September at-a-Glance

During the month of September our team has been hard at work iterating on design ideas and conducting preliminary research for this year's rocket and payload.

Our team is also excited to announce the establishment of our Sponsorship, Documentation, and Safety subteams in order to expand our capabilities in taking advantage of funding opportunities, maintain branding and produce professional reports and presentations, as well as ensure we achieve the highest level of safety that we can for our members.

On that note, congrats to our Sponsorship team for hosting a breakout session at this Fall's WPI Tech Advisors Network meeting and receiving a grant of $3,000 as part of the WPI Tinkerbox Cohort 6 program!

Members of our Couplings subteam working on modeling the motor casing.

Our Airbrakes subteam collaborating on this year's preliminary design.

Upcoming milestones

Our application for the Intercollegiate Rocket Engineering Competition (IREC) is due on October 15th, 2021.

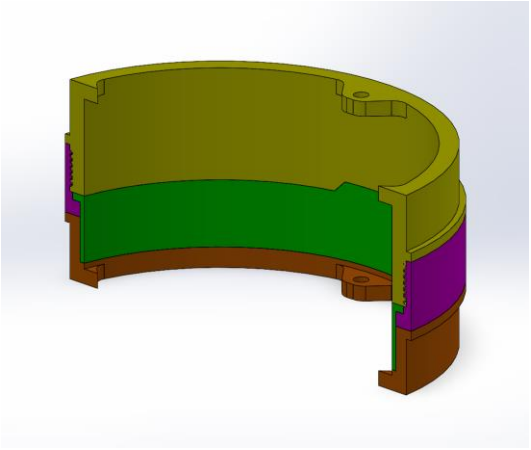
Rocket Division

Aerostructures

We have been researching potential materials for this year's fins, fin can, and tailcone and have made several critical design decisions including the implementation of a tip-to-tip fin can and a custom tailcone. Members have been practicing carbon fiber layups to gain hands-on experience with composites.

Airbrakes

For the airbrake system, we narrowed down design choices and began conducting kinematic analysis. In addition, we made initial calculations for drag coefficients and deployed area for the fins. The subteam is focusing on learning MATLAB, SolidWorks Flow Simulation and Simulink over the coming weeks.



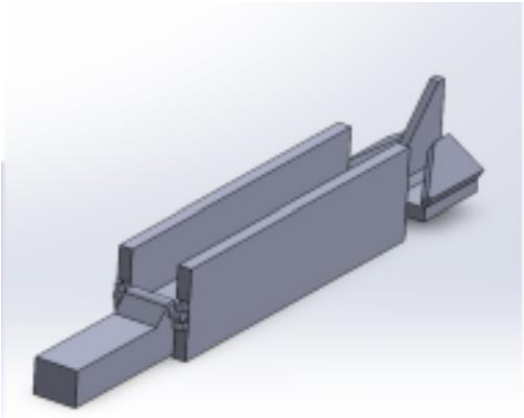
Couplings

Our couplings subteam has decided on a general design for our coupling locking and radial alignment mechanism. We are now moving forward with calculating the stresses our couplings need to withstand during flight under worst case flight scenarios to determine if our design is sufficient. In the next few weeks we will start prototyping our preliminary coupling design.

Recovery

We have been learning about recovery hardware and OpenRocket while reviewing past year's recovery system designs. Our brainstorming sessions have produced several potential recovery systems that incorporate what our members hope to see in this year's rocket and have initiated the decision to design a single end system that uses CO2 ejection.

Payload Division



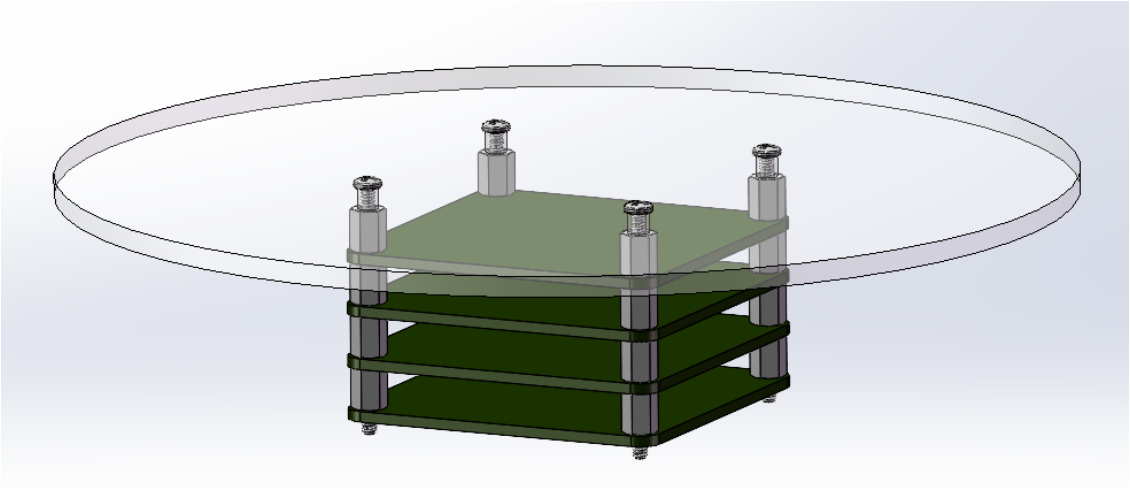
We have been weighing the pros and cons of various designs to accomplish our mission of designing and building a payload capable of autonomously locating the launch vehicle upon landing. To do this, we split up into three different prototyping groups to evaluating the mechanisms of quadcopters and two types of fixed-wing aircrafts.

Electronics and Programming Team

For this year's competition, we have decided to create an electronics and programming team that extends across both the rocket and payload divisions. This team consists of a software-focused group and an electronics-focused group.

Electronics

We have been working on defining this year's mission requirements and recently got started with some early design work. In terms of software, we are working on embedded systems specifically with the Teensy 4.0 microcontroller, ICM-20498 9-axis IMU, and MCP2515 CAN Controller. Our members are also developing plans for a novel ground station, which will receive telemetry and build an application to display flight data. We have begun work on the printed circuit boards for the rocket and are in the process of finalizing component selections and defining the structure of the boards. We have split into groups for the four boards that need to be designed: controller board, sensor board, telemetry board, and power board. Each team is working on finalizing component selection and requirements for their respective board, and have begun working on the schematics design in Altium Designer.



Software

Our software team has begun brainstorming ideas for the new ground station and is learning about sensors and communication protocols. We will continue to develop the ground station and test individual electronics components for the avionics computer in the coming weeks.