**FlyNet Team Minutes**

23 September 2015 11:00AM –

Recorded by: Tyler Clayton

Attending: Drew, Austin, Steve, Matt, Bryce, Taylor, Tyler, Prashant, Ed, Joe Tanner, Eric Frew, Sibylle

* Began with telecom meeting with customer Zohaib Mian: 11:00AM – 11:40AM
  + Want to reduce/eliminate requirements dealing with:
    - Payload
      * Smaller platform to fit through doorway
      * Smaller payload = more flight time
      * Possible Sensor weights:
        + RGBD Camera: 240g + Computer 140g
        + Hokuyo LIDAR: 250g
      * Zohaib: Doesn’t want to eliminate it completely but leave it at X lbs for now, FlyNet provides the trade space on how it can perform
    - lighting conditions
      * 2 conditions
        + Standard light
        + No light

Navigate through no light conditions but do not need to be able to detect/tag targets

* + - * Focus on standard light conditions for first semester
    - Speed
  + Focus on the aerial architecture for speed versus ground vehicle platform
  + Create a tradeoff analysis between architectures & design decisions
    - between payload and endurance
  + Requirement Prioritization
    - Most important requirement is to ***find the person***
      * Focuses on map quality and detection
      * Want probability detection to be at least 90%
        + Flexible to be defined by FlyNet
      * FlyNet: How does speed play a factor in your metrics?
        + Trade off of how fast to fly vs. probability detection
        + Speed is a secondary objection and not as much the end goal
  + What is the end goal? Does the drone need to return to the outside? Does there need to be live reporting?
    - Get the vehicle out of the building
    - Have a ground station such as a tablet (where no computation takes place) in which human rescuers have a map and are aware of the indoor environment
  + Zohaib would like a 3D map but if we choose to do a 2D map need to show the trade off
  + Joe: (Twisted Pine) beer for the whole team if the project meets the end goal set out in charter
* Assume 1 floor building, Target is static
* Status Updates:
  + Nav Team
    - Been experimenting with different methods (RGBD & LIDAR) and SLAM algorithms
      * Best so far using RGBD and *RTABMAP*
        + Can use GPU acceleration
        + Sparse method
        + Could send key frames to ground station as a map update
        + Will need a control strategy if we get lost
      * *CCNY* map using RGBD had less quality
        + Dense method
      * Taylor got *HECTOR\_SLAM* working with the LIDAR
        + Works well in smaller rooms
        + Doesn’t do well in open spaces 🡪 loses itself easily
        + Will work better with IMU fusion, but haven’t tested yet
        + Real time and fast
        + 2D map
    - Need to identify where we need to do new work from things that do not exist
    - Frew: using the 2D prior for global planning
    - RGBD is looking as the best option at the moment
      * Do we need a second monocular camera to help augment and get better visual odometry?
* Final Test should have an obstacle
* RECUV has given us the H-bridge and doesn’t expect
* Sticking with the Pixhawk as nothing stood out and have the most experience with it
  + Cheaper
* Planning has not been a large focus as of yet as we continue to work through the perception and controls
* Need to architect the whole project even what we don’t plan on completing this semester
* Keep in mind the ground robot can carry the payload
  + Possibility to spool comm cable out from a ground robot to the outside world
* SIL: Using Gazebo and a quad can be flown using an xbox controller
  + Can plug the pixhawk into the computer and use the actual RC radio to do the controls
  + PX4 firmware was running the physics and controls of the quad
* **Action Items:**
  + Send a requirement list to customer by **9/25**
  + Have a preliminary design document to the customer by
  + Send a final demonstration test plan/description by **9/25**
  + Get it running on ODROID, Tegra and determine if use of GPU is needed
  + Block Diagram/Slides of software architecture/algorithm - **Nav Team**
  + Fly the drone pull VICON data by **9/29** – **Tyler/Matt**
  + Reflash the team laptop
  + Functional decomposition of how each of the parts fit together and what is being communicated between each other