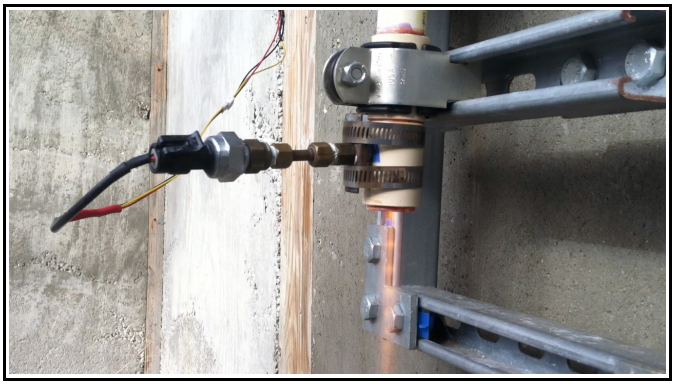
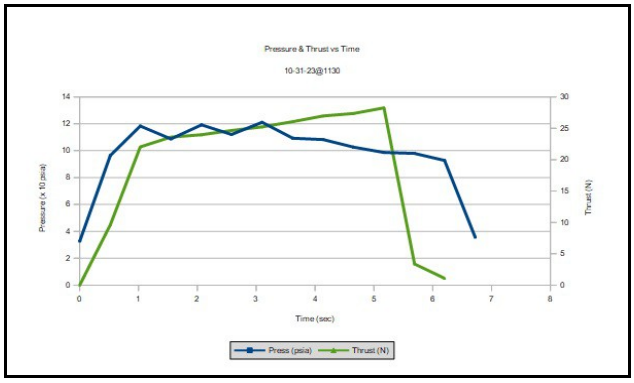
Executive Summary

This month, I ran two tests without the check valve. There was an increase in both the chamber pressure and thrust. Ignition time was shorter and burn time was longer for each run. The average chamber pressure was ~ 107 psia with an average thrust of ~ 25 N.

Technical Stuff

This month, I ran two tests without the check valve. As expected, there was an increase in both the chamber pressure and the thrust. Ignition time was about 0.3 sec and burn time was about 6.0 sec for each run. The graph below is the best test to date. It shows an average chamber pressure of ~ 107 psia. The initial thrust was ~ 22 N and increases to ~ 28 N at the end of the run with an average thrust at ~ 25 N.





The diameter of the phenolic graphite nozzle starts out at 6.0 mm and erodes to 7.5 mm at the end of the burn. The larger throat area corresponds to the highest thrust. So, the next logical step is to start with a 7.5 mm diameter throat and try to get 28 N of thrust at ignition. The higher the thrust at ignition, the faster the rocket glider will exit the rail guide and the more aerodynamic control I'll have to keep it straight. As such, next month I'll run a few test with a 7.5 mm diameter throat.

Once again, the endoscope showed a nice even burn of the fuel core. The PLA/$KMnO_4$ does not reach the wall of the 1" CPVC pipe indicating longer burn times are possible. The injector evenly distributed the spray around the fuel core and the cone angle of the spray is clearly visible.