Coordinated multi-drone aerial performance development

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Individual Project

The main aim of this capstone project was to design and develop a real-time kinematic positioning drone via GPS in order to emit sequences of lights for aerial performance to expand for multiple drones. The coordinated multi-drone aerial performance development is an individual effort emphasising on precise coordination via GPS, along with motor control, piloting and light sequencing.

The first step of the building process was to research how and what makes for a precise GPS drone that will perform in real time for a high fidelity and resolution result. Understandably, high precision follows a high monetary cost. Multiple venture capitalists were persuaded and secured for this project.

Latest GPS equipment, "F9P" was used rather than older/ more commercially used GPS equipment, "M8N", because "F9P" GPS allows 2 centimeters of deviation while "M8N" GPS has 2 meters of deviation. What also makes "F9P" GPS more accurate is the use of its supplement ground station which "M8N" GPS does not support. The ground station allows more data and signal strength receiving from satellites.

Apart from GPS and the ground station, the remaining components of the drone were carefully researched and selected. Components needed to be able to accept the input voltage of a high-power battery, and need to withstand overcoming its weight for efficient flight while maintaining controllabiltiy and safety.

While using command API flight path software, "Ardupilot" and "Mission Planner" to control the drone and using "SkyBrush" to control the LED lights concurrently, C programming language is used to interact with the flight controller that is using ARM.

In conclusion, a "Hello World" concept has been developed for coordinated drone flight with light emission at a precise level. Further planning include attaining more resources and testing for multiple drone usage.