

Executive Summary

This month, I launched the Mki Viper. The liftoff mass was ~ 1.4 kg. Burn out occurred at about 20 feet. I had hands off the controls during liftoff. I wanted to observe the free flight. It looked like the Viper yawed to port and began to pitch down. Burn out occurred at about 20 feet. Liftoff mass was ~ 1.4 kg.

Technical Stuff

This month, I launched the Mki Viper. The Mki Viper is a vertical takeoff and horizontal landing rocket glider. The Viper is powered by a hybrid rocket motor. The oxidizer is concentrated hydrogen peroxide (HTP) and the fuel is poly-lactic acid (PLA) infused with potassium permanganate (KMnO_4). Infusing PLA with KMnO_4 makes the fuel catalytic with the HTP. There is no need for a separate ignitor. Ignition occurs in less than one second. Also, the KMnO_4 increases the thermal conductivity of the PLA resulting in a higher recession rate and a more even burn. After thrusting for approximately six seconds, the canopy is ejected and a paraglider is deployed. The Viper then glides to a safe landing.



I had two launch attempts this month. I had an engine failure on the first attempt. Failure analysis showed that I did not seat the mixing chamber to the nozzle properly. I took extra care during the assembly process and the second attempt was successful.

For this launch, I used 50 ml of HTP and 2 ml of ethanol for the oxidizer instead of the usual load of 62.5 ml and 2.5 ml respectively. Ignition took about two seconds and burn time was about three seconds. As such, burn out occurred at about 20 feet. The HTP had been stored in a stainless steel container and went from ~85% to ~ 81% over five months of storage. The liftoff mass was ~1.4 kg.

During launch, I had decided hands off the controls during liftoff. I wanted to observe the free flight. It looks like the Viper yawed to port and began to pitch down. I did not deploy the paraglider. The Viper landed tail down. Several pieces broke off, easily repaired. Unfortunately, I shorted out two RC switches, the receiver, and broke the check valve. I had to order a new receiver and check valve. Next launch was delayed until next month.

Next month, I will have a controlled launch and deploy the paraglider.