CASE STUDY

Nuts about farming with drones

When training one drone customer, iQlaser's Norbert Plate employed the client's new eBee to assess the health of a peanut crop

When organisations purchase senseFly mapping drones for the first time, our distributor partners typically provide full system and software training, often at the customer's own location. This was the case in South Africa in early 2015, when Norbert Plate of senseFly distributor iQlaser headed to a farm in Limpopo province to get a new customer up to speed.

The client was a crop consultant who plans to use his eBee to provide scouting and analysis services to the region's farmers. The site was an arable farm, owned by one of the client's relatives.

Getting started

For the customer's training project, Plate and his client agreed to scout and assess a field of late-season peanut crop. While not the most common crop in South Africa—which is maize—peanuts are widely grown, thriving in sub-tropical, sandy areas like Limpopo.

"Our customer had bought their eBee Ag and now needed to become an expert at flying the drone, processing its imagery and analysing its outputs," says Plate. "He had previously used satellite imagery, but he'd become frustrated by having to book satellite time in advance, by waiting for the satellite to come around and collect its data, and by having to pay for imagery whether it was usable or not (for example, even in the case of cloud cover). He was also looking for higher resolutions that satellite services can provide. So he loved the eBee's offer of high-resolution data on demand for relatively little money."

With the customer's purchase he had received the drone's near-infrared (NIR) camera as standard, however he had also bought additional RGB and red-edge sensors to round out his sensor family.

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"For this project we wanted to do two flights; one with an RGB camera and the other with the red-edge, then we could create a combined RGB/RE index map and use this output to differentiate between sections of healthy and struggling (or missing) vegetation in one specific field," Plate explains.

To map this peanut crop of 16.5 hectares (40.7 acres), Plate suggested a ground resolution setting of 8 cm (3.1 in) per pixel in the drone's eMotion flight planning software. Based on this setting, eMotion calculated a required flight altitude of 230 metres (754 feet).

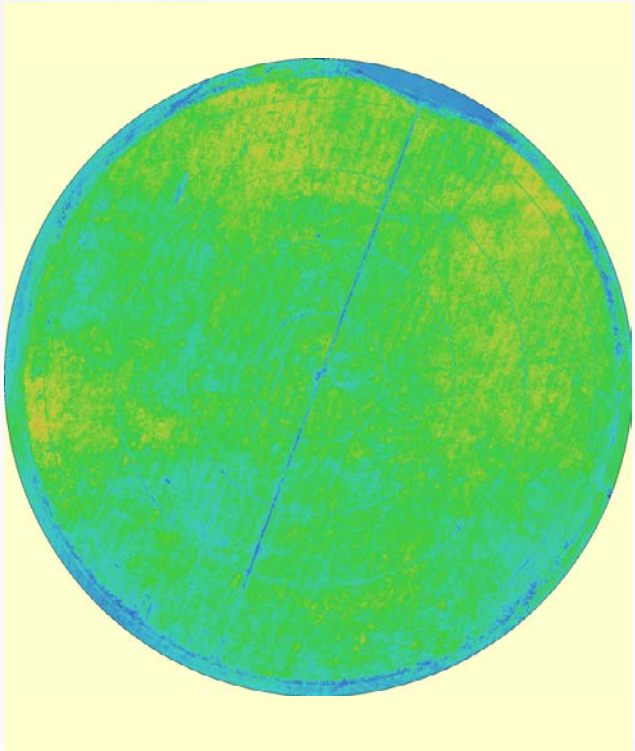
"The art of flight planning, we've learned, is to find the right compromise between the detail you require [the ground resolution, which set in eMotion and measured in centimetres/inches per pixel] and the maximum altitude you can fly at," Plate says. "The higher you fly, the less images you'll need, and the quicker your processing will be, but of course, the less definition you'll also see."

Due to the relatively small area being mapped, each of the two flights took just eight minutes and captured 55 images.

"Processing the two flights' data, on a good laptop in the field, took us around twenty minutes," Plate explains, "that's the importing and geotagging of images, and the transformation of these RGB and red-edge images into an orthomosaic. Then we used Postflight Terra 3D to create the NDVIRE index map we needed to analyse the crop's health."

The RGB orthophoto of the peanut field.

The red-edge orthophoto of the field.



The index map Plate created by combining RGB and red-edge imagery, and then applying the NDVIRE index formula (a red-edge version of NDVI): green indicates healthy vegetation, yellow signifies struggling plants, and dark blue signifies areas of no vegetation (roads, drainage etc.).

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Plate claims the key benefit of creating such an index map is that this can help guide a professional's manual scouting on the ground. "By highlighting which plants are struggling, the index map specifies where a farmer or crop consultant needs to walk in the field."

"Although the map by itself won't tell you exactly the kind of problem you are having—maybe an infestation, a lack of nitrogen or overly compacted soil restricting root growth—it can save you a lot of time in finding out," he continues. "You know you've got a problem, where it is and how widespread — now you can pinpoint the problem and treat where needs treating. For example, on this peanut project, one of the issues we saw in the southern section of the field was actually due to nearby animals entering the field and eating the nuts!"

Real-world results

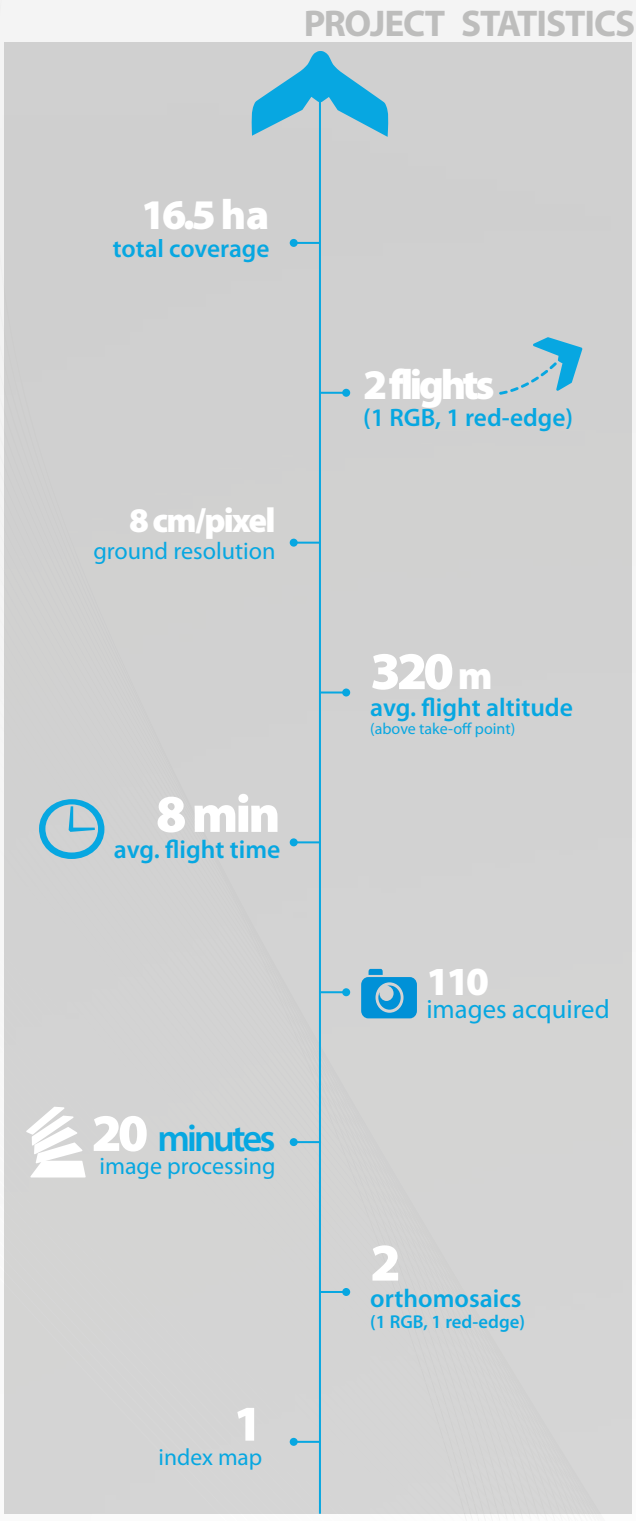
Through this short training project, Plate was able to furnish the client—and in turn his brother, who runs the farm—with up-to-date, actionable data he could use to better manage his peanut crop.

Plate using the index map that was produced to highlight several parts of the field that required further ground truthing. The core problem was waterlogging, plus the side issue of hungry animals already mentioned.

"Producing a real-world output like this confirmed to the client that he had purchased a usable, valuable data collection system. He immediately understood what kind of time-saving and accuracy benefits the eBee Ag can provide," Plate concludes.

About iQlaser

Based in South Africa but serving the entire southern half of the continent, iQlaser (www.iqlaser.co.za) is a technical leader in the field of portable 3D measurement, digital scanning and reverse engineering solutions. The company was founded in 2004 and was the first in the region to introduce 3D scanning for large-scale developments such as mines, tunnels and buildings. iQlaser represents several of the world's most renowned 3D measuring equipment and software brands, including senseFly, FARO, Geodetic, Geomagic, Delcam, and Werth.



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