Using a Hybrid Rocket Engine to Create Controllable Lift

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The purpose of this project is to create controllable lift by means of a hybrid rocket engine with solid fuel and a gas oxidizer. The thrust will be able to be controlled by the flow of the oxidizer. The hypothesis of this project is that since the flow of the oxidizer is controllable then the amount of thrust being produced will also be controllable and will vary based on oxygen flow. Due to the trust being controllable, suspended flight is achievable. The fuel of the hybrid rocket engine was created by using a 1 inch diameter acrylic rod with a ¼ inch hole drilled through the core. The oxidizer was welding grade oxygen. Copper pipe was used as the housing and graphite was used as the nozzle. The rocket engine was first tested by being mounted in a vice and then ignited. This test ensured that the engine component worked correctly. In the second test, the rocket engine was mounted to a digital scale to measure the amount of thrust being produced at different psi. During the first test, the rocket engine ignited and burned correctly, a small amount of smoke was produced where the nozzle attaches to the housing. During the second test, the JB weld holding the rocket nozzle in place failed due to heat and expelled the nozzle. The second test was repeated, this time a steel nozzle that screwed into place replacing the graphite nozzle. In the second test, as the oxygen increased the thrust increased. In conclusion, Hybrid rocket engines provide a means of controllable trust. This was due to the control of oxygen levels. The application of this project is for hybrid rocket engines to work in conjunction with each other to provide a stable thrust in an atmosphere that cannot use air power. This will add the application of unmanned vehicles to the realm of outer-space.