**Computer Engineering 417 – FPGA Final Project Abstract**

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**Names:** Bryan Dickens, Gabe Harms, Neal Malkani, Luke Uliana, Joe Wolfe, Andrew Quintero

**Intended Project Outline:**

For this project, we plan on building the Platform 1 option: Clearpath Husky UGV.

First, we will design an FPGA interface to the HUSKY that receives all the information transmitted by the robot. Our design will allow us to send legal commands the Husky. We plan on completing this task via the following steps:

1. Implement serial read
2. Implement serial write

We also need to design a fixed course for the robot to follow. To do so, we will complete the following steps:

1. Familiarize ourselves with the Clearpath API in order to understand how the robot interprets our instructions
2. Create a list of instructions that give the robot a fixed course to follow
   1. Note – This course will ensure that the robot moves forward, backwards, and rotates correctly

**Overview of Technical Approach:**

The technical plan involves the following tasks:

1. Research serial protocol to allow us to implement serial read/write
2. Familiarize ourselves with ClearPath’s API to devise the fixed path instructions
3. Develop a strategy to implement the Husky’s kinematic control unit
4. Since we would like this project to replace our final, we want to take extra steps to go above and beyond for our Husky robot. We will be adding multiple probing sensors to the robot to turn our regular husky into an emergency recovering robot that will be able to detect obstacles and objects. The robot will be able to communicate with these sensors and react based off of the sensor input to control the robot’s motion.

**Verification and Validation Approach:**

In order to verify the project, we will have to confirm that the outputs of our “Serial Write” module are the commands to the Clearpath Robot that we expect. Before we can accomplish this we will be required to make a test bench module that injects data into our “Serial Read” module. This test bench will have to be able to inject serial data identical to the output we expect to see from the Clearpath Robot. We will then be able to monitor the output of “Serial Write” to make sure that our control unit is sending the proper commands .

To verify, we would like to test our design on the Husky after we complete each technical step listed above.

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| **Team Member** | **Responsibilities for the Project** |
| Bryan Dickens | Movement Control Unit |
| Gabe Harms | Serial Read/Write |
| Joe Wolfe | Serial Read/Write |
| Neal Malkani | Validation and Verification |
| Luke Uliana | Validation and Verification |
| Andrew Quintero | Validation and Verification |

\*subject to change