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A white turboprop aircraft is shown from a low-angle, front-quarter perspective, flying through a blue sky with scattered white clouds. The aircraft's propellers are blurred, suggesting high speed. The cockpit windows show a pilot wearing sunglasses. The aircraft has a red and white stripe running along the fuselage.

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## EPIC SPEED

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# EPIC JOURNEY

SPEEDY TURBOPROP SINGLE GETS READY FOR CERTIFICATION.

“Wow” was all I could say as I held the throttle forward in the climb out of Camarillo Airport in California on our way to Bend, Oregon. David Robinson, Epic Aircraft’s chief pilot, said he often hears similar expressions from

the left seat during demo flights, though generally a slightly less polite version. We were climbing at 175 knots indicated, faster than most airplanes I fly cruise, and showing a climb rate of 3,500 fpm.

BY PIA BERGQVIST



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**THE COMBINATION OF THE EPIC'S STREAMLINED FUSELAGE, EFFICIENT WING DESIGN AND 1,200 SHP PT6A ENGINE MAKES FOR A SPEEDY PACKAGE.**

I was in the captain's seat of the Epic LT, the predecessor to the Epic E1000, a certified version of the turboprop kitplane Epic hopes to bring to market next year. The Epic is a sleek carbon-fiber machine powered by a single Pratt & Whitney PT6A-67A, producing 1,200 shp. With about a decade of experience behind it, and with continuous tweaks being made in the process, the Epic is just about ready for prime time. The company hopes the E1000 will debut as the fastest single-engine airplane on the market.

With clear skies, smooth air and stellar views of the Pacific Ocean, the Sierra Nevadas and the Cascades, we weren't in that much of a hurry. Once established in cruise, I powered back to 99 percent Ng, burning 55 gph for a comfortable 305 ktas cruise, and with an approximate 20-knot tailwind, we rolled into the Epic factory in Bend almost exactly two hours after our wheels left the pavement

in Camarillo 600 nm south.

Home to Epic, Bend is a scenic tourist destination with skiing, mountain biking, hiking and rock climbing galore. Its arid climate also creates ideal conditions for composite construction. And, as a bonus, the area is loaded with talented airplane makers. Lancaster is only about 30 minutes away in Redmond, and Columbia/Cessna had its factory in Bend for the airplane that is now named the Cessna TTx, the production of which moved out of Bend to Chihuahua, Mexico, in 2009.

While Epic Aircraft today has what it says is solid financial backing, the company has a checkered past. Epic was introduced to the GA market in the early 2000s with businessman Rick Schrameck at the helm. The intent from the get-go was to offer a kit version of the single-engine turboprop Epic LT while simultaneously going through certification.

Epic began delivering kits in 2004

and also announced its intent to bring two jets — a single and a twin — to market. However, customers and suppliers claimed Epic failed to fulfill its promises, and several lawsuits against Epic and Schrameck followed, forcing Epic to shut down in 2009.

The timing of the original company's demise happened to be perfect for Doug King, Epic's CEO who is referred to by some employees as "The King of Epic." An entrepreneur who grew up with a passion for aviation, King, who ran several high-tech companies, bought an Epic LT in 2008. "It was my dream airplane. It's something I could fly without a type rating and get jetlike performance," he said.

When Epic went out of business, King wanted to ensure his airplane would receive continued support from a U.S.-based company, and he found he had the money, the time and the wherewithal to take on the company. King took control of Epic in 2010.

King stayed on as a very hands-on leader, and with the backing of Engineering LLC, the company, he said, is now financially solid. Any concerns about political conflicts with Russia, he said, were overcome by moving the money required to keep the company going to the United States. While he didn't disclose financial details, King said Epic is in good shape financially to bring the E1000 to certification. "I don't see anything holding us back now," King said.

Epic stopped selling the LT in October last year, and King does not expect to offer any amateur-built airplanes in the future. However, the company is looking to expand its product line. At this time, King has not decided whether the next model will be larger or smaller than the Epic. He simply wants to "get to the finish line with this product before moving to the next."

Before starting the certification process for the E1000, King hired a DER (designated engineering representative) test pilot to go through the Part 23 flight-test process with an Epic LT. "We made sure we could pass all of the Part 23 flight testing before we started certifying the airplane," King said. He didn't want to get to flight test and have to redesign the airplane — a quagmire that has delayed plenty of airplane programs in the past.

In addition to reducing the chances for snags late in the process, the flight testing allowed the company to make early decisions regarding the systems modifications that would be necessary to successfully bring the airplane through the rigors of Part 23 certification.

While the general aerodynamics and powerplant remain identical to the LT, which is why the kitplane was a good representation for this article, there have been some changes. Major additions include an emergency exit and a stick shaker/pusher, which King said was added to allow the airplane to have a wider elevator throw while removing some of the risk in the certification effort. "The process for certifying an airplane with a shaker pusher is known," said King, "and the results are predictable."

The hydraulic system in the E1000 will change from an electric/hydraulic system in the LT to an engine-driven hydraulic pump providing a

continuous flow, which will allow the gear to come up quicker.

Epic is also adding deicing equipment in the form of a boot in the leading edge, which is joggled (slotted to fit the boot) to prevent extra drag. Mike Schrader, Epic's director of sales, said that because of the joggle, which is impossible to do on metal wings, there is no speed penalty with the boots.

In some cases the mods have gone from a more advanced system to one that is more easily certifiable. For example, the box that controls the heat in the LT has a microprocessor and software that likely would have cost a lot of money to bring to certification. Instead, the E1000's system will have an analog-based microprocessor because it is easier to certify. "To the user it's the same," King said.

Some mods will make the pilot's life easier, such as an automatic fuel valve, which will eliminate the need for the pilot to switch fuel tanks. A completely new interior was to be revealed at the National Business Aviation Association's annual convention and exhibition in late October.

King's focus on reaching the target of certification without major delays also flows into the cockpit. "It is very attractive to try to do some new crazy stuff with the avionics," King said, "but if you look at failures with certification and major delays, it's not uncommon for them to involve avionics."

While Garmin has come out with the touch-capable G2000 avionics, which is certified and already flying in the TTx, King decided to stay with the G1000 — a system that is not only well proven, but also known and loved by many potential Epic customers. Unfortunately, it looks like the initial certification will not include the integrated GFC 700 autopilot. Instead, the E1000 will roll out of the factory with S-Tec's IntelliFlight 2100. Backup instrumentation will be electronic, provided by the Mid-Continent MD302, which has a dedicated backup battery.

While the cockpit may not offer the latest possible avionics upgrades, the performance of the Epic E1000 reaches new heights. One major modification, which has yet to be announced, and some slight aerodynamic mods, particularly in the wheel wells, may bring the top speed up by several



THE E1000 WILL FEATURE GARMIN'S G1000 AND S-TEC'S INTELLIFLIGHT 2100 AUTOPILOT. BACKUP INSTRUMENTATION WILL BE PROVIDED BY MID-CONTINENT'S MD302.

knots. If that is the case, the airplane has the potential to become the fastest certified single-engine airplane on the market. With full power during the flight from Camarillo, we showed a true airspeed of 332 knots, already bettering the top speed of the TBM 900 by a couple of knots.

Epic is not speculating on what the final numbers for the E1000 will be at this point. But the LT's performance can be competitive with at least a couple of entry-level jets. When flying to and from the same destinations, sometimes the Epic beats the Cessna Citation Mustang. Sometimes the opposite is true. In any case, the winner in operating cost is the Epic with its single-engine turboprop versus the Mustang's two jet engines. (See our digitally exclusive comparison page to see how the Epic compares with some of its other competitors.)

While it is fairly easy to get in and out of the cockpit, something that is not true for many cabin-class airplanes that you enter from the rear, I found the headroom a little tight on the left side with the seat at the highest, far-

thest forward position, which was my preferred seat position. Schrader said the new seat design has solved this, but the aerodynamic shape of the nose does impinge slightly on the otherwise very roomy cockpit.

Ground control is easy without using brakes since the nosewheel is linked to the rudder pedals, and, unlike some high-powered airplanes in which you have to pay attention to the torque on takeoff, the Epic, which will include a torque limiter, allowed me to push the throttle to the firewall without fear of losing control before the wheels departed the pavement. Some rudder is naturally required to keep the airplane straight, but the large horizontal stabilizer makes it easy. Once you rotate, it's important to raise the nose to a 10-degree nose up attitude and get the gear up or the speed will get too fast to retract the gear.

As I mentioned before, the climb performance is awe-inspiring and we left the SoCal oceanfront behind us in a hurry. In the busy airspace north of Los Angeles we had to level off a few times in the climb, but we still reached

our targeted FL 280, 6,000 feet below the airplane's service ceiling, in about 16 minutes. At 27,000 feet we were still climbing at 2,000 fpm.

Like any high-powered turboprop, at sea level and full power, the PT6 burns a lot of fuel, about 90 gph. At full power cruise at 28,000 feet, the jet-A was flowing at around 65 gph. At that altitude and power, a setting of 104 percent Ng, we saw consistent true airspeeds above 330 knots before bringing the power back to a normal cruise setting. It's no wonder the controllers who were not familiar with the airplane kept referring to us as "Epic jet."

Speed aside, the load-carrying and range capabilities of the Epic could also live up to its name. With 288 gallons of fuel in the tanks the airplane is expected to be able to carry more than 1,100 pounds of passengers and gear and travel as far as 1,650 nm. Since we didn't have a full fuel load on our flight from Camarillo, we tested the LT out of Bend the following day. With full fuel and three people on the airplane, we climbed from nearly 3,500 feet, the elevation at the Bend

Municipal Airport, straight to FL 270 in just 11 minutes. With the power set at 65 percent burning 45 gph, we would have been able to make it non-stop to Cleveland, Ohio, that day with a tailwind of about 20 knots.

We descended to conduct a stall in the Epic, which was a nonevent. I felt no tendency for a break, even a couple of knots below the estimated stall speed of 61 knots. In slow flight, the Epic felt extremely solid, partially thanks to the flap design, which is slotted with a Fowler movement, allowing air to flow between the wing and flap. The controls are connected through a combination of cables, bell cranks and push rods, and hand-flying the Epic is quite comfortable even at higher speeds. It needs an armrest, however, something Schrader promised would exist in the new interior.

Despite its considerable size, the glide ratio for the Epic is terrific. We pulled the power to idle, feathered the prop and pitched for 130 knots, establishing a comfortable descent rate of 700 fpm. The G1000 indicated that, although we had 15 nm to go to Bend and were only 7,000 feet agl, we would have made the airport even with a slight headwind working against us.

On my very first approach into Bend I got a big surprise on short final. A bizarre wind gust made the airplane momentarily buck like a bronco, but the Epic quickly settled back on the stabilized approach I had set up, making me comfortable enough not to initiate a go-around despite the surprise.

The trailing-link gear and Robinson's masterful instructions helped me guide the Epic's tires onto the pavement in Bend with a gentle kiss. Putting the throttle into beta slowed the airplane down in a hurry, and I used no brakes to get the airplane from the runway to the taxiway. Robinson said he feels completely at ease landing the airplane on strips as short as 2,500 feet.

The E1000 will be produced inside Epic's original manufacturing facility. "We designed the building to be able to produce 50 airplanes a year," King said. "If the marketplace demands more we have the additional building we can grow into."

The fuselage is built in oversize hot-tub-looking molds, producing the left

1. LARGE WINDOWS PROVIDE NATURAL LIGHT AND GOOD VIEWS. THE FINAL INTERIOR FOR THE E1000 WILL BE UNVEILED THIS FALL.
2. THE BEND, OREGON, AREA, WHERE EPIC IS HEADQUARTERED, HAS A GOOD BASE OF EXPERIENCED COMPOSITE AIRPLANE MAKERS.
3. A TORQUE LIMITER ALLOWS FOR EASY OPERATION.



# Epic E1000 Specs

The airplane flown for this article was the Epic LT, the experimental predecessor to the E1000, which Epic expects to earn FAA approval next year and which has similar specs to the LT. The Epic features the Garmin G1000 integrated avionics system with an S-Tec IntelliFlight 2100 autopilot and Mid-Continent's MD302 electronic backup instruments.

<b>PRICE</b> \$2,950,000	<b>EMPTY WEIGHT</b> 4,440 pounds
<b>ENGINE</b> Pratt & Whitney PT6A-67A	<b>MAX USABLE FUEL</b> 288 gallons
<b>HORSEPOWER</b> 1,200 shaft horsepower	<b>PRESSURIZATION DIFFERENTIAL</b> 6.5 pounds per square inch
<b>TBO</b> 3,500 hours	<b>8,000-FOOT CABIN</b> 31,000 feet
<b>PROPELLER</b> Hartzell four-blade, 15-inch, reversible, metal	<b>MAX RATE OF CLIMB</b> 4,000 feet per minute
<b>CABIN LENGTH</b> 15.0 feet	<b>TAKEOFF, 50-FOOT OBSTACLE</b> 1,600 feet
<b>MAX CABIN WIDTH</b> 4.6 feet	<b>LANDING, 50-FOOT OBSTACLE</b> 1,840 feet
<b>MAX CABIN HEIGHT</b> 4.9 feet	<b>MAX CRUISE</b> 325+ knots true airspeed
<b>SEATS</b> 6	<b>FUEL FLOW, MAX CRUISE</b> 65 gallons per hour
<b>LENGTH</b> 35.8 feet	<b>FUEL FLOW, LONG RANGE</b> 45 gallons per hour
<b>HEIGHT</b> 12.5 feet	<b>MAX OPERATING ALTITUDE</b> 34,000 feet
<b>WINGSPAN</b> 43 feet	<b>VNE</b> 280 knots indicated airspeed
<b>WING AREA</b> 203 square feet	<b>MMO</b> Mach 0.60
<b>WING LOADING</b> 36.2 pounds per square foot	<b>STALL SPEED, MTOW (CLEAN)</b> 81 knots (estimated)
<b>MAX TAKEOFF WEIGHT</b> 7,500 pounds	<b>STALL SPEED, MTOW (DIRTY)</b> 61 knots (estimated)



and right halves, which are then bonded together. With certified composite production, there is an incredible amount of quality control. Each batch of glue is computer analyzed to ensure a proper cure. Other tests ensure that the carbon fiber, which is stronger than metal, would fail before the glue.

The main and rear spars of the airframe have already been tested to 10.5 G, at which point the testing equipment broke, Schrader said. A structural testing facility is now being built at the former Columbia facility, which Epic purchased. It will also house the service center, training center, sales offices and some subcomponent production.

There are currently 46 Epic LTs flying, and eight more experimental models will be produced before Epic turns completely to its certified production. The last few LT customers hit the jackpot, because they will receive some of the mods that are going into the E1000, and simultaneously, Epic is getting the benefit of being able to improve the production procedures and processes on the last few kitplanes.

Provided all goes as planned with the certification, the customers who bought the experimental version will have made a decent investment. The first few Epics went for around \$1.3 million, Schrader said, and the last price for the kit was \$1.95 million. Used Epic LTs are currently selling for between \$1.6 and \$2 million, depending on the number of hours and overall condition. The E1000 is currently priced at \$2.95 million.

Despite all the clever planning King did before starting down the road of certification, there have been some snags with the FAA. But King is determined to get it done. "We have the expertise, the experience, the resources and the tenacity to outlast the process," King said. The conforming flight-test airplane is expected to fly by the end of the year, and by resisting the temptation to make last-minute modifications to the design, King hopes to deliver the first E1000 next year.

"We have an innovative carbon-fiber airplane that goes super fast, hauls a great big load, is easy to fly, looks great and is comfortable," King said. That is a recipe for success. 🍷