Meeting - April 10th

Accomplished

Notes:

1. Install version 4.5.5 of openCV; explore versions of glob to install for camera calibration
2. For calculating approximate GPS location of targets, we need to find a way to read in roll and pitch properties of aircraft from Pixhawk to eliminate distortion from camera lens not being parallel to ground plane. Once we account for distortion and transform image, the GPS ground location of the pixel at the centroid of the area of target can be approximated. Consider looking into mission flight logs in the form of Python/Github interfaces.
3. We need to figure out how the ‘videoCapture()’ method can recognize that the camera is connected to the Pi and continuously capturing video. This way, we can feed the live video into a video object directly and slice that video as opposed to having to import mp4 video into the workspace after it’s been captured and slice that.

* Should implementing the “videoCapture()” method be unsuccessful, we will need to determine if there are time constraints associated with converting h264 file into mp4 file, and ultimately, reading into workspace. If so, how do they compare across the user-defined python function, and the VLC command-line interface options?

In Progress:

Next Steps:

1. Perform camera calibration to eliminate tangential and radial distortion on images for aerial image stitching algorithm in map generation, and for pairing targets in images with approximate GPS ground locations
2. Assemble 2D object with well-defined geometry and use dimensions as parameters, as well as focal length, and field of view in python program to obtain camera calibration matrix that can be applied to any skewed image to replace distorted (curved) lines with straight lines

| Parameter | Parameter Type | Value (mm) | Notes |
| --- | --- | --- | --- |
| Focal Length (fx) | Intrinsic | 6 | Can be defined in terms of length units or number of pixels |
| Focal Length (fy) | Intrinsic | 6 | Can be defined in terms of length units or number of pixels |
| Optical Center (Cx) | Intrinsic |  |  |
| Optical Center (Cy) | Intrinsic |  |  |
| 3D Object Point Locations | Extrinsic |  |  |
| 2D Image Point Locations | Extrinsic |  |  |

2) Continue refining thresholding algorithm and determine what metrics will be used in the analysis plan to gauge effectiveness of target detection, recognition, and identification

1. Examples: Confidence Intervals of Accuracy, False/Positive Rates, proportion of green circle identifiers in training image-cropped image pair that passes through Sift Detector and is classified

3)

Questions/Concerns: