FOUNDATIONS OF FLIGHT
GLIDE, PART 1

AXIS Flight School®

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The previous two installments covered the differences between a parachute's forward speed and its ground speed, as well as the difference between descent rate and sink rate. Understanding these concepts allows us to discuss glide. "Gliding" in this context refers to unpowered flight. A parachute descends toward earth under the influence of gravity while interacting with the atmosphere it passes through. A parachute's trim angle is defined as the angle between the chord and the horizon while in full flight. The A lines at the leading edge are shorter than the D lines near the trailing edge, setting the trim-angle to a nose-low attitude. This design is responsible for redirecting airflow in such a way that lift is tilted slightly forward, providing the system with horizontal forward speed while descending. Depending on the design of the parachute and the pilot's flight configuration choices, the system moves on a slope or decline plane in a smooth and continuous motion while in a controlled descent.

Side notes about trim: A flat trim angle provides a pilot with greater glide; however, this can make a wing vulnerable to turbulence because of lowered cell pressurization. A steep trim angle provides a stable and highly pressurized canopy at the expense of glide.

TRUE GLIDE
(Forward Speed / Descent Rate)

In essence, true glide is a description of the aerodynamic forces the system experiences. An airfoil's efficiency is based on the relationship of the lift-to-drag ratio (L/D) it produces. Put simply, at 2 to 1, the parachute's forward speed is two times faster than its descent rate. A canopy pilot plays a balancing act with these two forces by manipulating the shape and angle of attack of the wing. The configuration that results in the least amount of drag will provide the pilot with the best glide angle and therefore maximum range. If the forces remain constant, the glide slope through the air will remain unchanged. We'll cover this in more detail in the next installment.

GLIDE RATIO
(Ground Speed / Sink Rate)

Also known as relative glide, it is the projected distance the system can cover across the ground (its range) in relation to the altitude available. As mentioned in previous installments, a skydiver's heading in relation to wind dramatically affects its range. Ignoring this in the following example, a parachute with a 2 to 1 glide ratio can cover twice the distance than it has altitude. In practice, this means if you turn onto your final leg at 300 feet AGL, you must budget for a 600-foot travel distance from your turn location. To get a sense of scale, use a chart or Google Maps to familiarize yourself with the landing area. Consider aiming slightly short of the target to accommodate the distance needed to plane out during the landing flare.

If wind is present, then your glide ratio will change based on your alignment to it. With a tail wind, your glide ratio increases, flattening to perhaps up to 4 to 1. Conversely, a headwind steepens the glide ratio because the wind is stealing some of your ground speed. The stronger the wind, the greater the effect on your range, though you will continue to descend at a similar rate as on a no-wind day. To remain accurate despite changing conditions, consider moving the location of your turn onto final, not the altitude. The distance adjustment is based on how accurately you read the winds via wind indicators, assess your ground speed or interpret the effect of the wind on your fellow jumpers. For safety and skill building, avoid making low or S-turns near the ground. These are compensatory techniques that attempt to make up for a poorly planned and executed pattern. The benefit of a steady state approach on landing is that it provides you with a stabilized sight picture, making it easier to determine your touchdown location. To become consistently accurate, start keeping track of the distance you landed from your target on every jump. This observation can help you determine what pattern adjustments you need to make on your next jump.

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