The Voyager HP2

by Brian Porter

In the spring of 1979 I had just recovered from a broken ankle, an injury sustained while unintentionally spinning a Mitchel Wing. The crash had set me back nine months and started my search for a more docile rigid wing hang glider. In this effort I met Klaus Hill who had been developing a glider known as the Voyager. This glider was a hybrid of the Fledgling series, as originally developed by Klaus.

In the summer of 1979, I moved to Morgan, Utah. Living out of my car, I built a Voyager under the guidance of Mr. Hill. Having been mentored as to its basic construction and design, I started on Voyager design innovation work. Between school, work, world travels and flying seasons, Voyager design changes continued.

The Voyager-HP2 is a hybrid Voyager utilizing a hang cage structure and supine pilot position. It has a number of options that contribute to its performance: flying tips, low dyhedral, and an enclosed streamlined cage along a high center of gravity. This collapsible pilot faring reduces drag most significantly at higher speeds. Unfortunately this particular wing is drag-limited by its abundance of wires (16 total, approximately 150 feet).

The entire wing breaks down, including pod faring, to a conventional flex wing bag shape, 20 feet long.

The Voyager has gone through countless control changes. The wing tips have gone through six design changes, including "vertical-surface free" spoiler arrangements. The original Voyager had a highly cambered root and highly reflexed tip. This, in my case, made for a marginally stable aircraft. Now a moderate amount of reflex is distributed among all battens; the net result is the same performance and more stability. Part of this gain comes from the elastic quality of the airframe, which was twisting more in the previous situation. At one time I rigged a variable geometry system. This "VG" allowed the overall twist to be varied from 1 to 4 degrees by pulling the sail down at the root. Since the addition of the pod, the Voyager's washout has been fixed at 2 degrees.

The glider is very light in roll and turns with a flick of the wrist, via a hand twist grip and handle. The twist grip actuates a tip dragger winglet device which contributes to lift. It is canted out at 30 degrees and toed in 1.5 inches. The winglets' axis of rotation is canted back approximately 15 to 20 degrees. These wing tips supply directional yaw stability and greatly inhibit the wing's ability to tip stall. This effect makes the hang glider docile and manageable near stall. Because the tip continues to fly even when the entire outer wing is stalled, the glider will not drop off abruptly on a wing. Instead it tends to slip toward the stalled wing and at the same time roll laterally toward it. Because the wing tips add to the glider's effective area and aspect ratio, the machine flies faster and slower than in its previous configurations.

The pilot fairing provides greater comfort in flight by reducing the wind, and wind chill, a pilot feels at all speeds. The high center of mass, being closer to the center of lift, requires less pitch movement for speed. Sixty-five percent of the time the pilot need only move his feet to adequately control the craft. At minimum sink and in light thermals pitch input is not needed. The supine position reduces physical fatigue associated with prone flight. The pod makes the wing track through the turn in a more coordinated manner at normal glide speeds of 18 to 35 mph. But the distribution of side area around the center of pressure is such that the glider is yaw unstable at speeds greater than 40 mph. As a result, the pilot's hands must be on the controls at all times or an unintentional wingover may result. At these speeds the machine tends to overbank into the turn, and requires opposite rudder.