PATTERN SPEED

The matter of pattern and landing airspeeds appears to not be well understood, if answers to questions on Flight Reviews is any indication. I ascribe to the “Goldilocks” plan---not too slow, not too fast, but just right. To find out what is just right requires some knowledge and thought.

We all know that the price of “too slow” is a stall, and maybe a spin and probably doing some damage to the ship or the self. So we all get drilled on stall speed. But stall is dependent on angle of attack, not speed. Trim is your friend. The glider will seek the trimmed angle of attack all by itself if give the chance.

The price of “too fast” can be landing long and running out of runway or field. In a 3 wheel glider it can lead to a PIO with fracture of the fuselage. In a 2 wheel glider, it can lead to a jounce (read “Stick and Rudder” for explantion) and a splat!

So-to arrive at “just right” we have to consider runway (or field) length, wind velocity and direction, gusts, density altitude, weight, and stall speed at some reference weight.

Length—plan for 1000 ft. anything more is pure gravy.

Weight- The K21 in flight weight can vary considerably—2 of our bigger boys can be 200 lb more than 2 of our more slight members. This can change the stall speed by about 8% or about 3.5 kt/

Wind- an aircraft has two velocities—airspeed is what is seen by the wing and produces the lift we desire, and its’ cost, drag. Groundspeed (better thought of as inertial velocity) determines our relationship to earth and tends to be more resistant to instantaneous change. Wind produces discrepancies between these two, and gusts can make nearly instantaneous differences of great importance.

We know that the wind at 2000 ft is usually about twice the velocity at the ground, and that gusts are usually about 50% higher than the prevailing wind. They can come from any direction. They can increase or decrease your airspeed almost instantly. This can be a big problem.

Density altitude is not much of a player in our case at Monroe.

To get to “just right” we want to be fast enough that a tailwind gust won’t stall us, as our inertial speed continues, while the airspeed decreases. But, we also don’t want to be much faster than this as well. Normal airplane approach speed is 1.3 Vs1, but historically, gliders got in trouble with this—too slow. So, the recommendation was raised to 1.5 Vs1 (turns out best L/D is about the same number) as the basic no-wind velocity. This gives us a moderate cushion in velocity. Then add in enough to prevent stall with a tailgust. So I like half the prevailing wind and all of the gust. There are other formulae used-i.e. half the wind and half the gust is the other common one. So-any more than this is “too much”.

Another way to get in trouble is the decreasing headwind. Uncompensated, you’ll land short by being on the “backside” of the polar. Doing 60 kt into a 20kt headwind give a inertial velocity of 40 kt. Sudden absence of headwind leaves you at airspeed of 40 kt, briefly---way too slow. How does this happen—Wind gradient is steepest at about 200 ft AGL, and this is where you can get a sudden loss of the headwind. You want to go through this height with wings level, and trimmed for approach speed.

This is why the recommendation is for a faster, higher, and closer in pattern. About 10% on each parameter does it. Once below this height, excess speed can be safely reduced somewhat.

Bottom line---Adding extra speed for wind and gusts is good within limits. Adding more for “the wife and kids” is not.