

Primed to go—

fast

Piloting a Pratt and a picture-perfect panel

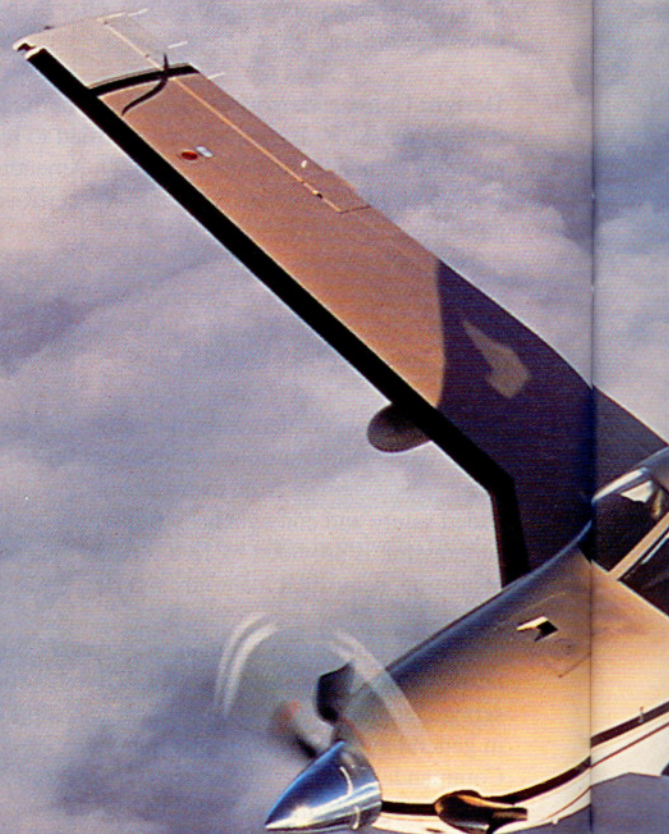
BY THOMAS B. HAINES

General aviation airplanes helped business partners Lawrence E. Hayman and Walter P. Messick build their trucking business. So as the business expands it only makes sense that the partners' airplanes grow right along with it. Until a few months ago, the pair each flew their own Piper Malibu to sales calls flung across America. The piston-powered Malibus served them well, but with business in California and the Northwest growing steadily, the two needed a bit more performance. ■ Fortunately, The New Piper Aircraft happened along with the new Meridian single-engine turboprop built around the Mirage's fuselage. Hayman



and Messick (pictured at left), the H&M in H&M Bay Inc., jumped at the chance to go some 50 knots faster and 5,000 feet higher in

turboprop comfort. They quickly made the decision to trade their Malibus for a pair of Meridians with consecutive serial numbers. They took delivery of their new airplanes last December. ■ The two have come a long way from driving trucks. Tired of working for someone else, they began their own trucking business on Maryland's Eastern Shore, moving frozen seafood to points throughout the United States. The business took off and now employs about 130. The company owns 20 truck tractors and about 70 trailers, but most of its goods—all food products—are moved by leased equipment. Hayman and Messick also own a truck financing company that allows independent operators to afford trucks that they then often drive for H&M Bay. The







company has a new dock and warehouse facility in Hurlock, Maryland, and is building a new 24,000-square-foot office building in Federalsburg, Maryland.

While he was still driving trucks Messick's wife bought him an introductory flight lesson, fueling his lifelong passion for airplanes. Five months later, in 1985, he had earned his pilot certificate. Hayman soon caught the bug and started flying as well. The two bought a Cessna 172 together, but it seemed that when one wanted to go flying, the other was already flying. Each partner needed his own airplane. They flipped a coin to see which one of them would have the right to buy out the other. Messick won and bought Hayman's share of the Skyhawk. Hayman purchased a Piper Dakota. They each bought various, increasingly sophisticated airplanes and ultimately wound up in a pair of Malibus. Messick also owns a Piper Twin Comanche.

When we talked in mid-January, each had flown his Meridian about 60 hours. As might be expected, they were thrilled with the capabilities of a turboprop and the greater performance. Both claim to consistently see actual cruise speeds higher than New Piper's book speed of 262 knots true airspeed (KTAS). Messick has seen as high as 275 KTAS and both



The Meggitt PFD shows about everything you need to fly the Meridian. The navigational display below improves situational awareness.

flight plan for speeds closer to 270 KTAS.

The Meridians make perfect sense for the business partners. Maryland's Eastern Shore is a remote area; it's a two-hour drive to the nearest airline airport. Hayman, who handles sales in the Northwest, says that on trips of up to 1,500 nm he can beat the airlines on door-to-door time. Even on longer trips to the Northwest, he can accomplish more in a couple of days with his own airplane than he can in a

week on the airlines. Messick has the same philosophy when it comes to his California and Florida sales.

They say for the price of the two Meridians—about \$1.4 million each—they almost could have bought a light jet. "But did you ever try to make a [Cessna] Citation go two places at once?" quizzes Hayman. The pair also could have purchased a larger turboprop twin, such as a Piper Cheyenne, but would have faced the same issue. "We could buy two [Meridians] almost for the price of one larger turboprop."

And besides, says Messick, "I'm 54 years old, and I've never owned a new airplane, so I thought it was time for one." When you have the wherewithal, it's hard to argue with logic like that.

A Mirage it's not

So what's it like to pilot one of H&M's business development tools? We found out during a visit to The New Piper headquarters in Vero Beach, Florida, where the company is turning out Meridians to meet a customer backlog of 137 orders. Piper plans to produce 114 Meridians this year. All in all, Piper plans to build 542 total aircraft in 2001.

Regional Sales Manager David Naugle showed us around a Meridian, comparing

and contrasting it with the Malibu Mirage, which continues in production. This is a case where looks truly can be deceiving. The pressure vessel is the same and the wings are similar. But without a Mirage sitting nearby to compare with the Meridian, one might assume that Piper just lifted out the Mirage's Lycoming and dropped in the Pratt & Whitney PT6A. One would assume incorrectly.

The Meridian features wing-root gloves that increase wing area enough to allow the heavier model to meet the 61-knot landing speed for a single-engine airplane certified under FAR Part 23. By focusing the greater wing area at the root, it means the wingspan and basic wing structure of the Mirage could be maintained. In preparation for the Meridian program, Mirages, starting in 1999, received a core spar beef-up and a 60-pound gross weight increase. As a result of that change, the Meridian and Mirage can share the same spar design.

Internal differences in the wing accommodate fuel system and other changes. For example, the Meridian's wet wing tanks extend 18 inches farther outboard than do the Mirage's, allowing a total of 173 gallons. The Mirage carries

122 gallons. All in all, Naugle says, the Meridian contains about 360 pounds more structure than the Mirage.

The fuel system is a model of simplicity from the pilot's standpoint. Do nothing. Gravity feeds fuel from the main tanks to the header tanks in the wing root. The engine-driven pumps pull fuel from the header tanks—evenly from both sides. Fuel imbalances greater than 25 pounds, usually caused by maneuvering flight, are annunciated to the pilot, but the boost pump on the high side comes on automatically to increase flow out of that tank until the two sides are even once again. There is no need to switch a selector from side to side. In fact, except for turning the fuel boost pumps on for starting, there is normally no need to interact with the fuel system at all.

Despite the physical similarities between its piston and turboprop models, Piper chose not to install fuel port restrictors in the Meridian. As a result, Meridian and Malibu/Mirage owners will want to be particularly vigilant while their aircraft are being fueled. Careless line personnel could easily overlook the large "Jet A" placards near the Meridian's fuel ports and load it up with 100LL. The

turbine engine will burn the avgas, if not happily. The greater danger is to the Malibu/Mirage pilot who is fueled by line staff who has recently fueled a few Meridians. The unnoticed introduction of jet fuel into a piston airplane can have deadly consequences.

The Meridian's landing gear is larger and stronger than the Mirage's, but it retains Piper's classically simple and effective hydraulic actuation system. Hydraulic pressure holds the gear up; if pressure is lost, the gear free-falls into a down-and-locked position. You'll never have to crank down a Meridian's landing gear. New fairings ahead of and behind the main gear wells smooth airflow there and slightly reduce drag.

When Piper first announced the Meridian in 1997, it was to be powered by a PT6A-42A engine derated to 400 shaft horsepower. At the rollout in 1998 the company left the door open for a slight increase in horsepower. The certified airplane utilizes 500 shp. The same engine delivers more than 850 shp in other applications, so it's not working hard in the Meridian. As a result, the Meridian can maintain rated horsepower all the way to its maximum altitude of 30,000





feet, and it comes out of the box with a time between overhaul of 3,600 hours; that time will likely go up once experience is gained on this particular model.

The cockpit area is protected from potential engine compartment fires by a fire annunciating system, six inches of dead air space between the back of the engine compartment and the firewall, and by the stainless steel firewall itself. In addition, a quilted fire blanket that must withstand a 2,500-degree Fahrenheit fire for at least 15 minutes protects the firewall and engine mounts.

To allow the Pratt to breathe, New Piper engineers crafted a clever inlet design that cannot ice up enough to block air flow, so it needs no heat. In addition, debris cannot enter the engine because air must make a 90-degree turn inside the inlet before entering the plenum. Debris—including ice and rain—can't make the turn and instead exits the lower fuselage. The engine drives a Hartzell four-blade aluminum fully feathering and reversible propeller.

A 250-amp starter-generator and a 130-amp standby alternator supply electrical power.

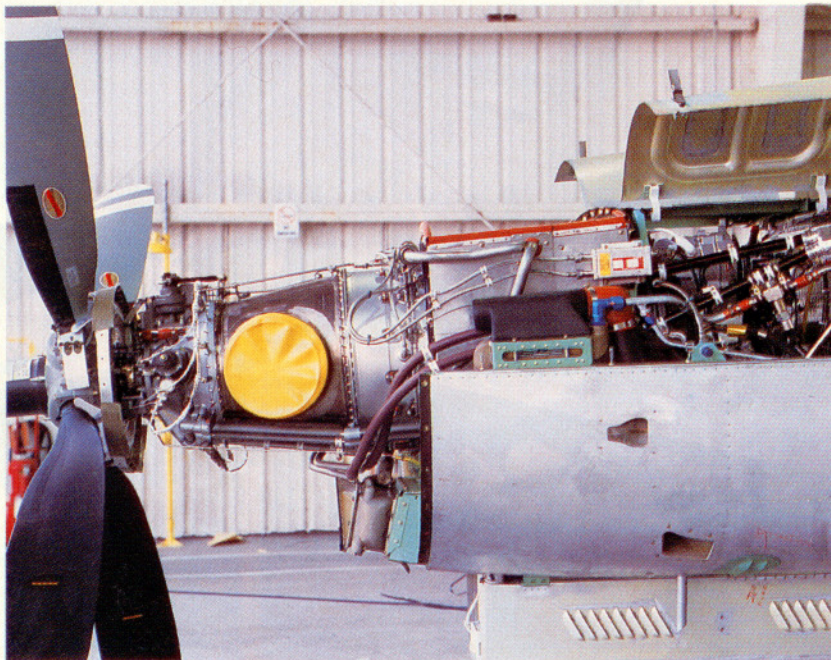
A pair of 24-volt lead-acid batteries, of 19 and 12 amps, is located in the lower right cowl. They conveniently slide out on a tray for servicing.

Around back is the most significant airframe change from the Mirage. The Meridian's horizontal tail is 37 percent larger. The greater area increases the Meridian's center of gravity envelope and improves overall handling. In addition, the Meridian includes a separate rudder trim tab with dual actuators for redundancy and to handle larger loads. Mirages use a spring system for rudder trim rather than an actual trim tab. The structure of

the Meridian's rudder and vertical fin has been strengthened as well.

The changes to the tail and other aerodynamic modifications necessitated a complete spin program for the Meridian. Piper test pilots conducted some 650 spins. More will be necessary before icing certification is approved.

Meridians delivered so far are placarded against flight into known icing conditions because the icing certification is not complete; Piper expects to finish the testing this spring. Like the Mirage, the Meridian uses pneumatic deicing boots on the wings and tail.



Everything from the firewall forward is new on the Meridian, compared to the Mirage.

Electric boots protect the prop. An electrically heated windshield keeps the pilot's view clear. Naugle says the Meridian is one of only a few turbine aircraft to complete icing certification since the Roselawn, Indiana, accident that claimed an ATR-72 commuter. Since that accident and another involving an Embraer 120, the FAA has dramatically toughened the qualifications for icing certification. Now, systems must deal with icing associated with larger, super-cooled drop-



The aft seat backs are certified to bear weight when folded forward and when using a cargo net. Interior cabinets and materials are equivalent to what you might find in a business jet.

lets. These droplets tend to run back beyond the normal area protected by deicing boots. As a result, the Meridian may need boots that extend farther aft than those currently installed. Any changes will be retrofitted at no charge to existing Meridian customers.

One thing missing from the Meridian that's found on the Mirage is an external baggage compartment. The Mirage's external baggage was a small compartment located in the cowl. It wouldn't hold much, but was good for storing chocks and engine inlet covers. To at least partially offset the loss, Piper engineers found a few cubbyholes on the Meridian's airframe to accommodate small items. One is in the area behind the radome under the right wing. The area behind the

radar antenna is simply a fairing, so Piper added a small access door behind which up to five pounds of small items, such as engine inlet covers, can be stowed. On the aft left fuselage is a small access door to a one-cubic-foot storage area for fuel samplers and rags, for example.

Inside, baggage can be stowed behind the aft seats. One or both of the aft seat backs can be folded forward to handle larger items, such as golf clubs. The Meridian's cabin is similar to the Mirage's, but it has been restyled and the materials are all new. As before, the cabin consists of a club seating arrangement with a right-side executive table. Access to the cabin is through a clamshell door with an integral airstair. The left aft-facing seat can be replaced with an option-

al entertainment center that features a multimedia system. The system includes an AM/FM/CD player and a VCR with a small LCD screen. Those who elect not to get the entertainment center can elect to have an AM/FM/CD system installed in the cabinet behind the pilot's seat.

While the Meridian's pressurization system, which has a maximum pressure differential of 5.5 psi, is mostly the same as the Mirage's, the Meridian does feature double-pane windows, a requirement for flight above 25,000 feet, the Mirage's maximum altitude. Also necessary for higher flight is a pressure oxygen system and a quick-don mask for the pilot, which is located in the cabinet behind the copilot's seat. Flying in the high twenties, Meridian pilots may see an amber annunciator on the panel and hear an alarm as the cabin tops 10,000 feet. The alarm, which can be silenced, is just a reminder that the cabin is near the area where supplemental oxygen may be necessary. If a pressurization system malfunction allows the cabin to drift to more than 12,000 feet, automatic systems come on to flood the cabin with a high flow of extra air to maintain cabin pressure. This certification change is at least partly a result of the depressurization accident that claimed the life of golfer Payne Stewart.

An engine-driven air conditioning system maintains cabin comfort on the ground. In flight, the air conditioning typically isn't necessary. There, an automatic environmental control system keeps the crew and passengers comfortable.

Panel on parade

While externally the Meridian and Mirage look similar, there is no doubt when you plunk down in the Meridian's left seat that you are in a very different airplane. Almost nothing in the Mirage's panel is like what you'll find in the Meridian.

While Meridian buyers have the option of conventional electromechanical flight instruments, none has opted for them. Instead every customer has chosen the full-up Meggitt Avionics Next-Generation Integrated Cockpit (MAGIC), an EFIS that features pilot and copilot primary flight displays (PFD) and navigation displays (ND). The option costs \$97,000, or about 7 percent of the base price. The airplane comes standard with two Meggitt engine display units that depict all engine parameters, including fuel quantity, fuel flow, fuel to destination, vacuum pressure, and other information. Meggitt has been

supplying backup nav displays and engine sensors to the turbine market for years, but this is its first installation as a primary system. Piper chose to install three electromechanical instruments as a backup: airspeed, attitude, and altimeter. The electric standby attitude indicator has an independent battery, so if all else fails, you have a way to get the airplane safely on the ground.

The Meggitt screens interface not only with the engine display units, but also with the complete stack of Garmin avionics: dual GNS 530 GPS/moving maps with VHF nav/coms; audio panel; and transponder. A second Garmin transponder and S-Tec ADF and DME are optional, as is a BFGoodrich WX-1000 Stormscope. A WX-500 Stormscope that displays on the 530s should be available later this year. Additional weather avoidance is provided by the Honeywell Bendix/King RDR 2000 vertical profile radar. S-Tec, which is now owned by Meggitt, supplies the System 550 three-axis autopilot with a flight director and altitude preselect.

I spent more than an hour on the ground with Naugle and test pilot Bart Jones going over the Meggitt panel. Punch buttons on the ground all you want, but you must fly to really appreciate the level of sophistication that the system provides.

After engine start and avionics power-up, the aircraft must remain stationary for three minutes while the dual solid-state attitude heading reference systems (AHRS) initialize. These black boxes behind the panel—each about the size of an electric pencil sharpener—replace the mechanical gyros and heading systems found in conventional systems. The AHRS interface with the PFDs and NDs on each side of the cockpit. If the pilot's AHRS fails, the copilot's system can drive the pilot's displays. Likewise, if the pilot's PFD fails, the primary attitude data can be combined with the nav data and displayed on the ND. The same is true on the copilot's side. Basically, everything you need to fly is on the PFD, including attitude, heading, airspeed (including trend tapes), altitude, vertical speed, and baro setting. The ND can be set to depict a conventional HSI, including pointers from multiple nav sources, or an arc-mode moving map.

The only shortcoming in the system at this point is that glideslope is depicted only on the PFD, even when the ND is depicting an HSI. Piper engineers and others who have flown the airplane have

requested that glideslope also be shown on the ND, a software change that Meggitt is considering, according to Piper.

While sophisticated, the Meggitt system is intuitive and easy to use. The liquid crystal displays are bright and readable in all light situations.

The combination of the MAGIC panel and the latest Garmin avionics gives the Meridian a truly revolutionary cockpit.

In the flight levels

During our flights, we saw the book speed of 262 KTAS at 27,000 feet while burning 271 pounds per hour, or about 40 gph. Jones prefers to fly more conservatively using his own "three 25s" rule of thumb: 250 pph at 25,000 feet delivers 250 knots. During our climb to 27,000 feet, the airplane maintained more than 1,200 fpm the whole way up at the best-rate-of-climb speed of 125 KIAS. Lowering the nose to achieve a cruise climb of 145 KIAS decreases the rate by a few hundred feet. A realistic range with reserves is 1,000 nm.

The Meridian is an all-around good performer, with the ability to get into and out of about any reasonably sized airport and fly nonstop across half a continent. Like a lot of modern airplanes, its biggest shortcoming is its full-fuel payload. Typically equipped and full of fuel, it can carry about 350 pounds. Piper says its customer surveys show that the typical load in a Mirage is just the pilot. The next most likely trip involves a husband and wife. For an average couple, 350 pounds will about do it, but some fuel will need to be left behind for bags. That's not a bad tradeoff, because not that many pilots need to fly 1,000 miles; most trips are less than 500 miles. But if you need to carry five or six people, you won't be going very far without stopping—whether in a Meridian or almost any other new high-performance single. The amenities, avionics, and safety systems demanded by today's consumers and the FAA are just too heavy for airplanes that must still meet a 61-knot stall speed, climb gradients, and other certification criteria.

Piper isn't satisfied with the payload and is still searching for ways to improve it. "At this point, we're looking for ounces, not pounds," commented a Piper spokesperson. Every piece of material in the interior, for example, is being examined to see if weight can be shaved there.

The Meridian fits the Piper mold in that it delivers a lot of value for the money. It comes in at more than \$1 million cheaper than its next closest competitor, the Socata TBM 700. The TBM

Piper PA-46-500TP

Base price: \$1,550,000

Price as tested: \$1,596,000

Specifications	
Powerplant	Pratt & Whitney PT6A-42A 500 shp @ 2,000 rpm
Recommended TBO	3,600 hr
Propeller	Hartzell, 4-blade, 82.5-in dia
Length	29 ft 7 in
Height	11 ft 4 in
Wingspan	43 ft
Wing area	183 sq ft
Wing loading	26.5 lb/sq ft
Power loading	9.7 lb/shp
Seats	5 or 6
Cabin length	12 ft 4 in
Cabin width	4 ft 2 in
Cabin height	4 ft
Empty weight	3,344 lb
Empty weight, as tested	3,383 lb
Maximum ramp weight	4,892 lb
Maximum gross weight	4,850 lb
Useful load	1,548 lb
Useful load, as tested	1,509 lb
Payload w/full fuel	408 lb
Payload w/full fuel, as tested	369 lb
Maximum takeoff weight	4,850 lb
Maximum landing weight	4,850 lb
Fuel capacity, std	173 gal (170 gal usable)
	1,160 lbs (1,140 lbs usable)
Oil capacity	12 qt
Baggage capacity	100 lb, 20 cu ft

Performance

Takeoff distance, ground roll	1,698 ft
Takeoff distance over 50-ft obstacle	2,545 ft

Max demonstrated crosswind component	17 kt
Rate of climb, sea level	1,739 fpm
Max. level speed (at 25,000 ft)	265 kt
Cruise speed/range w/45-min rsv (fuel consumption)	
Max contin. power	265 KTAS, 920 nm (269 pph)
Max endurance	153 KTAS 1,460 nm (108 pph)
Service ceiling	30,000 ft
Landing distance over 50-ft obstacle	2,114 ft
Landing distance, ground roll	1,009 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)	143-127 KIAS
V_{FE} (max flap extended)	118 KIAS
V_{LE} (max gear extended)	168 KIAS
V_{LO} (max gear operating)	
Extend	168 KIAS
Retract	129 KIAS
V_{NO} (max structural cruising)	143-127 KIAS
V_{MO} (max operating limit)	188 KIAS
V_R (rotation)	85 KIAS
V_{S1} (stall, clean)	79-69 KIAS
V_{SO} (stall, clean)	61 KIAS


For more information, contact The New Piper Aircraft, Inc., 2926 Piper Drive, Vero Beach, Florida 32960; telephone 561/567-4361; fax 561/778-2144; 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, gross weight conditions unless otherwise noted.

700 is about 20 knots faster in normal cruise and has a slight payload and range advantage—but it does so with 200 more shp and the accompanying fuel burn. The Meridian's thoroughly modern cockpit and its significantly lower price do a good job of leveling the playing field.

New Piper CEO Chuck Suma summed up his product well at a recent press conference: "The aircraft was conceived to provide the highest-value turboprop in the owner-flown class of business and personal aircraft.... We were challenged to provide turboprop performance and utility, to introduce technology to the cockpit never before seen in this class of aircraft, and to bring the Meridian to the market at a fraction of the cost of its nearest competitor."

And that New Piper has done. Just ask truck-drivers-turned-entrepreneurs Hayman and Messick, who have built their successful company flying Piper products. □

 Links to additional information about single-engine turboprops may be found on AOPA Online (www.aopa.org/pilot/links.shtml). E-mail the author at thomas.haines@aopa.org