Project Aeolus: Modernizing and Automating Drone Fleets

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This project was developed to find a way to charge autonomous aerial vehicles by the use of wireless charging. The project, codenamed Aeolus, intended to eliminate the need for human interaction during the drone's charging period. The finalized designs of Aeolus consisted of two main parts. The power source came from a solar panel that generated electricity to the battery, which would then power both the transmitting coil and electronics. The brains of the operation were held within a central casing. Located inside were the battery, charge controller, and custom printed circuit board. The PCB is responsible for providing consistent and regulated power to the other components, preventing malfunctions, and allows for wireless data transfers and drone detection. Power is transferred within this system to a transmitting coil located atop the contraption. A receiving coil, on the drone, allows for current to flow from Aeolus to the drone's battery without a physical connection. This increases autonomy and allows the drone to operate without intervention. Testing the system involved determining the time it took for the solar panel to charge the battery and the time required for the drone to fully charge via Aeolus. Examinations showed that the solar panel was able to charge the battery in 30-minutes in optimal sunlight. The drone was able to be charged in ~100-minutes, faster than conventional power means by several minutes. Aeolus has concluded that using inductive charging for delivery drones is not only possible but is a reasonable option for future deliveries.

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