AIR FACTS

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ONE of the big surprises in these early days of our Permanent Prosperity is the size of the market for high speed pressurized five- to ten-place aircraft. Those most experienced in building small airplanes did not think there was one. Lockheed, North American, Grumman, Hawker-Siddeley, Dessault, Piaggio, Hamburger HFB Hansa, Mitsubishi, Lear, and more recently Beech and Rockwell Standard thought otherwise. The amount of money spent in designing, testing, and tooling up for production of these new aircraft must exceed many times over the total development and tooling cost for all general aviation aircraft built since the beginning of flying time. It took a lot of nerve, and you wonder how they knew.

Comes now the MU-2, developed and certificated by one of the world's largest industrial firms, well known for high quality of its products, and with long experience in building high performance aircraft. They are presently building F-86's and F-104's under license from North American and Lockheed. And the MU-2.

The MU-2 was a natural for a tie-up with Mooney. Their forte is speed at a price and that's what the MU-2 has. In fact extra speed. They figure they are $40,000 lower (cheaper doesn't seem appropriate past the $100,000 mark) in price and 30 m.p.h. faster. And they're all set to go. The airframes will be shipped, probably by air freight, from Japan to Kerrville, Texas, assembled there, and American engines, radios, and instruments installed. That's one of the first big impressions about this airplane: the parts of it where there is likely to be any need for parts or maintenance, well, you're home on that. AiResearch engines and airconditioning, Hartzell propellers, Collins radio (in the one we saw), Goodyear tires and brakes, and so on.

Off the Top

When new airplanes are on their maiden demonstration tour you cannot expect more than once-around-the-field, for there is a line waiting and some of them may be prospects. Suffice to say, a detailed report cannot be made from a short flight in an airplane on which they want a new pilot to go to school a week at AiResearch to learn about the engine and then spend a week at Kerrville getting fully checked out. But in a short flight you can get some impressions about the airplane generally and how it flies, and sometimes first impressions seem more helpful for the next man than anything else.

On first sight the airplane seems small by comparison. It sits low, the

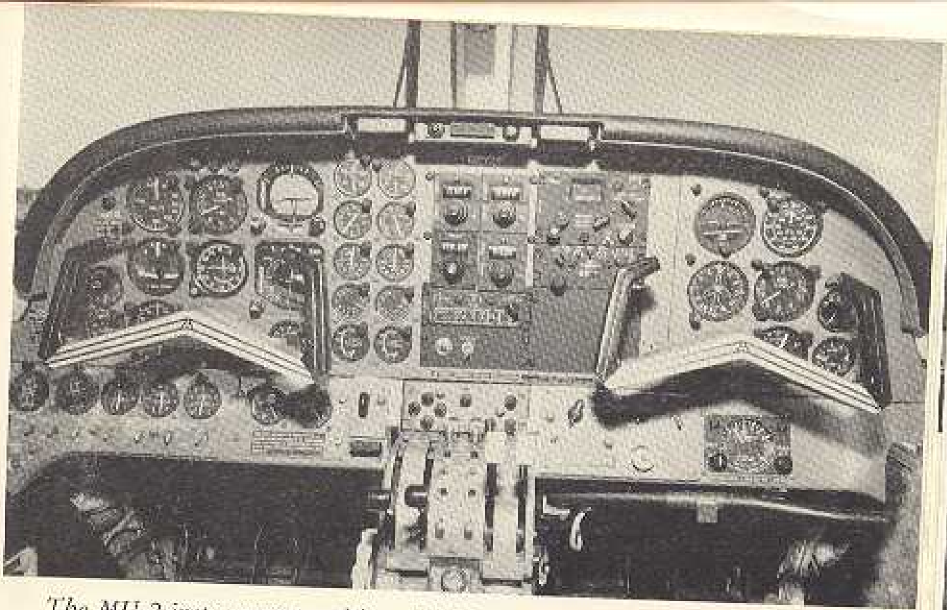
This view of the MOONEY MU-2 gives away some of its secrets: the small low-drag engine nacelles, a very clean fuselage, the low cg, the extra fuselage width, the actual width of the main landing gear.

fuselage is on the stubby side, the wing is small. You notice, too, that the wing appears to droop as if it had negative dihedral, but it doesn't. It has 0° dihedral. The bottom of the wing is straight. The appearance of droop comes from all the taper in thickness coming from the top of the wing slanting downward towards the tip. This is further accentuated by the leading edge of the outer section of the wing having a slightly drooped leading edge, which increases the effective camber in that area and improves stall characteristics.

From the side, the landing gear seems pretty narrow, but from behind or directly ahead it doesn't look so narrow. And, of course, the cg is low. Even so, the geometry of this gear would never work on a light airplane for it would be like landing on a bicycle, but it is used in airliners and military jets to an even more extreme degree and is acceptable there, so evidently weight must make the difference.

Other external items. The wing has full-span, double slotted flaps and no ailerons. Lateral control is by long narrow spoilers which raise up on top of the wing just ahead of the flaps. The engines are low enough to be worked on without even a stand. The stabilizer has reverse camber. The top of the nose section is readily removable, giving complete access to all radio and other black boxes. There is an overall appearance of good solid quality.

Since the floor is so low, getting



The MU-2 instrument panel is well laid out with the usual standard instruments for such an airplane, plus those extra required for the turbine engines. This low shot conceals the unusual side and forward viz.

in is easy, and once in you have a feeling of unusual roominess. Actually the cabin is about standard in dimensions, but mainly it seems wider because with a cylindrical fuselage they can't put the seats right up against the sides, so there's elbow room along with a standard head clearance. There's also quite a bit of space between the back seat, which accommodates three, and the two rear-facing seats. The cockpit is quite roomy, and with the low-cut windshield, front and sides, it is almost helicopter-like.

Let's Taxi

We flew on the left side with Bill Mullen of Mooney on the right. He gave us a fast cockpit tour. There's a warning light at the top center of the main panel. At the left there's an enunciator panel on which appropriate signs will light up for some eight or ten mal-functions. Trim tabs, fuel gauges, engine gauges in per cents—we were soon lost, for actually we were trying to be sure we knew exactly where to look for the heading and airspeed. And we were even more lost as he talked his way through the procedure and started up the engines. It actually didn't seem so complicated, but the words were unfamiliar.

There's no warm-up and since the engines idle at 83% r.p.m. with the props in almost zero pitch there's quite a whine. In our first flight we'd ridden in the back and had wondered why he taxied so fast and with so much power. But that's the

The MOONEY MU-2 at the Lancaster, Pa., airport (the phone call from the tower will be because they have a tower now). Numerons demonstrations were made at quite small sod fields.

way it is. With the throttles back all the way it moves along and turns up fast. Not wanting to ride the brakes, this caused us to make some fairly fast turns on and off the taxiways. It doesn't lean like you'd expect from the narrow gear, in fact it just didn't lean at all.

Let's Fly

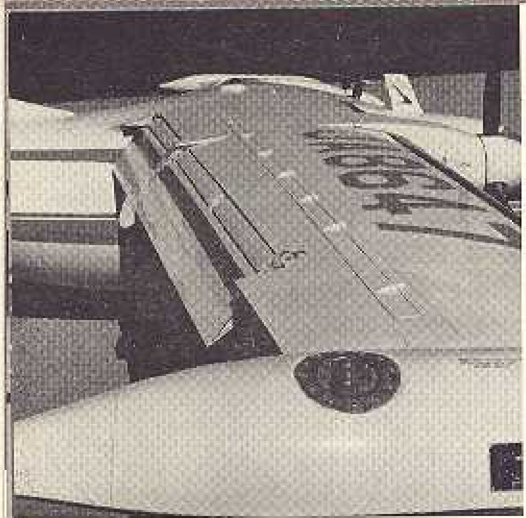
We cannot recall whether Bill used the word mode or condition, but the propeller controls aren't used to control propeller r.p.m. directly, or at least we never found an r.p.m. gauge. These controls are set for taxying first, and then, ready to go, they are moved forward to a take-off and approach position. Maybe there is a cruise position too. At any rate we got on the runway, put down 20° flaps, pushed on the toe brakes and Bill moved the prop controls and throttles to where they should be for take-off and said to let it go. It really leans you back in the seat.

The main thing to be said about the take-off and also landing of this airplane concerns the position of the main gear. It is way back. As far as the flying part goes the ideal place for a main gear is directly below the cg of the airplane. That way the nose can be raised a bit early in the take-off run, which lightens the load on the wheels and helps acceleration if the field is soft, and if any bumps are hit there is neither pitch-up nor pitch-down. Nor is there any if you drop it a little in landing. Trouble with the ideal location for main gears is that, in case of the tri-cycle, if you put a little baggage in and someone in the rear without someone in the front end first, its tail may settle down onto the runway. So all tri-cycle main gears are back some to prevent this, and the farther back they are the less likely you are to feel you have some secret skill in landing an airplane. In the MU-2 the wheels are even farther back than usual because they wanted to retract them into the fuselage and did not want to sacrifice any cabin area for wells.

The trick on the take-off is simply to let it run, level, up to about 85. The airspeed indicator shows knots only, so everything is knots. If you try to raise the nose sooner you'll just prolong the run and every time you hit a bump the nose may go back down anyway. In the level-attitude run, then, there's a little fore and aft rocking motion that's different, more like an automobile than an airplane.

But not for long, for, as mentioned, the acceleration you get is likely to be the most you've ever experienced. In the previous take-off Bill had pulled the nose well up on reaching 85 and the climb-out had been at a steep angle and with around 4000 f.p.m. rate of climb. He'd told us that 135 was the number but that most everyone seemed to settle on about 160. We did too, mainly because we wanted to see where we were going. The climb was around 1000 f.p.m.

The "ailerons" feel funny at first. They are responsive enough, in fact



The MU-2 double-slotted flap in full down position. Note the long, narrow spoiler which replaces the usual ailerons.

quite responsive, but there's seemingly a complete absence of that accustomed need for more wheel pressure for more aileron displacement and vice versa. This might cause a bit of overcontrolling at first, but you can also see that once used to spoilers you might even prefer them, for they leave no doubt about who is in control. This [illegible] at home on instruments. Maybe we started off with the airplane out of trim but in any event it seemed it required more rudder trim changes and lateral trim changes than one would expect. Maybe it is because of the speed range or that it's not easy to set the engines at close to the same power. In any event, being able to trim an airplane quickly and precisely about the roll and yaw axes while on instruments takes some practice and is in the necessity category.

Stride

As soon as you level off you become aware that this is a racehorse. It gets its extra speed from its smaller overall dimensions and its small wing. Its 178 sq. ft. wing area is about 100 sq. ft. less than might normally be used for the weight. They take care of the landing speed with the full-span double slotted flaps which use of spoilers makes possible. We don't know what the power setting was but presume it was high enough when we let it run a bit at 3500′. The indicated settled on 235 kts. Its maximum cruise figures are given as 310 m.p.h. at 10,000′, 307 at 15,000, and 298 at 20,000′. Bill told us it would climb to 10,000′ in 7 minutes at gross [illegible] through 15,000 in 13-14 minutes. Fuel consumption at 10,000′ he said was 75 g.p.h., and at 20,0[illegible] tanks, is 284 gallons usable and they give max range at 20,000′ with 30 mins. reserve as 1200 miles.

Bill had us stall it (at 7500′). It is solid as a rock laterally and with full flaps the indicated is 50 kts. when a good shake develops. Lateral control continues into the stall. Flaps up it indicated 85. The TAS stalling speed in landing configuration is 74 kts and 91 flaps up. Then he had us fly it level at 100 kts. flaps down so that we could see the slightly nose-low attitude required for level flight in this condition.

Next Time

Bill told us to bring it in at 100 kts. and as we entered downwind we asked him for 20° flaps. These seemed to come fast enough, but as we turned on final and asked for 45° flaps it was several seconds before, in their last few degrees travel, they really dug in. There is surprisingly little retrimming required with flap position changes.

Bill had told us how to land the airplane, but, of course, we didn't. It holds its speed beautifully in the approach, we were beginning to do pretty good laterally by now, and we probably flared and chopped the power at about the right place. He had told us to land it more on the level than tail-down side, but we landed with the wheel full back, nose way up, and not too hard. Wheel still back, the nose fell down pretty hard immediately on contact with the runway. Even with this minimum speed touchdown the landing speed seemed a little high.

In order to reverse the props you simply have the throttles all the way back and then lift up on them and move them still farther back. The results produced are so startling (you really lean forward the deceleration is so great) that you think immediately that you're overdoing it and don't need all this drag so push the throttles forward to where they were. This gives you 83% taxying r.p.m. and that's where your short landing goes to pots, for it really keeps rolling. By now, of course, you're on the brakes, but don't push hard enough and are finding more rudder pressure for steering is needed than expected and a lot of runway goes by. Next time, you think. And it would probably be as good as anticipated because the airplane can't go very far if you just put the throttles in reverse prop position and leave them there for a few seconds. This reverse prop capability would be invaluable on an icy runway.

Short Fields

They mention the STOL capabilities of the MU-2 and we think they are certainly right in stressing that having a 300 m.p.h. airplane with small field ability is something to think about. There will always be a lot of business near 2500′ fields, or less. They give [illegible] over 1500′ [illegible] 50′ obstacle on take-off at gross and 1100′ to land over 50′ at around 7000 lbs. (or about out of fuel). This is *mighty* impressive for so fast a machine, but it is interesting that it doesn't come [illegible] come from low take-off [illegible] or low landing speed. It comes from low power loading and hold-your-hat acceleration to take-off speed and from powerful reverse thrust after the touchdown. It takes about 1000′ to get up to flying speed on take-off and the landing roll or stopping distance is about 800′. These figures are, of course, sea level standard air data. The turbine engines' power output is considerably affected by OAT at temperatures above standard, but we have not seen any MU-2 or AiResearch charts on this which would show summer-time shortfield capabilities.

As to weights, the situation is the common one. They mentioned a gross of 8930 lbs. The published empty weight is 5330 lbs. but with all the extras this one weighed 5660 empty, which we presume includes some ten gallons of unusable fuel at 6.7 lbs./gal. From 5660 to 8930 is 2270 useful so with full tanks the payload would be 368 lbs. On that basis, in this particular airplane, with pilot and three passengers, which would probably be above an average load factor, the range would have to be cut down to around 1,000 miles. And, of course, that would be [illegible] the range is [illegible] 20,000′. The cabin pressure there would be only 8,000′.

There are a lot of very clever things about this airplane. There is no vacuum pump. They run bleed air from the compressors through venturis. Cabin pressurization is by use of bleed air also, cooled off, of course. Fuel from [illegible] automatically forced into the mains by bleed air when the fuel level in the mains falls below 140 gallons. Although the cabin pressure differential is only 4.61 lbs. the windshield has been tested to a 22 lb. differential pressure. Bleed air is used to de[illegible] de-ice the engine air intake system. Also to heat the cabin and defrost the windshield. Did we say back at the first that the cabin is beautifully trimmed and that the seats are all comfortable?

All in all, it flies a little differently, it goes fast, and it would be an intriguing airplane to learn how to really put through its paces. Especially into and out of some of the really short fields they used for demonstration purposes while in this area. The 2500′ we used getting stopped at Lancaster makes us hang our head in shame. But not next time.

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