Crosswind Operations
By Rick Wheldon

Despite the hangar talk, I've found that crosswind techniques in the MU-2 are quite conventional, and the airplane presents no great difficulties for a capable pilot. Having accumulated almost 4000 hours in the airplane, I have come to respect its predictable handling and high controllability. That being said, let me offer a few tips that will allow any pilot to feel quite comfortable when confronted with a crosswind.

First, let's review the crosswind limitations. For most models of the MU-2, the maximum demonstrated crosswind limits are 22 knots for takeoff and 18 knots for landing. I have heard some pilots argue, because the word "demonstrated" is used in the flight manual, that these are not really limits at all and can be ignored. I guess that would depend on whether your crosswind takeoff or landing was successful or not. If you ran off the runway and damaged your airplane in a crosswind exceeding these "demonstrated" limits, it would be tough to explain to the FAA, and who knows how the insurance adjuster would react. I think a good policy is to treat these numbers as absolute limits.

Because of the relatively narrow gear on the MU-2, I've found that it is quite important to keep the wings level during the takeoff and landing roll. This is done using the spoilers. If the wings are level, then equal weight will be distributed on both main gear, resulting in equal rolling resistance on both wheels. It will be easy to track the centerline, steering gently through the rudder pedals. However, because of the narrow gear, a crosswind component pushing against the upwind side of the airplane will try to "roll" the airplane toward the downwind side and put more weight on the downwind gear (Fig. 1.) The additional weight on one gear will cause the airplane to turn toward the downwind side. Responding only with rudder will not level the wings on the ground and can cause the nose wheel tires to skid, because the nose wheel steering is directly linked through the rudder pedals. Therefore, I recommend the following crosswind takeoff technique: make note of the winds before taking the runway and use full spoiler into the wind at the start of the roll. As the airplane accelerates, use as much spoiler as is necessary to keep the wings level. Less and less spoiler will be needed as your airplane accelerates, but some will probably remain until liftoff. Once airborne, because of the remaining roll input, the upwind wing will dip slightly. Level the wings and the spoilers will return to neutral.

What about pitch inputs? Full forward elevator will put considerable weight on the nose wheel and provide good steering control, but the main wheels might become light, providing some tendency to fishtail. On the other hand, full aft elevator will keep the main tires firmly on the concrete but leave the nose tires light and make steering difficult. I find that the best controllability results when I keep the weight evenly distributed between the main and nose wheels. I start the takeoff roll with the elevator in a mid position, which requires some back pressure. As the airplane accelerates, I gradually release some back pressure as the elevator becomes more effective with airspeed. Once rotation speed is achieved, a gentle pull will do on the long body, and a firm pull on the yoke will be required on the short body MU-2 (be prepared to quickly release the back pressure on the short body once the main gear leave the ground).

There is one subtle difference between long and short body MU-2s that should be mentioned here – weathervaning. In a crosswind, the main wheels act as a fulcrum against the side force of the wind. The relative size of the side facing area forward or aft of the main wheels will determine whether the nose will tend to turn toward or away from the crosswind. If there is more side area (fuselage and tail) forward of the main tires, the nose will tend to turn about the main gear away from the wind. Conversely, if there is more side area aft of the main tires, the nose will tend to turn into the wind. The long body MU-2 has more side area aft of the main gear (Fig. 2) while the short body has more side area forward of the main gear (Fig. 3.) Consequently, the long body will tend to weathervane toward the crosswind while the short MU-2 will tend to turn away from the crosswind. Keep in mind that weathervaning will not affect the basic rule about keeping the wings level with spoilers. However, because of weathervaning, short body pilots must expect to use more spoiler input than their long body counterparts to counter the crosswind rolling tendency. In a stiff crosswind, this could involve some considerable control forces.

What about landing? Basically, the same rules apply (in reverse order), but some things happen quickly in the short body MU-2. Prior to touchdown, the pilot, in order to align the airplane with the centerline of the runway, typically lowers his upwind wing and adds some top rudder. Because the short body wheels are well aft of the CG, the nose will often come down quickly at main gear touchdown, even though the pilot instinctively pulls back on the yoke. The trick is to get the nose wheel centered as the nose comes down in order to track straight down the centerline. When the nose steering and rudder is centered at touchdown, the loss of rudder yaw must be countered by increasing the yaw from spoiler deflection. In a strong crosswind, it is not uncommon to considerably increase the spoiler input into the wind as the rudder is centered and the yoke is pulled back. Once on the ground, use spoiler to keep the wings level until taxi speed is reached. This all happens almost simultaneously – touchdown, back elevator, rudder centered, and increased spoiler into the wind. It is very predictable, and once understood, it is quite easy to consistently make good crosswind landings.

I hope this discussion will help those of you who haven't yet found a level of comfort with crosswind operations. The response of the MU-2 is very predictable and, with a bit of practice, most capable pilots can consistently make good landings in even the worst of crosswinds.

Fig.1 – Downwind Lean Caused by Crosswind

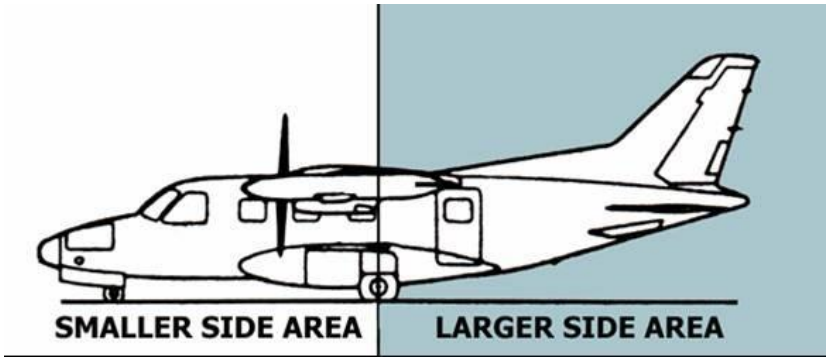

Fig. 2 – Weathervaning Tendencies for Long Body MU-2

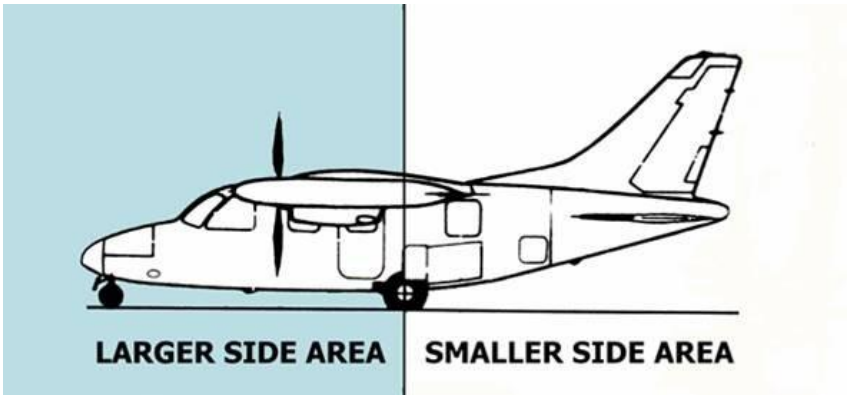

Fig.3 – Weathervaning Tendencies for Short Body MU-2