CHAPTER 6

BASIC FLIGHT MANEUVERS

The Four Fundamentals

There are four basic flight maneuvers upon which all flying tasks are based: straight-and-level flight, turns, climbs, and descents.

In addition, the powered parachute (PPC) has a unique characteristic, the pendulum effect, as covered in Chapter 2. This chapter will cover the basic flight maneuvers and how they are influenced by this pendulum effect.

Flight Controls

The PPC has two basic flight controls:

1. Throttle: used to adjust the vertical speed to climb or descend
2. Steering controls: used to turn right or left

The wing design, angle of trim, and total weight determine the PPC airspeed, which remains about the same for most flight operations.

The vast majority of PPC steering is done via either foot pedals or foot steering bars. However, some PPC designs incorporate hand steering controls. In addition to the mechanical hand or foot steering controls, the steering line itself can be pulled directly or in combination with the mechanical controls. For simplicity of the information in this handbook, flight steering controls will be addressed as foot controls. For those PPCs with hand steering controls or steering lines that are pulled directly, substitute "push the foot steering control" with "pull the hand steering control" or "pull on the steering line."

Throttle

While in the air, the throttle provides thrust and therefore controls altitude; it is used to climb and descend. Throttle changes will not measurably affect your airspeed. The aircraft maintains about the same indicated airspeed throughout your pitch angle and altitude changes. There is less than a 1 MPH increase in speed as the throttle is increased from gliding flight to level flight; not easily measured on the instruments or felt by the pilot in the air.

Pitch angle changes in a PPC are similar to pitch changes in an airplane being flown at a constant airspeed. Assuming a typical 3-to-1 glide ratio for a powered parachute, the pitch increases about 20 degrees from gliding flight to level flight. The pitch would increase an additional 20 degrees from level flight to full power climb, assuming a three-to-one climb path with a high powered engine. This total pitch change of 40 degrees from glide to high powered climb is significant and noticed by the pilot, passenger, and observers on the ground. Throughout the large pitch variations of the PPC, the PPC will continue to fly at about the same airspeed, even with the engine off.

As you descend with the throttle retarded, the nose of the cart is pointed more towards the ground while the wing is overhead. As you climb, the nose of the cart is pointed more towards the sky, and the wing appears to be rotated in back of you. These are large pitch changes. A common misunderstanding is that these pitch changes, which can be as much as 40 degrees, are a change of angle of attack. This is not the case. The angle of attack stays almost constant for the same weight and the same speed, but the pitch angle, especially as viewed from the cart, changes dramatically.

On a PPC, the angle of trim is determined by the suspension lines and set at the factory, but the cart can rotate around the riser attachment point to the cart. Generally, the angle between the cart and the wing remains the same; both pitch together rotating around the center of gravity of the complete aircraft. [Figure 6-1]

Flying in good atmospheric conditions and using smooth throttle applications can avoid additional loading which results in slight increases in angle of attack and speed.

A common, inappropriate use of the throttle is an abrupt power application when the engine is at idle. This abrupt application of throttle from idle to full