Natural disasters cause significant structural damage to important community infrastructure. To help expedite fast structural recovery, companies such as Aerial Applications use drone technology to help repair crews locate and identify crucial infrastructure such as power lines in need of immediate repair. Since drones are limited to taking photographs or short videos, the challenge is to take this data from the drone and recreate the landscape for future analysis.

Photogrammetry is a technique used commonly to map areas and objects with the input of photographs. This science is useful in reconstructing 3D models from 2D images using intricate algorithms that involve matching key features between images, as well as calculating and estimating the camera’s position. These algorithms carry over to point cloud development, which is the plotting of key features into a 3D environment from these images. The end product is a detailed mesh of the area that was photographed by a drone flying in a specific flight pattern.

Although Photogrammetry might seem to be narrow field of study, our group has come across many sub-fields that comprise this science. A few of these sub-fields are Multi-view geometry, Epipolar geometry, complex linear algebra computations, and homography. We tasked ourselves with researching, analyzing, and in some cases reprogramming code from existing applications that implemented these technologies in an effort to improve or re-think how Aerial Applications could envision an alternative method for their service .

To that end, we are developing an alternative method of reconstruction by combining existing technologies with a different presentation layer that using panorama imaging to develop a 3D reconstruction of the photographed area.