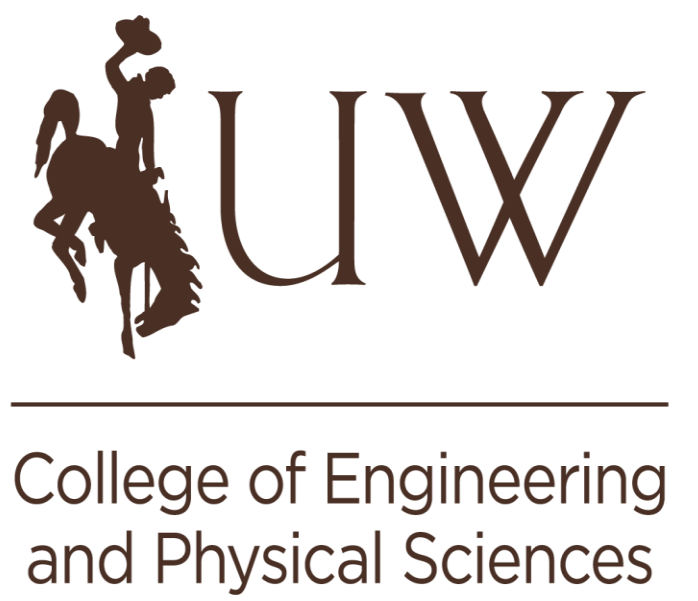


Collegiate Wind Turbine

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Clients: Michael Stoellinger and Jonathon Naughton

Advisor: Kari Strube



Project Description

The primary objective of the project is to repair broken components of the previous year's wind turbine and generate power in accordance with the Collegiate Wind Competition Rulebook. Utilizing the rulebook's prescribed rubric for competition scoring, the team will assign a score to the current turbine and enhance its original performance rating. The central focus of this project will be on prototyping and testing. The turbine is designed with the hope that the Cowboy Wind Club at the University of Wyoming will continue work on the turbine as an official part of the competition in the coming years. To improve the score, certain modifications will be implemented regardless of the initial testing results, while others will be contingent on the results.



The current turbine design fully assembled.

Initial Design

The initial design from the past team provided:

- A functional skeletal structure
- An initial blade design with two functioning blades
- A prototype pitching system
- Necessary internal components for the nacelle

Design Requirements

Operations and Mechanics

- The turbine will produce a power curve that maintains less than or equal to 48 DC volts at a common coupling point.
- The wind turbine will maintain a constant rotor speed and power with varying wind speeds.
- The turbine nacelle and blades will fit within a 45 cm by 45 cm by 45 cm cube.

Safety

- The wind turbine will have an automatic shutoff switch that will need to be restarted once the issue is resolved.
- The turbine will have no exposed wires and all connections will be properly coupled.



The initial broken blade and pitch system

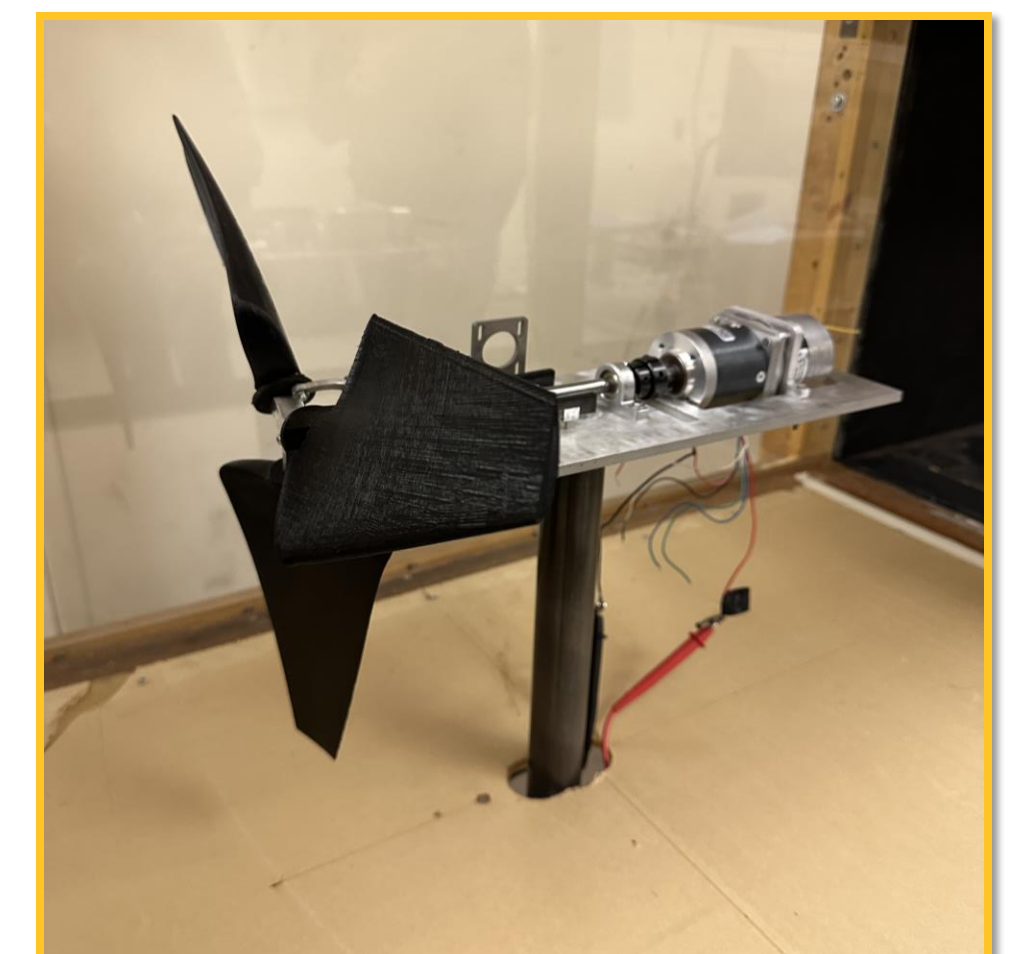
Current Progress

The following accomplishments have been made over the course of the project so far:

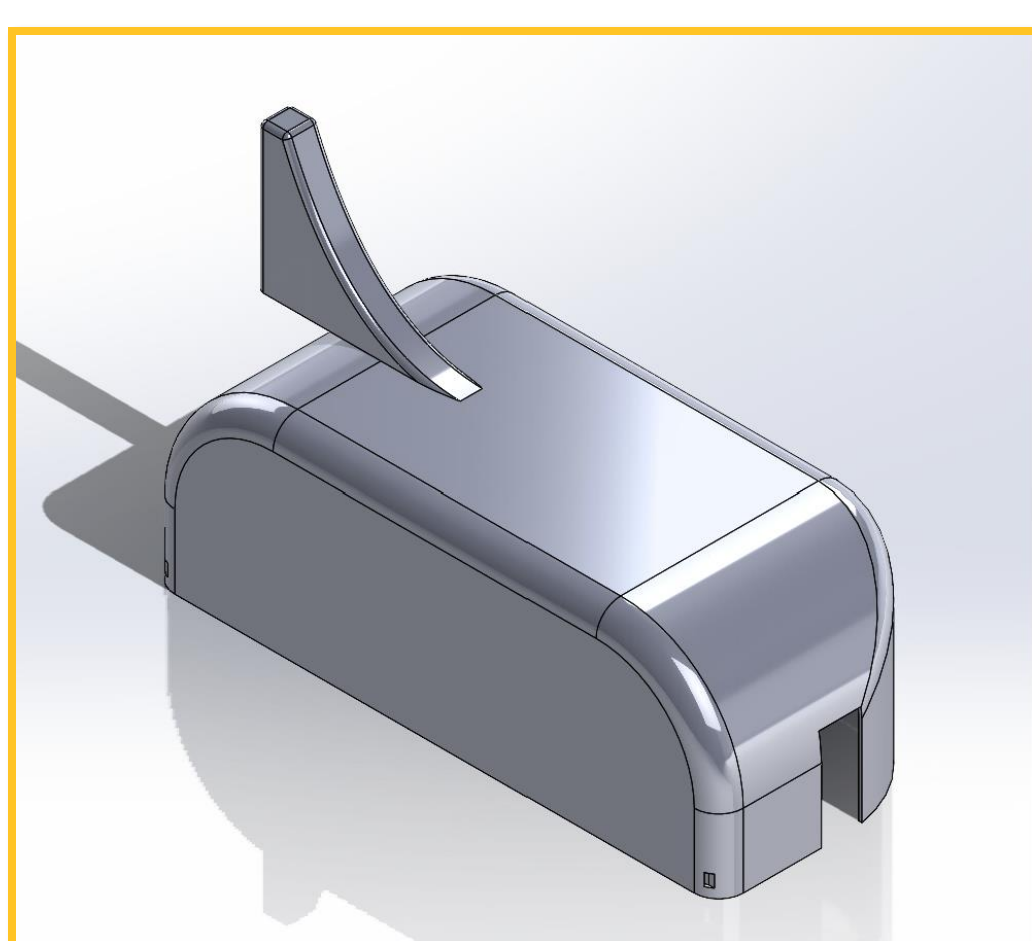
- Changed the pitch system to a fixed pitch system
- Repaired a broken blade
- Remanufactured the pitch arm
- Replaced the generator from a bipolar motor to one with a brushless motor.
- Modified the wind tunnel
- Assembled the turbine
- Rewrote the Arduino code
- Designed the Nacelle and Yaw system



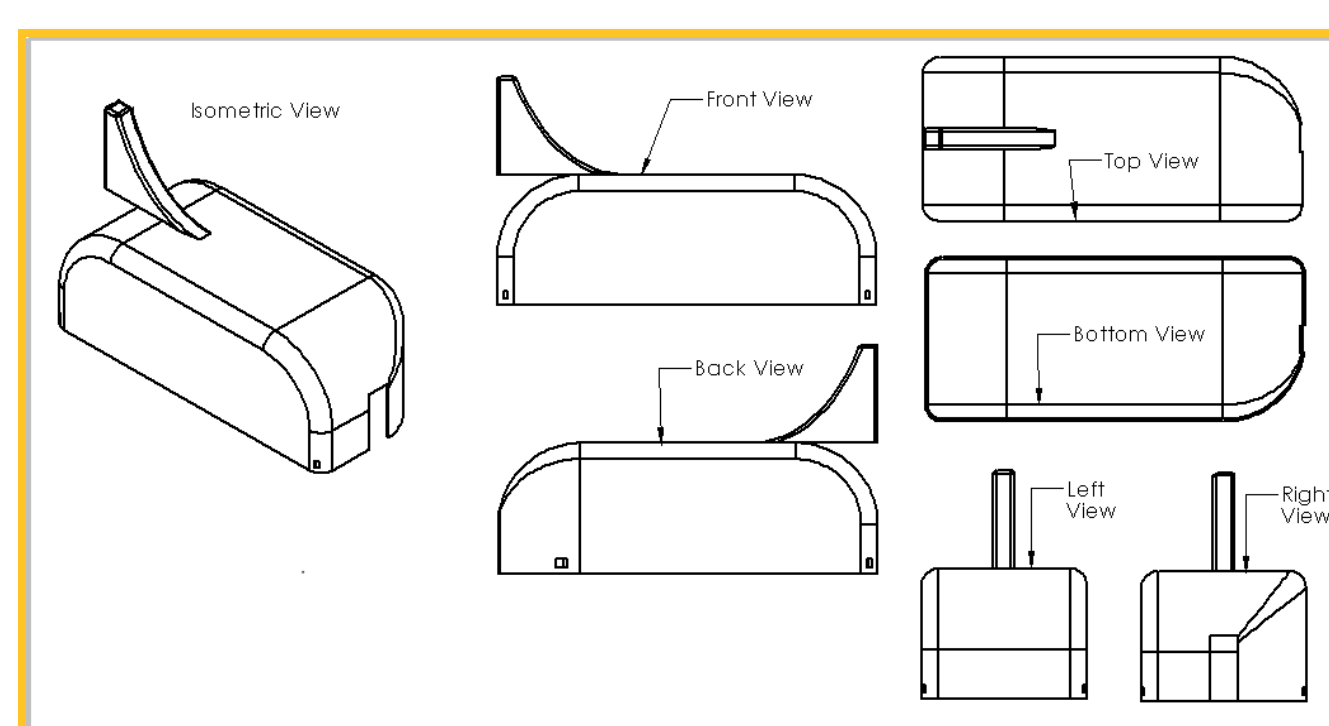
Fully assembled turbine after repairs



The turbine fully assembled in the mezzanine wind tunnel.



Solid works model of the nacelle housing and yaw fin.



SolidWorks drawing of the nacelle housing and yaw fin

Going Forward

The focus for the project next semester will revolve around prototyping and testing the wind turbine to obtain the best score possible for the collegiate wind competition.