



Colemill Foxstar Baron

A better Baron?

From Nashville with performance

For nearly 40 years the Beech Baron has been a principal ruler of the light-twin realm. With such success, it is a hard airplane to improve upon. However, Colemill Enterprises in Nashville, Tennessee, has spent the past 56 years taking good designs and making them better. Over the years Colemill engineers have tinkered with all sorts of airplanes in an attempt to improve them. Among the success stories are modifications to the Aero Commander 500, Cessna 310, Piper Navajo, and the Beech Bonanza and Baron models. ■ To give you an idea of how much clout these conversions have in the market, you need only look at the value of the converted airplane compared to stock models. In our last report on the

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PHOTOGRAPHY BY MIKE FIZER



Colemill Panther Navajo (see "Born-Again Navajo," November 1999 *Pilot*) the value of a converted airframe was \$149,000 more than that of a stock airplane, according to the aircraft price guide *Vref*. The Colemill Foxstar conversion has similar effects on the value of Beech C55, D55, and E55 Barons, as well as the Model 58. And as the fleet ages, the importance of updating the primary components such as engines, propellers, and instrumentation becomes ever more important if the airplane is to remain marketable.

The heart of the Foxstar conversion is the installation of new or factory-remanufactured 300-horsepower Continental IO-550-C engines. C, D, and E55 Barons and all 58s built prior to the 1984 model year had 285-hp Continental IO-520s installed on each wing. The IO-520 is a good engine, but it was not built under the minimum-horsepower concept like the newer IO-550. Under this rule, the IO-550 must produce at least 300 hp plus 10 percent and minus zero percent. The 520

can be within plus or minus 10 percent of 285 hp. That means that with all of its accessories dragging it down, an IO-550 will deliver the full 300 hp (and probably more) for a net horsepower increase better than the 30 hp total listed on the specifications sheet. Not surprisingly, owners who've made the conversion see cruise speeds of their airplanes increase by 10 knots or so. In addition there are proportional gains in takeoff and climb performance.

Testing of a Foxstar Baron 58



This 1980 Baron 58 underwent the full Foxstar treatment, including new four-blade Q-Tip props and new nacelle inlets (left). Zip-Tip winglets (facing page) add 20 inches to the wingspan, boosting the Baron's single-engine service ceiling to 10,000 feet.

revealed a top true airspeed of 195 kt at a density altitude of 7,800 feet. Power was set at full throttle (22 inches of manifold pressure) and 2,500 rpm. Fuel burn at that power setting worked out to 17.5 gallons per hour for each engine using a best-power mixture. At the same altitude and still at full throttle (23 inches) and 2,300 rpm, the speed settled on 190 kt. The last IO-520-powered 58 that I flew, a high-time charter workhorse, would only muster about 185 kt at similar power settings.

Also available with the 550 conversion is an optional altitude-compensating fuel system that automatically leans the mixture as the airplane climbs. Raytheon has stopped using the system in its new Beech Bonanzas and Barons because many mechanics in the field improperly set up the system, leading to short cylinder/engine life. Doug Colbert at Colemill, however, is a whiz with the IO-550's fuel system and has it set up perfectly before any airplane leaves the shop. Colbert, director of maintenance

and test pilot for Colemill, takes every converted airplane up for its first few hours with the new engines while diligently cross-checking fuel flow with altitude and power settings.

One of the more noticeable exterior changes distinguishing a Foxstar Baron from stock are the Hartzell four-blade Q-Tip propellers. Besides adding a distinctive look, these props are claimed to make the Foxstar Baron quieter inside and out. FAA testing indicated that over-flight noise at full throttle and 2,700 rpm was a low 74.5 dBA. This figure allows a Foxstar to operate out of airports with strict noise regulations, such as those in California and Europe. With a diameter of 74 inches the propellers also increase ground clearance by several inches, which reduces the chance of blade erosion or prop strikes during ground operations. On a test flight, I noted that the props create a higher-pitched noise in the cockpit, but I was unable to determine if it was any quieter than the two-

bladed Baron in which I flew to visit Colemill that day. (Typically, the overall noise level in a Baron or Bonanza is more dependent on the integrity of the main cabin door fit and the quality of the door seal around it.) The vibration level with the four-blade props was noticeably reduced, however.

In theory, the four-blade propellers with their reduced diameter and narrow-chord blades reduce initial acceleration and, therefore, short-field takeoff ability.

If such operation is critical, Colemill offers three-blade propellers as a substitute. Overflight noise with the three-bladers increases to 77.6 dBA, however.

With the four-blade propellers come new nose cowlings that are designed to work with the larger spinners to increase the cooling airflow to the engines. Additional benefits include a better resistance to cracking, which the original fiberglass Baron 58 nose cowlings often suffer. In addition, the cowl-

ings are easier to remove, making them more mechanic-friendly.

Probably the most noticeable changes to a Baron that has undergone the Foxstar treatment are the Zip Tip winglets, which are claimed to increase climb rate, increase the single-engine service ceiling, and reduce yaw in turbulence. In total, the winglets add 20 inches to the Baron's wingspan, so be sure to check your hangar's size before committing to the conversion.

Have it your way

Ways to personalize your new airplane

Most aircraft owners and prospective buyers associate mods with the aftermarket—take a dowdy old airplane and make it look or perform like a new one. But new airplanes...you take them the way they come, right? Not necessarily. The aircraft salesperson may not want you to know it, but you can spec your new airplane any way you want. Sure, the factory's standard offering may be the most economical way to get into a new airplane, but if you're buying the airplane of your dreams, maybe you'd like to go the extra step and have it your way.

Such was the mindset of Van Nuys, California-based Norman S. Schindler, an advertising salesman for AOPA and other publishers. With all of the western states as his territory, Schindler has been flying airplanes for years. He picked up a new turbo Beech Bonanza from the factory in 1968 and, more recently, was flying a 1976 Beech B55 Baron. Two years ago, the new-airplane bug bit, and he quickly settled on a new Baron. When he placed his order, Raytheon was offering the Baron equipped with a Bendix/King stack. Since then, the factory has begun offering Garmin equipment as standard. Schindler, though, wanted his airplane to be different. At the top of his list was the UPS Avionics Technologies stack, particularly the MX20 multifunction display, and the Sandel SN 3308 moving map and electronic HSI. From there the project quickly snowballed as he opted for more and more nonstandard equipment.

Like most manufacturers, Raytheon likes building standard airplanes, so Schindler negotiated the price *sans* the

standard Bendix/King package, except for the new and highly capable KFC 225 autopilot, the KN 63 DME, and indicators. Most Barons leave the factory with the panel full; Schindler shoved off staring at a lot of blank metal with only a transponder and one navcom to get him to the avionics shop at Raytheon Aircraft Services on Houston's William P. Hobby Airport.

There, Avionics Manager Dennis Kronenberger set about building Schindler's dream machine. Five weeks later, the project was complete. As you can see, the finished product includes the entire UPSAT stack and the Sandel HSI. Behind the panel, the BFGoodrich

WX-500 Stormscope data shows up on both the MX20 MFD and the Sandel moving map. Engine data from the twin Continentals, including percent of horsepower, is displayed on the JP Instruments EDM 760 engine monitoring system. A Shadin fuel/air data system interfaces with the UPSAT GX50 IFR GPS to compute fuel burns and true airspeed.

To pass the time while the KFC 225 expertly flies the airplane, Schindler can listen to his favorite music on an Avionics Innovations CD player. With a six-disk changer in the aft baggage compartment, the tunes don't run out before the fuel does. A pair of Rosen



Because of the added lift from the Zip Tips, the Baron can make slower approaches. One enterprising Foxstar owner, whose airplane is featured on these pages, had his airplane approved for Category II approaches, which allow an airplane to shoot ILS approaches down to 100 feet. Since the winglets lower the approach speed by several knots, the Foxstar Baron slips into the Category A approach classification, which requires an approach speed of 90

kt or less; Barons typically fall into Category B for instrument approaches where the approach speed is 91 to 120 knots. Colemill doesn't publish revised stall speeds after the conversion, but on our test flight, even when using a slightly slower approach speed, the Foxstar Baron wanted to float down the runway more than a stock airplane. The winglets are also a boon to those operating in mountainous areas since the Foxstar's single-engine service ceiling

is 10,000 feet, which is about 2,500 feet higher than that of a standard IO-550-powered Baron.

Owners of older Barons with 136-gallon fuel cells may want to take advantage of Colemill's optional auxiliary fuel tanks because the total fuel burn of the airplane will increase by at least two gallons per hour in typical operation. Fifteen-gallon fiberglass wing tanks are installed in the leading edge of each wing, in the same spot where Beech



sunshades further enhances the cockpit. Outside, a set of Precise Flight Pulse Lights alternately flashes the airplane's recognition lights to make the Baron more visible to other aircraft.

As Schindler's project shows, new needn't mean cookie-cutter. With a little negotiating, you too can customize your dream airplane.

—Thomas B. Haines

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



Colemill Foxstar Baron Conversion price: \$102,900

Specifications		Single-engine ROC, sea level	
Powerplants	2 Continental IO-550-C	Cruise speed/endurance w/45-min rsv, opt. fuel	390 fpm
Recommended TBO	1,700 hr	(fuel consumption, ea engine)	
Propellers	Hartzell four-blade, constant-speed, full-feathering, 74-in dia	@ 78% power, best power	202 kt/4.1 hr
Length	29 ft 10 in	6,000 ft	(102 pph/17 gph)
Height	9 ft 10 in	@ 65% power, best power	192 kt/4.9 hr
Wingspan	39 ft 6 in	8,000 ft	(87 pph/14.5 gph)
Wing area	207.2 sq ft	@ 55% power, best economy (lean of peak)	
Wing loading	26.1 lb/sq ft	8,000 ft	185 kt/6.1 hr
Power loading	9.16 lb/hp		(72 pph/12 gph)
Seats	6	Service ceiling	24,000 ft
Cabin length	12 ft 7 in	Single-engine service ceiling	10,000 ft
Cabin width	3 ft 6 in	Landing distance over 50-ft obstacle	1,950 ft
Cabin height	4 ft 2 in	Landing distance, ground roll	1,500 ft
Empty weight	3,600 lb	Limiting and Recommended Airspeeds	
Empty weight, as tested	3,784 lb	V_{MC} (min control w/critical engine inoperative)	87 KIAS
Maximum ramp weight	5,427 lb	V_X (best angle of climb)	92 KIAS
Maximum takeoff weight	5,400 lb	V_Y (best rate of climb)	105 KIAS
Useful load	1,800 lb	V_{XSE} (best single-engine angle of climb)	100 KIAS
Useful load, as tested	1,616 lb	V_{YSE} (best single-engine rate of climb)	101 KIAS
Payload w/full fuel	804 lb	V_A (design maneuvering)	150 KIAS
Payload w/full fuel, as tested	620 lb	V_{FE} (max flap extended)	152 KIAS
Maximum landing weight	5,400 lb	V_{LE} (max gear extended)	152 KIAS
Fuel capacity, std	142 gal (136 gal usable)	V_{LO} (max gear operating)	152 KIAS
	852 lb (816 lb usable)	V_{NO} (max structural cruising)	195 KIAS
Fuel capacity, w/opt tanks	172 gal (166 gal usable)	V_{NE} (never exceed)	223 KIAS
	1,032 lb (996 lb usable)	V_R (rotation)	80 KIAS
Oil capacity, ea engine	12 qt	V_{SI} (stall, clean)	84 KIAS
Baggage capacity	(nose) 300 lb, 18 cu ft	V_{SO} (stall, in landing configuration)	73 KIAS
	(aft) 120 lb, 10 cu ft		
Performance		For more information, contact Colemill Enterprises, Post Office Box 60627, Cornelia Fort Airpark, Nashville, Tennessee 37206; telephone 615/226-4256; or visit the Web site (www.colemill.com).	
Takeoff distance, ground roll	1,400 ft	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.	
Takeoff distance over 50-ft obstacle	2,300 ft		
Accelerate-stop distance	3,000 ft		
Accelerate-go distance	3,200 ft		
Maximum demonstrated crosswind component	22 kt		
Rate of climb, sea level	1,735 fpm		

installs its standard 166-gallon fuel cells. Unlike the Beech system, however, the Colemill tanks use pumps to transfer fuel into the airplane's main tanks. In total, the aux tanks will add about an hour of endurance to the Baron and \$19,500 to the conversion bill.

If you forego the extra fuel tanks you'll better appreciate the accuracy provided by the installation of a Shadin Digiflo-L fuel computer/totalizer, which is included in the Foxstar treatment. The Shadin provides a digital readout of fuel flow for each engine while interfac-

ing with a GPS or loran to compute endurance, reserve fuel at the destination, and other useful calculations. For Barons built prior to the panel redesign in 1984, the Shadin replaces the airplane's existing analog fuel-flow gauge.

Finally, Colemill takes care of the often-overlooked items of an overhaul. Vacuum pumps, starters, alternators, Lord mounts, and fuel and oil hoses are all included as part of the conversion. Colemill also will throw in a pair of Woodward prop governors and a synchrophasing system. Colemill says

that the Woodward prop governors are more dependable and easier to work on than those from Hartzell.

Plan on 15 working days of downtime for the conversion. Although it seems that anything involving major maintenance on light airplanes takes twice as long as predicted, Colemill has established a good reputation for turning around airplanes on time and as promised. For charter operators, this is especially important, as downtime is money lost.

The Foxstar conversion isn't cheap. With factory-new engines and four-blade props, you'll spend \$102,900 for the conversion. Because of Continental's restructuring of engine pricing, ordering factory-remanufactured engines only saves you \$6,000. Opting for the three-blade props and factory remans lowers the price to \$88,900.

While this pricing may seem staggering, the potential buyer need not worry about getting that money back if he were to sell the airplane. According to *Vref*, the Foxstar conversion returns the full amount of the conversion to the value of the airplane (adjusted for engine time, of course).

Owners of older IO-520-powered Barons who look forward to the performance increase that the IO-550s can provide should take a serious look at the Foxstar conversion. It may make sense economically to perform the job if your airplane is currently equipped with obsolete engines and propellers whose cores are nearly worthless by today's standards. For example, if your IO-520s have light crankcases and airmelt crankshafts, both of which are subject to onerous airworthiness directives, it does not add to the cost of the conversion. A field overhaul on such an airplane would be cost prohibitive and you'd still be left with the IO-520s. In addition, if you have old two-blade propellers that may be condemned at overhaul time, Colemill will trade them for three- or four-bladers as part of the deal. Finally, items like the Shadin fuel flow computer and all-new accessories and hoses are bonuses that could make the Foxstar conversion an economical choice for keeping your Baron competitive in the red-hot light-twin market. □

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i Links to additional information about Colemill conversions and the Beech Baron may be found on AOPA Online (www.aopa.org/pilot/links.shtml). Peter A. Bedell, AOPA 1136339, is a first officer with a regional airline and former technical editor of AOPA Pilot.