

MOONEY OVATION2

New-math Mooney



**Three blades minus
one blade equals
seven knots**

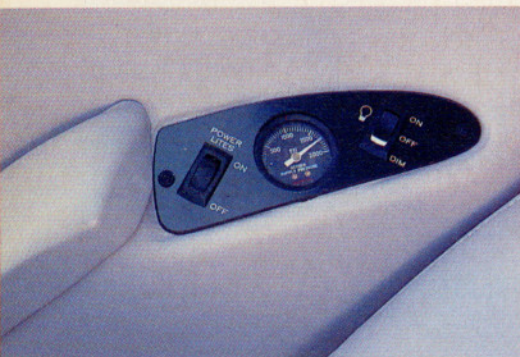
BY THOMAS B. HAINES

PHOTOGRAPHY BY MIKE FIZER

IN the latest offering from Mooney Aircraft, less really *is* more. To get more speed for the Ovation2, Mooney chose a propeller with one less blade than the original Ovation. Lopping one blade off of the Ovation's three-blade propeller to gain about seven knots seems simple enough, but like most things in aviation, it wasn't as easy as it may sound. ■ To determine which propeller airfoil would deliver the maximum speed increase, Mooney's engineering staff flew three different McCauley propellers—two two-blade versions and one three-blade. In the end, a two-blade NACA supercritical airfoil pro-

PELLER delivered the best performance. The airfoil is from the same family of propellers that McCauley produces for the Jetstream 41 commuter airliner. In that installation, however, the aircraft uses five-blade props.

Mooney's objective with the Ovation2 project was to not only eke a bit more speed from its popular 280-horsepower model, but also to further differentiate it from the Eagle. The Eagle debuted in late 1998 flying behind the same Continental IO-550-G as the Ovation, but sporting only a two-blade propeller. In the case of the Eagle, the IO-550 is limited to 2,400 rpm, where it churns out 244 hp—enough to speed the Eagle along at book cruise speeds of 175 kt. In day-to-day operation, though, the Eagle is routinely performing at something closer to 180 kt or even a bit more. That kind of performance is with-

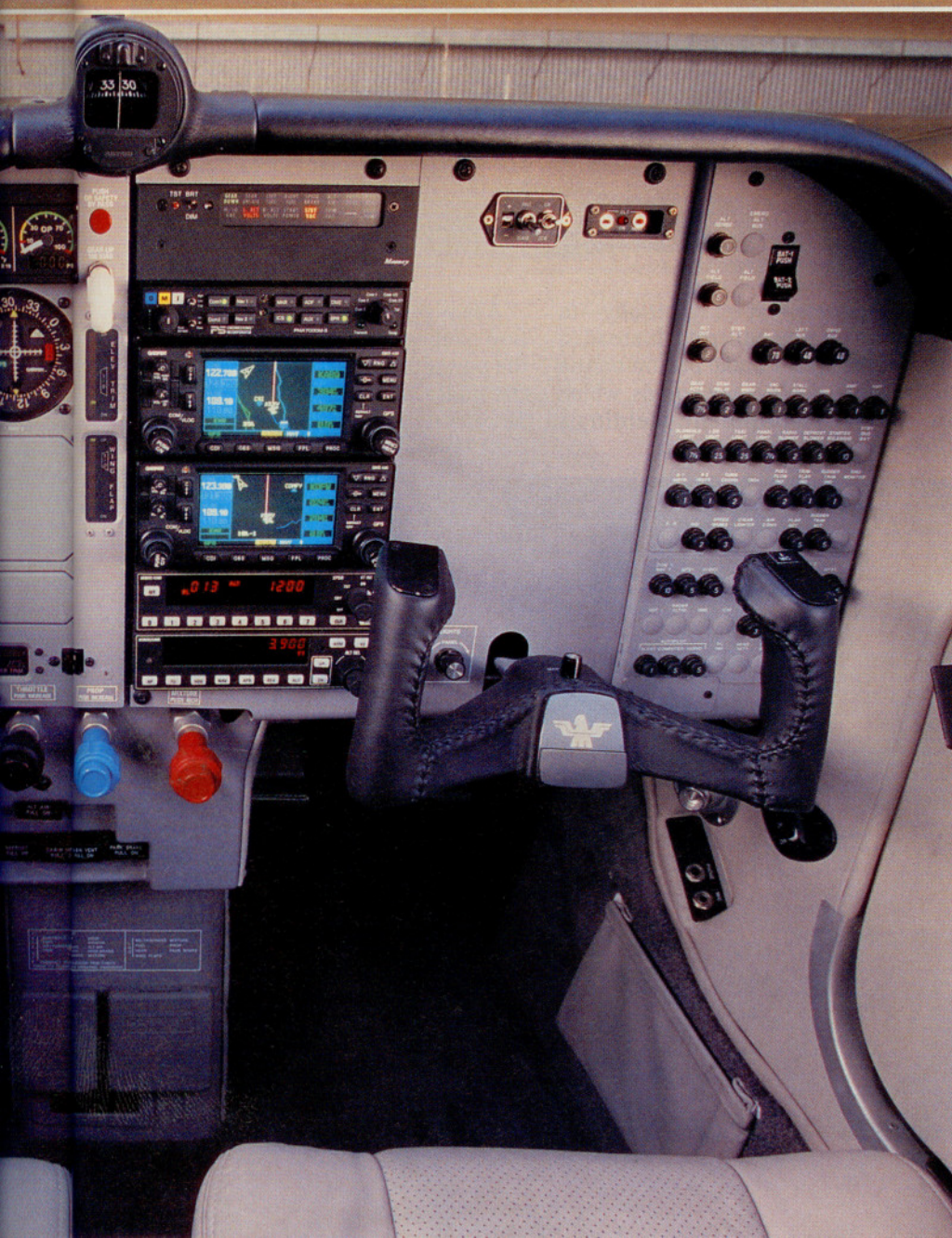


in spitting distance of the Ovation's typical 184- to 187-kt cruise. Yet the Ovation carries a price premium of some \$70,000, so you can see why the financial folks at Mooney felt a need to create a greater gap between the two products. Otherwise, who would buy an Ovation over an Eagle?

In actuality, there was more differentiating the two models than a few knots and the price of a little house on the prairie. The Eagle comes with a rather Spartan stack of AlliedSignal avionics, a less-capable autopilot, a lower fuel capacity, a lower maximum gross weight, and a shorter options list. Still, pilots buy the brand from Kerrville to fly fast and efficiently, and the Eagle does that really well.

Thus was hatched the plan to further differentiate the two models. Aerodynamically, the only economically feasible change to the Ovation would be the prop. Decreasing the number of blades from three to two generally causes a slight bump in speed because of reduced drag. However, if the diameter of the two-blade prop equals that of the three-blade, you also give up static





thrust, which hurts takeoff and climb performance. Mooney opted to increase the diameter of the two-blade prop to 76 inches, three inches greater than the Ovation's original three-blade prop. The result is a fair compromise between initial thrust and cruise speed.

Applying full throttle on the runway, you will *not* be thrown back in your seat in the Ovation2 (or the Eagle, for that matter). However, once achieving a rotation speed of about 75 kt, the Ovation2 delivers an impressive initial climb rate of about 1,400 feet per minute—about 300 fpm more than an Ovation will manage. And, like that battery-powered bunny, the Ovation2 keeps going and going. The day I flew the airplane, we were a couple of hundred pounds below the maximum gross weight of 3,368 pounds. The Ovation2 maintained the 1,400-fpm rate right

Lopping one blade off of the Ovation's three-blade propeller wasn't easy.

through 6,000 feet; at 7,500 feet we were still ascending at 1,250 fpm. Not many normally aspirated singles can make that claim.

Leveling off at 7,500 feet, the airplane quickly accelerated to an indicated air-speed of 169 kt. Corrected for temperature and pressure, the result was 194 kt true at about 77-percent power, leaned to 50 degrees Fahrenheit rich of peak EGT and burning 17.1 gallons per hour. That's about seven kt faster than the original Ovation and about 12 kt faster than the Eagle.

We put the Ovation2's built-in oxygen system to work and climbed on up to 14,500 feet for another speed run. It quickly became obvious why Ovation owners like to fly high. Running at about 64-percent power, the true air-speed settled on about 191 kt on 13.5 gph, which was about 50 degrees rich of peak EGT. Trading three kt and a longer climb for a 3.6-gph savings is certainly a good deal.

Many owners these days are finally accepting the notion that it's OK to fly engines lean of peak at lower power settings. At 11,500 feet, we leaned the Continental to a best-economy setting 50 degrees F lean of peak. There, the true



airspeed worked out to 186 kt on 12.7 gph. The cylinder head temperatures decreased by some 20 degrees F from the rich-of-peak power settings, and the engine ran smoothly.

One thing I've always admired about the Ovation is its simple engine operation. For take-off, push all the levers forward and leave them there. During the climb, a twist of the mixture knob every thousand feet or so will keep the EGT needle comfortably in the blue arc on the gauge. Upon leveling off, a little fine-tuning of the mixture may be necessary. Since the IO-550-G in the Ovation turns at a maximum of 2,500 rpm, there's no requirement to touch the prop control, although you may choose to pull it back for a quieter ride. However, even at 2,500 rpm, the Ovation's cabin is relatively quiet. And, like the Eagle, the Ovation has no cowl flaps to fiddle with.

Even for descents, there's

no requirement—at least initially—to touch the engine controls. Instead, a push of the speed brake button on the control yoke deploys the boards, which are standard equipment, yielding a 1,200-fpm descent rate.

A new generation of Moritz Corporation gauges helps the pilot to manage the power on all 2000-model Mooneys: the Eagle, Ovation2, and the Bravo. Mooney debuted the Moritz gauges on the 1999 Eagle. Moritz refined the analog portion of the display and made a few other changes for the 2000 models. The gauges, which show both digital and analog readouts, make engine management easy. Use the analog manifold pressure, rpm, and temperature displays for quick settings and then fine-tune with the digital readouts. Digital readouts also depict fuel quantities, vacuum pressure, OAT, fuel flow, and system voltage.

As noted earlier, speed isn't the only thing the Ovation2 owner buys over the Eagle. While the Eagle comes standard with only one KX155A nav/com, an S-Tec System Thirty two-axis autopilot, and an IFR KLN 89B GPS, the Ovation2



carries dual KX155A nav/coms, a KLN 89B, and the sophisticated KFC225 two-axis autopilot with flight director and altitude/vertical speed preselect. Both models also include an HSI, transponder, and a PS Engineering PMA 7000 audio panel/intercom/clearance recorder.

Pilots who see in color may prefer to upgrade their Ovation2 with the optional Garmin avionics package. For an additional \$5,000, buyers can replace the KX155As and the KLN 89B with a pair of Garmin GNS 430s, which include not only IFR GPSs and VHF nav/coms, but also color moving maps. Some of the other options available on the Ovation2 include the BFGoodrich Stormscope, a Shadin fuel-flow computer, TKS known-ice certification, oxygen, and air conditioning. Base price of the Ovation2 is \$399,000. However, with the aforementioned options and a few more, the price can be within sight of \$500,000.

Not only is the Ovation2's panel more deluxe than the Eagle's, the higher-end airplane also can lift more. The Ovation's 3,368-pound



max gross weight is 168 pounds higher than the Eagle's. The Ovation also carries more fuel: 89 gallons vs. 75. The Ovation2's extra fuel, additional avion-

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ics, and standard leather interior offset much of the weight advantage, so the two end up with similar full-fuel payloads.

In the case of the typically equipped Ovation2, that means a full-fuel payload of about 500 pounds—enough for three adults. However, with 89 gallons available, it's easy to trade some fuel for baggage and still be able to travel long distances. Take off with the 75 gallons standard on the Eagle, and the Ovation can carry three adults and about 75 pounds of baggage.

With the Ovation project now complete, Mooney's engineering staff isn't sitting idly by. Instead, believing that the Eagle would make an ideal complex trainer, they have begun to look at flight school versions of that model. Preliminary work has also been done on the Predator, a two-place side-by-side sportplane that might be certified for light aerobatics. In addition, management has made noises about the prospects of a six-place, pressurized airplane a few years into the new millennium.

These are all pretty heady pro-





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jects for a small company, but not forgotten in the midst of it all is the need to continue to refine the existing products. While today's Mooneys look much like those of a decade ago on the outside, inside there have been many refinements (see "Beginning the Millennium (Literally)," p. 59). The interiors are entirely different, and the avionics enhancements are completely obvious. More subtle are refinements behind the panel—a part of Mooney's ongoing program of decreasing the long-term cost of ownership and improving maintainability. For example, the circuit-breaker panel has been redesigned and reengineered. The complex panel can be completely disconnected in about 10 minutes and swung open for easy troubleshooting. Likewise, the entire avionics stack can be removed in about 10 minutes by twisting eight screws and pulling two connectors. The avionics

bus and the rest of the electrical system have been redesigned to reduce radio frequency noise, resulting in quieter electronics and fewer interference problems.

And so while the Ovation2 may look like the same old ship minus a prop blade, there's really much more to the

change—enough that Mooney felt the model deserved a second Ovation. □

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

Mooney M20R Ovation2	
Base price: \$399,000	
Price as tested: \$428,300	
Specifications	
Powerplant	Continental IO-550-G 280 hp @ 2,500 rpm
Recommended TBO	2,000 hr
Propeller	McCaughey two-blade, 76-in diameter, constant-speed
Length	26 ft 9 in
Height	8 ft 4 in
Wingspan	36 ft 1 in
Wing area	175 sq ft
Wing loading	19.3 lb/sq ft
Power loading	12 lb/hp
Seats	4
Cabin length	10 ft 6 in
Cabin width	3 ft 8 in
Cabin height	3 ft 9 in
Empty weight	2,225 lb
Empty weight, as tested	2,338 lb
Max gross weight	3,368 lb
Useful load	1,143 lb
Useful load, as tested	1,030 lb
Payload w/full fuel	609 lb
Payload w/full fuel, as tested	496 lb
Fuel capacity, std	95 gal (89 gal usable)
	570 lb (534 lb usable)
Oil capacity	12 qt
Baggage capacity	120 lb, 20.9 cu ft
Performance	
Takeoff distance, ground roll	1,600 ft
Takeoff distance over 50-ft obstacle	2,600 ft
Rate of climb, sea level	1,050 fpm
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)	
@ 75% power, best power	190 kt/4.8 hr
	8,000 ft (96 pph/16 gph)
@ 65% power, best economy	179 kt/6.3 hr
	8,000 ft (73.2 pph/12.2 gph)
Service ceiling	20,000 ft
Landing distance over 50-ft obstacle	2,500 ft
Landing distance, ground roll	1,100 ft
Limiting and Recommended Airspeeds	
V _x (best angle of climb)	85 KIAS
V _y (best rate of climb)	105 KIAS
V _A (design maneuvering)	127 KIAS
V _{FE} (max flap extended)	110 KIAS
V _{LE} (max gear extended)	165 KIAS
V _{LO} (max gear operating)	
Extend	140 KIAS
Retract	106 KIAS
V _{NO} (max structural cruising)	174 KIAS
V _{NE} (never exceed)	195 KIAS
V _{SI} (stall, clean)	66 KIAS
V _{SO} (stall, in landing configuration)	59 KIAS

For more information, contact Mooney Aircraft Corporation, Louis Schreiner Field, Kerrville, Texas 78028; telephone 800/456-3033, fax 830/896-8180; or visit the Web site (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.