Tire Care & Protection / Owner's Corner: Baron/KA200 / Unauthorized Approaches

TWIN & TURBINE

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

JANUARY 2023 $3.95 US
VOLUME 27 NUMBER 1

GROUND SAFETY

CAN
CORPORATE ANGEL NETWORK

Cancer Patients Fly Free

Can You Spare a Seat?

Corporate Angel Network (CAN) is a 501(c)(3) nonprofit organization whose mission is to provide cancer patients with free transportation to treatment centers throughout the United States.

CAN works closely with over 500 of America's top corporations, including half of the Fortune 100, to match empty seats with patient flights. Thanks to the generous support of these companies, CAN has coordinated more than 67,000 flights since its founding in 1981.

Contact CAN to learn more about registering a cancer patient or to donate an empty seat on an aircraft.

corpangelnetwork.org

"It's wonderful that organizations like the Corporate Angel Network are able to help connect those most in need of flights to those who are flying."

-Henry Maier, President and CEO, FedEx Ground

Westchester Center Airport – White Plains, NY | (914) 328-1313

TWIN & TURBINE

EDITOR
Rebecca Groom
rebecca@twinandturbine.com

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

PUBLISHER
Dave Moore

PRESIDENT
Dave Moore

PRODUCTION MANAGER
Mike Revard

PUBLICATIONS DIRECTOR
Jake Smith

GRAPHIC DESIGNER
Marci Moon

TWIN & TURBINE WEBSITE
www.twinandturbine.com

ADVERTISING
Jenna Reid
316-409-7033
Jenna.Reid@VPDCS.com

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

GENERAL AVIATION ADVERTISING INFORMATION
Aviation.Publications@VPDCS.com

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

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

Twin & Turbine (ISSN 1092-6402), USPS 24432 is published monthly by Village Press, Inc. with advertising offices located at 2779 Aero Park Drive, Traverse City, Michigan 49686. Telephone (231) 946-3712. Printed in the United States of America. 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

JANUARY 2023 • VOL. 27, NO. 1

COVER PHOTO:
Photo Courtesy of Stan Dunn

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

Editor's Briefing

by **Rebecca Groom**

New 2023 Series

With the turn of the year, I am excited to introduce a new T&T editorial series called "Emerging Tech."

The concept for this series is as straightforward as it sounds: A section of the magazine dedicated to spotlighting a specific technology, product, STC, or upgrade that is new-to-market or potentially lesser known to aircraft owners of high-performance pistons, turboprops and jets. The piece might pertain to weather, performance, safety, comfort, training – the boundaries are wide set.

To launch the series this issue, we highlight two separate STC's: ASI's auxiliary heading selector for King Airs and Cutter Aviation's MaXus APU for Pilatus.

ASI's (Aerospace Systems International) pedestal-mounted auxiliary heading selector illustrates how a small component can make a big impact. The Wichita-based company developed an auxiliary heading selector STC for Collins Pro Line 21 and Fusion-equipped B200- and B300-series King Airs. The STC was created to better the safety, ergonomics and workload of King Air pilots. The installation also includes an option to add USB A/C charging ports. You can read more on page 20.

And following the ASI piece on page 22, you will find information on Cutter Aviation's recently unveiled APU unit. The company teamed up with Advanced Innovative Engineering (AIE), HFE International, Acutronic, and U.S. Technical Consultants to design an APU for the PC-12 and PC-24. The unit couples a 45-horsepower Wankel Rotary engine with a starter-alternator which provides 300 amp (8.4KW) 28-volt DC power. The company expects STC approval later this year.

Our industry is constantly innovating and our goal with Emerging Tech is to regularly feature and review some of the latest and greatest (and coolest) innovations out there. If you have a product you would like to see featured or reviewed in a future issue, feel free to submit your ideas to my email below. T&T

rebecca@twinandturbine.com

COMBAT WOUNDED
THEY'VE GOT HEART, THEY NEED WINGS

Imagine returning home from combat facing devastating injuries
and long-term hospitalization-- in a facility hundreds of miles away from your family.

Imagine somebody brings you together.

The VAC provides free air transportation to wounded veterans and their families for medical and other compassionate purposes through a national network of volunteer aircraft owners and pilots.

FIND OUT HOW YOU CAN MAKE A DIFFERENCE.

VeteransAirlift.org

952-582-2911

Not Authorized

by **Thomas P. Turner**

Safe and successful instrument flight is in the details. What does it mean when a procedure is marked as "not authorized?" Doesn't the controller protect you by refusing to clear you for an unauthorized procedure?

It's your responsibility as pilot-in-command to be aware of the limitations on approach procedures, to avoid asking for an unauthorized approach, and to refuse a clearance if it includes a procedure that's not authorized. Air Traffic Control's guidance is to clear you for any procedure you request as long as there is no conflict with other IFR aircraft. What sorts of procedures may be "not authorized" for an instrument approach? How will you find out a procedure is not authorized, so you'll know not to request it or attempt to fly the procedure?

Symbology

Most "not authorized" instrument procedures are identified in textual notes on the approach chart. There is no specific symbol to jump out and alert you. You must read the notes at the top of the chart and look for the notation "NA" – for example, "Circling to Rwy 5-23 NA at night."

Here are some limitations that may apply to an instrument approach.

NA at Night

"Occasionally, operations at an airport may be limited at night," wrote James E. Terpstra, now retired Senior Corporate Vice President at Jeppesen. "Because runway lighting is required for approval of night instrument operations, some approaches are authorized only during the day. In some cases, the mountainous terrain around an airport is so significant that some night operations may be limited or not authorized at night."

Circling NA

If terrain or obstacles are near the airport, straight-in approaches may be authorized but circle-to-land procedures may not. A variation on this theme is when an obstacle exists on one side of the airport but not others, and circling is not authorized if it takes the airplane near that obstacle. In this case, you may see a note that says, "Circling NW NA," for example, if any circling maneuver that would take the airplane northwest of the airport puts it in conflict with the obstacle. Or "Circling to Rwy 15 NA" if maneuvering from the final approach course for the procedures being flown cannot safely end with a circle-to-land maneuver to Rwy 15.

Circling NA at Night

It may be that obstacles or terrain permit circling in daylight conditions (even in poor weather that requires a circle-to-land maneuver), but the obstruction is not lighted, so attempting the circle maneuver at night is hazardous. In this case, a note such as "Circling to Rwy 5-23 NA at night" provides you with this warning.

Straight-In Minimums NA at Night

At first glance, this may seem odd. It *sounds* like it means straight-in procedures are not authorized, but circling maneuvers are. That seems backwards. What this notation is really saying, however, is that you must use the circling minimums value to define MDA, DH or DA even if you're flying a straight-in approach – a straight-in procedure is authorized, but you must use the higher circling minimums. This is usually because the runway has limited lighting that does not completely prevent the use of the *procedure* at night but that requires you to be more conservative about flying it after dark.

It's in the Details

The "NA"s can be lost in the fine print of a long note on an instrument procedure chart. The ILS RWY 5 approach at eastern Tennessee's Tri-Cities Airport (KTRI), for example, has these limitations *(Figure 1)*:

- **Circling to Runway 9 not authorized at night.** A quick look at the surrounding terrain (which, if you've ever flown to KTRI, you know is steep and devoid of lights) tells you why.
- **Circling northwest of Runways 9 and 23 not authorized.** Even in the daylight, the terrain is too close to the runway to permit circling in the low visibilities that would require you to be flying a circle-to-land maneuver.
- **Autopilot coupled approach NA below 2200.** Terrain or other features make the localizer and/or glideslope signal unreliable below 2200 MSL, which is 300 feet above decision height and even higher than localizer-only and circling minimums. So if you need to fly all the way to minimums to make it in, you have to hand-fly at least the last part of the descent to the missed approach point.
- **Procedure not authorized when the tower is closed.** This approach requires radar, per the larger note on the approach chart. When no one is in the tower the entire ILS is NA.

Figure 1

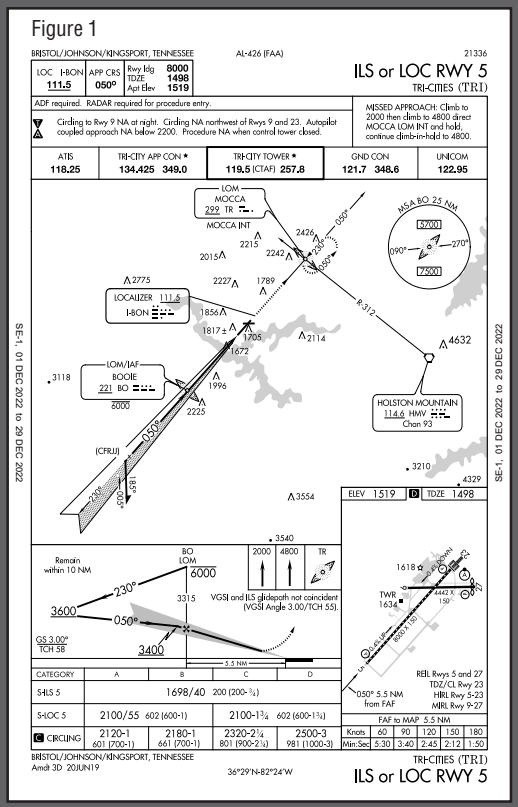
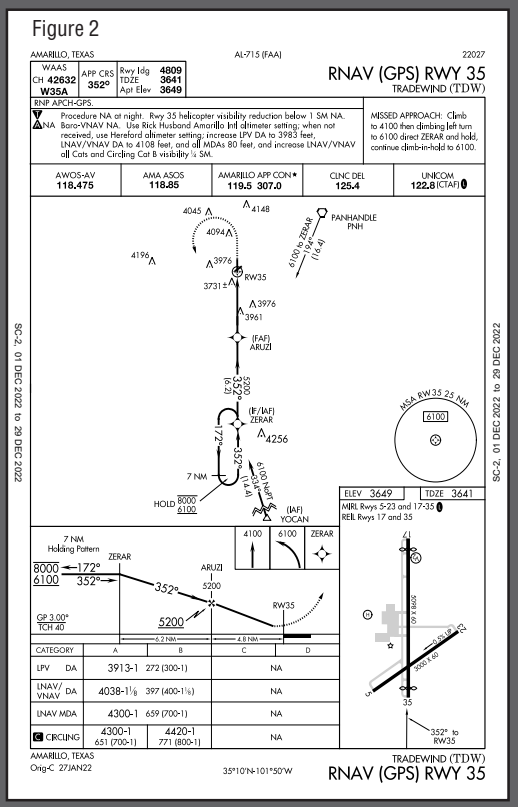


Figure 2



The Amarillo/Tradewind Airport (KTDW) RNAV (GPS) RWY 35 approach chart *(Figure 2)* illustrates these approach limitations:

- **Procedure not authorized at night.** There are likely related to obstructions on the final approach, and/or limitations on the type of runway lighting available.
- **Helicopter visibility reduction below one nautical mile not authorized.** In the flat terrain near Amarillo, Texas, this is most likely related to obstacles near the runway as well.
- **Baro-VNAV approach not authorized.** There are obstacles on the approach path that prevent use of a GPS-derived, non-WAAS glidepath below the published MDA for the nonprecision approach.

Both of these approaches are good examples of why we must review approach charts, including a close review of all the notes, well in advance of beginning a procedure.

Temperature-Limited GPS Approaches

This one is a little more esoteric but no less vital. Procedures that use GPS to generate an electronic glidepath through Baro-VNAV may not provide obstacle clearance below the procedure's Minimum Descent Altitude (MDA). What is Baro-VNAV?

The FAA tells us:

Baro-VNAV is an RNAV [GPS] system which uses barometric altitude information from the aircraft's altimeter to compute vertical guidance for the pilot. The specified vertical path is typically computed between two waypoints or an angle from a single way point. When using baro-VNAV guidance, the pilots should check for any temperature limitations which may result in approach restrictions.

This is why IFR approach-cer-tified GPSs prompt the pilot to enter the current altimeter setting into the box before loading an approach. The GPS uses its terrain database to calculate and display an electronic

glidepath using barometrically derived altitude information. But the FAA warns there may be temperature limitations on Baro-VNAV approaches. The Aeronautical Information Manual (AIM) tells us:

Hot and Cold Temperature Limitations. *A minimum and maximum temperature limitation is published on procedures which authorize Baro-VNAV operation. These temperatures represent the airport temperature above or below which Baro-VNAV is not authorized to LNAV/VNAV minimums. As an example, the limitation will read: "Uncompensated Baro-VNAV NA below -8˚C (+18˚F) or above 47˚C (117˚F)." This information will be found in the upper left hand box of the pilot briefing. When the temperature is above the high temperature or below the low temperature limit, Baro-VNAV may be used to provide a stabilized descent to the LNAV MDA; however, extra caution should be used in the visual segment to ensure a vertical correction is not required. If the VGSI is aligned with the published glidepath, and the aircraft instruments indicate on glidepath, an above or below glidepath indication on the VGSI may indicate that temperature error is causing deviations to the glidepath. These deviations should be considered if the approach is continued below the MDA.*

NOTE: *Many systems which apply Baro-VNAV temperature compensation only correct for cold temperature. In this case, the high temperature limitation still applies. Also, temperature compensation may require activation by maintenance personnel during installation in order to be functional, even though the system has the feature. Some systems may have a temperature correction capability, but correct the Baro-altimeter all the time, rather than just on the final, which would create conflicts with other aircraft if the feature were activated. Pilots should be aware of compensation capabilities of the system prior to disregarding the temperature limitations.*

There's good news for pilots of WAAS GPS-equipped aircraft:

NOTE: *Temperature limitations do not apply to flying the LNAV/VNAV line of minima using approach certified WAAS receivers when LPV or LNAV/VNAV are annunciated to be available.*

In other words, if you're flying a GPS approach using a non-WAAS approach-certified GPS, watch for limitations on the use of the advisory glidepath in very hot or very cold conditions. If you're using a WAAS GPS or the temperatures are not extreme, you'll quickly dismiss this warning when you see it.

Other NAs

This is not an all-inclusive list of the procedures that may not be authorized for a given approach. Read the notes thoroughly as you brief for the approach. Remember, your success is in the details.

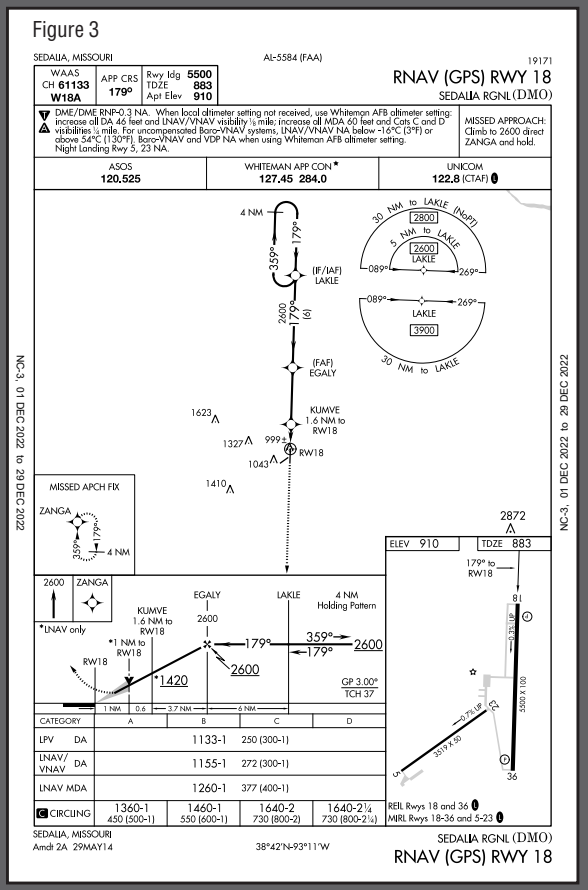
Won't Controllers Protect Me?

Controllers won't prevent you from trying to fly an unauthorized approach. According to the FAA's guidance to controllers in Air Traffic Organization Policy JA 7110.65V, section 4-8-1 (with my emphasis added in italics):

Approach clearances are issued based on *known traffic.* The receipt of an approach clearance does not relieve the pilot of his/her responsibility to comply with applicable

Baro-VNAV Limits

Figure 3



The RNAV (GPS) RWY 18 approach *(Figure 3)* to Sedalia, Missouri (KDMO) shows a Baro-VNAV temperature limitation. When the ambient temperature is below -16 C (+3 F) or above 54 C (130 F), the LNAV/VNAV approaches are not authorized. I served at nearby Whiteman Air Force Base and my first flight instructor job was at Sedalia. It's not likely to get above 130 F, but there were many times (in that pre-GPS era) that the temperature was below 3 F.

Baro-VNAV and the VDP are both no authorized when using the Whiteman AFB altimeter setting, and night landings are not authorized on Runway 5/23.

Parts of [the] Federal Regulations and the notations on instrument approach charts which levy on the pilot the responsibility to comply with or act on an instruction; e.g., "Straight-in minima not authorized at night," "Procedure not authorized when glideslope/ glidepath not used," "Use of procedure limited to aircraft authorized to use airport," or "*Procedure not authorized at night.*"

FAA directly advises pilots of our responsibility to adhere to these notations in Section 5 of the Aeronautical Information Manual (AIM):

Section 5. Pilot/Controller Roles and Responsibilities

5-5-4. Instrument Approach

a. Pilot.

1. Be aware that the controller issues clearance for an approach based only on known traffic.
2. Follows the procedure as shown on the IAP, including all restrictive notations, such as:
   a. Procedure not authorized at night;
   b. Approach not authorized when local area altimeter not available;
   c. Procedure not authorized when control tower not in operation;
   d. Procedure not authorized when glide slope not used;
   e. Straight-in minimums not authorized at night, etc.
   f. Radar required; or
   g. The circling minimums published on the instrument approach chart provide adequate obstruction clearance and pilots should not descend below the circling altitude until the aircraft is in a position to make final descent for landing. Sound judgment and knowledge of the pilot's and the aircraft's capabilities are the criteria for determining the exact maneuver in each instance since airport design and the aircraft position, altitude and airspeed must all be considered.

Air Traffic Controllers separate airplanes from other airplanes. They are not responsible for protecting pilots from themselves. It's your responsibility to research and adhere to any restrictions on approaches and landings. It's all part of the awesome Pilot-in-Command responsibility you accept when you exercise the amazing freedom of flight. T&T

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


WARNING
A6
←A→

PHOTOS COURTESY OF STAN DUNN

GROUND SAFETY

by **Stan Dunn**

Safety, in an operational sense, is a building block process. Good preflight practices set the stage for ground handling, which sets the stage for takeoff, climb, cruise, descent, approach, taxiing, parking and tying down. The failure of an individual element can result in not only a costly incident but a dangerous one as well. Good preparation leads to good execution. Process is as important as skill. Experience and education round out the safety circle. What you do on the ground is as important as what you do in the air.

Developing a process that ensures the completion of preflight duties prior to movement is critical. Combining taxiing with other tasks should be avoided when able and mitigated when not. A good percentage of ground mishaps occur within the context of a task-saturated pilot. Always maintain awareness of your mental load. Are you green, yellow or red? When you are in the green, you are several steps ahead of the aircraft. You know how many intersections before the next turn, where exactly you are in relation to the runway, performance calculations for takeoff have been computed, the flight plan has been programmed, and you are ready to go. If you get a reroute during taxi (or a runway change that affects takeoff performance), you will slip into the yellow. Your vision will shift from a thousand yards to a hundred. In the red, you are dangling from the tail. Green means go. Yellow means slow. And red means stop. Simple, but hard.

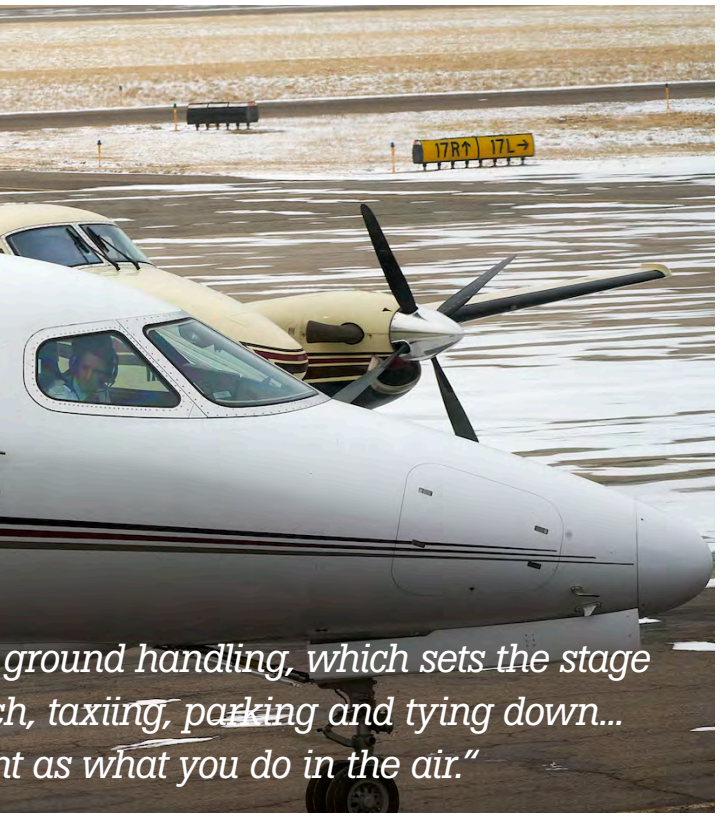
The Preflight Process

I have yet to meet a pilot who loves calculating weight and balance. Years ago, I used Sheppard Air to prepare for my ATP written. At the time, the performance calculations for the exam involved a myriad of spaghetti charts. It was easy to get lost in them. Even when you used them correctly, you would end up with four different results out of four identical attempts. For their part, Sheppard focused on a mnemonic to memorize the correct answers to those questions. If you wanted to obtain reliable test results, it was pointless to drill technique. I formed an intense distrust of shorthand charts from that test bank. It bordered on hatred. I doubt that was what the FAA had intended. For what it is worth, memorization worked. I scored 100 percent on the test. When I was younger, I wasted a lot of time pursuing perfection. I would not be a worse pilot today had I gotten an 85 percent on it.

My first captain job was on a BE-1900. Over the course of two years, I calculated thousands of weight and balances. We used a calculator and Whiz Wheel (a circular slide rule) for the computations. It was more reliable than the spaghetti charts. Out of five attempts, I would end up with only three different answers. Today, of course, everything is on an app. And while technological reliance represents a real danger to pilots, when it comes to math, it is absolutely the right tool for the job. Apps such as ForeFlight incorporate weight and balance into the preflight flow with an eye on human factors. There is nothing wrong with operating an aircraft under a "standard weight and balance" (full tanks and only the pilot on board). But you should still pause briefly on this task, even if it is simply to confirm that "standard" conditions actually exist. Knowing weight and balance prior to taxi is the first step in decluttering ground operations.

With every seat filled and a haul of baggage, you may find that fuel calculations have suddenly become critical. Just like with weight and balance, aviation apps take quite a bit of mystery out of this. Still, if you are getting close to minimum regulatory fuel, it is important to consider additional factors. If you are operating into a remote airport, will "destination plus 45" be enough to get you to a safe alternate should an aircraft become disabled on the sole runway? Fuel stops are a hassle, but being nervous about your fuel load will inevitably narrow your vision for every other required task. Make a stop and enjoy the view.

Pilots need to establish oversight into every aspect of aircraft servicing. If someone screws something up on the ground, we are the ones who pay for it. A high-performance aircraft can be confused with a turbine. A small turbine can be confused with a piston. Do not take it for granted that the fueler will know whether you were asking for Kerosine or 100LL. Pounds versus gallons can be an issue as well. The prevalence of different units of



ground handling, which sets the stage
ch, taxiing, parking and tying down...
nt as what you do in the air."

measurement (particularly when flying internationally) also represents a risk. Each one of these scenarios has caused crashes. Even before you have started the engines, there are a half-dozen different categories of aircraft mishaps lying in wait. An established, reliable and familiar preflight process is the easiest solution to getting off on the right foot. A comprehensive app/subscription (e.g., ForeFlight) is a good step in the right direction. As with all technological aids, the app universe requires proficiency. The toughest part of current tech is the fact that updates constantly tinker with the user interface. While these updates seek to establish better processes, it also requires users to continually adapt.

Weather

Units of measurement can be a problem with weather as well. On a recent flight to Puerto Rico, the Terminal Area Forecast (TAF) deteriorated for our alternate of Punta Cana (located in the Dominican Republic). Approach minimums were depicted in kilometers. The TAF reported visibility in thousands of…feet? Meters? We honestly did not know. The regional manual for the airport was no help. It stated that either feet, kilometers or meters could be used. The units in use made the difference between a legal alternate or the need for something else. Our Jeppesen app came to the rescue. Utilizing the "plain language" function, we were able to determine that visibility was forecast in meters (the 6000 on the TAF was converted to 3SM). Once we knew it was meters, figuring out the rest was easy.

Weather is obviously important in the air, but it can also be critical during movement on the ground. Traction is reduced when operating at an airport with standing water, slush, snow or ice. Poor braking action generated by these surfaces can easily triple the required landing distance. Contamination increases the takeoff run as well. Crosswinds on slick surfaces have caught more than one pilot unaware. Aircraft weathervane more aggressively when tire grip is limited, and nose-wheel steering on these surfaces is less effective. Slick surfaces call for slower taxi speeds and may also require an adapted sequence of preflight activities. Safe ground handling begins with reviewing cold weather procedures prior to "firing them up." If specific limitations are not published for your aircraft, consider reducing crosswind limits in half for operations with medium braking action. Cut it in half again if it is poor. While manufacturer cold weather data reigns supreme, guidance can also be found via the FAA, AOPA and aircraft-specific owners' groups.

Taxiing

You cannot discuss ground safety without talking about taxiing. What you do prior to movement has a profound impact here as well. It is good to familiarize yourself with the expected taxi route prior to contacting ground. It is also a good idea to have the proper frequencies in the active and standby radios for the progression from ground to tower to departure. Any published hot spots that you might encounter should be reviewed. Be wary of runway-taxiway intersections. You need to be solely focused on the outside world when operating in these locations. Vitally important (and easy to overlook) is maintaining fluency in airport signs, markings and lighting. Do you know what a double solid and dashed yellow line means? Which side of this marking is the runway, and which side is the taxiway? How about an ILS-protected area? When do you need clearance to cross the boundary? (Technically, only when ATC has instructed you to hold short of the protected area. This may occur with a ceiling of less than 800 feet or visibility of less than 2 miles). When approaching a direction sign for a crossing taxiway, is the sign before or after the indicated taxiway? (It is before it).

Though a mere 85 percent on an ATP written may not be a big deal, being only 85 percent on airport markings and lighting is. A few years ago, I was performing a recurrent check ride on a crew. The captain was a line check airman (another instructor). The first officer was a line pilot. The scenario in the simulator began with a nighttime taxi at Boston Logan airport. At this airport, taxiway Alpha curves at a 70-degree angle when approaching runway 15R. The captain straddled the blue taxi lights in the turn. The problem, of course, is that blue lights delineate the edge of the taxiway. Green lights are the center. The entire

Weather is obviously important in the air, but it can also be critical during movement on the ground. Traction is reduced when operating at an airport with standing water, slush, snow or ice. Poor braking action generated by these surfaces can easily triple the required landing distance.

area was concrete, so I commented on it and let it go. If he had been on the edge of the paved surface instead, he would have stuck a tire in the mud. Airline crews get one retrainable event during a recurrent check ride. He got his sole strike before leaving the ground.

I had a captain applicant in another training session get lost during taxi at JFK airport. He justified himself by noting that the ownship function in Jeppesen (which uses the iPad GPS to display aircraft position on the airport diagram) did not function in the simulator. I explained that it does not always work in the real world either, and he needed to be able to figure it out with situational awareness and signage. He failed his upgrade checkride with another examiner after getting lost during the taxi (among other things). It is not just in the sim. A 737 knocked down a light pole with its wing while taxiing from the ramp at DFW airport a few years ago. The first officer was heads down during a congested part of the taxi attempting to program the Flight Management System (FMS). The captain turned onto the double yellow line (taxiway edge) instead of the single yellow line (centerline). It did not help that the taxi line was faded. Still, it underscores the importance of knowing airport signs, markings and lighting. You really want to be 100 percent on this subject.

The Problem with Runways

Just before Thanksgiving in 1996, a Beech 1900C and a King Air A90 collided at the cross-point of runways 13 and 4 at Quincy Municipal Airport in Illinois. All 12 passengers and crew were killed in the 1900 and two in the King Air. The cause of death for all occupants was smoke inhalation and fire (the collision resulted in a peak of 19 G's in the 1900 and 30 G's in the King Air, both survivable). It is interesting to note that Raytheon (who had purchased Beechcraft in 1980) argued with the NTSB to blame the crew of the 1900. Raytheon had a vested interest. The NTSB had pinned partial blame for the fatalities on the inability of the first officer to open the airstair door (his body was found in proximity to this exit). The captain, who was trapped in the cockpit, pleaded with first responders to "get the door open." According to witnesses, she survived for approximately 120 seconds prior to succumbing to smoke inhalation. Raytheon argued that the deaths were primarily due to negligent operation during flight (they pointed at the decision to shoot a straight-in approach at an uncontrolled airport – a technique that is not prohibited – and the fact that the crew had exceeded 250 knots below 10,000 feet). The NTSB denied Raytheon's appeal.

The cause of the collision itself was never in question. The pilot of the King Air failed to communicate (or effectively monitor) the Common Traffic Advisory Frequency (CTAF) prior to takeoff. This was not the mistake of a novice. The pilot had accumulated 25,000 hours of flight time over the course of his career. He was a retired TWA pilot who had reached the rank of Colonel with the U.S. Air Force. He was an active CFI and a part-time air taxi pilot. His CV, however, was not without blemish. Following a certificate action due to a gear-up incident on an instructional training flight, the responding FAA examiner reported that he had made statements "to the effect that he was a retired U.S. Air Force Colonel…and that a gear-up [landing] did not mean anything." His student in the gear-up incident testified that the pilot oftentimes "seemed to be in a hurry" and rushed him during training sessions.

A second non-pilot occupant of the King Air made a CTAF call "holding short of runway four" two minutes before the collision. On short final, the 1900 crew

inquired as to whether the "aircraft" was still holding short of the runway. A Piper Cherokee (who was holding short behind the King Air) stated that he was holding short of the runway. He followed up with a transmission that was partially blocked by an automated GPWS callout on the 1900: "…on the uh, King Air." Likely he was communicating that the King Air was on the runway. The King Air began its takeoff run approximately 13 seconds before the 1900 touched down. The 1900 crew was not alerted to this.

Runways are dangerous, high-speed environments. Uncontrolled airports add to the risk factor. A healthy scan of intersecting runways (as well as the runway of intended landing) is a good idea. However, in an already high-workload environment, this can be difficult to accomplish. Good radio etiquette is also important, as is the awareness that others may not be actively hearing your transmissions. Any operation around a runway demands your complete and total attention. Any task not associated with the operation of the aircraft should be suspended when approaching or occupying a runway. Do not be in a rush. The consequences can be dire. T&T

Stan Dunn *has 8,000-plus hours in turbine-powered aircraft, with three years of experience as an instructor and evaluator for airline pilots. Stan publishes detailed coverage of aviation accidents at bellmanmultimedia.com/flying. You can contact Stan at* **Stan@bellmanmultimedia.com**.

Where the Rubber Meets the Runway

by **Elliott Cox**

When performing a preflight inspection, there's usually little more than a cursory glance given to the tire treads. I think it's worth your time to give the rest of your tires a closer look.

Tires are designed to take abuse from literally every angle. They must be rigid in one area while simultaneously being flexible in others, under heavy loads at high speeds, all while enduring dramatic temperature changes over a relatively short time. At first glance, it may look like a tire is nothing more than the product of pouring some rubber into a mold, but a tire's construction is almost as complicated as its mission.

The part of the tire that comes in contact with the wheel is called the "bead." Only a few dozen square inches of tire bead connect your airplane to the earth, so the rubber is thick and reinforcing wire is used to ensure an airtight seal, as well as to prevent the tire from slipping on the wheel. The last thing you'd want is for your tires to spin on the wheels when you grease that landing. You may be surprised by how much heat and smoke can be generated instantly when you spin a tire.

The part of the tire that takes the most abuse is the sidewall. Any "cushion" that comes from the tire is provided solely by the sidewall. The tire bead retains most of its shape as it goes through a rotation, but the sidewall is constantly in flex. Let's say that the valve stem of a main landing gear tire is at the six o'clock position, where the tire is at its maximum compression. If you roll the tire 180 degrees where the valve stem is at the 12 o'clock position, the sidewall is at its least compressed. Now imagine that spot making a full revolution 27 times every second, which is what the main tires on our Falcon 900 are turning when we rotate. If I were better at math, I'd calculate approximately how many revolutions our tires make on a typical takeoff roll. As a placeholder, I'll just say a bunch.

The tread is where the rubber meets the runway and comprises the sacrificial part of the tire. Keeping an eye on the tire tread will give you good insight into the health of your entire landing gear system. If your main tires are wearing evenly, you're keeping the tire pressures where they need to be, and your camber and toe are as they should be. If your tires are wearing unevenly, you may have a problem somewhere in the landing gear that is starting to manifest. Odd tire wear is a great early indication of problems to come, and prompt attention may save you a few dollars or maybe even a trip off the side of the runway.

Those are all parts of the tire that you can see, but the real magic happens inside the tire in the form of plies. "Radial" and "Bias" are the two ply options, and those terms describe the way in which the reinforcing cords are oriented within the tire. The cords in a radial tire are perpendicular to the direction of the tire tread. Bias tire plies run at about a 40-degree angle to the direction of the tire tread and make a crosshatch with every ply.

I also think it's important to note that just because a tire is "six-ply" doesn't mean that it contains six plies. "Six-ply" means that the tire has a ply rating of six, which indicates the load

capability of the tire, not the number of plies. Win a bar bet at the next hangar social with that one.

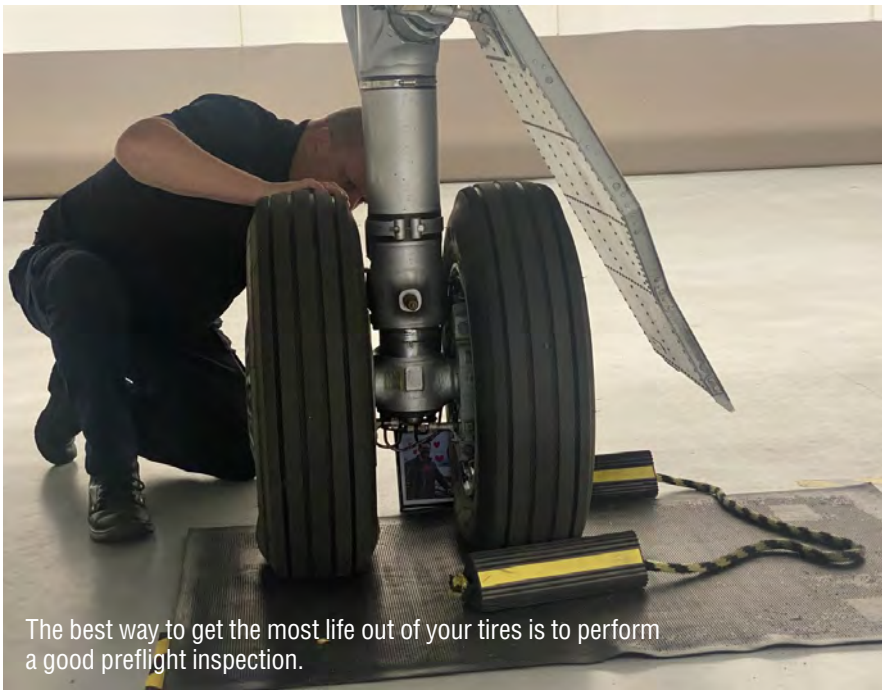
If your airplane has a max gross weight of less than 12,500 pounds and is not turbine powered, the POH should specify the approved tire size and ply rating. You can also find it in the aircraft's Type Certificate Data Sheet. As long as the tire is the proper size, ply rating, and is FAA TSO certified, you can use any manufacturer you'd like.

If you operate a turbine airplane or an airplane with a gross weight over 12,500 pounds, your tire options are more limited. The certification standards of these airplanes are different than their lighter, gas-burning cousins, so manufacturers don't specify tire sizes, they specify approved tire part numbers. These manufacturers did tons of testing to get the airplane certified for use on various runway surfaces and conditions, and whatever tires they used during those tests are what's approved for use on the airplane.

If the manufacturer only used Michelins to meet their certification standards, Michelin tires are your choice. If they threw a set of Goodyear tires on the airplane and repeated all the tests, you're welcome to use either tire as long as they're installed as a matched set.

It'd be great if we could mix and match Michelin and Goodyear tires, but if Textron Aviation (or Pilatus or Embraer) wanted us to use any tire installed in any position, they would have certified every conceivable combination of Michelins and Goodyears. That'd be a very expensive endeavor for a very small return.

Now that we know what tires are made of and which ones you can use let's take care of them. The best way to get the most life out of your tires is to perform a good preflight inspection. If you own your airplane or are part of a flying club, you'll see the same tires each time you fly, so you'll know the history and pedigree of the tires. That is, you'll know when something has changed, like a cut that wasn't there last time or tread starting to separate. These are just a few clues that you'll use to know when it's time to do something or not.



The best way to get the most life out of your tires is to perform a good preflight inspection.

Speaking of inspection criteria, if you need help determining if a cut is superficial or if that tire is toast, there are ways to find out for sure. Some aircraft manuals have somewhat useful tire criteria. FAA AC20-97B is a good source of information available online for free. I recommend using your Google machine to download the fantastic guides that Goodyear and Michelin have each created and made available as free pdf downloads. Other manufacturers may produce something similar, but these are the two with which I'm familiar. They contain tons of useful information along with pictures of anomalies so you can make an informed decision. These guides can also educate you enough so that when your airplane is down for maintenance, you don't have to take your IA's word as to the condition of your tires; you'll know their status before you even show up at the shop.

If you rent airplanes from a flying school, you won't have as good a grasp on the history of the tires, so you'll have to look a little closer during your preflight. It's almost impossible to tell just by looking at a tire if it's over or under-inflated. The rule of thumb is that if you can visibly tell that the tire is under-inflated or takes full power to taxi out of the chocks, the tire pressure is dangerously low and, in some cases, may be unairworthy. Most tire manufacturers publish a pressure that

The Worldwide General Aviatio

owner/operators and chief pilots of these air

100%

TOTAL MARKET COVERAGE

JETS - 21,487

CHIEF PILOTS & OWNERS

COUNT	AIRCRAFT
66	AIRBUS A300S
8	ASTRA 1125
39	ASTRA 1125SP
48	ASTRA 1125SPX
23	BEECHJET 400
239	BEECHJET 400A
228	BOEING BBJ
18	BOMBARDIER CRJ
745	CHALLENGER 300
286	CHALLENGER 600
68	CHALLENGER 601-1A
94	CHALLENGER 601-3A
325	CHALLENGER 604
62	CHALLENGER 650
3	CHALLENGER 800
58	CHALLENGER 850
6	CHALLENGER 870
354	CIRRUS VISION SF50
118	CITATION 500
339	CITATION 525
303	CITATION BRAVO
182	CITATION CJ1
96	CITATION CJ1+
231	CITATION CJ2
225	CITATION CJ2+
458	CITATION CJ3
216	CITATION CJ3+
383	CITATION CJ4
178	CITATION ENCORE
75	CITATION ENCORE+
370	CITATION EXCEL
10	CITATION I
241	CITATION I/SP
408	CITATION II
46	CITATION II/SP
140	CITATION III
145	CITATION LATITUDE
43	CITATION LONGITUDE
312	CITATION M2
489	CITATION MUSTANG
124	CITATION S/II
313	CITATION SOVEREIGN
108	CITATION SOVEREIGN+
268	CITATION ULTRA
260	CITATION V
25	CITATION VI
108	CITATION VII
297	CITATION X
37	CITATION X+
256	CITATION XLS
310	CITATION XLS+
1	DIAMOND I
23	DIAMOND IA
17	DORNIER ENVOY 3
310	ECLIPSE EA500
17	EMBRAER LEGACY
20	EMBRAER LEGACY 450
78	EMBRAER LEGACY 500
102	EMBRAER LEGACY 600
64	EMBRAER LEGACY 650
15	EMBRAER LINEAGE
332	EMBRAER PHENOM 100
475	EMBRAER PHENOM 300
86	EMBRAER PRAETOR
55	FALCON 10
23	FALCON 100
13	FALCON 200
248	FALCON 2000
5	FALCON 2000DX
25	FALCON 2000EX
135	FALCON 2000LX
126	FALCON 2000LXS
24	FALCON 20C
16	FALCON 20C-5
15	FALCON 20D
1	FALCON 20D-5
16	FALCON 20E
45	FALCON 20F
71	FALCON 20F-5
171	FALCON 50
5	FALCON 50-4
8	FALCON 50-40
99	FALCON 50EX
262	FALCON 7X
53	FALCON 8X
161	FALCON 900
26	FALCON 900C
17	FALCON 900DX
322	FALCON 900EX
85	FALCON 900LX
152	GLOBAL 5000
6	GLOBAL 5500
202	GLOBAL 6000
22	GLOBAL 6500
55	GLOBAL 7500
244	GLOBAL EXPRESS
25	GULFSTREAM G-100
110	GULFSTREAM G150
203	GULFSTREAM G-200
252	GULFSTREAM G-280
10	GULFSTREAM G-300
9	GULFSTREAM G-350
21	GULFSTREAM G-400
294	GULFSTREAM G-450
95	GULFSTREAM G-500
596	GULFSTREAM G-550
68	GULFSTREAM G-600
383	GULFSTREAM G-650
15	GULFSTREAM G-I
13	GULFSTREAM G-II
10	GULFSTREAM G-IIB
81	GULFSTREAM G-III
152	GULFSTREAM G-IV
290	GULFSTREAM G-IVSP
174	GULFSTREAM G-V
27	HAWKER 1000A
5	HAWKER 1000B
1	HAWKER 125-1AS
1	HAWKER 125-600A
9	HAWKER 125-600AS
36	HAWKER 125-700A
5	HAWKER 125-700B
65	HAWKER 4000
203	HAWKER 400XP
43	HAWKER 750
105	HAWKER 800A
14	HAWKER 800B
346	HAWKER 800XP
43	HAWKER 800XPI
82	HAWKER 850XP
167	HAWKER 900XP
2	HAWKER-3B
168	HONDA JET
2	JET COMMANDER 1121
1	JET COMMANDER 1121B
2	JETSTAR 731
6	JETSTAR II
4	LEARJET 23
4	LEARJET 24
1	LEARJET 24A
1	LEARJET 24B
13	LEARJET 24D
6	LEARJET 24E
6	LEARJET 24F
1	LEARJET 25
15	LEARJET 25B
1	LEARJET 25C
22	LEARJET 25D
1	LEARJET 28
23	LEARJET 31
152	LEARJET 31A
19	LEARJET 35
380	LEARJET 35A
20	LEARJET 36
34	LEARJET 36A
118	LEARJET 40
214	LEARJET 45
200	LEARJET 45XR
89	LEARJET 55
8	LEARJET 55B
6	LEARJET 55C
244	LEARJET 60
114	LEARJET 60XR
13	LEARJET 70
109	LEARJET 75
17	LEARJET 7T
119	PILATUS PC-24/45
272	PREMIER I
6	SABRELINER 40A
1	SABRELINER 40EL
2	SABRELINER 40R
4	SABRELINER 60
8	SABRELINER 60ELXM
38	SABRELINER 65
4	SABRELINER 80
1	SABRELINER 80SC
1	SUKHOI SBJ
3	SYBER JET SJ30
49	WESTWIND 1
1	WESTWIND 1123
12	WESTWIND 1124
38	WESTWIND 2

TURBOPROPS - 13,856

CHIEF PILOTS & OWNERS

COUNT	AIRCRAFT
174	AVANTI
2	AVRO RJ70
5	BRITISH AEROSPACE 146
486	CARAVAN 208
2109	CARAVAN 208B
137	CHEYENNE I
13	CHEYENNE IA
202	CHEYENNE II
45	CHEYENNE III
35	CHEYENNE IIIA
61	CHEYENNE IIXL
37	CHEYENNE IV
214	CONQUEST I
264	CONQUEST II
74	DAHER TBM-700A
86	DAHER TBM-700B

PHOTO BY JESSICA AMBATS

n & Business Aviation Markets

craft *ALL RECEIVE* Twin & Turbine every month

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

ADVERTISE IN TWIN & TURBINE

106	DAHER TBM-700C
352	DAHER TBM-850
116	DAHER TBM-900
69	DAHER TBM-910
96	DAHER TBM-930
124	DAHER TBM-940
4	DAHER TBM-960
163	DE HAVILLAND DHC
25	EPIC E1000
1	FOKKER 100
1	FOKKER 70
20	JETSTREAM 31
68	JETSTREAM 32
66	JETSTREAM 41
29	KING AIR 100
442	KING AIR 200
20	KING AIR 200C
13	KING AIR 200T
238	KING AIR 250
23	KING AIR 260
175	KING AIR 300
14	KING AIR 300LW
629	KING AIR 350
91	KING AIR 350C
34	KING AIR 350ER
375	KING AIR 350I
6	KING AIR 350IER
41	KING AIR 360
7	KING AIR 90
195	KING AIR A90-1
6	KING AIR A/B90
69	KING AIR A100
162	KING AIR A200
28	KING AIR A90
95	KING AIR B100
1030	KING AIR B200
117	KING AIR B200C
105	KING AIR B200GT
6	KING AIR B200SE
8	KING AIR B200T
40	KING AIR B90
281	KING AIR C90
35	KING AIR C90-1
181	KING AIR C90A
358	KING AIR C90B
68	KING AIR C90GT
96	KING AIR C90GTI
137	KING AIR C90GTX
13	KING AIR C90SE
234	KING AIR E90
147	KING AIR F90
29	KING AIR F90-1
4	MERLIN 300
14	MERLIN IIB
4	MERLIN III
23	MERLIN IIIA
42	MERLIN IIIB
17	MERLIN IIIC
2	MERLIN IV
12	MERLIN IV-A
32	MERLIN IV-C
78	MITSUBISHI MARQUISE
13	MITSUBISHI MU-2F
1	MITSUBISHI MU-2G
11	MITSUBISHI MU-2J
30	MITSUBISHI MU-2K
11	MITSUBISHI MU-2L
20	MITSUBISHI MU-2M
21	MITSUBISHI MU-2N
23	MITSUBISHI MU-2P
45	MITSUBISHI SOLITAIRE
68	NEXTANT 400XT
1	NEXTANT G90XT
939	PILATUS PC-12 NG
604	PILATUS PC-12/45
202	PILATUS PC-12/47
278	PIPER JETPROP
82	PIPER M500
193	PIPER M600
1	PIPER MALIBU
578	PIPER MERIDIAN
255	QUEST KODIAK 100
1	ROCKWELL 680T TURBO
5	ROCKWELL 680V TURBO II
5	ROCKWELL 680W TURBO II
4	ROCKWELL 681 HAWK
5	STARSHIP 2000A
45	TURBO COMMANDER 1000
22	TURBO COMMANDER 690
126	TURBO COMMANDER 690A
130	TURBO COMMANDER 690B
61	TURBO COMMANDER 840
22	TURBO COMMANDER 900
21	TURBO COMMANDER 980

TWIN PISTON - 8,807 OWNERS

COUNT	AIRCRAFT
38	BARON 56 TC
1446	BARON 58
1	BARON 58 PA
363	BARON 58P
102	BARON 58TC
3	BARON A56TC
320	BARON G58
181	BEECH DUKE B60
292	CESSNA 414
388	CESSNA 414A
34	CESSNA 421
28	CESSNA 421A
272	CESSNA 421B
615	CESSNA 421C
109	CESSNA 310
165	CESSNA 340
553	CESSNA 340A
53	CESSNA 402B BUSINESS LINER
125	CESSNA 402C
28	CESSNA 404 TITAN
292	CESSNA 414
388	CESSNA 414A
34	CESSNA 421
28	CESSNA 421A
272	CESSNA 421B
615	CESSNA 421C
57	CESSNA T303
111	DIAMOND D42
120	DIAMOND DA
84	PIPER 600 AEROSTAR
3	PIPER 600A AEROSTAR
45	PIPER 601 AEROSTAR
4	PIPER 601B AEROSTAR
203	PIPER 601P AEROSTAR
24	PIPER 602P AEROSTAR
581	PIPER CHIEFTAIN
26	PIPER MOJAVE
304	PIPER NAVAJO
257	PIPER SENECA
12	ROCKWELL 500 SHRIKE
23	ROCKWELL 500A SHRIKE
83	ROCKWELL 500B SHRIKE
47	ROCKWELL 500S SHRIKE
4	ROCKWELL 500U SHRIKE
12	ROCKWELL 520 COMMANDER
3	ROCKWELL 560 COMMANDER
9	ROCKWELL 560A COMMANDER
5	ROCKWELL 560E COMMANDER
6	ROCKWELL 560F COMMANDER
11	ROCKWELL 680 SUPER
3	ROCKWELL 680E
10	ROCKWELL 680F COMMANDER
11	ROCKWELL 680FL GRAND COMMANDER
4	ROCKWELL 680FLP GRAND LINER

HIGH PERFORMANCE MOVE-UP SINGLES - 6,873 OWNERS

COUNT	AIRCRAFT
446	CESSNA 182
55	CESSNA 206
426	CESSNA P210N
22	CESSNA P210R
57	CESSNA T182
1106	CIRRUS SR20
3594	CIRRUS SR22
21	MOONEY ACCLAIM ULTRA
12	MOONEY OVATION ULTRA
235	PIPER MALIBU
183	PIPER MATRIX
472	PIPER MIRAGE

TWIN & TURBINE

Jenna Reid, Advertising
316.409.7033 • Jenna.Reid@vpdcs.com
www.twinandturbine.com

if the tire falls below while installed on the airplane, the tire must be replaced.

Anyone who pulls a wagon or pushes a wheelbarrow with flat tires will instantly understand why this is the case. When tires are under-inflated, they're put under much more strain and are subjected to loads for which they're not designed, especially in the sidewalls. Under-inflated tires also generate more heat than properly inflated tires. In other words, no good will come from not keeping your tires properly inflated. You can find the proper tire pressures in the aircraft POH, maintenance manual or even on some checklists, but I'd recommend verifying those before you dig out the air chuck.

There was a crash of a Lear 60 in 2008 where one of the main tires "separated from the wheel and likely struck the underside of the airplane." The NTSB's probable cause of the crash was "due to severe underinflation, and the captain's execution of a rejected takeoff after V1..." There were a few other links in the accident chain, but the underinflated tires set everything in motion.

An obvious and rather nasty tire gouge. If you need help determining if a cut is superficial or if a tire is toast, there are ways to find out for sure.

The tires on the accident airplane had been replaced recently, and the pressures hadn't been checked in the weeks leading up to the accident. Once new tires are mounted onto serviceable wheels and initially inflated, the new tire/wheel combo stretches and settles while the newly pressurized gases inside the tire cools and

contracts. All of this leads to what can be a significant drop in pressure within the first 24 hours of a tire change.

The last thing I'll say about taking care of your tires is this – every tire manual I've ever read has at least one note, usually in several places, telling people to not stick sharp objects into cuts of INFLATED tires in order to see if the cord is visible. At the risk of being repetitive and getting myself reported to The Department of Redundancy Department, I'd like to stress the fact that you shouldn't do that. If you think a cut is severe enough to warrant probing, just assume that you need a new tire or at least a second opinion from a technician.

Speaking of new tires, I've known of many people over the past few years who have grounded their airplanes due to worn tires where no replacements were available. Attempted tire orders have been met with lead times of 6 to 12 months. These weren't people who operate some obscure airplane either. They were Citation and Falcon operators flying airplanes currently in production.

All that is to say, if you own an airplane, you might consider keeping at least one full set of tires, O-rings, tubes, and whatever else is associated with a tire change on hand. I understand that not everyone has the luxury of keeping their airplane in their own hangar with a built-in tire rack along the wall, but I think it's worth the effort to find a spot to keep a full set of rubber. The worst-case scenario is that you'll have to use your "extra" set of tires while your order for new tires is delayed. Best case scenario is you'll always have a new set of tires in your way.

Tubes, tires and O-rings are easy to store because they usually don't have a shelf life as long as they're stored properly. Keeping your tires and tubes out of direct sunlight and fluorescent light is the best thing you can do for them. Light deteriorates rubber faster than almost anything else. They don't even have to be kept in a climate-controlled environment, although that wouldn't hurt. When you stack your tires, don't stack them horizontally, meaning, don't lay them sidewall-down on the concrete. Stand your tires vertically, just like they'd be installed on your airplane. Laying a tire sideways on the floor will deform the sidewall over time, and that's not a part of the tire you want to weaken.

With a bit of care and forethought, you can get the maximum life and safest operation possible out of your tires. If you keep a close eye on them, keep them properly inflated, and don't go sticking pointy things into them, they'll serve you well for many flights. T&T

Elliott Cox *is a pilot and the Director of Maintenance for a Part 91 Corporate Flight Department in the Southeast. You can reach him at his website TheWritingFlyer.com or by email at* **elliott@thewritingflyer.com**.

ASI Auxiliary Heading Selector

by **Dale Smith**

Sooner or later, every pilot will deal with an AOG (aircraft on ground) situation. And while all AOGs are a pain-in-the-aft section, the ones that really drive you up a wall are the nonsensical ones like burnt-out light bulbs or broken switches.

Take a failed heading selector, for example. It's hard to find a King Air pilot who hasn't reached up on the panel to change a heading only to have that innocuous little switch break. No switch means no flying.

Fortunately, Aerospace Systems International (ASI) has developed an FAA STC to install an auxiliary heading select switch (AHS) in the pedestal of Collins Pro Line 21 and

ASI's pedestal-mounted auxiliary heading selector for Collins Pro Line 21 and Collins Fusion-equipped King Air B200- and B300-series aircraft.

The STC offers versions of the AHS installation that includes USB A/C charging ports.

Collins Fusion-equipped King Air B200- and B300-series aircraft.

While having ASI's backup AHS in the pedestal indeed ensures system redundancy, it also provides significant ergonomic benefits to single-pilot operators.

"Having the standard heading selector mounted up on the panel is just inconvenient for pilots, especially when flying alone," stated ASI's VP of Customer Support, Randy Mullin. "Reaching up to the panel to make a progressive heading change while shooting an approach can be unnecessarily difficult. It's just easier to have the AHS located down on the pedestal. That's where pilots want it."

While ASI's pedestal-mounted auxiliary heading selector is ideally suited to reduce the workload of King Air pilots, the unit was initially developed for a foreign authority special mission customer.

"Textron Aviation approached us to develop a solution for a foreign King Air operator," explained ASI's VP of Sales and Marketing, Evan McCorry. "They had a search and rescue mission profile but didn't want to pay to update their current FMSs."

"Also, because of their missions, the operator wanted to be able to do heading inputs manually, and locating the unit in the pedestal would make that easier for the crew," he added. "We engineered and manufactured the auxiliary unit in-house and were able to do the installation in their aircraft via an FAA 337 major alteration form."

McCorry said that during the unit's development, the ASI team realized that the AHS would be a great addition to any Collins Pro Line 21- or Fusion-equipped King Air because of its benefits. The company has earned FAA STC validation and foreign certification approvals from EASA, Brazil, Mexico, Canada, and Argentina. Both of the ASI configurations, with and without USB ports, have FAA parts manufacturing authority (PMA) approvals.

While providing a fully redundant, remote-mounted auxiliary heading selector provided a host of benefits, Mullin said that the development team saw an additional opportunity with the new unit.

"King Airs don't have any USB power plugs in the cockpit, and with so many pilots relying on iPads today, that's often a problem," he said. "We amended our STC to offer versions of the AHS installation that includes USB A/C charging ports in the sidewall near the pilot's and co-pilot's seats."

"To simplify the system's installation, the power supplies for the USB ports are located inside of the AHS chassis," Mullen added. "Most King Air owners coordinate the installation of the AHS and USB connectors with other maintenance tasks. If the cockpit seats are already removed, the components can be installed in as little as 20 hours."

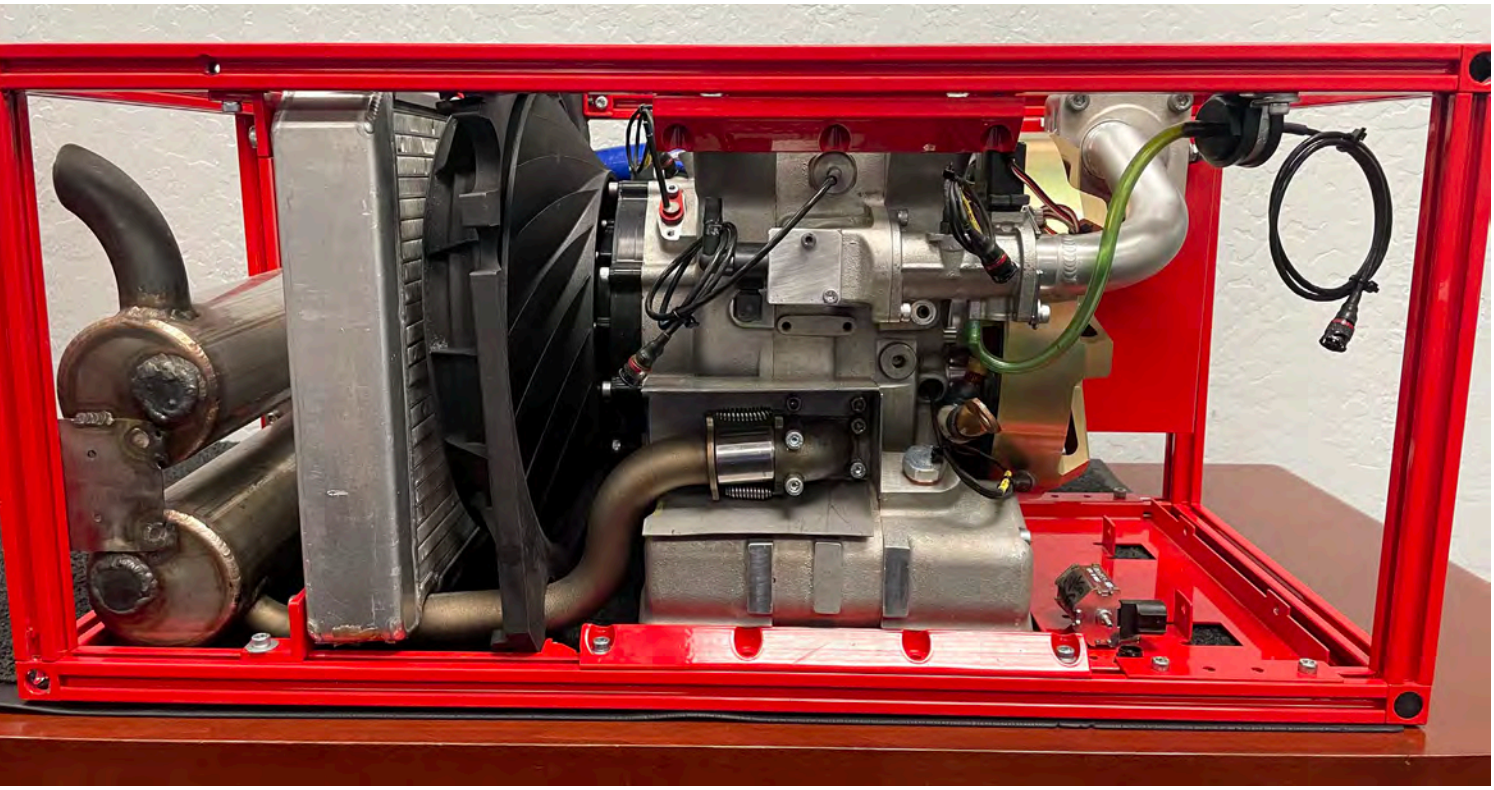
"The flight guidance panel heading (HDG) switch has historically been a single point of failure in an otherwise redundant system," McCorry said. "Adding our auxiliary heading selector, which is isolated from the aircraft's primary system, provides unmatched mission readiness."

"Add the optional USB A/C charging ports, and operators can provide a new level of convenience and capabilities to crews flying Collins Pro Line 21 and Fusion-equipped King Airs around the world," he added. "These are amazingly capable aircraft, and we're proud to have developed a system that adds safety by reducing a pilot's workload." 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.**

Cutter Aviation MaXus Power Unit

by **Rich Pickett**



You are in a Pilatus PC-12 at a remote airport with no FBO within hundreds of miles. It is hot and humid, and you will be flying passengers in need of medical attention. It would be helpful and appreciated to pre-cool the airplane and get the aircraft ready for flight.

This is the exact experience I've encountered flying during a disaster relief mission. Without running the engine, which isn't always reasonable, there are no viable options – until now. Cutter Aviation, along with its partners, has embarked on a new design for an in-airplane ground power unit (APU) for the PC-12 and PC-24.

In talking with Dean Miller, Cutter's STC Program Manager, they found a unique market need and developed an interesting solution. When I first examined the unit, it was like nothing I'd seen before. The unit couples a 45-horsepower Wankel Rotary engine with a starter-alternator which, through a rectifier, provides 300 amp (8.4KW) 28-volt DC power, more than enough to power many aircraft.

Cutter Aviation has teamed up with Advanced Innovative Engineering (AIE), HFE International, Acutronic, and U.S. Technical Consultants to design this APU for the aviation market. AIE is developing the engine and engine subsystems, while HFE is designing the controllers, sensors and testing. The alternator and power unit itself is developed by Acutronic, and U.S. Technical is assisting with the STC process. Cutter Aviation expects approval of the STC in 2023.

Cutter Aviation expects approval of the STC in 2023.

The APU will be installed in the empennage aft of the rear pressure bulkhead and is much quieter than turbine APUs. The installed unit weighs 92 pounds and has minimal impact on the Center of Gravity (CG). The potential operational benefit is impressive.

Powered by Jet A and lubricated with turbine oil, the APU also allows the operator quite a bit of flexibility. It is expected to operate on less than 1 GPH of Jet A with minimal use of oil. Of course, using the unit will also provide the capability to fully charge the aircraft batteries to facilitate the standard battery start process.

Whether you are at a remote airport or simply want to use your own aircraft power on the ground, the MaXus Power Unit will expand the flexibility of PC-12 and PC-24 aircraft. T&T

With 12,000+ 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. You can contact Rich at* **rich@personalwings.com**.

React: Pilot Reflexes

> True genius resides in the capacity for evaluation of uncertain, hazardous and conflicting information.
>
> – Winston Churchill

"The time elapsing between the beginning of a stimulus and the beginning of an organism's reaction to it." That's the definition of reaction time – that is, if you don't mind being called an organism. Even if you do mind, it's still the definition. Our high school driver's education teacher used "age, experience and wisdom" as his retort to the class contention that our youth and quick reaction time made us better drivers than older, slower-thinking drivers. We had yet to learn that the quickest reaction time is the one in which you avoid the need to react quickly in the first place. Or one in which you avoid having to react a second time because the first reaction was wrong.

In our flying world, when we discuss quick reactions, we are all trained to relax and to move switches and controls deliberately, with purpose and in the correct order. In the Citation 650, the one and only event in which a knee-jerk reaction is allowed is during an uncommanded thrust reverser deployment in flight. There are two switches near each fire switch labeled EMER and NORMAL with the word STOW next to EMER. In the sim, thrust reverser deployment in flight is often used to initiate unusual attitude recovery practice – from very unusual attitudes.

Very few problems are solved with a knee-jerk reaction – except this one.

Screaming Passengers

The top 12 percentile – that's what I scored today using an internet reaction-time test. And I'm within a pitching wedge of age 70. Another test categorized my reaction time as equivalent to that of age 40 – not quite as fast as a high school driver's ed student. However, they were very simple physical tests using the "click-now" function more similar to an arcade game than a useful reaction time measuring tool. Also, more of a hand-eye coordination assessment than a test of the ability to react, they didn't require any decision-making other than the recognition of a visual cue.

There was no requirement for subject matter knowledge, analytical thinking or risk assessment. There were no time constraints like an approaching mountain, accumulating ice, low fuel, the end of a runway or the airplane rolling over due to a deployed thrust reverser. There were no screaming passengers, no smoke filling the cabin or the sound of accelerating air or that of a decelerating engine. You could not clip any trees, sink in the ocean, land short, or bend any metal if your decision was wrong or reaction inadequate. In other words, there was no pressure. No

pressure except for that imposed by my piloty-arrogance in attempting to get into the top ten percentile.

If It Ain't Broke...

Without a ballistic recovery system or an ejection seat, we must control the aircraft until it stops moving. The decisions we make determine where that point is, in which our flight path intersects the tangent of the horizon. We prefer that area to be a nice, long, paved runway. The need for us to react instantly in order to achieve this geometric solution is normally relegated to takeoff, landing and perhaps avoiding a mid-air collision. Other than these examples, the need for a nanosecond analysis, decision and immediate reaction is uncommon. There is normally time to think. As in business and politics, however, sometimes our deliberation and analysis result in a congress-like decision: take no action at all....for the moment.

Some of our actions can be irrevocable, and a hurried decision, even when using well-developed intuition, can be incomplete, inadequate, and occasionally disastrous. We have learned to slow down, analyze by cross-checking multiple sources, gather data, evaluate the options and then react appropriately and deliberately. Only at the end of the process do we execute any physical portion of the reaction, which is the moving of a control – or five. An unnecessarily quick reaction could generate an unpleasant surprise and additional difficulties. The first few seconds, or even a full minute, when reacting to an event are therefore used for recognition, analysis, decision-making and then action, if any.

> Man, know thyself.
> – Socrates

A New Year, A New Perspective

Flying single-pilot in the weather can elevate heart rates faster than a letter from the IRS or an engine failure at V1. Unlike a warm sunny day or in our younger days when we could analyze and react more quickly, inflight events can become distressing. It may take more time and effort in the planning and execution of the flight to ensure a safe, smooth and stress-free operation. We are getting older and probably slower in thought and movement, maybe complacent and sometimes forgetful. Father time is unstoppable. For all of us, it can move along more quickly than a fast-moving cold front – and faster than we recognize.

It's common for the perpetually-young person in our minds to overestimate our ability or to modify reality through hopeful optimism. We push ourselves, often without realizing it as if we were young and swift. We assume that we will think and react quickly when needed. The time to discover that we are not the teenager we once were is not during an inflight event. How do we recognize if we are experiencing diminishing abilities as time overtakes skill, cunning and luck – I mean, experience? There are clues and you may have seen them.

Remembering More Slowly

It could be more of a struggle to read back a clearance, or we may miss more radio calls, forget or skip some of a checklist. Or we may have difficulty in remembering a speed, pressure or other operating limitation. It could be anxiety in the execution of a climb-via or descend-via procedure, loading the wrong approach, trouble flying the approach, or we may have a less-than-optimal landing. And not simply a hard landing necessarily; one that touches down too far down the runway, not on centerline or at too fast or too slow of an airspeed. Nowadays, a common indicator of diminishing proficiency is remembering more slowly.

It may be an obscure GPS function like the missed approach mode, used less often. Rapidly changing technology is a fine litmus test of our ability to learn, remember and keep up with the airplane. Even a modern transponder with traffic and weather can trip us up as we swipe through the pages of data and information. Struggling with avionics or another system is indicative of low proficiency or a change in our ability to think and react. Some say we remember more slowly not because our brains are older and therefore slower, but because they are full of data and other "crap" from years of experiences. And it simply takes more time to find the data in our full hard drives. Perhaps like creating a hot-path or an icon for the most frequently needed data, training and accessing the data more frequently can be a defense against this phenomenon.

It may feel like torture at times, but recurrent training is invaluable.

Recurrent Training Torture

To stay ahead of the airplane and to avoid the need for quick reactions, we use checklists, an efficient and practiced instrument cross-check,

and we try to remember past experiences or the experiences of others. We stay within operating limitations, properly manipulate the flight and engine controls and we avoid letting the airplane touch anything other than rubber to runway. Initial and recurrent training helps to point out and correct our weak spots. The MU-2 folks are very happy with the results that SFAR 108 (Special Federal Aviation Regulation) have produced in their pilot community. Perhaps we could follow their lead and accomplish the same type of training regimen. The CJP (Citation Jet Pilots Association) recommends we attend six-month recurrent training whether our insurance requires it or not. Most of us that fly turbines for hire already do.

And not necessarily to comply with or avoid further government-imposed regulation or to satisfy underwriters, but in order to stay proficient and to stay alive. Maybe we can increase the frequency of our recurrent training to every six or nine months instead of once each year. If nothing else, we should grab a buddy every couple of months as a safety pilot and fly some approaches – including the missed. Throw in an unplanned diversion as well. Have your safety pilot select an airport without telling you in advance, and let them also decide after which approach you should divert. It will force us into a short-notice reaction as we assess runways, the weather, approaches, and make the fuel computations.

Full Diapers

A pilot's reaction time is based on experience, knowledge, our ability to access memory, forecast outcomes and, unfortunately, our age. Distractions, fatigue, complacency and lack of understanding are detriments to decision-making and reaction time. What may have been a manageable flight in the past may now peg our fun meter or fill our task-management diapers. If this type of apprehension occurs when we go flying, the "old organism" in us tells the "young organism" that the demands of the task may be too high.

We can avoid the areas of discomfort by a re-route, reschedule or cancellation. Or we can take a chance and continue with the hairs standing up on the back of our neck. Remember the adage: "Better to be on the ground wishing you were in the air than in the air wishing you were on the ground." Let's use our age, experience and wisdom to avoid the need to react quickly in the first place. No one wants a full diaper. T&T

Kevin Dingman *has been flying for more than 40 years. He's an ATP typed in the B737, DC9 and CE-650 with 25,000 hours in his logbook. A retired Air Force major, he flew the F-16 and later performed as an USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is retired from a major airline, flies the Cessna Citation for RAI Jets, and owns and operates a Beechcraft Duke.Contact Kevin at* **dinger10d@gmail.com**.

From Point A to B-eechcraft

Hollan's current 1979 Beechcraft Baron and former 1976 Bonanza.

Terry Hollan has been a pilot for three decades, first entering the cockpit in the late 1980s. He is a passionate aviator, family man and angler but often simply describes himself as a "businessman."

His lifelong entrepreneurial interests have spanned several diverse industries. They presently include investments in recreational sports, a Mexican bass fishing resort, and life settlement annuities – which have been his primary focus for more than 15 years.

In support of both business ventures and personal recreation, Hollan has owned a number of aircraft over the years. The 9,000-plus hour multi-engine and instrument-rated pilot has owned a cadre of singles and twins.

This list includes a couple of later model 414's and a Cessna 421. But out of the more than half a dozen birds he has owned and operated, there is a strong trend toward varying Beechcraft models. The first Beech-made aircraft that the lifelong Texan owned was an A36 Bonanza, which he "owned from the start." Hollan briefly explained the history with this aircraft.

"I've used aviation mainly as a tool to go from Point A to Point B. When I lived in Amarillo, I bought a 1976 Bonanza 707T that I recently sold. I kept it all these years and actually trained in that plane. Since I bought it, I put three sets of motors in it, and after I put the last one in, I decided to sell. It was one of the nicest Bonanzas in the world. It was hard to let go of it."

It was in 2019 Hollan decided it was time for the immaculate piston single to be cared for by a new owner. And if any of his aircraft were a case study of his pride of ownership and longevity with a particular model, this Bonanza would be it. But he's also treated his other aircraft with equally as much respect and care.

"My 1979 Baron 58TC is the same way [one of the nicest of its kind out there]. The avionics are all glass, and nothing has ever been spared on it." He continued, "My Baron is special for various reasons – new paint, a new interior, new windows, new motors, and an all-new panel with a Garmin 600 TXi, 750 TXi, and GFC 600 autopilot. It has been maintained at the highest level and is capable of 224 knots true at FL190."

Today, Hollan also owns and operates a 1979 King Air 200. This twin turboprop is the final piece of what could be referred to as a Beechcraft Triple Crown. But it's not the first King Air he has flown or owned.

"I have owned and financed various King Airs since the early 90s. My current King Air is serial BB-570. It has an extremely high-time

The Baron is outfitted with new paint, a new interior, new windows, new motors, and an all-new panel with a Garmin 600 TXi, 750 TXi, and GFC 600 autopilot.

airframe but had years of pedigree maintenance before I purchased it. I like King Airs because of their utility. They can take big payloads in and out of small runways and have extremely reliable engines."

Like any experienced angler, Hollan knows which bait to use and when it's the best time to use it. This facet extends to his decision-making surrounding which of his two twins to take to one of his most frequent destinations, Lake Baccarac Lodge, a popular fishing lodge he owns in Sinaloa, Mexico.

"For me, where I go, I travel mostly to Mexico. Both the King Air and the Baron are perfect for getting into the small airstrips near the property. These are asphalt runways, but they're out in the middle of nowhere, so the utility of the aircraft is useful. Down there, we have to maintain our own airstrip, charging stations, parking spaces, and so on."

Having made the flight so many times, he has an efficient process of getting to one of his favorite destinations.

"In Mexico, I typically fly into MMLM (Los Mochis International Airport) to clear customs. Our lodge airport is identified as MM12 (Bacubirito Airport), and I have the permit to operate that airport per the rules of the DGAC, the Civil Aviation Authority in Mexico. When flying in the country, my best advice is just to be patient. Follow their rules and you will have no problem."

With both of Hollan's aircraft well suited for the 767-nautical mile trip from his home airport, Denton Enterprise Airport (KDTO), the choice between the two typically comes down to anticipated passenger loading and the terminal forecast.

"The King Air will climb at 1,600 plus FPM through 12,000 feet, whereas I very rarely see 1,200 FPM in the Baron. And I very rarely fly without a lot of fuel onboard. Additionally, I can get the King Air up to 27,000 feet to avoid bad weather," Hollan said.

Depending on the mission, Hollan can also opt to fly his 1979 King Air 200.


Terry Hollan

"Also, when there are more people, I usually take the King Air. The bigger the party, the bigger the mission. It's always five to eight happy fishermen on board. But if they are more cost-conscious as far as costs associated with an increased fuel burn, then that may sometimes sway the decision towards the Baron," he explained.

"My particular Baron has the RAM motors. On the trip to my lodge in Mexico, I will usually do that leg in about three and a half hours, between 16,000 to 18,000 feet, with a fuel burn of around 34 gallons per hour. This is a pretty unique Baron, but I think

all of the TC's (non-pressurized) birds perform about the same. This one goes 224 knots at its maximum cruise speed."

Of course, the King Air 200 is no slouch either and has uncontested attributes Hollan truly appreciates. As a result, it's a heavily relied upon asset he flies more than 100 hours a year.

"Actually, to be honest, I think that the King Air is easier to fly than the Baron. I mean, your flows and checklists are more intense in the aircraft, but not having to be in that envelope all the time at takeoff and other times is a lot easier. There are other attributes as well that are easier, too."

The range he gets from the aircraft is impressive as well, frequently from flying Los Angeles to Dallas, a 1,000-plus nautical mile trip. He currently has no plans for more updates in the King Air, but is looking for an upgraded plane with Blackhawk PT6A-61 motors. Hollan did admit there is a downside of King Air ownership, though.

"I've never owned a late model King Air and have always owned an earlier model. And you've probably heard this before, but the biggest problem with a King Air is the cost to own it. At FL270, the King Air burns 83 GPH and I plan for 96 GPH, block to block. The costs to keep it up are the biggest part being that the systems are old. I had to put fuel controllers on the [PT6A-42] engines the other day and it was $70,000. It never stops!" T&T

Ad Index

ADVERTISING, JENNA REID
316-409-7033
Email: Jenna.Reid@VPDCS.com

Game-Time Decision

Ask the average kid in Dallas, Texas, what sport they play and the answer is likely soccer. That certainly wasn't the case in the 1960s when I grew up here. The sport didn't even exist in public schools. But it has become extremely popular, especially for kids not playing Texas football. My son Matt played it, and now his son, Hayden, does too.

And, at age 13, Hayden is really good.

He plays on what they call a "select team." You try out for it. You sign a contract. You travel to multiple out-of-town games like Houston, San Antonio, Austin and Oklahoma City. And you still have to be home after a Sunday away game in time to finish your homework and be ready for seventh grade on Monday morning.

That was the issue when Matt asked if I could fly him and Hayden to Tulsa, Oklahoma, for a 4 p.m. Sunday game recently. The drive from Dallas is 4.5 hours, and arriving back home after 11 p.m. was not first on Matt's list.

And the flight in the Mustang? Forty-seven minutes.

But when to depart Dallas? You see, Hayden is a starter. Starters can't just miss the game. What if the starters on the Mustang failed and they had to drive?

We met at Addison airport at 10:30 a.m. on Sunday morning, just in case. Of course, the trusty Mustang started as usual. Matt sat up front and ran the checklist while "Nana" Patty fed Hayden pre-game snacks. With zero headwind at FL 270, we cruised at 325 knots in clear skies and arrived hours in advance of the game.

We were early enough to enjoy a leisurely lunch at a Jimmy John's sandwich shop, a forty-five-minute shopping tour of the local Academy Sports outlet, and a stint in the soccer field parking lot baking under 97-degree Oklahoma heat.

The game was close, and the fans intense, with the Tulsa team prevailing 4-3 even after Hayden's magnificent corner kick.

Slightly sunburned, we loaded up the folding chairs in the Mustang's cavernous baggage compartment and headed back to Addison the same way we came, with Patty up front running the checklist, touching down minutes before a stunning sunset.

All in all, a very satisfying day.

As Hayden exited the plane, he looked at me and said, "Pops, I'm thinking about trying out for the European soccer league in a couple of years. Could you take me to those games too?"

"Sure, Hayden," I said. "I will sign up for my Gulfstream type rating next week."

Boys can dream, can't they?

Fly safe. T&T

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**.

TWIN & TURBINE

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

Written By Pilots For Pilots

www.twinandturbine.com

Product Reviews | Turbine & Piston Operations | Safety & Training
Market Trends | Aircraft Upgrades | Industry News | Lifestyle Features

BLACKHAWK AEROSPACE TECHNOLOGIES

GARMIN

TECHNOLOGY AND SPEED MAKE THE ULTIMATE KING AIR

GARMIN G1000 NXi

GARMIN STANDARD GWX 75 RADAR

The King Air G1000 NXi suite comes standard with the GWX 75 digital Doppler-capable color weather radar. It combines excellent range and adjustabel scanning profiles with precision target definition - for accuarate, easy to interpret, weather analysis in the cockpit. And it's available with advanced optional capabilites such as turbulance dectection and ground clutter suppression.

BLACKHAWK XP67A ENGINE+ UPGRADE

The Blackhawk-upgraded King Air 350/350ER is the fastest, highest performing King Air on the planet. The Pratt & Whitney Canada PT6A-67A engines and quiet MT 5-blade natural composite propellers deliver jet-like performance at King Air costs.

Call today to save with pre-purchase pricing incentives from experienced providers in King Air avionics, engine upgrades, and modifications. Our facility is located in the "fly-away" state of Missouri, which could lead to additional savings. Call for details.

+1 (309) 314 4169 + conrad.theisen@blackhawk.aero + blackhawk.aero