Developing a Multi-Use UAV Capable of Long-Range Flight

Bell, Alexander (School: Kealakehe High School)
White, Nicholas (School: Kealakehe High School)
Curry, Evan (School: Kealakehe High School)

The current factor holding back the advancement of the drone industry is battery life. Commercially available drones currently average flight times of around 20 minutes, which is a huge limitation on what can be done with a UAV. Our research includes the design, fabrication, and testing of a rigid prototype for a long-distance drone. The system we created is powered off a 2-stroke engine coupled with a brushless motor that has the functionality of a gas-electric generator. Testing showed that this generator was capable of producing 80 amps and 40 volts of power. This generator system was then integrated onboard our custom-built hexacopter and optimized to run at the consistent 24 volts required for sustained flight. What we found is that 64 ounces of gas equated to a 76 minute flight time, meaning that a full tank of 128 ounces would yield 2 hours and 15 minutes of in-air flight. This is the equivalent of a 445% increase over current industry alternatives. We estimate that a market-ready version of this UAV would cost less than $6000 dollars, a considerable price reduction over the $50,000-$80,000 options currently available. Our further research includes applications in the fields of conservation, humanitarian aid, search and rescue, and much more. Besides the obvious potential for profit, our drone serves as an excellent testbed for long-range systems of the future. Ultimately, we would like to replace the gas-powered generator on our drone with renewable systems, but those technologies aren't at a sufficient level yet. Instead, this system will allow us to optimize all other aspects of the drone for the time when that technology does become available.

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