Solar Airplane 2020-2021

**Background**
Solar Airplane aims to create a UAV that utilizes solar cells to extend flight time. A modular payload bay will be incorporated so the aircraft may be used in multiple different use-cases, such as search-and-rescue, payload drop delivery, and surveillance of a large area.

**Goals & Objectives**
- To provide students an understanding of integrated systems, airplane design, prototyping and manufacturing
- Aim to increase the flight time of our UAV by integrating solar panels and minimizing mechanical losses
- This quarter’s objectives were to research the components of a UAV, create a design utilizing Solidworks, run stress analysis on components, and create models on electrical components

**Aircraft Specifications**
- Current Weight: 6.3 lbs.
- Payload Capacity: 0.5 lbs.
- Wingspan: 10 ft 5 in
- Wing Loading: 9.7 oz/ft²
- Stall Speed: 12.3 mph
- Total Length: 6 ft.
- Power Consumption: 50 watts
- Power Generation: 117 watts
- Solar Cells: Sunpower C60

**Current Status**
- 50% of components shipped
- Revision of characterization of aircraft using Excel
- Components selected

**Wiring Diagram**

**Budget 2020-2021**
- Wings: $150
- Tail: $50
- Fuselage: $180
- Avionics: $1330

**Projected Timeline**
- Fall: Research, design, of electrical and aero components. Stress analysis of the structures.
- Winter: Component verification, weight reductions, and design modifications.
- Spring: Fabrication/manufacturing, flight testing, performance analysis.

**Requirements**
- Multipurpose aircraft
- Must be able to fly in 20 mph winds
- Solar cells supplement battery power
- Minimum of 30 minutes extension beyond the battery-alone duration
- GPS and camera integration
- Aircraft should be portable and fit within a small car (max. component length 6ft)
- In-flight data received via remote terminal

**Next Steps**
- Continue with characterization of MPPT, battery charging cycles, & development of most efficient flight plan
- Begin fabrication of wings, fuselage, and tail parts. Concurrently build jig for assembly of all parts.

**Team Members**
- Project Manager: Andre Necochea
- Wing Lead: Tyler Ong
- Fuselage Lead: Alexander Tobey
- Tail Lead: Gabriel Nicklaus
- Avionics Lead: Preston Sterling
- Andre Necochea: anecoche@uci.edu
- Tyler Ong: ongtdd@uci.edu
- Alexander Tobey: atobey@uci.edu
- Gabriel Nicklaus: gnicklau@uci.edu
- Preston Sterling: pbsterli@uci.edu

**For further inquiry, contact:**
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