MOONEY ENCORE

Back to the future

Seldom do the words *classic* and *mechanically sound* go hand in hand. You can gush over a classic old roadster all you want, but give me a BMW Z3 instead, thank you very much. The Z3 gives you the look and feel of the roadster, but under the hood you won't find a carburetor and wheezy vacuum system to power the windshield wipers. The top doesn't leak and you can bet the radio isn't just AM and plays more than the Beach Boys.

Occasionally, though, what was good then is also good now, particularly when "then" was just a decade ago.

And so it is with the Encore, Mooney Aircraft's late 1990s revisit of the mid-1980s 252. If eking blistering speed out of a 210-horsepower engine and making life simple for the pilot are the criteria, most any Mooney buff will agree that the 252 was the airplane to beat. No model encapsulates the Mooney mantra of high performance, high economy better than the 252.

The Mooney Encore builds on the 252's strong points

BY THOMAS B. HAINES

252 production gave way to the more powerful TLS with its longer cabin in 1989. The 270-hp, turbocharged TLS provides the speed you'd expect from a Mooney, but at the price of greater fuel burn—high performance, lower economy. Last year, the introduction of a new engine cooling system caused Mooney to change the TLS name to Bravo. The Lycoming TIO-540 on the Bravo now uses oil delivered under pressure to the exterior of the exhaust valve guides to better wick away heat. And while the TLS/Bravo has carved out its own market niche as the

PHOTOGRAPHY BY MIKE FIZER

fastest production piston single, Mooney aficionados still yearned for a model like the 252 that strayed off the normal performance/economy charts.

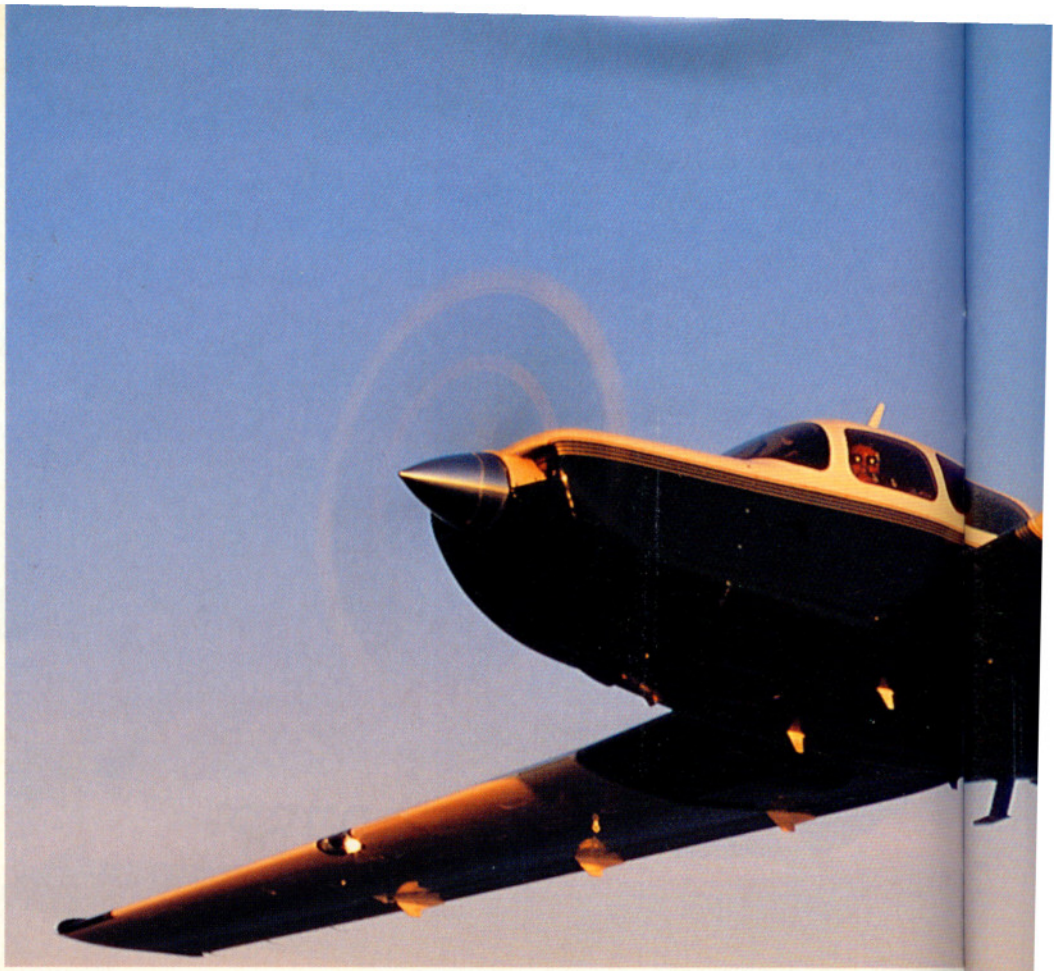
As it turns out, a modern-day 252 is the answer, according to Mooney. First announced last fall, the new Encore takes all that was good about the 252 and adds a decade's worth of panel and interior refinement along with a little engine tweak that boosts horsepower by 10, to 220 hp. Those extra horses don't really affect the cruise performance, however. Instead, the additional power is needed to lift the 230-pound maximum gross weight increase that comes with the Encore, a greatly needed improvement over the 252.

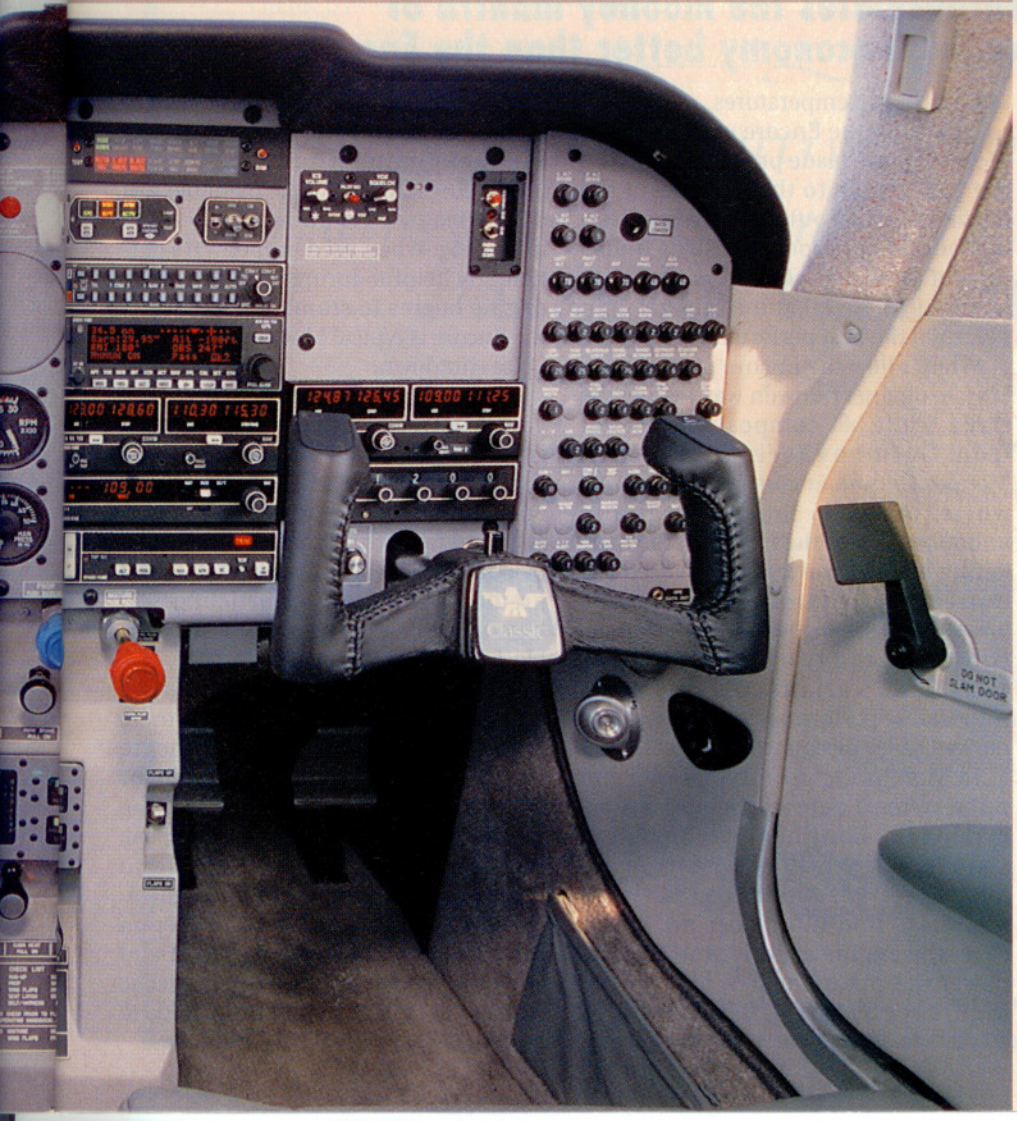
A typically equipped 252 went out the door in the late 1980s with a full-fuel payload of only about 390 pounds. Under the same circumstances, a typical Encore's payload will be about 505 pounds, enough for two adults and lots of baggage. What the extra payload brings is plenty of versatility. With 75 gallons of useable fuel, the Encore's range with VFR reserves stretches to 985 nautical miles, or about 5.2 hours at maximum cruise power setting and Flight Level 210; at reduced power settings endurance stretches to more than 6 hours. Max cruise of 75-percent power results in about 198 knots on 13.7 gallons per hour, again typical of what you might expect from a 252. Fill the seats instead of the tanks and your Encore can still cruise for 3.2 hours, or about 590 nm in still air. Four in a 252 would cut the trip to just 1.5 hours with VFR reserves.

The increase in max gross weight required Mooney to run nearly a complete recertification program on the 252, according Thomas A. Bowen, Mooney's director of engineering. To handle the extra loads, the Encore uses the beefier landing gear found on the longer and heavier Ovation and Bravo. The 252 used the same landing gear as Mooney's other short-body product, the 200-hp MSE (soon to be renamed the Allegro).

Inner space

From the outside, you'll have trouble telling a well-kept 252 from an Encore. Inside, however, 10 years of refinement in the Mooney product line becomes evident, particularly in flight. A new acoustic firewall pad drastically reduces engine noise in the cabin. Better seat materials mean a more comfortable ride. Throughout, the cabin has been refined to include better ventilation and night lighting. As with the other





Mooney products, lighting switches have been moved to the overhead. More and better annunciators keep the pilot informed. And, of course, GPS—which surely every Encore will carry—wasn't even an option a decade ago.

In an effort to boost production efficiencies, Mooney last year revised its option list into three categories: Standard, Classic Group, and Classic/Plus Group. The standard Encore comes equipped for basic IFR at a price of $329,950. The Classic Group adds a two-axis autopilot, IFR GPS, intercom, and slaved horizontal situation indicator for another $39,950. The Classic/Plus Group also adds a flight director, altitude and vertical speed preselect, and a BFGoodrich WX-950 Stormscope for $56,950 over the standard price. N697SP, shown here, is decked out with the Classic Group along with the optional WX-950 and a second glideslope indicator. Also optional on this airplane are the polished spinner and leather interior. N697SP lists for $387,100.

Since the 252 days, Mooney has shortened the options list considerably by making many of the previous options

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standard. Today's airplane comes standard with a standby vacuum pump and alternator, speed brakes, oxygen system, windshield defroster fan, altitude encoder, recognition lights, aux power plug, access step, vertically adjustable front seats, and a host of other features. Among those items, only the standby vacuum pump was standard when *AOPA Pilot* flew a 1988 model 252 in late 1987. Base price on that airplane was $135,900. With IFR equipment of the day and some of the above optional items, it retailed for $210,860. As Tom Horne, now our editor-at-large, wrote back then, a full-up 1988 airplane could tip the scales at close to $300,000, making the 1997 price a bit more palatable.

The first few Encores delivered through mid-summer carry the same max gross weight and horsepower as the 252. Once Mooney completes all of its recertification tests and FAA paperwork, those airplanes will get the sign-off to fly at the higher gross weight and

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an engine tweak to up the horsepower to 220. Mooney expects the recertification to be complete by early August.

Propeller tales

A Continental TSIO-360-SB engine powers the Encore, a slight change from the 252, which used the TSIO-360-MB. Inside, the two are pretty much the same. The new variant includes a pad for that now-standard second alternator. The extra 10 hp comes from an additional 3 inches of manifold pressure squeezed out of the -SB, which puts out 39 inches.

To deliver all of that performance, the engine uses a Garrett turbocharger and an intercooler, which reduces the temperature of the compressed air entering the engine. The TSIO-360 also uses a tuned induction system, which allows more aggressive engine leaning, improving fuel specifics. To the pilot that means more even temperatures among the cylinders, with the promise of longer engine life and reduced fuel consumption. A tuned induction system provides air to the cylinders through tubes of a variety of lengths and diameters, the goal being to deliver the same volume of air at the same velocity to each cylinder, thus evening out power production among the cylinders and providing more uniform temperatures.

Out front, the Encore uses the same McCauley two-blade propeller found on the 252—much to the surprise of the engineering staff. After 3 months of testing four other propeller designs from a total of three manufacturers, the engineers concluded that the original prop delivered the best performance.

When I flew the Encore prototype in March, engineer Bowen was testing the three-blade MT composite propeller from Germany (see "Waypoints: Mooney Gets an Encore," May *Pilot*). All white, the prop looked great and undoubtedly had the nod from the marketing staff. However, it delivered the worst cruise performance and had the lowest TBO and highest price. A Hartzell two-blade and two other McCauley two-blade variants all turned in respectable performance, but the original McCauley design won the heat.

In March, the prototype's fuel and turbo systems were still being tweaked, making the Continental reluctant to start. In June, however, we flew a production version that shows what a few months of fine-tuning can do. In this case, the engine eagerly started once power was put to the new lightweight, high-speed starter. The Encore is unusual in that it has a primer switch, located above the throttle and next to the fuel pump switch. The primer injects fuel into the intake manifold just downstream of the throttle body to aid in starting. When used properly, it's particularly helpful during hot starts if the engine begins to stumble. That aside, the Encore is typical Mooney from start-up to shutdown.

Except for the addition of an S-Tec yaw damper/rudder trim system—greatly appreciated in those long climbs to the flight levels, the Encore's flight control system is pretty much unchanged from the 252. Ailerons driven by push rods deliver instantaneous and predictable response. Particularly in high-speed flight, the controls feel stable, but not overly heavy.

Unlike some earlier turbocharged airplanes, where the turbo seemed to be added as an afterthought, the Encore flies as if it were built from scratch for flight-level excursions. For pilots flying turbo airplanes, three issues are critical: power management, workload, and physiology. The Encore address all three.

The absolute pressure controller on the turbo system eases workload and simplifies power management because it allows the pilot to shove the throttle to

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the stop for takeoff and, if desired, not touch it again until leveling for cruise. The controller steadfastly maintains the selected manifold pressure.

Throughout the flight, the built-in oxygen system conveniently delivers the gas to each occupant. The 115-cubic-foot Kevlar oxygen tank in the tailcone provides enough capacity that four can travel all day without a fill-up. A lone pilot can fly multiple cross-countries on one tank.

The automatic turbo system also eases workload in cruise by keeping manifold pressure from wandering. While cruising, set power to 75 percent and lean to peak turbine inlet temperature or 1,650 degrees Fahrenheit, whichever comes first, and let the Encore efficiently carry you to your destination. The Shadin fuel flow computer precisely displays the fuel burn and continuously calculates the remaining fuel and, when connected to the GPS, fuel to the next waypoint and final destination. Other systems, such as the standby vacuum pump, second alternator, and plethora of annunciators, provide peace of mind.

On the way back down, the speed brakes permit rapid descents without building up excess speed or requiring large reductions in power.

The Encore truly makes flight in the upper teens and lower 20s practical and efficient. The only system lacking is deice/anti-ice. The Ovation and Bravo have optional TKS fluid deicing/anti-icing systems approved for flight into known icing conditions. Mooney says that the Encore will get the same approval sometime in 1998. Existing models will be retrofittable. Expect the option to cost about $40,000 and to wick nearly 100 pounds away from the useful load when it's full of fluid.

TKS or not, the Encore packages sophisticated yet proven engine technology into an efficient airframe to deliver performance not available from any other manufacturer. Even more than a decade after it debuted as the 252, it's tough to top a classic like the Encore. □

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Mooney M20K Encore
Base price: $329,950
Price as tested: $387,100

Specifications

Powerplant	Continental TSIO-360-SB 220 hp @ 2,600 rpm
Recommended TBO	1,800 hr
Propeller	McCauley, constant-speed, two-blade, 74-in dia
Length	25 ft 5 in
Height	8 ft 4 in
Wingspan	36 ft 1 in
Wing area	174.8 sq ft
Wing loading	17.9 lb/sq ft
Power loading	14.2 lb/hp
Seats	4
Cabin length	9.5 ft
Cabin width	43.5 in
Cabin height	44.5 in
Empty weight	2,000 lb
Empty weight, as tested	2,169 lb
Maximum gross weight	3,130 lb
Useful load	1,130 lb
Useful load, as tested	961 lb
Payload w/full fuel	674 lb
Payload w/full fuel, as tested	505 lb
Maximum takeoff weight	3,130 lb
Fuel capacity, std	78.6 gal (75.6 usable) 456 lb (438.5 usable)
Oil capacity	8 qt
Baggage capacity	120 lb, 13.5 cu ft

Performance

Takeoff distance, ground roll	1,300 ft
Takeoff distance over 50-ft obstacle	2,000 ft
Max demonstrated crosswind component	12 kt
Rate of climb, sea level	1,300 fpm
Maximum level speed	203 kt @ 25,000 ft
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)	
@ 75% power, 25,000 ft	198 kt/4.9 hr (80 pph/13.7 gph)
@ 65% power, 25,000 ft	186 kt/6.3 hr (64 pph/11.1 gph)
Maximum operating altitude	25,000 ft
Critical altitude	21,000 ft
Landing distance over 50-ft obstacle	2,320 ft
Landing distance, ground roll	1,100 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb)	75 KIAS
V_Y (best rate of climb)	96 KIAS
V_A (design maneuvering)	120 KIAS
V_{FE} (max flap extended)	112 KIAS
V_{LE} (max gear extended)	165 KIAS
V_{LO} (max gear operating)	
Extend	140 KIAS
Retract	107 KIAS
V_{NO} (max structural cruising)	175 KIAS
V_{NE} (never exceed)	196 KIAS
V_{S1} (stall, clean)	69 KIAS
V_{SO} (stall, in landing configuration)	59.5 KIAS

For more information, contact Mooney Aircraft Corporation, Louis Schreiner Field, Kerrville, Texas 78028; telephone 210/792-2903, fax 210/896-7333; or via the World Wide Web (www.mooney.com).

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.