FOUNDATIONS OF FLIGHT
GLIDE, PART 3—DEFINITIONS

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This month's installment includes important key terms that will appear in future articles. In case you missed them, terms defined in previous installments are included.

Relative Wind is the air you feel rushing toward you when traveling through the atmosphere. Also known as apparent wind, it emanates from the opposite direction of the flight path and is the air that the parachute system or pilot has not yet disturbed.

Flight Path is the trajectory of the parachute system as it travels through the air. When you become aware of the direction and intensity of the relative wind, you become aware of your flight path.

Glide Angle is the angle created between the flight path and horizon while the wing is level.

Ground Track is the path a canopy pilot has covered over the ground (analogous to breadcrumbs left behind on a trail).

Chord Line is a straight reference line connecting the leading and trailing edges of a wing. This line can be outside the boundaries of the wing's profile shape if the wing is curved (i.e., when deep brakes are applied).

Angle of Incidence is measured between the chord line and the horizon. It is in essence the trim of a canopy that the differences in the length of the suspension lines creates. For safety and stability, the A-lines at the leading edge of a wing are shorter than the D-lines near the trailing edge so that its nose remains above its flight path no matter what inputs are performed. Even during a drag-plane (a canopy formation maneuver where a canopy pilot flies inverted) or barrel roll, the angle of incidence remains positive with respect to the system.

Angle of Attack, abbreviated AoA or by the Greek letter α (alpha), is the angle between the chord line and the relative wind. AoA is often confused with attitude (see March 2022 "Foundations of Flight"), which describes a parachute's orientation relative to the horizon. A canopy pilot alters the aerodynamic forces (lift, drag and airspeed) experienced by the wing with the applications of brakes, riser input and changes in body shape. These alter the shape of the wing and in turn can pitch the nose of the system up or down, affecting AoA. A low angle of attack is associated with increased airspeed and greater lift, while a high AoA is synonymous with increased drag and slow flight. A parachute has an optimum AoA for maximum glide and another for maximum float. These angles are not universal but are specific to each canopy's design.

Stall occurs when a canopy pilot exceeds their wing's critical AoA and the airflow separates from the top skin, resulting in severe lift reduction. On a flexible wing such as a parachute, this goes hand in hand with excessive brake or rear-riser input that causes gross trailing-edge deformation. When a wing is in a stall, the canopy pilot may experience loss of control and an abrupt loss of altitude. A stall requires immediate attention; the AoA must be reduced smoothly to regain control and reestablish a normal flying envelope. It is a misconception that insufficient airspeed is responsible for the onset of a stall. Each parachute's unique critical AoA is an aerodynamic constant, independent of airspeed. This means if the critical angle is reached, the parachute will stall no matter how fast or slow it is traveling through the air.

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