**The Aerospace Corporation Robot Project – Computer Science Proposal**

We have identified the following tasks that the team will need to learn and do for this project. The timeline is below.

**Tasks**

1. How to setup a programming environment on a laptop so that we can download and execute code on the Jetson
2. Getting an image from the camera

This is needed to locate the QR code, as well as locating the other robots.

1. Figuring out how the D/A and A/D works on the Jetson
2. How to make the Bluetooth communication work on the Jetson.
3. How to identify a QR code
4. Controlling the movement of the robots using the fans
5. How to locate the other robots
6. How to coordinate the robots movement as a group
7. How to use the threading capability of the Jetson to get best performance
8. Have the robots communicate with each other once the QR code has been located so that they move into a specified configuration
9. Utilizing the signals from the IMU to control movement decisions
10. How to locate the QR code
11. Figure out the data protocol for the IMU. Test it to see what units position is being reported in.
12. Get a USB camera to work with the Jetson.

**Timeline**

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| --- | --- | --- |
|  | **Start Date** | **Completion Date** |
| Tasks 1 through 5 | Jan 18 | Jan 27 |
| Task 6: Test control of the fans without the robots | Feb 7 | Feb 13 |
| Task 10: Test multiple Jetson’s communicating through Bluetooth only | Feb 7 | Feb 13 |
| Task 12: Test mechanisms for finding a QR code in an image | Feb 7 | Feb 22 |
| Task 7: Test mechanisms for finding another robot | Feb 21 | Mar 6 |
| Task 10: Test without the actual robots (use QR codes?) | Feb 14 | Feb 27 |
| Task 11: Test mechanisms for using IMU signal without the robots. We can move the IMU’s ourselves | Feb 7 | Feb 20 |
| Task 13: Read through the documentation to figure out the data format/protocol for the IMU. Test the data output to figure out the units position is reported in. | Feb 15 | Feb 22 |
| Task 14: Get a USB camera to work with the Jetson | Feb 15 | Feb 29 |
| Tasks 6, 7, 10, 11: Integration of code with robots | Feb 28 | Mar 27 |
| Task 8 | Mar 28 | Apr 17 |
| Task 9 | Feb 28 | Apr 17 |
| Final Testing | Apr 18 | Apr 28 |

Update – 2/15/2017

Tasks 1, 2, 3, 4, 10, 13 have been completed.

Task 5: In process. We have code that can change the saturation of an image to remove almost everything but the QR code. Next step is to get real images from the Jetson that includes a QR code to see if the existing code still works.

ECD: 2/22 Assigned to: Brian

Task 6: We have a fan setup, but the wiring instructions that Mike wrote down do not work properly. The fan runs as soon as the battery is connected. We need to get a clarification from the ME students on the proper wiring of the fan setup.

ECD: 2/22 Assigned to: Mike

Task 13: Read the documentation for the IMU to figure out how to access individual data elements.

ECD 2/22 Assigned to: Charles

Task 14: Get a USB camera to work with the Jetson

ECD 2/29 Assigned to Emma and Cathy