



SmartDrone Case Study

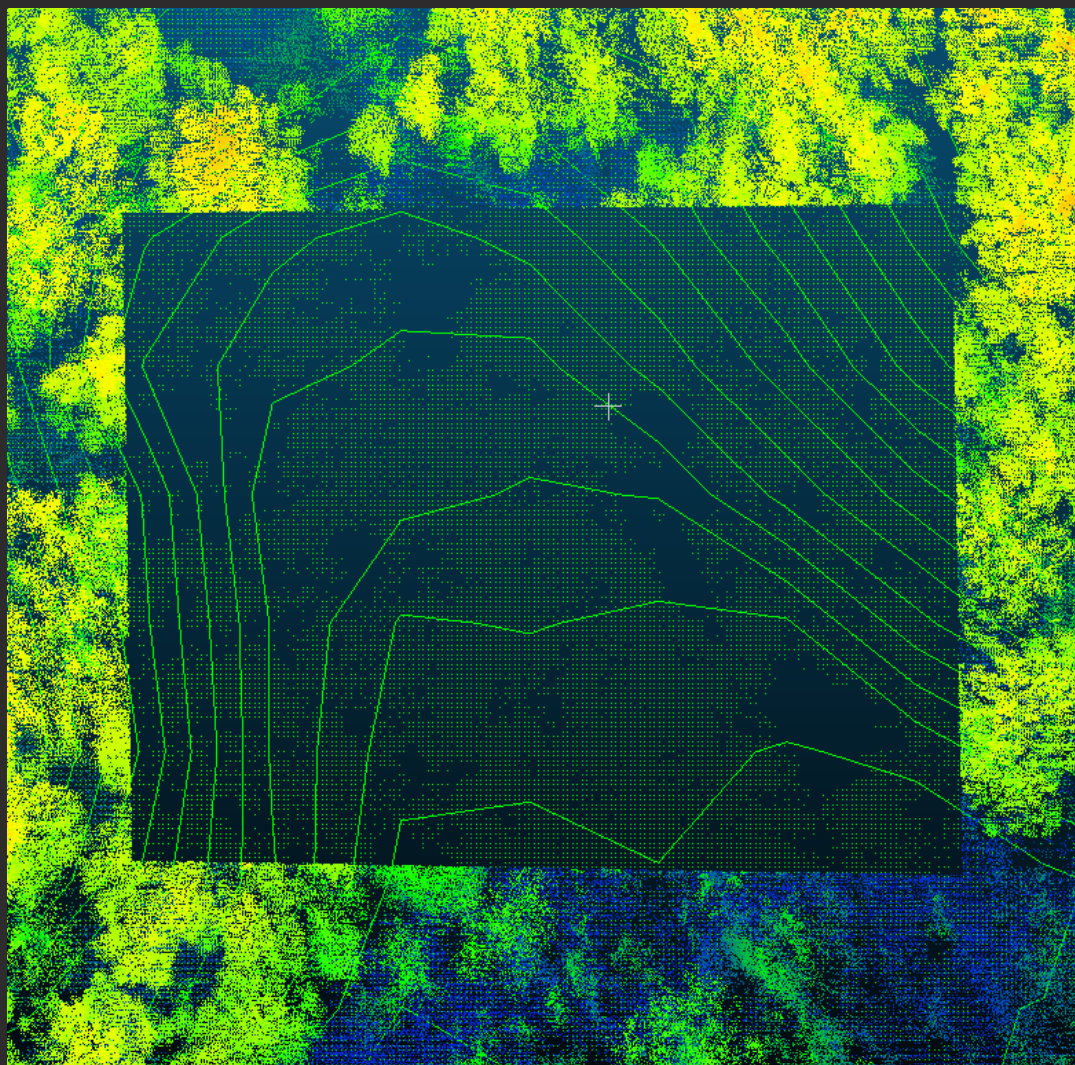
320-Acre Case Study in East Texas Piney Woods

One person, one day, 320 acres scanned and validated to national standards for one foot contour accuracy

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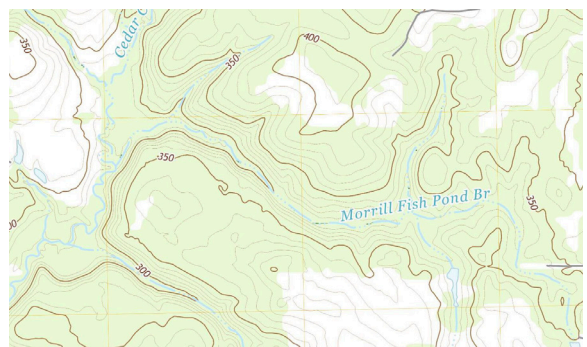
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A potential client calls and is scheduling construction on a 320 Acre property consisting of overgrown timber forest - the deliverable is a 1-foot contour map of the entire property. The client wants to properly dam three waterways coming into the property and cut timber to make a lake for bass fishing and recreation. As a hunting enthusiast he is looking to find high vantage points on the property, and clear shooting lanes. Then, as expected, he asks how much it would cost to get this done yesterday.

As an experienced surveyor, what would your first thoughts be? Would it be about the lanes you are going to have to cut to get accurate break lines? Have you considered using a drone for mapping or using an aerial drone survey? Or would you immediately think about how you could fit this in your busy schedule?



Top - SmartDrone CEO Rob Cammack watching Discovery fly.

Middle & Bottom - Two public images showing the vegetation and terrain across the 320 acres job site.

Left - Discovery drone rising above dense canopy for scanning.



This is the exact job type that is a breeze for the SmartDrone Discovery.

Rob Cammack, our CEO, set out on a Saturday with a Discovery unit in the back of his UTV and planned seven 50-acre missions with 3 different launch points. Over the course of 5 hours, he autonomously flew those 7 flights over the 320-acre property, processed the data in the field, and then packed up and headed home.

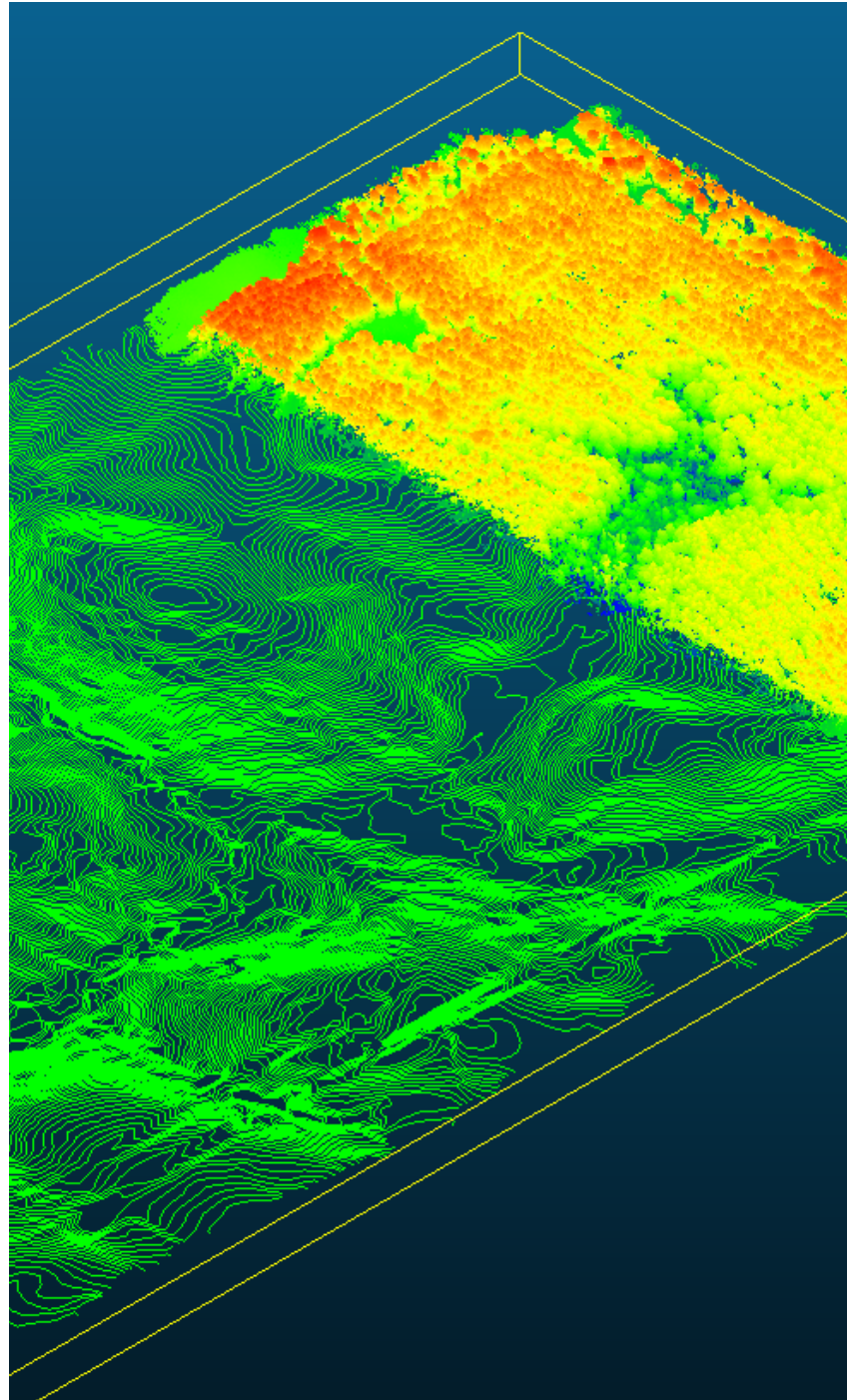
That afternoon, in just 2 hours using SmartDrone's one-click processing drone software, Rob had results that allowed him to begin planning what the lake would look like. The next day, he was able to apply CORS Virtual Base Station corrections to the data to create a dataset that was validated to meet NMAS 1ft contour standards.

He was also able to import the data into a variety of CAD software (Carlson, Civil3D, TBC, microstation, etc.) to have a surveyor identify break lines and generate contours for quick turnaround and property development planning.

At SmartFleet Academy events we work with leaders in land surveying, civil engineering, and earthwork, who want to learn more about aerial collections. We asked them what they would charge a client for a job like this.

\$143,000

At each SmartFleet Academy event we ask leaders in surveying to write down what it would cost a customer and how long it would take to do this job. **On average they expect this job to take 2 crews 4-6 weeks.** How long would it take your crews?

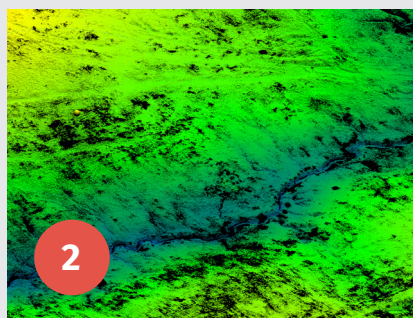


Above - SmartDrone offers one-click processing which handles processing large point clouds for 80+% of use cases. This software performs local corrections, filters vegetation, and delivers data in ASCII readable .XYZ files which can be imported into any modern CAD software.

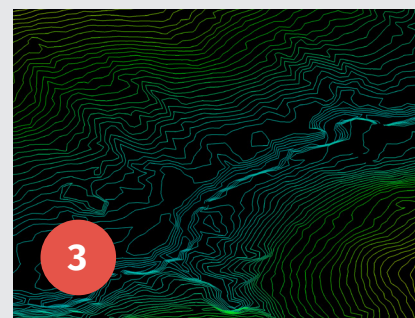
Easily import into Civil3D, Carlson, TBC, Microstation, or any modern CAD workflow.



A full processed lidar point cloud result is generated with each job, allowing you to go in and classify or identify different features.



This result is post-processed with CORS corrections (or corrections from your base station) and then vegetation filtering occurs.



An ASCII readable .XYZ file is generated with only ground points at your selected grid distance - allowing for import into your CAD software as ground shots.

Aerial earth measuring with lidar has been around for decades. It is only recently that aerial collection has become accessible due to advancements in chip technology and the industry overall.

As technology becomes more accessible, more surveying and civil engineering firms will use it. In fact, the U.S. Bureau of Labor Statistics (BLS) projects hiring and replenishment in land surveying to be only half (50%) that of all other occupations over the next ten years. They say, "Surveyors will continue to be needed to certify boundary lines, work on resource extraction projects, and review sites for construction. However, the use of drones and other technologies is expected to increase worker productivity and may limit employment growth."

There are safety benefits to autonomous aerial collections - and ignoring them could be expensive! The BLS reports that annually 3% of the construction workforce sustain injuries that require days away from work or job restriction. Across the U.S. that is 200,000 injuries each year in the construction trades - on top of that, each year over 1,000 die in the construction trades. What are some of the stories you recall out in the field that might have been avoided with an aerial solution?

Ultimately, you will be weighing the benefits of aerial collection against the costs of adopting new technology. Depending on the aerial platform you select there will be equipment costs, training costs, and workflow (office productivity) costs to consider.

Estimating benefits of autonomous aerial earth measuring

Bringing autonomy to a field or to an industry creates opportunities to reduce cost, grow revenue, and brings a paradigm shift in productivity.

The value of any autonomous solution for earth measuring is going to be dependent on where you are in your aerial collection "journey". Some relevant questions you will want to consider are:

1. How important How important is it to your business to be an innovator / technology leader?
2. Are your competitors busy using aerial collections?
3. Are your customers asking for aerial deliverables?
4. Are your employees asking for aerial collection products?
5. Which rapidly-evolving technology "future-proofs" your strategy?
6. Is an accurate, high-resolution 3D "view" of environment needed quickly with minimal processing?
7. Do you operate in heavy canopies, or changing light conditions?
8. Does your solution have a future? Only SmartDrone's unique focus on fitting in your workflow leverages frequent software updates.
9. Is service important? Do you need timely support with new technology?
10. How important is low training cost & rapid time to collection?

There are several UAV scanner lidar applications available to the professional surveyor. LIDAR offers unique advantages over photogrammetry in many jobs like this.

Below - Photogrammetry results collected when our team visited the job site prior to Rob's one day scan.

The white voids in the scene come from the inability of the orthomosaic algorithm to patch adjacent pictures together because of the dense and amorphous tree cover. Additionally, the contour map that would be generated using the photogrammetry would have large voids or unreliable data. In contrast the LIDAR produced reliable contour information across the entire scene increasing the quantity of suitable jobs with drones.





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