☀ Solar Airplane 2018-2019 ☀

SAMUELI SCHOOL OF ENGINEERING
UNIVERSITY *of* CALIFORNIA · IRVINE
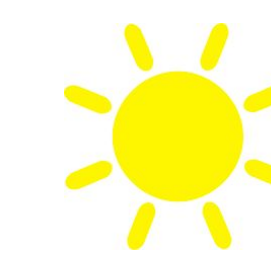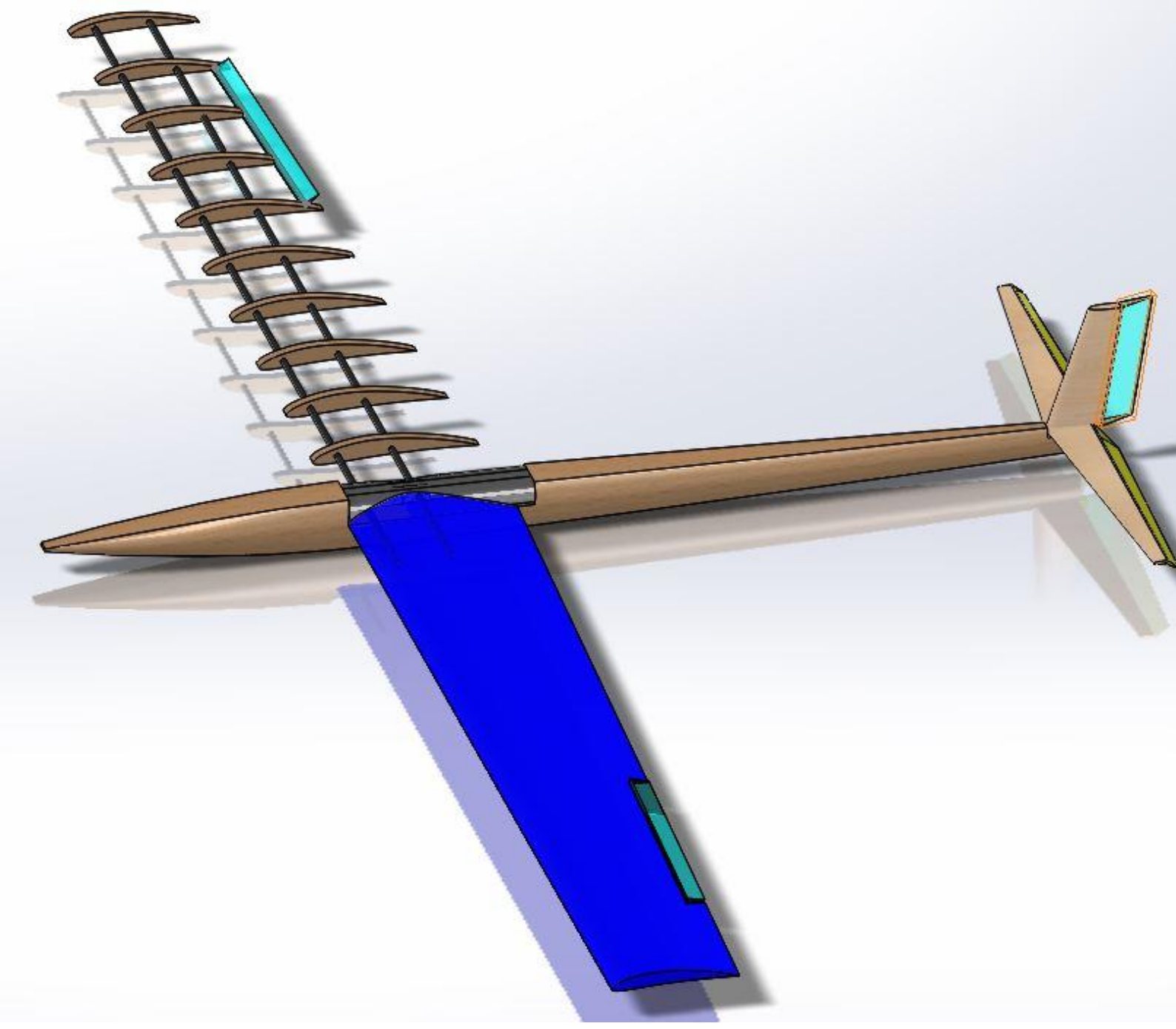
Background

Today's RC technology is rapidly changing to suit our needs, but they can be improved to operate more autonomously and efficiently with the correct design and systems in place. Current batteries used in lightweight UAVs (unmanned aerial vehicles) do not provide ample flight time. Using solar power, we plan to extend the flight time and make the UAV capable of more coverage.

Goals and Objectives

·Purpose is to provide students an understanding of integrated systems and aeroplane design and manufacture
·Aim to increase the flight time of out UAV by integrating solar panels and minimizing mechanical losses
·This quarter's objectives were to design a UAV in Solidworks, run simulations on each component, and create simulations and models on electrical components

SOLAR AIRPLANE BUDGET 2018-2019

Total Budget: $1800

- Landing Gear — $180
- Unallocated Funding — $450
- Avionics — $324
- Fuselage — $306
- Wing & Tail — $540

Preliminary Solidworks Model

·Wings will be ribbed and strung with carbon fiber rods
·Wings will aim to have solar panels near the surface
·Fuselage will be paneled in some segments, and monokoted in others
·Tail will be ribbed and strung like the wings
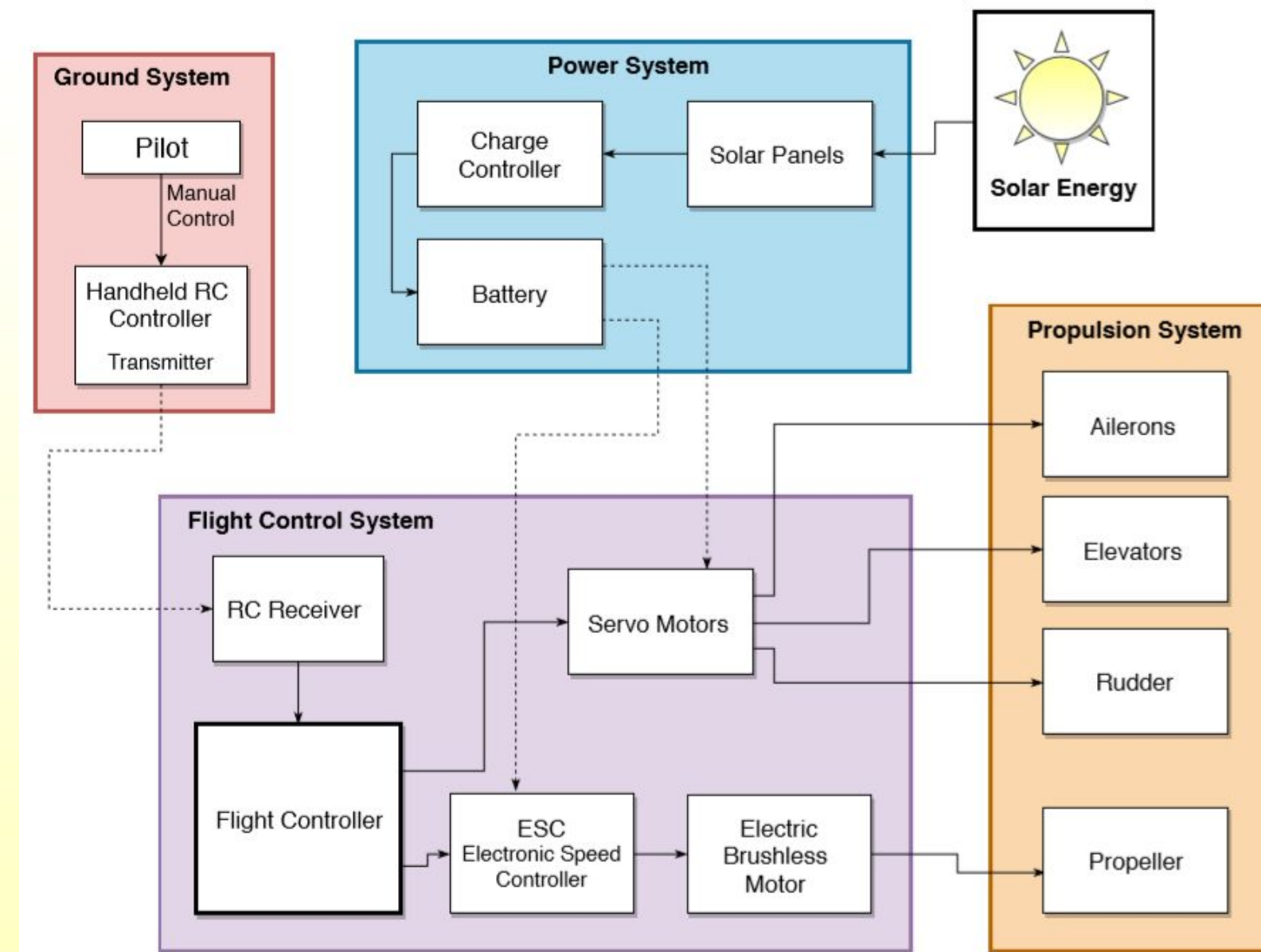·Servos will be fitted near aileron, elevators, and rudder and wired to the fuselage

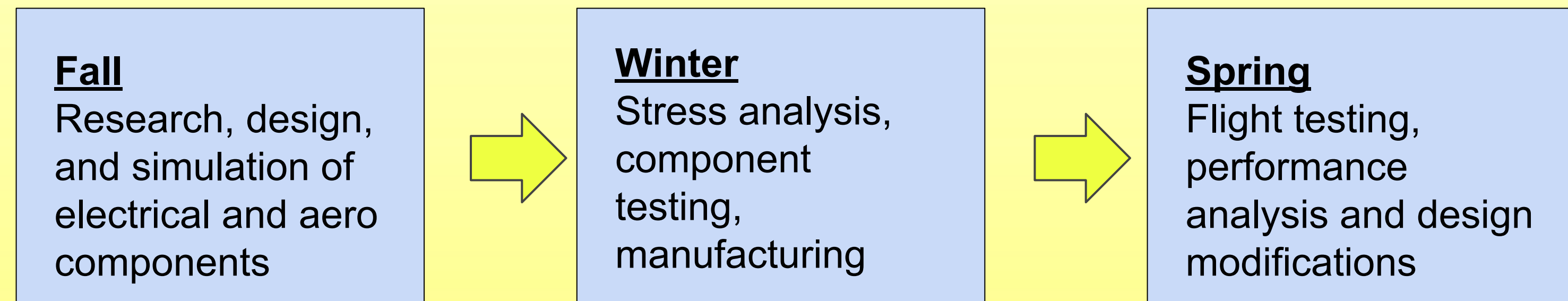## Avionics System Block Diagram

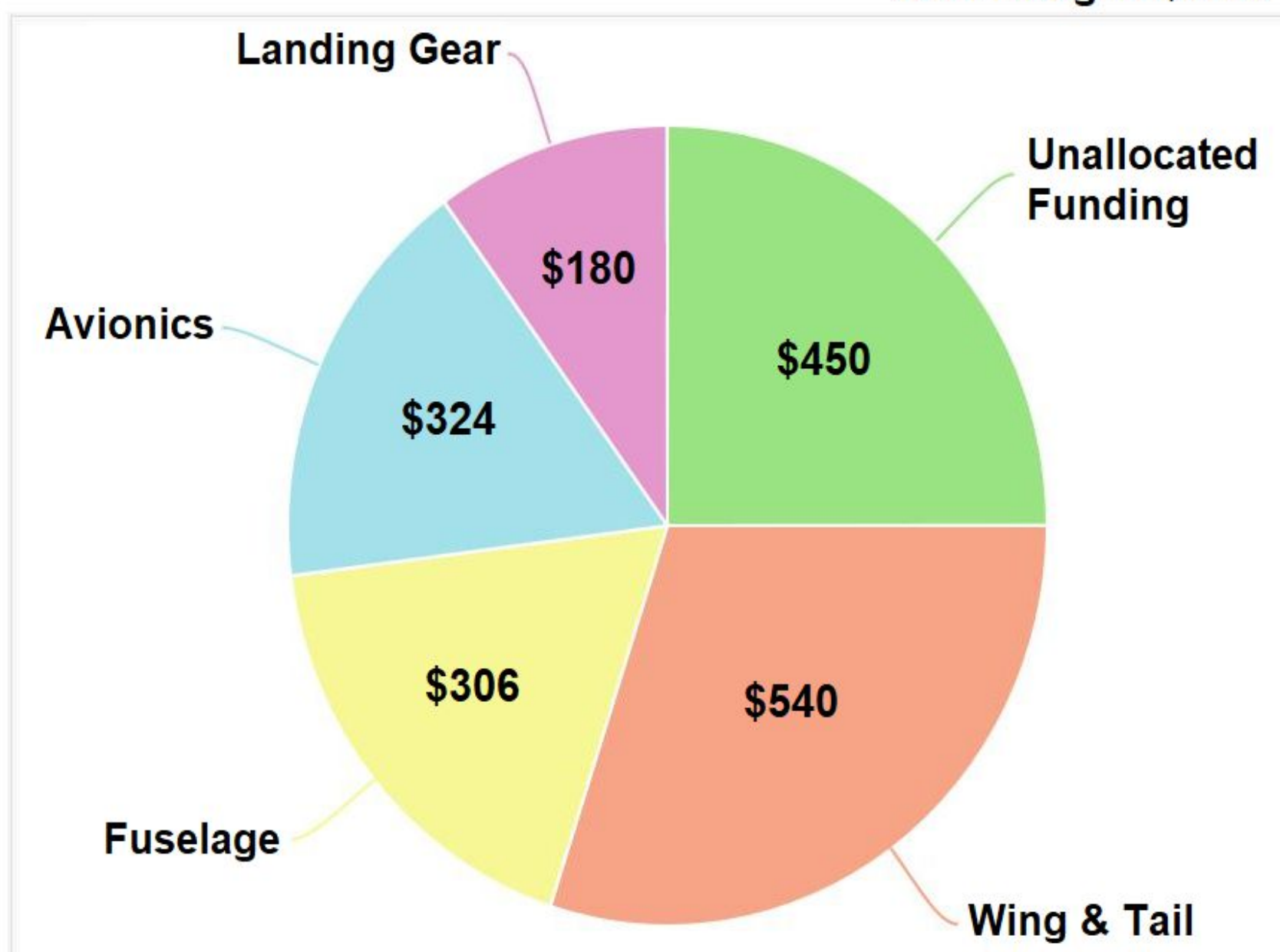·**Innovation**: solar power augmentation allows for longer flight time

·Solar panels are integrated onto the plane itself and collect solar energy from the sun
·Solar energy then supplements the main battery that powers the airplane
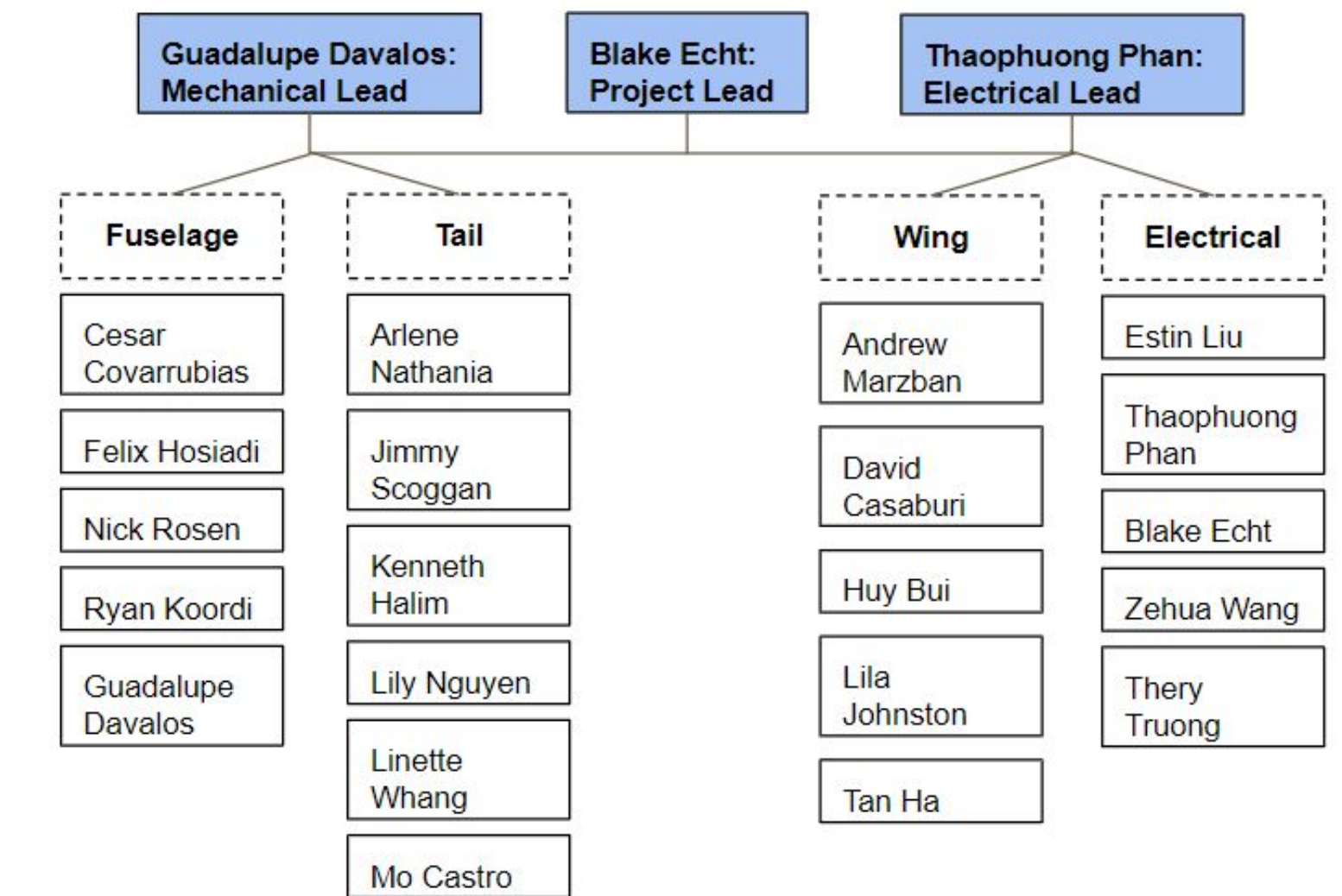·The motor and servos that control the ailerons, elevators, and rudder, are powered by the main battery

Requirements

·Maximum UAV weight of 20 pounds
·Maximum UAV dimensions are 24 square feet
·Technical payload of 2 pounds
·Minimum flight time of 10 minutes
·Solar panels must extend flight time by a minimum of 15%
·Must fly at an altitude between 456 to 700 feet above sea level
·Must have 2 control systems that respond to environmental or operating conditions
·One component must be made of carbon fiber

Next Steps

·Updating SolidWorks models
·Running simulations on the entire SolidWorks assembly
·Acquiring proper electrical equipment
·Assembling model airplane

Team Formation

- Guadalupe Davalos: Mechanical Lead
- Blake Echt: Project Lead
- Thaophuong Phan: Electrical Lead

Fuselage
Cesar Covarrubias
Felix Hosiadi
Nick Rosen
Ryan Koordi
Guadalupe Davalos

Tail
Arlene Nathania
Jimmy Scoggan
Kenneth Halim
Lily Nguyen
Linette Whang
Mo Castro

Wing
Andrew Marzban
David Casaburi
Huy Bui
Lila Johnston
Tan Ha

Electrical
Estin Liu
Thaophuong Phan
Blake Echt
Zehua Wang
Thery Truong

Timeline

Fall
Research, design, and simulation of electrical and aero components

Winter
Stress analysis, component testing, manufacturing

Spring
Flight testing, performance analysis and design modifications

For further inquiry, contact:
Blake Echt — becht@uci.edu
Guadalupe Davalos — gdavalos@uci.edu
Thaophuong Phan — thaophup@uci.edu