

## Measuring the World with sUAS

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Land Surveying is one of the oldest professions in the world. With such a long-standing profession how data can be gathered has progressed with time. From pulling a chain for days on end to being able to gather a large number of accurate measurements in a matter of hours with the help of sUAS. With the improvements in technology, companies need to be able to adapt to what is the most efficient. There are several options on the market now, with Laser Scanner total stations, sUAS with LIDAR technology, and sUAS with the capabilities to gather measurements using Photogrammetry.

With many factors in mind as to which system would be best, a limiting factor with smaller companies will be price. “An entire high-end photogrammetry system costs between \$US 20,000 – 30,000 whereas lightweight drone LIDAR payloads by themselves run between \$US 65,000 and \$US 100,000.” (Loosli). This would be a tough selling price for a company that would only use either form less than ten times a year. However, as in most cases, you would be getting what you pay for.

The limiting factor for photogrammetry is the applications that it can be used for. “Photogrammetry will not get through the tree canopy to the ground to get the digital terrain model.” (Karpowicz). When working in densely forested areas, you will not be able to get through the leaves to acquire accurate measurements of the ground. However, there may be certain instances where that would be alright. For instance, if

only part of your job site were to be covered in trees, you would still be gathering data through the use of photogrammetry over the rest of the job site. While this may mean you have to come through and gather more information with a total station after the drone work is done, it is still a cost-effective, viable option. While your survey crew would most likely be on-site regardless of obtaining site control.

The way control is gathered through photogrammetry is by using ground control points. "They are used to provide points on the ground that are visible in the imagery and have known spatial coordinates." (Abdullah). This process would involve placing control points that can be visible from the air on the ground. The surveyor would then go out and shoot each control point to obtain GNSS measurements for the site. These measurements are crucial to both vertical and horizontal control that can then be used in the future for either future development or nature conservation.

With all things considered, using photogrammetry on sites that can otherwise take multiple days to survey, and process points. It is a viable option going into the future. The upfront costs of an sUAS would be a worthwhile, cost-effective investment for any firm in the market of gathering information.

## Bibliography

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