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TBM OWNERSHIP

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Photo: Chris Rose

The Daher TBM 940 sets the standard for performance, while also taking safety to new levels. After incorporating envelope protection and autothrottle to make loss of control virtually impossible, we have now introduced HomeSafe™, the emergency autoland system that automatically returns the plane to a runway if the pilot becomes incapacitated. Not to mention the most reliable turboprop in its class, built-in engine safeguards and automatic transmission of critical engine data back to the manufacturer after each flight. Daher, where safety comes first.

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TBM 940

HOMESAFE®

Daher TBM 700

Fast, efficient personal travel machine

BY PETER A. BEDELL

DAHER/SOCATA'S TBM 700 is now 30 years old and, despite being the first pressurized turbine single, it's still the reigning speed champ of its category. The 900-series TBMs in production today top out at 330 KTAS. The TBM 700 burst onto the scene in 1990 while GA was emerging from a 1980s slumber. Back then, the only nonmilitary single-engine turboprop was the utilitarian Cessna Caravan with its fixed gear, struts, and all the sex appeal of a box hauler. The much smaller TBM, originally a Mooney design, promised six seats, high speed, and pressurization all wrapped in an attractive package.

At the time of its introduction, the TBM 700 nearly doubled the speed of a typical complex piston single and coddled its occupants with pressurization and altitude flexibility all at a manageable 55 gph rate of fuel burn. In the pattern, it flew just like a complex piston single in terms of approach and landing speeds, making the turbine step-up process easy for pilots who could afford the steep entrance fee.

All turbine singles are hobbled by a 61-knot stall speed at maximum takeoff weight. Because of that, the TBM 700 and its follow-on models have a high-lift wing whose chunky looks belie the speeds of 280-plus KTAS the airplane is capable of. That motivation is taken care of by a 700-shaft-horsepower Pratt & Whitney PT6-64 that has a thermodynamic rating of 1,570 shp. That means the TBM's engine can hold its flat-rated 700 horsepower to higher altitudes.

Early models have a maximum takeoff weights of 6,579 pounds. Typical useful load is in the range of 2,200 pounds. Like most airplane designs, TBM 700s gained weight with each new model year, progressively restricting useful load. Socata took a unique approach to this dilemma by beefing up the seats in later models to prove that raising the stall speed to 65 KIAS resulted in the same risk to occupants as the 61-knot speed did with the original seats. Socata also beefed up the landing gear to accommodate the now 7,394-pound maximum takeoff weight that appeared in the C2 models.

Other big changes to the 700 came in 1999 with the introduction of the B model and its large rear door and FL310 operating ceiling. Socata also added a dedicated pilot's door, which was a $45,000 option in 2002. The C2 versions came in 2003 with increased gross weights and useful loads. Owners who have the pilot door like the ability to close the rear door from the outside to avoid an awkward waddle forward to the cockpit among seated passengers.

Avionics from the factory started out with BendixKing gear and later models had optional Garmin setups. Today, expect TBM 700s for sale to have different setups, including glass retrofits. Factory autopilot is the three-axis BendixKing KFC 325. Although the current entrance price of an early TBM 700 is as low as the price of a new piston single, the costs of stepping up to a turbine are sobering. Many owners say that the per-mile operational costs are in line with a high-end piston single (say, a Piper Mirage). But maintenance costs of $20,000 to $40,000 per year place the TBM in a new cost bracket.

Baggage capacity is somewhat limited compared to piston twins and the much larger Pilatus PC–12 competition. There's a small nose baggage area and a larger area behind the aft seats. Center of gravity tends aft and pilots must remain vigilant with weight and balance. Ballast in the nose baggage may be required to balance heavy loads in the passenger compartment.

According to *Vref*, a 1991 TBM 700 fetches $770,000 ranging up to $1.2 million for a 2005 TBM 700C2. Value will greatly depend on RVSM approval, avionics equipment, and maintenance/damage history. **AOPA**

SPEC SHEET

1991 TBM 700A

Powerplant | **700 shp Pratt & Whitney PT6A-64**
Length | **34 ft 3 in**
Height | **13 ft 9 in**
Wingspan | **41 ft 2 in**
Seats | **7**
Max takeoff weight | **6,579 lb**
Takeoff distance over 50-ft obstacle (sea level) | **2,133 ft**
Max cruise speed | **300 kt**
Range | **1,378 nm**

PETER A. BEDELL is a pilot for a major airline and co-owner of a Cessna 172 and Beechcraft Baron.

MIKE FIZER

TBM owners turn safety lessons into fun challenges

BY THOMAS B. HAINES
PHOTOGRAPHY BY THE AUTHOR

Perfect *pitch*

TBMS LINE UP in Naples, Florida, for their chance to participate in the TBM Spot Landing Contest organized by pilot owners (right). The data card from the Garmin G1000s and G3000s is the key to understanding what is happening with the airplane in the final seconds before and during touchdown—and how the pilot can improve his or her performance (below, center). The contest is not just about safety, it's also a time for the TBM owners to socialize and trade hangar tales.

Big data sounds scary and like no fun at all. But a group of TBM owners have figured out how to leverage data to create a fun competition that can lead to increased safety and a whole lot of socialization. The second TBM Spot Landing Contest took place in Naples, Florida, in February with nearly 20 airplanes participating and nearly 50 people in attendance. Andy Davidson of New York City won the two-day contest in his TBM 850, but credit goes to another TBM owner for helping galvanize the owner community into taking action to improve precision landings among the fleet and reduce the number of prop strikes.

Richard Krulik of Hauppauge, New York, never intended to start a movement when he had a prop strike upon landing his TBM 850. "Obviously, I was hugely upset about having a prop strike after 15 years of flying." He just wanted to put the incident behind him and get his confidence back. Although he had owned the TBM for about two years at the time, his training hadn't focused enough on the nuances of setting up the airplane for a precision touchdown. "I hadn't learned, apparently, correctly how to get the right speeds and the right power settings and attitudes and had a prop strike." The staff at Daher, which manufacturers the TBMs, encouraged him to "go to the prop strike guru."

Meet Bill Panarello, an airline pilot who also conducts TBM training on the side. Whether it's flying the Boeing 737 or the TBM—or during his airborne radar and icing training courses—Panarello approaches flying from an analytical point of view. He likes data. In instructing Krulik, Panarello discovered a rich data set built into the Garmin G1000s and G3000s common on many TBMs. The software records dozens of parameters, including pitch, speed, torque settings, and position, which can be used to gauge how and where a pilot is touching down on the runway.

"TBM is a great plane to fly, but when you're landing, it definitely has some subtleties. Knowing that you have the exact procedures in place to land smoothly every time and to not use up too much runway, just gives you the confidence to travel more places." ***— Andy Davidson***

"We noticed that within the data that was available, we could tell when Richard bought the airplane. We could tell when Richard had the prop strike. And then, what was even more remarkable, after the training sessions to have him understand [angle of attack] and get confident again, we could record the incredible ability to just be retrained and to have him safely feel that he has control back."

To help analyze the data, Panarello turned to Dierk Reuter, a TBM owner and aeronautical engineer. Reuter, with help from others in the community, wrote a program to analyze the Garmin data and create a report about each landing, focusing on speed, power setting, and pitch at touchdown. Reuter then created a simple website where owners can upload their data and get an email report back within a few minutes.

After some trial and error and working with data from Daher, the group

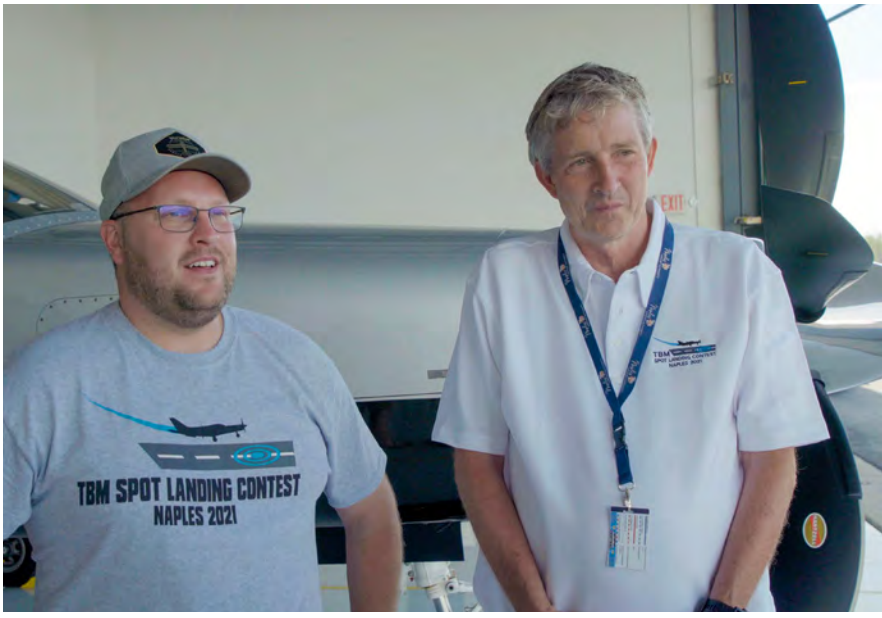
nailed down the precise speed, power settings, and pitch necessary to improve the accuracy of landings while reducing the chance of the prop strikes.

Too often owners were landing fast—sometimes 15 to 20 knots too fast—resulting in a porpoise that gets the prop, which can result in an engine teardown and prop replacement, all at a cost of some $400,000. The higher speed also meant unstable approaches and using more runway than necessary. Jerry Chipman, a TBM instructor at SimCom Training Centers, points out that while the TBM has about eight inches of prop clearance when sitting on the ramp, it's only about five inches when the nose strut compresses during landing. With a top speed for some models at around 330 knots true airspeed and appropriate landing speeds of about 80 knots at some weights, the airplane has a very wide speed envelope. Because of its size and top speed, pilots want to believe the TBM must be landed at something closer to 100 knots, but with careful management it can be safely flown with touchdown speeds below 80, which deceives operators. The data shows many operators making significant torque setting and

RICHARD KRULIK (on right) relives his prop strike while receiving coaching from "prop strike guru" Bill Panarello. The incident was one that helped uncover the value of data analysis to understand prop strike issues. TBM Spot Landing Contest winners got no bonus points for their precision touchdowns in a stiff crosswind (top photo).

pitch changes on short final to attempt to salvage a poorly established approach.

In an effort to spread the word about the data analysis and improve safety of the fleet, Reuter partnered with fellow TBM owner Phillip Bozek. The two had previously set a world speed record from New York to Paris in Reuter's TBM. With the TBM Owners and Pilots Association meeting canceled in 2020 because of COVID-19, the pair were looking for a way to bring pilots together in a smaller group but to retain a safety and socialization theme. Their solution was the first TBM Spot Landing Contest in July in Michigan. Seven TBMs and about 17 people participated ("TBM Technique: Landing in Style," January 2021 *AOPA Pilot,* Turbine Edition). As with the Naples event, each aircraft was equipped with an action camera on the bottom of the radome under the left wing. The video, combined with data from the Garmin system, helped determine the winner. The goal was to



touch down on the 1,000-foot marker, with points also accrued for proper speed, pitch on final, power setting, flap setting, flight path, descent rate, and touchdown pitch.

At the Naples event, pilots practiced with instructors on board on Friday. The competition was Saturday. In between there was plenty of socializing and hangar flying. Each pilot was eligible to win 155 points—up to 100 for a stable approach, 50 for hitting the leading edge of the touchdown spot, and five for proper torque setting.

Davidson won with 147.8 points. The close second went to John Benediktssonn of Lake Tahoe, Nevada, with 147.1 points. Jim Thorpe of Naples, Florida, took home third place. The winners got plastic trophies, and everyone got a shirt.

"I've been practicing, just doing the disciplined landings," Davidson said at the Saturday evening banquet when he was announced the winner. "I knew that they were all going to be good. I'm surprised that I came out on top, but very happy for that to happen.

"TBM is a great plane to fly, but when you're landing it definitely has some subtleties. Knowing that you have the exact procedures in place to land smoothly every time and to not use up too much runway, just gives you the confidence to travel more places."

Michel Adam de Villiers, vice president for sales, attended the event to show support from Daher. The company launched its Me&MyTBM app several years ago to track maintenance and provide other services to owners. The latest versions also include a feature called the Aviator Challenge, which allows pilots to compare their adherence to established flight standards to others in the fleet. The effort

ANDY DAVIDSON proudly shows off his trophy for winning the TBM Spot Landing Contest (top, left). Phillip Bozek and Dierk Reuter (above, right) organized the contest, with support from the Naples Air Traffic Control Tower staff, Robinson Aviation, and numerous volunteers.