HoverGames

- HoverGames is hardware and coding challenges created by NXP
- Program in which anyone can order a kit and begin to develop skills while facing real societal issues
- As of right now the HoverGames is geared more towards drones and NXP want rovers to become as prevalent as the drones

Project Motivation

- A goal of NXP is for rovers to become more prevalent in the HoverGames
- PX4 software programed to FMU
- Test FMU and code implemented on a rover to determine the functionality
- Implement a Pixy2 Camera to expand upon the rover

Team Members

- Project Manager: Tyler Corn
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- Alexander Hawkins

Acknowledgments

- Faculty Advisor: Professor Mark Welker
- Sponsor: Mr. Iain Galloway
- Senior Design Instructors: Professor Stan McClellan & Professor Lee B. Hinkle
- Administrative Assistant: Ms. Sarah Rivas
- Students: Grant Seligman, Alex Greer

Project Description

Initial Goals:
- Port the FMU to the rover
- Slow the speed of the rover
- Design a system to test the functionality of the FMU mounted to the rover
- Log assembly and testing of FMU on rover
- Use the implementation of the Pixy2 camera so the rover will follow a single line on the ground semi-autonomously

Stretch Goals:
- Have the rover move and stay between two lines semi-autonomously
- Have the rover navigate around obstacles semi-autonomously
- Testing other interfaces, sensors, and components such as NXP Rapid-IoT Module
- Integrate other NXP teams battery management unit

Deliverables:
- A rover with a slower maximum speed
- The FMU along with other components mounted to the rover
- Notes on the functionality given to NXP
- The rover following a line semi-autonomously

Block Diagram & Flowchart

Results to Date

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMU implemented and mounted to rover</td>
<td>Completed</td>
</tr>
<tr>
<td>Rover max speed slowed</td>
<td>Old motor - 35520 rpm</td>
</tr>
<tr>
<td>New motor - 15022 rpm</td>
<td></td>
</tr>
<tr>
<td>Vehicle calibration</td>
<td>Completed</td>
</tr>
<tr>
<td>Testing software port</td>
<td>Started</td>
</tr>
<tr>
<td>Rover can operate carrying at least 1 lb</td>
<td>Tested with 1.5 lbs</td>
</tr>
</tbody>
</table>

Pixy2 Camera Progress

- Connection between the Pixy2 and Beaglebone black is successfully established.
- The camera can successfully track a line
- Pixy2 displayed the vector tracking in Pixymon

Future Tasks:

- Fix arming issue and test more of the functionality
- Get the Pixy2 to track 2 vectors simultaneously
- Implement the Pixy2 to the FMU and test communication
- Write code for the FMU in order to interpret vectors tracked by the Pixy2 and follow them