



UNDER A CLOUD

*A series of accidents
raises serious questions
about the Piper Malibu.*

BY MARK R. TWOMBLY

The flagship of piston singles and the pride of Piper Aircraft Corporation is facing its severest test. Seven Malibus have broken up in flight in the last two years, and we don't know why yet. Nothing is more frightening for a pilot to contemplate than an airplane that comes apart in the air for

PHOTOGRAPHY BY MIKE FIZER



The Malibu has a stature and image of class unmatched by any other piston single.

unexplained reasons. Families and friends of those who died in the accidents obviously are most affected. So are owners of the more than 500 Malibus Piper has delivered over the past seven years. Many have confidence in their airplane, yet an unusually restrictive airworthiness directive issued after the most recent breakup prevents them from flying except in VFR conditions. Finally, everyone in general aviation has a stake in seeing the issue resolved because it may determine the future of Piper Aircraft Corporation.

The most recent in-flight breakup was on March 17 in northern Florida. Four days later a frustrated FAA, which along with the NTSB has had an ongoing investigation of Malibu accidents, issued an Emergency AD that immediately prohibited pilots from flying the Malibu in instrument meteorological conditions. The airplane can be flown on an IFR flight plan as long as the pilot remains in VFR conditions. In other words, Malibu pilots still can cruise at and above Flight Level 180 as long as they are in VMC. Even so, the IMC restriction removes much of the Malibu's utility.

The AD also prohibits pilots from using the autopilot, control wheel steering button (which when held depressed in-

terrupts the autopilot, freeing the pilot to adjust heading or altitude using the yoke), or vertical trim control to change altitude. The autopilot may still be used for level flight. The Bendix/King KAS 297 Altitude Preselect and Vertical Speed Select, if installed, must be physically removed from the aircraft and the electrical connections capped. In addition, pitot heat and alternate induction air must be used throughout the flight except for takeoff and landing.

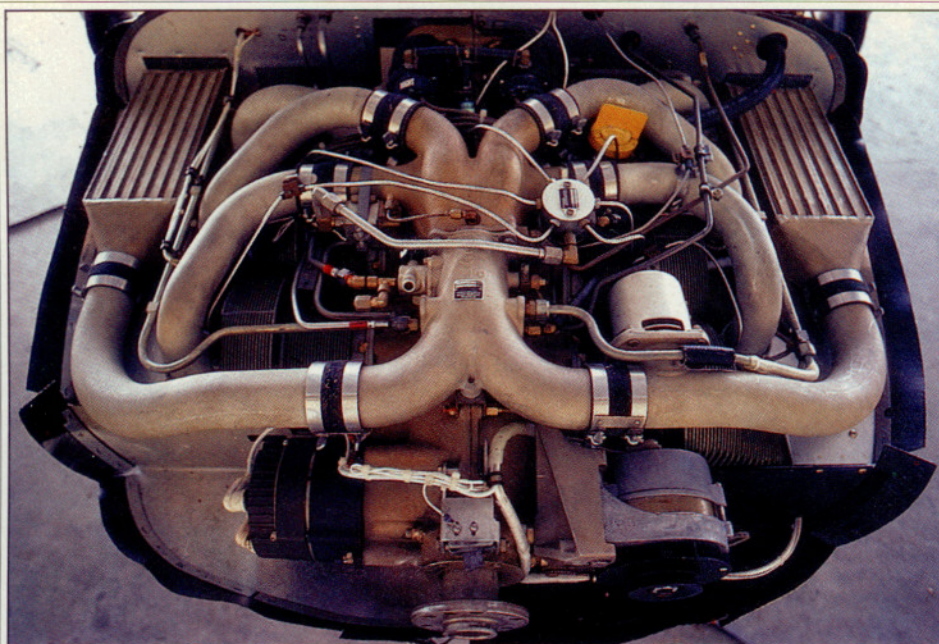
The AD has caused a firestorm of protest among Malibu owners, and with good reason. The AD addresses symptoms of the accidents rather than the causes. So far, no solution has emerged from the investigation of the accidents—only the AD—and that is what has people upset. In a letter to NTSB Chairman James L. Kolstad and FAA Administrator James B. Busey, AOPA President Phil Boyer noted that it has been nearly two years since the first breakup, "and our government appears no closer today than it was two years ago to solving the mystery, making appropriate recom-

mendations, and returning the Malibu fleet to adequate levels of service." AOPA has been acting as an information conduit to Malibu owners, passing on whatever is learned from the investigating parties.

Boyer called on the FAA and NTSB to release all information used by the FAA to justify the Emergency AD, and to make public all the facts of the in-flight breakup investigation. Boyer also asked Busey and Kolstad to set a date for either reaching a conclusion on the cause of the accidents, or easing or lifting the AD.

There are some common factors in the five accidents. The airplanes apparently were in IMC, although that is not certain. One of the key ingredients in the accident investigations is detailed weather data, but so far the NTSB has been unable to get the information.

Pilots were climbing, descending, or had just leveled off at an assigned altitude when large altitude deviations began, followed by high-speed descents and airframe failures. Each of the aircraft was equipped with a King KAP/KFC 150 flight control system. It is the only autopilot system certified in the Malibu. The KAS 297 allows the pilot to program a climb or descent rate for the autopilot to fly and a target altitude for



Piper and Continental have sparred over problems with the TSIO-520 engine in the Malibu. The twin turbocharged and intercooled powerplant is operated lean of peak at cruise.

leveling off.

Piper and Bendix/King have been participating in the investigation. Both companies have conducted extensive reviews of the design, certification, manufacture, and service history of their respective products, and no smoking guns have been uncovered.

An FAA review of the supplemental type certificate for the KFC 150 as it is installed in the Malibu concluded in February. According to King, the review confirmed that the autopilot performs as certified. The FAA noted that "the autopilot design does not indicate any shortcomings that would contribute to a hazardous flight condition," King said. Moisture contamination of the pitch and yaw servos in the tailcone has been a problem—King made a kit available in 1990 to shield the servos—but so far that has not been implicated in the accidents. King said that of the accident airplanes examined to date, the flight control servos showed no evidence of water damage, corrosion, or deterioration; the automatic pitch trim switch springs were intact and unbroken; and the clutch tensions checked within tolerances.

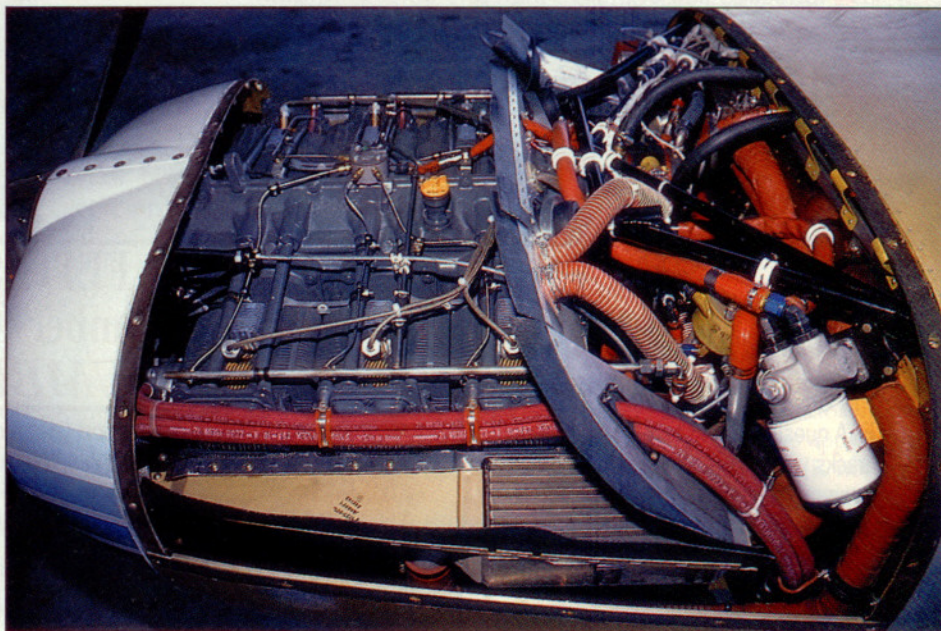
Piper says it devoted more than a year to its review, covering everything from the basic design to the pilot's operating handbook. Flight tests and failure load analyses confirmed that all control surfaces and structures exceed certification

requirements for load limits.

"We've spent more than 10,000 hours searching for a needle in a haystack," noted Raymond L. Dickey, Piper's vice president of product engineering. "We didn't find the needle, and we don't think there's one in there."

other parties are interested in the company, but according to Millar it could mean moving everything, including manufacturing, to a foreign country.

The Malibu's troubles will make it more difficult for Piper to find a willing investor. Meanwhile, Malibu owners—



The Mirage, which replaced the Continental-powered Malibu, has a 350-hp Lycoming TIO-540 in the nose. The extra power boosts cruise speed at the expense of fuel flow.

Piper is recommending that Malibu pilots be required to take formal proficiency training. "We believe there must be demonstrated competency to fly an aircraft like the Malibu," said Piper's owner, M. Stuart Millar. Piper will design an expanded training curriculum—

all Piper owners, for that matter—are concerned about continued technical and parts support from the factory.

When Piper debuted the Malibu at a splashy dealer conference in 1982, the airplane was immediately heralded as the classiest single available then and

Millar called it a "Piper type certificate"—based on what is currently being taught at the factory school. It will be offered to training schools and firms.

The AD was issued a few days after Socata, the light-airplane manufacturing division of France's Aerospatiale, terminated negotiations to buy Piper. Socata apparently pulled out because of concern over the potential outcome of all product liability claims pending against Piper.

Socata was seen as Piper's best hope for survival. The company has been operating on a shoestring for months, building only the occasional Malibu and Cheyenne. Employment is down to a skeleton crew of just over 300. Millar has said it will take a major outside investment to put the company back on its feet. Several

probably for years to come. Indeed it has been. The Malibu has a stature and image of class unmatched by any other piston single. The tall gear, extended nose, and long wing contribute to its aesthetic appeal, but it is the wide, six-place pressurized cabin and airstair door that really set the airplane apart.

The Malibu eclipsed the Cessna P210N, the only other pressurized piston single produced in volume, in appearance and performance. The all-new design, Piper's first in years, had a clear advantage over the P210N in cabin space and comfort. The 5.5-psi pressurization differential yields an 8,000-foot cabin altitude at the airplane's 25,000-foot maximum operating altitude. The P210N's 3.35-psi differential translates to a 12,100-foot cabin at 23,000 feet.

A clean airframe (metal bonding is used extensively to mate skins to structure) and high-aspect-ratio wing contribute to the Malibu's efficient high-altitude performance. The PA-46-310P Malibu, powered by a turbocharged and intercooled 310-hp Continental TSIO-520-BE engine, cruises at about 215 knots on 16 gallons per hour at 25,000 feet. The 350-hp Lycoming TIO-540-AE2A-powered PA-46-350P Mirage is capable of 225 knots, although at a higher fuel flow.

Where the P210N edges the Malibu is in handling qualities in turbulence and in the clouds. The Malibu's long wing is an advantage in climb and cruise, but it does not take the bumps as well as the P210N's shorter-span, wider-chord wing. The Malibu has lighter pitch forces than the P210N ("truck-like" is often used to describe the Cessna's handling) and also is less stable in yaw. Light control feel is a delightful characteristic when hand-flying in visual conditions, but less desirable in turbulent air or when the view out the windows is of the inside of clouds. The P210N has not been immune to airframe failures, especially early in the program when it was beset by vacuum system troubles and in thunderstorms. It was also once the subject of an AD restricting operation in IMC, but with modifications the airplane could be immediately returned to full service.

Teething problems beset the Malibu soon after it entered service. Owners received a ream of service letters, bulletins, and ADs. The most serious prob-

lems concerned the Continental engine, in particular, fretting of the crankcase at the main bearing support and shifting of the bearings. Piper's relationship with Continental became increasingly strained as the two companies sparred over engine problems. At one point Millar took the extraordinary step of contacting Malibu owners to ask them to stop flying their airplanes until a problem was corrected. To atone for the inconvenience, Millar bought first-class airline tickets for Malibu owners who had to make business trips.

In 1989 Piper switched to a Lycoming



Light controls are delightful in visual conditions, but less desirable in the clouds.

engine for the Malibu and in the process adopted the name Mirage. Dual 70-amp alternators and dual continuously driven vacuum pumps were included as standard equipment on the Mirage. The interior also received a facelift. Even at \$359,000 for the basic airplane (the price for a new Mirage equipped with color radar and electronic flight instruments topped \$550,000), orders flowed in and the backlog grew.

The first airframe failure was in May 1989 near Bristol, Indiana. The pilot had been cleared to descend to 12,000 feet and to deviate around "a big cell," according to the NTSB, when the airplane entered an area of level two and three thunderstorms. The airplane broke apart

soon after, scattering debris over a four-mile area. Three people died.

In February 1990 a Mirage broke up in flight near Bakersfield, California. The airplane experienced an uncontrolled descent from 9,000 feet and came apart at 7,800 feet. Two were killed.

The third accident took place in May 1990 near Naylor, Missouri. Frank Adams, a former top executive of Allied Signal Aerospace, parent of Bendix/King, and his wife were killed after their Malibu broke apart. According to the NTSB, Adams had changed to a cruising altitude of Flight Level 210 and had reported moderate turbulence. At the time, thunderstorm activity was reported 20 miles southwest.

A month later one person died when a Malibu broke up near Lakeville, Michigan. The pilot had been cleared to climb to 15,000 feet just prior to the breakup.

In March of this year, a family of four was killed near Bronson, Florida. The airframe failure occurred late at night shortly after the pilot, who had departed St. Petersburg, Florida, for Massachusetts, had been cleared to climb to higher altitude. Another Malibu owner who had planned to fly north from Florida that night canceled his trip after receiving a briefing that noted severe storms in northern Florida.

The other two in-flight breakups occurred outside the United States, one in Mexico and one in Japan. Reports indicate that each involved a VFR-rated pilot taking off into instrument conditions. In the Mexican accident, witnesses said the airplane entered a thunderstorm, then came out the bottom in pieces.

The NTSB may never pinpoint the cause of every Malibu breakup accident, but it seems obvious that some involved weather that either the pilot or the airplane could not handle. That is not unique to the Malibu, and the fix is the same as for any airplane: a trained and proficient pilot who flies within his and the airplane's limits. The Malibu is no more difficult to fly than other high-performance singles, and its systems are not overly complicated. But given the big-airplane cabin and cockpit, a preference for cruising in the flight levels, and the sophisticated avionics many owners opt for, it may be that pilots are lulled into believing the airplane is capable of more than it is, and are treading in places where they should not. □