1. Abstract
   1. (do last)
2. Intro, why relevant and novel

Structure from Motion (SfM) and MultiView Stereo (MVS) algorithms are increasingly being used to generate pointcloud data for various surveying applications, however the accuracy and sources of error in the resultant pointcloud across various use cases are difficult to realize without thorough experimentation. The acquisition of imagery and rigorous ground control data at field sites is a time consuming and sometimes expensive endeavor. These experiments are also almost always unable to be perfectly replicated due to the numerous uncontrollable independent variables, such as solar radiation and angle, cloud cover, wind, objects in the scene moving, exterior orientation of cameras, and camera dark noise. The large number of independent variables creates a scenario where robust, repeatable experiments are cost prohibitive and the results can be site specific. Here, we present a workflow to render computer generated imagery using a virtual environment which is capable of mimicking all of the independent variables that would be experiences in a real world data acquisition scenario. The challenges and steps required to validate the photogrammetric accuracy of computer generated imagery are also discussed. The resultant modular workflow utilizes the open source software Blender for the generation of photogrammetrically accurate imagery suitable for SfM processing, with tight control on camera interior orientation, exterior orientation, texture of objects in the scene, placement of objects in the scene, and Ground Control Point (GCP) accuracy.

1. Background (put research in context)
2. Describe Computer Graphics to render a scene
   1. How, why beneficial?
3. How to Validate a Computer Generated Image
   1. Validate rotation conventions
   2. Validate Object Placement (if automating placement)
   3. Validate photogrammetric accuracy (fx,fy,cx,cy)
   4. Validate Texture resolution and “sharpness”
4. Description workflow/methodology I developed
5. Proof of Concept Experiment
   1. Hypothesis: “Do Independent GCPs bias accuracy of resultant pointcloud?”
   2. Experiment Design/Methodology
   3. Results
   4. Conclusion
6. Conclusion/Future Work/ Implications of Methodology