Project Drone Charge Proposal

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1 Background and Motivation

Aerial Drones have a lot of potential use, but the use of commercially available drones are limited by the short amount of time they can stay airborne before requiring a recharge. Many applications could be considered where a drone would need to stay airborne for long periods of time to do various tasks. For instance, monitoring areas using various sensors or spreading pesticide on a field of crops.

2 Main Problem/Idea

Although battery life will increase as technology advances, there is a current need for alternatives. If drones could recharge themselves or somehow become sustainable this would increase the usage scenarios of drones significantly. Our idea is not to have drones stay airborne indefinitely, but to have the tasks that the drones are performing continue in spite of the need for a recharge. This could either be done by having other fully-charged drones take over the task or by allowing the drone to resume its task after it has been recharged.

3 Suggested solution

Our solution involves creating a framework that allows for applications to easily add autonomous recharge capabilities to their drone-applications. Application developers would provide means to locate and control the drone, as well as a task that the drone is supposed to perform. The framework would the interrupt the task and have the drone return to a charging station and either recharge and resume its task, or be replaced by another drone while it recharges. The drone would be required to be able to automatically dock to a charging station by landing on a platform that charges the drone. Once the drone is recharged or it becomes its turn to take over the task, it would resume the task in whatever state it was in.

4 Plan

We will start by outlining the framework and testing the recharge capabilities of drones through platform-charging. We will then develop the framework, and at the same time work on setting up a physical sample-application for the framework. Once the framework is completed, we will create an application that utilizes the framework to add recharge capabilities to a simple task in a controlled environment. This would involve writing the required application-dependent components such as location-tracking and movement controls.

5 Requirements for equipment, space, etc.

We will need:

- 3-5 Crazyflies (Probably this kind of drone) – Depends on how fast you charge drones with coils.. Subject to test.
- 2-3 Charging coils (Sebastian showed us some coils for charging)
- HD Webcam for drone-tracking
- Might need a room for setting up a controlled environment for testing the drones, this should be later in the process once we set up our test-application.