Mitsubishi MU-2

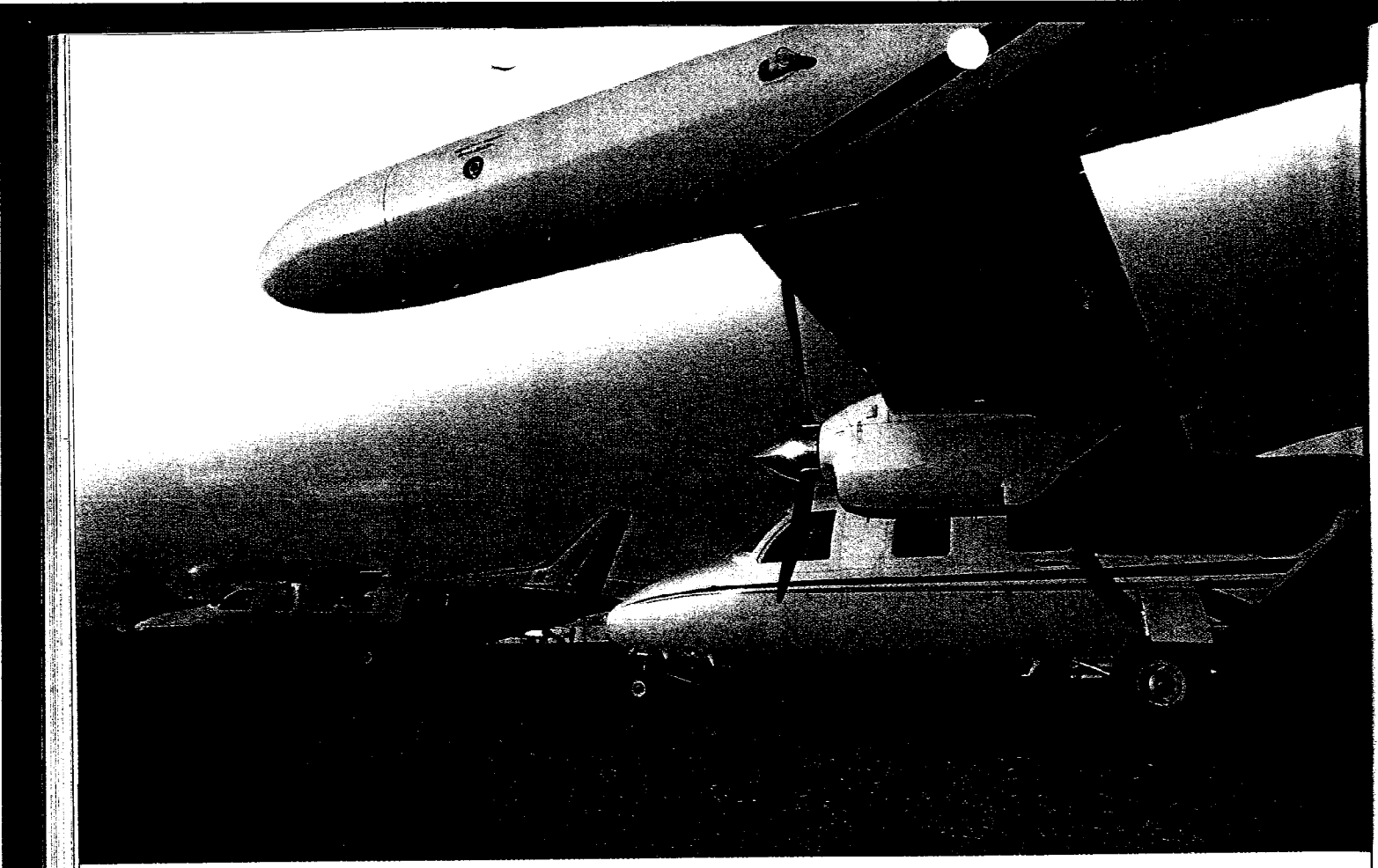
Long out of production, the Mitsubishi MU-2 has comprehensive support in every respect.

By Richard L. Collins

THE TWIN TURBOPROP MITSUBISHI MU-2 first came to the United States (from Japan) in the mid-'60s. Mitsubishi made a deal with Mooney where the airframes would be built in Japan and shipped to San Angelo, Texas, where Mooney would complete and market the airplanes. Mooney fell on hard times shortly after the agreement was signed, and the project was taken over by Mitsubishi Aircraft International, using the same plant in San Angelo. Mitsubishi competed effectively in the turboprop market, improving the MU-2 all the while. A stretched version was introduced in 1970, and both airplanes were produced into the '80s. The designations can be confusing at best, and many pilots refer to them as either short- or long-body MU-2s.

The last built got names, Marquise (long-body) and Solitaire (short-body) but these airplanes came along in 1979, after the blush was off the general aviation rose, and not too many were built.

In its time the MU-2 set the turboprop pace on speed.



It is fast, dealing with that 300-knot number that has been hard to reach in turboprops. The Solitaire has a top cruise speed of 320 knots, and the long-body Marquise tops out around 305 knots. It is powered by Garrett TPE331 engines, [redacted] which are fuel efficient and have [redacted] between overhauls with a single hot section inspection at 2,700 hours. The very first MU-2, flown only in Japan, was powered by Turbomeca Astazou engines, a real first-generation turboprop.

The short-body MU-2 is the more personal of the two airplanes. In the cabin it has two aft-facing seats and a couch across the rear, making a cozy club arrangement. There's ample baggage space. The long-body airplane is over six feet longer and is a true executive airplane, with indoor plumbing, though the vertical dimension of the circular cabin seems short when compared with the length of the cabin.

The fuselages of the two airplanes have differences other than length. The [redacted] fuselage aft of the passenger cabin. The long-body's main gear retracts into pods on each side of the fuselage. The gear pods probably account for most of the speed advantage the short body enjoys.

The MU-2 still appeals to a lot of people because it is a fine balance of speed and economy at a reasonable initial purchase price. The airplanes are well supported, and excellent training is available. [redacted] from the beginning there was a [redacted] to go down.

ance of the airplane suggested that it would be different to fly. Dig a little deeper and there are a lot more reasons for the airplane to be unique.

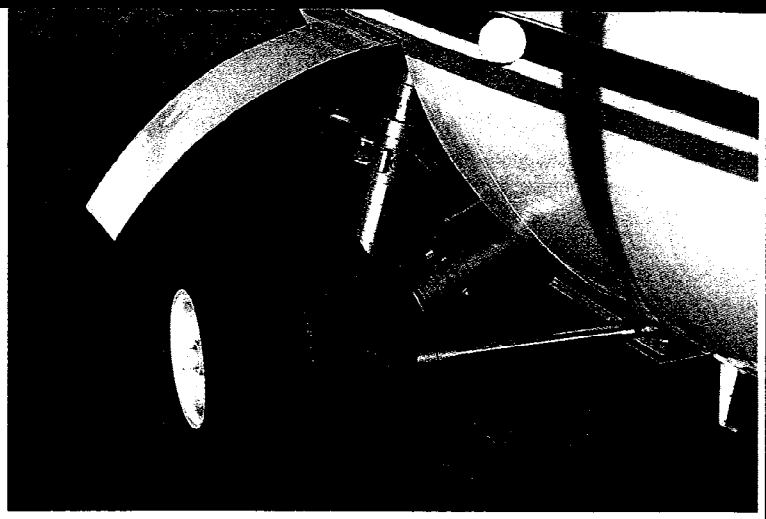
The MU-2 has high wing loading. The wing area is about the same as that of a Cessna Skyhawk, and the highest maximum takeoff weight shown in *Vref,* an aircraft value reference, is 11,575 pounds, for the last Marquise built. So, the stalling speed is a bit on the high side. The MU-2's designers wanted high cruise speed; a small wing is optimum for that, but you want a bigger wing to fly slowly on approach. The need for more wing is addressed by full-span flaps that extend to 40 degrees. The effective flaps system lowers the stalling [redacted]

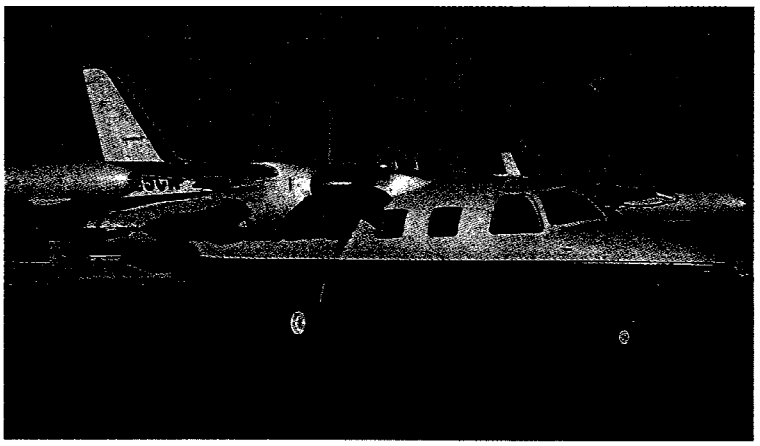
With the flaps using up most all the trailing edge of the wing, Mitsubishi turned to spoilers for roll control. There is nothing unusual about this. Jetliners do it, too, but there spoilers are to augment roll control initiated by the ailerons and the spoilers are not primary. When you move the control wheel of an MU-2 left and right you do nothing but raise a spoiler on the wing you want to go down.

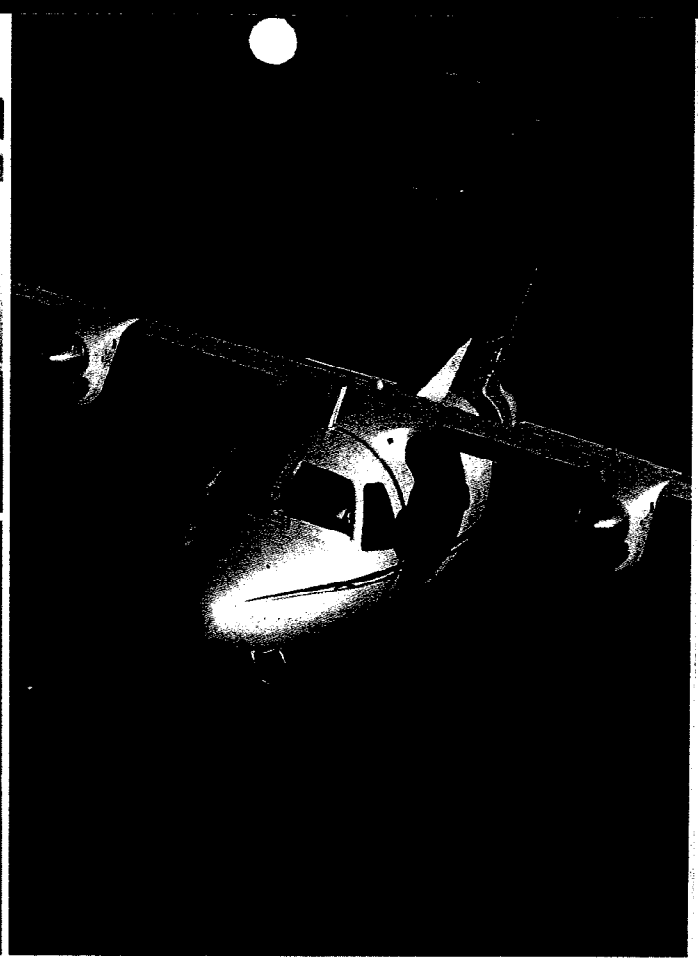
trim panels on each wing on the trailing edge of the flaps. These are operated by a switch, one of the most important controls on an MU-2. More about that in a minute.

Next, look at the geometry of the airplane. The wheelbase is long, the main gear narrow, and a lot of the weight is high and outboard of that narrow main landing gear.

Pilots who looked at the MU-2 and decided it was going to be different were right on the mark. One thing that was lacking early in the MU-2 program was training to complete understanding even for pilots who were demonstrating the airplane. The first pilot report I wrote, in 1971, was laced with inaccura[redacted] the pilot demonstrating the airplane. I remember the flight as being one with more questions than answers. Fortunately it was a clear day.







In fairness to that demo pilot, this was at a time when real pilots didn't do much training. Kick the tires and light the fires was the word. That simply does not work with the MU-2. The airplane is different; it demands understanding, and those who don't take the trouble to understand the airplane tend to wind up in smoking holes. It was 1980 before I flew an MU-2 with a demo pilot who truly understood how to show someone else how to fly the airplane. That made a big difference.

■ It's easy to see the difference between the long and short MU-2 airplanes in these photos, particularly in the main landing gear arrangement. The gear on the short body retracts into the fuselage leaving no protrusion, while on the long-body airplane the gear folds into pods on the fuselage to preserve space in the cabin.

Even today, with good training available, the MU-2's accident rate falls in with the more average piston singles and light twins instead of the rest of the turboprop fleet.

Reading the accident reports shows that the accident history has little to do with the airplane as a machine and a lot to do with pilot understanding of the airplane. The MU-2 is, simply, an airplane that can be safely flown one way and one way only.

The MU-2 safety record prompted the NTSB to request that the FAA do a special certification review (SCR) of the airplane in the early '80s. Such a review goes through the certification basis to confirm that the airplane does indeed meet all the requirements. SCRs are relatively rare, but the DC-10, early Learjets, V-tail Bonanzas and Piper Malibu/Mirages have also gone through SCRs. I'll add that the general aviation airplanes subjected to SCRs have come through with basically clean bills of health and pilots flying them can be doubly sure they meet the standards.

There was no defined pattern of accidents in MU-2s that triggered the SCR; the airplane just had more serious wrecks than other turboprops. The only changes required after the SCR were higher-wattage pitot tube heaters for older models, replacement of a trim tab clevis that had already been the object of a service bulletin and some safety wire on a bleed air fitting on the engines. None of these things were determined to have been a factor in an accident, but the FAA thought they needed improvement.

That left the pilot pretty much in question, and Mitsubishi addressed this on its own, not at the request of the FAA, with some operational changes. The MU-2 is a good short-field airplane, but Mitsubishi apparently felt pilots were asking too much of it. All the takeoff and landing distances in the manual were increased and a five-degree flaps setting is now specified for hot-day takeoffs with heavy loads. Twenty-degree flaps are used for normal takeoffs.

Further, the engine-out drill after takeoff came to be taught in a manner more akin to transport category jets than prop twins. The blue line on the airspeed indicator marking the best single-engine rate-of-climb speed was relegated to a secondary role. Instead, the airplane needs to be flown at a slower speed for best engine-out angle of climb in the takeoff configuration. This is the speed jet pilots use for initial climb with an engine out and it is called V_2. That speed in an MU-2 is 120 to 130 knots, depending on weight and other conditions. Once clear of all obstacles the airplane is slowly cleaned up and the air-

speed target becomes that revered 152-knot blue line.

The MU-2 is like any light propeller twin: it requires only a multiengine rating to fly, and there are no engine-out performance guarantees. In fact, the MU-2 single-engine performance is about the same as many light piston twins when engine-out rate of climb is considered, and not as good when engine-out climb gradient is considered because of the high blue line speed. There's also the requirement for acceleration as and after the airplane is cleaned up—not easy on one engine.

Many thought, after the SCR, that the FAA should require a type rating to fly the MU-2 to ensure proper training. The FAA didn't rise to that proposal.

The MU-2 is quite trim sensitive. When something changes, trim, especially roll trim, becomes critical. With an engine out, for example, in most airplanes you might step on a rudder and crank in some aileron to keep things under control, but this leads to problems

raises a spoiler on one wing. Were the right engine to fail and the pilot to roll the wheel to the left while getting on the left rudder, the spoiler on the left wing would be up. A spoiler is literal—it spoils lift on the wing. That is not a good thing to do in an airplane that doesn't climb well on one engine in the best of circumstances.

The optimum drill is to, in any phase of flight, always use roll trim so that the control wheel remains centered and the spoilers are down—except when you want to roll into or out of a turn. Like other spoiler-controlled airplanes there is a spring that helps keep the control wheel in the center unless you apply pressure to move it.

I flew MU-2s for photo missions a couple of times, and, believe me, all movement around the photo platform is best done with your feet while the wheel is left centered.

The narrow landing gear and the spoilers can make crosswind takeoffs interesting. The spoilers can have some effect in keeping the wings level early in the takeoff roll, but not nearly as much as ailerons. If the wind is trying to lift a wing, spoiling lift on that wing can help, but the airplane might still get the leans in a strong crosswind. And you don't particularly want to try to lift off with one spoiler all the way up.

When using spoilers for roll control

airplane. The way to deal with that is to forget it. Pilots who fly without using rudder will feel right at home in an MU-2 until faced with asymmetric power or a strong crosswind.

Another notable characteristic of the MU-2 relates to the extremely high sink rates that can develop, especially with full flaps. The drag is out of sight, and this can be seen in some MU-2 wrecks where the pilot was flying visually, not minding the instrument panel, and a high sink rate developed on approach. Even with the flaps up, the MU-2 can descend *and* decelerate rapidly, which is something most prop pilots aren't used to. To convince yourself of this just look at an MU-2 from the front. The arcs of those big props total over 16 feet in front of a wingspan of just over 39 feet. There's a lot of drag there when the power is pulled back to flight idle.

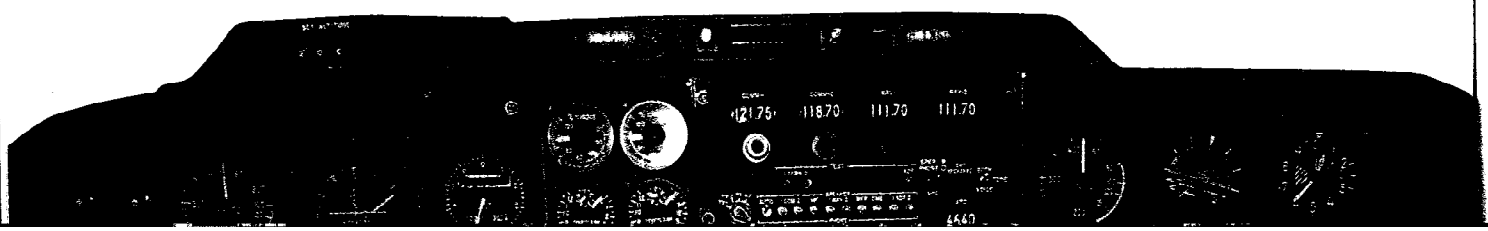
Insurance cost and availability is a big factor in all aircraft operations now, and the MU-2 is certainly not immune to the vagaries of the market.

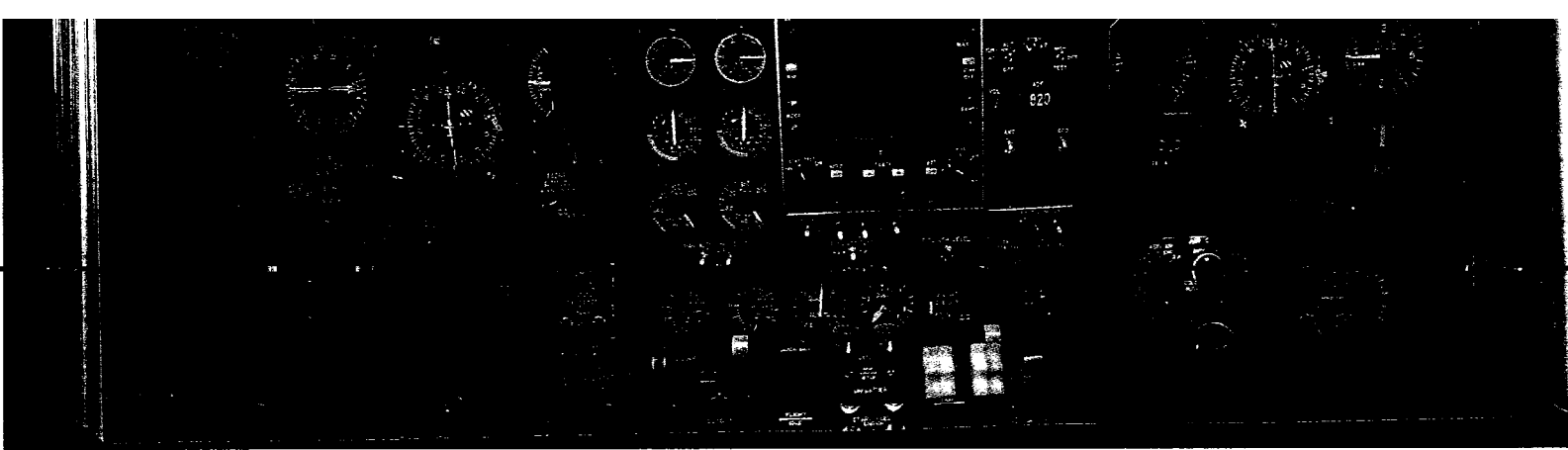
MU-2 training is in the process of being transferred from FlightSafety International to Simcom as this is being written. Good training is ensured, too, as Simcom has a 10-year contract with Mitsubishi to provide this training. The simulators used by FlightSafety are already in place at Simcom's Orlando facility and the contract with Mitsubishi calls for two new simulators to be on line in the next couple of years.

Insurance is a big factor in all aircraft

market. If you just call for a quick quote, one company will offer a million liability per accident with a $100,000 a seat limitation and a maximum hull value of $500,000. That $100,000 a seat is not really insurance, and experienced pilots can likely do better than those numbers.

I knew one MU-2 owner who flew





without insurance. He said that if the airplane wound up in that proverbial smoking hole, he'd be with it and the only persons who would lose would be his ex-wives.

Most insurance companies want MU-2 pilots to have a lot of hours and a lot of multiengine experience before they will insure them in the airplane for personal and business use. Again, that is no reflection on the airplane. It is just an acknowledgment that this is a different airplane and that you had better not fly it unless you are well-trained and sharp.

All the MU-2s (and other Garrett-powered airplanes) are noisy on the ground,

side. Work on the later models quieted that interior noise somewhat, but the engines and props are still out there making horsepower and thrust on each side of the cabin.

Comparing the short- and long-body airplanes, the longer one is the easier of the two to tame, though they both have the characteristics that get the best of some pilots. It's jut a matter of degree. On the other hand, the short airplane is more the true aerial hot rod. If I were buying an MU-2, I would select the short one in a heartbeat.

The MU-2 isn't a true long-range airplane, though later models have more fuel than earlier ones. It does get up and down quickly, so stops don't take a lot of time. For average trips, in the 300 to 600 nm range, the MU-2 would be close to the flying time of the slowest jets on not a lot more fuel than would be required in the highest horsepower piston twins.

The last time *Flying* visited the MU-2

the Garrett engines, which were rated at 3,600 TBO at the time. (TBO has since been increased to 5,400 hours.)

Things have changed in 16 years, and MU-2 values are now much more solid. That 1975 short-body is now worth $480,000, according to *Aircraft Bluebook Price Digest*.

There are 411 MU-2s on the FAA Registry, according to *Vref.* More of these were built in the 1972-1978 time period than at any other time.

One reason that MU-2 values are good is that the airplanes are well supported. After Mitsubishi sold its Diamond jet to Beech and went out of the general aviation business, Beech provided support by Mitsubishi and application of the support is now contracted to Turbine Aircraft Services in Dallas, which employs many former Mitsubishi employees.

Parts are as or more available than for other out-of-production turboprops. Technical support is excellent and Mitsubishi still does any required engineering and prepares necessary publications.

Turbine Aircraft Services also organizes free MU-2 safety seminars, runs the customer service program and coordinates with the training agency, Simcom. Mitsubishi has appointed five service centers in the United States where full service is available for the airplanes.

So if your MU-2 has a problem, help is at hand. Mitsubishi's dedication to this is pretty remarkable.

1971 Mitsubishi (long-body) MU-2G

Information in this spec box is from the July 1971 issue of Flying. The airplane was fully equipped for IFR of the day. The numbers are as they appeared then. The price today is an average of that in Aircraft Bluebook Price Digest [illegible]. Performance figures are from the manufacturer and are at maximum weight in standard conditions at sea level unless otherwise noted.

Price as tested	[illegible]
Price today	[illegible]
Engines	[illegible]
TBO	[illegible]
Seats	[illegible]
Props	[illegible]
Length	[illegible]
Height	[illegible]
Wingspan	[illegible]
Aspect ratio	[illegible]
Wing area	[illegible]
Wing loading	[illegible]
Empty weight as tested	[illegible]
Useful load	[illegible]
Fuel	366 gals [illegible]
Maximum takeoff weight	[illegible]
Full fuel payload	[illegible]
Power loading	[illegible]
Rate of climb	[illegible]
Single-engine rate of climb	[illegible]
Service ceiling (at 9,200 lbs)	27,000 ft
Single-engine service ceiling (at 9,200 lbs)	11,600 ft
Max cruise at 10,000 ft	281 kts
Economy cruise at FL 230	270 kts
Range at economy cruise, 45 min reserve	[illegible]
Stalling speed, clean	[illegible]

The MU-2 isn't the lowest-priced twin turboprop in the marketplace. According to *Vref,* that distinction goes to the Cheyenne I, when like year models are compared. A 1978 short-body MU-2 runs $525,000, according to *Vref,* and a long-body is $535,000. That's little difference. A 1978 Cheyenne I is $485,000. The top value in 1978 turboprops is a Cessna 441 at $1,130,000, or more than twice as much as an MU-2, which has about the same performance. The lowest price shown for an MU-2 is $190,000 for a 1967 model.

for a good solid MU-2 is $500,000 to $600,000. The later models, the Marquise and Solitaire, fetch a lot more money because they have the upgraded Dash 10 Garrett engines that produce a lot more power at altitude. With a small wing, there's just nothing like horsepower to improve cruise performance, especially at altitude. The Marquise and Solitaire were certified to a maximum altitude of 31,000 feet.

A 1979 Solitaire is listed at $800,000 and a Marquise at $815,000. Those values are close to $300,000 higher than like models of the previous year. That gives you some idea of the increase in performance.

There are various engine upgrades for older models, including a switch to the Dash 10. There are a lot of other differences between model year airplanes. A prospective buyer should do a lot of research to learn about the mods available and the improvements in the air-

planes have their strengths. The big cabin might be wonderful, but as these airplanes become prized personal possessions, the short-body might be the real MU-2 to a lot of pilots.

The MU-2 is a beautifully built and sturdy airframe. The economy of operation is good with a fuel flow of 80 or 85 gallons of fuel per hour in the low twenties while going 300 knots or better in a short-body Solitaire or a little slower in a long-body Marquise. Airplanes with earlier than Dash 10 engines would find their maximum cruise at a lower altitude and a higher fuel flow.

The MU-2 is quite a package. You just have to learn how to fly it. □