

M600

Piper's Best Performer

by Matt Thurber



PILOT REPORT

Piper's new M600 single-engine turboprop, while not a clean-sheet design, is a logical addition to the Vero Beach, Fla. manufacturer's product line and delivers a big boost in performance for a competitive price. Now the top of the line in Piper's M-series, the \$2.853 million M600 also expands the range of products offered by Piper and pushes it closer in performance and capability to competing airplanes while retaining the comfort and easy flying characteristics that are a Piper hallmark.

During the EAA AirVenture show in Oshkosh in July, I flew the M600 with Piper chief test pilot Bart Jones. Piper positioned the M600 at Appleton International Airport, where the flying is more flexible than in Oshkosh, with its busy runways and airspace. Our flight wasn't too long because of a slow-moving thunderstorm

approaching the airport, but we were able to climb to 16,000 feet and evaluate performance and handling characteristics.

Subtle changes mark the physical difference between the M500 and M600; most noticeable is probably the M600's slightly upturned winglets, which add 0.16 inch to the wingspan. The wing is new and strengthened to accommodate the higher maximum takeoff weight of the M600, which is 6,000 pounds, up from the M500's 5,092 pounds, and the increased fuel capacity, now 260 gallons, up from the M500's 170 gallons. Also new is the radar pod on the right wing, now more streamlined and more aligned with the leading edge.

The M500's 1,000-nm NBAA IFR maximum range (100-nm alternate), while sufficient for a single-engine airplane, has long been on Meridian/M500 owners' wish lists for improvements,

and the M600 boosts that number significantly to 1,484 nm. The M600's maximum range, in fact, ended up 284 nm better than originally projected. With a standard equipped weight of 3,650 pounds, about 200 pounds higher than the M500, the M600 can carry a payload of 645 pounds with full fuel; under the same conditions the M500 has a payload of 550 pounds. The added fuel capacity of the M600 allows much more loading flexibility for trips requiring maximum range.

The M600's maximum cruise speed is now 274 knots, 14 knots higher than the projected 260 knots (which is also the max speed of the M500). The performance gain is attributable to the Pratt & Whitney Canada PT6-42A engine, the same as the M500's but flat-rated to 600 shp instead of the M500's 500 shp. "Now, rather than pulling 1,313 ft lbs of torque at max power," Jones

said, "it's going to pull 1,575."

For pilots, the big improvement is the upgrade to the Garmin G3000 integrated flight deck, from the G1000 system in the G500. The G3000 is controlled by two GTC 570 touchscreen controllers mounted in a tilt panel below the center multifunction display (MFD). This required moving some switches around, but also allowed Piper to remove items that cluttered the cockpit, such as the Garmin GCU 476 keypad and the audio panel. All these functions now reside in the much simpler to operate touchscreen controllers.

In the M600, all three cockpit displays now measure 12.4 inches, an improvement on the M500's two 10-inch primary flight displays (PFDs) and single 12.4-inch MFD. The larger displays make the cockpit look more consistent and add to the less cluttered feel.

One of the switches that was updated is the flap control,



which is a solid white flipper-type switch flush with the panel instead of the M500's black flap-shaped vertically operated switch. The flaps in the M600 are larger and extend down farther, to 41 degrees instead of 35, and the flap switch has

only three positions: up, take-off and down, while the M500 switch has four positions. The fuel system is unchanged, with the same on-off fuel selector and no need to switch between tanks.

A welcome benefit of the

G3000 flight deck is the ability to display multiple panes on the PFDs. An example of the 60/40 split pane capability is display of synthetic vision in one 60 percent pane and a chart or other information in the 40 percent pane.

The G3000 system also adds the enhanced map HSI feature, which allows overlay of information on the HSI such as map, SafeTaxi, flight plan, Metars, Nexrad and weather radar. While both airplanes feature Garmin's Electronic Stability Protection (ESP) with level mode button and underspeed/overspeed protection, the M600 adds an emergency descent mode. While flying above 14,900 feet, this monitors pilot response to message prompts to detect whether the pilot is affected by hypoxia, and if the pilot doesn't respond properly within a certain time the emergency descent mode will drop the nose and take the M600 first to 14,000 feet then 12,500 feet. The ESP feature allows the M600 (and M500) to fly coupled missed approaches.

The M600's maximum altitude is 30,000 feet, but it would require RVSM approval to fly above 28,000 feet, and this is not available for now. At 28,000 feet, the 5.6-psi cabin pressure differential provides a cabin altitude of 9,600 feet.

ADS-B OUT is standard on the M600, as is the automatic flight control system with ESP and emergency descent mode. Optional are ADS-B IN, Sirius XM Weather, GSR 56 Iridium satcom, L-3 WX500 Stormscope and Taws-B. Flight into known icing is included, too, but that system isn't scheduled for certification until December.

Cabin Comforts

Inside the cabin, the M600's seats have been redesigned with premium leather. Passenger side panels have a new interface along with multiple cupholders. Among the other interior appointments are USB charging ports, folding executive tables and folding seats. There



The M600 features the Garmin G3000 with three 12.4-inch displays. The Electronic Stability Protection system, also available on the M500, has the additional benefit of an emergency descent mode in case of pilot hypoxia.



The interior of the M600 is an upgrade of that of the M500, with interior appointments that include premium leather and USB ports.

Piper M600 Specifications and Performance

Price (base)	\$2.853 million
Engines (1)	Pratt & Whitney Canada PT6A-42A, flat-rated at 600 shp
Avionics	Garmin G3000
Passengers (typical)	1 crew + 5 pax
Range (w/NBAA reserves, 100-nm alternate)	1,484 nm
High-speed cruise	274 ktas
Long-range cruise speed (intermediate cruise)	250 ktas
Fuel capacity	260 gal/1,742 lbs
Max payload w/full fuel	645 lbs
Ceiling (certified/non-RVSM)	30,000 ft/28,000 ft
Cabin altitude at certified ceiling	10,650 ft
Max takeoff weight	6,000 lbs
Takeoff field length at mtow (sea level, standard)	2,635 ft
Landing distance	2,659 ft
Length	29.7 ft
Wingspan	43.16 ft
Height	11.3 ft
Cabin	
Width	4.125 ft
Height	3.92 ft
Length (instrument panel to rear bulkhead)	12.3 ft
Baggage capacity	20 cu ft/100 lbs
FAA certification (basis, date)	FAR Part 23, 6/17/16

are four seats in the aft cabin, with two forward-facing seats in the rear and two rear-facing seats behind the cockpit. The cabin measures 49.5 inches at its widest and is 47 inches high. The entry door is 24 by 46 inches, and baggage space behind the aft seats encloses 20 cu ft. Maximum weight allowed in the baggage compartment is 100 pounds.

Starting the M600's PT6 is a simple automatic process. The engine won't start unless certain items, including the Garmin GIA 63W integrated avionics modules or the landing gear's three green lights, pass their self-test. With fuel pumps and ignition set on manual and the start mode switch in auto, after pushing the start switch, wait for at least 13 percent NG, then move the condition lever to run and watch to make sure the ITT doesn't exceed 1,000 degrees C for more than five seconds.

The reversible Hartzell four-blade propeller can be operated in beta mode to keep taxi speed down, which is helpful because at the 1200-rpm idle, the M600 moves a little too quickly on

the ground. The M600's mainwheels sit six inches farther outboard than the M500's, which should make a strong crosswind easier to handle. Demonstrated crosswind velocity is 17 knots.

With Jones and me on board and about 1,100 pounds of fuel, the M600 weighed just over 5,000 pounds. This is likely a typical load for the M600, about the same amount of fuel that the M500 can carry. If we were going somewhere, we would be able to fly about 600 nm at normal cruise speed of 257 kias at 20,000 feet and land with a 300-pound fuel reserve, plenty for more than an hour's flight time at cruise power settings.

The temperature was nearly ISA +10 degrees C, which should mean a ground roll of 2,000 feet and takeoff distance of 2,600 feet, but after I pushed the power to near maximum torque and lifted off from Runway 30 below 90 knots, we climbed into the air short of using 2,000 feet of runway. I lowered the nose after cleaning up the gear and flaps and accelerated to 140 kias instead of the 122-knot best rate of climb speed, and the M600 was climbing at 1,700 to 1,900 fpm then up to 2,500 fpm as we gained altitude.

Turning to the east to avoid the looming thunderstorm, I climbed directly to 16,000 feet, which took about 10 minutes, almost two minutes less than the number in the manual, and I wasn't even flying at the recommended climb speed. At that altitude and ISA +7, we had a choice between a maximum cruise speed of 250 kias and fuel flow of 358 pph or an intermediate cruise at the next lower setting of 241 kias and 332 pph. Piper recommends flying at max cruise, and it's easy to see why; the lower speed doesn't save much fuel. Slowing to the lowest intermediate cruise setting, however, would give a speed of 168 kias

WHERE DOES THE M600 FIT IN THE MARKET?

The M600 makes it apparent that Piper recognizes the changing general aviation landscape. It used to be normal for manufacturers to make the same airplane year after year with few changes. But rapid developments in technology and a market that has shifted to buyers who appreciate regular introductions of new features mean that manufacturers can't sit still.

The M500 has proved popular, and adding the M600 to the mix was a smart move on Piper's part, achieving both a higher-performance upgrade that will keep many M500 owners in the Piper fold and offering an airplane that will also attract buyers moving into their first turboprop. That the M600 is so easy to fly and brings new technology that is a step up in ease of use—the G3000 flight deck—to the owner-flown market makes even more sense. Passengers will appreciate the smartly outfitted interior, too.

The single-engine turboprop is one of the stronger market segments; in the next few years, Textron Aviation's Cessna Denali and Epic's E1000 will join the dominant players (the M500, TBM 900/930 and Pilatus PC-12), offering buyers a range of price and performance from which to choose.

The M500 remains the lowest-cost entry-level pressurized turboprop, starting

at \$2.26 million, with range of 1,000 nm, top speed of 260 ktas and full-fuel payload of 550 pounds. For about half a million more, the M600 adds range (1,484 nm), speed (274 ktas), full-fuel payload capability (645 pounds) and the benefits of the touchscreen-controlled G3000 flight deck.

The only other sub-\$3 million offering is the Epic E1000 (\$2.95 million), which is expected to receive FAA certification early next year. The E1000 has a much larger engine (1,200 shp PT6A-67A), longer range (1,650 nm), the second-highest top speed in its class (325 ktas) and a hefty full-fuel payload (1,120 pounds). Avionics are the G1000 system.

TBM buyers now have two choices for new models: the \$3.66 million 900 with the G1000 flight deck and the \$3.9 million 930 with G3000. Both offer similar class-leading performance, with range of 1,730 nm, 330-ktas max cruise speed and 891-pound payload with full fuel.

Currently the most expensive in its class, the \$4.055 million PC-12 has dominated the market for large-cabin single-engine pressurized turboprops for many years. With range of 1,840 nm, top speed of 285 ktas and 1,209-pound payload with full fuel, the PC-12 remains the best performer with a cabin that can seat up to six in the executive-configured

cabin for a total of eight occupants. The other airplanes in this class seat up to six occupants, except for the Denali, which can also seat eight occupants in an executive layout, and which also features a large aft baggage door like the PC-12's. The \$4.5 million Denali will offer range of 1,600 nm, top speed of 285 knots, full-fuel payload of 1,100 pounds and G3000 avionics, and it is expected to fly in 2018. Textron Aviation hasn't released the planned certification date yet.

For buyers in the market for a single-engine pressurized turboprop today, the choices remain the two Pipers, the two TBMs and the PC-12. For the time being the M600 is the lowest-cost new turbine-powered airplane offering the G3000 flight deck (the \$2 million Cirrus Vision single-engine jet, which may be certified by the time this story is published, also is equipped with G3000-based avionics).

The M600 was certified on June 17, but Piper plans to build just 35 M600s per year to prevent a surge in initial orders and deliveries followed by a flattening out of production, which is difficult to manage. "We've already sold out this year, and we're taking orders for next year," said Piper president and CEO Simon Caldecott. "The M600 is the big thing for us." ■

and 206 pph, which could be worthwhile given a strong tailwind or if needing to remain aloft for a long time.

Single-pilot Friendly

We didn't have too much time to work with because of the thunderstorms, but I managed to squeeze in some slow flight and handling evaluation. I'm used to the ESP nudging the controls when a turn steepens, and it didn't detract from the pleasure of flying the M600. It's a solid, stable aircraft with zero surprises. Of course, the ESP can be switched off using an option on the G3000

touchscreen controllers during a particular flight, but it resets for subsequent flights.

Descending from 16,000 feet, Jones had me keep the power up and I let the airspeed climb to the 251-kias (250-kcas) VMO so I could see how the ESP raises the nose to keep the speed within limitations, which it did, conveniently as we were passing through 10,000 feet and had to slow down to below 250 knots anyway. I continued descending and headed back toward Appleton, where we were directed on a base leg to Runway 3. The thunderstorm was getting closer but we could see that it was still well away

from the airport on the M600's Garmin GWX 70 digital radar.

What I like about Pipers in general and the M600 in particular is that they never make me feel like I'm in a hurry, and there is plenty of time to manage all the tasks involved with flying single pilot. The G3000 suite does make this easier, but on the M600 it's easy to kill speed when needed or keep the speed up until close to the airport and then decelerate promptly, which makes it highly flexible. Gear operating speed is 170 kias, and once the wheels are down the M600 doesn't

take long to reach 147 kias for the first notch (15 degrees) of flaps. Flap speeds in the M600 are lower than in the M500 because the surfaces are larger.

Passing through 112 kias, I set full flaps and turned final and reduced the speed to below 100, crossing the threshold at 85. Throughout the speed regime, the M600 handled perfectly and remained stable at the desired attitude. The landing was perfectly smooth, and we slowed down quickly enough to take the first turnoff less than a quarter way down the 8,000-foot runway. □