TWIN & TURBINE®

FOR THE PILOTS OF OWNER-FLOWN, CABIN-CLASS AIRCRAFT

AUGUST 2006 $3.95 US

VOLUME 10 NUMBER 8

Mitsubishi MU-2

Earning Fans Despite Checkered Past

Hardened Soldier

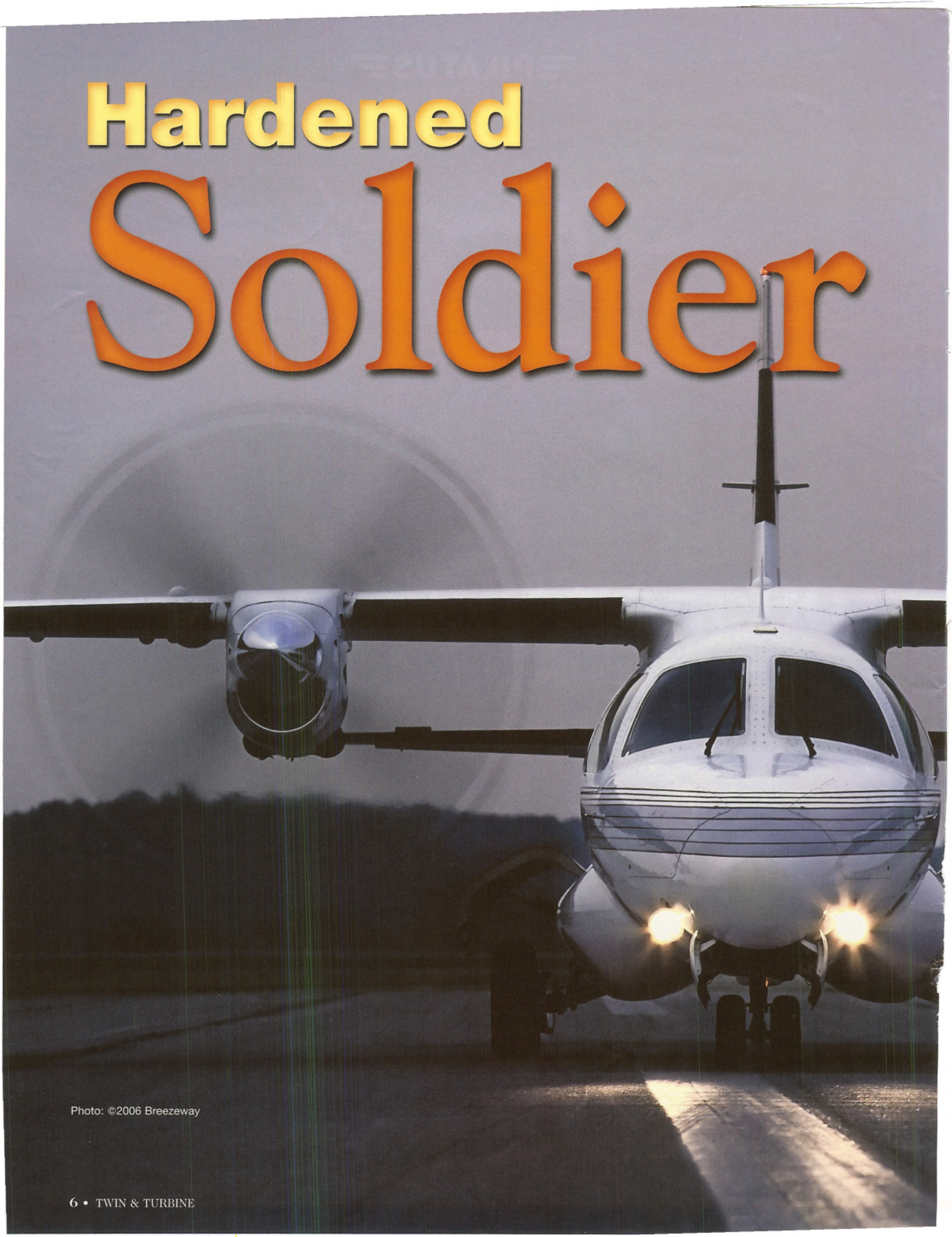
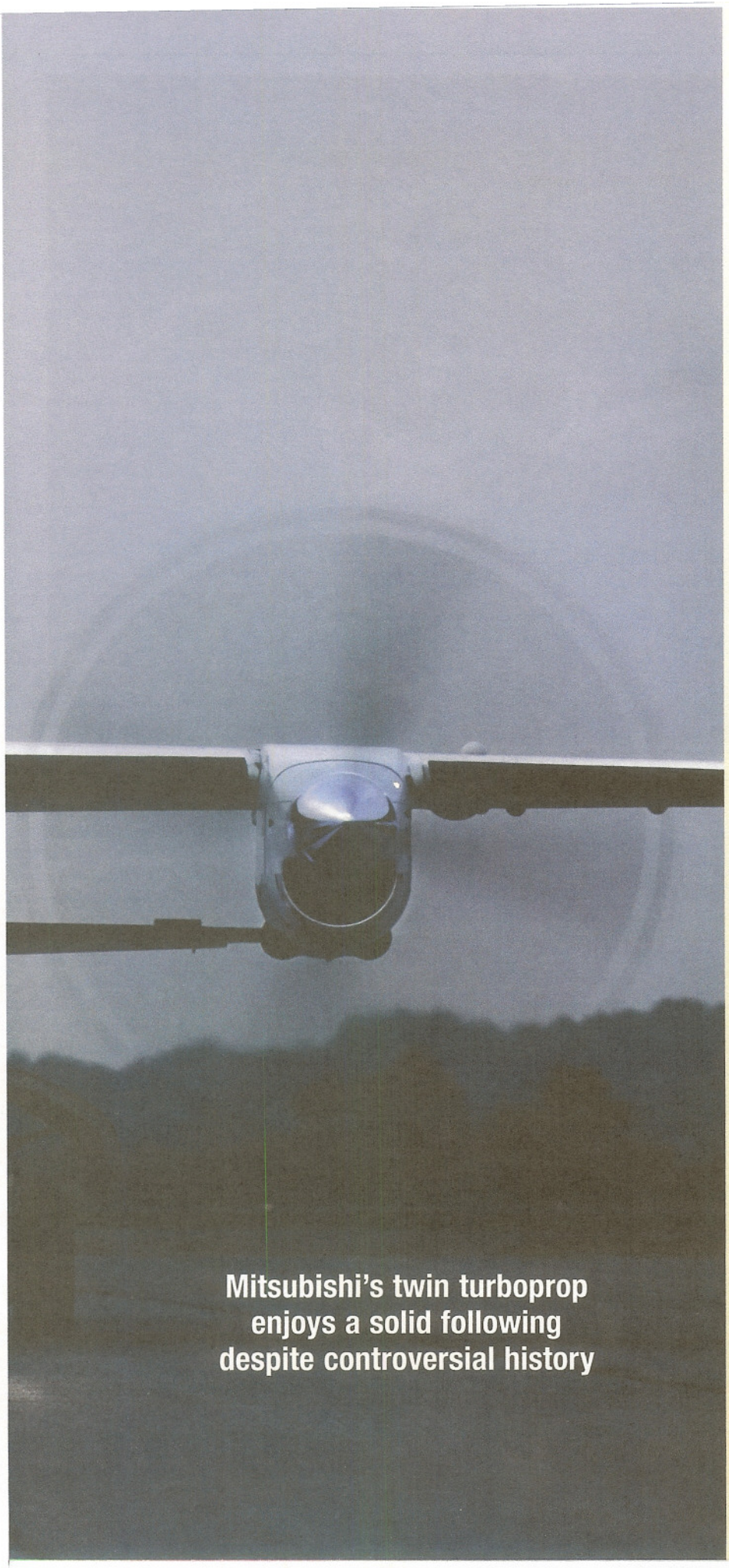


Photo: ©2006 Breezeway



Mitsubishi's twin turboprop enjoys a solid following despite controversial history

by Ken Ibold

Fast, cheap and capable – or a quirky orphan with unconventional handling. Over the last two decades the Mitsubishi MU-2 series of turboprops has earned its share of criticism. However, on the other side of the fence are those who think the MU-2 is a great airplane that has been unfairly maligned. The truth, as is so often the case, is likely pegged squarely in the middle.

There's no doubt that when design began on the MU-2 nearly half a century ago, it was an oddball in a world of corporate wannabes.

Mitsubishi Heavy Industries of Japan decided in 1959 to build a pressurized turbine airplane for the business aviation segment. The company's long history of aircraft design did not include a business aircraft, and rather than repackage an existing design the company started with a clean sheet of paper.

Research included surveying business executives and chief pilots in the United States, and the results were, in retrospect, predictable. The target market wanted a spacious cabin and a speedy airplane. But potential users also expressed interest in using small, unimproved airports.

The desire to operate from short, rough fields dictated the airplane be a turboprop rather than a jet. (Think for a moment about the state of jet engine technology in 1960.) To meet the speed and comfort goals, designers opted for a small wing. The short span reduced drag, and the high wing loading smoothed the ride in turbulence. It was that choice that in

continued on page 8

©2006 Breezeway

the time since the airplane's introduction has given critics more than a little ammunition.

The small wing provided little room for fuel, so the airplane was fitted with tip tanks. While carrying the fuel outboard improves safety by keeping the bulk of the fuel away from the occupants in case of an accident, it also greatly increases the inertial moment. That means it's harder to get the airplane to start rolling and harder to stop once it starts.

The highly loaded wing also meant the airplane needed big flaps to reduce approach speeds and shorten takeoff and landing distances. Designers opted to install double-slotted Fowler flaps that have some pluses and minuses. They increase the wing area by more than 25 percent when extended, reducing stall speed to 71-76 knots, depending on the model. On the downside, however, they extend the entire trailing edge of the wing — which left no room for ailerons.

What you get in exchange for its idiosyncrasies is a unique airplane with capabilities far beyond its competitors – especially when you consider the price.

For roll control, the airplane uses spoilers on the top surface of the high-mounted wing. That the company picked a high-wing design should not be surprising, given the airplane's mission. The wing/fuselage junction in a high-wing airplane produces slightly less drag, and the high wing provides better wing and prop clearance for rough-field operations. In addition, the high wing means the landing gear is mounted to the fuselage rather than the wing, allowing the airplane to handle bumpy runways with a little more competence.

The downside of having the gear retract into the fuselage is that it intrudes on cabin space – at least on the short-bodied models. When the MU-2 was stretched, the gear was relocated to faired pods that stuck out of the sides of the fuselage, giving the airplane an unusual pregnant look, like the military C-130.

Teething Pains

Almost as soon as the first MU-2 was delivered to the United States in 1967, it earned a reputation as being a handful of airplane. The accident rate was high in the early years – so high in fact the FAA considered requiring a type rating for the MU-2.

The heart of the issue is that MU-2s are a more difficult step up than other turboprops such as the Beech King Air or the Piper Cheyenne. Part of that is due to the wing loading, part is because of the spoilers.

The accident rate has fallen since the early years, due in large

part to operators recognizing the need to get type-specific training rather than simply a checkout. The cockpit is similar in size and layout to a Cessna 310, and the systems are as straightforward as any of the piston twins that upgrading pilots might have flown. But that similarity is misleading.

First among the differences pilots must understand is the negative torque system (NTS) that detects engine power and sets the prop pitch based on how much power the engine is producing. In the case of an engine failure, the NTS feathers the prop to about 90 percent as a way to limit drag and prevent the prop from driving the engine.

While that takes some workload off the pilot, it also demands the pilot understand how the system works and what happens when it fails. Operators also have to commit to testing the system periodically and keeping it working correctly.

Another quirk is due to the spoilers. Flying on one engine is done with the wings level rather than banked into the good engine. Because of the drag created by the spoilers, the wings are leveled using roll trim from electrically powered tabs on the trailing edges of the flaps. And speaking of flaps, they provide much-needed lift during takeoff and initial climb, so retracting them upon engine failure early in the flight deprives the airplane of lift at the very time it needs it most.

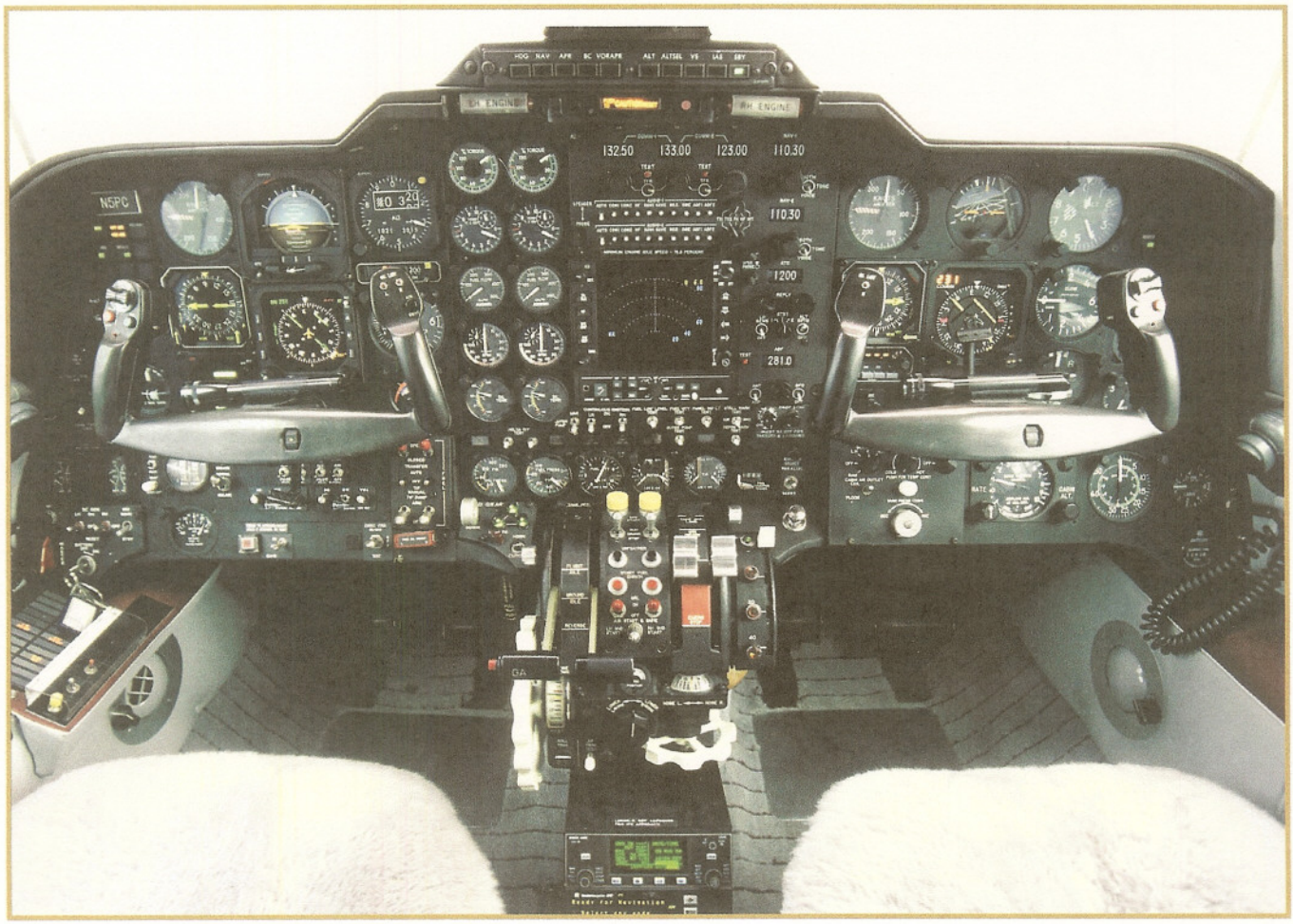
Pilots trained in jets are used to not touching the flaps if an engine quits on takeoff. Once you have climbed to a safe altitude, you can raise the flaps and accelerate to blue line. However, flying an MU-2 like a Baron or an Aztec is a recipe for trouble.

The short-bodies are notorious for making, uh, firm arrivals, with the nose planting itself firmly because the center of gravity is ahead of the main gear. On the long bodies, the CG is over the main gear, and the nose gear does not take as much abuse.

What you get in exchange for its idiosyncrasies is a unique airplane with capabilities far beyond its competitors – especially when you consider the price. Maximum cruise speeds exceeded 300 knots for most models, with typical cruise speeds still better than 260 knots.

The airplane also delivered on its mission to operate at short fields; grass strips as short as 2,000 feet are not out of the question at lighter weights. Spot landings are relatively simple given the airplane's unwillingness to float, and the power and big flaps get the MU-2 up and out on takeoff.

continued on page 10



©2006 Breezeway

The roomy cabin also earns praise. The short-bodies typically seat six in executive configuration (plus two in the cockpit) and the long bodies seven, although they can be fitted with up to nine seats. They can be had with private toilets.

Pilots and passengers alike give high marks to the airplane's ride in turbulence; the high wing loading allows it to sail through chop without fuss. Operators like the way the airplane's robust design improves dispatch reliability.

Safe, or Not?

No discussion of the MU-2 would be complete without looking at its checkered history. In the days before FlightSafety, when a simple CFI checkout was the best you could do, the MU-2's accident rate raised hackles at the FAA. In 1981, the agency conducted a review of the airplane to determine if the airplane's approach characteristics were unsafe.

Together, the accident records portray an airplane that occasionally breaks but that protects the pilots well during the ensuing excitement. However, they also show an airplane that occasionally is asked to do too much by its pilots, or that is flown by pilots who are unable to cope with its demands.

There had been some indication that the airplane could exhibit a very high sink rate that was difficult to arrest. However, FAA pilots found that if their airplane was stabilized on a normal glideslope they could raise the nose without adding power and fly level until the stall warning activated. High sink rates, as it turned out, were due to the pilot mishandling the airplane rather than vice versa.

Continued accidents, however, led the FAA to look again in 1984, this time with a special certification review that was requested by the NTSB. The FAA looked at the engines, fuel system and flight controls. It analyzed the airplane's handling with one engine out, in IMC and while carrying ice.

After nearly 70 hours of flight-testing, the MU-2 was found to meet certification standards and the airplane was given nearly a clean bill of health, with only a couple of minor modifications required, mostly to early aircraft.

The FAA also used the review to answer its own concern that the airplane's performance might put it into a category in which a type rating should be mandatory. On

continued on page 12

©2006 Breezeway

Tricks of the Plane

1. Control inputs are heavier than those of a piston twin, and the pilot must retrim the airplane whenever changing pitch or power.
2. Pay attention to keeping the ball centered, first by setting equal torque from each engine and then using rudder trim as required.
3. Use the autopilot during periods of high workload to keep the wings level. This prevents the tendency of a wing to drop when the pilot is preoccupied.
4. The yoke must be deflected about 30 degrees farther to get the same roll rate as in a similar conventional airplane. If you are timid, the aircraft will feel sluggish.
5. The heavy wing loading requires a stabilized approach. Pay attention to both airspeed and rate of descent. Avoid reducing power in the flare; rather, hold power until the mains touch to avoid a hard landing.
6. Control the rollout by using ground idle or reverse thrust if needed.

this front, too, the FAA found no reason to make the requirement, although since then pilots have found a de facto type rating almost a requirement in order to get insurance in the airplane.More recent analyses of the accident record show no discernable patterns. Over the last 15 years, NTSB records show 26 nonfatal accidents and 25 fatal accidents that claimed the lives of 75 people.

In the less serious accidents, only five involved injuries. They involved a variety of causes, ranging from hard landings to water contamination from the FBO's fuel truck. Of those accidents, 30 percent could be directly attributable

continued on page 14

Mitsubishi MU-2

SPECIFICATIONS

	Short body	Long body
Years produced	1967-1985	1970-1985
Typical used price	$136,000 - $1.17 million	$260,000 - $1.19 million
Powerplant: Garrett TPE 331		
Power output	575-665 hp	665-715 hp
TBO	5,400 hrs	5,400 hrs
Dimensions:		
Length	33 ft, 3 in	39 ft, 5 in
Height	12 ft, 11 in	13 ft, 8 in
Wingspan	39 ft, 2 in	39 ft, 2 in
Pressurized volume	245 cu ft	347 cu ft
Cabin length	13 ft, 5 in	21 ft, 6 in
Cabin width	4 ft, 11 in	4 ft, 11 in
Baggage capacity	374-574 lbs	300-600 lbs
Seating capacity	8-9	9-11
Weights:		
Maximum ramp weight	9,920-10,520 lbs	10,800-11,625 lbs
Maximum takeoff weight	9,920-10,470 lbs	10,800-11,575 lbs
Empty weight, typical	6,300-7,010 lbs	6,700-7,695 lbs
Maximum zero fuel weight	9,270-9,700 lbs	9,780-9,950 lbs
Maximum landing weight	9,435-9,955 lbs	10,260-11,025 lbs
Useful load, standard	3,570-3,710 lbs	4,000-4,175 lbs
Fuel capacity	2,439-2,700 lbs	2,439-2,700 lbs
Payload with full fuel	1,010-1,183 lbs	1,475-1,648 lbs
Performance:		
Maximum certificated operating altitude	29,300-33,500 ft	27,000-30,800 ft
Maximum cruise speed	296-321 kts	283-308 kts
Typical cruise speed	270-313 kts	261-295 kts
Takeoff distance over 50 ft obstacle	1,700-1,800 ft	1,870-2,170 ft
Landing distance over 50 ft obstacle	1,550-1,960 ft	2,000-2,200 ft
Climb rate, sea level, 2 engines	2,150-2,650 fpm	2,200-2,690 fpm
Climb rate, sea level, single engine	470-600 fpm	410-845 fpm
Accelerate-stop distance	2,675-2,750 ft	2,625-3,400 ft
Stall speed, landing	71-76 kts	73-76 kts
Range (ISA-45 minute reserve):	1,330-1,600 nm	1,261-1,395 nm

Note: Specifications vary by model year, but for each type fall within the range indicated.

Photo by Greg Mink

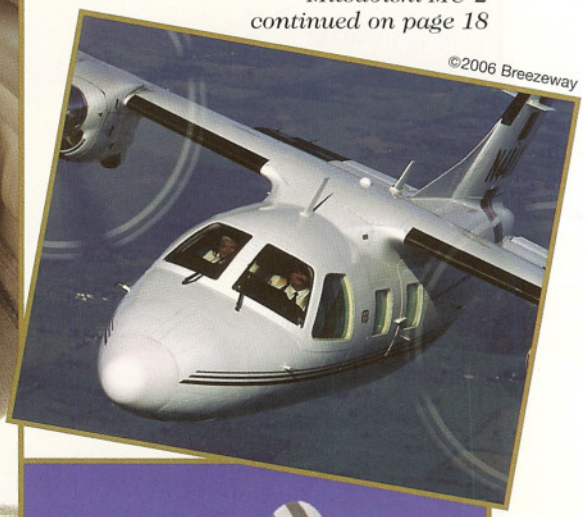
reportable accidents in 15 years is a decent record.

While the MU-2 is probably not the first turboprop that comes to mind when you're in the market for a six-passenger traveling machine, there are a lot of reasons why for some people it's the last. Its blend of speed, utility and robustness forms a package that some find enticing, despite the sideways looks they might get from owners of more mainstream birds.

T&T

Mitsubishi MU-2

continued on page 18



to pilot error. Four were miscellaneous causes, and the remaining 14 involved mechanical problems of some kind. Nine of those 14 were the result of engine or propeller troubles.

The fatal accidents painted a decidedly different picture. Of the 26 accidents involving fatalities, 21 were the direct result of pilot error – descending below minimums on an instrument approach, loss of control, stall/spin episodes.

Together, the accident records portray an airplane that occasionally breaks but that protects the pilots well during the ensuing excitement. However, they also show an airplane that occasionally is asked to do too much by its pilots, or that is flown by pilots who are unable to cope with its demands. However, with 387 airplanes on the U.S. registry, 51

A Tale of Two Mits

Nothing says quite as much about an airplane as how owners use it. To that end, we asked MU-2 owners Greg Mink and Craig Sjoberg to describe their impressions of the airplane and its role in their flying lives. Here are their stories.

Greg Mink
MU-2-60 Marquise

Photo by Greg Mink

We are based at Indianapolis at Executive Airport (TYQ). From our home base, we travel throughout the country in support of our medical equipment leasing company. Our typical missions range anywhere from a short trip to a nearby state or longer ones to Colorado and beyond. That is one of the nice things about this airplane. It is economical enough to use for short missions as well as long ones.

This airplane replaced a beautiful 414 we owned for three years. We thought actual flight time on an annual basis would decrease, but that has not been the case. The speed and economy of this aircraft have allowed us to use it at a higher rate than our 414. Trips to Colorado and Arizona that would have been impractical in our 414 are very realistic in our Marquise.

When we started shopping, we thought we wanted to stay in the Cessna line. We looked at a lot of Conquest 1s. After evaluating the true performance of that aircraft, we found that the speed difference between it and our 414 were minimal. We definitely wanted a step up in speed, and the Conquest 1 was not going to provide it.

We looked at Commanders. Eagle Creek Aviation is right here in Indianapolis, so we thought that might be a good match. Ultimately, the service bulletins and ADs on that aircraft scared us away. Plus, it was really hard to find a lower time airframe. We thought about a Conquest II, but they are so expensive and we didn't think it represented a good value. We even looked at Citation 1SPs. Our conclusion was that it lacked the economy for our missions.

On a whim, we flew down to Tennessee and met with Ron Northern of Northern Jet Sales. He educated us on the MU-2 and took us for a ride. He also gave us our first exposure to the true quality that is built into this aircraft. The construction of an MU-2 is quite simply unmatched in any turboprop.

Look at its service history. There is a reason why there are no airframe-related ADs. This aircraft was designed from the start as a turboprop without compromise. We purchased our plane in August

of last year through Ron. It is a Marquise with the SPZ-500 autopilot. We took it to Ranger Aviation in San Angelo and had paint and interior done as well as avionic work done at Intercontinental Jet in Tulsa.

If we had it all to do over again, we wouldn't have wasted a year looking at other aircraft and listening to all the brokers badmouth the MU-2! I would have gone right to the MU-2.

Compared to what I'd expect on other airplanes, insurance is slightly higher in the MU-2, but it is not at all prohibitive. This airplane is as cheap to maintain as my 414. It is as reliable as any aircraft we have ever owned. All our maintenance is done at Intercontinental Jet and they have been a joy to work with. The MU-2 is still supported by the factory.

All the systems are straight forward. The big thing is the pilot. You must get proper training to fly this aircraft.

Lots of people like to criticize the high wing loading. High wing loading – just like a jet right? It is a good thing in a jet (nice ride in turbulence) but a bad thing in a turboprop? People praise the flying qualities of the Beechjet 400 (Mitsubishi Diamond Jet) and talk about its high wing loading and the use of spoilers for roll control and the many benefits therein, but put it on a turboprop and suddenly it's a bad thing.

Let me tell you something about this plane. There are two types of pilots when it comes to MU-2s. The first is the pilot who has received training in it and realizes its capabilities and loves it. The second is the pilot who has never flown one, knows nothing about it except what he has heard from other self-proclaimed experts and tells all of us what a bad airplane it is.

This airplane is so far superior to anything out there even today. Of course I may be an anomaly in the aviation world. I flew F-16s for 10 years (they call them lawn darts if you recall) and I happen to think it is a great airplane, too.

You must get proper training in this aircraft. I cannot stress this enough. This airplane flies like a jet and nobody can fly a jet without proper training. So don't do it in this plane. The accident reports are full of pilot error due to improper or lack of training in the aircraft.

I take recurrent training from Professional Flight Training (*www.mu2training.com*). It typically includes four days of ground school and a strict flight syllabus. Mitsubishi has come out with a factory training profile that will probably be adopted by the FAA for the MU-2. This is a good thing.

As I have gotten more experience in the airplane, I have come to appreciate it not only from its capability but also from its engineering. This plane has exceeded my expectations so much that we are now purchasing a second plane. This one will be a short body. Our utilization of the MU-2 has increased to the point that we need to compliment our activities with another plane. And again, we think the MU-2 is the perfect match.

continued on page 20

Photo by Greg Mink

A Tale of Two Mits *(continued)*

Craig Sjoberg
MU-2-40 Solitaire

Photo by Craig Sjoberg

The best thing about my MU-2 Solitaire is that it's the ultimate all-purpose "escape-mobile." It is capable of all my missions for one to eight passengers, with reliability, and it's the smoothest ride in the sky. Most of the time I'm flying with my wife Carol and one or two other couples. Sunriver, Ore., is the favorite destination by far. A pilot and country boy's dream!

The most fabulous trip we've taken was one to Alaska last year with mom and dad. We visited Juneau, Skagway, Fairbanks and Homer. The approach into Juneau is for sober pilots and southeast Alaska locals only. The Skagway winds solidly dictated landing on runway 20. So I had to U-turn in the tall and narrow box canyon to the northeast before turning final. With the tight terrain I doubt this would be safe or even possible in your Citation, Lear or Beechjet. The MU-2 flew the box canyon pattern like a 182; turning inside the centerline.

The next leg was Skagway to Fairbanks, 1.5 hours. This flight over the desolate no-man's land of Canada and Alaska – which in my mind says this is "twin turbine country."

In my early years I'd fly a rented Cherokee 180 home over the mountainous Sierras. I am happy I can now afford to rule out this risky single-engine night process. Now, after packing the plane with halibut, the four of us flew nonstop from Homer over the Gulf of Alaska to Seattle in 4.4 hours at FL280. Comfort and safety is the game.

My mom and dad, Jean and Ken Sjoberg, live in Fall River Mills, Calif., which has a 3,600-foot runway. Once again, thanks to the Mitsubishi design, we can land at Fall River Mills; while Clint Eastwood's party, in his Lear, cannot.

The Mitsubishi MU-2 was designed from the beginning as a short- and rough-field turboprop. The full-span flaps give the wings another 28 percent of lifting ability at five degrees, and at five- or 20-degrees flaps it is very stable tooling around the patch at 120 to 140 knots. Short final is 100 knots and touch down at 87 knots.

My MU-2 followed my beloved Ted Smith Aerostar 601P-700. My "conversion" started with sage friend Hank Van Kestern, an octogenarian with the experience of 10 pilots. He owns more than a handful of airplanes and flies them all! We spent a few days together on Cay Chapel off the coast of Belize.

I sniffed and examined his MU-2F and listened to Hank tell me why it's always his first choice for secure flying – in this case over water and into a 20-foot wide strip. Paul Nenda, an Aerostar owner who edits the Affiliated Aircraft Owners Group magazine, also gave the Mitsubishi a glowing recommendation: "After you've got one, you'll never go back."

Competing for my attention were the King Air, Cheyenne, Conquest, TBM-700. King Airs were too big; the 50-foot plus wingspan took hangaring out of the equation for me. Cheyennes have too many ADs and maintenance issues, and deliver basically Aerostar performance. A Conquest with Garrett engines seemed good but went for double the price of comparable MU-2s. They also had longer wings not near the quality of construction of the Mitsubishi. I really liked the TBM-700, but it's expensive. For the difference in cash outlay, I can feed two turbines for 20 years.

In my 4-plus years of MU-2 ownership I have been most impressed with the manufacturer's pride and support for this well-thought-out machine. Even now, 40 years after the MU-2 was designed, I don't think a better turboprop can be built.

Photo by Craig Sjoberg

I think I'll own this Solitaire for a long time. It had a fabulous avionics upgrade just a few years ago, with dual-glass EFIS-40s, Garmin 530, King KMD 850 MFD and a back-up KLN 90B in the pedestal. This will get upgraded to a 430/Garmin in the panel or a 396 with satellite WX.

The radar was upgraded to the RDR2000 and a WX-500 stormscope and IHAS 8000 traffic alert were added. Even the gyros were upgraded for good high altitude stability for the autopilot.

I'd say my MU-2 flights are more "planned and deliberate" for this pilot's skills then they were for the last five years in the good ol' Aerostar, which I flew for 13 years. I'd say I have to be extra careful flying this "MU-Ferrari." If you get crossways and add too much throttle, you're in the ditch. The MU-2 is a lot of plane, and we all need to fly it the way we're taught. The plane will absolutely do what you tell it to do.

Photo by Craig Sjoberg

My personal proficiency is growing. I'm about halfway to the comfort zone (and feeling) I had with the Aerostar. Perhaps the freight dawgs, (all due respect to their endeavors), who have dominated the MU-2 accident scene could increase their "pucker factor" away from complacency.

Other great features are the baggage capacity and passenger comfort. A smooth ride and a 6.1 psi cabin. For rainy days we get out right under the wing and the step into the cabin is easy for all.

What an airplane!