Import

Love it or leave it, the MU-2 makes a rip-roaring personal airplane.

IT ALL STARTED OVER dinner with a heavy-hitter who owned a pressurized twin. He was hot to buy a Mitsubishi MU-2 as his personal airplane, and was spurred on by the fact that Beech has taken on support of the MU-2 in a [illegible] move to the acquisition of its [illegible] the Mitsubishi Diamond. The [illegible] of the MU-2 was appealing; the

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PHOTOGRAPHY BY GORDON BOW

into service on contract freight runs for the big national overnight delivery services, and is eyeing four more.)

The smaller MU-2 might be useful for overnight check runs, but its body is too small for wide application as a freighter. The two airplanes are really as different as night and day: the big one is a walker; the little one is a speedster. And prices are surprisingly low—the well-appointed MU-2 that I flew was on the block for $175,000; that's about half the price of a new pressurized single, and not much more than the value of the remaining TBO of the two Garrett turboprop engines plus the scrap value of the airframe parts. Sad, but true.

Horror stories about insurance for MU-2 owner-pilots abound, although the insurance game seems to work reasonably well for the Part 135 folks: Bruce Martin, owner of Martinaire, was quite able to purchase the required liability and hull insurance for his MU-2 freighter fleet. Barron Thomas says that MU-2 insurance for the rest of us is readily available—for a price. To test the market, I called my conservative insurance broker to see how my insurance company of 35 years, USAIG, would react if I were to roll a seven and wind up with an MU-2.

"Lee, it's Dick. I just sold my airplane and got another one, need to change my policy."

"That's great, what did you buy?"

"Oh man, I got the prettiest little short-body MU-2 that you have ever seen."

"Hello, hello, hello, I think we have a bad connection...been cut off..."

If I would agree to go to FlightSafety for initial training and return every six months for recurrent training, then we could open discussions with the insurance company. But, I was warned, that still wouldn't make it good. The hull premium would probably be 80 percent higher than for, say, a King Air; the liability would be substantially higher, and the upper limit might be lower. He was not happy about insuring an MU-2 for me and was glad that I was only kidding. (I'd add that the premium for my 210 increased almost 50 percent this year.)

So what's with the MU-2? Is it an airplane that will bite anyone other than the bright young time-building pilot who flies all night, every night, carrying packages? Is the dream of a 300-knot personal hot rod destined always to end in a plume of black smoke?

I had never before flown a short-body MU-2, and it had been years since I had flown a long-body. The last flight in a long one was the only time I felt that I flew reasonably well. The Mitsubishi pilot who flew with me took considerable time explaining the differences between an MU-2 and other airplanes, and, understanding these differences, I was able to fly the airplane and enjoy the experience. I found that it was not a mean airplane but one that would reward understanding and a good touch on the controls with a reasonable ride. I relearned some of these lessons in flying the short-body MU-2 and found that it is a bit more demanding than the larger airplane. (If you think I'm ducking an issue by not calling them Marquise and Solitaire, or using the letter suffixes, you're right. Those names remain a mystery to me; MU-2s are either short or long ones.)

The cockpit of an MU-2 is roomy enough, and while it lacks a lot of human-factors engineering, it takes only a moment to find everything you need. The first start was off a power cart

"ALTITUDE AND RATE-OF-DESCENT AWARENESS IS VITAL FOR LANDING THIS AIRPLANE."

(Martin says that this is a requirement with his freighters), but a subsequent start with the airplane's NiCad battery system worked equally well. The checklist on the airplane is not overly involved and corresponds with that of any other Garrett-powered turboprop.

On takeoff the acceleration is good, almost like a nickel rocket, and the nosewheel steering is positive enough. If there is a crosswind, forget it and just keep the airplane on the runway. The roll-control spoilers don't do much to keep the wings level, and the narrow and relatively soft landing gear allows the wind to adjust the roll attitude of the airplane while you are charging down the runway. (The MU-2 has no history of accidents related to this.)

The MU-2 has a long wheelbase because the main gear has to retract into the fuselage without ejecting the rear-seat passengers. It takes a humongous tug to rotate the airplane, and then the back pressure must be released as the airplane rotates, lest the beginning of a loop be attempted. This sounds bad but is easy to handle on an MU-2. Pull to take off, and as soon as it is off the ground, push forward. The control forces are heavy enough that overcontrolling doesn't enter the picture, and you can do it right the first time if you know it is coming.

I was flying the airplane on a clear day. I must admit that I wondered how I would feel, five months and 29 days out of FlightSafety, doing it on a dark and rainy night after spending all day making big deals.

Landings in the airplane are arrivals. You have to drive it on, and when the main gear, way back there, touches, the nosewheel quickly slams onto the runway. It might be done more gracefully with practice, but few pilots of short-body MU-2s will bet money on a squeaker every time. And everyone quickly learns to appreciate that "overbuilt" landing gear.

To fly an MU-2 reasonably well, you have to trim it well. If the airplane is not trimmed properly, it is hard, even mean, to fly. With an engine out, it feels almost out of control until its roll and yaw are trimmed; then it's a pussycat. The oddest feeling that I had when flying the airplane came after power was restored following an engine-out drill. Roll and yaw trim were set for single-engine flight; with both engines going, the airplane was completely out of trim and felt as though it were assaulting the air sideways. This happened on right base to land at Love Field in Dallas, and I never got the airplane trimmed correctly before landing; the gallery had a good har-de-har at the little show that ensued.

It's not easy to think the same way that the airplane trims. Roll trim is located on the flaps, and roll with the control wheel is induced by spoilers atop the wings, so the physical motions of trimming are different. Say, for example, the right engine is out. Your left foot is at the firewall and the control wheel is far to the left. But the airplane might well still be turning right a little, and the right wing might be down. What the airplane is saying is that the controls you are using are okay, but there's a better way on the pedestal in the trim controls. The rudder trim is straightforward—just trim off the pressure as in any airplane—but the roll trim is different. Instead of trimming off pressure, you trim away control-wheel displacement. As left roll trim is applied, the object is to move the wheel back to the right, trimming until the control wheel is centered.

If the MU-2 has a significant characteristic that has to be practiced, learned and relearned, it relates to trim. I'm sure that if you took a pilot who had never flown an MU-2, didn't

tell him about the trim, and let him take off with the airplane significantly out of trim in roll and yaw, he'd be so convinced that the airplane was out of control that he'd go ahead and crash just to prove it.

That quirk is, of course, something that a pilot can and should learn in the beginning. The only other MU-2 feature I could see that might nab an entrepreneur pilot is the very high rate of sink that can develop almost instantly when the power is pulled back to flight idle on approach. This could hurt on a

or at night. Altitude and rate-of-descent awareness is vital for landing

in the trees. With its high wing loading

cant. A pilot peering at distant lights and not minding the instruments could get into trouble quickly. He can get out of trouble quickly by adding power, but that obviously must be done before arriving in the weeds.

The MU-2's attributes are a fine airframe, good engines (Pratt & Whitney lovers will argue that point), good efficiency (on a given trip it would hardly cost more in jet-A than something like a Duke might cost in 100-octane), and maintenance costs that should be reasonable until and unless an unscheduled glitch of major proportions should occur. That's not to say that it can be flown for the price of a Skyhawk; but it can be a relatively small step up for the user of a pressurized piston twin. Even the insurance has to be put into context. Because the hull value is low, a much higher-percentage hull premium doesn't mean so much. The liability would be the biggest rub, because a person with enough income and worth to buy one would want more than the $1 million coverage that so many insurers now consider a top figure. There is also the cost of going to FlightSafety or somewhere similar every six months, but that should be a requirement for owner-pilots of all twins

for less than half the price of a pressurized single..." So which would you rather have? I like new ones because of a personal bond with airplanes. There's great enjoyment to be had the budget for fuel, and the resources to handle the big pop that might come with a premature engine replacement, it would be tempting to call Barron Thomas and say, "If you'll paint it red, white and blue and put in a purple interior, I'll give you...." □

USED MARKET

Adjustment Period

Learning to live

determine if, in fact, it meets the rules...

idiosyncrasies.

The MU-2 is now, and maybe always was, the fastest airplane for the money. Various models of the high-performance turboprop are currently available in good condition for the price of a new high-performance single, and nearly new MU-2s can be had for the price of a new unpressurized piston twin. But the MU-2 is one of the most controversial general aviation airplanes ever built. It is unlike any other turboprop, making it exciting to some pilots and loathsome to others.

The MU-2 went out of production at the end of 1985, after a 20-year run that saw 758 of the stubby airplanes delivered. A significant reason to reexamine the MU-2 is that Beech now delivers all parts and maintenance support under an agreement with Mitsubishi. The legendary Beech product support removes all question about the operations future of the MU-2.

With the question of continued support answered, attention shifts to the airplane itself, to its flying qualities, its performance and its safety record

which has had enormous impact on insurance costs. The MU-2 has had a poor safety record—the worst of the popular turboprops—and thus costs much more to insure than other air-

been asking why the MU-2 safety record is so bad and, so far, the answer has been pilot training and proficiency.

In 1983, at the request of the National Transportation Safety Board, the FAA launched a special certification review (SCR) of the MU-2. An SCR is usually conducted when a pattern of accidents emerges, or an area of the aircraft design (such as the systems in the DC-10) is suspect. With the MU-2, there was no definable pattern to the fatal accidents except that they happened more frequently than with other turboprops.

Without a definite pattern of accidents to examine, the FAA looked at all aspects of the MU-2, concentrating on its performance in icing, its handling qualities during an instrument approach and its behavior and performance with an engine out. The FAA also considered requiring a type rating and a two-pilot crew for flying the airplane, but the agency rejected both changes.

The MU-2 emerged from the SCR with essentially a clean bill of health. The only three specific actions required by the SCR were to replace pitot-tube heaters with higher wattage units on older MU-2s; replace a trim-tab clevis that had been the object of a service bulletin; and safety-wire a bleed-air fitting on the engine. Although unable to determine that any of these three factors was involved in any accidents, the FAA SCR team decided

that the safety record

As a result of the SCR, but not a requirement of it, Mitsubishi has also made changes in the aircraft operating manual. The primary differences

called for increased takeoff and land-

days with heavy loads. The MU-2 has always had extremely good short-field performance, and the new charts are more conservative, increasing the safety margins.

It's too bad the FAA didn't see fit to require a type rating because it ap-

pears that training is the only way to make a competent pilot safe in the MU-2. Everything about the way the airplane flies is a little different. In some aspects it is very different from other propeller twins, and pilots need to learn the proper techniques.

FlightSafety International offers complete simulator based training for [illegible] the MU-2 at its center in Houston. The five-day initial training course costs $6,100 and includes 10 hours in the full-motion visual simulator—20 hours if you ride right seat while another pilot flies—plus as much flying in the airplane as necessary to reach appropriate levels of proficiency.

Al Johnson, head of MU-2 training, says he sees the same problem in new MU-2 pilots as he sees in pilots of other types—lack of instrument proficiency. Pilots who are not sharp on instrument attitude flying and IFR procedures have a difficult time brushing up their instrument skills and learning to fly the MU-2 at the same time. As with all other airplanes, poor weather is a factor in most MU-2 crashes, so good basic instrument skills are a prerequisite. FlightSafety will graduate a student as a VFR-only MU-2 pilot if the pilot can't handle the instrument procedures, but such an endorsement carries little weight with the insurance companies.

Beyond basic instrument skills, it is the high wing loading and more neutral stability of the MU-2 that give new pilots problems. The wing loading on the MU-2 can be as high as 65 pounds per square foot in the late-model, long-body airplanes—close to the 67.2 pounds of the Learjet 35. High wing loading means that the MU-2 flies more like a jet than the thick-wing turboprops or piston twins most prospective MU-2 pilots are used to flying. Because of its wing loading, the MU-2, like the jets, is sensitive to precise pitch control. Small changes in attitude generate large changes in vertical velocity. Power management also becomes more critical with the highly loaded wing. It is possible for the MU-2 both to descend and decelerate rapidly at the same time, something most prop pilots aren't used to experiencing.

The MU-2 has long-period static stability in pitch, which means the airplane does not tend to stay exactly on its trimmed airspeed. Trim the airplane and it will wander about the trimmed airspeed and altitude by a few knots and a few hundred feet. It is not unstable and divergent, but it simply does not stay where you put it with the consistency of some airplanes. The MU-2 pilot therefore needs a better instrument scan and needs to pay more attention to attitude at all times. The MU-2 is more difficult to fly on instruments.

Again, because of its high wing loading, flap position is critical in the MU-2. The double-slotted Fowler flaps extend across the entire trailing edge and, fully extended, they increase total wing area by about one third. The effi- to 81 knots or less, which is low for such a high wing loading. The initial flap setting of five degrees adds a great deal of lift but little drag. The next flap position (20 degrees) adds lots of drag, and the final, 40-degree setting with power off brings the MU-2 down like a rock. Normal takeoffs and landings are made with 20 degrees of flaps.

With the flaps consuming all available space on the wing trailing edge, roll control is handled by differential spoilers that kill lift on one wing to roll the airplane. Spoilers are common on jets and normally act to augment roll authority that is initiated by ailerons. But because the MU-2 has spoilers only, the airplane must constantly be trimmed in level flight so that both spoilers are down and not stealing lift. Roll trim is accomplished by small, electrically actuated trim tabs on the trailing edges of the flaps.

"JUST STAY ON THE PEDALS AS THOUGH YOU WERE FLYING A TAILDRAGGER, AND EVERYTHING WORKS OUT FINE."

The spoilers provide good roll authority at all airspeeds but have a different feel—actually a lack of feel—compared with ailerons. On the runway the spoilers are worthless for holding a wing down in a crosswind, so you stay on top of the rudder pedals and only at liftoff do you start controlling roll with the wheel.

The most challenging flying in the MU-2, as in any multiengine airplane, is with an engine out. If an engine quits on takeoff there are three major drag producers, some aspects of which are peculiar to the MU-2. An obvious source of drag is the windmilling propeller, which should have been driven to a near-feathered position by the negative torque sensing system (NTS). NTS, a no-go item, has to be tested before each flight. In the NTS mode the prop blades are at a 55-degree angle, windmilling the fixed-shaft Garrett TPE331 engine. FlightSafety instructors say that the MU-2 with a prop set by the NTS climbs at about 200 fpm feathered.

The next consideration is spoiler position. To control the asymmetric thrust during an engine failure you need considerable control-wheel deflection, which means that a spoiler is extended and reducing lift. The way to cure this is to reach down below the power levers and twist the roll trim knob to level the wings with the control wheel centered. Holding the wings level with the control wheel puts a spoiler up rather than using the trailing-edge trim tab, and costs 100 to 150 fpm in engine-out climb.

The MU-2's short, stubby landing gear does not add as much drag as that on many airplanes. However, large gear doors open during the retraction sequence, so you will lose climb performance (and maybe even altitude) during an engine-out gear retraction.

Given these three variables, FlightSafety does not teach a rigid clean-up procedure after an engine failure on takeoff. The first requirement is to control the airplane; then think for a moment about what is causing the greatest problem, and address that first.

I flew through several takeoff engine failures in the FlightSafety simulator and found that you need to push the rudder to the floor to maintain directional control, while simultaneously deflecting the wheel toward the operating engine. I found it most natural to reach immediately for the trim knob and start trimming in roll toward the direction I had the wheel deflected. This required little or no concentration, and provided a couple of seconds to be sure I had identified the failed engine and had the airplane under control before feathering the prop and securing the engine. Roll trim is much more important than rudder trim. Although the rudder requires a long throw on the pedals, it is not inordinately heavy compared with that of other turbine airplanes.

FlightSafety teaches you to maintain a speed near that of rotation until reaching 400 feet agl, much as a pilot does during the second segment of engine-out climb in a jet. Rotation comes around 100 knots, depending on the model, and it is important to keep the nose up to maintain that speed for initial climb. If you release back pressure

the airplane starts sinking. Forget about the 152-knot VYSE blueline; that's for best single-engine rate of climb after the airplane is cleaned up and on its way. Right after liftoff you care about climb gradient and, in a dirty configuration, that is optimum at a speed near VMCA.

I found the engine-out characteristics of the MU-2 manageable from the start but, with practice, the motions became more rapid and natural. The simulator represents the worst case because even with the simulated visibility set for VFR it is always night, so only the instruments can give you precise information on what is happening. A few hours of wrestling with the simulator every year, or preferably every six months, would keep you sharp on all IFR and engine-out procedures and techniques. FlightSafety instructors, and the flight manual, also remind you that the MU-2 is not a transport-category airplane, so there are times when the airplane will not be able to fly after an engine failure. If you choose to take off on a hot day at a high-altitude airport with a heavy load, you should be prepared to land straight ahead if an engine quits.

Most simulators are more difficult to fly than the actual airplane because they do not provide all of the sensory inputs of actual flight, but the MU-2 simulator is better than most. If you can do a good job of flying the FlightSafety simulator you will do a very good job of flying the airplane. The reverse probably won't be true until you gain some experience in the simulator.

Landing the MU-2 is an exercise in speed and glidepath control. Depending on the model, VREF is between 95 and 100 knots, which is 1.3 VSO. As with all VREF speeds, this is the minimum speed on final with no fudge factors for wind or turbulence. I found that VREF plus 10 knots worked well in the simulator and the airplane. If you're on speed and glidepath, only a small power reduction and virtually no flare is needed for an acceptable landing. You can try to hold the airplane off and work for a smoother touchdown, and it may or may not pay off. The smoothest touchdown I could make, or that I have seen in an MU-2, is firm by the standard of most turboprops, so many MU-2 pilots give up trying for the greaser and let the airplane land itself.

Because of the landing-gear geometry, it is impossible to keep the nosewheel from banging onto the runway very shortly after the mainwheels touch. The best landings I could make came from a relatively shallow approach, but even then the nosewheel thumped the pavement with authority. After a time you accept that this is just the nature of the airplane—plop-bang, it's how an MU-2 lands.

Once on the runway the MU-2 demands your full attention on the rudder to keep it going straight. The airplane rocks on its narrow gear, and any asymmetry as the props come back into reverse changes the airplane's direction. As in the landing, the feeling is different. You may not feel completely in control on roll-out, but if you just stay on the pedals as though you were flying a taildragger, everything works out fine. The prop reverse is extremely effective and the airplane can be landed and stopped easily in well under 2,000 feet.

Systems on the MU-2 are straightforward. Fuel feeds into a center wing tank from which both engines draw. The only fuel-management requirement is to be sure that the fuel pumps are off when the two small outboard wing tanks run dry. Fuel from the tip tanks is fed to the center by bleed-air pressure. The electrical system is basic and operates all major subsystems such as flaps and the landing gear. Environmental control is via an air cycle machine that uses engine bleed air for both heating and cooling.

"AT NORMAL CRUISE POWER, THE LATER MODELS CAN EASILY FLY FOR MORE THAN FOUR HOURS."

The original short-body airplane is approved to carry nine people, but a more comfortable load would be four in the cabin and two in front. Two spacious baggage compartments can hold bulky items such as golf bags, so no luggage need intrude on the cabin. The long-body airplane has a very large cabin with seats for six or seven, a bar and a flushing toilet.

The major differences among the various models of MU-2 are in the engines and fuel capacities. The first few airplanes delivered had just 575 shp per side, flat rated to 500 shp. That quickly changed to 776 shp, flat rated to 665 shp, on the MU-2F first sold in 1968. The flat-rated power remained at 665 shp on the short-body airplane but increased to 715 shp on later models of the long-body airplane. The final two models, the long-body Marquise and short-body Solitaire, had 1,000-shp Garrett -10s, making them the fastest and best of the MU-2s.

Over the years there were several modifications to the Garrett TPE331 engines, so you need to be certain you are buying engines that are up to date in mod status. Most of the engines carry a 3,600-hour TBO, and they now enjoy a reputation for reliability. One thing that hasn't changed, and never will, is the shriek of a fixed-shaft turboprop engine in ground idle. A taxiing MU-2 will have everyone outside covering their ears, but the noise level inside is reasonable.

A nice feature of the Garrett engines is that their superior fuel efficiency is less dependent on altitude, allowing you to blast along westbound down low without a significant fuel penalty. Late models of the short-body MU-2 can cruise at 300 knots in the teens or low 20s, while the long-body airplanes are good for 275 to 280 knots. Those speeds come from a fuel burn of about 600 pounds per hour, but if you throttle back 20 knots the fuel flow drops to around 400 pph—not bad for 280 knots cruise.

The MU-2 began life with 4.16-psi cabin pressure, but that quickly grew to five and then to six pounds. The airplane is not at its best at high altitude, although the later models were certified to 31,000 feet. Later models do their best work in the mid-20s flight levels and the early airplanes work well in the high teens. Fuel capacity grew to 2,700 pounds from 1,910 pounds. Airplanes built after 1968 carried at least 2,452 pounds of fuel, which is plenty for more than three hours' endurance with IFR reserves. At normal cruise, later models can easily fly for more than four hours with reserves.

The MU-2 can be a very fast and cost-effective way to travel, but only if you are willing to study the airplane and its characteristics and practice to stay sharp. If you want an airplane that you don't have to think about much until you're rolling down the runway, the MU-2 isn't for you. But if you are willing to take the time to learn the airplane properly to begin with, and maintain proficiency through approved recurrent training at an accepted facility, the MU-2 is both fast and fun.

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