New Business:

Project objective and current work was discussed with new members. Subgroups were combined to provide more in depth information on current tasks and progress.

Visual Odometry:

Current Tasks: Our group is trying to figure out the reason why the raspberry pi cannot connect to the pixhawk. There are no signals coming from the pixhawk and we have setup the raspberry pi according to many tutorials and websites. We believe it might be due to some settings on the pixhawk or other packages that need to be installed on the raspberry pi. Quinton is reformatting his Raspberry Pi and redownloading applications and packages. Zavia is figuring out the problem of why the raspberry pi is not connecting to the pixhawk. Trent is working on the 3D camera mount.

Future Tasks:

Will be the same as our current task. Still trying to figure out the problem of the connection between the raspberry pi and pixhwak.

Dead reckoning Team:

Completed Tasks:

Brendan: Researched bias correction methods. Worked with Dr. Mekky to develop EKF state matrices to implement into EKF code.

Ryan: Researched bias correction and found a MATLAB script that can be edited to suit our specific case. The code requires 9 different static position test of the IMU and take the X, Y, and Z direction readings. On Friday, Dr. Mekky explained the EKF and how we are going to try and implement it. Brendan and myself plan on typing out the matrices on Sunday and presenting it to Dr. Mekky on Monday during lab hours

Future Tasks:

Brendan: Implement state matrices into EKF code and test for functioning EKF.

Pi Integration/GPS:

Current Tasks:

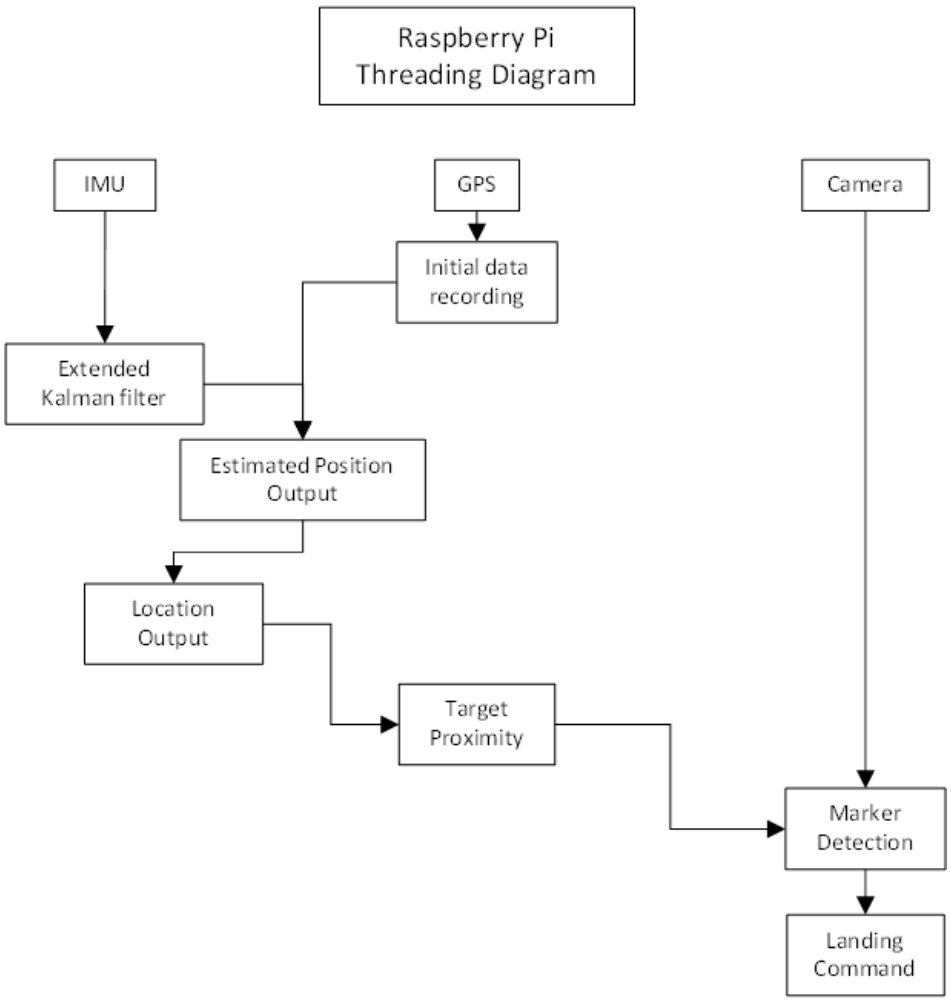
Rushal: Been working on getting accurate latitude and longitude data from gps. Confirmed that module gives accurate postional data when moving. Worked on using gpspipe to print data to a text file. Command doesn't work when gps has a fix on location, only worked when the gps was in the lab. Will work on how to print data into a text file when position is acquired.

Nick: Currently working with Rushal on attempting log NMEA data from the GPS using gpspipe. Currently, I am researching ways to get a stronger and quicker connection from our GPS unit as well.

Vivian: Worked with Rushal on testing the GPS data during changes in location. Data came back accurately. We tested moving from Kaufman Hall to in front of Perry Library with coordinates 36.8845226 latitude and -76.3051065 longitude. Our results on the GPS were 3653.07127 latitude and 07618.30453 longitude. Converting NMEA to GPS lat/long is simple. Take the degrees and add them to converted minutes: 36 + (53.07127/60) = 36.88452117. The slight difference in numbers can be attributed to using a pin drop on google maps that wasn't quite on our location.

> Outside Lab Hours: Next I want to write the file where the pi will store the initial GPS lock NMEA data and then build off this file using the IMU over chosen intervals of time. I am thinking of using a cron job which is a linux utility. Since the Raspberry pi is a dedicated server this job can run as often as set up to.
>
> https://www.hostgator.com/help/article/what-are-cron-jobs
>
> https://www.ostechnix.com/a-beginners-guide-to-cron-jobs/
>
> https://www.instructables.com/id/Data-Collection-With-Raspberry-Pi/
>
> https://www.raspberrypi.org/forums/viewtopic.php?t=115380

Josh: Due to multiple scripts being run on the Raspberry Pi at the same time, research has begun on multithreading in Python. Three threads may be needed, one for each script created by the IMU, GPS, and Pi camera integration subgroups. These three threads could be started together and their outputs combined in a separate script at an optimal frequency to be output to the PixHawk flight controller as GPS data. A simple diagram was made to visualize the process and determine if multithreading is necessary. https://www.guru99.com/python-multithreading-gil-example.html



A helpful tutorial was found to assist in converting Matlab script to Python script, including the differences in calling functions and using variables.
https://bastibe.de/2013-01-20-a-python-primer-for-matlab-users.html