5 THINGS TO KNOW About How Drones are Being Used for Forestry & Agriculture in North America
Not long ago, the technology most farmers utilized was associated with soil maps and satellite images that would give growers an overview of their fields’ status, even though it could take days or even weeks to collect and process the required data to take action. While many are still utilizing this approach, drone technology has enabled a more efficient way of doing so by delivering instantly accessible, actionable data to allow farmers to make immediate decisions.

In the past few years, we have seen many companies and individuals adopt the technology throughout the agriculture industry, especially after the introduction of Part 107. This development simplified many of the legal issues that flying a drone for commercial purposes represented. However, the effective adoption of the technology is about more than sorting through the necessary legal hurdles.

From mapping farms of all sizes to finding weeds and planting trees, there are countless use cases that have proven the success of drones in agriculture and forestry. Farmers have used drones to find diseases down to the individual crop and have even experimented with UAVs that eat insects. These are just a few of the ways the technology has proven to help growers of all types save time, money, and resources.

Drones are Helping to Identify Issues Before They Turn into Problems

With a Bachelor’s degree in Agricultural Business Operations and Computer Science, Kyle Miller decided to combine both worlds and started to fly a drone over his family’s 1,400 acres farmstead and the research fields at his school in 2013. Back in 2015, as a field representative for Agribotix, Miller was already flying a drone equipped with infrared sensors to create maps and understand which areas of a farm “may be nitrogen deficient down to the individual crop — an important tool for farmers who can then be more precise with their nutrient applications”.

“If you’re able to detect with your agronomist what’s going to happen in your cornfield before it actually happens, you’re going to be able to stop disease issues, you’re going to be able to stop pests, or see if your corn or soybeans need different nutrients,” Miller told AGWEB.

However, building maps back then wasn’t as easy as it is today. There were many difficulties a professional had to go through to get the correct lighting, photo orientation, or altitude to then correctly stitch the collected photos together. Today, Miller works as a Solutions Engineer at DroneDeploy, and in a webinar with Chad Colby, from Colby AgTech, they talk about how software and cloud-based solutions, such as DroneDeploy’s platform, were the missing key to
unlocking more of the drone’s potential in agriculture. As an example of what that means in a practical sense, with the DroneDeploy Live Map feature, a pilot can collect real-time insights directly on their smartphone or tablet.

“When I’m out mapping my parent’s fields, the amazing thing is the Live Maps have come back so well - they’re accurate enough that we’re getting such a good stitch,” Miller said. “I would say 80% of the time I don’t even bother uploading the data anymore. This Live Map is good enough, I don’t mess with SD cards.

**The Technology is Being Deployed to Help Herd and Manage Livestock**

In 2018, after buying their first drone with a camera, a DJI Phantom 4 Pro, John Ridder, the owner of Falling Timber Farm, a purebred Polled Hereford ranch, and his son, Ben, used the drone to check the 200-cow hay feeders to know if they were or weren’t empty. Ben mentioned when recording, they can usually get the drone within 30 to 40 feet of the cows before they even seem to notice. It’s a pretty good view, and all the ranchers need.

John hopes one day, they can use a drone to remotely monitor the cattle in a farm 45 miles away from their home. Additionally, Ben used the drone to put together a video for a farm tour and a bull sale. The next step is “to put a small whistle on the drone” and use it as a flying herd dog to get the animals’ attention.

Dave Jacob is a software developer who specializes in custom farm applications and is hoping to make that a reality. He’s working on software that, in the future, will allow anyone fly over a pasture, take pictures, and actually count the cattle. Eventually, “the software will be able to inform the size of the animals, recognize them individually, and even track their weight gain,” Jacob predicted.
Drones are Making a Difference in Viticulture

Jim Meyers, a viticulture specialist for the Cornell Cooperative Extension in a 17-county region in eastern New York, is using drones instead of tractors, or other traditional methods, to map 50 acres’ vineyards in 10 minutes and identify the areas of high or low vigor. With the help of an off-the-shelf camera on the drone for photos and videos, Meyers can produce maps showing large variability zones in vineyard floor health and vine size. In addition, by equipping a second camera, Meyers collects data to create NDVI maps of the vineyard, identifying areas of variability that would otherwise be less visible with standard photography.

However, according to Meyers, NDVI sensors only provide passive insights. The technology allows him to identify issues in a faster manner, but he then needs to actually go out to that location to see what’s really happening in those areas. On the other hand, hyperspectral sensors provide more accurate information when it comes to deciding whether or not a specific vine is infected with a particular virus.

With this kind of information, growers and specialists can make decisions like the exact best time to apply certain insecticides or fungicides. In the end, the information professionals obtain from this type of map can identify differences that can indicate real problems.

That’s not the only way drones are creating value though. During a case study Meyer conducted, he also created a 3D model of a farm for his clients who were looking to buy the land which provided them with essential insights they never would have been able to obtain otherwise.

“They were able to take my 3D map and start to do real planning with it,” Meyers said. “They were playing around with where they might want to put certain buildings, where they might want to plant, what the drainage is likely to be in a certain area, etc. They actually took that model and had a 3D printer print a model of the farm itself, and it helped guide the decisions they ended up making about their business.”
Simply Getting an “Eye in the Sky” Can Make a Big Difference

As the owner of Brint Seed & Supply, David Brint deals with many farming customers who buy seed and fertilizer from him. A few years ago, he saw an opportunity to provide some extra services to his customers with the help of drones. After learning how to fly the drone he had purchased, David started helping farmers to “identify and document where low spots may lead to poorly drained soil and weeds in need of spot spraying.”

As an example of what this means, the drone’s overhead view was used to record video of a field where a customer was laying field tile to aid in drainage. The collected data allowed them to easily see “what sections were already laid and what still needed to be done”.

“It’s a real time saver as we can now visually inspect a field using the drone versus having to walk the entire area,” Brint told Patch. “It’s a great way to get an overall visual of the property, essentially making it possible to see what crops look like from an airplane without having to incur the cost of hiring or flying a plane.”

Drones are Helping Reduce Workers Exposure to Pesticides

Using drones for spraying applications is a concept that many have been focused on over the past few years, and few doubt the technology can create real value in this area. Vineyards in Napa and Sonoma and farms in the Central Valley were some of the first test grounds for the use of drones to spray pesticides over fields. This type of capability is an essential part of the “farm of the future” which will see drones and other robotic system perform numerous tasks in an automated manner.

However, there is an ongoing discussion about the advantages and problems that spraying pesticides with drones represent for farming. The amount of fluid a drone can carry doesn’t often
make it a worthwhile endeavor from a cost/benefit perspective, but David Doll, an advisor at the UC Cooperative Extension in Merced County, looks at the value of the technology in a different way. He is focused on the core safety benefit of this application since having drones spray farms with pesticides reduces human exposure to toxic chemicals.

Doll, who works with farmers around the state, put together a project team formed by UC Merced professors and graduate students, and UCCE advisors and staff to explore the potential of using unmanned aircrafts in agriculture. The project is funded by the UC Division of Agriculture and Natural Resources. California has been, according to Farm Progress website, at the forefront in terms of adopting new technologies in agriculture and food production, with $2.2 billion invested in 2017.

It’s an illustration of the potential drone technology has to enable in agriculture in terms of both money and safety.