

POWER HOUSE



Colemill has
built its house
on the belief
that bigger engines
are better.

BY MARK R. TWOMBLY

Colemill Enterprises, Incorporated, has been in the business of altering the personalities of airplanes since 1965, when owner Bill Colbert began replacing 260-horsepower Continental IO-470s on Aero Commander 500As with new Continental IO-520-Es. That engine was the first version of the 520 to be rated at 300 horsepower for takeoff, and Colbert was the first to put it to use. The Super Commander 300 defined all Colemill conversion projects that have followed: Boost the performance by replacing the original powerplants with higher horsepower, off-the-shelf, factory-new engines.

Colemill (a compilation of the names Colbert and Miller; Colbert subsequently bought out his partner) has been a fixture at Cornelia Fort Airpark just north of downtown Nashville, Tennessee, since 1944. In 1950 Colbert bought the nearly 300-acre airport, named for a Nashville resident who was the first woman killed in military service in World War II in a ferrying accident. Colemill began as a fixed-base operation, which it still is, and did not begin to specialize in engine conversions until a friend asked Colbert to swap the GO-435 engines in his Aero Commander 520 for GO-480s from a Commander 560. That favor started Colbert thinking, and the Super Commander 300 conversion was born.

Colemill subsequently received sup-

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plemental type certificates (STCs) to install IO-520-E engines on Cessna 310s (F through Q models) and 320s (through the C model) and 55A- and B-model Beech Barons. The 310 conversion is called the Executive 600; the Baron, the President 600.

Colemill's next target of opportunity was the Piper Navajo. In 1979 the company received an STC to replace the Navajo's 310-hp Lycomings with 350-hp TIO-540-J-series engines, which are standard on the longer and heavier Navajo Chieftain.

When Continental introduced the IO-550, Colemill switched to it from the IO-520. The 550 is rated at 300 hp maximum continuous power, 15 more horsepower than the 520. Colemill's first use of the IO-550 was the Foxstar, a modification of the Baron 58 and 55C, D, and E models. Next came the Starfire, an IO-550-powered Bonanza. Candidates for the Starfire conversion are the A36; C, E, and F33A; S and V35; and V35A and B.

WILL ENTERPRISE CONSTRUCTION PASSENGER RIDES AIRPORT

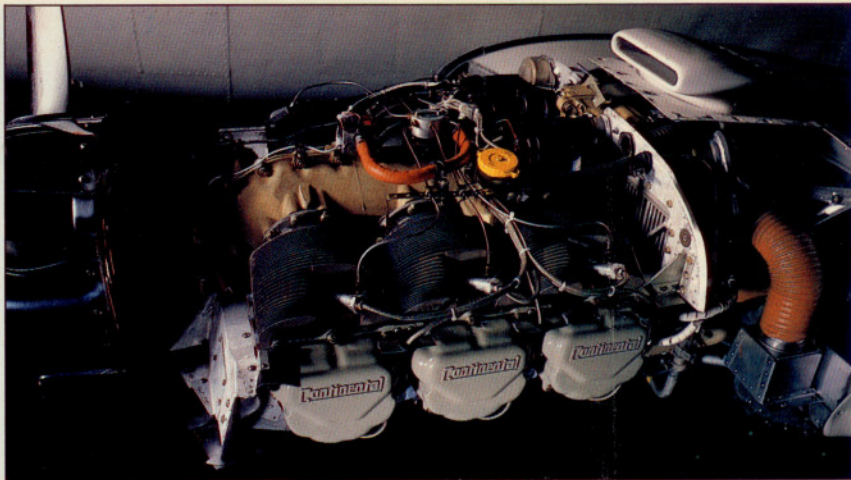


Owner Bill Colbert is celebrating Colemill's 45 years of continuous operation at Cornelia Fort Airpark near Nashville, Tennessee.

The latest Colemill product is the Bearcat, a Cessna 310R fitted with a pair of IO-550s.

The Panther, Foxstar, and A36 Starfire can be operated at full power. Other conversions have manifold pressure restrictions that limit power to the same as the original engines. The limitation has little practical consequence because the extra power from the bigger engine is available when it is needed most—taking off in high density altitude conditions, climbing to higher cruising altitudes, and, for the twins, single-engine operations.

The Panther conversion costs \$114,500. Winglets are a \$3,000 option. The Foxstar is \$65,000, while the President, Executive, and Bearcat conversions are \$4,500 each. The Starfire is \$32,900. Customers have the option of ordering factory-rebuilt engines for any of the conversions except the Panther. The savings range from \$4,400 on the Starfire and \$10,000 on the Foxstar to



\$12,000 on the President, Executive, and Bearcat.

With each new conversion Colemill has refined the formula. The goal is not simply a horsepower boost, but an all-over enhancement: Lower the noise level, dampen vibration, tweak the handling, and attend to the aesthetics. The airplane that comes out of Colemill's shop is very different from the one that went in. The Panther Navajo in the photographs that accompany this story is a good example. Stock, a Navajo is handsome. Add winglets, four-blade propellers, bold black and gold striping, and 80 more horses grazing under the nacelles, and it becomes aggressive.

This particular Navajo had been converted to a Panther a few years ago and flown to TBO. Colemill bought it back, then resold it to a pilot who had been flying a Piper Saratoga. While the new owner was attending FlightSafety International's Piper Learning Center in Lakeland, Florida, enroute to a multi-

engine rating, Colemill installed new engines, brakes, and a Northstar loran. The rest of the Panther mods already were on the airplane.

It then was ferried to Alabama for new paint and interior selected by the owner and his wife. The final touch was a personalized N number. The owner returned to Nashville for the checkride and the keys. From plain-vanilla Saratoga to customized cabin-class twin that will turn heads wherever it goes; it must have been a proud moment for this new multiengine pilot and his wife when they settled into the cockpit.

Colemill hitches extra propeller blades to the additional horses in all of its conversions except the Bearcat: three-blade props for the Executive and President and four-blade Q-tips for the Panther, Foxstar, and Starfire. The size and shape of individual blades are a product of Colbert's own noodling—with technical confirmation from the propeller manufacturer—and trial-and-error test-

ing. Eleven different blade designs were tested on the Panther until Colbert settled on one.

One characteristic common to almost all propellers on Colemill conversions is that they have a smaller diameter than the ones they replace. Shorter blades, which have lower tip speeds, are quieter. More of them reduces vibration, with no loss of efficiency, according to Colemill. New Woodward propeller governors are included in most of the conversions.

The original Panther conversion included wing tip extensions. Colemill has since received STCs to install winglets on the Panther, Foxstar, and Starfire. Each wing tip and winglet add about six inches of span. Colemill claims that the extra wing area improves climb and cruise performance and low-speed stability. Each Panther wing tip houses an enclosed landing light. Navajo pilots must lower the nose gear to turn on the landing light for conspicuity. Panther pi-

lots need not. Winglets are standard on the Foxstar and optional on the Starfire and Panther.

Colemill does not use a counterrotating right engine when converting a Navajo CR to a Panther. The benefit of parts commonality using identical clockwise-turning engines and propellers on both sides outweighs the advantages of counterrotation, the company believes.

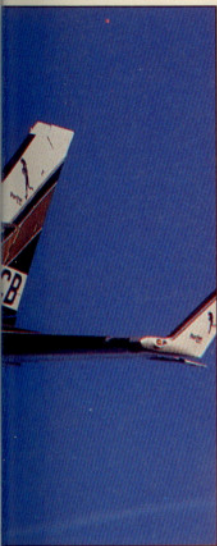
Expert spotters will notice that the Panther does not retain the Navajo's extended propeller shaft and sculpted nosebowl. Propellers are five inches further aft on a Panther to compensate for the greater weight of the 350-hp engine and propeller combination, and the spinners are considerably larger than stock. The only changes to the cowling itself are new fiberglass nosebowls and belly pans. Cockpit changes include a Shadin fuel computer, which displays fuel flow in tenths of a gallon for very precise fuel management. Heavy-duty Cleveland brakes are included in the conversion.

The Panther conversion also is available for the Chieftain. The difference, of course, is that 350 hp a side is standard on the Chieftain, so the Colemill treatment does not result in any net horsepower gain.

Colemill's power trip boosts all-around performance, but its greatest benefit is increasing the safety margins on piston twins. More power is available for takeoff and climb in high density altitude conditions, and single-engine performance is much improved. Following a photo session with N350CB, we set the airplane up for a simulated total power loss on the right side. At 4,500 feet msl, with full power on the left engine, the VSI registered a 1,000-fpm climb at the blue-line speed of 108 knots. This was a lightly loaded Panther with just the two of us aboard and a little more than half fuel, but the numbers are impressive nonetheless.

High noise levels are annoying and fatiguing, yet pilots grudgingly accept cacophonous cabins. Passengers aren't so accommodating. People haulers like the Navajo stand to gain the most from efforts to reduce noise, and Colemill's short props do make a difference. Cruising at 32 inches of manifold pressure, 2,200 rpm, and 19.5 gph a side, which is about 65-percent power, we were able to chat without raising our voices and clearly understand radio communications channeled through the cockpit speaker. Reducing to 2,100 rpm lowered





Colemills Panther mods boost the Navajo's all-around performance, and look good doing it.



engine and propeller noise to a background hum.

Cruising at 6,500 feet, indicated airspeeds rose 10 knots with each 10-percent increase in power. At 2,100 rpm and 30 inches, the Panther indicated 165 knots with a total fuel burn of about 32 gph. Bumping the power up to 65 percent increased indicated airspeed to 175 knots. At 2,400 rpm, 33 inches, and 24 gph per side, the airspeed needle climbed to 180 knots, top of the green.

Colemills claims the Panther mods increase a Navajo's cruise speed up to 35 knots and lop 15 percent off takeoff distances. The landing roll is shorter as well because Colemill installs heavy-duty brakes with an extra pad on each main wheel. The company promises a sea-level single-engine climb of at least 400 fpm at gross weight. Faster climb rates, higher single-engine service ceilings, and faster cruise speeds are the practical benefits of each Colemill mod, according to the company.

Colbert recently bought a batch of retired military Cessna L-19 observation airplanes and sold all but one, which he kept for himself. He has installed a 300-hp IO-550 in it and is working with Continental on an STC to convert stock 212-hp L-19s to IO-470 power. Continental would certify the conversion, and Colbert would supply the kit. Their intent is to sell the conversion to foreign militaries still operating L-19s. If they succeed, it would be the only conversion that Colemill sells as a kit. By insisting that all other modifications are performed in the shops at Cornelia Fort Airpark, Colemill controls the consistency and quality of the conversions.

Colbert has to think for a moment when asked how many airplanes his company has converted; 500 to 700 is his best guess. And the market still appears to be strong. Ralph Peeler, Colemill's sales manager, said we were lucky to time our visit just as N350CB was being finished because he had sold everything else in inventory.

What's next for the Nashville modifier? Colemill has been talking to Continental about turbocharging the IO-550. Continental would certify the engine, Colemill would find a home for it. That is in keeping with Colemill's conservatism toward performance enhancements: Use only factory-certified engines. No aftermarket engine mods, no structural changes, no surprises, except for the pleasant ones associated with a heap of new-found horsepower. □