TWIN & TURBINE

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

SEPTEMBER 2020 $3.95 US
VOLUME 24 NUMBER 9

Baron Pilot

FLYING TO THE TOP OF THE YOUTUBE CHARTS

Tech Look: Weather Radar

To Trade or Not to Trade

Jet Journal: Premier Rating

TAMARACK® ACTIVE WINGLETS
TAKE YOU FURTHER

Only Tamarack® Active Winglets dynamically respond to changing loads and conditions in flight, giving you incredible fuel savings of up to 33% so you can go further with fewer stops.

Active Winglets bring added safety, unparalleled flight stability and a smoother ride for passengers. And when you're on the ground, you can be sure their sleek design and seamless finish will turn heads at the ramp.

Right now we're offering 50% off installations until September 30, 2020. Call us today to find out how Tamarack® can take you further.

TAMARACKAERO.COM | USA +1 208.255.4400

Celebrating 10 years of Innovation

TAMARACK®
AEROSPACE GROUP

TWIN & TURBINE

EDITOR
Rebecca Groom Jacobs
rebecca@twinandturbine.com
EDITORIAL OFFICE
2779 Aero Park Drive
Traverse City, MI 49686
Phone: (231) 946-7770

PUBLISHER
Dave Moore

PRESIDENT
Dave Moore

CFO
Rebecca Mead

PRODUCTION MANAGER
Mike Revard

PUBLICATIONS DIRECTOR
Jake Smith

GRAPHIC DESIGNER
Marci Moon

TWIN & TURBINE WEBSITE
www.twinandturbine.com

ADVERTISING 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
Shannon Martin
Shannonmartin@villagepress.com

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

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

Twin & Turbine (ISSN 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. Periodical Postage Paid at Traverse City, MI.

SUBSCRIPTIONS: *Twin & Turbine* is distributed at no charge to all registered owners of cabin-class aircraft. The mailing list is updated monthly. All others may subscribe by writing to: *Twin & Turbine,* P.O. Box 968, Traverse City, MI 49685, or by calling 1-800-447-7367. Rates for the United States and its possessions follow: one year $15.00; two years $29.00. Canadian subscriptions are one year $24.00; two years $46.00, including GST tax. Overseas subscriptions are one year $52.00; two years $99.00, U.S. funds. Single copies $6.50.

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

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

SEPTEMBER2020 • **VOL. 24, NO. 9**

COVER PHOTO:
Photo Courtesy of Elizabeth Allenbaugh

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

The Search is On

It's official. My husband Jared and I are in the market for an airplane!

We have discussed (dreamt of) owning an airplane for years, but I always swiftly dismissed the idea – we are too young and they are too expensive.

Well, my mindset shifted this year. We are financially stable, well-connected and commercial travel is even more unappealing due to COVID. Another huge motivation behind the investment is the ability to fly ourselves to visit our family scattered around the Southeast – a far distance from Wichita, Kansas.

That distance became especially apparent following a road trip this past summer to see family members in Arkansas and Florida. In all, the trip equated to 48 hours of driving (~3,000 miles). It was a worthwhile adventure, but by the end, we were flat-out exhausted and seriously talking about airplane ownership.

You could say the experience was our tipping point, leading us to where we are today – scouring airplane listings every night. And let me tell you, judging by what we have seen, the used market is hot right now!

On the path to ownership – in search of an efficient cross-country machine.

Main Considerations

We need a cross-country machine. The 1,000-nm haul to Florida is far from a light jaunt, and we currently make the trek (via airlines) three to five times per year. I anticipate that frequency to continue once we have our own set of wings, plus a trip or two to North Carolina and other multi-state journeys.

Though there are single-engine pistons that could make the Florida flight nonstop, we do not see the need to sit in the airplane for 7 to 8 hours at a time. So in reality, we are looking for an aircraft that excels in 600-nm legs, providing us with a single fuel stop. (And I already know our halfway point – Meridian, Mississippi. Land of the free hotdogs, popcorn and sweet tea!).

Jared: We are also looking for an aircraft capable of 150 KTAS at a minimum. By the time you add in pre-flight duties, a fuel stop, weather deviations and headwinds, the day becomes very short. Any slower than 150 and we are on the edge of spilling over to a two-day trip – time we could otherwise be spending with family.

Of course, behind every investment is the mighty dollar. Twin-engines are (sadly) out of the question. Maintaining and feeding two thirsty engines is more than our wallet can afford. Finding an aircraft that can produce speed while maintaining a decent fuel economy (10 to 15 gallons per hour) will allow us to enjoy our aircraft of choice all the more.

Jared: We are open to exploring the different options available to accomplish this prerequisite: small engines that pull a small and sleek airframe; or larger engines with sophisticated engine monitoring and tuning to allow for fine-tuned fuel flows and even lean of peak operation. And while I haven't completely written off the turbocharged engines, the upkeep costs seem to outweigh the efficiency gains, especially when most trips will be flown east of the Rockies.

The Candidates

The perfect airplane for us may not exist (at least not in our budget), but we do have an idea of what features the ideal aircraft will offer. Logically, at the top of the wish list is a newer engine and updated avionics.

Jared: Spoiled by a job in which I exclusively operate the latest in avionics, I would feel much more comfortable in an aircraft with some panel upgrades. I have no illusions of this airplane being an all-weather machine, but when covering the distances we are trying to, the chance of running into IMC goes up. Garmin and Aspen upgrades are at the top of the list but seem to be hard to come by, so the possibility of adding those after the purchase is real.

Also, low to mid-time engines will hopefully allow us to enjoy the aircraft longer before encountering a frightening overhaul bill. Purchasing an aircraft with minimum time before the overhaul is due, or even beyond the recommended overhaul seems risky.

Jared: Of probably the most value to me and easily the hardest feature to come by is finding an airplane that has been loved – maintenance performed above and beyond the bare minimum, meticulous logs, hangered, upgraded…real cherries that jump off the page when you see them. I've had the pleasure of speaking to two sellers of such aircraft so far, and you can hear it in their voice when they talk about the airplane. These airplanes were their pride and joy, and they tend to fly off the market in short order.

With all of that said, here are our top prospects today:

- **Mooney M20J** – Fast and efficient, the only potential downside is the size of the cabin. By far the "newest" airframe in our budget.
- **Bonanza 35** (M, S, P models seem to be in our price range) – Flying in style in a roomy cabin with a decent ability to haul. Plenty of upgraded engine options that bring the speed up, though at the cost of more fuel.
- **Debonair** – A potentially more affordable option to the Bonanza.
- **Cessna 210** (D or E models) – Long time competitor to the Bonanza, the Centurion would give the flexibility to bring friends along for the ride.

Certainly, the pace of the market right now adds pressure on us to jump to a decision. But as first-timers, we feel it is important to take some time to thoroughly research our options and the many components that come with aircraft ownership (finance, insurance, maintenance, etc.). We are truly fortunate to be surrounded by supporters – people who have owned numerous aircraft, aircraft salespeople, A&P's, avionics specialists – all chipping in to answer questions and provide advice.

And what better avenue to welcome additional insights than right here – in a magazine that speaks *solely* to aircraft owners and operators. If you would like to share any sage airplane purchasing advice (or know of a special gem we should consider!), we would love to hear from you: email me at *rebecca@twinandturbine.com*.

I look forward to keeping you all posted on this exciting new chapter.

Digital Weather Radar
Past, Present and Future

by **Dale Smith**

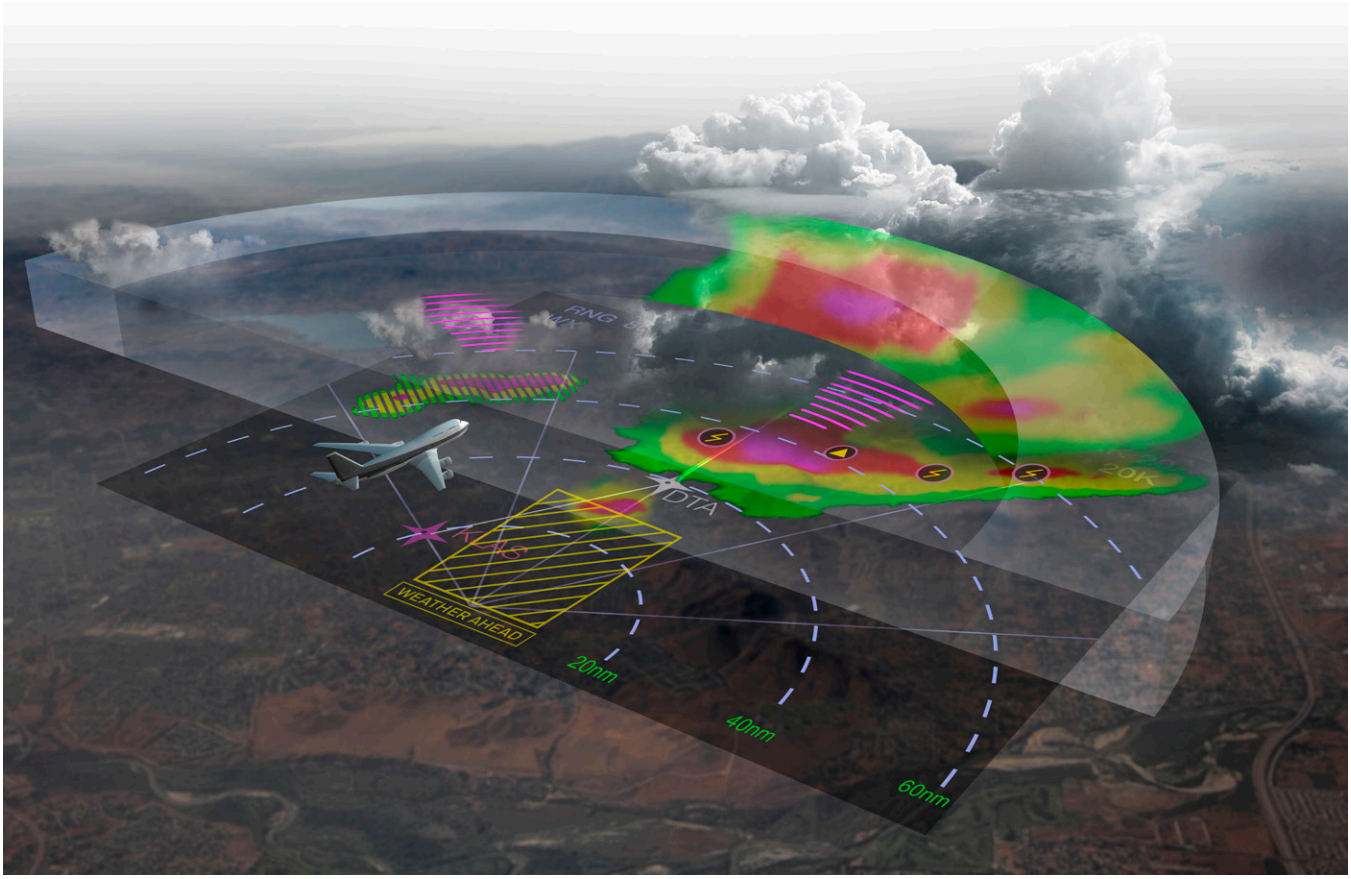


IMAGE COURTESY OF HONEYWELL

"Conversation about the weather (radar) is the last refuge of the unimaginative." – Oscar Wilde, Irish Dramatist

Obviously, Mr. Wilde was not a pilot – well, at least not a pilot that did any serious instrument flying. If he were, he'd have a much greater appreciation for the safety-enhancing capabilities offered by airborne weather radar.

When properly operated, airborne weather radar gives pilots the best possible, real-time view of the position and severity of any precipitation between the nose of their aircraft and the intended destination.

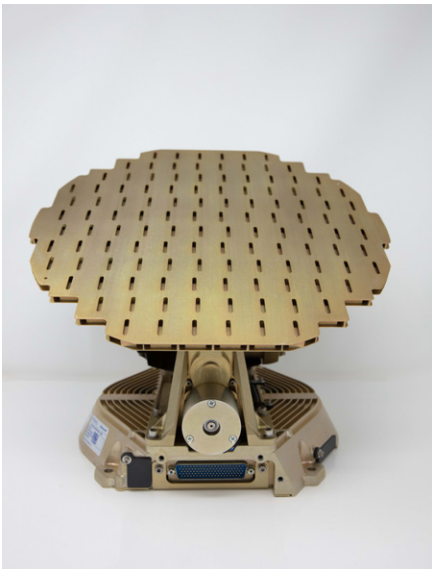
I say "intended" because the real value of live radar is helping you plan a safe deviation track around said weather. The stronger the precipitation return, the wider the berth. Believe me, heavy rain, hail and associated areas of wind shear and turbulence have brought down bigger airplanes than any of us are flying.

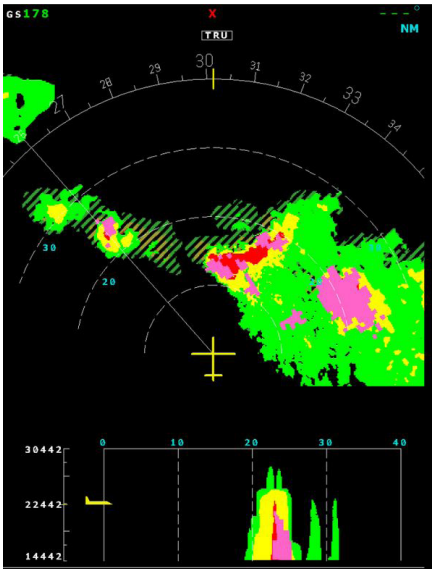
Radar is all about weather avoidance, so when in doubt, heed the old sailor's warning: "Thar' be dragons out thar'…"

Monochrome and Magnetrons

There's no debate that today's weather radar systems are marvels of capability and simplicity. Digital technologies have enabled manufacturers to add a host of safety-enhancing functions, including turbulence, hail, lightning and predictive wind shear detection capabilities into many of today's new-generation systems.

But, before we dive deeper into what the new generation of radars can do





Honeywell's new RDR 7000 can interface with a variety of current-generation cockpit display units as long as they support ARINC 708 or 453 interfaces. (Images courtesy of Honeywell).

for you today, let's go back to when all the weather was monochrome green.

Radar had been around for a long time, but it took a few leaps in manufacturing technologies to shrink the antenna, magnetron, and all the associated mechanicals and electronics down to where it would fit in the front of even a large airliner.

Bendix Avionics (now Honeywell/BendixKing) introduced the first commercial airborne weather radar, its RDR-1, in 1956. The ability for pilots to see rain, and thus avoid turbulence, garnered so much popular press that airlines and aircraft manufacturers went so far as to tout "Radar Equipped" in advertising and on the sides of their aircraft.

"The magnetron is a very high-powered device that's very similar to what you'd find in an old-style tube TV," explained Dr. Joel Andrews, team leader design engineering, Garmin Aviation. "And just like those old TVs, the old weather radars had to warm up when you turned them on. They also had issues with the magnetrons losing power and the screen images getting dimmer over time."

That meant that the airlines were having to change out the magnetrons and some of the receiver/transmitter antenna's mechanical systems every 500 to 600 hours. But, when they also had to swap out a big radial engine every month or so, it wasn't that big of a deal.

Then along came the Jet Age, and everything changed. Faster aircraft meant that radars had to show weather at longer ranges and with a higher degree of accuracy. And, the fact that jet engines operated for thousands of hours put pressure on radar manufacturers to develop more reliable hardware.

As technology evolved, so did the reliability, consistency and signal clarity of the magnetrons. In fact, many current-generation weather radar systems still rely on them to generate their beam energy. You're probably flying with one right now.

Less Power, Better Processing

"We actually used the magnetron in our first radar, the Garmin GWX68," Andrews says. "It had 6.5 kilowatts of transmit power at 5,000 volts. It's not something you want to mess with. They were all very high-power units."

And that high-power requirement was one reason that the magnetrons powering the legacy-generation radar systems had such short lifespans. The solution was to transition to new-generation magnetrons or, better yet, switch to solid-state designs, which was a change that you would expect to have been met with great joy. Well, not so much…

The fact of the matter was, with 6.5 kilowatts of transmitter power, the old analog type radars did a fine job of punching electronic holes in storms, so pilots could see what was inside. While this was good, it wasn't without its drawbacks. In some instances, they'd actually give a false impression of the severity of the storm, which led more than one unsuspecting pilot to fly into areas they shouldn't have.

"It's a hard thing for people to get their minds around, but our new-generation systems like the GWX70 and GWX80 only use 40 watts of transmit power," Andrews continued. "They think lower power means less performance, but what it comes down to is the difference between raw transmitter power and advanced digital processing."

"What we do with the lower-power, solid-state systems is to use longer pulses and digital processing on the waveform to put the same, if not more, energy on the target," he says. "Even though we are using a lot less power, we are getting better weather depicting performance from the unit."

Along with an equal-to, or better-than a magnetron image, today's radars are a lot more reliable than their Neolithic ancestors.

"As you can imagine, as we go from legacy magnetron-based systems to fully solid-state units, we get a huge spike in the reliability," stated Vipul Gupta, product line leader, weather radar, Honeywell/BendixKing. "Of course, it's a bit dependent on the aircraft type, but we are seeing reliability increasing two or three times – up to 16,000 to 20,000 hours MTBF."

While the dramatic increase in reliability was a driving factor for the manufacturers to begin the switch to digital, solid-state technology, it was just the beginning of the benefits the new format would deliver.

"One of the immediate benefits of digital radars was doppler processing, which is really hard to do with a magnetron. With digital signal processing, you are transmitting exactly the same

High-level features like ground clutter suppression, turbulence, and hail and lightning prediction are found in Garmin's GWX70 and GWX80 (pictured).

IMAGES COURTESY OF GARMIN.

frequency pulse every time," Andrews says. "It's incredibly repeatable, so you can create a more accurate, consistent weather return."

"That display consistency is one of the first things a pilot will notice about a new solid-state radar versus an old magnetron-based system. Magnetron units can vary or drift – they're very inconsistent – some pulses are super-hot or off-frequency so the image can change from one sweep to the next," he continued. "Not so with digital. The picture is very consistent, which makes it easier for the pilot to interpret what the weather really looks like."

Many Happy Returns

A sharper, more detailed display isn't the only benefit solid-state technology and advanced signal processing bring to onboard weather radar. As you no doubt know, doppler capabilities have opened the door to many other ride- and safety-enhancing features.

"Providing hazardous weather avoidance information is a major benefit of solid-state radar," Gupta says. "Hail, turbulence, predictive wind shear and lightning are all hazards modern radars can help pilots avoid. We also have a built-in terrain database in our larger systems that can automatically remove ground-clutter from the display. That further enhances the weather picture."

Ground clutter returns have always been a major headache for pilots. Tweaking that antenna tilt just right to get all the precipitation without false ground returns can drive you to distraction. Never a good thing in an aircraft's cockpit. No matter what the weather.

To help eliminate the problem, and reduce pilot workload, many newer radars feature an automatic tilt control function of one form or another.

"Our newest radar, the GWX80 has an Auto Mode, which is extremely sophisticated. It's a set-and-forget type system," Andrews explained. "You just turn it on, and the system will set the antenna at the optimal view of the air in front of the aircraft. Pilots really love it."

It does, of course, have a manual tilt control for instances when pilots want to pitch the antenna up to get a view of weather above their aircraft: Especially when they suspect hail to be involved. As you might guess, this can be as challenging as tilting downward to remove ground clutter.

Yet again, digital technology is providing a solution in the form of the Vertical Profiling capability found on many of BendixKing's new-generation radars.

"In a normal scan, we are looking at the entire volume air of front of the aircraft that is sliced into lateral pieces, and the radar displays it in a top-down view," Gupta stated. "With vertical profile, we can slice it along the azimuth so you can see the vertical signature of the precipitation within that cell. Hail above the aircraft can be very dangerous."

"We had a pilot flying a Falcon 8X recently. They were at FL450 and the vertical profile was painting a supercell topping off at over 60,000 feet," he continued. "Needless to say, they planned a deviation course well around that cell."

Navigating Your Digital Radar Upgrade Path

No doubt that with all of the new-generation features and benefits they provide, upgrading to a solid-state radar system is high on every pilot's wish list. But, as you may well expect, not all features are available in all radar systems. A big determiner is the size of the radar antenna that your aircraft can accommodate.

The larger the antenna diameter, the more returning pulses the system can collect. And it's those returning pulses that the system uses to create the display. More pulses equal a more accurate display. Of course, along with the size of the antenna, there's also the avionics you currently have in your panel to consider.

"If you want to upgrade to some higher-level features like ground clutter suppression, turbulence, and hail and lightning prediction found in our Garmin GWX70 or GWX80, you need to have at least a Garmin GNS display. If you have G1000, then it's an easy upgrade," Andrews said. "The issue with trying to integrate new radars with legacy displays is that the older panel units don't even have the bezel knobs or buttons to control the new display functions."

Regarding upgrading legacy RDR- or RDS- systems from Honeywell/BendixKing, Gupta says that systems

like the new RDR 7000 can interface with a variety of current-generation cockpit display units as long as they support ARINC 708 or 453 interfaces.

If your aircraft is equipped with a legacy BendixKing RDR 2000-series unit, the company is offering its RDR 2060 upgrade. Basically, you upgrade the receiver/transmitter (RT) unit, which increases the radar's range up to 320 nm. The upgrade also provides some new-generation features like Auto Tilt, Auto Range Limiting and Sector Scan.

Weather Changes. So Do Weather Avoidance Systems

Another capability unique to the new generation of solid-state/digital radars is the ability for manufacturers to add new features and capabilities via software upgrades. That's just not possible with analog systems.

So, what does future radar look like? While neither company would offer up any real information, they did share a few long-range prognostications at what we may well see on tomorrow's cockpit displays.

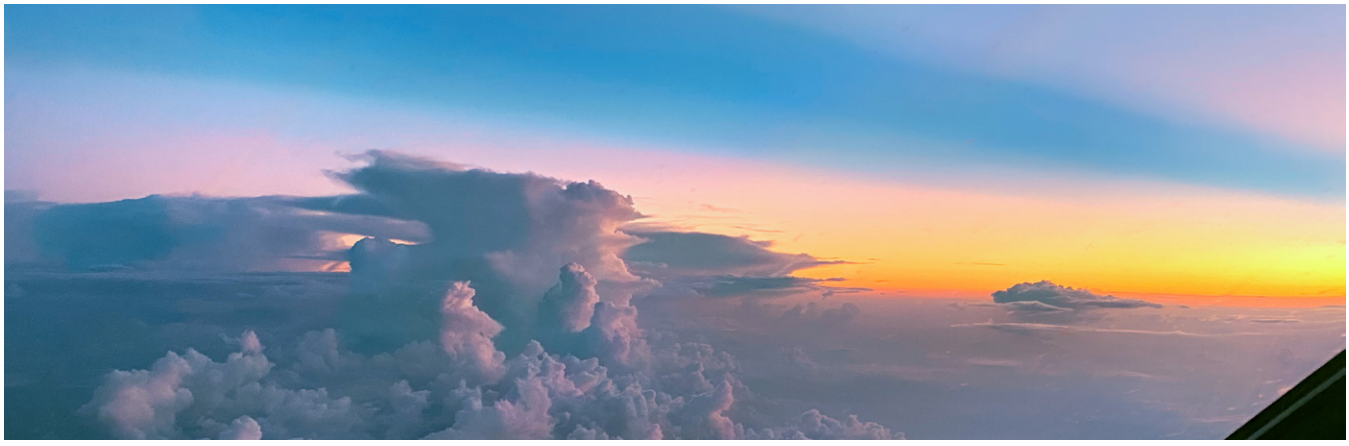
Features they suggested may be forthcoming are a digitally enabled technology that would allow aircraft to digitally link together to share weather information to create a more detailed picture. Another capability may well be the system's ability to predict the track and growth of storm cells. That could be very beneficial for strategic, long-range storm avoidance planning.

We'll see. But no matter what the future of weather radar brings, it's all coming together to do one thing: Give pilots the information they need to steer clear of dangerous weather. T&T

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

Magenta Sky
Know Your Radar

by **Stan Dunn**



In addressing thunderstorm flying, the Aeronautical Information Manual (AIM) begins with this gem: "Never regard any thunderstorm lightly, even when radar echoes are of light intensity. Avoiding thunderstorms is the best policy." It sounds like sage advice. One of those things that are great in theory, but rapidly becomes muddled in the grey shades of the real world. I have lost track of the number of times that I have landed at an airport with the thunderstorm (TS) descriptor amended to the terminal weather.

I do recall the first time it happened. I was a raw captain on a Beech 1900 approaching Denver international Airport. I could actually see the field, and told the controller that they should get rid of the TS code present in the weather: We were not, I explained, allowed to fly through thunderstorms. The proverbial crickets chirped a few moments before the controller calmly countered that none of the 150 aircraft that had landed in the past hour had complained.

> **"Here is the first thing to know about thunderstorms: They can kill you. Here is the second thing: For aviation to be useful as transportation, you will eventually have to fly through an area in which they are present."**

Here is the first thing to know about thunderstorms: They can kill you. Here is the second thing: For aviation to be useful as transportation, you will eventually have to fly through an area in which they are present. While there are a number of different resources available to assist in making the penetration of weather safe, few are of higher value than weather radar.

Know Your Radar

The first bit of information that you should memorize about your radar is the angle of the beam. With X-band radar, the radar beam's width is inversely related to the size of the antenna dish; the larger the antenna, the narrower the beam will be. A narrow beam gives a radar system more fidelity over distance, as the radar pulse is much more concentrated. Think of it like a flashlight: If you have a wide beam, the light gets dim very quickly; with a narrow beam, it has a much longer range.

An 8-degree radar beam (a standard size for civil aircraft) ends up covering 40,000 feet worth of sky at 50 nm (you can calculate this via the ancient rule of 60, where 1 degree equals 100 feet per nm). Although 40,000 feet worth of radar sounds impressive, the problem is that this can begin to stretch the limits of physics. At 40,000 feet, the radar's initial energy pulse is covering just shy of 7 nm worth of sky. This can make it easy to miss magenta danger areas at longer ranges, as radar returns become fruitlessly diffuse.

The physical limits of the radar beam also make the use tilt extremely important since onboard radar covers a limited slice of the sky (particularly at shorter ranges). At lower altitudes tilt management can be fairly basic: Below 10,000 feet, dangerous weather is largely defined by the amount of precipitation that exists above the aircraft. Start from zero tilt (with half the beam above and half below the aircraft altitude) and tilt up by half of the width of the radar beam. The result will be that the bottom of the radar beam will be at your present altitude, with the radar displaying the precipitation above you. (This assumes zero tilt is properly calibrated; you can use the rule of 60 and a little math to verify this while painting the ground).

At higher altitudes, hazardous weather is progressively defined by the amount of precipitation below the aircraft. It is important to remember that frozen precipitation is not nearly as reflective as liquid droplets. Since weather radar (in general) assumes liquid precipitation when depicting intensity, precipitation above the freezing level tends to underestimate the hazard ahead. As such, green (low intensity) returns for precipitation above 20,000 feet indicate hazardous weather. Confirming this analysis is easy: Tilt the antenna down to see what is below you; in many cases, once the radar beam is pointed towards the liquid part of the cell it will paint red and magenta returns – the exact sort of thing that you do not want to be flying above.

Hazardous turbulence can exist many thousands of feet above those red and magenta areas – not to mention dry hail, which is the precipitation form of a stealth fighter (i.e., dangerous and resistant to radar). The goal should be to tilt towards the area of the sky that gives the greatest indication of hazardous weather, and that area almost exclusively exists below 20,000 feet.

A simple solution above 20,000 feet is to tilt down in order to paint the outer third of the radar display with ground returns. This will keep the radar focused at the lower, liquid portion of storm cells. In combination with this, routinely vary the range that the radar is displaying. To paint the ground on the outer third of the display at shorter ranges, you will have to tilt the antenna down even further. This will ensure that you are not inadvertently overflying a rapidly growing cumulonimbus. (We had a passenger not long ago get seriously injured following an encounter with severe turbulence due to a cell rapidly growing beneath the radar beam as the aircraft approached it. The invariable tilt of the radar resulted in the hazardous weather never being presented to the flight crew).

One last advantage of painting the outer portion of the display with the ground is that it makes for a foolproof means to identify truly strong weather. A ground shadow behind a cell (i.e., a conspicuous area where no ground is being painted) indicates that all the radar energy is being absorbed by the storm cell itself. This is a cell to avoid by a minimum of 20 nm, every time.

Ground-Based Radar

The size and capabilities of ground-based radar far exceed that found onboard aircraft, though they are not without limitations as it relates to inflight decision making. There are three common ways to access these ground-based resources: on the ground via internet connection, in the air via data-link, and verbally via communication with Air Traffic controllers. All of these methods provide a more complete picture than onboard radar alone is capable of. It is the combination of these radar resources that ensure the safest path of flight for a given situation (sometimes the safest path of flight is to be tied down and chocked).

Air Traffic Control as a resource varies by location. In the United States, Center and Approach controllers have weather radar data available at their stations. They are required by rule to provide weather alerts, but their primary

Turbulence can be encountered in the clear air around a cell.

focus remains the separation of IFR traffic. Controllers are available to provide information, but they do not always offer it unsolicited. If you fly in less developed countries, be aware that controllers may not have access to weather, and that there may be large gaps in ground radar coverage when using data-link weather. Do not assume a lack of displayed weather means that the area is free of convective weather.

Be proactive in asking controllers for information. Understand the services that are available in the airspace that you are flying in. If you are unsure whether controllers have weather depiction capabilities along your route, ask them. It is easy to fly yourself into a corner when deviating around closer weather while being unaware of more distant cells that are behind. ATC and data-link services fill the hole nicely, providing hundreds of miles worth of radar information to help generate to plan of attack.

While ground radar is a great supplementary tool, in practice, it possesses some shortcomings as well. You will occasionally find radar echoes observed inflight differ substantially from those produced from the ground. There are many assumptions that radar systems utilize to depict weather, and this can create conflicting information. Properly functioning airborne radar is the most reliable resource for making decisions en route. Not only will it keep you safe but it can (at times) shave off hundreds of miles worth of needless deviations.

Weather radar is a precipitation detector, plain and simple. It can detect other things as well –namely the ground – but its design and purpose is to display the precipitation that normally accompanies convective activity. It is important to recognize that the presence of precipitation in and of itself does not mean that the area cannot safely be navigated. Precipitation echoes can also be associated with broad, non-convective rain showers as well. You want to err on the side of safety, but you do not want to divert due to a little rain.

Convective buildups come in many different shapes (there is an entire catalog of radar shapes that meteorologists use to identify extreme weather), but most hazardous weather shares this in common: well defined red or magenta areas encircled by a relatively narrow band of yellow. Extremely sharp gradients in intensity represent violent storms that should be given plenty of room. Magenta returns also indicate areas to avoid.

Nonhazardous rain showers tend to appear splotchy, with gradual and uneven gradients from red, to yellow, to green. If other sources indicate that these areas are benign (such as pilot reports, lightning strike indicators, or tower reported surface winds), they can generally be transited without fuss.

The decision to proceed, delay or divert should be made as early as possible based on the best information available. As you prepare for an approach at an airport with questionable weather, ask ATC what they are depicting and solicit suggestions for approaches that will keep you clear of significant returns. Outside of 100 nm, onboard radar is of limited use (it does a good job displaying well-defined lines of weather, but small isolated cells – even when there are dozens of them in a concentrated area – are oftentimes not displayed at longer ranges). Controllers in these cases can be a reliable source of information, if only you ask.

The approach phase of flight is high workload, and becoming fixated on the radar can greatly erode situational awareness to other required flying duties (always remember: aviate, navigate and communicate). Assess the information available, commit to a course of action and adjust only if new information arises which is relevant. Second-guessing is a worthless distraction. Focus your attention on flying the airplane instead. Thunderstorm encounters are a much less common cause of accidents than Loss of Control Inflight (LOC-I).

You should remember throughout the process that diverting to an alternate represents the successful completion of a flight. The only measure that matters in aviation is a safe landing for every takeoff. To the degree that pressure exists to land at your destination, you must purposefully ignore that impulse and focus on making a smart decision. Do not roll the dice with your life or the lives of your passengers. If you have any serious question about the intensity of the weather, either divert or (if you have enough fuel) hold until it clears.

Enjoy The View

There is one thing that is better than radar: When in visual conditions, the best way to avoid hazardous thunderstorms is to use your eyes. There is no device on our increasingly sophisticated aircraft that beats biology.

Radar is supplementary in the case of visual flight, but still important. It is quite difficult to determine the distance to cells by sight – a function that radar excels. It is also under visual conditions that we become increasingly comfortable with interpreting radar images. Since we can actually see the cells, it provides direct feedback in developing a mental picture from the radar display for those times when visibility is restricted.

For all the platitudes of weather radar, there is nothing safer and more pleasing than remaining in visual conditions to enjoy – from a safe distance – that beautiful, powerful and awe-inspiring cumulonimbus. T&T

Stan Dunn *is an airline captain and check airman. He has 7,000 hours in turbine powered aircraft, with type ratings in the BE-1900, EMB-120, EMB-145, ERJ-170, and ERJ-190. Stan has been a professional pilot for 14 years, and has been flying for two decades. You can contact Stan at* **Stan@flyingformoney.com.**

WHEN YOU REALLY HAVE TO TRUST YOUR AUTOPILOT TRUST THE EXPERTS

THE GENESYS AEROSYSTEMS S-TEC 3100

The S-TEC 3100: The next generation of autopilot technology and capability, from the leading name in autopilots. You can now be confident of precise digital control for every phase of flight with the safety of an advanced digital autopilot.

Learn more at stec3100.genesys-aerosystems.com/tt

*Additional equipment may be required depending on configuration

GENESYS AEROSYSTEMS

S-TEC 3100
PRECISE PERFORMANCE.
PROVEN EXPERIENCE.
PERSONALIZED ATTENTION.

Pilot Tube

Baron Pilot

Flying to the Top of the YouTube Charts

by **Dale Smith**

PHOTOS BY ELIZABETH ALLENBAUGH

Kristoffer Patasnik combined his love of aviating and his Beechcraft Baron to create a popular YouTube series that he hopes will motivate aspiring aircraft owners, pilots and passengers.

Like most of us, Kristoffer Patasnik was bitten by the aviation bug while in grade school, which means he spent, or misspent, depending on how you look at it, his early years dreaming about flying F-16's. But that career path wasn't in the cards.

"I had sort of given up on aviation, but right after I graduated from high school, I talked to a family friend who was a private pilot. Until then, I had never really thought of anything but military flying. All I know is that conversation saved my flying life," Patasnik said. "I immediately ordered the Sporty's VHS Private Pilot course and subscribed to every aviation magazine – all that, and I had never even been up in a small airplane."

After a few months of diligent saving, that first flight took place at Tamiami Airport in southwest Miami.

"My instructor's name was Veronica, and during my very first flight, she let me handle the takeoff. It's probably standard practice, but it meant the world to me," he said. "From the moment I pulled back on the yoke, flying was no longer something I wanted to do; it became something I had to do."

"There are a few things in life you just never forget. For me, one of those is a Cessna 152 – November 5356 Bravo – the airplane that changed my life forever," Patasnik said. "Although I reconciled with myself that a career as a pilot was out of my reach, I knew I could still fly. So became committed to building a career that would allow me to afford my life's passion."

After earning a degree in television production, he got married and started a family. As time and budget allowed, he built time and added to his ratings. But, as we all know, the responsibilities of a career and family take precedence over recreational flying – no matter how therapeutic.

"My inability to stay proficient is what brought me to the conclusion that I either needed to buy an airplane or give up flying once and for all," Patasnik said. "I quickly realized that flying was not just what I did, but it was essential to who I was. So, I sold my boat, quit playing golf and started searching for my first airplane."

The First is Not the Last

After doing a lot of research and asking his pilot friends even more questions, Patasnik settled on a Mooney M20J as his best first airplane. It had room for his family, plenty of speed for weekend trips, and it was relatively economical to buy and operate.

"I eventually found a 1993 Mooney M20J MSE in Alabama. I bought a ticket and went up to see her. I had never flown a Mooney before, but after an hour in the left seat, I was hooked," he said. "I went home and asked my wife for permission. She said yes. I'm pretty sure she really thought that I wasn't going to go through with it. And I'm very sure she wasn't pleasantly surprised when I flew it home."

Unfortunately, after an all too brief time, he and his wife divorced, and Patasnik sold the Mooney. But, after things settled back into a comfortable routine, he decided to make another go at aircraft ownership. His need to fly was stronger than ever.

Since most of his planned flights would be alone or with his two young children, Patasnik was predisposed to buy another Mooney. But, as fate

Patasnik's panel upgrade includes an Aspen Evolution Pro display, a complete Avidyne IFD avionics package including an IFD550, IFD440, AMX240 audio panel, AXP340 ADS-B Out transponder and a Skytrax 605 with Active Traffic.

> "If I could make a career out of promoting aviation, I would quit my day job tomorrow. I have no greater passion than sharing my love of flight."

would have it, a friend told him about a "gently used" Beech B55 Baron that was not yet on the market. Just like with the Mooney, he had never flown a Baron before, but based on the type's reputation, Patasnik felt that the legendary twin might well fit his desire for more range and all-weather safety.

"I went up to New York and met the owner. After just one flight, I knew this airplane was for me," he said. "I made an offer the next day, and before I knew it, I was in the left seat of 3175 Whisky and headed south to her new home."

Patasnik's career path had brought him to a position in the television production group for a major sports association. He uses the Baron to commute between his home and the company's production facilities, as well as travel to assignments in cities that are easier to reach in his airplane than via commercial airlines.

The Baron Gets the Royal Treatment

"I am amazed by the pure utility of this airplane. I have loaded it up, topped off the tanks, and have easily remained in CG and max gross weight limits," Patasnik said. "You can't do that in many other light twins. And the Baron is so easy to fly if you follow the numbers. Simply put, it's a very solid airplane that was well designed and built. The only downside to owning the Baron is the high cost of new factory parts."

Kristoffer Patasnik and fiancée Kim Hanover ("FlyingSIC").

Patasnik explained that while the Baron was very well equipped for IFR flight when he purchased it, as a 1974 model B55 with right at 1,400 hours on its pair of Continental IO-470L engines and aging Collins radios, he knew there was work to be done. Because 3175 Whisky is truly a workingman's airplane, Patasnik has been taking the "most flying benefit for the buck" route to his aircraft modernization program.

"To date, I have completed a new paint job, replaced the front windshield and updated the panel to give me greater capabilities, situational awareness and reliability," he said. "Avionics wise, it can do anything a new Baron can do, and a little more."

Patasnik's panel upgrade includes an Aspen Evolution Pro display, a complete Avidyne IFD avionics package including an IFD550, IFD440, AMX240 audio panel, AXP340 ADS-B Out transponder and a Skytrax 605 with Active Traffic.

"With all of the airplanes in Florida, even with ADS-B, you will miss someone," he said. "Active traffic is a must if you really want to see the most complete picture of the who's around you."

In addition, he's added an angle-of-attack (AOA), JPI EDM 900 digital engine monitor, and an Astronics MAX-VIZ Infrared (IR) camera connected to the IFD550.

"The Max-Viz camera and synthetic vision on the Aspen and Avidyne displays give me great awareness when flying into unfamiliar, rural airports in lower visibility situations," he said.

No doubt, with all of its capabilities, 3175 Whisky's panel is the envy of other B-55 owners. And when his budget allows, Patasnik said that the very last to-do list items are to upgrade the legacy Bendix weather radar and

install a new Genesys Aerosystems S-TEC 3100 digital autopilot as soon as it is STC'd in the B55.

"I have to take my hat off to the guys at A&J Aviation in Arkansas," he said. "They did a fantastic job integrating all of the various avionics to create the kind of system I wanted – while staying within my budget."

Following the panel work, Patasnik said it was time to turn his attention and budget towards overhauling the original factory Continental engines.

"I had put 400 hours on the Baron after I got her and then it was time for overhauls, so I flew up to Alabama to have Continental install a pair of factory rebuilt engines," Patasnik said. "I'm amazed at how much more power and performance the engines deliver. 3175 Whisky handles like a brand-new Baron."

The Making of YouTube's Baron Pilot

"The Baron Pilot channel on YouTube started simply enough. I had watched a few flying videos and figured with my TV background I could easily do that," he said. "When my early video hit 100 views, I was thrilled. When the channel hit 500 subscribers, I felt like I had won the lottery."

"The channel is not about me. It has and always will be about flying and promoting aviation. I want people to come to the channel because they are curious about flying or learning to fly or because they are afraid of flying and want to overcome those fears," Patasnik said. "Countless viewers have commented or sent private messages about how the videos have motivated them to get their pilot's certificate or get back into flying. That's what it's all about."

"I think that the one that means the most is from a woman who had refused to fly with her husband, but after viewing the channel, she got the courage to finally do it," he said. "It is this kind of comment that is the most humbling to me and motivates me to continue to make the videos."

While it takes him nearly 40 hours to edit each episode of Baron Pilot – time which he is more than happy to invest in promoting aviation – Patasnik said that there might be more lag time between postings than before. It seems his passion for flight has led him to a freelance gig with a local Part 135 charter operator as a "right seater" flying a Cessna Citation.

Even with less free time to dedicate to his YouTube audience, he said the Baron Pilot channel is something he's not planning on closing the book on anytime soon.

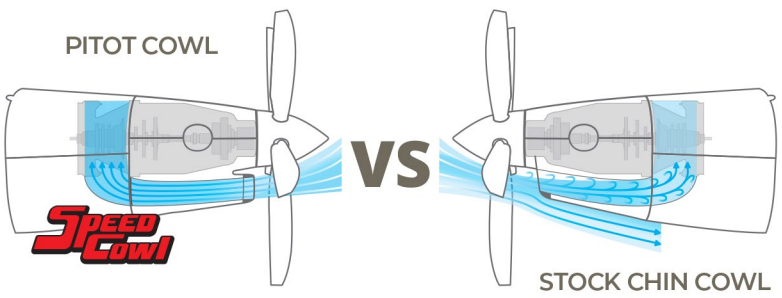
"If I could make a career out of promoting aviation, I would quit my day job tomorrow," Patasnik said. "I have no greater passion than sharing my love of flight." T&T

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

UNLEASH THE POWER OF YOUR PC-12

COWL INTAKE DESIGN

Internal Aerodynamic Design is a key factor in achieving optimal engine performance. The stock Pilatus cowl is referred to as a chin cowl. In general, chin cowls are not efficient due to the turbulent air they develop which reduces the airflow (ram air recovery) to the engine. The design of Speed Cowl is referred to as a pitot cowl. Like a pitot tube, the inlet is positioned lower and forward to capture uninterrupted airflow. Speed Cowl provides increased ram air recovery to the engine which equates to better engine performance.



HEATED INLET LIP DESIGN

Take a look at the left side of the stainless steel inlet lip on your PC-12. You will undoubtedly see discoloration on the lip due to excessive heat. There is roughly +800° F exhaust entering the lip at that point. The heated air moves to the right side of the lip where it exits at about 350° F. Over time the carbon fiber and paint start to deteriorate, especially on the left side of the lip. As all PC-12s age, heat damage to the carbon fiber and paint is inevitable. Speed Cowl's patent-pending heated stainless steel inlet lip features internal baffling reducing the temperature of the exhaust entering the lip and maintains a more even temperature of the heated air as it moves through the lip. This design will reduce the possibility of heat damage to the carbon fiber and paint over time.

Keep a look out for more Speed Cowl benefits.
In the meantime, if you have any questions email:
sales@edmo.com

Manufactured by AMERICAN AVIATION Inc *| Distributed by EDMO Distributors, Inc.*

info.edmo.com/speedcowl

To Trade or Not to Trade

by **Kevin Ware**

For the past 20 years, I have owned the same airplane: a 1979 RTSOL RAM VII Cessna 340A. From time to time, there is a maintenance event, artful advertising from a manufacturer or colorful photos in one of the aircraft sales magazines that makes me wonder, "Maybe I should change to a different airplane." This thinking then spins off a series of questions and calculations regarding the potential prospect. So, I pick up the latest Controller at the FBO and leave it in a handy place around the house to peruse – feeling somewhat guilty while doing so, given a certain sense of loyalty to the faithful C340.

Certain events tend to trigger this thinking more than others. For example, my C340 recently went through its annual inspection and in addition to the usual relatively minor problems, there was a problem noted by another pilot who flies it: The cabin would not maintain rated pressure up to the airplane's ceiling of 25,000 feet. This precipitated a week-long period of very expensive leak chasing, which (among other things) revealed the plugs for the drain holes in the bottom of the fuselage were 40 years old and lost their flexibility.

Once those were fixed, it was discovered there was a leak in one of the boots that goes around the gear retraction mechanism as it exits the fuselage. The boot was 40 years old, made of some rubber cloth material, and upon examining it, I was amazed it had lasted that long. Even though only one was leaking, the mechanics decided they should replace them on both sides. This made sense to me, but it was a nasty job that took hours and hours of the mechanics' $150/hour time. After everything was fixed, I was asked to test fly the airplane.

Once airborne, the pressurization system worked well, maintaining a sea-level cabin until passing about 8,000 feet. A loud roar then began somewhere in the nose section, and the cabin started climbing with the airplane. To complicate things further, the rate control knob on the pressure controller refused to vary cabin rate change at all. So, back to the maintenance hangar and more head scratching. A rate controller from another aircraft was borrowed and another test flight was made – with the same outcome. Back again

to the maintenance hangar with a committee of mechanics gathering around to speculate the diagnosis.

After some collective thought, it was decided that one of the hoses in the nose section related to the heater must have developed a leak. Unfortunately, this was located under the instrument panel, almost impossible to see or access. One of the junior mechanics was assigned the nasty job of crawling under the panel and disassembling a stack of things that were in the way. After about four hours it was apparent that a tear had occurred in the flexible hose just before it attached to the heater portion. The hose itself looked like it was installed at the factory 40 years ago and all dried out. It was decided the hose became cracked only after the other leaks had been repaired, which resulted in the cabin pressure climbing to a point the old hose couldn't handle.

All hoses related to the system were then replaced, and I was again asked to test fly the airplane. I was cautioned that if the cabin failed to pressurize normally, the next thing would be to replace the controller itself, which would be very expensive. With some trepidation, I climbed the airplane through the previous 8,000-foot altitude and was relieved to see the cabin was still at sea level and the roaring leak noise was no longer present. I continued climbing until reaching the cabin's maximal pressurization differential – also normal, indicating that the leaks were fixed.

Now, this kind of problem really does lead to questions about how long you should own a 40-year-old airplane versus trading it in for a newer one…say something in the $1 million range.

Since I am already typed in the CJ, the jet was the first one to come to mind, with an Eclipse being a close second. But the problem is that these airplanes are really designed to fly long distances in the high flight levels. Just banging around down the west coast of Washington to California at 2,000 feet on a sunny day would not make sense, and that kind of flying is something I like to do recreationally. Another problem with a jet is, if you fly it 120 hours per year at 400 knots, that is nearly 50,000 nautical miles. That is a lot of distance without any specific mission. Then there is the matter of the annual model-specific recurrent training in jets, which is expensive and also time consuming if just flying the aircraft for personal use. Insurance for single-pilot operations is also becoming a real problem for most light jets, in many cases resulting in just absurd costs for relatively poor coverage.

The next thought was, "How about a turboprop?" Prior to the C340, I owned a PT6-powered Cessna 425, so I have some experience with owning a twin-turboprop aircraft. But, I am not sure the notion of having twin engines in PT6-powered aircraft makes much sense anymore given the proven reliability of the engines. That logic leads me to think about a TBM or a Piper Meridian. The Piper Meridian does about 270 knots in the lower flight levels, but as it is derived from a piston-powered airplane, it is a little slow and short on fuel.

A TBM, on the other hand, was designed for turbine power from the start. The C-model carries a decent amount of weight and does about 300 knots on less than 50 gph in the flight levels. The cabin size is about the same as the 340, and if you do the math, the miles per gallon is very close to the same (with the jet fuel being a bit cheaper). Further, there is no required annual training (something I am not opposed to but prefer to do on my schedule, not the FAA's).

Now that I think a change from the C340 to a single-engine turbine such as the TBM might be a good idea, further questions come up. One is the loss of flexibility when considering landing at nonpaved airports, something the RSTOL 340 with piston engines handles with ease. Next is the business of "capital cost." I own the 340 outright and long ago depreciated the aircraft given its business use. My capital cost for that airplane is almost negligible.

However, if I spend $1 million to buy a TBM (even if using my own money), that much cash should generate 8 to

The nose section just forward of the pressure bulkhead with the usual coverings removed. The black hoses are very expensive new replacements for ones that were dry and cracked.

The Worldwide General Aviatio

owner/operators and chief pilots of these air

100%

TOTAL MARKET COVERAGE

Jets – 15,414

Chief Pilots & Owners

Count	Aircraft
55	AIRBUS ACJ319
26	ASTRA 1125
30	ASTRA 1125SP
49	ASTRA 1125SPX
33	BEECHJET 400
226	BEECHJET 400A
117	BOEING BBJ
371	CHALLENGER 300
53	CHALLENGER 600
31	CHALLENGER 601-1A
108	CHALLENGER 601-3A
49	CHALLENGER 601-3R
286	CHALLENGER 604
9	CHALLENGER 800
113	CIRRUS VISION JET
163	CITATION 500
279	CITATION 525
261	CITATION BRAVO
150	CITATION CJ1
82	CITATION CJ1+
188	CITATION CJ2
170	CITATION CJ2+
364	CITATION CJ3
123	CITATION CJ3+
273	CITATION CJ4
151	CITATION ENCORE
55	CITATION ENCORE+
305	CITATION EXCEL
18	CITATION I
248	CITATION I/SP
437	CITATION II
57	CITATION II/SP
154	CITATION III
86	CITATION LATITUDE
191	CITATION M2
377	CITATION MUSTANG
123	CITATION S/II
256	CITATION SOVEREIGN
76	CITATION SOVEREIGN+
234	CITATION ULTRA
232	CITATION V
27	CITATION VI
97	CITATION VII
249	CITATION X
29	CITATION X+
208	CITATION XLS
229	CITATION XLS+
1	DIAMOND I
38	DIAMOND IA
5	DORNIER ENVOY 3
227	ECLIPSE EA500
59	EMBRAER LEGACY 500
141	EMBRAER LEGACY 600
67	EMBRAER LEGACY 650
221	EMBRAER PHENOM 100
264	EMBRAER PHENOM 300
73	FALCON 10
20	FALCON 100
19	FALCON 200
196	FALCON 2000
22	FALCON 2000EX
56	FALCON 20C
14	FALCON 20C-5
21	FALCON 20D
2	FALCON 20D-5
31	FALCON 20E
9	FALCON 20E-5
65	FALCON 20F
58	FALCON 20F-5
178	FALCON 50
7	FALCON 50-40
93	FALCON 50EX
152	FALCON 900
24	FALCON 900C
104	FALCON 900EX
176	GLOBAL 5000
128	GLOBAL EXPRESS
19	GULFSTREAM G-100
202	GULFSTREAM G-200
9	GULFSTREAM G-300
22	GULFSTREAM G-400
288	GULFSTREAM G-450
8	GULFSTREAM G-500
500	GULFSTREAM G-550
54	GULFSTREAM G-II
21	GULFSTREAM G-IIB
120	GULFSTREAM G-III
165	GULFSTREAM G-IV
283	GULFSTREAM G-IVSP
170	GULFSTREAM G-V
33	HAWKER 1000A
5	HAWKER 125-1A
6	HAWKER 125-1AS
4	HAWKER 125-3A/RA
11	HAWKER 125-400A
13	HAWKER 125-400AS
12	HAWKER 125-400B
9	HAWKER 125-600A
3	HAWKER 125-600AS
95	HAWKER 125-700A
59	HAWKER 4000
184	HAWKER 400XP
34	HAWKER 750
170	HAWKER 800A
33	HAWKER 800B
336	HAWKER 800XP
39	HAWKER 800XPI
83	HAWKER 850XP
158	HAWKER 900XP
71	HONDAJET
6	JET COMMANDER 1121
3	JET COMMANDER 1121B
8	LEARJET 23
15	LEARJET 24
1	LEARJET 24A
11	LEARJET 24B
28	LEARJET 24D
11	LEARJET 24E
7	LEARJET 24F
10	LEARJET 25
35	LEARJET 25B
8	LEARJET 25C
85	LEARJET 25D
4	LEARJET 28
26	LEARJET 31
161	LEARJET 31A
30	LEARJET 35
350	LEARJET 35A
13	LEARJET 36
32	LEARJET 36A
29	LEARJET 40
186	LEARJET 45
166	LEARJET 45XR
92	LEARJET 55
4	LEARJET 55B
12	LEARJET 55C
253	LEARJET 60
108	PREMIER I
6	SABRELINER 40
17	SABRELINER 40A
3	SABRELINER 40EL
1	SABRELINER 40R
21	SABRELINER 60
17	SABRELINER 60ELXM
2	SABRELINER 60EX
58	SABRELINER 65
13	SABRELINER 80
6	SABRELINER 80SC
66	WESTWIND 1
4	WESTWIND 1123
27	WESTWIND 1124
63	WESTWIND 2

Turboprops – 11,605

Chief Pilots & Owners

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

n & 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

Count	Aircraft
253	CONQUEST II
42	JETSTREAM 31
57	JETSTREAM 32
60	JETSTREAM 41
25	KING AIR 100
484	KING AIR 200
21	KING AIR 200C
17	KING AIR 200T
197	KING AIR 250
173	KING AIR 300
9	KING AIR 300LW
554	KING AIR 350
64	KING AIR 350C
354	KING AIR 350I
16	KING AIR 90
10	KING AIR A/B90
63	KING AIR A100
209	KING AIR A200
48	KING AIR A90
104	KING AIR A90-1
93	KING AIR B100
854	KING AIR B200
99	KING AIR B200C
8	KING AIR B200CT
91	KING AIR B200GT
4	KING AIR B200SE
21	KING AIR B200T
77	KING AIR B90
329	KING AIR C90
34	KING AIR C90-1
191	KING AIR C90A
351	KING AIR C90B
80	KING AIR C90GT
89	KING AIR C90GTI
150	KING AIR C90GTX
12	KING AIR C90SE
242	KING AIR E90
156	KING AIR F90
25	KING AIR F90-1
61	MITSUBISHI MARQUISE
1	MITSUBISHI MU-2D
22	MITSUBISHI MU-2F
16	MITSUBISHI MU-2J
33	MITSUBISHI MU-2K
10	MITSUBISHI MU-2L
18	MITSUBISHI MU-2M
17	MITSUBISHI MU-2N
24	MITSUBISHI MU-2P
36	MITSUBISHI SOLITAIRE
616	PILATUS PC-12 NG
462	PILATUS PC-12/45
146	PILATUS PC-12/47
215	PIPER JETPROP
68	PIPER M500
79	PIPER M600
794	PIPER MERIDIAN
201	QUEST KODIAK 100
2	ROCKWELL 680T TURBO
5	ROCKWELL 680V TURBO II
5	ROCKWELL 680W TURBO II
4	ROCKWELL 681 HAWK
96	SOCATA TBM-700A
68	SOCATA TBM-700B
283	SOCATA TBM-850
100	SOCATA TBM-900
33	SOCATA TBM910
111	SOCATA TBM930
5	STARSHIP 2000A
68	TURBO COMMANDER 1000
30	TURBO COMMANDER 690
132	TURBO COMMANDER 690A
136	TURBO COMMANDER 690B
81	TURBO COMMANDER 840
24	TURBO COMMANDER 900
52	TURBO COMMANDER 980

Twin Piston – 6,320 Owners

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

High Performance Move-Up Singles – 5,807 Owners

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

39,146 TOTAL AIRCRAFT

TWIN & TURBINE

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

10 percent annually in any reasonable investment, which is $80,000 to $100,000 per year I would be in theory losing. That thought leads to yet another calculation (which you are frankly best off not even doing if really intent on buying the airplane). With a capital cost of $100,000 per year and 100 hours flown, the capital cost alone is $1,000 per hour plus around $600 to $800 in operational cost per hour. Now, do I really want to spend that kind of money just to fly a bit faster in an airplane with newer engineering for just recreational purposes? Difficult question…best not thought about for too long.

After going through all of this contemplation, I go to the hangar and look over the C340. Yes, I just spent $25,000 to have the annual done and the pressurization problem fixed. Undoubtedly, there are other age-related problems lurking in the fuselage or under the cowling somewhere. But hey, that $25,000 was less than a quarter of the yearly capital cost if I traded up to a TBM…I am saving money here.

I then preflight and fly the airplane just for the fun of it. I land at a 2,500-foot grass runway and get turned off about 1,800 feet down, not in the least worried about a turbine intake sucking in a bunch of the recently mowed grass with occasional clods of dirt. Departing from there, I climb up to 17,500 feet, circle Mount Baker a couple of times with an 8,000-foot cabin while burning all of 36 gph and doing over 200 knots.

The airplane, perhaps knowing I am contemplating a "formal separation," behaves exceptionally well. And with the ANR headset on and the props well balanced, the noise and vibration level is way down there with the turboprops. The Garmin avionics work just as well in the C340 as they would in a turbine, so there is not much to be gained in that respect by changing airplanes.

I fly back to my home airport and taxi to the FBO's hangar where a couple of young non-pilot airplane enthusiasts are hanging out. The first thing they say as I exit the airplane is, "Is that a new airplane? It sure looks fast." With that feedback in hand I drive home where, reluctant to leave the matter alone, I consult with a higher authority. My wife cannot imagine why I would switch to a different airplane. She says, "Why would you do that? We have flown that one all over the place and I like it." Decision made, case closed.

For the time being, the 40-year-old C340 will stay where it is and Controller will get thrown away next time I go by the living room coffee table. 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**.

Avidyne's FMS/LPV Upgrade Solution For Business Aviation

Get increased capabilities and better technology at a more affordable cost.

- LPV/SBAS vertical guidance couple approaches
- 3D synthetic vision with terrain, traffic and obstacles
- Compatible with most legacy EFIS systems
- Free 4-year warranty available*

Attn GNS Owners: The IFD Series FMS/GPS/NAV/COM is a simple slide-in replacement of your old GNS saving you on downtime and installation cost. Use the same tray and connectors.

CERTIFIED, IN STOCK & READY TO SHIP*

See Avidyne's FMS/LPV upgrade solution in action **Avidyne.com/videos**.

* Certain restrictions apply. Select Citation and King Air models.

Call: **800.AVIDYNE (284.3963)**
Email: **sales@avidyne.com**
Visit: **avidyne.com/business-aviation**

AVIDYNE®

Train Like You Fly – Fly Like You Train

Beechcraft Premier Type Rating

by **Rich Pickett**

It started as a pleasant flight from Fresno (KFAT) to Oakland (KOAK) in the Beechcraft Premier 1A jet. Departing Fresno with low ceilings and visibility of 600 RVR, it was a fast climb through the overcast to FL400 in the clear then WHAM! Rapid decompression. Oxygen mask on, mic to mask, throttles to idle, speed brakes out, autopilot off, pitch the nose down to the V_{mo} of 0.8 Mach, 45-degree bank, ensure passenger masks deployed, autopilot back on, and advise ATC of an emergency. We descended up to 15,000 fpm to 10,000 feet where we could breathe again.

I then saw the smile on the face of Stephen Rutherford, my simulator instructor. It was so much fun, we climbed back up to FL400 and did it again. How I love practicing emergencies!

I was in the midst of my initial training for the Beechcraft Premier type rating with my long-time friend, Horacio Valeiras. Horacio and I were in Wichita at the FlightSafety Textron Aviation Training (FSTAT) Center. The training was 16 days and entailed 80-plus hours of ground instruction, 8 hours in the FlightSafety MATRIX Graphical Flight Systems (GFS) procedure trainer, 14 hours of instruction in the simulator, concluding with a five-hour oral and practical test. The goal: a Premier single-pilot rating (RA-390S).

Preparation

The work starts before arriving at FSTAT, with pre-study materials provided via FlightSafety's "My Flight Bag" iPad app. I used the same app three weeks earlier for my Part 135 PC-12 recurrent in Dallas. This was my third training event in the two months since my discharge from the hospital for COVID-19 (see "A Close Call with COVID," T&T July 2020). I guess I was trying to catch up for not flying while in the ICU!

While I enjoy the flexibility of the comprehensive iPad app for studying, I find printed versions for some of the documents are more effective. In addition, you can lose access to the aircraft materials when the Internet is not accessible – hence, when you need them in flight, you can't access the documents.

Upon arriving in Wichita, we received a backpack filled with a comprehensive collection of material, including the Aircraft Flight Manual (AFM) and Pilot Operating Manual (POM). All jet ratings start the same way – systems and limitations. Denny Reid was our initial ground instructor, and with over 1,600 pages of information at our desk, we began.

With a swept-wing design, relatively high wing-loading (compared with other light jets), multiple lift dump panels (roll spoilers, speed brakes, lift dump), and redundant trim systems, it was initially a challenge to understand the integration. It sometimes left me scratching my head trying to understand the design philosophy. When you first practice the cockpit pre-flight it isn't unusual for it to take an hour. Denny told us the goal was to reduce it to 30 minutes. That is a long checklist! The Premier utilizes Rockwell Collins Pro Line 21 avionics, which was familiar to the three of us in the class, and FSTAT's Cary Wangelin provided very comprehensive information on those systems.

FlightSafety MATRIX

FSAT utilizes FlightSafety's MATRIX, a multi-component learning system designed to integrate with the Level D flight simulators and encompasses courseware, desktop simulators and the Graphical Flight-deck Simulator (GFS). The GFS training platform can support a number of aircraft easily selectable by the pilot. With multiple touchscreens, including an overhead panel, it displays virtually the entire cockpit. As you activate switches you can simultaneously watch animated schematics of the various systems. Since it is available 24 hours a day to the clients, I would practice as many procedures as I could from pre-flight to landings late at night. Using the GFS, I was able to reduce the checklist time to 20 minutes which meant more time flying in the sim.

On to the Sim

The next phase was flying FSTAT's full-motion Level D simulator. My first instructor was Brett Friederich who had a previous career with a regional airline. During the training, my goal was to experience a variety of situations, including shorter airports representative of my home base, Montgomery Gibbs (KMYF) in San Diego. The Premier is not exactly a short runway star, and KMYF has a runway landing length of 3,400 on our three runways. After a flight from John Wayne (KSNA) to San Diego International (KSAN), we opted for Santa Monica (KSMO). As pilots know, the runway was recently

shortened to 3,500 feet by the City of Santa Monica to discourage jet operations. It was a perfect one to choose.

I established a final visual approach to Runway 21 at KSMO with a V_{ref} of 114 KIAS at 11,000 lbs. From the performance charts, our total landing distance would be 3,136 feet at 20 degrees Celsius. On any airplane, it is important to be exactly at V_{ref} to meet performance specifications; the Premier is no exception. Beechcraft stresses that fact in the AFM, including multiple warnings about being on speed. The AFM states that the performance is predicated on a three-second flare, firm touchdown, brake application within one second, and deployment of the lift dump within one additional second.

① FSTAT offers one full-motion Level D simulator for the Premier.

② FlightSafety's Graphical Flight-deck Simulator (GFS) is available 24 hours a day for client practice.

③ The 16-day Premier training included 8 hours in the GFS and 14 hours in the full-motion sim.

PHOTOS BY AUTHOR

For every 10 feet above 50 feet over the threshold, add 200 feet to the distance. Each additional second of flare or delay in brake application adds 5 percent to the landing distance. Each knot above V_{ref} increases the landing distance by 1.3 percent. For comparison, the V_{ref} for a 12,000 lb Cessna Citation CJ3 would be 105 KIAS with a slightly shorter landing distance.

Over the Runway 21 threshold at 50 feet, I touched down and immediately lowered the nose, power to idle, brakes, and with the lift dump extended, used firm braking. It takes 80 percent of the landing distance to dissipate 50 percent of the speed, with the remaining half in the last 20 percent – which can be interesting. When I came to a complete stop, we still had 600 feet of runway. I wouldn't want to do this on a wet runway, however, it was a great experience to evaluate the capabilities.

The next five simulator sessions were with Stephen Rutherford, a very

experienced Premier pilot. Stephen enjoyed programming as many abnormal and emergency events as he could fit in each two-hour session. We had the usual engine fires and failures, engine restarts, flap anomalies, emergency descents, wind shear, TCAS and GPWS alerts, icing and even some normal operations thrown in.

Hot and High

Sometimes we assume our jets offer stellar performance, and with two engines operating, they generally do. Stephen suggested we fly from Gunnison, Colorado (KGUC) at 7,680 MSL to Colorado Springs (KCOS) with a landing elevation of 6,187 MSL and a warm day at 30 degrees Celsius. After an ILS to Runway 35R, single engine of course, we repositioned for a takeoff to the north. We were limited to 11,500 lb for the airport conditions. Upon reaching a V_1 of 115 KIAS, I experienced an engine failure. Using significant rudder to keep the Premier on the runway until a V_r of 115 KIAS and a bit beyond that to obtain more control, I rotated. Or at least I tried to rotate. I was able to finally raise the nose and fly in ground effect. Approaching the end of the 13,500-foot runway, which slopes up, I barely made it over the runway end lights and steered the plane between two tall trees over rising terrain. Even in the sim, I'm sure my heart rate was up. After I climbed slowly and stabilized the airplane, Stephen casually mentioned that he forgot to tell me the plane was 500 pounds over our acceptable weight under these conditions. Even with 2,300 pounds of thrust from each Williams International FJ44-2A turbofan, it was a great demonstration of the importance of flying by the performance numbers.

Stephen then came up with the idea to fly from Palm Beach (KPB) to Ocean Reef Club (07FA) on Key Largo, Florida, with a 4,400-foot runway. The graphics for this airport on the FlightSafety sim were amazing, with

sufficient detail to see the windsock moving in the wind. With trees and the ramp in close proximity to the runway, it was a great way to learn about more confined airports. Of course, Stephen decided to change the runway conditions to wet to make it interesting and so I could gain more experience with the anti-skid brakes on wet runways. The plane did very well, stopping with sufficient distance. On takeoff, he failed an engine on me and wanted to see if I could fly straight and not hit the planes on the ramp or the near trees. You just can't train for these situations in the actual aircraft – safely at least.

Check Ride

With more than 40 initial and recurrent check rides in my aviation career, each one is a new experience.

Jason Reynolds was my examiner and we started bright and early at 0630 on day 16. One of the first tasks was a weight and balance and performance exercise. This was a good scenario, which required working backward from the airport conditions (altitude, temperature, wind, and runway length and slope), resulting in a reduction in the MTOW of the aircraft. The remaining oral evaluation centered on systems, in particular, their interdependencies. It isn't sufficient to understand one particular system, but important to explain the impact on others when that system fails, especially when that failure may occur at FL410.

Five-and-a-half hours later, Jason signed my Beechcraft Premier Single Pilot Type Rating and a FlightSafety ProCard. It was a long but very thorough training course that also offered me the opportunity to enjoy Wichita and visit friends in the area.

The Program

FSTAT only has one operating Premier simulator. which can impact scheduling. However, the management team was very responsive and accommodating to our changing needs. Along with the instructors, FSTAT Premier Program Manager Scott Dickmeyer was accessible to answer questions during and after our course. Scott and his staff take personal pride in supporting the training needs of the 270-plus Beechcraft Premiers that continue to operate around the world, and it shows in their program! T&T

With 11,000+ hours of piloting more than 100 aircraft models **Rich Pickett** *still has a passion for flying. Rich holds an ATP, CFII SME, SES, glider licenses, and type ratings in the L29, L39, Citation 500/510s/525s, Eclipse 500S, Beechcraft Premier and DA10. His company, Personal Wings, provides training, mentoring and aircraft services. He is also a proud owner of an Eclipse and Cirrus SR22. You can contact Rich at* **rich@personalwings.com**.

PILATUS OWNERS, DEALERS, AND SERVICE CENTERS:

You are now Cleared Direct to the SPEED COWL™ Factory at American Aviation Inc. Our launch distributor has done its job of making owners, dealers, and service centers aware of our new performance enhancing Speed Cowl™ for the Pilatus PC-12, PC-12/45, PC-12/47, and PC-12/47E(NG). Operators of all models are reporting significant performance gains and substantial reductions in ITT's.

For more information please contact:
Jim Christy
American Aviation Inc.
Vice President
800-423-0476
JC@AmericanAviationInc.com

AMERICAN AVIATION INC

www.AmericanAviationInc.com
800-423-0476

by **Kevin R. Dingman**

Stoichiometric *(stow-e-key-oh-metric)*

Airplane engine chemistry, carbon monoxide detectors and butter pecan ice cream.

Jet fuel	$C_{12}\ H_{23}$ (about 13% more energy per pound than gasoline)
Avgas	$C_8\ H_{18}$
Combustion	$C_xH_y + O_2 \rightarrow CO_2 + H_2O + CO + C + \text{Energy}$ or stoichiometric as: $2\ C_8H_{18} + 25\ O_2 \rightarrow 16\ CO_2 + 18\ H_2O + \text{Energy}$
Heme	$C_{34}H_{32}FeN_4O_4$
Hemoglobin (Hb)	$C_{738}H_{1166}N_{812}O_{203}S_2FE$
Ice Cream	$C_{15}H_8C_{l802} + NaC_l + H_2O + C_8H_{803} + C_{12}H_{22011} + H_2 + \text{Milk} + \text{Pecans}$

If you understand the relevance of the above compounds, chemicals, emulsions and reactions as they relate to flying fossil fuel-powered planes, then just go purchase a sensitive CO detector, put it in your airplane and move on to the next prodigious T&T article. If not, or if you simply can't resist reading this humble column, then please continue. But be warned, even though this story may save your life, it's going to taste more like insipid plain yogurt than tasty butter pecan ice cream.

Forward

In May of this year, I wrote an article titled "1.29 Gigawatts!" It was about electrical fires and onboard emergency equipment. I claimed that any old smoke/CO detector would be better than none at all and suggested a $36 detector from Home Depot. While this is obviously true, one of our longtime readers (a trained and qualified hazmat guy) pointed out that it's not much more money, in airplane dollars, to get one that's extra sensitive that will alert us sooner and thereby give us more time to get on the ground and into clean air. And thus was the impetus for this article. So, if you're not a hazmat expert or versed in thermodynamics, engineering, chemistry, the respiratory system of vertebrates or in making ice cream, please read on.

Poison Contrails

An ideal fuel/air mixture in which both the fuel and the oxygen in the air are completely consumed is called the stoichiometric mixture and is described as the ratio of the mass of

air to the mass of a particular fuel. This ratio is approximately 14.7 to 1 for Avgas and about 14.5 to 1 for Jet A (jets vary significantly based on the specific engine). In the complete combustion of hydrocarbons (stoichiometric), the products are carbon dioxide, water and unaffected nitrogen. Notice how the CO from the first combustion equation above is missing from the second stoichiometric equation. With the incomplete combustion of hydrocarbons in recips and jets (the first equation), the products include unburned hydrocarbons, nitrogen oxides, carbon monoxide (the boogeyman in our story), carbon dioxide and water. These types of emissions are responsible for not only contrails but carbon monoxide poisoning. And there you have our story's first spoonful of plain yogurt.

Why Not Stoichiometric?

Most recips and jets operate at something other than the stoichiometric mixture in order to achieve better economy, power or engine life. For example, an idling engine runs richer and colder than at cruise power, is even further from stoichiometric and produces a relatively high amount of CO. And if you operate LOP (Lean Of Peak) in your recip, you pass through the stoichiometric mixture on your way to LOP, and for a brief moment, you have an ideal fuel/air mixture and all CO is burned (at around 609 degrees Celsius). Once you get to LOP, combustion is once again cooler and the CO remains unburned. Running at the stoichiometric mixture is impractical because the mixture would burn too hot for engine longevity and power would be diminished. So, we are burning fuel at a ratio such that CO is produced and not burned. Now, here is a big spoonful of plain yogurt.

The Porphyrin Class

Carbon monoxide is a very important industrial compound used in refrigeration and cooling, as an inert gas in chemical processes, in the synthesis of ammonia, and in the storage of carbon powder in fire extinguishers. It burns in air with a bright blue, 2,121 degrees Celsius flame, is only slightly soluble in water, and its physical properties closely resemble those of nitrogen. Carbon monoxide is a colorless, odorless and insipid (there's that word again) gas and is the number one cause of accidental death from poisoning. The human respiratory system provides oxygen to the tissues and eliminates the carbon dioxide produced by them. When inhaled, carbon monoxide passes from our lungs into our bloodstream, where it attaches to the hemoglobin molecules that normally carry oxygen. Most of the O_2 transported by the blood is through its reaction with hemoglobin molecules. Hemoglobin is a red protein responsible for transporting oxygen in the blood of all critters possessing an internal spine (that's us). Its molecule is comprised of four subunits, each containing an iron atom bound to a heme group. Heme is an iron-containing compound of the porphyrin class (see

My FO Mike demonstrates the response to CO, hypoxia and smoke/fumes in the cockpit.

formula #5 above), and makes our blood red and gives it the ability to carry oxygen. The transport of CO happens in the same way, but its attraction with hemoglobin is about 250 times greater than O_2. Apparently, CO likes to stick to Hb even more than we like to eat butter pecan ice cream.

Neurological Conditions and Half-life

Without enough oxygen, individual cells suffocate and die, especially in vital organs such as the brain and heart. The most common symptoms of CO poisoning are headache, dizziness, weakness, upset stomach, vomiting, chest pain and confusion. Symptoms are often described as "flu-like." If you breathe in a lot of CO it can make you pass out or kill you. If you are exposed to low levels of carbon monoxide over a longer period (by an exhaust leak, for example), your symptoms can also appear like the flu. The half-life of CO after a pilot resumes breathing "clean" ambient air is approximately 4 to 5 hours, while breathing high-flow oxygen via a non-rebreathing face mask (one that prevents rebreathing your own breath) is about 90 minutes, and with 100 percent hyperbaric oxygen (pressure breathing), approximately 30 minutes. An unusual feature of acute CO poisoning, however, is a delayed deterioration in neurological conditions occurring anytime from a few days to as long as five to six weeks after initial exposure.

What's a Mother to Do?

CO poisoning from jet exhaust may be slightly less likely than from a recip, but any smoke or fumes would call for the same mayday call and emergency descent.

If you smell exhaust odors or begin to feel any of the symptoms previously mentioned, you should immediately assume carbon monoxide is present and take the following actions:

- Turn the cabin heat fully off.
- Increase the rate of cabin fresh air ventilation to the maximum.
- Open windows if the flight profile and aircraft's operating manual permit such an action.

- If available (provided it does not represent a safety or fire hazard), consider using supplemental oxygen.
- Land as soon as possible.
- Do not hesitate to let Air Traffic Control know of your concerns. Use Mayday and ask for vectors to the nearest airport, request ARFF.
- Once on the ground, seek medical attention.
- Before continuing flight, have the aircraft inspected by a certified mechanic and consider CO's half-life as described above as well as the delayed neurological issues.

Getting to fresh air may necessitate an emergency descent.

CO Detectors; In My Own Words

Most retail brand carbon monoxide alarms are designed to meet minimum government standards (UL 2034 in the U.S. and CA 6.19 in Canada). These standards are meant to protect healthy adults from high levels of CO. Approved alarms must adhere to the following test point minimum exposure times. Note: Carbon Monoxide is measured and displayed in "PPM" or parts per million.

- 0 – 29 PPM: The detector must remain silent. If it has a digital display, it must show a zero reading.
- 30 PPM – 69 PPM: If the carbon monoxide level remains in this range for a minimum of 30 days, the audible alarm may sound. If the unit has a digital display, it should display the CO level, provided it is 30 ppm or higher.

- 70 PPM – 149 PPM: The alarm must sound when levels reach this range for between 60 – 240 minutes.
- 150 PPM – 399 PPM: The alarm must sound if the carbon monoxide level remains in this range for between 10 to 50 minutes.
- 400 PPM +: The alarm must sound if the carbon monoxide level remains at or above this level for between 4 to 15 minutes.

Feel free to surf the web to select a CO detector of your own choosing and consider the following more sensitive alarm as an example: Available for about $190, CO Experts offers the Model 2016. It displays CO starting at 1 PPM and makes its first alert immediately with no time delay at 7 PPM. It has a graduated series of alarms as the CO concentration rises, and there is no time delay between hitting a concentration level and the alarm sounding. It has a silence feature allowing the user to shut off the alarm temporarily – the length of time the alarm will remain silent decreases at higher CO concentration levels, and the alarm will sound again after silencing if the CO level increases any amount. The unit has an expected life of five years and includes a monitoring system that warns of a detector failure, low battery and impending end of life of the unit.

CH4 Is Not A Noble Gas

(He, Ne, Ar, Kr, Xe, Rn and Og)

Thank you for reading my humble column, written left-handed from memory without the internet, while on a layover in BOS and not MIA (see "To Err Is Human," T&T August 2020 for the relevance of MIA). You've made it through a life-saving, plain yogurt flavored article about CO, chemistry and our respiratory system and can now move on to the next T&T article without regret. Well, except for the regret you may feel after eating too much butter pecan ice cream. I say go for it; there are no ice cream detectors here. But make certain the ratio of ice cream to chocolate fudge is stoichiometric. If not, you may need to run yourself LOP to thwart N_2 + H + CO_2 + O_2 + CH_4 emissions. And if you're in the yogurt business, please forgive me – no malice was intended; I just don't like plain yogurt.

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

“DANKA, STEVENS!”

On time. On budget. Exceptional work. That’s how you earn respect from around the world. This spring, working with a German customer, Stevens performed the pre-buy for this King Air 90, then installed a G-1000 avionics suite, MT 5-bladed props, winglets, strakes, as well as custom interior refurbishment and partial paint. Seventy years ago, we began building a reputation for technical expertise and personal engagement. Airplanes have changed since 1950, but the Stevens commitment to a great customer experience remains the same.

STEVENS AEROSPACE AND DEFENSE SYSTEMS

EST.1950

SOAR WITH THE LEADER

www.stevensaerospace.com | 1-800-513-9164 | Greenville SC | Macon GA | Nashville TN | Dayton OH

En Route

Introducing the Beechcraft King Air 360

Textron Aviation ushered in the next generation of its legendary King Air turboprop family with the Beechcraft King Air 360/360ER. The updated flagship turboprop offers the latest technological advancements in the cockpit, a redesigned cabin, and enhancements to passenger comfort. The aircraft is currently in production with customer deliveries expected to begin in the Fall of 2020.

A key feature of the King Air 360 cockpit is the addition of the Innovative Solutions & Support (IS&S) ThrustSense Autothrottle. The autothrottle supports pilots in their critical mission of delivering people or cargo safely by automatically managing engine power from the takeoff roll through the climb, cruise, descent, go-around and landing phases of flight. This enhancement reduces pilot workload and supports them in their continuous vigilance to prevent over-speed or under-speed, over-temp and over-torque conditions.

Another important update in the cockpit is the new digital pressurization controller, which automatically schedules cabin pressurization during both climb and descent, reducing pilot workload and increasing overall passenger comfort. The pressurization gauges have been integrated with the powerful Collins Aerospace Pro Line Fusion flight deck.

With seating for up to nine passengers, the latest King Air offers an even greater passenger experience than its predecessor. The aircraft features a cabin altitude of 5,960 feet at a typical cruising altitude of 27,000 feet – more than 10 percent lower when compared to the King Air 350i. The improved cabin altitude levels provide greater comfort for passengers, especially during longer flights. For more information, visit *www.txtav.com*.

En Route

Garmin Autoland Certified on TBM 940

Garmin announced European Aviation Safety Agency (EASA) and Federal Aviation Administration (FAA) certification of Autoland in the Daher TBM 940. The Garmin Autoland system is available as part of the G3000 integrated flight deck and is capable of taking control and landing the aircraft without human intervention in the event the pilot is unable to fly.

In the event of an emergency, the pilot or passengers on board the aircraft can activate Autoland to land the aircraft with a simple press of a dedicated button. Autoland can also activate automatically if the system determines it's necessary. Once activated, the system calculates a flight plan to the most suitable airport, while avoiding terrain and adverse weather, initiates an approach to the runway and automatically lands the aircraft – without pilot or passenger intervention. For more information, go to *www.garmin.com/aviation.* T&T

Cirrus Aircraft Launches VisionAir Ownership Program

Cirrus Aircraft recently announced VisionAir, a revolutionary ownership program for the Vision Jet. Designed as a completely turnkey program, VisionAir includes everything needed to own, operate and manage a Vision Jet.

VisionAir is an exclusive, comprehensive aircraft management program for Vision Jet owners. The program includes an on-demand professional pilot, concierge services, complete maintenance coverage, aircraft management oversight and storage, as well as options for insurance coverage and referrals for professional tax advice. VisionAir is a total ownership solution that goes beyond fractional ownership and charter services to offer full ownership.

VisionAir is currently available at Cirrus Aircraft's newest factory-direct facility, Cirrus Aircraft McKinney (KTKI), located in the Dallas Metroplex area. Additional locations will be available soon. For more information visit *www.cirrusaircraft.com/visionair.* T&T

Ad Index

ADVERTISING DIRECTOR, JOHN SHOEMAKER
779 Aero Park Drive, Traverse City, MI 49686
Phone: 1-800-773-7798 Fax: (231) 946-9588
E-mail: **johns@villagepress.com**

Fund an Angel Virtual Auction

BID ON ITEMS NOW

CLOSES WEDNESDAY, OCTOBER 7 | 8 P.M. EDT

The Fund an Angel Virtual Auction will raise critical funds for Corporate Angel Network, which helps cancer patients access the best treatment centers in the country by arranging free travel on corporate aircraft. Bidding is now live and new auction items will be added as they are received. Don't miss this chance to secure a unique experience or item while helping to support a great cause.

"The last time we drove the 750 miles, but this time we got a flight for which we are so grateful."
– *CAN Participant*

A SPECIAL THANK YOU TO OUR CURRENT SPONSORS

PRESENTING SPONSOR NBAA

PLATINUM SAFE FLIGHT INSTRUMENT CORPORATION | SEL SCHWEITZER ENGINEERING LABORATORIES | Williams INTERNATIONAL

GOLD AIN | NETJETS

SILVER AOPA

BRONZE ConocoPhillips Global Aviation | ROLLS ROYCE

BID ON ITEMS NOW | fundanangel.org

Belted

"Jax Center, King Air three niner six delta mike would like to deviate ten right for a buildup," I asked. "That's approved, and when able, direct Charleston executive," came the immediate reply.

Descending through 12,000 feet, in the clear, I noticed a small buildup to my left, only a few hundred feet above me. I thought about pushing through it, but with Patty on board, a more comfortable ride was in order. I nudged the airplane slightly to the right to miss the benign, puffy cumulus.

Then I lost consciousness.

I woke up less than a second later. My head had slammed to the left against the sidewall of the King Air. It was the most violent turbulence encounter of my 50-year flying career. My headset was ejected from my body. As I regained my composure, my vision was blurred. I looked for my headset which was on the cockpit floor. Next to it was my spare set of glasses tossed from my pocket, a black metal screw and a small piece of broken plastic.

I glanced to the right and realized that Patty's headset had departed as well.

"You okay?" I yelled.

"I think so," she replied. As usual, we both had on our full, four-point seat belts. If Patty had been in the cabin and unbelted, she likely would have been injured.

Incredibly, the Garmin autopilot remained engaged. I glanced up toward the ceiling and noticed several black scuffs on the vinyl where my head had landed (see photo).

We continued on to our destination and landed uneventfully. I laid awake that night wondering how bad things could have been if we had not been secured in our seats.

We were in Charleston for a Citation Jet Pilots regional meeting. While there, I had an opportunity to ask others if they had ever had a similar event. Very few had.

"How many of you have ever had your headset thrown off in turbulence," I asked.

Almost no one raised their hand.

It wasn't my first such event. Years ago, in my Citation Mustang, I lost my headset twice in one flight, in clear, low-level wind shear as I approached Dallas after a frontal passage.

"How many of you fly in cruise flight with the inertia reel belts released," I asked. The answer was quite a few.

Each year, numerous flight attendants and passengers are injured in airline operations from unexpected encounters with turbulence. In late September 1999, a Falcon 900B with a crew of three and seven passengers incurred a violent flight control issue. Only the three crew members were wearing seat belts. The seven unsecured passengers died during the event.

Seat belts are installed in our airplanes for a reason. It's simply not okay for us to discontinue their use because we feel more comfortable without them.

Especially flying single pilot.

Fly safe.

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

ice shield PSA™
de-icing systems

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. Simialar to the FASTboot®, Ice Shield PSA allows minimal aircraft downtime and easy installation. Contact an authorized distributor to purchase today.

Ice Shield & Ice Shield PSA products are available for sale worldwide!

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

COMMAND MORE POWER WITHOUT ADDING NOISE

RAISBECK COMPOSITE 5-BLADE SWEPT PROPELLERS

"The performance is astronomical from takeoff to landing with these new Raisbeck propellers. It's like a new airplane!" – R. Glenn, King Air B200GT Pilot

Noticeably quieter, Raisbeck's Composite 5-Blade Swept Propellers for the King Air 200 series offer a 30% noise reduction throughout the airplane with 16.5% better runway acceleration and 25.8% improvement in engine-out climb scenarios with flaps up. Your passengers can sit back and enjoy the quiet while crew can enjoy the improved performance.

(800) 537-7277 | sales@raisbeck.com | raisbeck.com

RAISBECK ENGINEERING
AN ACORN GROWTH COMPANY