Autonomous Life Raft

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Introduction

In case of a shipwreck at sea, a rescue helicopter will drop our autonomous life raft near the shipwreck. The life raft will locate potential survivors using the beacons on their life vests. The raft will then navigate to each beacon and pickup the survivor. Once the rescue mission is completed, the raft returns to base.
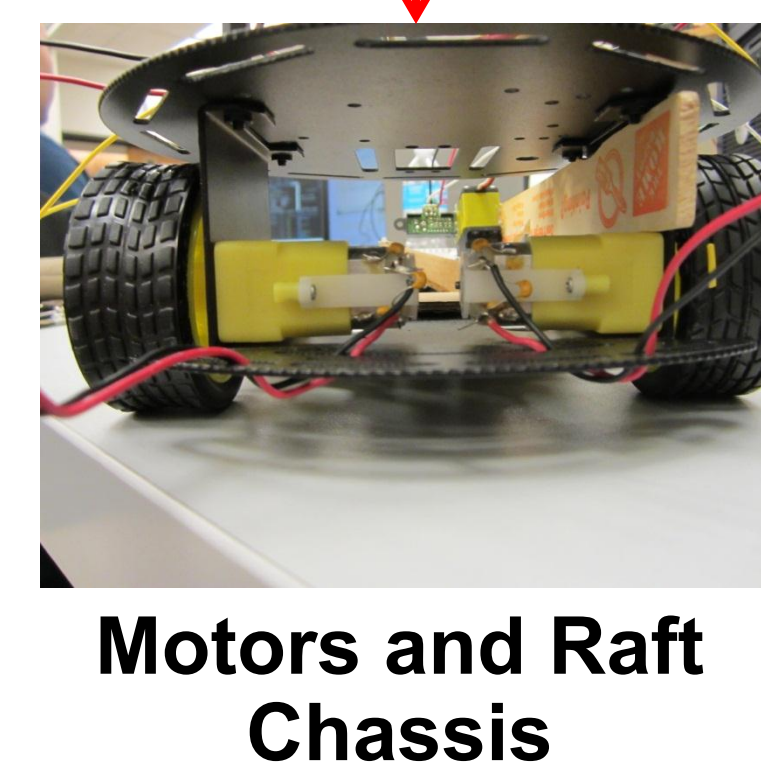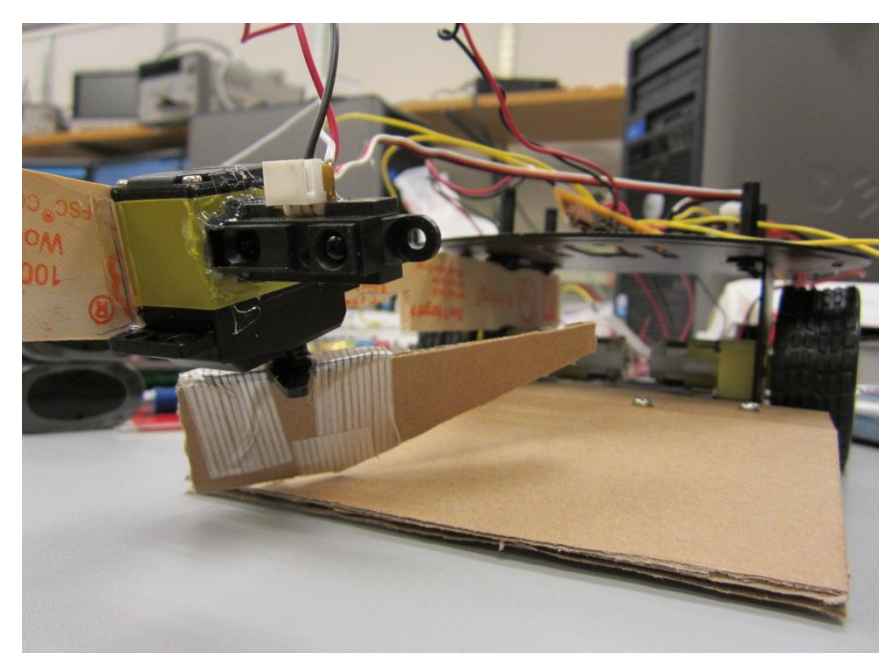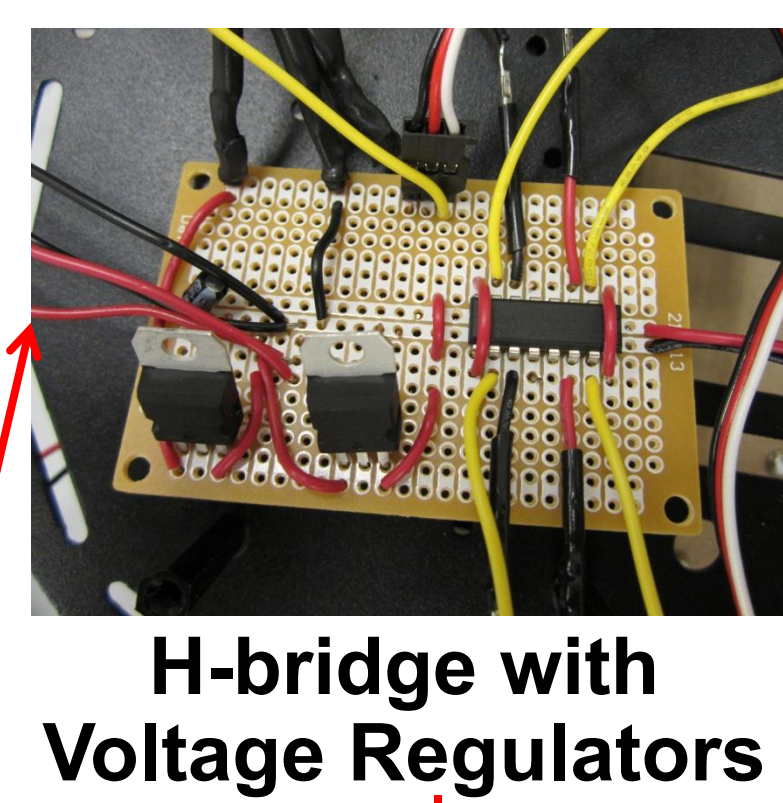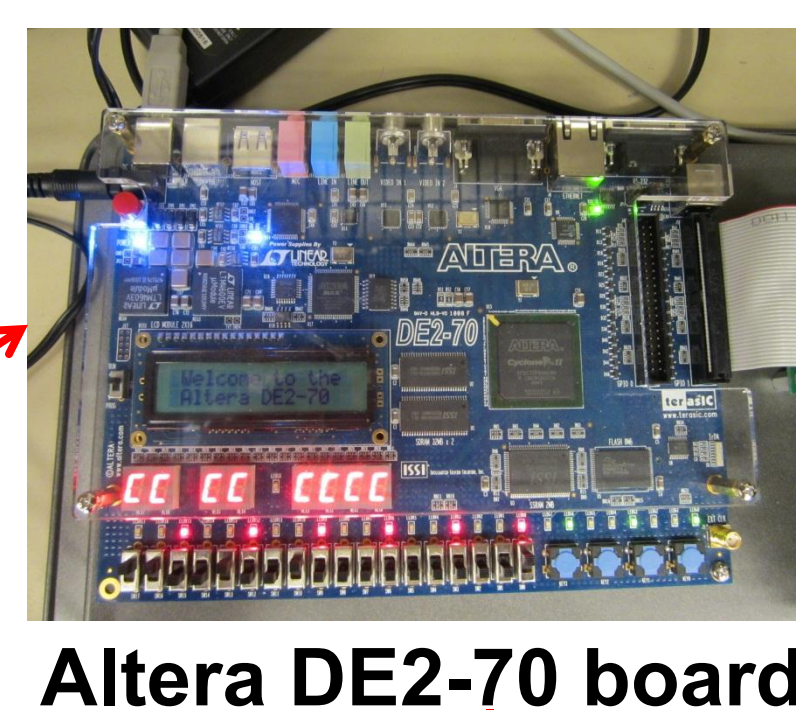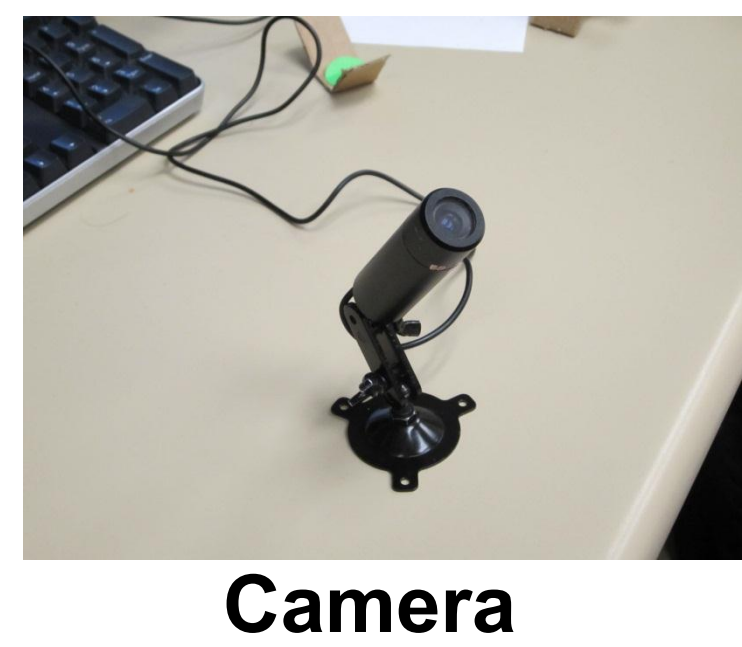
Project Goals

For our project, we intend to build a land-based proof of concept. Our life raft should have the following functions:

1. Locate beacons
2. Travel to each beacon
3. Retrieve each beacon onto the vehicle
4. Display current raft status
5. In addition, our life raft will be able to switch between autonomous and manual control

## Project Implementation

Autonomous Life Raft

- Camera to detect beacon
- Proximity sensor to slow down when approaching beacon
- Radio signal from Base Station for manual control
- ADC for camera

Camera

Altera DE2-70 board

Servo with Proximity Sensor

Smartfusion with Radio

H-bridge with Voltage Regulators

Motors and Raft Chassis

- DC motor with H-Bridge for differential driving
- Radio signal to base station to transmit location and information
- Continuous duty servo to help pickup passengers

Base Station

- NES controller for manual control
- Radio signal from raft stating information to display
- ADC for NES controller

NES controller

Base Station setup

LCD character display
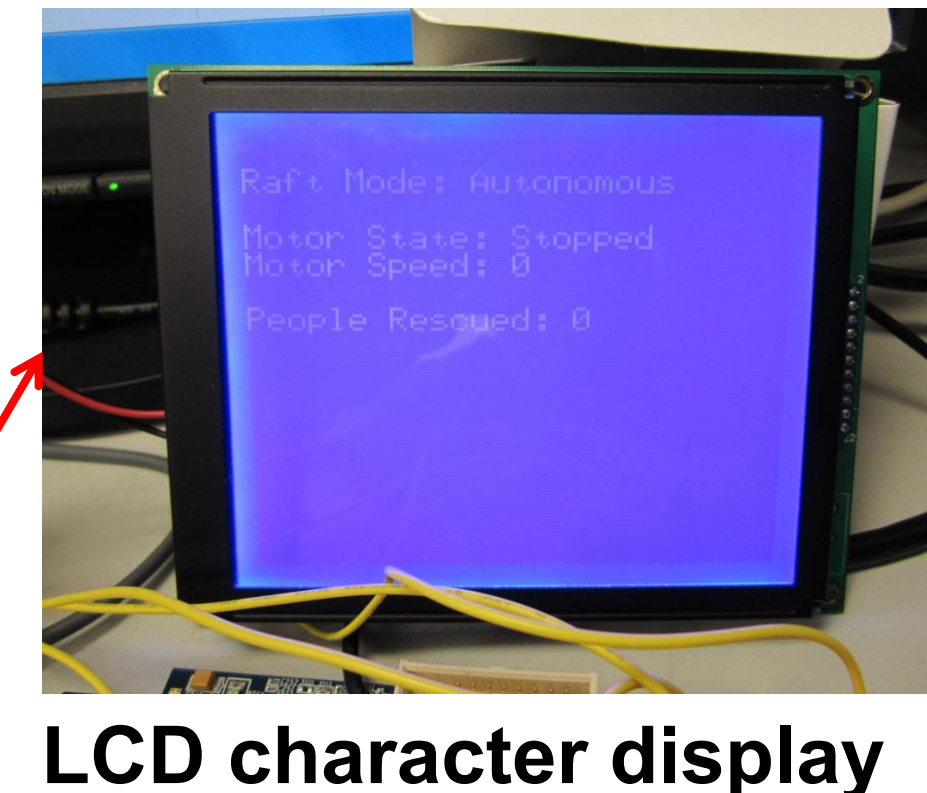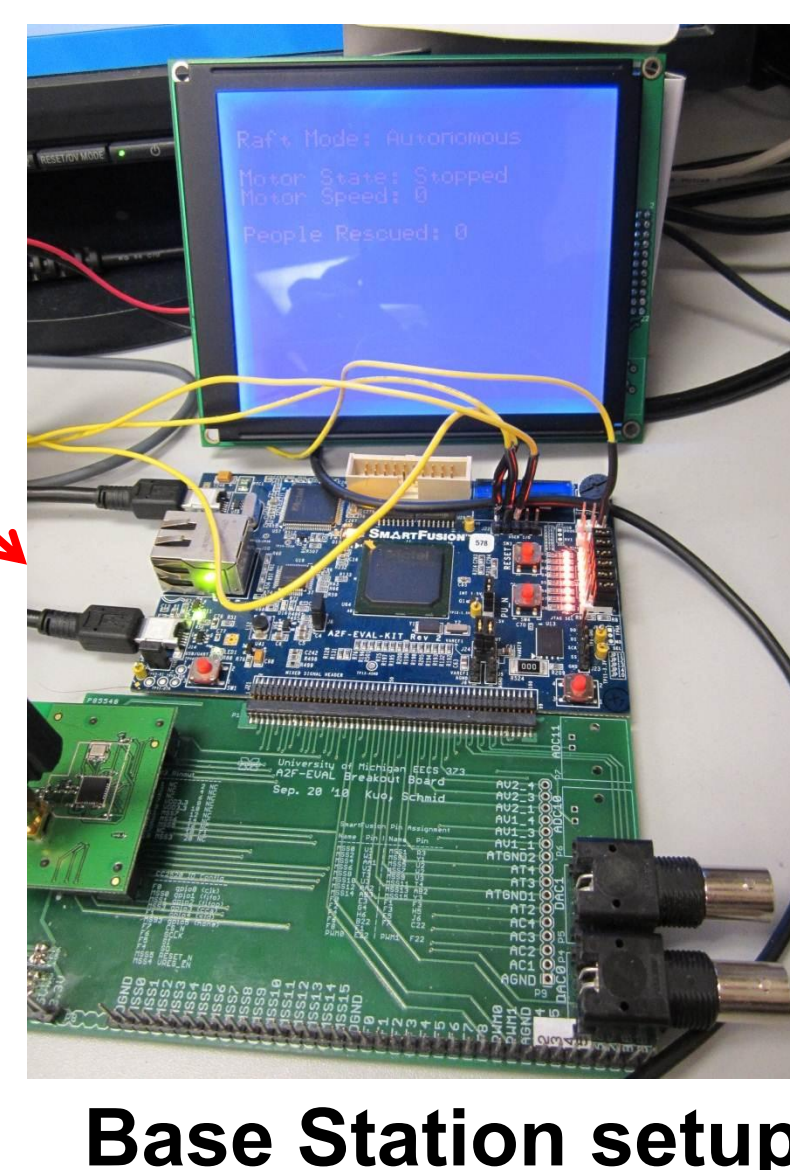
- Character display to show information from raft
- Radio signal to raft for manual control

Camera

Steps to Calibrate:
- Display camera to VGA output through Altera DE2-70
- Calibrate threshold for beacon detection using Matlab
- Develop algorithm to find largest beacon
- Error-checking feedback loop for directional steering
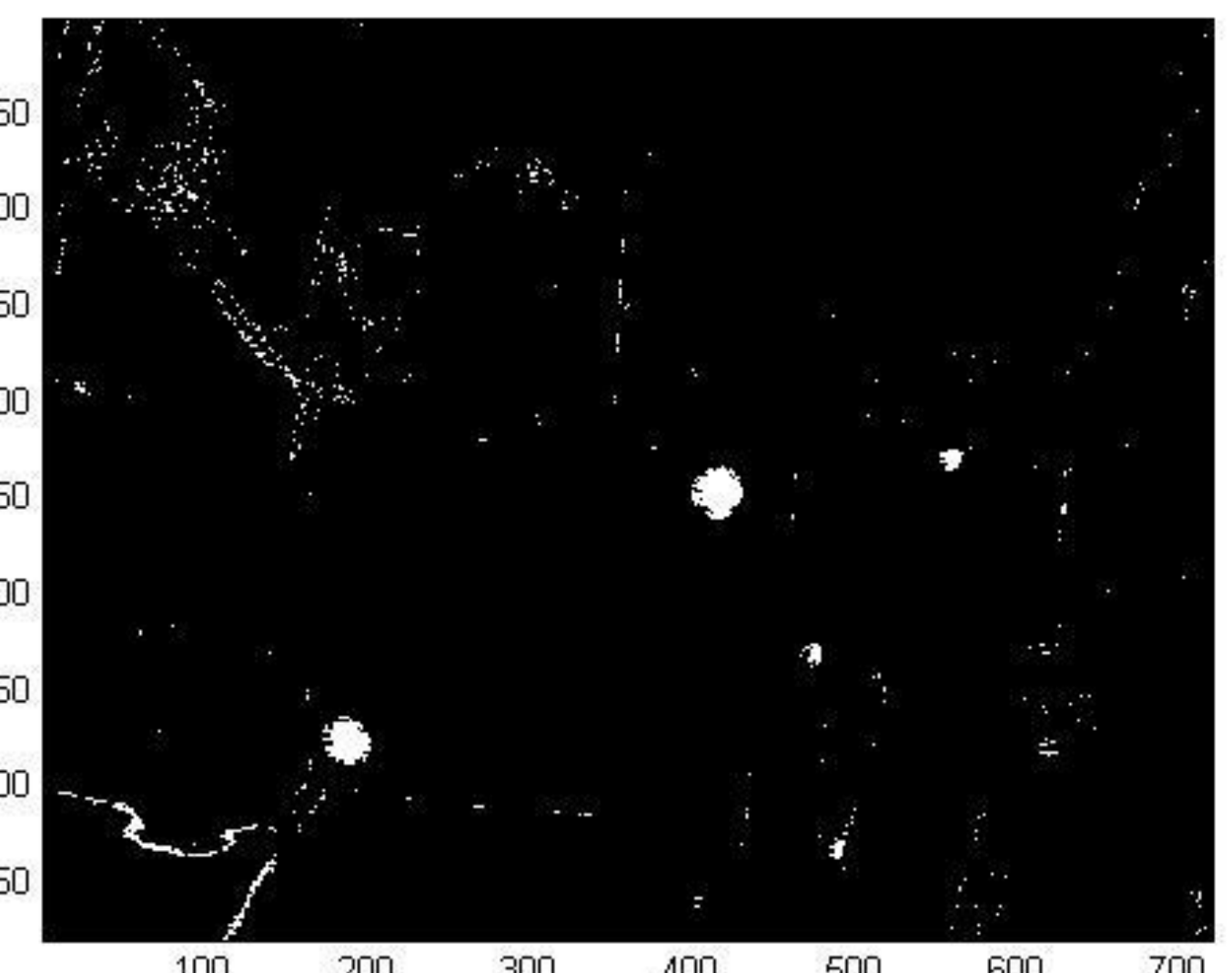
Matlab images before and after RGB thresholds applied