Enstrom's refined turbine single gets a power boost, makes converts of the fixed-wing set

BY MARK HUBER

HGH ECONOMY

uring the 1940s, a lumberman in Crystal Falls, Michigan, named Rudy Enstrom had an idea for a piston helicopter. Fifty years later the genesis of this backvard dreamer has matured into an easy-to-fly, rugged, and reliable singleengine turbine, the Enstrom 480B. But, as in the lyrics of The Grateful Dead, "What a long, strange trip it's been." forests of Michigan's rough and raffish Upper Peninsula hardly seemed the ideal incubator for aerospace innovation. This is the kind of place it is: Crystal Falls replaced Iron River as the county seat when, in the late 1800s, the city fathers challenged their Iron River rivals to a poker game. Meanwhile, their minions stole the courthouse records.

PHOTOGRAPHY BY MIKE FIZER



where Enstrom, who had no formal aerospace engineering education, persevered and obtained the backing of several local businessmen. Stock in the little company was sold at county fairs. and eventually there would be more than 10,000 shareholders. The company moved to Menominee in the eastern Upper Peninsula in 1959. Eventually some real engineers got involved, and Enstrom's first production helicopter, the F-28, gained certification in 1965. The Purex Corporation bought Enstrom in 1968 and began serial production of an upgraded model, the F-28A. Purex's tenure was brief and, in 1971, the company was sold to a group led by the noted trial attorney and aviator F. Lee Bailey.

Bailey recruited some of the best and brightest minds in aviation and lured them to little Menominee. One of them was Alfred Checchi, then only 23 years old, a wunderkind who would eventually take over Northwest Airlines. Bailey introduced several new piston models and production zoomed to 100 The majority of the 480s are flown by core customers, the owner-operators who use them for personal flights.

units a year. But while Bell and Hughes (now MD Helicopters) were growing fat cranking out 800 single-engine turbines a year between them during the go-go 1970s, Enstrom opted to develop a four-place piston single. The project ate cash at an alarming rate and was eventually shelved, but not before Enstrom was in trouble.

By 1980, Bailey was gone, and since 1987 Bob Tuttle has led Enstrom. Tuttle, a former aerospace engineer with an MBA, is candid, cautious, and has no illusions about Enstrom's position in the marketplace. It exists largely to build helicopters at reasonable prices for "affluent individuals with fixed-wing experience." Enstrom continues to build five to 10 F–28F and 280FX piston helicopters per year, which sell for anywhere from \$268,000 to \$280,000 each. But in 1988 the company, unsuccessfully chasing a U.S. Army training helicopter contract, bet the farm on turbine power.

The Enstrom TH-28 lost the Army's 1992 fly-off, but from that defeat came the seed of the five-seat Model 480. Since it was certified in 1994, the 480 has sold 45 copies. Today, 480s fly everywhere from China to Siberia to South Africa on missions varying from law enforcement to power-line patrol. However, the majority are flown by core customers, the owner-operators who use them for personal transportation. A follow-on model, the 480B, should be certified by the time you read this. Prices for the 480 range from \$580,000 to \$640,000 depending upon options and avionics. That rings in at approximately





The panel is straightforward and there's plenty of room for moving maps, GPS/coms, and police radios. Dual controls are a \$9,000 option.

\$230,000 less than a Bell 206B and \$20,000 less than a Schweizer 333 with comparable equipment. (The 480B features boosted takeoff and continuous power; minor gearbox, rotor, and control system improvements; and an extra 150 pounds of maximum gross weight—for 3,000 pounds total—allowing for either an extra passenger or an extra hour of endurance.)

The 480 incorporates many of the popular design and performance features of its piston-powered predecessors, specifically the high-inertia rotor system; an absence of hydraulics; good stability, thanks in part to healthy vertical boom fins; and an unblocked tail rotor that maintains full authority even in the weirdest winds and emits an unobtrusive noise signature similar to that of the MD Notar (no tail rotor) helicopters. The beefy 32-foot, three-blade main rotor system weighs more than 300 pounds and is driven by an upgraded, pressurized gearbox.

"The rotor system is indestructible," according to Carl Hagglund of General Aviation Services, in Pendleton, Oregon. Hagglund has 23 years of experience working on piston Enstroms and has flown the 480. According to Hagglund, wire cutters on Enstroms are redundant because the cyclic controls are inside the mast. (Most helicopters have the cyclic control rods exposed and outside the mast, and these can become entangled with tree limbs and power lines. The comfort inside the 480 rivals that of some automobiles. If you are a big person, this is your bird.



Wire cutters ameliorate some, but not all, of this risk.) According to Hagglund, "You can put power lines against the mast with no damage to the blades. You can fly it into the ground and walk away." Housing the controls inside the

mast also reduces drag. The blades themselves have no life limits. The particle separator for the 420-shafthorsepower (derated to 279 shp continuous) Rolls-Royce 250-C20W handles light snow with dispatch. The last thing a helicopter pilot wants in MVFR is the privilege of relighting at low altitude. (The 480 is not IFR-certified.) The derated Rolls also allows the 480 to function well when high, hot, and heavy.

There are several things you won't find on the 480. These fall into the category of "things likely to break, followed by rapid autorotation." They include boost pumps, a reduction gearbox, and hydraulics. The absence of hydraulics is compensated for by a trim system that absorbs main rotor feedback. On the 480B a new dampener fur-





ther reduces feedback from the cyclic.

Mike Keenum is an Illinois businessman with more than 4,000 hours of fixed-wing time in everything from an F–86 to a Beech Starship. He has logged 230 hours in his 480. He says the lack of hydraulics necessitates "a little more force" on the control inputs when making speed changes compared to a Bell JetRanger or a Eurocopter AStar, but it is a minor inconvenience compared to "painful" maintenance bills that often accompany a helicopter with hydraulics. It is also offset by the reduced likelihood of unwanted autorotations. Keenum praises the 480's autorotation manners, especially contrasted to those of the Hughes 500 he previously owned.

In the 500, "look between your feet because that's where you are going to, be—and very quickly. The Enstrom autorotates pretty easily. It's a pretty painless operation for a helicopter. I was looking for simplicity and reliability. I use it like a car."



The comfort inside the 480 rivals that of some automobiles. The leather-covered crew seats are much more comfortable than the metal "buckets" on an AStar, and the front cockpit is actually roomier than that of the Eurocopter model. If you are a big person, this is your bird. However, Enstrom's claim that this is a five-seater is somewhat exaggerated, unless body number five is small and canine. The 480 lacks the AStar's big backseat; however, with four souls aboard, the cabin is amply capacious. Interior noise levels are low for a helicopter, and visibility is spectacular for all occupants. The baggage hold in the tail cone accommodates loads up to 150 pounds. The wide cabin doors facilitate graceful egress. While the high skids allow all manner of FLIRs, NightSuns, loudspeakers, and other law enforcement paraphernalia to be slung below the belly, the drop from door to ground is mitigated by a large intermediate step.

The quick-change interior can be reconfigured to any one of four basic layouts in a matter of minutes, and its flexibility serves just about any mission appropriate for a helicopter in this category. The pilot in command (PIC) generally flies from the left seat. Dual controls install/uninstall quickly and are a \$9,000 option. With dual controls installed, the 480 is effectively a threeperson helicopter because of increased clearance required around the crew seats. With the PIC on the left, the

2001 Enstrom Model 480B \$580,000 to \$640,000

Maximum gross weight	3,000 lb
V _{NE}	165 kt
Maximum cruise speed (T/	AS @ 3,000 ft) 150 kt
Service ceiling	13,000 ft
Maximum rate of climb	1,375 fpm
Hover ceilings	
In ground effect	11,000 ft
Out of ground effect	4,500 ft
Range and endurance (no	reserve)
Range (at 3,000 feet)	463.5 sm
Endurance	4.4 hr
Fuel capacity	90 gal
Powerplant	Rolls-Royce 250-C20W
Available power	420 shp
Maximum power	305 shp
Normal (continuous)	277 shp

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.

For more information, contact Enstrom Helicopters, 2209 22nd Street, Post Office Box 490, Menominee, Michigan 49858; telephone 906/863-1200; fax 906/863-6821; e-mail enstrom@ cybrzn.com; or visit the Web site (www. enstromhelicopter.com). instrument stack is slightly biased in this direction, although it can be easily moved slightly to the right of center for traditionalists who prefer to fly from the right seat.

The straightforward panel itself has plenty of room for moving maps, GPS/ coms, and police radios. The prominent red warning lights are clearly visible at the top: fire, engine out, and rotor rpm.

From a fixed-wing pilot's perspective, the 480 is the ultimate oxymoron: a turbine helicopter that is easy to maintain, easy to fly, and has direct operating costs of less than \$200 an hour. For Kendall Early, that was important. Early, a retiree and a lapsed Cessna 182RG pilot, took delivery of his 480 last July after just 60 hours of helicopter time. From his base at Sheridan, Wyoming, he has taken it on trips to Indianapolis, San Francisco, and Reno, Nevada, at altitudes up to 11,800 feet. "It's a euphoric experience," says Early. "Before I got too ancient, I had to have some of this."

Links to additional information on rotorcraft may be found on AOPA Online (www.aopa.org/pilot/links.shtml). Mark Huber is an occasional contributor to Pilot. He works and flies in Michigan's Upper Peninsula.