STATUS REPORT – Will Wu

Writer	Will Wu
Status Update Period	Week of 03/05/23 - 03/11/23
Professor	Dr. Dorothy Wang

Accomplishments for the week of (03/05/23-03/11/23)

- *System Development in ROS2 is underway*
    1. Onza is still working on the RPM publication node. She started designing a custom message for the RPM sensor. I helped her debug the code
    2. I started programming the PID controller
- *Navigation System Design*
    1. I met with professor Yiannis Kantaros to discuss the navigation system design
    2. We both agreed that the outdoor environment is lacking features for the LiDar to pickup
    3. We settled on using a GPS-IMU fusion algorithm for the main navigation component
    4. LiDAR can be used for landmark-based navigation
- *GPS Sensor Fusion*
    1. We chose and ordered an GPS module for the PiCAR

Plan for next week (03/19/23-03/25/23)

- Continue PID implementation as ROS nodes
- Continue designing and implementing Kalman filters
- Finish RPM node with ONza
- Conduct literature survey of GPS+IMU fusion algorithms

Topic Outline/ Progress toward deliverables

I. Implement ROS2 sensor nodes for Encoder **Scheduled to complete by 03/26/23**
II. PID Controller, linear estimator and angular estimator design. 20% done; ongoing: **2/24/23 - 3/31/23**
III. Kalman Filter ROS2 implementation. 10% done; ongoing: **to complete by 4/15/23**
IV. Testing **Scheduled: 4/01/23 – 4/20/23**
V. Landmark based SLAM study **Scheduled 4/01/23 – 4/27/23**

Issues

- We need to finish the RPM node within the week
- Frame transfer needs to be investigated: x, y speed on local car frame is not the same as x, y speed in NED frame.