Business & commercial Aviation
COVER STORY


## Inflight Report

# PIPER MALIBU MIRAGE

The re-engined Malibu brings to the aircraft a degree of systems redundancy and heritage that should be appreciated by business operators.

By JOHN W. OLCOTT

**The Malibu Mirage panel features a six-probe exhaust gas temperature gauge and LED readouts of electrical system parameters, as well as ample room for avionics and copilot instruments. Some switches have been relocated, and the caution and warning panel has been expanded. A three-piece glareshield significantly increases accessibility for maintenance.**

Turbine-engine altitude capability, cabin-class comfort and light-twin speed—all with single-engine operating costs—became reality when Piper Aircraft Corporation introduced its PA-46 Malibu in 1982. The pressurized, six-place aircraft quickly became a winner as it entered service late in 1983, selling well when other singles were languishing.

The opportunity for Piper, therefore, was to capitalize on the Malibu's popularity. Twin-engine as well as turbine-powered versions were discussed, as was a four-place "mini Malibu," but the first derivative to evolve is the Malibu Mirage, powered by a 350-hp Textron-Lycoming engine similar to those used on the Navajo series, and finished with many customer-requested features.

At first glance, there appears to be no difference between the PA-46-350P Malibu Mirage, which was introduced at the 1988 NBAA convention, and the aircraft it replaced, the PA-46-310P. In fact, externally, the lines of the newcomer and its predecessor are so nearly identical that only a seasoned observer could distinguish the difference. The Malibu Mirage has a slight bulge in the cowling immediately aft of the spinner to provide room for the 350-hp Textron Lycoming TIO-540-AE2A engine that replaced the original Malibu's 310-hp Teledyne Continental TSIO-520-BE powerplant. Retractable tie-down rings lie flush under each wing. Window shades replace side curtains. And gone is the "hot plate" that provided forward vision in icing conditions, replaced by an integrally heated windshield.

Internally the differences are more significant. Cockpit and cabin appointments have been noticeably enhanced, systems changes provide added redundancy and obviously the powerplant is completely new.

## OPPORTUNITY SEIZED

Although the Malibu's acceptance was impressive, particularly in contrast to the depressed state of the light aircraft industry throughout most of the 1980s, Piper had several motivations to improve the aircraft. As with nearly every new aircraft, extensive operations in everyday applications revealed areas that needed refinement.

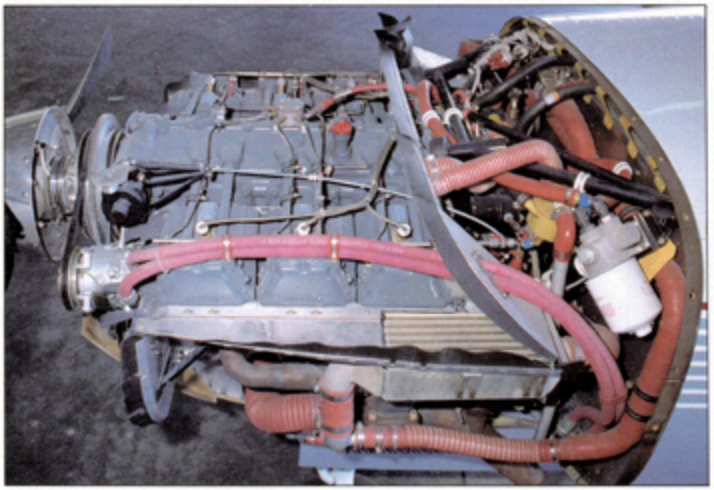
The hydraulic system experienced some O-ring problems that were attributed, in large part, to pressure pulses caused by the lack of an accumulator within its design. Some components of the selector for the aircraft's hydraulically operated flaps needed attention, and flap linkages required additional adjustments in the field. Low fluid levels would cause the hydraulic pump to self-destruct, and replacement of the unit cost about $4,500.

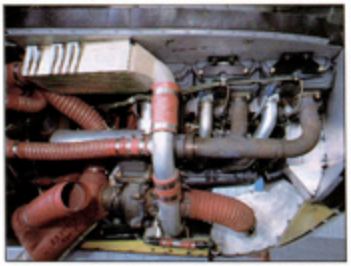
Piper responded initially by adding an accumulator, and in 1986 by replacing the hydraulic flap actuation with one that was electric, thereby reducing the requirements placed on the hydraulic system (the landing gear uses hydraulic pressure). Also, a disabling switch senses if the hydraulic system is cycling too frequently, as it would if fluid were low, and interrupts electrical power to the Parker Hannifin hydraulic pump located aft of the rear baggage compartment.

Thus, in addition to pursuing market opportunities uncovered by the Malibu's success, Piper was endeavoring to improve the existing product.

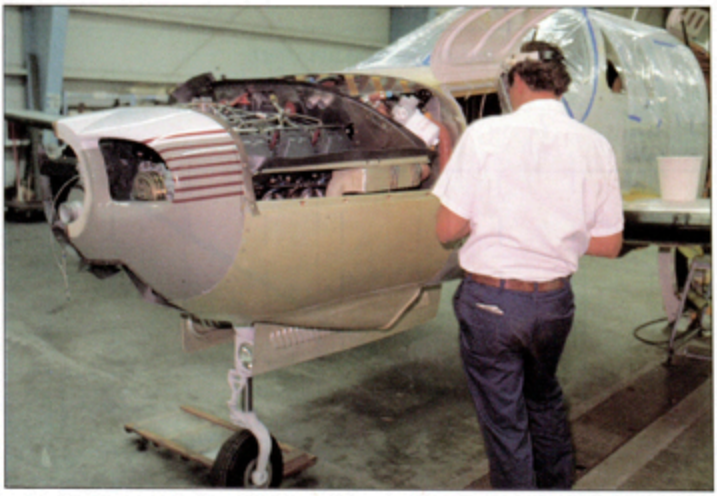
By the summer of 1987 the decision was made to build a "better" Malibu, and a questionnaire was sent to operators soliciting what they would like to see in an improved model. Owners wanted additional refinement in certain areas, particularly the cockpit and cabin, and they wanted even more performance in the pressurized, high-flying single. Asking, however, was easier than implementing.

While interior refinements, such as additional or more sophisticated instrumentation and new appointments, usually can be accomplished without great difficulty, improving on the Malibu's refined design offered limited options. The aircraft's aerodynamics and structural efficiency were first class from the start, so the cost of marginal improvements in those areas would hardly be worth the effort. The obvious solution was to add more





**Since the 350-hp Lycoming TIO-540-AE2A engine is about three inches longer than the 310-hp Continental it replaced, the cowling had to be extended and slightly redesigned. Also, some room had to be taken from the nose baggage compartment, but additional engine access was provided through the firewall. The cowling itself is fabricated from metal rather then fiberglass as in the earlier Malibu. The photo above looks upward at one of the engine's two intercoolers.**



that mixes with injected fuel for each cylinder (engine power is related to the density of the induction air). A control within the induction system monitors manifold pressure and uses engine oil pressure to position automatically the waste gate valve, which determines the amount of exhaust gas flowing back to the turbocharger. By bleeding excess gases from the exhaust manifold crossover pipe and discharging them out the left exhaust stack, thereby bypassing the turbochargers, the system maintains manifold pressure at the setting corresponding with throttle position even as the aircraft climbs or descends. The waste gate controller automatically protects the Mirage's engine against over-boosting by limiting manifold pressure to 42 inches. A pressure relief valve provides additional over-boost protection in the event of controller malfunction.

## DUAL SYSTEMS

Whereas the original Malibu provided dual sources of electrical and vacuum power, they were not identical. One of its 60-amp alternators was belt-driven, the other gear-driven; one gear-driven vacuum pump was operated continuously, the other was engaged via an electric clutch when required (but was checked during preflight, thus experiencing loads on every flight and requiring periodic inspection).

The Mirage's 70-amp, 28-VDC al-

ternators are identical, each supplying power to a split-bus electrical system similar to the type found on twin-engine aircraft. During normal operation, both alternators are energized. Current flows from the bus tie to the main bus and to the No. 1 and No. 2 avionics buses as well as to the nonessential bus. If one alternator is inoperative, the available current is cut from 140 to 70 amps, but no electrical component is denied power. If both alternators are inoperative, electrical power is provided by a 24-VDC, 15.5-amp-hour battery. Individual LED readouts provide continuous indications of system voltage and output load from each alternator.

Like its alternators, the Mirage's two continuously operating dry vacuum pumps are standard equipment. Either pump is capable of supplying all aircraft components that require pneumatic power, including deicing equipment, but intentional or continued operations in icing conditions (which is approved) are not recommended with only one vacuum pump functioning. Integrity of the vacuum system is indicated by a vacuum gage and a "Low Vac" annunciation. The aircraft's 5.5-psi pressurization system, which relies on the Garrett turbochargers for its power, is identical to that of the original Malibu.

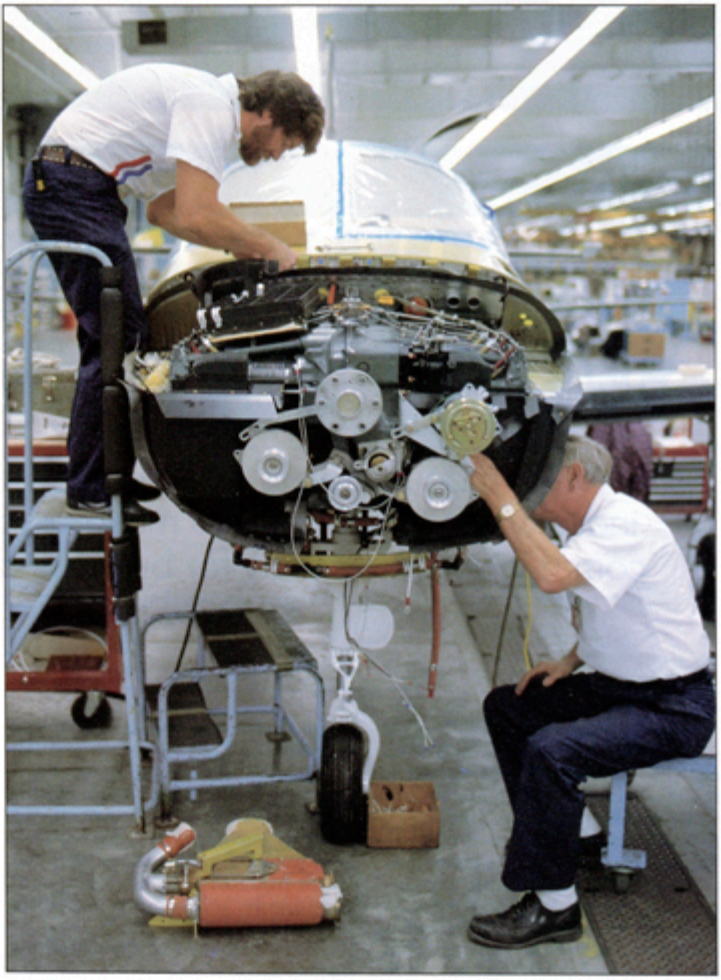
## FLYING THE MIRAGE

The Malibu Mirage retains the very nice handling qualities of its predecessor (see B/CA, February 1984, page 40), although the Lycoming powerplant does not have the uncommon smoothness of the Continental used in the original Malibu. At gross weight and in conditions that averaged 15°C above standard, we were able to climb to FL 230 in 24 minutes using a cruise-climb airspeed of 125 KIAS (presumably, the optional climb speed of 110 KIAS would have reduced that time, though over-the-nose visibility would have been diminished).

Engine temperatures stayed well within nominal values, and power management required minimal attention. The aircraft does have a placard to balance fuel (which is contained in single tanks within each wing) to within 60 pounds, thus switching tanks is required at least once during a climb above about 15,000 feet.

At FL 230 the aircraft achieved a true airspeed of 215 knots while consuming 121.2 pph at the power setting Piper recommends for high-speed cruise (32 inches and 2,500 rpm). At economy cruise (26 inches and 2,200 rpm), the true airspeed was 188 knots and fuel consumption was 90 pph. Those speeds are about 10 knots less than Piper claims for a Malibu Mirage flying at mid-weight (we were still within 150 pounds of gross takeoff weight when the data were taken) at FL 250.

While the 350-hp Lycoming does not significantly improve upon the impressive performance of the original PA-46, and in the areas of fuel consumption and range does not match the original Malibu, it does bring to the aircraft a degree of systems redundancy and heritage that should be appreciated by business operators. The noticeably improved interior appointments and instrumentation also are definite enhancements. Considering these factors as well as the aircraft's performance, good handling qualities and refined features, the Malibu Mirage should enjoy a continuance, if not an acceleration of operator acceptance that greeted the original PA-46 five years ago. **B/CA**



**Both of the Mirage's 70-amp alternators, which energize the aircraft's split bus electrical system, are belt driven.**

Management

# AFTER THE MERGE

The effects of having one's flight department swallowed by another company can be de-stabilizing—or a golden opportunity. The right attitude can help keep things in perspective.

By ROBERT B. PARKE

Photography by Flight Level Design/Alan Staats

"Sure, we have a long-range plan that ultimately will work toward a standardization of [our] aircraft as well as other phases of our operations, but we always try to make [the] best use of our assets," Nielsen said.

is reported to have a larger fleet and greater utilization than it had before the takeover. After the merger of American Hospital Supply and Travenol Laboratories, the newly formed company, dubbed Baxter Healthcare Incorporated, developed a stronger, more efficient flight department with higher use of aircraft than ever before. Other mergers and acquisitions have resulted in improved crew benefits and even the imposition of more detailed and higher operational standards.

**SMOOTH TRANSITION**

One example of a highly successful acquisition, at least from the standpoint of the flight department and travel services, is the Philip Morris takeover of General Foods. Although the General Foods acquisition took place several years ago, the actual integration of the flight department occurred in January 1987. The General Foods fleet consisted of an aging Falcon 20, a BAe 125-700 and a G-II. Theodore F. Wahl, a veteran of 35 years of flying was chief pilot. He is now base manager of Philip Morris Management Corporation's aviation department and an admiring employe.

"I'm not just saying this because I'm a part of Philip Morris," he reports, "but because I must give them a lot of credit. They handled the whole thing quite well.

"Thinking back to the time when the acquisition was going on, I don't think there was anything kept from us," continues Wahl. "Before the deal was complete, my corporate contact met with us here and told us we would probably become a part of the Philip Morris aviation department and that there would be no drastic changes. Shortly after that, Ray Tourin, head of the Philip Morris flight department, came over and assured us there would be no jerking the rug out from under us or selling off the airplanes. It was all reassuring.

"As it turned out, we had one 20-year pilot who took early retirement, and our planned fleet growth went ahead with minor modifications to help standardization with the Philip Morris fleet," says Wahl.

"As for a smooth transition," Wahl continues, "we all went down to New York [City] and had a congenial [and helpful] orientation program—learning about the various Philip Morris companies.

"In the flight department, we adopted the Philip Morris operating manual, which is stronger in some respects than the flight department operations specifications we had before. Philip Morris has greater fuel minimums, which takes a bit of the monkey off the pilot's back. Our takeoff minimums are more stringent than [FAR] Part 91. [And we now have] something we didn't have before: clearly spelled out crew duty times. We observe [them] as scrupulously as possible. We are getting more utilization out of the aircraft—

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# COMMUTER

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**Aspen Airways Spreads Its Wings**

**Dealing With the New Drug Regulations**

**Off the Blocks**

to determine if a positive test result was valid or not. The MRO also would have the authority to order a re-test.

If the MRO determines that a positive test result was caused by the illegal use of an illicit drug, he would first notify the employe involved, then the employer and, if that employe holds an FAA medical certificate, the Federal Air Surgeon. The affected employe would be prohibited from performing any safety or security functions until the MRO determined that he is once again fit to perform those tasks, assuming that the carrier has an EAP that includes provisions for rehabilitation.

Obviously, regional airline managers must have complete confidence in someone who makes decisions that can affect the safety of an airline's operations so dramatically.

But where can regional airlines find qualified MROs? Attorney Kassin suggests that operators might first want to see if a doctor currently on staff or under contract can perform the MRO duties, the advantage being that such a person is someone with whom the carrier is comfortable. Also, companies that have been performing drug testing and rehabilitation for other industries are now entering the aviation drug-testing field. Finally, there are aviation consulting firms that are beginning to offer anti-drug services.

One such aviation consultant is Washington, D.C.-based Phaneuf Associates Incorporated, which has been in business for over a decade, but only within the last few months has developed an anti-drug program. Phaneuf does have the advantage, however, of the experience of Dr. Homer Reighard, the former Federal Air Surgeon and consultant MRO on the DOT's internal drug-testing program, and Gene Weithoner, the former FAA Associate Administrator for Human Resource Management, who was at the agency when it introduced its in-house drug testing program. Initially, Phaneuf plans to charge $20 per specimen report and an hourly consulting physician fee of approximately $150 for MRO services in conjunction with a positive test result.

## SAFETY AND LEGAL WORRIES

While locating an MRO and finding an effective way to cover contractor employes are major challenges of the FAA's new drug rule, the safety and legal implications of the regulation are also primary concerns of regional airline executives.

For example, many CEOs believe that the rule doesn't go far enough. Some operators would like to test all employes, not just those performing security or safety functions. They also would like to be able to screen for the abuse of legal drugs as well as administer tests that could detect smaller amounts of illicit substances.

Said Stephen, "I think the vast majority of operators want to go beyond this standard, but the rule ties our hands. This is not an impairment rule. Nothing in this rule is designed to disqualify an individual who is [impaired while] on duty. . .the screening level is so high [that the rule] does not protect you from someone who is an occasional user. All it does is protect you from someone who is a habitual user or has used drugs recently."

FAA's Chase responded, "Nothing in this document precludes an employer from going beyond this particular regulatory structure. What it makes clear is that where an employer moves beyond what is prescribed in this rule, the employer is doing so under its own authority." In other words, a carrier would have to set up a second completely separate drug-testing program if it wanted to deviate at all from the standards that the FAA has outlined.


**FAA officials contend that operators must use the definitions of "maintenance" and "preventive maintenance" that are found in the appendix to FAR Part 43 when classifying employes for drug-testing purposes.**