CVCS: AutoDESK 2D/3D

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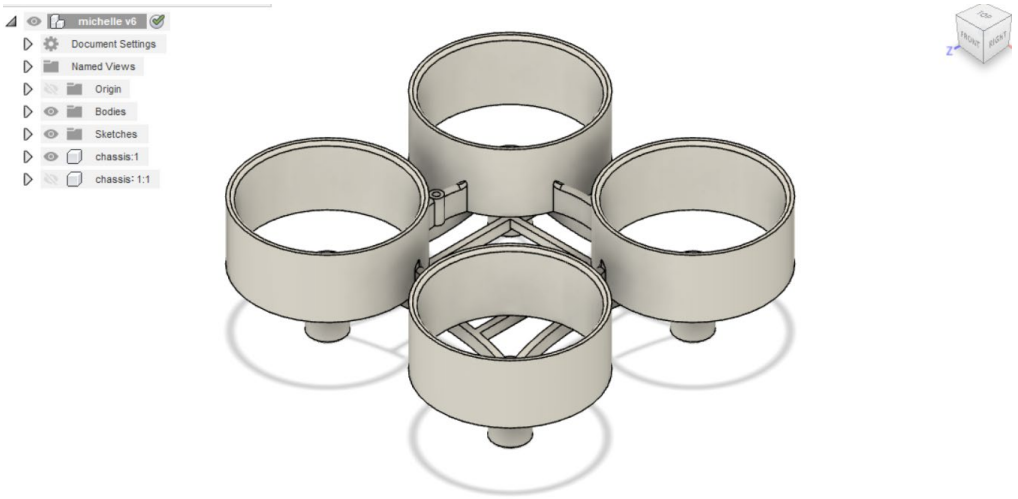
Sample Drone Report

Introduction:

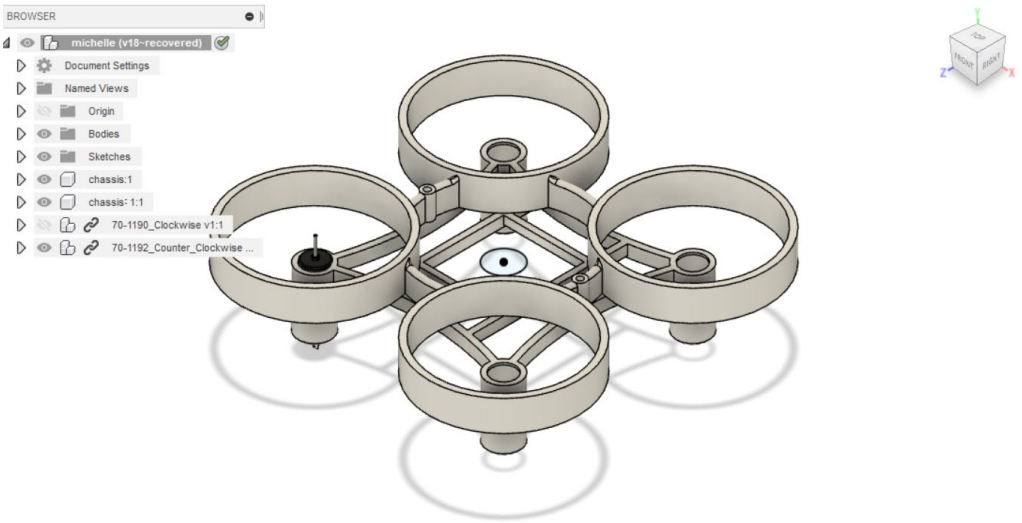
Using Fusion 360 design software, a drone chassis to fit the eamachine micro drone was designed and built. The prebuilt drone chassis worked well, and it was a tough challenge to improve on this design. The key to a nimble and light chassis was minimal structure. Contrary to using funnels and solid designs, a lightweight chassis worked well. Our goal for this project was to research, design, and build a 3D drone chassis. Minimally, our drone needed to take flight, yet my drone was able to do the majority of maneuvers it was originally designed for.

Design:

My original design was full of structure and solid elements. As shown below, the funnels are tall with plenty of structure.



When I printed and tested this drone, it didn't have enough force to lift off the ground. After many trial and errors, my drone will now take flight. As shown below, this is my final design. The funnels are much smaller and I considerable reduced the mass.



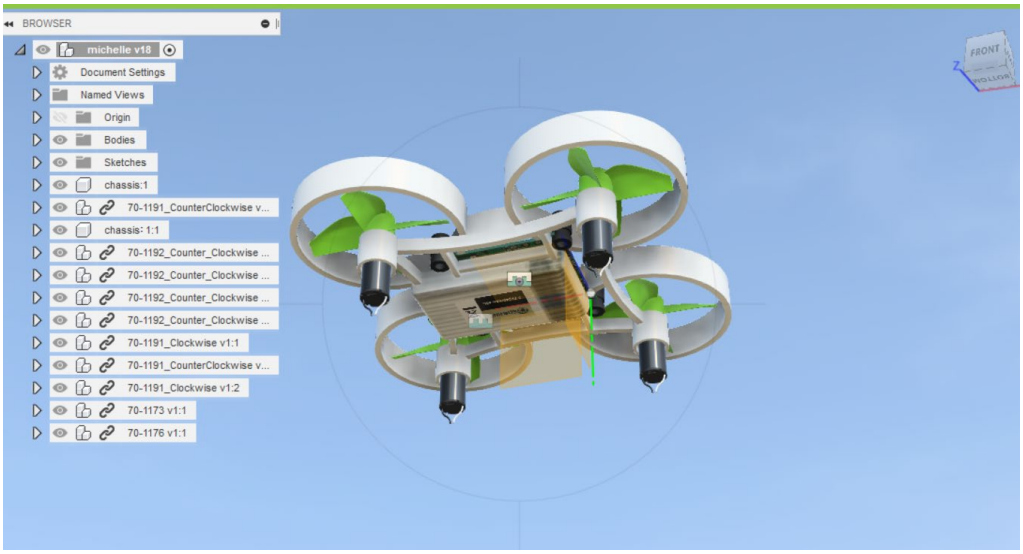
The final mass of my drone is 14.664g, while the center of mass is -1.26953mm, -0.0717751mm, 7.37933mm. The center of mass is a coordinate system (x,y,z).

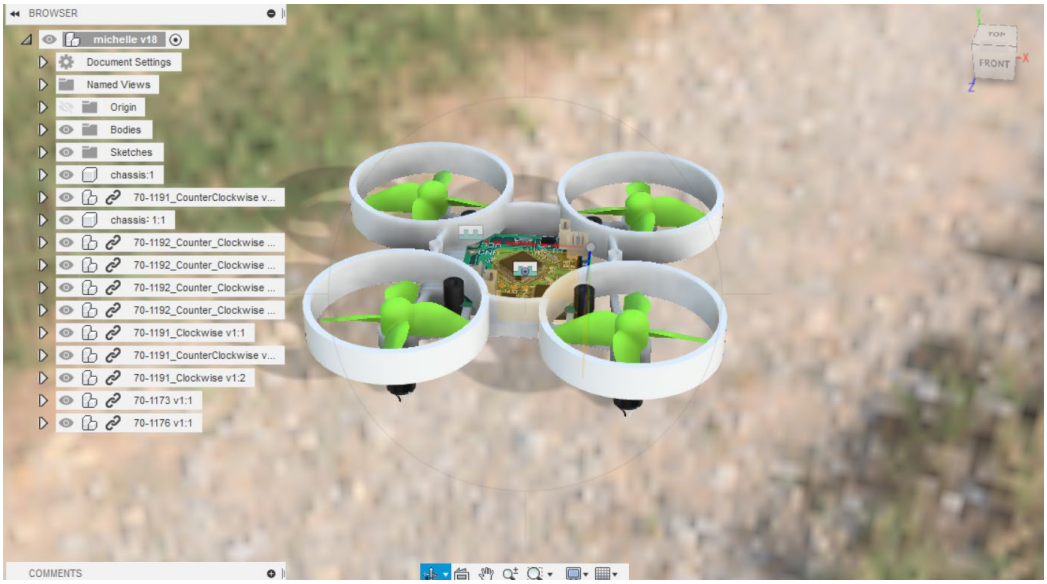
Simulation:

Simulation allows us to apply a force and see if the drone structure will break. Below is a snapshot of the results from the simulation study. The minimum force to start breaking is 2.307N applied to each motor. Maximum force is over 8N. The color coded diagram is an easy way to visualize the breaking structure.

Rendering:

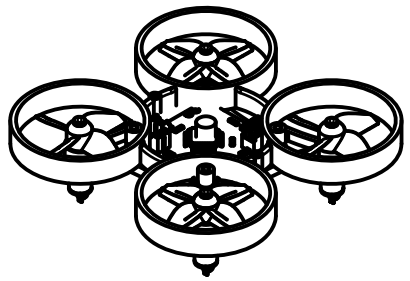
Below is a rendering of my drone design with all added components. These pictures would be useful in marketing my drone. A rendering creates a background and lighting elements.

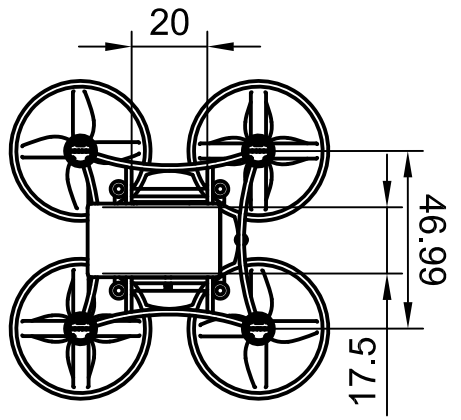


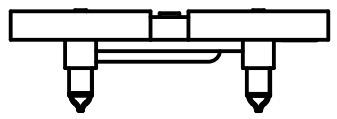


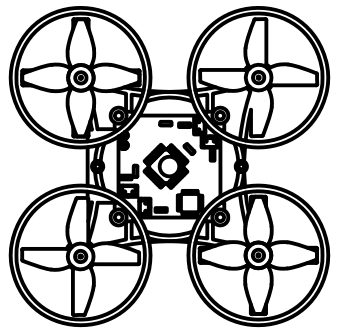
2D Drawing:

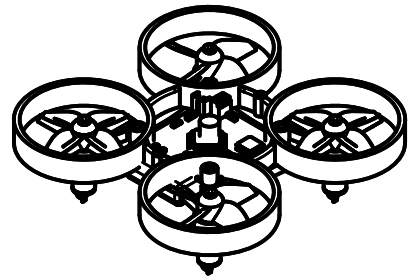
Below is a 2D drawing of my drone. A 2D drawing assists those ready to build a drone. A further analysis of the parts used in my drone would be helpful.











Dept.	Technical reference	Created by	Approved by
CVCS	MicroDrone	Julie Morgan 2/11/2020	Engineer
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Conclusion:

After many trials, my drone finally flew! Fusion 360 is a powerful tool to design and simulate 3D objects. The timeline aspect was most helpful when my motors didn't fit in the holes. I look forward to designing more objects, especially breaking them in simulation before built in real-life.