

# Developing the Technology for a Combat Drone

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The goal of this project was to determine and develop a reliable, long-term replacement to the job of being a combat pilot by developing a small sized UAV. Last year, we concluded that the idea of using a small, simple drone with a small rocket was possible. This year, we wanted to take the prior project and improve upon it by creating a more advanced drone and rocket, along with a reliable and accurate motor test stand to test the thrust of rocket engines, to see if a powerful rocket, that simulated a missile, could be launched from a very small drone. This year, contrary to last, we designed the drone to be fast, powerful, agile, and modular. Improvements to the rocket include a custom PCB/PID controller that was able to read data, and had the capabilities for thrust-vector-control, although we did not implement this into our project. The first test was a motor test rig, which was also designed with a custom PCB. We used this to find the thrust of the rocket motor. We compared this data with some tests run on the drone. We tested speed and acceleration, and used Newton's Second Law to determine the force of the motors. We also ran tests on the drone, since it was custom built. After multiple tests, we were able to develop a combat UAV that could potentially launch an advanced missile to replace the hazardous job of being a military/combat pilot.