Executive Summary

This month, I worked on the MkI Viper rocket glider. I broke the glider into three sections; a forward section, a mid section, and an aft section. I moved the servos from the mid section to the aft section and connected them directly to the fins. This shifted the center of mass of the rocket glider aft. To compensate, I moved the battery pack to the forward section. Next month, I'll finish the forward and rear cowlings and work on the paraglider.

Technical Stuff

This month, I worked on the MkI Viper rocket glider. The MkI Viper is a small class I rocket with a paraglider return. It is a hybrid rocket with hydrogen peroxide as the oxidizer and poly-lactic acid infused with potassium permanganate as the fuel. A waiver is not required to launch a class I rocket. As such, I can launch the MkI Viper from my backyard, work out the bugs, learn how to fly the rocket glider, and demonstrate the concept.

The pictures below show the progress made on the glider. Instead of a single piece fuselage, I broke the glider into three sections; a forward section, a mid section, and an aft section. The forward section houses the battery pack, pressure/propellant tank, canopy release, and forward cowl (not shown). It has two triangular struts, one attached to the front of the forward section and the other attached to the rear of the forward section. The mid section has the solenoid opening valve, check valve, cockpit, and canopy. The aft section contains the hybrid fuel, aft cowl (not shown), servos, and fin assembly. The aft section also has a forward and aft triangular strut. A lightweight carbon graphite shell covers the forward, mid, and aft sections.

As shown in Figure 3, I moved the servos from the mid section to the aft section and connected them directly to the fins. This shifted the center of mass of the rocket glider aft. To compensate, I moved the battery holder to the forward section (Figure 1).

The cockpit and canopy were the greatest challenge. The cockpit houses the paraglider, weighs 75 gm, and takes approximately eight and a half hours to print. Shown here is the fourth print. To get the canopy shape, it has to be printed upside down with PLA supports. The supports have to be removed and the canopy sanded down. I had hoped to get the MkI Viper launched this month but with the redesign and long print times it was a "no go" for the launch.



Figure 1

Figure 2

Figure 3

Next month, I'll finish the forward and rear cowlings and work on the paraglider. The biggest challenge yet is to keep all this under 1.5 kg.