

UAV Flight Endurance Testing

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Abstract

Problem Identification:

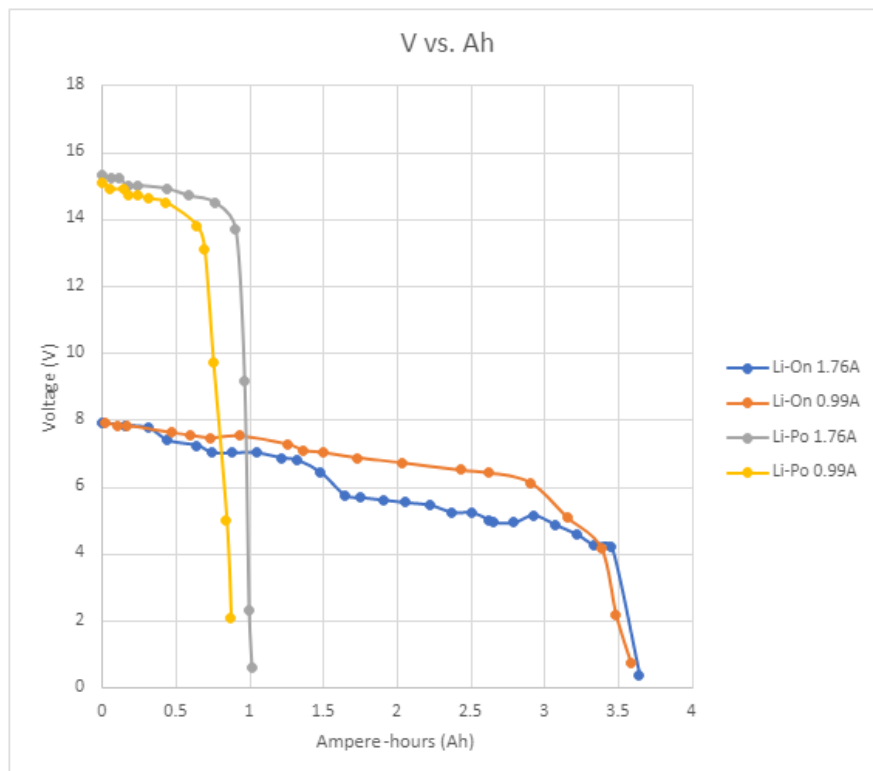
There are severe limitations to electric powered UAVs flight endurance. The BANSHE UAV team intends to increase the flight endurance of a UAV platform by incorporating structural members that store or generate power while in flight, while using an intelligent power storage switching system.

Approach of This Project:

To improve the endurance of our UAV, the team ran battery and transmission line tests. The Battery Testing Team manages Li-On and Li-Po battery testing to determine which battery will be best for our UAV. On the other hand, the Transmission Line Testing Team oversees obtaining voltage, current, and power values from 3-phase transmission lines with the help of Imperial Irrigation District (IID). Our approach is to locate a coil near a 3-phase transmission line at varying distances. The team will be monitoring the changes in current and voltage due to the changing magnetic field from the power lines. This data will be used to calculate how much power we can obtain from flying near the power lines. As a result, this will provide a consistent charge to the UAV when mounting the coils to the wings of the UAV while it is examining powerlines. This will pave the way to implement wireless charging for our UAV drone, which ultimately improves the endurance of our UAV drone.

Expected Results of This Project:

We expect to increase the endurance of our UAV through conducting battery and transmission line testing. Battery testing will enable us to choose the battery with the highest capacitance, thus increasing the endurance of the UAV. This will be accomplished by testing SANYO Li-On batteries and the OVONICS Li-Po batteries. The SANYO Li-On batteries come in individual cells, whereas the OVONICS Li-Po battery is configured in a battery pack with 4 batteries in series. For this reason, the OVONICS battery pack will be the preferable option. On the other hand, the Transmission Line testing team is expected to increase the endurance of our UAV by spearheading the development of wireless charging for our drone. This team is expected to find the voltage, current, and power values from a coil when we place it by a transmission line. The magnetic field of the transmission line is expected to induce a voltage through our coil, which will create a current flow through the center of our coil.



V vs Ah Results from Our Battery Testing

How Will Your Results Impact the Real World?

Our results will impact the real world by making it safer for linemen to inspect transmission lines by using our drones. Instead of linemen climbing up transmission lines, they will be able to fly our drone above the transmission lines. Our high-endurance drone will be capable of providing this service with minimal downtime because it will be continuously charged with the wireless technology that we are working on now. Not only will it be able to charge continuously, our research and testing on different batteries will give our drone the best battery life. In short, our drone will be able to make the job of being a lineman safer by providing consistent and reliable drone service for them.