



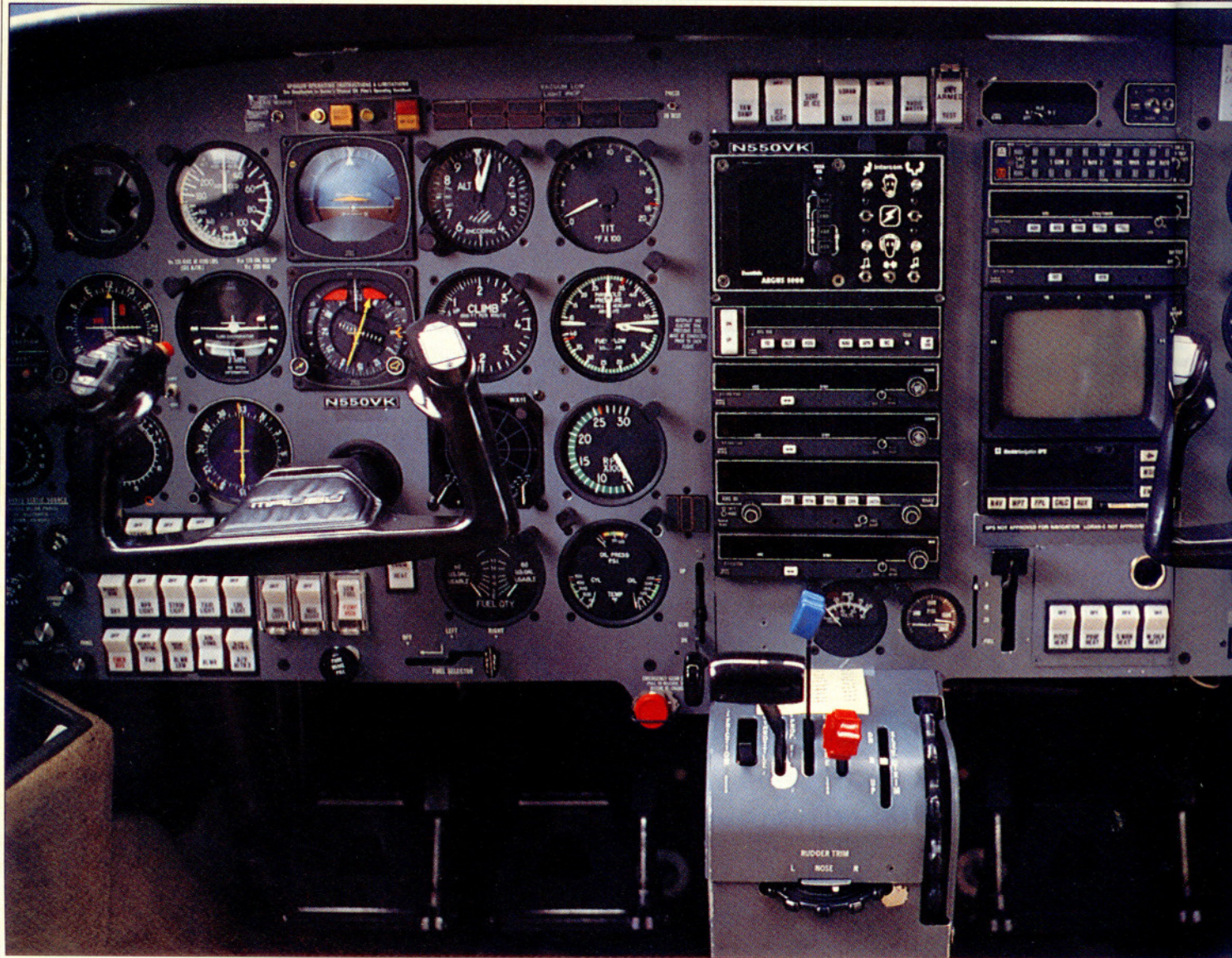
A FASTER MALIBU

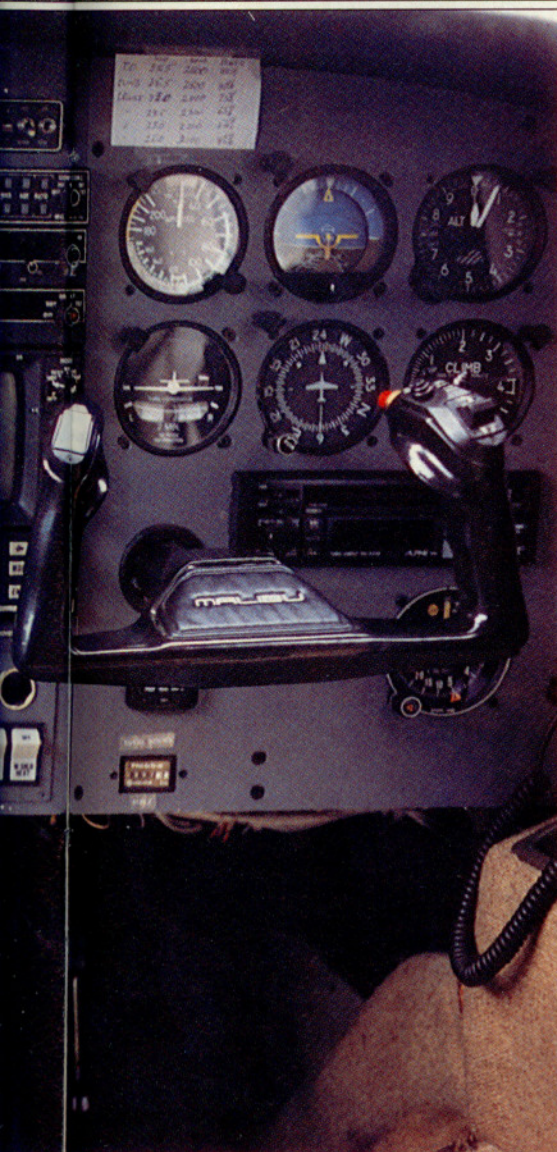
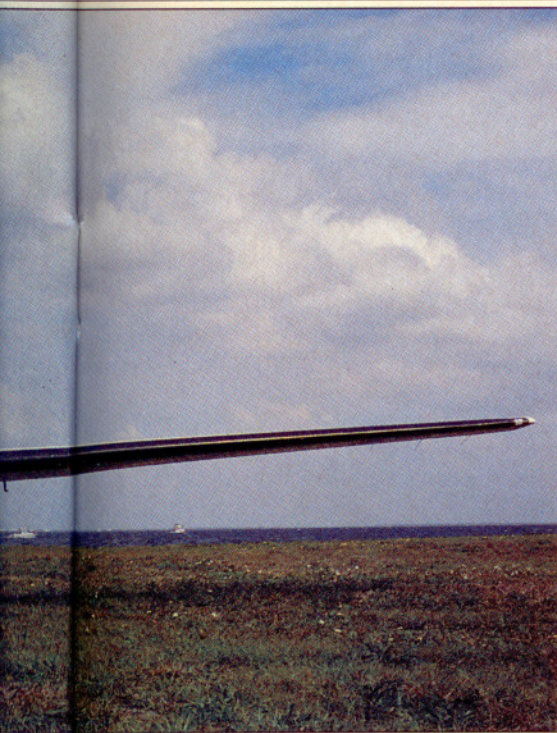
Let the modifications begin.

BY MARK R. TWOMBLY

Airplane design principles seem to be based on the notion that anything worth doing is worth modifying later on. Is there an airplane flying that doesn't have a long list of modifications available to it that push the envelopes of performance, safety, utility, and comfort?

Though it has been in production for only 10 years—





and some of those were very lean production years—Piper Aircraft's PA-46 Malibu already has undergone one significant round of factory modifications. This was when Piper switched from a 310-horsepower Continental TSIO-520-BE engine to a 350-hp Lycoming TIO-540-AE2A, cleaned up the instrument panel, and freshened the interior design. The re-engined Malibu was renamed the Mirage. The Mirage is faster but at the expense of higher fuel consumption and greater empty weight.

Now the aftermarket is eyeing the pre-Mirage Malibu. Not surprisingly, power and speed are the focus—turbine power (Piper tried it), liquid-cooled power (RAM wants to do it), and just plain more power. Henry Van Kesteren, a longtime fixed-base operator who now has a modification shop at Albert Whitted Municipal Airport in St. Petersburg, Florida, has opted for the latter approach. His Continental TSIO-550C-powered Malibu conversion has been approved by the Federal Aviation Administration under a supplemental type certificate, and he has sold and delivered the first example, the airplane you see pictured here.

Van Kesteren has taken a middle-of-the-road approach with his conversion, achieving something that has the performance characteristics of both the Malibu and the Mirage.

The twin-turbocharged, twin-intercooled 550C engine is rated at 350 hp, but in Van Kesteren's Malibu conversion, it is manifold pressure limited to 310 hp, the same as the 520-BE engine it replaces. Maximum power in a standard 520-powered Malibu is achieved at 38 inches manifold pressure and 2,600 rpm. The 550 delivers the same 310 hp at 35.5 inches and 2,600 rpm.

If the larger engine is limited to the same maximum power output as the one it replaces, what then is the advantage of the conversion? The answer lies in the percentages. The 550 achieves its 310 hp at about 88.6 percent of maximum rated power. At 310 hp, the 520 is delivering everything it's got—100 percent. Reduce power to 75 percent for cruise, and with a 520, you'll have 232 horses pulling for you. The 550 delivers 262 hp at 75-percent power. The bottom line: Even with the 310-hp limitation, there's more usable horsepower

available from the 550.

Because there is no such thing as a free power lunch, the bill for the 550's extra punch is in fuel consumption. It takes fuel to produce power and more fuel to produce more power. At the same percentage of power, the 550 consumes about 24 percent more fuel than the 520. That affects endurance and range.

Of course, with the 550 you have the option of reducing power to achieve the same horsepower and fuel flow as a 520, thereby preserving original endurance and range performance. In fact, it's likely that the 550 is a bit more efficient than the 520 given its "volumetric efficiency" and other esoteric features understood only by people gifted with internal combustion insight. But why buy more power if you're not going to use it? The 550 Malibu likely will be flown the same as a Mirage: Bump up the

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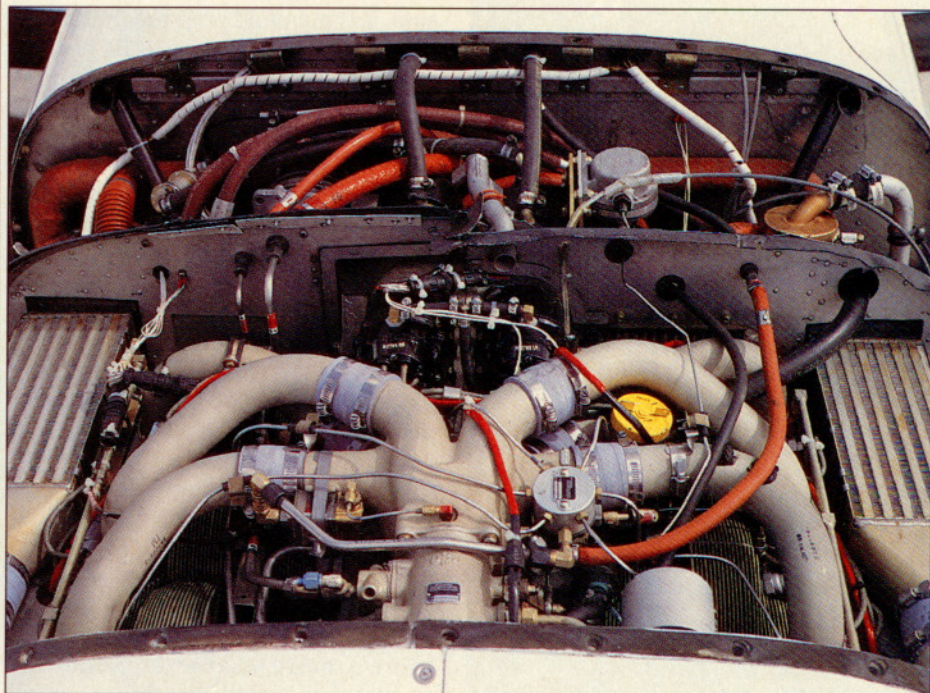
throttle to a go-fast setting on shorter trips when endurance or range are not concerns, and go for lower power settings and lower fuel consumption on those continent-crossing trips.

The differences between the 550 and 520 are all internal. The 550 has a longer piston stroke and thus a different crankshaft and piston skirts, and it uses a single-stage engine-driven fuel pump rather than the more expensive two-stage pump on the 520. Like the 520, the 550 has dual alternators and vacuum pumps and a 2,000-hour time between overhauls. The 5.5-psi pressurization differential is unchanged with the conversion. Engine dimensions, weight, and configuration (where the accessories are mounted) are the same, so it's a relatively easy conversion to perform. No changes are required to the cowling, and weight and balance is unaffected. The manifold pressure gauge is altered to reflect the lower maximum limit of 35.5 inches.

Van Kesteren's first 550 conversion is a 1985 Malibu. The previous owner,



Is it a Malibu or a Mirage? With more power available from the Continental 550 engine conversion (below), it's a little bit of both. (Below, left) Lyle Kallis (left) is the new owner of Van Kesteren's (right) first Malibu project.





Larry Lee, flew it in the 1992 around-the-world air race and also installed some new interior appointments developed by his company, Plastek, including attractive Mirage-style pull-down window shades.

Van Kesteren bought the airplane after it was involved in a minor landing accident. He repaired the damage (a collapsed gear), performed the engine conversion, and installed Spoilers, Incorporated's hydraulically actuated spoilers in the wings. The airplane has been sold to Lyle Kallis, a contractor in Red Deer, Alberta, Canada, near Calgary. Kallis and a friend, along with Van Kesteren, stopped by AOPA in Frederick, Maryland, on their way back to Canada to give us an opportunity to fly the airplane.

No question, a Malibu is beautiful in almost every respect. It stands higher and wider than any other single on the ramp and many twins, as well. Its big-airplane character is accentuated by the airstair door and the fact that you pass through the passenger cabin—albeit hunched over—to get to the cockpit.

The Malibu's attributes—cruise performance, pressurization, the long and wide cabin, and its commanding presence—are responsible for its resurgence in the used airplane market. After the rash of Malibu/Mirage in-flight structural failures between May 1989 and March 1991 and the National Transportation Safety Board/FAA investigation that followed, used Malibus dropped as much as \$50,000 each in value. However, the federal investigation did not find fault with the airplane's structure, and today, prices for used Malibus are back almost to normal levels. One dealer quoted current prices ranging from \$260,000 to \$350,000 for low-time Malibus built between 1985 and 1988 (the last year for the 310-hp version; the Mirage appeared in 1989). Asking price for a new Mirage is about \$658,000.

Van Kesteren repainted his Malibu and, at Kallis' request, installed a Shadin fuel totalizer—a worthwhile addition given the nonstandard fuel flows.

The Malibu holds 120 gallons of usable fuel and has a maximum takeoff weight of 4,100 pounds. When the Malibu Van Kesteren converted was first registered in 1985, it weighed 2,777 pounds empty, and it has only

gained 58.8 pounds since. With full fuel, the airplane can handle 544 pounds in the cabin. For our flight, the tanks and seats were half-full, so we were about 410 pounds shy of maximum takeoff weight.

The takeoff is more work intensive than in a standard Malibu because the throttle has to be monitored to avoid exceeding the 35.5-inch manifold pressure limit. On the plus side, there is no turbo lag as you add power; they spool up instantly.

We spent the first part of the flight at low altitude, droning around in circles for air-to-air photos. When that was over, we bade the photo platform ship, a Piper Saratoga, farewell and set climb power. Air traffic control cleared us in steps to 25,000 feet, the Malibu's maximum operating altitude.

Recommended climb power setting is 33.5 inches and 2,500 rpm. With the mixture at full rich, the engine took in 32 gallons of gas per

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hour. Rate of climb at 125 KIAS ranged from 1,000 feet per minute passing through 10,000 feet to about 500 fpm as we approached our target altitude. This may represent somewhat better performance than a standard Malibu, but differences in pilot technique, instrument indications, ambient conditions, and the unique characteristics every airplane exhibits make it difficult to make accurate comparisons. Where the 550 conversion has a distinct edge is in engine temperatures. The standard Malibu's 520 engine has suffered heat problems since the airplane's inception. Proper setup of the fuel and induction systems can mitigate the problem, but the 550 seems to run far cooler. On our ascent to Flight Level 250, cylinder head temperatures (CHTs) hovered around 300 degrees. When we leveled off for cruise and leaned, CHTs rose about 50 degrees.

Van Kesteren believes the 550 Mal-





ibu to be the fastest in the PA-46 fleet, and the numbers bear him out. We set the power at 75 percent—31 inches, 2,500 rpm, and about 21 gallons per hour and watched the airspeed needle settle on 149 knots indicated, 230 knots true airspeed. A reduction to 65-percent power resulted in 220 KTAS and fuel flow of 17.7 gph.

At 16,500 feet, a high-speed cruise power setting resulted in 210 KTAS at 22.4 gph.

Van Kesteren takes a conservative approach to leaning. He does not rec-

ommend retarding the mixture to achieve a turbine inlet temperature (TIT) that is 50 degrees lean of peak, as Piper and Continental do with the 520. Leaning past peak TIT is necessary on the 520 to reduce engine temperatures and to avoid exceeding 75-percent power—above which leaning is not permitted, but it has proven to be a controversial procedure. Owners report excessive wear on the exhaust valves, pipes, and exhaust gas temperature probes.

At high-speed cruise power set-

If a 550 engine doesn't excite you, try a 550-shp PT6. Van Kesteren bought Piper's Malibu prototype and stuck a King Air B90 engine in it. Not available in mass quantities.



tings, the 550-powered Malibu will have about an hour's less endurance compared to the standard airplane. The flight manual supplement does not include revised performance, range, and endurance tables, only this cryptic note, "Performance will be equal to or better than a standard Malibu," and the caution that range and endurance are adversely affected if fuel flows are increased over that of a standard Malibu.

The spoilers enabled us to descend from the flight levels with ease. Descents from high altitudes in a clean airplane like the Malibu are difficult at best and, to avoid gross power reductions, involve use of flaps and at times even extending the landing gear. The spoilers eliminate the worry and the work. With the boards extended, we were able to keep the power and engine temperatures up

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and still descend at nearly 2,000 fpm.

Van Kesteren's 550 conversion for the Malibu sells for \$57,000. That is the installed price for a factory-new engine (provided the 520 engine it replaces is sent to Continental in exchange), new Lord mounts, and the supplemental type certificate. The standard two-blade Hartzell Malibu propeller can be used on the 550. That compares to a list price of \$42,256 for a factory overhauled 520-BE (including exchange). Van Kesteren's conversions are done at his shop in Florida (contact VK Leasing, Incorporated, One Beach Drive, Box 2, St. Petersburg, Florida 33701; telephone 813/898-1921; fax 813/823-5484), but he said he is willing to consider field installations done by experienced Malibu service centers.

Is the 550 conversion a Malibu or is it a Mirage? The answer is either or both. It weighs no more than a Malibu and can be operated like one using equivalent horsepower and fuel flows. Or it can be flown like a Mirage: higher horsepower, higher fuel flow, and the payoff, more speed. It's an interesting choice. □