CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

S0907

Project Title

The Design of an Ultra-Lightweight Hybrid Solar-Powered Radio Controlled Aircraft

Abstract

Objectives/Goals

The objective of this project is to construct a solar harvesting system for a model airplane, and to integrate the solar harvesting system on the plane to test if there is enough energy produced from solar cells to power the airplane.

Methods/Materials

Phase one, a solar harvesting system was built by soldering four solar panels with wires. The wires are connected to the Li-Po balance charger and the airplane power system. The four solar panels were then installed on the airplane wings. Tests were conducted.

Phase two, an integrated hybrid battery and solar panel system was constructed by connecting a Li-Po battery with the Li-Po balance charger and the airplane power system. Tests were conducted on the performance of the airplane.

Results

The power generated from the solar panel system alone built in phase one was not enough to move the airplane, but noise can be heard from the running motor.

The energy generated from the integrated hybrid battery and solar panel system built in phase two was able to power the airplane. The airplane was able to run on various ground surface, take off from concrete ground and fly in the air for less than one minute each time during the test.

Conclusions/Discussion

The experiments demonstrated that an integrated hybrid battery and solar panel system has the potential to generate enough power to fly a model airplane. The primary ways to harvest more solar power for longer flying time or for bigger airplanes are to install more solar panels by increasing airplane wing span and to increase solar panel efficiencies since the efficiencies of current flexible solar panels on the market are low.

Summary Statement

The Design of an Ultra-Lightweight Hybrid Solar-Powered Radio Controlled Aircraft

Help Received

Studied engineering design fundamentals at University of California Irvine in Summer 2014.