Meridianmakeover

New Piper's top-of-the-line gets a value upgrade

BY THOMAS A. HORNE

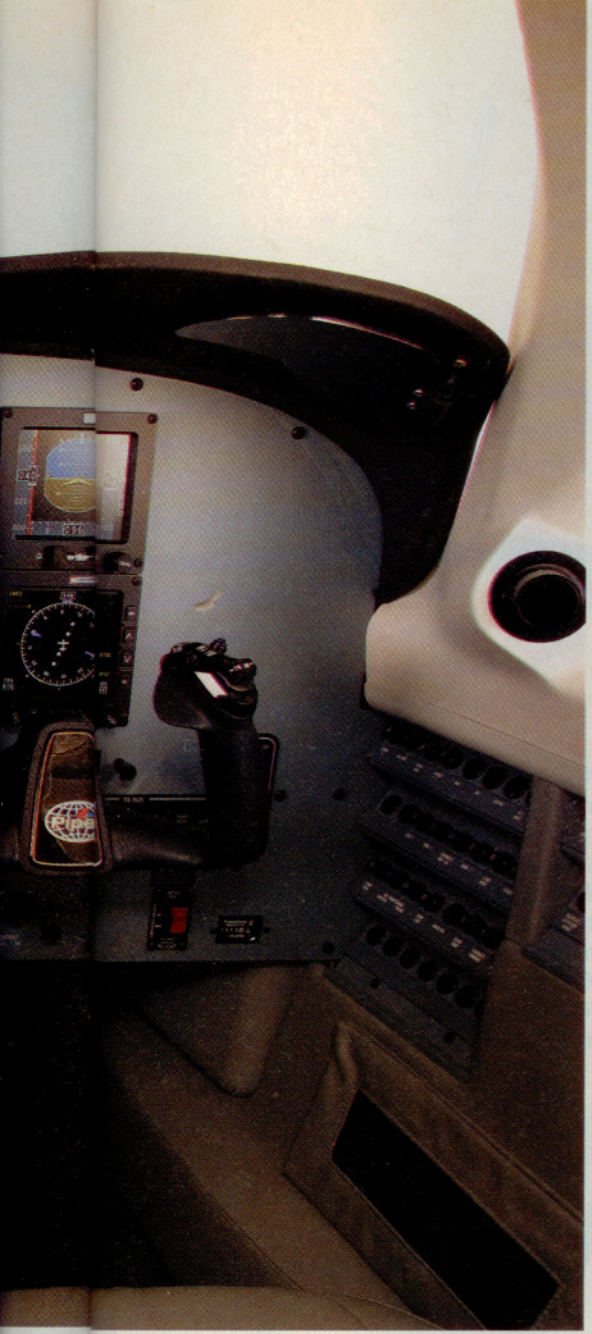
There's a rule in general aviation: You can fill the seats or the fuel tanks, but not both. Put another way, you can fly two or three passengers a long distance, or carry a seats-full load on legs as short as 100 nm. For many pilots in the market for a step-up turbine airplane, these sorts of trade-offs can come as a shock. After they run the math, you can imagine the reaction: "What?! A full-fuel payload of just 350 pounds? I thought a turboprop could do better than that."

Engineers do their best to keep payload-range envelopes as flexible as possible, but certification and practical limitations conspire against a long-range, seats-full design. This is especially true of smaller airplanes, be they turbine or piston powered. The need to keep stall speeds low—at or below the 61-knot mark for turboprop singles—means that maximum takeoff weights must be kept down. The need to keep flexing forces at wing attach points under control means zero-fuel weight (the weight above which all additional load must be in fuel) limitations that can be hundreds of pounds less than maximum takeoff weight. This can limit passenger and baggage loads right there, leaving less weight allowance for fuel.

Single-engine turboprops have been plagued by these payload-range tradeoffs from the beginning. After the first versions of these airplanes came out, work was begun immediately to increase their takeoff weights, useful loads, and full-fuel payloads.

The New Piper Meridian has just followed suit. Last fall, New Piper announced a maximum takeoff weight increase for the airplane—from 4,850 to 5,092 pounds. This expansion translates into a 242-lb boost in useful load, according to New Piper. And a concomitant full-fuel payload hike to 569 pounds. Of course, the actual weights vary from airplane to airplane, depending on equipment.

The avionics suite reaches a new plateau with the addition of the Meggitt Avionics MAGIC 1500 digital flight control system.



How did they do it?

To help lift the extra weight while preserving the 61-knot stall speed in the landing configuration, New Piper added vortex generators (VGs) to the Meridian's wings and horizontal stabilizer. These help preserve laminar airflow over the lifting surfaces at higher weights and angles of attack. There are 92 VGs on the wings and 80 on the undersurface of the horizontal stabilizer. A side benefit of the VGs was the elimination of the center pair of stall strips on the wings: They simply weren't needed to meet certification standards for behavior in the stall regime.

To beef up the landing gear to handle the extra weight, New Piper added stiffeners to wing brackets that help support the main gear assemblies.

The MAGIC 1500 completes the Meridian's suite of Meggitt avionics. Though it's a tight squeeze into the front office, once seated you face one of the most advanced panels that ever graced a single-engine airplane. One nice feature is the foolproof pressurization system. Forget to set it, and it automatically comes on as you pass through 12,000 feet.

A MAGIC autopilot

The maximum gross weight increase isn't the only big change in the Meridian line. The avionics suite reaches a new plateau with the addition of the Meggitt Avionics MAGIC 1500 digital flight control system. The MAGIC (Meggitt Avionics Advanced Generation Integrated Cockpit) system is included as standard equipment, completes the airplane's full Meggitt suite, and replaces the earlier autopilot—Meggitt's S-Tec System 550.

Designed from the start for compatibility with the rest of the Meridian's Meggitt avionics, the 1500 adds an extra level of integration to the panel's many capabilities. With its yaw damper, roll steering, airspeed-hold, vertical-speed-hold, and altitude preselect modes the 1500 is almost as capable as units found in much more expensive turbine aircraft—the only features missing are soft-ride and half-bank modes.

The 1500's voice annunciations add to the pilot's safety and situational awareness. A digitized female voice advises when pitch trim is in motion, if the airplane is in an out-of-trim condition, when the airplane is within 1,000 and 200

feet of a target altitude, if a selected altitude is exceeded by 200 feet or more, and when the autopilot is disconnected.

In addition to the Meggitt's primary flight display (PFD) and navigation display (ND), another pair of engine display units (EDUs) depict engine status, fuel flow and quantity information, and trend monitoring and exceedance of any engine parameters—such as torque or ITT (inter-turbine temperature).

Guidance for the PFD, ND, and MAGIC 1500 is provided by dual air data, attitude, and heading reference system (ADAHRS) units. These lightweight, compact, solid-state modules use tiny vibrating elements to establish a reference platform for attitude and heading information.

Dual Garmin GNS 530 GPS/nav/coms, a Honeywell KMD 850 multifunction display, and a Honeywell/Allied Signal RDR-2000 vertical profiling weather radar are also included in the standard avionics package. Among the options are the Honeywell IHAS 8000 (integrated hazard avoidance system), an L3 Avionics WX-500 Stormscope, and a Honeywell KDR 510 datalink receiver for uplink weather data. All in all, it's a

An outgrowth of the Malibu and Mirage piston singles, the Meridian offers a plusher interior and scads more high-tech features.

very impressive stack of avionics—and New Piper has kept the Meridian's price frozen at last year's $1.75 million level.

Flying impressions

The Meridian is perhaps the simplest of the single-engine turboprops. Many of its systems have set-and-forget functionality (fuel and pressurization come most readily to mind) and the airplane's an easy step up from a Mirage or, for that matter, any large complex piston single. Control feel, appropriately heavy for a ship its size, is solid and conveys a sense of the airplane's substance. As for target airspeeds, they correspond to those of a Beechcraft Bonanza or New Piper Saratoga: Rotate at 85 knots, climb out at 125 knots, and fly final approach at 85 knots with full flaps. Touchdowns should be planned for 80 knots—a speed low enough that reverse thrust isn't really needed on all but the shortest runways.

Of course, in cruise the Meridian eats up Bonanzas and Saratogas. The day of my familiarization flight I saw a 250-knot true airspeed at 25,000 feet, burning Jet-A at a rate of 250 pph, or 37 gph. Outside air temperature was minus 17 degrees Celsius

SPECSHEET

New Piper PA-46-500TP Meridian

Standard-equipped price: $1.75 million

Specifications

Powerplant .....Pratt & Whitney Canada PT6A-42A, 500 shp
Recommended TBO .....3,600 hr
Propeller ..... Hartzell, 4-blade, constant-speed, full-feathering, reversible-pitch
Length.....29 ft 7 in
Height .....11 ft 4 in
Wingspan .....43 ft
Wing area .....183 sq ft
Wing loading .....27.8 lb/sq ft
Power loading .....10.18 lb/shp
Seats.....6
Cabin length .....12 ft 4 in
Cabin width .....4 ft 1 in
Cabin height .....3 ft 9 in
Typical equipped weight .....3,384 lb
Max ramp weight .....5,134 lb
Max takeoff weight.....5,092 lb
Max useful load.....1,750 lb
Max zero fuel weight .....4,850 lb
Payload w/full fuel .....548 lb
Max landing weight.....4,850 lb
Fuel capacity, std.....173 gal (170 gal usable)
.....1,160 lb (1,140 lb usable)
Baggage capacity, aft cabin .....100 lb, 20 cu ft

Performance

Takeoff performance SL, standard temp ....
.....2,438 ft
Takeoff performance, 5,000 ft @ 25 deg C /77 deg F .....3,691 ft
Maxdemonstrated crosswind component ..
.....17 kt
Rate of climb, SL .....1,556 fpm
Cruise speed/range w/NBAA fuel rsv, std conditions (fuel consumption) @ max speed cruise, 28,000 ft .....
.....257 kt/960 nm (269 pph/40 gph)
@ Max range cruise, 25,000 ft....175 kt/1,035 nm (143 pph/21 gph)
Max operating altitude.....30,000 ft
Sea-level cabin .....12,400 ft
Landing distance over 50-ft obstacle, w/o reverse.....2,200 ft
Landing distance, ground roll .....1,042 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb).....95 KIAS
V_Y (best rate of climb).....125 KIAS
V_A (design maneuvering) .....127 KIAS
V_{FE} (max flap extended), 10 degrees .....
.....168 KIAS
20 degrees .....135 KIAS
36 degrees (full) .....118 KIAS
V_{LE} (max gear extended) .....168 KIAS
V_{LO} (max gear operating)
Extend.....168 KIAS
Retract .....129 KIAS
V_{MO} (max operating speed) .....188 KIAS
V_{S1} (stall, clean) .....79 KIAS
V_{SO} (stall, in landing configuration).....
.....61 KCAS

For more information, contact The New Piper Aircraft Inc., 2926 Piper Drive, Vero Beach, Florida 32960; telephone 772/567-4361; fax 772/978-6584; or visit the Web site (www.newpiper.com).

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, maximum weight conditions unless otherwise noted.

(about 10 degrees C above standard, or ISA plus 10 degrees), torque was set at 1,100 ft/lb, the propeller was set at 2,000 rpm, and ITT was 670 degrees C—firmly in the middle of the green arc. This was a maximum-speed cruise setting. Up at 27,000 feet and minus 24 degrees C, max cruise power settings yielded 257 KTAS.

New Piper says the Meridian turns in its maximum speed of 260 KTAS under ISA conditions at 25,000 feet (minus 35 degrees C) while burning about 270 pph. A fuel temperature gauge, located on the lower left corner of the instrument panel, can be installed to spot lower-than-recommended fuel temperatures.

The MAGIC 1500 flight control system did a lot of the flying, and it did a beautiful job. This is perhaps one of the most intuitive flight control systems. With just a little practice, you can easily master all its many functions. Localizer intercepts are exceptionally smooth, as are altitude captures and the roll-steering course-change commands provided in the nav mode. The voice annunciations add another "big airplane" touch to the cockpit environment.

Landings are real confidence builders. With gear and flaps extended, you can ballpark a 500-lb/ft torque setting for an ILS' final approach; this produces 125 knots. VFR approaches can be flown slower: 100 knots on final is a good speed. On short final, a torque setting of 280 to 300 lb/ft prevents propeller pitch from flattening out and causing high sink rates. Arrest airspeed to 80 to 85 knots over the threshold, touch down mains-first, let the nose settle to the runway, pull the power levers up and over the first gate and into the beta range (flat pitch), then apply brakes to stop. Anyone with an instrument rating, some time in a big piston single, and simulator-based formal training from SimCom (included with the purchase of a new Meridian) will be comfortable behind the wheel in 10 hours or so.

The Meridian cabin is plenty comfortable for typical passenger loads. To access the aft baggage area, fold down one of the rear seats.

The Meridian was a relative latecomer to the single-engine turboprop market, but its combination of low cost, high performance, advanced avionics, and simple operation give it a firm niche. With the price freeze, the hike in gross weight, the high-end autopilot, and the bonus depreciation rates (buyers of new airplanes may enjoy up to 60-percent depreciation in the first year of ownership) the Meridian remains one of the best values in a single-engine turboprop. AOPA

i Links to additional information about the New Piper Meridian can be found at AOPA Online (www.aopa.org/pilot/links.shtml).

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