

ECE Capstone 448:38 Spring 2016

Advisor: Dr Rich Howard

Project: The Arduino Based Heavy Lift Blimp

Team:

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Abstract

As humanity continues forward the need for resources to sustain and progress society continues to grow. With the increasing need for resources, new areas of the globe must be scoured to acquire these resources but, new areas are not easily accessible. As a species we need to find more efficient methods of obtaining resources without pioneering every obscure location. Our project will tackle this issue; we plan to build a scaled model of a heavy lift blimp. Human error is another large issue when it comes to extracting resources; to prevent human error we would like to implement an Arduino based autonomous flight control system that can be implemented on a large scale in the future.

Our team will begin by acquiring a scaled sized blimp to use. We will need to break our tasking into multiple components to complete for our project. The first task to complete will be to use an Arduino microcontroller to control our autonomous flight control system. During the programming of the microcontroller, we will need to implement a communication system to send commands to the blimp from a control station. Our next order of business will be to integrate additional lift controls; this will be done using three motors, one on each side and one at the bottom. The third module of our project will be to incorporate the identification of infrared tags and the ability to fly to them. After the navigation portion of the project is completed, we can employ the heavy lift function of our blimp. We have discussed using a second set of IR markers to orient the blimp once it is over the payload, lowering down to it, and picking it up. Upon lifting the payload, we will have the airship transport the cargo to a predetermined landing site using another IR marker.

At the end of this project, we will be delivering a scaled model of a heavy lift blimp. Using an autonomous flight control system, programmed on a micro Arduino, to navigate to and from resource sites and returning to a predetermined offloading area with a payload. Using IR markers, and possibly other forms of navigational aid, to perform these tasks quickly and accurately as possible. The airship will be completely autonomous once in the air, besides from the commands from the control station to be used to determine the order in which the blimp will proceed about its takings. In the future, the blimp should have a tracking device where it would simply find the object and pick it up without the use of IR beacons, this would make it fully autonomous and easy to put in use right away. The blimps will be made on a much larger scale to give them the lift capacity to lift extremely heavy objects.