ESE650 Project 4 Addendum:

I was asked by Steve to incorporate Kinect data into project4, to show this I am drawing the ground plane as seen from the Kinect.

To find the ground plane using the Kinect I first transform the Kinect frame such that it is aligned as shown in the robot diagram. Then I threshold the Z value of the Kinect to acquire points that ought to be near the ground. Next I perform RANSAC on the points, using an SVD based approach to find the plane normal. Typically I performed 50 RANSAC samples with a 0.03 distance threshold. Those points that are within the threshold of the best plane found are then transformed and then superimposed upon the map (Figure 1 shows this).

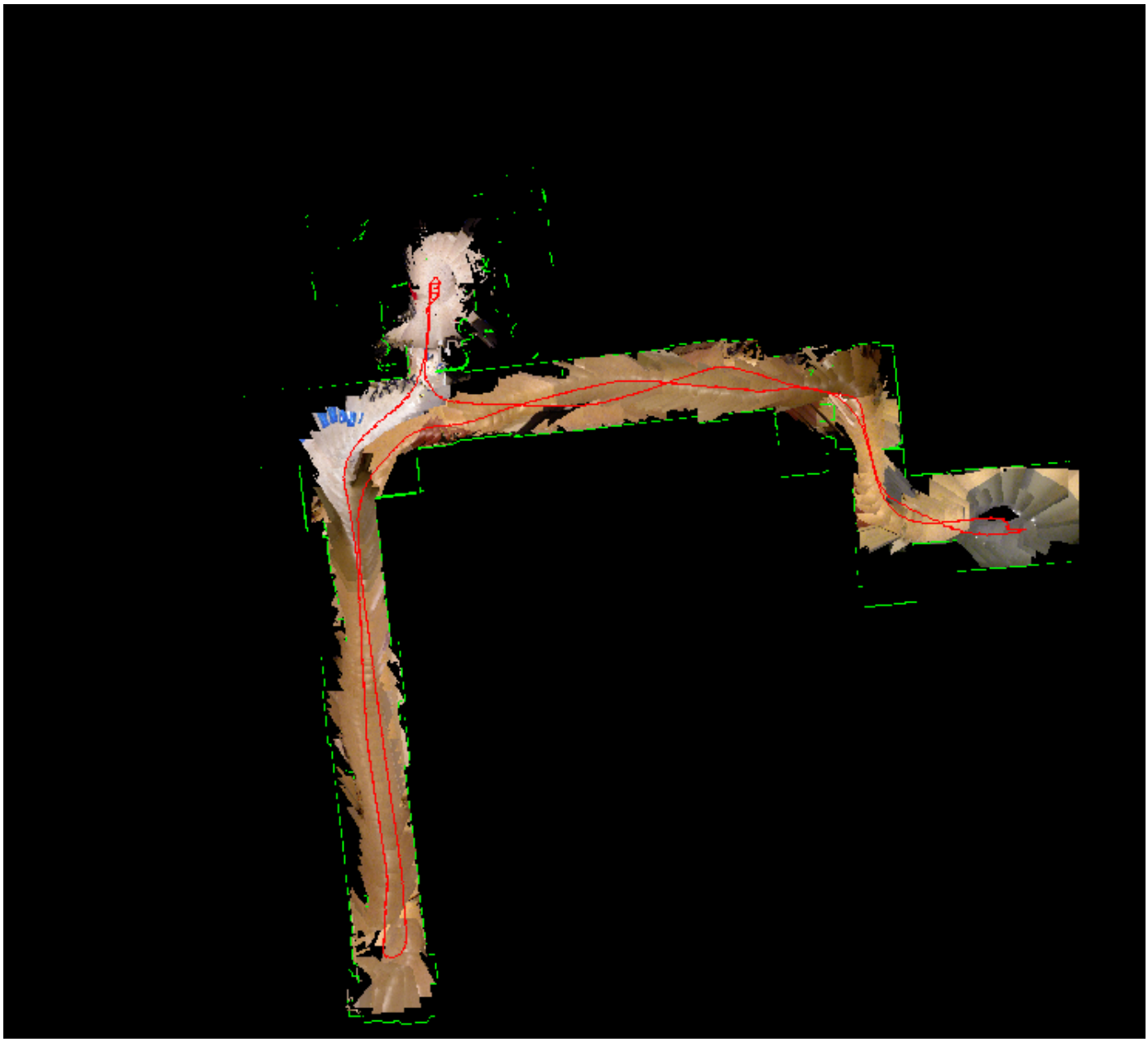

Figure 1: Kinect Imposed upon map.

While it is clear that my method does not work perfectly everywhere, it shows the general idea. Figure 2 shows the map without the Kinect ground plane.