# 99 PROBLEMS,

## but the wind ain't one

by

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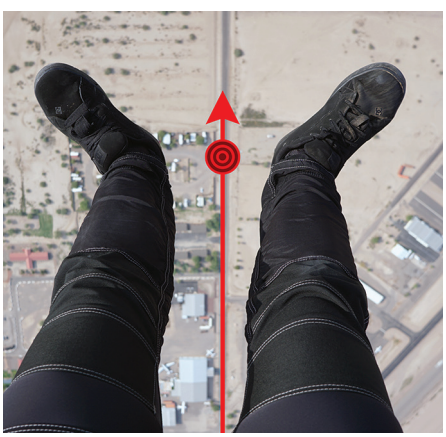
When a canopy pilot moves through air that is itself moving, that air continuously affects the parachute's speed and path over the ground. When you are trying to make it back to the landing area, merely pointing the canopy's nose toward the target may not be enough. If you do not compensate for the effects of the surface winds, you will most likely miss your target. Given that wind conditions change constantly, being able to properly read and compensate for them is an important skill set for students and competition pilots alike.

Rather than focusing on accuracy alone, first ensure that your method of getting to your target is precise. Once you can replicate a good landing pattern and hit your checkpoint altitudes consistently, then it is only a matter of making small adjustments to be accurate. The secret is to perfect your method (dial in your precision) to achieve the desired result (become more accurate). So whether you are trying to fulfill your accuracy requirements for your next license or you want to fly through competition gates, these are the skill sets you need to succeed.

## ATTITUDE AND RELATIVE POSITION

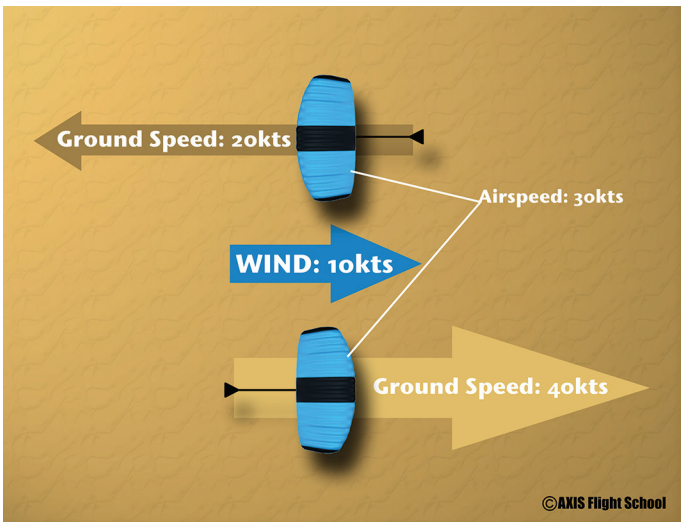
Before you can effectively compensate for winds, you must first become aware of your system's attitude (the parachute's orientation relative to the earth's horizon) and relative position over the ground. This may seem simple enough, but when looking at the ground, how do you know where you are exactly? A jumper's perceived location over the earth can be drastically different from the actual location. This is because your body posture and your system's attitude and motions can influence your relationship to the vertical axis, which in turn can influence what you perceive to be the gravitational vertical.

Since your body is like a pendulum weight suspended under your canopy, it is easiest to approximate your location by flying level in about quarter brakes for an extended period of time. Your body lines up directly under the nose of the parachute, effectively making the A lines as close to vertical as possible. With your legs fully extended and feet flexed, take a look between your heels. This is the path you are carving across the ground. You should not get fixated on this visual trick, but simply check in with it routinely just like you do your altitude.



Imagine a line that is perpendicular to the plane of the earth's surface that connects the jumper to the ground. This vertical line moves with the jumper and traces a line across the ground.

Next, notice how quickly you are traveling relative to structures and objects on the ground. Does your speed change across the ground when you fly in the opposite direction? If your answer is yes, then you have just discovered a change in ground speed (the wind's influence on your ground track and speed)!




In this scenario, the same jumper is represented facing in opposite directions in a 10-knot wind. Even though the airspeed of the jumper is the same, the ground speed differs by 20 knots.

## COMPENSATING FOR WIND

Once you have determined your relative position, now it is time to examine the wind direction, quality and strength (see "Foundations of Flight—Reading Surface Wind Conditions," October 2014 *Parachutist*). When your direction of flight aligns with the surface winds, only your ground speed is affected. A headwind will reduce your ground speed (aka "holding"), whereas a tailwind will increase it (aka "running"). This is why jumpers prefer to land against the wind. If the wind is not in line with the direction you intend to go, then the wind will push you off course. This navigation error is called drift, and you can compensate for it with a wind correction angle (WCA). To stay on your desired course, you must adjust your heading by turning the nose of the parachute into the wind.


Determining the wind correction angle can help you compensate for drift.

The wind correction you make in order to stay on course is your heading. This act will now enable you to track your course.

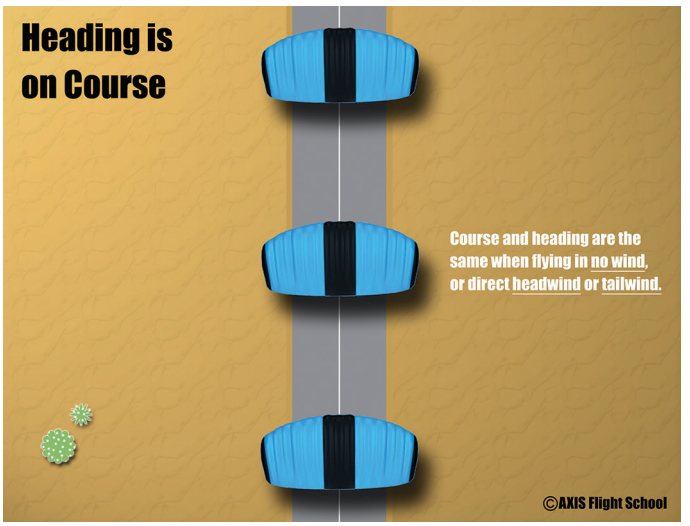
Canopy pilots who intentionally move sideways under canopy use a technique called "crabbing." In order to acquire or maintain a specific location over the ground, it may be necessary to contend with the wind in this manner. An example is navigating the base leg in high winds, where the nose of the canopy may be lined up close to the target for the entire duration of the base leg. Transitioning between a "true crab," "running crab," and "holding crab" is quite common in high-wind conditions when navigating a landing pattern.

## GROUND REFERENCE MANEUVERS

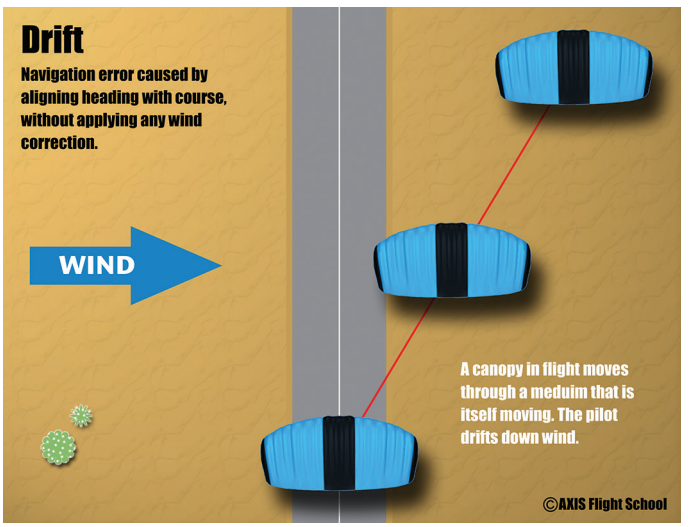
To expand on the concepts above, here are a couple of drills you can try at your home DZ. Keep in mind that you will lose altitude through all of these maneuvers, and you could possibly encounter different wind speeds at different altitudes. Stay altitude aware and abandon these drills at 2,500 feet above ground level.

### *the line*

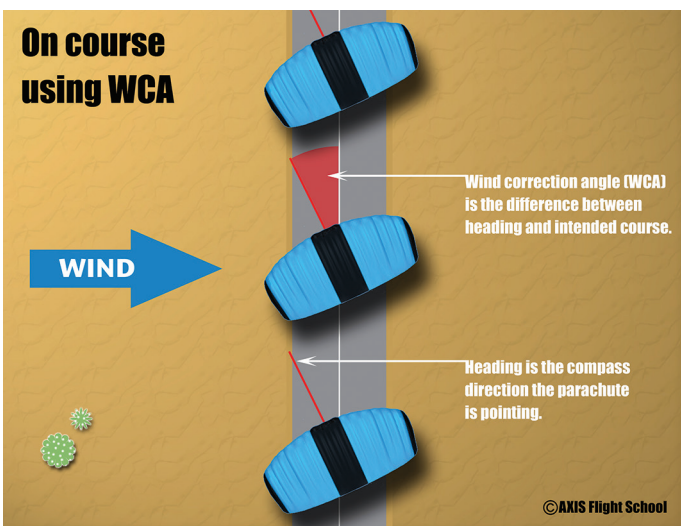
Find a ground reference that is a straight line. This could be a road, a set of power lines, a fence, etc. (the longer and straighter the better). Then try to fly a path directly above this reference line without allowing the winds to take you off course. Your WCA is an acute angle that represents the difference between the ground track and the parachute's heading. You must maintain this WCA to keep the parachute on the desired ground path.




1) Canopy along road without wind



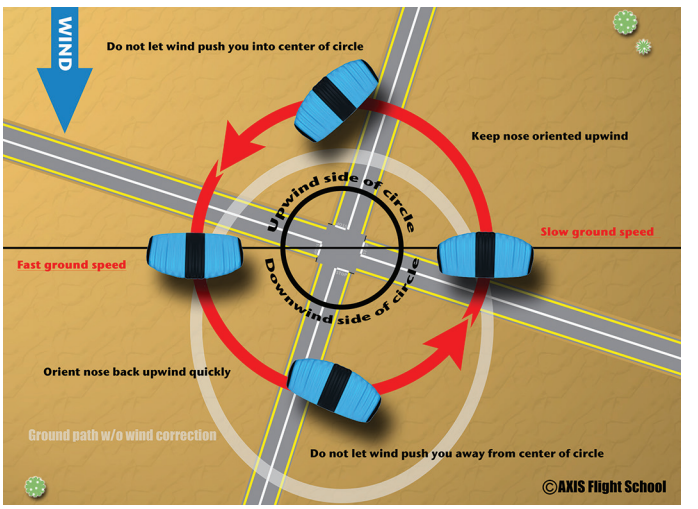

2) Canopy along road with wind and without correction




3) Canopy along road with wind and with correction

## the circle

In the example below, we use an intersection as the primary reference point. However, you can also use other fixed objects like a tree, a building, etc. The goal of this exercise is to fly a circle with a consistent radius around the object. Manipulating the bank angle of your wing will alter your turn rate. Use this to tighten or loosen the size of the turn.

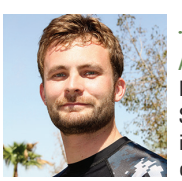



Anticipate drift and maintain a uniform distance to the reference point.

Once you have determined your path, try to keep the same distance from your ground reference at all times. Fly the canopy and stay alert to your surroundings. This requires multitasking—dividing your attention between maintaining your flight path, watching your ground references and controlling the canopy. Avoid fixating on any one task over the others.

During the circle drill, the wind is trying to push you into the target when you are upwind and then push you away from it when you are downwind. Avoid this happening by anticipating drift. When the wind is at your back, your ground speed is the fastest, so turn more sharply so you're not pushed too far downwind. When you are flying into the wind, your ground speed is slowest, so be patient and turn more slowly. Perform this drill in both directions to better prepare you for left- and right-handed patterns. If the wind is really strong—say the same strength as that of your airspeed—then you will not be able to make up ground when facing into the wind. Flying a circle around a target in this situation is not possible. This highlights why jumpers like to open upwind of the landing area.

The intent of this article is to give jumpers a greater understanding of the basic navigational challenges they face under canopy. With the accompanying drills, I wish you a fun learning experience that positively affects your aeronautical decision-making.



ABOUT THE AUTHOR

Niklas Daniel, D-28906, is a founding member of AXIS Flight School, which offers instruction in a variety of disciplines including canopy flight. For more information about AXIS' coaching services, please visit www.axisflightschool.com.