderstorm, you'll either not live to tell the story, or the story you tell will be of sheer terror and a bent airplane. The convection in a thunderstorm is greater than you or your airplane can handle; a thunderstorm will win every time. Avoidance is your only option. Drift away from thunderstorms, and the life you save may be your own. **T&T**

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



Our approach to a unique way of life.

Ocean Reef is more than a club, it's family; a family that holds tradition, privacy and belonging at its core. Ocean Reef Club is home to countless amenities including a private airport with a 4,400 ft. runway, 175-slip marina, two 18-hole golf courses, tennis facilities, K-8 school and state-of-the-art medical center to name a few. Most importantly, Ocean Reef is about its Members and their core belief in family and tradition.

There are only two ways to experience Ocean Reef Club's Unique Way of Life – as a guest of a member or through the pages of *Living* magazine. Visit OceanReefClubMagazine.com or call 305.367.5921 to request your complimentary copy.



OCEAN REEF CLUB
A UNIQUE WAY OF LIFE
KEY LARGO, FLORIDA

A U T H E N T I C • P R I V A T E • U N I Q U E

ice **shield** **PSA**TM
de-icing systems

**ICE SHIELD PRESSURE SENSITIVE
ADHESIVE (PSA) WING BOOTS
HAVE ARRIVED!**



Visit IceShield.com/PSA or contact an Authorized Ice Shield Distributor for more information

Ice Shield is pleased to offer Pressure Sensitive Adhesive (PSA) wing boots. Similar to the FASTboot[®], Ice Shield PSA allows minimal aircraft downtime and easy installation. Contact an authorized distributor to purchase today.

Ice Shield PSA products are not available for sale or shipment to Canada, U.K., Germany, or France. Ice Shield Standard wing boots are available for sale and shipment worldwide.

IceShield.com/PSA • 800-767-6899 • info@iceshield.com





PHOTOS COURTESY OF TEXTRON AVIATION

King Air 350i King Ranch Edition

by **Rich Pickett**

Since manufacturing the first King Air 90 in 1964, Beechcraft King Air products have earned the reputation of capable and versatile aircraft recognized by pilots worldwide. Today, more than 7,300 units of the iconic turboprop have been produced, with Textron Aviation currently offering the following commercial versions: King Air C90GTx, King Air 250, King Air 350i, King Air 350ER.

Though the largest model, King Air 350i (the “i” stands for interior), has been in production since 2009, Textron Aviation recently released a special edition with renowned agricultural brand, King Ranch. Similar to a branding deal existing between King Ranch and Ford Motor Company, the King Ranch option presents customers with a rustic-themed exterior and interior along with complementary accessories.

Upon completing the first production King Ranch edition, Textron Aviation invited Twin & Turbine to experience the uniquely configured 350i up close. Joined by T & T Editor Rebecca Groom Jacobs, I had the opportunity to speak with the interior design team as well as fly the aircraft at the manufacturer’s headquarters in Wichita, Kansas.

The Worldwide General Aviation owner/operators and chief pilots of these air

100%
TOTAL MARKET COVERAGE

Jets - 15,487

Chief Pilots & Owners

Count	Aircraft
55	AIRBUS ACJ319
25	ASTRA 1125
31	ASTRA 1125SP
51	ASTRA 1125SPX
36	BEECHJET 400
238	BEECHJET 400A
124	BOEING BBJ
371	CHALLENGER 300
55	CHALLENGER 600
38	CHALLENGER 601-1A
109	CHALLENGER 601-3A
51	CHALLENGER 601-3R
289	CHALLENGER 604
9	CHALLENGER 800
166	CITATION 500
285	CITATION 525
266	CITATION BRAVO
153	CITATION CJ1
85	CITATION CJ1+
194	CITATION CJ2
163	CITATION CJ2+
357	CITATION CJ3
92	CITATION CJ3+
240	CITATION CJ4
152	CITATION ENCORE
50	CITATION ENCORE+
297	CITATION EXCEL
18	CITATION I
242	CITATION I/SP
451	CITATION II
58	CITATION II/SP
161	CITATION III
64	CITATION LATITUDE
171	CITATION M2
381	CITATION MUSTANG
125	CITATION S/II
256	CITATION SOVEREIGN
68	CITATION SOVEREIGN+
241	CITATION ULTRA

236	CITATION V
28	CITATION VI
97	CITATION VII
255	CITATION X
25	CITATION X+
212	CITATION XLS
209	CITATION XLS+
1	DIAMOND I
42	DIAMOND IA
3	DORNIER ENVOY 3
232	ECLIPSE EA500
52	EMBRAER LEGACY 500
135	EMBRAER LEGACY 600
58	EMBRAER LEGACY 650
232	EMBRAER PHENOM 100
261	EMBRAER PHENOM 300
75	FALCON 10
21	FALCON 100
19	FALCON 200
186	FALCON 2000
21	FALCON 2000EX
58	FALCON 20C
15	FALCON 20C-5
23	FALCON 20D
2	FALCON 20D-5
31	FALCON 20E
9	FALCON 20E-5
68	FALCON 20F
64	FALCON 20F-5
194	FALCON 50
8	FALCON 50-40
91	FALCON 50EX
153	FALCON 900
23	FALCON 900C
102	FALCON 900EX
180	GLOBAL 5000
127	GLOBAL EXPRESS
19	GULFSTREAM G-100
206	GULFSTREAM G-200
8	GULFSTREAM G-300
22	GULFSTREAM G-400
283	GULFSTREAM G-450
7	GULFSTREAM G-500
471	GULFSTREAM G-550

62	GULFSTREAM G-II
22	GULFSTREAM G-IIB
128	GULFSTREAM G-III
170	GULFSTREAM G-IV
283	GULFSTREAM G-IVSP
170	GULFSTREAM G-V
34	HAWKER 1000A
5	HAWKER 125-1A
7	HAWKER 125-1AS
4	HAWKER 125-3A/RA
11	HAWKER 125-400A
13	HAWKER 125-400AS
12	HAWKER 125-400B
11	HAWKER 125-600A
3	HAWKER 125-600AS
103	HAWKER 125-700A
59	HAWKER 4000
187	HAWKER 400XP
34	HAWKER 750
180	HAWKER 800A
33	HAWKER 800B
353	HAWKER 800XP
40	HAWKER 800XPI
81	HAWKER 850XP
155	HAWKER 900XP
6	JET COMMANDER 1121
4	JET COMMANDER 1121B
1	JETSTAR 6
5	JETSTAR 731
12	JETSTAR II
8	LEARJET 23
17	LEARJET 24
1	LEARJET 24A
11	LEARJET 24B
34	LEARJET 24D
10	LEARJET 24E
7	LEARJET 24F
11	LEARJET 25
36	LEARJET 25B
9	LEARJET 25C
92	LEARJET 25D
3	LEARJET 28
28	LEARJET 31
167	LEARJET 31A

33	LEARJET 35
352	LEARJET 35A
13	LEARJET 36
32	LEARJET 36A
30	LEARJET 40
192	LEARJET 45
166	LEARJET 45XR
100	LEARJET 55
4	LEARJET 55B
12	LEARJET 55C
256	LEARJET 60
467	PILATUS PC-12/45
110	PREMIER I
6	SABRELINER 40
17	SABRELINER 40A
3	SABRELINER 40EL
1	SABRELINER 40R
21	SABRELINER 60
18	SABRELINER 60ELXM
2	SABRELINER 60EX
62	SABRELINER 65
13	SABRELINER 80
6	SABRELINER 80SC
71	WESTWIND 1
5	WESTWIND 1123
29	WESTWIND 1124
62	WESTWIND 2

Turboprops - 11,093

Chief Pilots & Owners

Count	Aircraft
2	PIPER MALIBU
362	CARAVAN 208
1206	CARAVAN 208B
2	CARAVAN II
33	CHEYENNE 400
137	CHEYENNE I
13	CHEYENNE IA
262	CHEYENNE II
57	CHEYENNE III
38	CHEYENNE IIIA
51	CHEYENNE IIXL
22	CHEYENNE IV

Twin & Business Aviation Markets

craft **ALL RECEIVE** Twin & Turbine every month

Do you want your marketing message to reach these key decision makers?

It will when you advertise in Twin & Turbine

PAUL BOWEN PHOTOGRAPHY

179 CONQUEST I
249 CONQUEST II
45 JETSTREAM 31
60 JETSTREAM 32
61 JETSTREAM 41
30 KING AIR 100
514 KING AIR 200
20 KING AIR 200C
17 KING AIR 200T
153 KING AIR 250
177 KING AIR 300
11 KING AIR 300LW
558 KING AIR 350
61 KING AIR 350C
314 KING AIR 350I
19 KING AIR 90
11 KING AIR A/B90
58 KING AIR A100
210 KING AIR A200
54 KING AIR A90
106 KING AIR A90-1
93 KING AIR B100
886 KING AIR B200
100 KING AIR B200C
8 KING AIR B200CT
95 KING AIR B200GT
4 KING AIR B200SE
21 KING AIR B200T
79 KING AIR B90
332 KING AIR C90
34 KING AIR C90-1
188 KING AIR C90A
369 KING AIR C90B
78 KING AIR C90GT
93 KING AIR C90GTI
119 KING AIR C90GTX
13 KING AIR C90SE
242 KING AIR E90
155 KING AIR F90
25 KING AIR F90-1
8 MERLIN 300

25 MERLIN IIB
19 MERLIN III
26 MERLIN IIIA
47 MERLIN IIIB
19 MERLIN IIIC
4 MERLIN IV
9 MERLIN IV-A
8 MERLIN IV-C
63 MITSUBISHI MARQUEE
1 MITSUBISHI MU-2D
23 MITSUBISHI MU-2F
18 MITSUBISHI MU-2J
33 MITSUBISHI MU-2K
11 MITSUBISHI MU-2L
18 MITSUBISHI MU-2M
17 MITSUBISHI MU-2N
24 MITSUBISHI MU-2P
36 MITSUBISHI SOLITAIRE
567 PILATUS PC-12 NG
149 PILATUS PC-12/47
228 PIPER JETPROP
46 PIPER M500
59 PIPER M600
481 PIPER MERIDIAN
3 ROCKWELL 680T TURBO
5 ROCKWELL 680V TURBO II
5 ROCKWELL 680W TURBO II
4 ROCKWELL 681 HAWK
98 SOCATA TBM-700A
68 SOCATA TBM-700B
292 SOCATA TBM-850
102 SOCATA TBM-900
5 STARSHIP 2000A
70 TURBOCOMMANDER 1000
38 TURBO COMMANDER 690
140 TURBOCOMMANDER 690A
139 TURBOCOMMANDER 690B
79 TURBO COMMANDER 840
24 TURBO COMMANDER 900
56 TURBO COMMANDER 980

Twin Piston - 6,507

Owners

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

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

**High Performance
Move-Up Singles -
5,668**

Owners

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

**38,755
TOTAL AIRCRAFT**

John Shoemaker, Advertising Director

2779 Aero Park Drive • P.O. Box 968 • Traverse City, MI 49685-0968

(800) 773-7798 • (231) 946-3712 • Fax: (231) 946-9588

E-mail: johns@villagepress.com • www.twinandturbine.com

TWIN & TURBINE



PHOTO BY AUTHOR

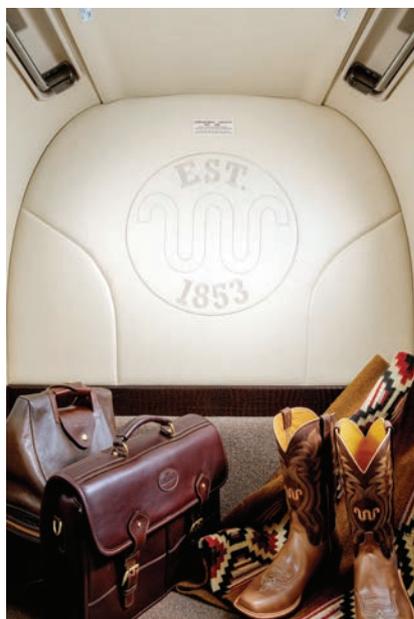
King Air 350i

With a wingspan of nearly 58 feet, length of over 46 feet and height of 14 feet, the King Air 350i is impressive on the ramp. The aircraft is powered by two Pratt & Whitney Canada PT6A-60A (1,050 horsepower) engines, each mounted with four-bladed 105-inch Hartzell propellers. With a takeoff weight of 15,000 pounds, the 350i requires a type rating but can be still be flown single-pilot.

The full-fuel payload is 1,534 pounds, which it can carry over 1,500 nm at normal cruise. If you need additional range, the King Air 350ER features nacelle-mounted fuel tanks that provide 1,580 pounds of additional fuel and extends the range by 700 nm, along with higher weight limits. No wonder individuals, corporations and government agencies operate these airplanes with such a large operational envelope as it offers amazing utility.

Since 1989, Beechcraft has manufactured more than 1,200 Beechcraft King Air 350's and more than 500 King Air 350i's. With the latest 350i, one of the core goals was to improve the interior design for sound proofing. As you can imagine, noise control can be a challenge with two powerful turboprop engines. Beechcraft has mastered it through the use of frame and skin mounted dynamic vibration absorbers that are tuned like a tuning fork for their specific placement. This technology coupled with new insulation throughout the fuselage has substantially reduced overall cabin sound and vibration levels.

With the Beechcraft King Air 350i, LED lighting was introduced throughout the cabin with individual passenger controls. Electrochromic windows are incorporated and have electronic tint control that is far superior to the early



polarizing filters (an added advantage is they automatically darken when power is removed, helping keep the cabin cool while parked on the ramp). And since airborne Wi-Fi is now an expected feature for passengers as well as crew, King Air 350i operators have the choice of Gogo ATG 5000 for domestic use or the Inmarsat-based Gogo Aviator 200 system with capabilities for international operations (standard).

King Ranch Edition

Prior to the flight, Rebecca and I first met with longtime "Beechcrafters" Martin Tuck with technical marketing and Jo Kimbell, senior interior design specialist and lead designer of the King Ranch edition. The pair provided a thorough briefing on the history and engineering behind the latest King Air 350i King Ranch. It was immediately clear they are proud of the accomplishment (as they should be).

After the successful branding program with Jaguar across many Beechcraft aircraft in the 1990s, Textron Aviation



opted to promote the King Air's rugged reputation and collaborated with King Ranch, one of the largest ranch and agriculture operators in the United States and well-known brand. The goal: Develop an aircraft that would be reflective of the rugged yet refined King Air style. Jo explained that teams from both Textron Aviation and King Ranch met frequently, and it took over three months to develop the resulting design.

Following the introduction, it was time to see the real thing. So, we walked out to the airplane alongside Karen DeMauro, Textron Aviation demonstration pilot, and Christina Walser from the communications team.

When you walk up to the King Ranch configured aircraft, you first notice the custom paint – white with pearlescent dark caramel and black stripes. The combination provides a distinctive look. And to the left of the cabin door is the familiar King Ranch "Running W" logo as well as on the inboard side of the winglets.

Upon opening and entering the cabin door, there is a obvious difference from other interiors. The King Ranch interior is a rich ranch-style, just what you would expect from an aircraft that matches its moniker. When designing the interior, Jo explained her objective of making it unique and beautiful yet capable of standing up to the rigors of operations on rough airstrips. For instance, the durable wool carpet is meant to stand up to a lot of use by passengers who opt for cowboy boots versus dress shoes.

The seats are bold and feature a dark brown Sundance Ranch leather that has a great look and feel. To

further the ranch-inspired design, Panama Antigua croc-embossed leather lines the sidewalls. Along with the Tendu wood grain sides and cabinetry, the King Ranch 350i showcases an elegant interior that teams the brown leather and sidewalls with bright window panels and headliner.

To top it off, the King Ranch 350i has the Running W logo embossed on the aft bulkhead of the 55 cubic feet aft baggage compartment. The theme continues with custom hair on leather pillows, throw carpets and even Running W whiskey glasses in the galley

Upgraded Avionics

With the latest Beechcraft King Air 350i, Beechcraft has significantly upgraded the avionics. The aircraft features Pro Line Fusion and now includes Collins Aerospace's latest multi-scan weather radar. This new radar (the same one found in the Cessna Citation CJ4) provides the pilot with a comprehensive view of precipitation with pre-selected tilt angles, which are compared to terrain and obstacle data to remove ground clutter and provide a more accurate

volumetric view of potential threats. To improve traffic awareness, the 350i now has TCAS II as standard equipment.

Along with the adoption of Pro Line Fusion, Beechcraft greatly simplified the maintenance schedule for the 350i. Before, there were four phase inspections, one every 200 hours. All four had to be completed within 24 months. Concurrent with the Fusion upgrade, the calendar limit has been extended to 48 months. This was particularly advantageous for owners with low annual utilization and operators that fly more frequently can now combine inspections. Both operator groups now benefit from lower downtime for maintenance and operating costs.

Textron Aviation offers two engine maintenance programs: Pratt & Whitney Canada's ESP or the company's own Power Advantage. The 350i features five-year limited warranties on the airframe, engines and avionics with two-year limited warranties on other components.

The Flight

A few key things popped out at me as Karen and I spent time doing a thorough

preflight and discussing the features of the 350i:

- The King Air has one of the most detailed pre-flight checklists I've used, with a robust description of each item making for a very complete check.
- The aircraft comes standard with two very large nacelle storage compartments, referred to as wing lockers, which can accommodate items up to six feet in length.
- The dual wheel main gear is robust, designed for rough runway operations, and features bleed air heating to dissipate freezing precipitation on the ground and while they are retracting.
- The airplane holds 539 gallons (3,611 lbs) of Jet A in the main wing and auxiliary center section fuel tanks. With robust fuel heaters, it does not require fuel anti-ice additives.

Following the preflight, Karen and I selected a flight plan that would provide a solid review of the airplane's capabilities, with a cruising altitude of FL240 where we could experience the max cruising speed of 312 KTAS. The 350i has a service ceiling of FL350, however, Karen

complete interior refurbishment

exterior paint • aeromed conversions • cabinetry construction • composite panels • floorplan changes • ice shield boot

Hillaero
Modification Center



One stop solutions with unmatched personal service



(800) 445-2376
www.hillaero.com

CITATION

The Better Performing Sealed Lead-Acid Battery



Built for Your Twin or Turbine Aircraft




7638-44T
AVAILABLE NOW AT DISTRIBUTORS

FAA-PMA approved for CITATION
See Gillbatteries.com for full list of aircraft models serviced by this battery

TELEDYNE BATTERY PRODUCTS | GILLBATTERIES.COM

Everywhere you look



mentioned she usually cruises anywhere from FL270 to FL310 unless optimizing for winds or range.

Settling in the cockpit, with the GPU connected, we took our time reviewing the cockpit and the flows. There are a lot of switches and controls in the King Air 350i, but once Karen explained the logical grouping by function, it was much easier to understand. Using Fusion, we quickly set up the defaults for the flight including weights and fuel loading. Flight plan entry with Fusion is aligned with the process in Pro Line 21. Start with the Flight Plan tab, enter departure and destination airports, waypoints and airways then press “Execute.”

Starting the 350i involves a short series of steps. Without a GPU, after starting the right engine, you leave the condition lever in high idle to assist in the cross-generator start of the left engine. The condition lever is then set to low idle on both engines, props forward and on to the Pre-Taxi check. Once the avionics powered up, we were able to utilize another fantastic feature with the Fusion – the electronic checklist. Using one of the split screen panels of either PFD and a pair of yoke mounted switches, either pilot can bring up the electronic checklist and quickly move through the required checks without fumbling around a paper checklist. Using this feature, we worked our way through the Before Takeoff checks while still on the ramp.

Taxiing the plane, the 350i can turn easily in tight areas especially when using differential braking combined with differential propeller “braking” (commonly known as propeller ground fine). In fact, you can turn it within a circle only 26 feet larger than its wingspan. The 350i has a solid feel taxiing. I find it slightly heavier than the Citation CJ3, which has a similar gross weight and may be related to the dual main gear.

Cleared for takeoff by Wichita Tower for takeoff on runway 1R, we confirmed lights, autothrottle, probe heat and other necessary switches active. I moved the throttles forward and 2,100 horses propelled us forward. We quickly accelerated through a V_1 of 99 KTAS, rotated at a V_r of 104 KIAS and changed to Wichita Departure. ATC quickly gave us a climb to FL240 and a very flexible flight path.

As you would expect, the King Air 350i is very stable and enjoyable to hand fly. Using the climb checklist, I reduced the prop RPM to 1,600 and we were quickly at 312 KTAS at FL240 burning 400 PPH per side, with a torque setting of 90 percent and propellers at 1,500 RPM.

Behind me, I looked to see Rebecca seated across the aisle from Christina, exploring and enjoying the King Ranch's sophisticated cabin. With its double club arrangement, the 350i offers a great passenger space for either work or relaxation.

King Air 350i King Ranch

Maximum

Cruise Speed.....312 KTAS@FL240

Max Cruise Speed
@ FL350..... 283 KTAS

Max Ramp Weight 15,100 lbs

Max TO Weight.....15,000 lbs

ZFW12,500 lbs

Max Landing Weight15,000 lbs

BOW - as flown - 1 Pilot 10,070 lbs

Useful Load5,030 lbs

Usable Fuel Capacity3,611 lbs

Full Fuel Payload.....1,534 lbs

IFR NBAA Max Range

@FL350, 4 Pax1,715 nm

IFR NBAA Max Range

@FL350, 8 Pax1,533 nm

Base Price \$7,775M

King Ranch Option\$125,000

We then requested a descent to 10,000 feet for some air work. I hand flew it down to altitude and prepared to practice steep turns and just enjoy flying the airplane. Flying steep turns at 45 degrees of bank was extremely easy with obvious stability (such stability that the large turboprop even maintained altitude and bank without control input). And the Pro Line Fusion's large PFDs and MFD provide great situational awareness.

After flying around western Kansas for a half-hour, it was time to try an approach back into Wichita. I selected the ILS to runway 19L on the Fusion's MKP (multi-function keyboard panel). With Fusion, there are multiple methods of selecting an approach, either by touch on the displays or with the MKP. Once loaded and executed (confirmed), we were ready for vectors to final.

Approach

With its large propellers, the King Air 350i can easily be slowed down to the flap extension speed of 202 KIAS for approach. As we neared the final approach course, the Fusion displayed an extended centerline of the runway and a “dome” over the arrival airport. These graphics, also for the departure and alternates, significantly increase situational awareness.

Once cleared for the approach, and with our V_{ref} of 100 KIAS and DA of 1,520 set, we joined the localizer. Over the runway at V_{ref} and a smooth reduction of power resulted in a nice landing on the robust landing gear.

Summary

After more than 50 years of producing an iconic aircraft, Textron Aviation has again proven that they can innovate, both with technology and design, with the Beechcraft King Air 350i. When you couple the aircraft with the King Ranch option, operators have a very capable aircraft that offers a unique inflight experience for pilots and passengers alike. **T&T**

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



When upgrading your panel, you can do things the hard way or the easy way. Which do you choose?

Avidyne's FMS/ADS-B solution for turbine aircraft.



Easy to use. Easy to install. Easy to upgrade. Easy on your wallet.

STC CERTIFIED & AVAILABLE NOW!*

*Citation 500 Series and King Air

Call: 800.AVIDYNE (284.3963)
 Email: sales@avidyne.com
 Visit: avidyne.com/FMS



AVIDYNE®



WHO:
Jo Kimbell

POSITION:
Senior Interior
Design Specialist,
Textron Aviation

HOME BASE:
Wichita, KS

1. *You have dedicated nearly four decades to business aviation, predominantly at Beechcraft. What aspects of the company and industry have had you hooked?*

Wow, when you put it into decades, it makes me seem old. But time has flown by; I love aviation and this company. We truly are a big family of loyal employees and loyal customers. It is a fast-paced, premium, fascinating market, which has always had a mystique and passion surrounding it.

The industry has always kept my enthusiasm and affinity growing. I have an inability to stop my mind from realizing new designs. It is like a rush of adrenaline when a new concept comes to life. It starts involuntarily and then becomes an addiction.

2. *Can you describe your current role and responsibilities at Textron Aviation?*

I am the senior interior designer for Beechcraft turboprops and pistons, and now the new Cessna Denali. In this position, I meet with all customers under those categories to help guide them to the successful interior for their aircraft.

I also participate in new product development for these products. This involves working on cross-functional internal teams with industrial design, engineering, supply chain management, manufacturing and sales.

3. *How has the aircraft interiors sector evolved since you first entered the segment?*

Over the last 38 years, I have observed a number of trends in aircraft design. The most prominent is the liberal use of a variety of materials such as leathers, silks, platings, custom carpets, rich wood finishes and most recently "green initiatives." The only boundaries are really those imposed by federal aviation regulations. However, we can still be very creative in working to satisfy customer requirements while meeting the necessary standards, which can lead to exciting new products.

Another evolution is our need to stay connected through electronics. We must design and incorporate useful technology into our onboard flying offices.

4. *In your position, you help set the tone for a customer/passenger's entire in-flight experience. Can you walk us through what key factors are considered going into each design?*

I maintain a customer-centered approach to design. How is the aircraft going to be used? Who is flying onboard? What are the primary missions? Will it be flown for personal or corporate use? What is the projected length of ownership? These are all questions to be determined before we start selecting interior materials.

To make the most efficient use of the space, we must pay attention to how the passenger will feel in the air. Interiors should be soothing, with rich accents and tones that express the customer's individuality while being mindful of trends and design for longevity.

5. *You were the lead designer on the new King Air 350i King Ranch edition. What was the inspiration behind this unique design/partnership?*

We wanted a combination of rugged comfort with refined precision. Although the interior was designed to be a "workhorse," it has the beauty of a thoroughbred. We wanted to appeal to farm and ranch, construction, manufacturing and the engineering sectors of business. I think we accomplished this and more judging from the level of interest we've seen from the market.

King Ranch has been a great company to work with on this special interior. We were able to gain a lot of insight and inspiration from our meetings together in addition to our visit to the Ranch. There simply is no other place like it. 

Contact us today to schedule your Recurrent Training customized for you.

Fly confidently




Piston Twin

- Cessna 300/400 series
- Piper Navajo/Chieftain
- Beech Duke & P-Baron

Turboprop MEL & SEL

- Cessna 425 & 441
- King Air 90, 100 & 200
- Cessna 208
- TBM 700/850

Call us about other aircraft!

www.NationalFlightSimulator.com
 steve@NationalFlightSimulator.com | 866.505.0077

PROPELLERS



- ◆ DOWTY
- ◆ HARTZELL
- ◆ McCAULEY
- ◆ MT PROPELLER
- ◆ SENSENICH
- ◆ RAPCO DISTRIBUTOR
- ◆ WOODWARD PT6A

http://www.rockyprop.com
 e-mail: rockyprop@rockyprop.com

- ◆ LARGE INVENTORY
- ◆ SAME DAY SHIPPING
- ◆ UNCOMPROMISED QUALITY
- ◆ COMPETITIVE PRICES
- ◆ WORLD CLASS WARRANTY
- ◆ FACTORY TRAINED TECHNICIANS

ROCKY MOUNTAIN PROPELLERS, INC.

2865 AIRPORT DRIVE ◆ ERIE, CO 80516
 FAX: 303-665-7164 ◆ FAA/EASA CRS FR6RS45N

800-462-7605

GOVERNORS

New for Cessna 208

Lumatech LED™

Reliability & Performance

You Can See



- Laser Crisp Sunlight Readable Lighting
- LED Reliability with Five-Year Warranty
- Eliminate Lamp Failures, Broken Caps, and shorted Diodes forever!

 **Luma Technologies LLC**
 Partners in Quality & Innovation

Phone: (425) 643-4000, x305
 Info@Lumatech.com

International Airspace: What You Should Know

by Rick Gardner



We are all accustomed to the freedom and liberty of being able to hop in our airplanes and fly wherever we want without doing much more than filing a flight plan, lighting the fires and blasting off. However, when your destination requires that you fly through international Flight Information Regions (FIRs), things can get a little more complicated.

Most pilots are aware that prior permission (overflight permit) is sometimes required to fly through international airspace and that fees may be due for flying through that airspace (including the United States). However, finding out how to obtain the overflight permit and how to make the payment can be a challenge and the procedures for doing so varies from airspace to airspace.

In some parts of the world like Central America and the Caribbean, smaller countries may have joined forces to combine their respective airspaces and turned over the responsibility to manage this airspace to a third-party entity. While the third party may administer the airspace above, each country below this airspace may still require operators to obtain a permit to overfly them. This is particularly true with COCESNA airspace in Central America where some jet operators have been forced way off of their planned route because they did not get a permit from a particular country. This can present an unplanned logistical and safety challenge.

Requesting a permit usually entails providing an itinerary, completing forms and submitting aircraft and crew documents to the controlling agency. The controlling agency will analyze the documents submitted and if completed correctly, will provide you with the authorization number for the overflight permit which should be included in box 18 of your ICAO flight plan form.

The methods for calculating airspace fees and for making payment vary widely. Some controlling agencies use Maximum Take Off Weight (MTOW) to calculate a “flat rate” for using their airspace whereas others use MTOW to calculate a rate applied to the actual distance flown. In rare instances a controlling agency, like SENEAM in Mexico, will use the wingspan of the aircraft to determine the rates to be applied. Some controlling agencies may exempt aircraft below a certain MTOW from airspace fees but not from permits. Usually, flights to or from a country like the

United States and Mexico will not pay airspace fees. However, if you flew through that airspace and did not depart or land at an airport in that country (U.S.), airspace fees will be due.

When the airspace is controlled by a third-party agency like COCESNA in Central America or Piarco in the Caribbean, fees will be charged regardless of where you depart or land. Airspace fees may have to be pre-paid prior to flight (Curacao) or become due after the flight has been completed. Fees may be collected in U.S. dollars, Euros (Cuba) or pesos (Mexico). You may be notified of the amount owed by receiving an invoice mailed by the respective controlling agency or not at all, as in the case of Mexico where they have a “self-determination” policy. Mail from some foreign countries may take an extremely long time to reach the recipient, if it arrives at all.

To help inform operators of the requirements for flights in the western hemisphere, we offer a free interactive map that is accessible from the “International Permits” page of our Caribbean Sky Tours (CST) Flight Services website (www.cstflightservices.com). By moving the cursor over the respective country, the map will display requirements for landing/entry/overflight permits, airspace and APIS. This can be a useful tool for planning your international flight. Members of our pilots association can also download many of the forms for requesting overflight and landing permits themselves. Or if pilots prefer, we can take care of obtaining the necessary permits and paying airspace fees on your behalf with our premium international permits or ground handling services.

Failing to obtain the required permits or failing to pay for past flights can result in inconveniences, or worse. We regularly receive calls from pilots who have been denied access to airspace or have had their airplanes grounded in a foreign country because they owed airspace fees from past flights that had been left unpaid by their trip planning company. One of the most challenging airspaces in this regard is Mexico due to the fact that routes from the United States to popular international destinations cross into their airspace. If you have flown from anywhere in the United States across Mexico, or the Gulf of Mexico, to Central America, the Caribbean or South America,

you probably flew through Mexican airspace. Unpaid Mexican airspace fees accrue back taxes and interest and follow the tail number of the aircraft. If you purchase an aircraft or change the tail number of your aircraft, you may also be purchasing the unpaid debt of that aircraft or that of the aircraft that bore the tail number you just obtained.

If you have any doubts as to whether you owe unpaid airspace fees, including Mexico, we will be happy to explain how to determine this on your own (yes, for free). If you determine that you do owe Mexican airspace fees, take note that these have to be paid to the Mexican IRS in Mexico and cannot be paid with a credit card, check or wire transfer. The most practical option for making payment is to use a company like ours that has offices in Mexico to avoid having to pay "company A" in the U.S. who pays "company B" in Mexico, and you pay for both. The company you use should always provide the actual payment confirmation made to the Mexican IRS; an invoice from the company doesn't cut it.

Make sure that your international trip starts on the right foot by determining what permits will be required for your route of flight and make sure that the corresponding airspace fees get paid. **T&T**

With offices in the U.S. and Mexico, Caribbean Sky Tours (CST) has been providing products and services to general aviation pilots flying piston, turboprop and jet aircraft to Mexico, the Bahamas, Caribbean, Central and South America since 2004. You can contact Rick at rick@caribbeanskytours.com.



(602) 614-7994
Arizona Type Ratings
 GE-500, CE-510 or CE-525
 Type Ratings / Recurrent Training

Simulation Real thing

**One-on-one training. Your plane or our plane.
 Your place or our place. Examiner on staff.**

www.arizonatyperatings.com

**Pratt & Whitney Canada
 Distributor and Designated Overhaul Facility (DDOF)**



**Specializing in the Maintenance and Overhaul
 of the PT6A, R985 & R-1340 Engine Series**

www.covingtonaircraft.com • Ph. (918) 756-8320
 Se Habla Espanol • FAA Repair Station No. CP2R750K

Imaginary Controls

by Kevin Ware



For some strange reason (perhaps my medical training), I have a particular fascination with horrific diseases. Over time, this interest has led me to faraway places such as Bergen, Norway where Dr. Hansen discovered the bacteria that causes leprosy, a disease that now bears his name. Leprosy itself is a ghastly condition that causes the most visible parts of its victim's body, typically parts of the face and hands, to slowly die while the sufferer is still alive and must watch their slow deterioration.

This scourge of humanity has been around for thousands of years and can be found in the tombs of the Pharaohs, and is even mentioned multiple times in the Bible. There is also a famous site in the Hawaiian Islands where lepers were once banished. And so, while on vacation in Molokai this winter, I decided my wife Kari and I just had to fly down to the small airport on Kalaupapa to see the leper colony that was formed there in the mid-1800s.

Now, my wife is not at all interested in horrific diseases and is also very conservative when it comes to riding in small single-engine aircraft. From her point of view, the major problem with visiting

Kalaupapa was we had to fly there in a small airplane flown by an unknown pilot. Of course, to me that just added to the experience so I assured her that the aircraft operator was no doubt FAR Part 135 certified and probably flew new equipment with a crew of two highly experienced and careful pilots.

Hoping my promises to be true, we show up at the small Molokai Airport (MKK) with some trepidation to check out our flight arrangements. On the ramp, I see three Cessna 208 Caravans. One was what we call a "POJ" at our airport. The paint was faded, the upholstery replaced many times (and still torn), the instrument panel full of old round gauges, and I could not help but notice someone had left the master switch on – with the crew nowhere in sight. About a hundred feet away from this fine flying specimen, there were two brand new looking Caravans with shiny company logos and Garmin G1000 avionics installed in the panels. The crew for each shiny aircraft consisted of two uniformed, clean-cut young people dressed up in black pants, white-starched uniform shirts with shoulder bars, and prominent gold wings pinned just above their shirt pockets.

Their energetic preflight made them look like students at Embry Riddle taking a final exam, making sure not to miss a single thing that could be wrong with their aircraft. My wife found this very reassuring, and we entered the small terminal to check in with their ramp agent.

In making our inquiry, however, we were told our reservation was with the "other company" and their people had gone somewhere but would probably be back shortly. After a while, a scruffy-looking ramp guy showed up, checked us in and assigned us seats in the junky airplane right behind the pilot.

We then sat there long enough with the master on and gyros whirling for me to start thinking that if we don't get this thing started pretty soon, the battery will be depleted and the PT6 is going to have a hot start if it starts at all. But just as I was wondering if I should do something about this, a portly old fellow shows up dressed in an old white uniform shirt with a frayed collar and stained cargo shorts. There was a tattoo on his right calve of sufficient size and design that'd make the Hells Angels motorcycle gang proud. He was chewing on a toothpick, apparently just having eaten something

at the girlfriend's place. Fortunately, he did have a TSA crew ID card from the Maui airport hanging around his neck. He climbed into the airplane, poked his head in the cabin and said, "Everybody going to Kalaupapa?" After we all nod in the affirmative he said, "Good, let's see if this airplane will start, and we'll get out of here."

He flips switches, yells "clear" and gets the turbine section of the PT6 starting to whine as he gives us the FAR Part 135 required seat belt briefing. I have flown PT6 engines often, and from my back seat, I start watching the RPM gauge, which is expressed in percentage terms. In order to avoid a hot start in a PT6, you first need to make sure there is at least 24 volts available from the battery, then before pushing up the fuel lever, let the starter turn the hot section until a good 12 percent is showing on the RPM gauge. (I actually like it turning faster than that because it provides a lot more cooling air across the turbine blades when the fire lights up). But our shorts-wearing, tattooed pilot doesn't seem to share my engine philosophy, because I see the red fuel control knob go forward the second the RPM gauge passes 10 percent. In spite of this, however, the engine lights off without too much of an over temp, at which time our brave pilot immediately releases the brakes. As the airplane starts rolling, my wife gives me a concerned look, and I try to look back in a confident and reassuring manner just as my right hand wanders about looking for an imaginary control wheel in front of me.

As we taxi into a quartering tailwind from the aircraft's left side, my old flight instructor habits start to kick in and I check to make sure that our brave pilot is holding the controls in the correct position. Sure enough, it appears he knows what he is doing because the elevator is down, flaps at the initial setting, and the ailerons positioned with the left one down, and the wheel forward, fully to the left and firmly held. Nevertheless, I try to help him out by holding the imaginary wheel in front of me, left wing all the way down. There is not much to check on a PT6 before takeoff, and the pilot gets it all done with his free hand as we are rolling along the taxiway.

Arriving at the end of the runway, we stop on the number with a 25- to 30-knot crosswind coming from the right side

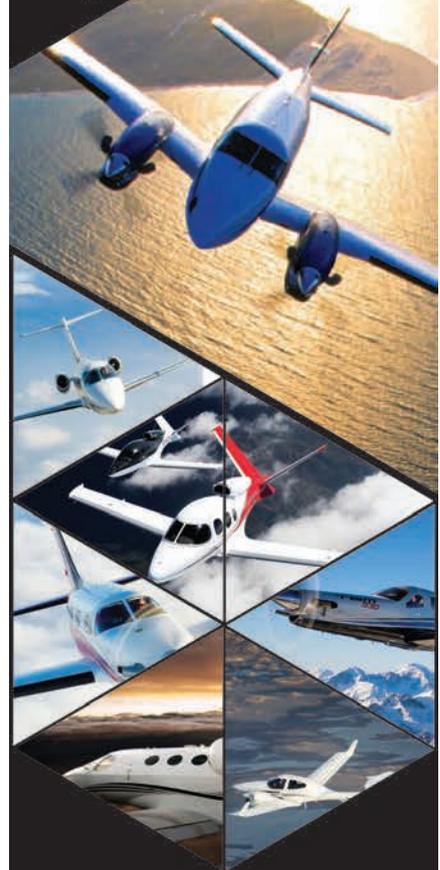
causing the airplane rocking slightly. It continues to jostle in the wind as the engine is brought up to full power and kept that way for a longer time than I deem necessary. I think maybe he is just making sure it won't quit. Finally, the brakes are released and the Caravan surges forward. I note the wheel being held in the correct position for the gusty crosswind from our right, with the left aileron down, right up, and elevator held nose down until we reach about 90 knots at which time the wheel quickly comes aft and the airplane jumps into the turbulent air. Looking back, I can see we are drifting off the departure centerline to the left, but it doesn't matter as that is the direction we are headed anyway, and there are no other aircraft in the pattern.

We level off about 1,500 feet above sea level and cross over the steep cliffs on the north side of the island. We get about a mile offshore and bounce along at about 100 knots – almost level with some of the island's cliffs to our right. The ocean below us is at least a Beaufort 8 as there are white caps and breaking waves as far out into the Pacific that I can see. The distance from MKK to the small runway at Kalaupapa is only about 15 miles, and we soon start descending with the bumps getting worse. My wife sitting to my right, and securely fastened in with a very tight seat belt, gives me another one of those "Are we OK?" looks with her eyes, to which I smile and nod in my most reassuring manner.

After a few minutes, I can see the runway sticking out on the peninsula that makes up Kalaupapa and off to its right an old lighthouse. At the distant end of the runway, there are breaking waves well above the 14-foot ASL threshold, with the wind driving those waves doing a good 35 knots from about 320, making it a direct crosswind landing. On final, I can see our brave pilot is holding what appears to be a good 30-degree wind correction angle, and I give some thought to whether landing here is a good idea at all. My right foot starts to look for a rudder pedal.

The pilot crosses the approach threshold with the wind correction angle still in play, speed about 100 knots with some power, then just before touchdown, lowers the left wing and kicks in enough right rudder to plunk us down with a screech of scraping rubber – almost dead

AIRCRAFT FINANCING



AIRFLEET
CAPITAL INC

**The Industry Leader
In Rates & Service**

- Flexible Loan Programs
- Unmatched Personal Service
- Easy, Fast & Efficient Process
- 100% Focused on Aircraft Lending

800.390.4324
www.airfleetcapital.com

on the white line. My wife lets out a sigh of relief as he immediately gets on the prop reverse and exits well before the breaking waves down at the end. I note he correctly positions the controls for a quartering from the left tailwind, and taxis to the small terminal where he parks the airplane into the wind, pulls the fuel shut off lever, and hops out while the prop is still turning to place some chocks under the tires. He then goes around to the airplane's rear door, opens it and invites us all out, cautioning the ladies to watch their step. Despite his worrisome appearances, he did a pretty good job.

The old leper colony is both an interesting and saddening place to visit. As it turns out, only a small percentage of the Western human population (5 percent) is susceptible to the disease, but among societies never before exposed the number is dramatically higher. For this reason, when the disease became evident in the Hawaiian Islands in the early 1800s, it spread quickly, leading the government at the time to banish anyone who even appeared to have the disease to Kalaupapa. But the history of this human

tragedy and how its victims managed is what makes the visit worthwhile.

After a sobering tour of the site conducted by a Hawaii Department of Health official, we returned to the airport to find the waves even higher – high enough to now push large volcanic rocks up onto the runway in huge sprays of salt water. Our same tattooed, goateed pilot is again nowhere to be found, but a local said he was “visiting a girlfriend” and would be back shortly. Half an hour later, we were again sitting behind the pilot as he pushed fuel to the PT6 at 10 percent RPM, quickly taxied out to the runway, took off and became airborne well before hitting the rocks now on the runway. He then makes a left 180-degree turn, which was more or less a direct heading to MKK. The nose is kept high and the IAS at about 90 knots as the old Caravan rocks in the turbulence, struggling to get to 1,500 feet in order to cross over the cliff to our left. We land 10 minutes later, with me applying full down left aileron and a lot of right rudder to compensate for the 35-knot crosswind from the left. My right hand grabs the prop reversing

lever immediately after landing, and my toes strain for the brakes. It was only after taxiing back to the terminal that I was willing to surrender the nonexistent imaginary controls in front of me.

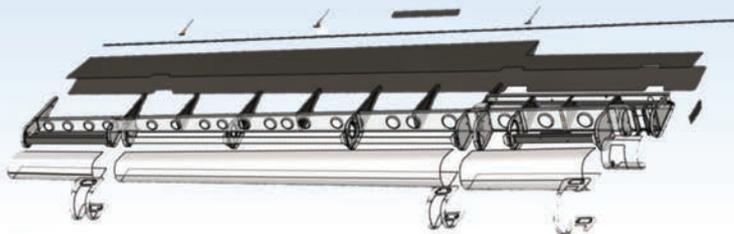
Kalaupapa was certainly an interesting place to visit but left me unsure about the “sitting in the back” business in small airplanes. The imaginary controls do not work very well, and it is much more threatening than actually having my hands on the real ones. **T&T**



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.

KING AIR ALUMINUM AILERONS KING AIR

STC FOR ALL 90, 99, 100
SOLD BY KIT OR REBUILD EXCHANGE



INSTRUMENT PANELS

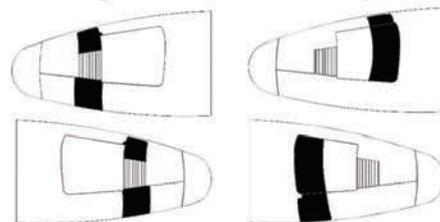
FOR 90, 200, 300



Call: 877-364-8003
Text: 952-447-7737
WWW.SRSAVIATION.COM
DAVE@SRSAVIATION.COM

ICE SHIELDS

STC FOR 90 TO 350



COME SEE US AT
NBAA-2019

In-de'-pen-dent:

Self-governing; *also*: not affiliated with a larger controlling unit/nor requiring or relying on something or someone else.

But time is a limited resource.

Fractional ownership will put you in the cockpit of a new jet. For a set number of days, not hours, the HondaJet is yours. Speed, efficiency, and comfort are the rewards for this choice.

Your decisions have gotten you this far -- would reaching your current "Point B" faster and less reliant, work for you?

Jet It



JET IT BENEFITS

- OWNERSHIP TAX ADVANTAGES - POTENTIAL TO WRITE OFF 100% OF ACQUISITION AND USAGE COSTS
- JET SPEED
- ARRIVE AND DEPART FROM THE AIRPORT OF YOUR CHOICE
- HASSLE FREE - NO TSA, LONG LINES, MISSING BAGGAGE AND DELAYS
- DEDICATED NO COST 24/7 CONCIERGE SERVICE
- LOW COST, LOW RISK, HIGH VALUE

JET IT

PRIVATE. FAST. SMART.

914.292.9888

GoJetIt.com

Email: info@gojetit.com

Greensboro, North Carolina

From the Flight Deck

by Kevin R. Dingman



Max Mania



Much has been written over the past several months about the reason(s) for the Boeing 737 Max crashes – and not just in aviation circles. The events garnered worldwide attention not only because of their commonality, the perceived culpability of the manufacture and implied pilot training deficiencies, but because aviation crashes remain the modern-day version of a train-wreck. Passengers are at the mercy of the man, the machine, Mother Nature and the 10 million manufacturing and design decisions that were made years and decades before they ever boarded the plane. And we can expect this to be our aviation paradigm until civilian, multi-passenger space travel usurps aviation as the most sensational venue for transportation disasters.

As you may imagine, those who pilot the 737 and its variants have been peppered with questions from inquiring minds that want to know. From family, friends, passengers, co-workers and other pilots we get questions such as, what do you think happened? Why didn't they turn off the system? Would you feel safe flying the Max? The executive summary is this: Engineers created a "background" system using a marginally reliable, non-redundant probe/sensor; the crews didn't recognize the failure mode; and yes, I would still fly the airplane. Here's why.

Not the First Time

Systems and components that operate behind the scenes, oblivious to the crew are not new. The previous airliner that I flew, the MD-80, had two-engine related systems and one of them worked behind the curtain similar to the MCAS. They were the ART system and the ATR system – same letters but different systems to augment the motors during non-normal situations. We operators only discovered the existence of the Mad Dog's second engine augmentation system through operational events that led us to query the manufacturer.

The Automatic Reserve Thrust system (ART) is an out-in-the-open, pilot-selectable/de-selectable system and uses the autothrottles to advance the remaining motor to a higher power setting after an engine failure. The system includes an annunciator that indicates activation to the crew. The Automatic

Thrust Restoration system (ATR – the second, "hidden" system) uses the fuel controllers (causing no throttle movement) to add fuel when several unusual conditions are encountered simultaneously during takeoff. And this system provides no system activation notification. With this system, as with the MCAS, any assertion that the manufacturer intentionally hid information from customers and pilots regarding their operation for some nefarious reason is unlikely. While the MCAS system is new to this aircraft, flight control augmentation, visible to the operator or not, is nothing new.

Innovation

Military and civilian aircraft designers have traditionally used imaginative, innovative and sometimes brilliant (Bell X-1, SR-71, SpaceShipOne) aerodynamic engineering in order to accomplish desired flight characteristics and capabilities. We have high-speed rudder limiters, flaps that "blow-up" when the limit speed is reached, a stick-pusher when AOA gets too high, slats that extend automatically at slow speed, even landing gear that extend on their own (Cherokee Arrow). We have anti-skid systems that override pilot aggressiveness, doors that won't open in flight and multiple other systems that are "pilot-proof." Almost all of the "below-the-surface" systems, however, alert the pilot when they are triggered.

When a new system is substantially similar to an existing system, or when failures in the new system display familiar failure modes or flight characteristics (and can be addressed with existing procedures), it's not unusual for manufacturers to consider new designs, systems or components as relatively inconsequential to operating procedures and therefore, not provide a pilot-alerting function in the system-activation logic nor recommend additional pilot training. Until that is, the brilliant new innovation displays an unexpected failure mode or proves to be overly complicated for Yogi or the other, average bears.

Why'd They Do It?

Boeing needed to make design changes to the venerable 737 in order to increase airline margins and thereby make the plane more competitive. To achieve this objective, a more efficient engine was chosen that was larger, but the engines needed more ground clearance. In order to avoid major airframe changes, the larger engines had to be moved higher, partially by making the nose strut longer, and partially by moving the engines forward. But the more-forward engines created unacceptable handling characteristics at high AOA. The Maneuvering Characteristics Augmentation System (MCAS) was designed to resolve the issue by adding to and changing the already existing Elevator Feel Shift (EFS) system (which makes the Max "feel" like a good-old-fashioned 737).

Most biz-jets and airliners like the Max have two AOA sensors but the "off the shelf, from the factory" MCAS only talks to one of

them. The MCAS uses a single, non-redundant AOA sensor input to trim nose down at high AOA – and the amount of nose down trim authority given to this autonomous, single-source system is very significant. Additionally, the single AOA sensor input may have a reliability issue. Boeing does offer the option for a second AOA input to the MCAS and an AOA disagree warning light for the system. Two power-shutoff switches on the center console (almost every turbine airplane, including the 737, has had these for a thousand years) are designed to disable the MCAS system either way, which will then allow a manual re-trim of the aircraft through a hand-crank trim wheel by the captain's right knee and another at the FO's left knee. Malfunctions in a system that operates silently in the background, like the MCAS, can be a challenge when they malfunction especially if the failure mode mimics a normal, day-to-day behavior of the system.

As the Trim Wheel Spins

The 737 has several modes of stabilizer trim, only one of which is the MCAS. The mode everyone is familiar with is activated by the switches on the yolk and we use it all of the time – and it spins the trim wheel. Another mode trims the aircraft when the autopilot is off. Called the Speed Trim System (STS), it's designed to improve flight characteristics with a low gross weight, aft center of gravity and high thrust when the autopilot is not engaged (i.e. during takeoff). This system spins the trim wheel as well. Another mode is the autopilot-on mode, which trims in the same



manner as we do when hand flying – and it also spins the trim wheel. And yet another mode is the now infamous MCAS which, yes indeed, spins the trim wheel.

My point is this: 737 pilots are accustomed to seeing and hearing the trim wheel spin. When we're fast, slow, autopilot on, autopilot off, when we expect it to trim and when we don't expect it to trim, the trim wheel spins. Is it possible that we are desensitized to trim wheel movement? Absolutely yes, at least potentially. May that be the cause of a delay in our response if the MCAS fails and runs away with our trim? Absolutely yes, at least for a few seconds. And how many seconds of trim wheel spinning does it take to make the nose really, really, really heavy? A couple of crews have found the answer to be less time than they imagined.

If the Trim Misbehaves

Required by AD 2018-23-51: In the event of uncommanded horizontal stabilizer trim movement (which I just told you happens routinely with the STS, MCAS, and the normal autopilot-on mode), *combined with* any of the following potential effects or indications resulting from an erroneous AOA input, the crew must execute the runaway stabilizer procedure in the operating manual:

- Continuous or intermittent stick shaker on the affected side only;
- Minimum speed bar (red and black) on the affected side only;

MOUNTAIN MODERN SIX @46U



Live Airpark Life. Mountain Modern Home on the Lake, Hangar Included \$1,850,000 [MLS](#)



35 MILES TO JACKSON HOLE

ALPINEAIRPARK.COM

LISA 303-709-6526 BILL 701-367-6161 MARION 307-248-2073

HANGAR HOME FOR SALE IN TAX-FRIENDLY WYOMING, NEW 70x5850' RUNWAY

50 W US HWY 26, ALPINE

- Increasing nose down control forces;
- IAS DISAGREE light;
- ALT DISAGREE light;
- FEEL DIF PRESSURE light.

A Typical Runaway Stabilizer Trim Procedure:

Control column...Hold firmly

Autopilot (if engaged)...Disengage

Control pitch attitude with control column and main electric trim.

If runaway trim stops...End of procedure

If trim continues to run away:

Stab Trim Cutout switches (both)...Cutout

If the runaway continues:

Stabilizer trim wheel...Grasp and hold

Stabilizer...Trim manually

Training guidelines for the Boeing 737 Max likely didn't emphasize the new MCAS anti-stall program or provide a pilot-alerting function because it was believed that current protocols to deal with other stabilizer and trim failures covered MCAS failure modes. Why they didn't have the MCAS listen to both AOA sensor inputs through a comparator, however, is perplexing. This being the case, it seems there are a few possibilities to explain the recent unrecoverable catastrophic failures.

One - pilots are not recognizing the failure mode or if they do, are not using the approved procedure that should remove

power from the MCAS. Two - pilots recognized the failure mode but are executing the procedure improperly, too late or the procedure when applied didn't work. Three - it's not the MCAS system that is malfunctioning at all, and there exists an unknown and unrecognized failure mode in the Max flight control system yet to be discovered.

When the Ground Gets Bigger

Magazine article lead-times are long (it's almost the end of March as I write this), and by the time you read this we will have some answers and a solution will be in place. Probably new software, additional AOA sensor input, system activation annunciation and additional aircrew training. Then we can all shake our heads in disappointment over pilot errors, engineering decisions, or the discovery of an unknown failure mode - or a combination of all of the above. However it unfolds, when any failure rears its head in the airplane, it will be, as it has always been, your training, experience, determination and judgement that will be working the problem. And the folks that made those 10 million engineering and design decisions regarding your airplane are not the ones that will be watching the ground get bigger as you demonstrate some of that pilot stuff. **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.

GET Your Airplane Built Into an Executive Desktop Model

ORDER EASILY
866.580.8727
 direct: +1.602.635.4646

FDM
 FACTORY DIRECT MODELS.COM

OFFICIAL BEECHCRAFT SUPPLIER

Preferred Airparts
 Chosen for value and service

35% to 85% Off!
 New Surplus Aircraft Parts

Over 14 million new surplus parts in stock & ready to ship!

- Airframe
- Piston Engine
- Turbine Engine
- Continental
- Lycoming
- Overhauled Rotables
- Exhaust Systems
- Wheels and Brakes
- Overhauled Propellers
- Hardware: AN, MS, NAS
- Pre-sewn Fabric Envelopes
- And More!

Free Online Inventory Search
www.preferredairparts.com

Preferred Airparts, LLC
 Div. of JILCO Industries, Inc.
800-433-0814
 Toll free, U.S. & Canada
 Tel. 330-698-0280 - Fax. 330-698-3164
sales2@preferredairparts.com

We Buy Worldwide!
 Sales Hours: 8:15am to 5:30pm EST

CALL HERE GET THERE



Your King Air was made to **fly** so when life is waiting, you shouldn't be.



You want the right part and the right price from a partner you can trust to get you back in the air – and on to there. **Professional Aviation Associates** is the largest independent King Air parts supplier in the world. We've been keeping aircraft flying for more than 30 years so you know we'll be around as long as you own your aircraft. We're based near Hartsfield-Jackson International Airport in Atlanta with access to immediate, global air service to get your part to your technician when you need it. Our sales force is dedicated to your satisfaction with the right part and the right price.

Call us, we'll help get you there.
(800) 283-2105 / www.KingAirParts.com

 **ProfessionalAviation**
ASSOCIATES

On Final by David Miller



Just a Tire

“Ladies and gentlemen, this is your captain. I have some good news and some bad news.”

“Uh oh,” I said to my wife Patty as we sat on a 2 p.m. American Airlines flight from Salt Lake City to Dallas, about to leave the gate.

“One of our tires needs to be replaced, and it may take an hour and a half. But we will get this done and be on our way as soon as possible. You will need to collect your belongings and depart the airplane,” said the captain.

My first thought was, why now? Was the tire damaged during the previous landing? Was it just a crew change and the new crew didn't like the looks of one of the main tires? Not that it mattered, but I knew immediately that there was no way we were going to depart in an hour and a half. But within 30 minutes a mechanic showed up with the replacement tire. A half-hour later, another guy arrive to help.

A disgruntled female passenger scowled at the mechanics and said, “Damn government workers.” I said, “Ma'am, these guys are private industry. Maybe you are used to the time it takes to change a tire at a NASCAR race, but it's a little more complicated on a Boeing 737-800.”

As we sat in the terminal, I thought about how I inspect my Mustang tires during preflight. And how I should look more closely at them after every landing. I am fairly conscientious about keeping tire pressures monitored though. I have good reason.

One warm summer morning, we departed for California in our Sabreliner Model 40. After a full week of business, we fueled and loaded up in Sacramento for the return to Dallas with a stop in Denver. On the previous landing, we noticed what appeared to be a slightly underinflated left main tire. But now it looked normal. Probably anxious to get home, we didn't check the pressure. The weather was great as we left the FBO and taxied to the active. My longtime pilot JC was PIC for this leg. Everything was normal as the Sabre smoothly accelerated down runway 12R at SJC until exactly V_1 speed. Simultaneously, we heard a loud boom and the airplane began to lurch sideways. Instinctively, JC rotated the old bird one second before we left the rapidly approaching runway boundary.



We made two passes by the tower for a visual inspection. The controllers said everything looked normal. What they couldn't see was the phonebook-sized hole in the left main tire – the one and only left main tire that came with the airplane. We knew something was wrong but decided to raise the gear and press on to Denver while we burned off fuel to reduce our landing weight. (Thinking back, raising the gear up was probably not the right thing to do, but it's the decision we made).

In the cockpit, we had the situation under control, were well briefed and composed. And on we flew to Denver for the next hour.

Over the threshold with the red lights of fire trucks flashing and sirens blaring, JC made a perfect landing. The tire stayed on the wheel. And just like in your car when you have a flat, the old Sabre just let out a “whomp, whomp, whomp” as the tire begrudgingly brought us to a stop. We were towed to the FBO. Six hours later, with a new tire sent from Dallas, we were on our way. Today, American Airlines got us going in three.

Fly safe.

David Miller has owned and flown a variety of aircraft types, from turboprops to midsize jets, for more than 40 years. With 5,000-plus hours in his logbook, David is also Chairman Emeritus of the Citation Jet Pilots Safety & Education Foundation. You can contact David at davidmiller1@sbcglobal.net

ADVERTISING DIRECTOR

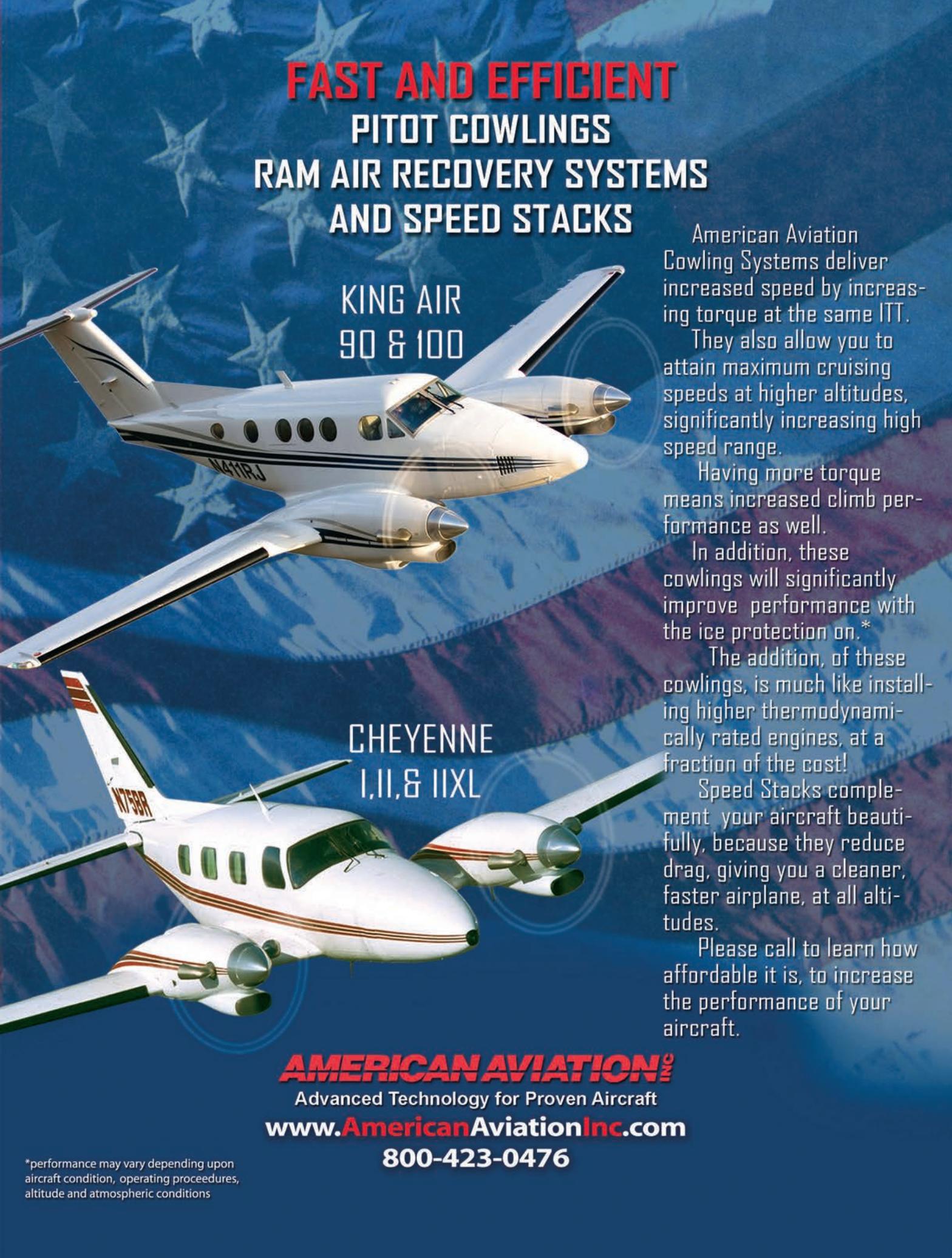
JOHN SHOEMAKER

2779 Aero Park Drive,
Traverse City, MI 49686
Phone: 1-800-773-7798
Fax: (231) 946-9588

E-mail: johns@villagepress.com

Ad Index

Airfleet Capital, Inc.....25	Hillaero Modification Center17	Recurrent Training Center3
Alpine Airpark29	Ice Shield/SMR Technologies.....11	Rocky Mountain Propellers, Inc.21
American Avation Inc. Inside Back Cover	Jet It.....27	Rosen Sun Visor Systems.....9
Arizona Type Rating23	Jet Shades.....7	Select Airparts5
Aviation Insurance Resources7	Luma Technologies LLC21	Short N Numbers9
Avidyne Corporation.....19	National Flight Simulator21	SRS Aviation26
CD Aviation Services.....3	Ocean Reef Club10	Teledyne Battery.....17
CIES Corporation.....3	Partners in Aviation Back Cover	Textron Aviation Inside Front Cover
Covington Aircraft Engines23	Preferred Airparts LLC.....30	Turbines.....5
Factory Direct Models30	Professional Aviation Associates31	



FAST AND EFFICIENT
PITOT COWLINGS
RAM AIR RECOVERY SYSTEMS
AND SPEED STACKS

KING AIR
90 & 100

American Aviation Cowling Systems deliver increased speed by increasing torque at the same ITT.

They also allow you to attain maximum cruising speeds at higher altitudes, significantly increasing high speed range.

Having more torque means increased climb performance as well.

In addition, these cowlings will significantly improve performance with the ice protection on.*

The addition, of these cowlings, is much like installing higher thermodynamically rated engines, at a fraction of the cost!

Speed Stacks complement your aircraft beautifully, because they reduce drag, giving you a cleaner, faster airplane, at all altitudes.

Please call to learn how affordable it is, to increase the performance of your aircraft.

CHEYENNE
I, II, & IIXL

AMERICAN AVIATION^{INC}

Advanced Technology for Proven Aircraft

www.AmericanAviationInc.com

800-423-0476

*performance may vary depending upon aircraft condition, operating procedures, altitude and atmospheric conditions



Flying has evolved. Now, so has ownership.

PIA MANAGED CO-OWNERSHIP:
AIRCRAFT PARTNERSHIPS, EVOLVED

We match you to the right Co-Owner and the right Aircraft - and provide a structure that eliminates the issues of DIY Partnerships.

YOUR AIRCRAFT. YOUR SCHEDULE.

HALF THE COST.

Find out if you're a good fit today at PartnersInAviation.com/Fit.



PARTNERS
IN AVIATION