



MEAN MACHINE

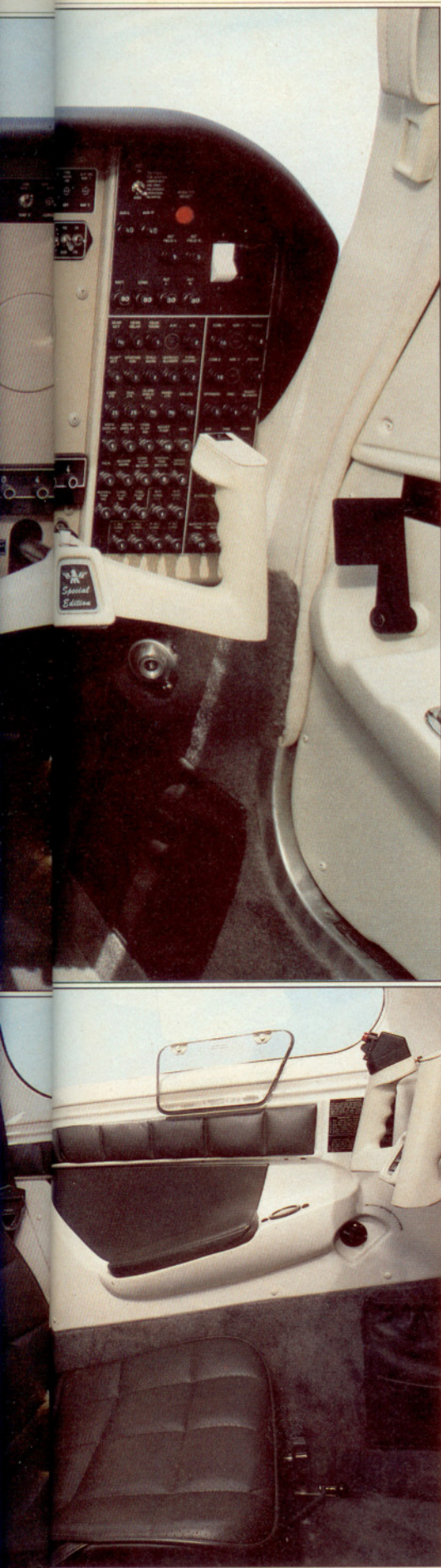
A big-block speed demon that nears the ultimate in personal airplane performance

BY RICHARD L. COLLINS

A single-engine personal airplane with a big engine has great appeal to a lot of pilots. The combination can bring a lot of flexibility to an airplane. Good climb rates become the

PHOTOGRAPHY BY MIKE FIZER





norm, and the range of cruising speed and efficiency can reach from that of a like airplane with a smaller engine up to the best available piston performance, if the fuel flow isn't of as much concern. Turbocharging can extend the advantages to high altitude. It was with all this in mind that Mooney developed the TLS, powered by a Lycoming TIO-540 rated at 270 maximum continuous horsepower. (You might have heard the airplane referred to as the "Sabre"; that was an internal code name. TLS is the name and it does stand for "Turbo Lycoming Sabre.")

Performance is the reason for the TLS, and the airplane is likely to have four high-performance mission profiles. Westbound, especially in the windy aloft seasons, the mettle is usually tested at 12,000 feet. Eastbound, or in light or crosswinds, with passengers, 17,000 feet allows the use of nasal cannulas for oxygen. With only a pilot, Flight Level 190 gives a good combination of performance and time to recognize any oxygen system problem and descend to a breathable level. Then there is FL250 for maximum performance, preferably with two pilots on board breathing from separate oxygen systems. (If you wonder why this caveat, check with your local flight standards district office about altitude chamber training at a nearby Air Force base.)

Climbing to 12,000 feet after a gross weight takeoff takes about 10 minutes in standard conditions. Maximum cruise at that altitude is 195 knots at best power (20.4 gallons per hour) and two or three knots less at best economy (17.4 gph).

The rate of climb hangs in there all the way up, and times to climb to higher altitude can be based on a minute per 1,000 feet, with somewhat more time required in above-standard temperatures. The fuel flows at cruise remain much the same at all altitudes, and the speeds, best power, are 208 at 17,000, 212 at FL190, and 223 at FL250, all according to Mooney's preliminary pilot's operating handbook. Subtract a little for best economy. Applying average specific fuel consumption figures shows maximum cruise power to be a very high percentage of maximum continuous power, and there is a rea-

son for this. Max power is not an engine limitation—the TIO-540 is the same basic engine used in a Navajo or Malibu Mirage, for example, where max horsepower is 350. The TLS limitation of 270 hp is related to the airframe and controllability. Some of the certification requirements are met by limiting the amount of horsepower that can be taken from the engine; the owner gets value back by being able to use a high percentage of power without overworking the engine and by being able to maintain horsepower to a



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high altitude. One other performance item: If the TLS is flown at the same speed as a 210-hp Mooney 252, the fuel flows will be much the same as in the smaller-engine airplane. Or, at any altitude, you can go 20 knots faster than in a 252. Good choices.

Contemplating the fuel flows raises a question about fuel supply. The TLS indeed has more than any previous Mooney, with 96 total gallons, 90 gallons usable. With more than legal IFR reserves, it can fly for six hours at 180 knots at FL180, for example, so it can be a long-range airplane. At the highest cruise settings, the endurance with comfortable IFR reserves would be about 3.5 hours and more than four if best economy high cruise is used.

The TLS is based on the stretched airframe used in the Porsche-engine





Mooney PFM, with the back of the rear seat moved aft four inches to enhance comfort for the rear-seat passengers. The cabin has 43 percent more window area than the PFM, giving the cabin a lighter and roomier feel. The new glass and graphite cowling is 12 pounds lighter than a 252 cowl and is easily removable. The cowl design gives up a few knots of speed to ensure adequate engine cooling, critical in a turbocharged airplane. The TLS engine is intercooled for additional protection; the engineers were determined that this engine would not have heat-related problems.

The TLS has a dual alternator system and is fitted with two batteries, one of which is in the tail. Because of the weight of the engine and prop, some weight was needed aft for center of gravity reasons, and Mooney chose to include something of value, an extra battery, instead of using ballast. The pilot can choose either battery for starting or running, giving further redundancy to the dual alternator system.

The TLS has wing-mounted taxi and landing lights on each side and standard wing-tip recognition lights. The result of all this is a definite MD-80 look when you are on final at night. There are a total of six bright forward-facing lights, as well as strobes, navigation lights, and rear-facing white wing-tip lights.

The instrument panel of the TLS is the same as used on the Porsche airplane, but the exquisite (and very expensive) engine instruments are not used. Still, the instrumentation of the TLS gives the impression of high quality, as does the interior. Almost everything (except avionics) you would want on the airplane is included in the standard price. For the first time on a Mooney, air conditioning will be optional.

The gross weight of the TLS is the highest of any Mooney ever, at 3,200 pounds. The standard empty weight of 2,012 leaves room for 100 or so pounds of options, full fuel, and three 170-pounders. Fuel can be dealt off for baggage or more passengers.

Flying the TLS brings a new dimension to the experience of being a Mooney pilot. The appearance of the

cowling and the three-blade propeller tells you that this is going to be different. The start proves it. A new high-energy starter turns the engine at incredible speed; when it starts, it settles into a nice low rumble that says "power."

Taxiing out, the fact that it is heavier on the nose than other Mooneys is evident in the steering. An-

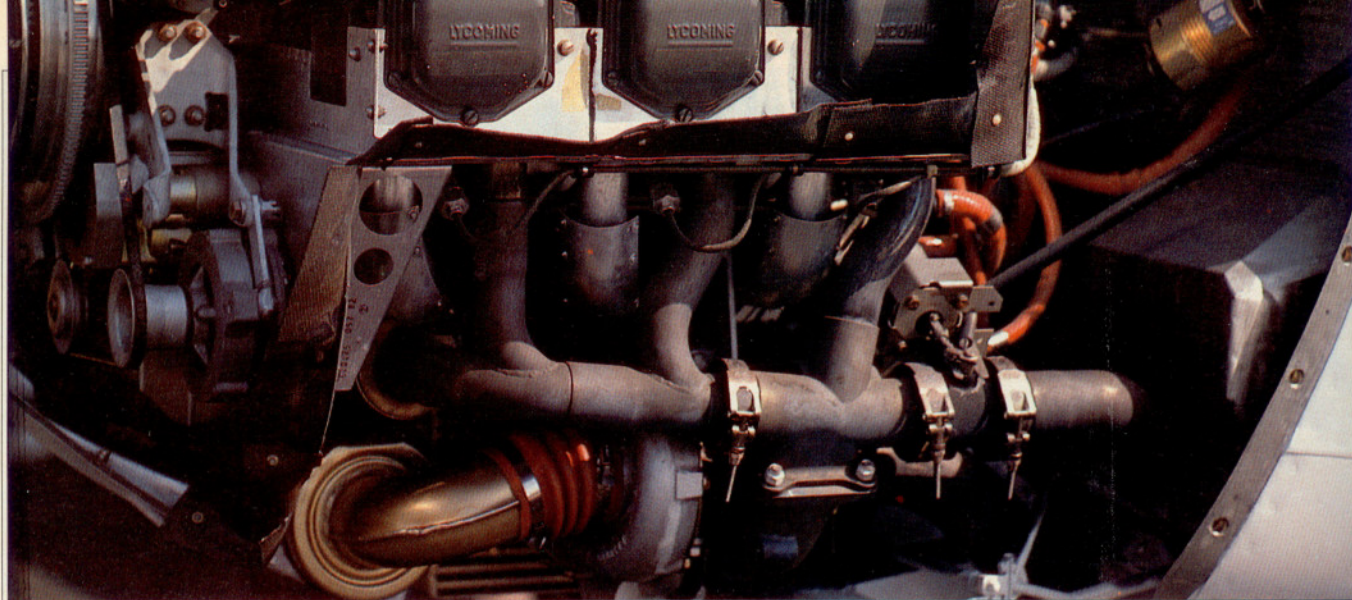


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other TLS first, rudder trim, will tend to make the airplane steer right if it is in the takeoff position during taxi.

The variable-density turbocharger controller will automatically set the manifold pressure that results in 270 hp for takeoff, so the only requirement is to monitor manifold pressure on a very cold day to avoid exceeding the maximum value.

You can tell there is more horsepower up front from the very beginning, though the relatively small



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prop diameter (75 inches) results in a slight compromise in static thrust. Once the TLS gets moving, though, it does move out, and the 65-knot rotation speed and the 105-knot best rate or 120-knot cruise climb figures are quickly reached, with the vertical speed at or exceeding 1,000 feet per minute. Because only 270 hp is maximum continuous, most TLS operators will probably choose to use this amount of horsepower for climb.

The in-flight sound level is comparable with other Mooneys. On the test airplane, there was a low-order vibration, likely caused by something attached to the engine touching the cowl and easy to fix. The TLS is quite nice in not giving the impression that it is an airplane in which the maximum amount of horsepower is unleashed. Except for the indications on the airspeed and vertical speed indicators, it is much like the other Mooneys.

At 12,500 feet, we settled into a best-power cruise that yielded 160 knots indicated on just over 20 gph. The temperature was warm, and the whiz wheel ruled that the true airspeed was 195 knots. It wasn't necessary to open the fully adjustable, electrically operated cowl flaps to

Mooney M20M TLS
Base price: \$177,500

Specifications

Powerplant	Textron Lycoming TIO-540-AF1A, 270 hp at 2,575 rpm
Recommended TBO	2,000 hr
Propeller	McCauley constant-speed, three-blade, 75-in diameter
Length	24.8 ft
Height	8.25 ft
Wingspan	36.1 ft
Wing area	174.8 sq ft
Wing loading	18.3 lb/sq ft
Power loading	12.55 lb/hp
Seats	4
Cabin length	10.5 ft
Cabin width	3.625 ft
Cabin height	3.7 ft
Empty weight	2,012 lb
Max takeoff weight	3,200 lb
Useful load	1,188 lb
Fuel capacity, std	96 gal (90 gal usable) 576 lb (540 lb usable)
Oil capacity	10 qt
Baggage capacity	130 lb, 20.9 cu ft

Performance

Rate of climb, sea level	1,230 fpm
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)	
@ maximum cruise power, best power	
25,000 ft	223 kt/3.5 hr (123 pph/20.9 gph)
@ intermediate power, best economy	
19,000 ft	202 kt/4.33 hr (99.6 pph/16.6 gph)
Max operating altitude	25,000 ft

Limiting and Recommended Airspeeds

V _x (best angle of climb)	80 KIAS
V _y (best rate of climb)	105 KIAS
V _a (design maneuvering)	123 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 _r (rotation)	65-70 KIAS
V _{s1} (stall, clean)	65 KIAS
V _{so} (stall, in landing configuration)	60 KIAS

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. □

keep the engine cool.

For descent, you can start down early and get your climb money back—if air traffic control allows. Or you can do a dive-bomber attack on the destination using the standard speed brakes. Either way, you'll appreciate the new 140-knot gear extension speed if you get a little close and a little fast. For emergency or extremely rapid descents, the speed can be increased to 165 knots once the gear is extended. Couple this with the speed brakes for a spectacular descent, should you or ATC long for the aircraft to be closer to the ground.

When the flaps are extended for landing, there is a strong nose-down pitch that has to be handled with trim (electric or manual) in a timely manner. This should be stored for future reference, in case of a go-around. There the pitch will be nose up.

For an airplane that flies so high and fast, the TLS has a low 75-knot approach speed and a low touch-down speed. Fly too fast on approach in any Mooney, and it will float. Fly the approach at the correct speed and make a normal landing. Some experienced Mooney pilots will tell you to minimize the use of flaps in strong crosswinds.

With the TLS, Mooney lives up to its promise to offer significant new models on a regular basis. Each time, the available choice expands, and it now ranges from the economical (to buy and fly) 201 to the classy PFM to the efficient and high-flying 252 to the powerful new TLS for the pilot who wants a personal single with performance normally associated with the best of the light twins. □