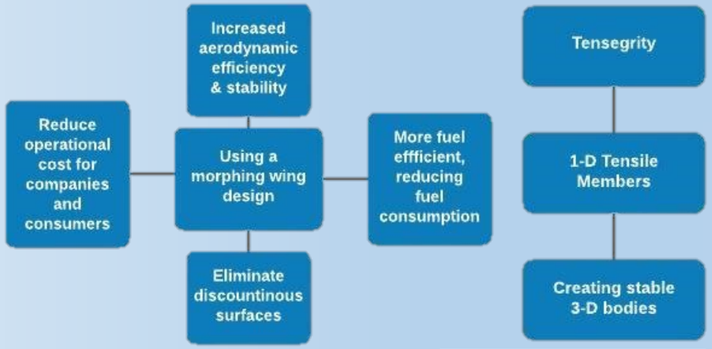
Winter 2021 Design Review

Tensegrity Wing

UCI Samueli School of Engineering

Background



Goals and Objectives

Design, manufacture, and test a morphing wing

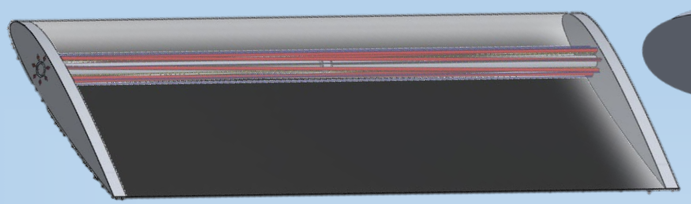
Winter quarter

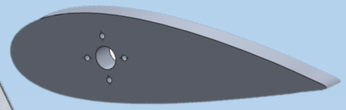
- Optimize internal mechanism in CAD to achieve desired twisting
- Determine lift and drag forces of various airfoil shapes at different angles of attack and twisting angles
- Integrate structural wing with selected airfoil shape
- Purchase materials to create an initial wing prototype
- Establish a plan for fabrication plan

Requirements

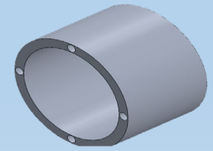
- Capable of maintaining ***optimal aerodynamic efficiency*** by twisting individual airfoils to adjust for changes in lift and drag
- ***No discontinuities*** present on the surface of the wing
- The morphing wing and the inner tensegrity mechanism combined would be ***lighter than traditional wing design***

Current Status





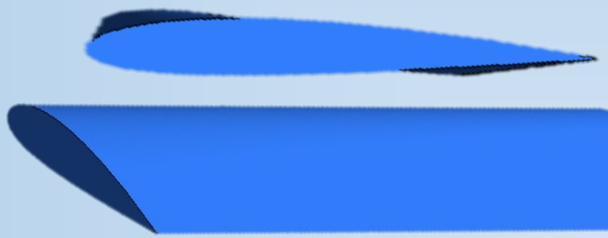
Airfoil Rib



Ring

Central Spar

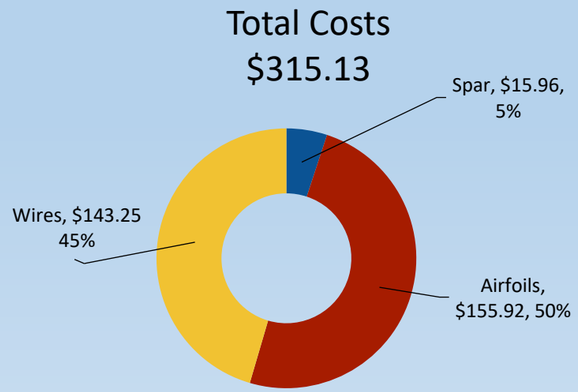
NACA 2415 at -10 twisting angle



Team

Advisor: Edwin A. Peraza Hernandez	
Team Lead: Oscar A. Verdugo	
Subteams	
Structures	**Fluids**
Kajohn Aguilar	Ali Haroon
Joel Venegas	Nicholas Federizo-Jimenez
Kimberly Martinez	Linda Chea
Ian Gonzales	Raphael Feliciano
Jesus Cervantes	Friedrich Zurawaka

Budget



Bigger Picture

Upcoming Objectives

Spring Quarter

- Continue using CFD simulations to test for aerodynamic properties
- Preliminary prototype fabrication
- Learn how to use UCI wind tunnel and prepare fabricated sample
- Gather wind tunnel data of lift and drag forces on the prototype
- Fabricate full wing prototype, including the tensegrity mechanism