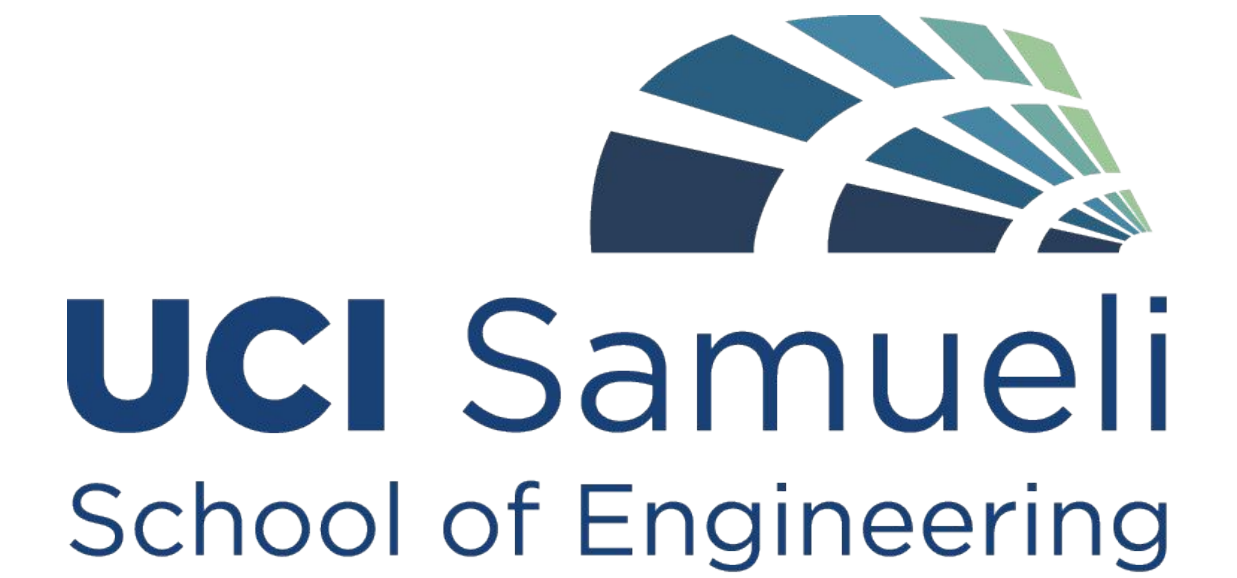




Fuel Cell Drone

Innovative Drone Design Combined with Fuel Cell Energy



Background

The demand for fossil fuel is increasing every year, while the rate of the fossil fuel production by nature is decreasing. As a result, fossil fuels will be depleted in the future if this continues. This will result in increase in price of fossil fuel products, such as gasoline, and will continue to harm the environment with pollution.

As a solution for the problem, hydrogen fuel cell has been developed, which produces pollution-free water. Also, since hydrogen is the most abundant element in the universe, it is inexhaustible unlike fossil fuels.

This is the first year that this project is being held, meaning that everything we do is brand new and our original work. Our team aims to understand fuel cell operations and apply our findings to the building of a fuel cell drone.

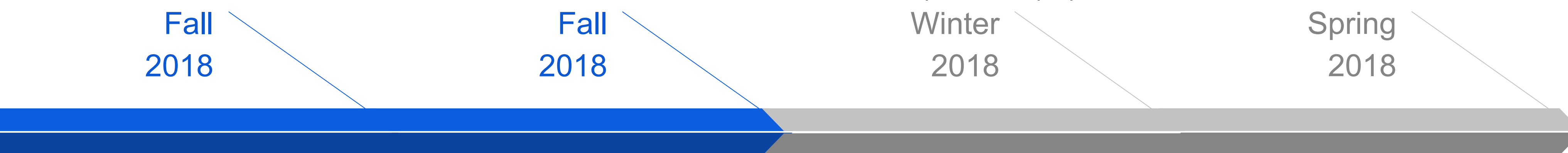
Goal

Build a drone that is powered by fuel cell. Furthermore, after the fuel cell drone is built, it will be developed and optimized to be able to fly while lifting a 5kg object.

Objectives

- Do research about fuel cell battery operations
- Learn about drone design and structures
- Do research and find appropriate construction materials and electrical parts for the drone

Timeline



Starting Phase (week 1-5)

- learn about drone structure by building up a reference drone
- GIF & UROP proposal for funding

Design Phase (week 6-10)

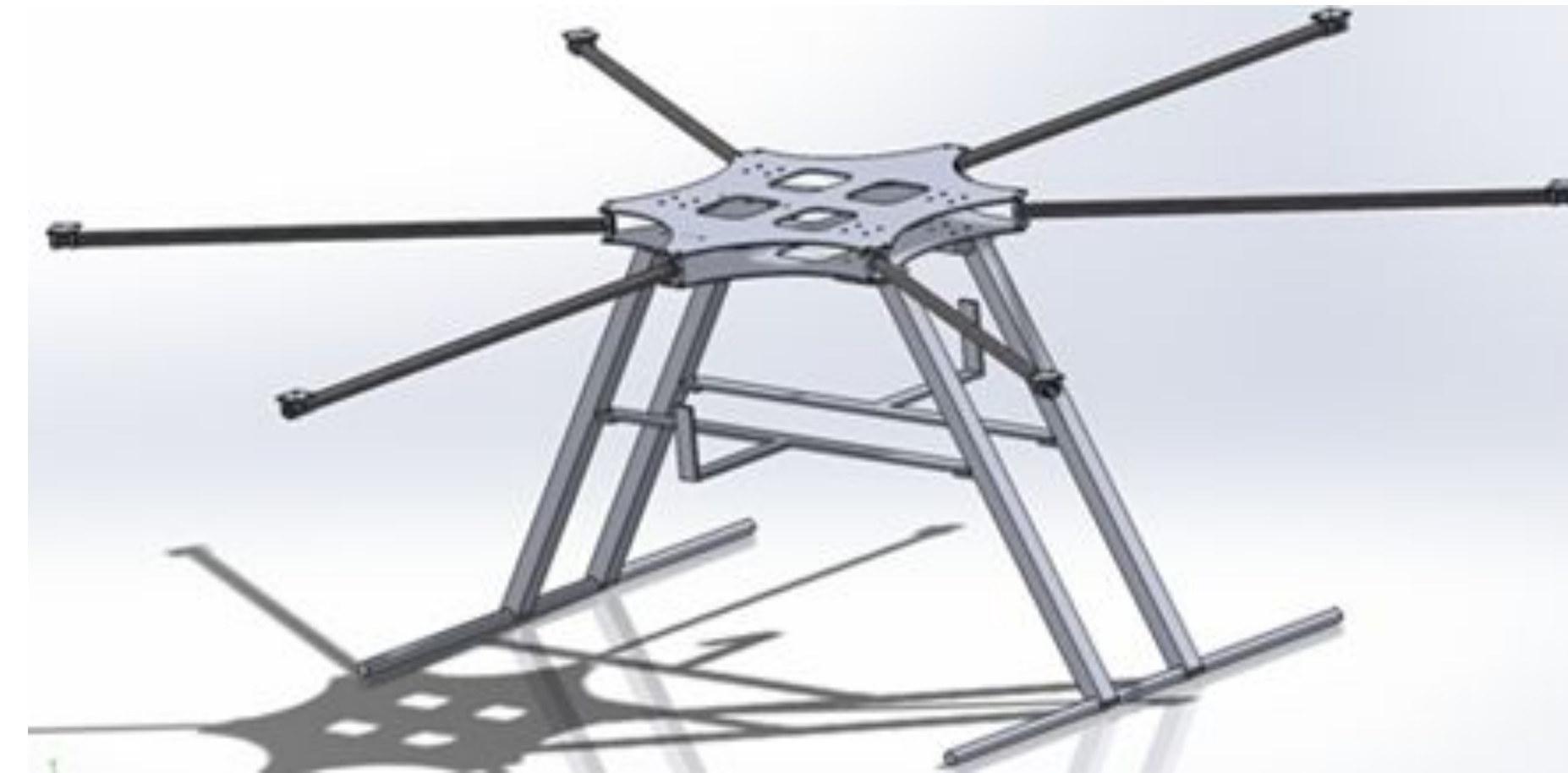
- design a drone that meets the requirements using SolidWorks which is 3D printable
- do simulations for designed drone parts

Manufacturing Phase

- 3D printing the drone parts
- manufacturing other parts
- connecting electrical parts

Testing phase

- testing with lithium battery
- testing with fuel cell battery
- testing carrying an object



Requirements

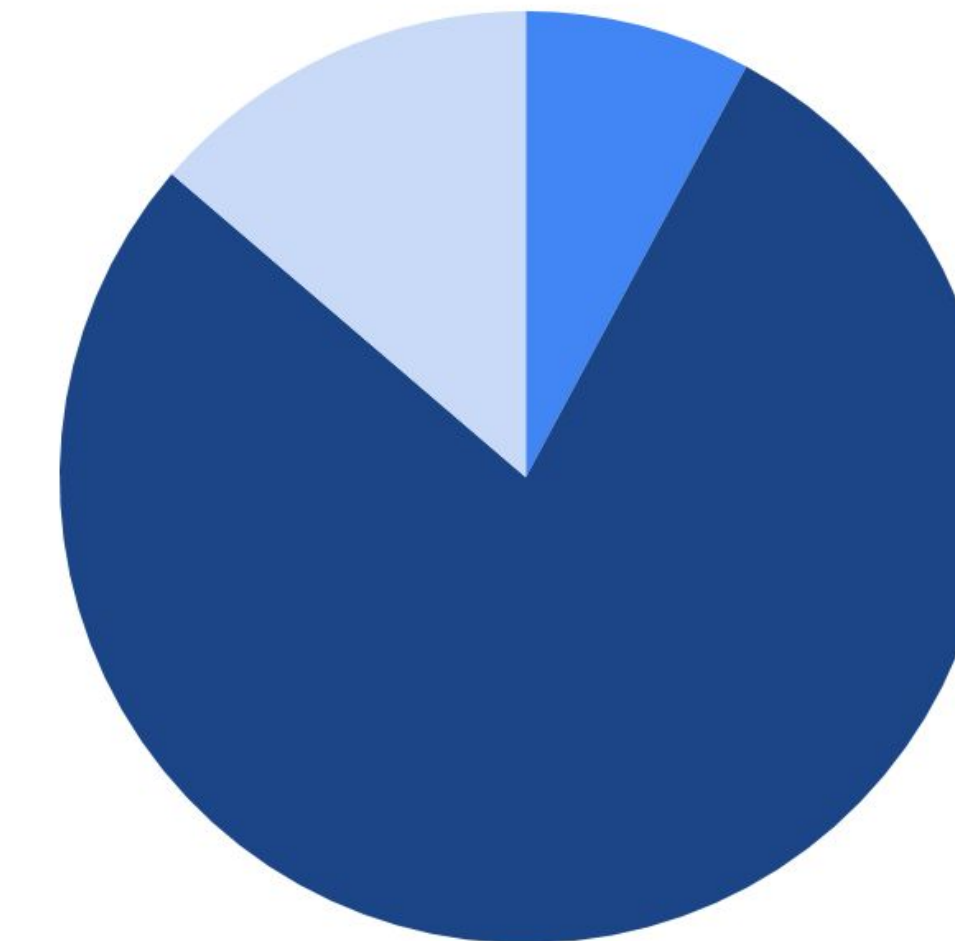
- Design our own original drone that will be powered by fuel cell battery
 - Hexacopter - more power than quadcopter which has only 4 motors
 - Dimension for the Drone - at least 30" X 10" X 10"
 - Large enough to carry the fuel cell battery: 10.5" X 5.1" X 4.8"
- Fly while carrying a 5kg object
- Fly for at least 5 minutes at an altitude of 2m

Current Status

We have designed the parts of the drone, which includes the arm, mainframe, and the landing gear using the Solidworks. They are built accordingly to the requirement stated and dimension of the fuel cell battery. Designed parts are being simulated using different materials and the material used to 3D print the drone will be decided by the one that had an overall best result. Also, the designed parts will be revised if necessary.

The propellers and the motor, will be purchased and not be made. The purchased propellers and motor will be tested for the max lift force.

Budget



- Material fee (\$350)
- Fuel Cell Battery (\$2000)
- Reference Drone (\$220)

- Reference Drone - \$220
Includes the propellers and motors
- Fuel Cell Battery - \$2000
Fuel Cell
Hydrogen Tank
Hydrogen Fuel
- Material Fee - \$350
Electrical Part
3D - Printing Fee
Additional Construction Materials

Next Step

We are almost done with the drone design and we just need to 3D print and purchase necessary parts and construct the drone. However, this is a "Fuel Cell" Drone and needs to be powered by a fuel cell battery. Thus, while the drone design is being finished and the drone is constructed, we will be testing the fuel cell battery on a different device, a mini car, to see and learn how it actually operates. We will be testing for its power and its energy content.

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