



by Ryan Voight

SAFETY IN SPEED

This month, I'd like to get a little technical on a topic that *should* be near-and-dear to all of us hangs and paras: AIRSPEED. Maybe you've heard the saying "airspeed is safety"? Most of the time that is true. The more air flowing over our wings, the more effect deforming the wing will have, and the more responsive your glider will be to your inputs.

Remember: In an AIRcraft, AIRspeed is all that matters. The wing

is passing through the air; if that air also happens to be moving across the ground (wind), so be it, but it doesn't affect the aerodynamics of the wing. When doing a 360, the wing will not behave differently, whether you are pointed upwind or downwind. The only "wind" the wing feels is airspeed, and the only airspeed we have while flying is forward—we hope!

Here is an analogy I like to use: If you think of altitude as LIFE, then airspeed would have to be life INSURANCE. If you find yourself in a situation where you need a few inches, even a few feet, you'll need to pull from

your extra airspeed to get it. The downside of having some extra airspeed is a small sacrifice in sink rate and a little more challenge when working light lift or tight thermals. More speed means larger diameter 360s for the same bank angle. Oh, and if you DO hit the ground, it will probably hurt more. So try not to do that!

If that were the end of the air-speed discussion, I could stop here. Unfortunately, life ain't simple. While we fly AIRcraft and concentrate on AIRspeed, we are also concerned with where we are located over the ground—whether it is places we might want to



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[above] Here “Dangerous Dave” Gibson demonstrates the bar position for best glide speed. If he had a tailwind, should he speed up or slow down? [opposite top] Flying faster than best glide speed allows this pilot to get lower and closer to the pilot below. And yes, the pilot below consented to doing some formation flying. [bottom] This pilot slows down to minimum-sink speed as he flies through lift, even though he is headed upwind.

be as well as places we definitely *don't* want to be. If you fly long enough, you WILL find yourself in situations where you need to be as efficient as possible. Sometimes it's about maximizing distance on an XC flight. Other times, efficiency is more crucial—for example, when you find yourself too low over

unlandable terrain or fighting a headwind and realize you MUST get out to survive. In these situations, you NEED to know “speeds to fly.”

Hopefully, everyone has at least heard the term “best glide speed.” This is the speed at which your glider is most efficient [through the air]. In hang gliders, this speed is generally found when you pull the base tube to the area near your nipples. In paragliders, it usually occurs when you go totally hands

up (pulling no brake), basically flying at trim. The actual airspeed at which “best glide” occurs varies from glider to glider, and from one pilot to another, which is why it's best described by general body positions rather than by a specific airspeed number.

Now, for the fun part: “Speeds to fly” is a CONCEPT more than a concrete number. In perfectly still air, i.e., no wind, the most efficient airspeed for maximizing your distance over the

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[top left] Here author Ryan Voight “hangs out” at trim... and has a ground speed of 0. Fun, but not very efficient if he wanted to fly his way out of there. **[left]** US National Team pilot Dustin Martin looking clean, fast and efficient. **[bottom]** Author Ryan Voight putting the “speeds to fly” concepts to use while flying into a strong headwind on a flat slope at the Kitty Hawk Kites Hang Gliding Spectacular.



ground is that “best glide” speed described above. Flying slower will keep you in the air longer, but you won’t go as far. And flying faster will put you on the ground sooner, *and* you won’t go as far. This is because of the polar curve of our gliders. At minimum sink speed, we aren’t covering much ground, and at high speed, there is just too much drag to be efficient.

Once you add WIND, the concept of “speeds to fly” really comes to life. When flying into a headwind, you need to fly FASTER than best glide. An easy example: If your best glide speed is ~20 mph, and you’re flying into a 20-mph headwind, it doesn’t matter

that you are flying through the air very efficiently, because you're still not making any forward progress! It's a bit tricky to explain HOW MUCH faster to fly when facing a headwind, because it is dependent on the strength of the headwind as well as the performance of your wing. On a low-performance hang glider or paraglider, pulling in/pushing the speed bar drastically increases your sink rate, but doesn't have a huge effect on your airspeed. On high performance wings, however, the opposite is true. A little change in pitch will yield a noticeable increase in airspeed and a minor increase in sink rate. That's what makes a "high performance" glider [high performance].

When flying with a tailwind, the "speeds to fly" concept says you should fly SLOWER than best glide speed. In simplified terms, the longer you stay in the air, the farther the tailwind will help carry you. How much slower than best glide should you fly? Again that depends—but the stronger the tailwind, the slower you should fly.

"Speeds to fly" also occurs when you are in lift or sink. If you are in lift, you'll want to slow down to stay in it longer. In sink, you want to fly faster than you normally would, in order to get out of the sinking air faster. Flying fast degrades your sink rate, so don't be caught off-guard when you start sinking like a rock when you fly fast in sink. It's still more efficient than flying slower and hanging out longer in the sink. And, like headwind/tailwind, how much faster or slower you should fly depends on the strength of the lift or sink.

It gets fun when we start combining some of these examples. If you're flying into a headwind AND flying through lots of sink, you need to fly REALLY fast. In that situation, you're probably going to lose a ton of altitude no matter what, but the key is minimizing how much you lose by getting out of there as efficiently as possible. What if you are flying downwind, and in sink? Flying downwind, you want to slow down, but

in sink you need to speed up. It can get tricky deciding what speed you should be flying for maximum efficiency.

I'm sure I'll get some hate mail for this, but I'm going to say it anyway: Some of the integrated GPS-vario units will calculate and display speeds-to-fly information for you. This can be a really great learning tool, as long as that's how you use it. A friend recently purchased a Flytec 6030, which displays speeds to fly. He was surprised to find he was often flying upwind too slowly for maximum efficiency. I like his story, because he used his instrument to help educate himself, rather than becoming dependent on the instrument to tell him what speed to fly. I'll bet he doesn't look at it as often as he used to, but he is definitely gliding more efficiently!

Understanding and embracing airspeed, groundspeed, best glide speed, and speeds to fly can literally save your life some day. If this is new information for you, I strongly urge you to pursue educating yourself further. And if this is old news to you, I still strongly urge you to explore a bit deeper. It's an important topic, and, in the real world, the variety of situations you can find yourself faced with can stump even the most knowledgeable pilot. Remember: Safety is No Accident! 🇺🇸

If you have a question you'd like answered or a topic you'd like to see discussed, email Ryan at Ryan@WingsOverWasatch.com and you just might get to see your answer in print here in Hang Gliding and Paragliding Magazine!

Ryan is a second-generation hang gliding instructor and flight school owner. He has been flying since he was still wet behind the ears; he's the youngest person to ever earn the Hang 5/Master rating. He currently resides near Point of the Mountain in Utah and flies as much as he can, both hang gliders and paragliders



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