Drone rapidly converts aerial photos into valuable information about crop health

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Anthony Hearst is chief executive officer and co-founder of Progeny Drone, a Purdue-affiliated startup that has created software that rapidly converts aerial crop photos into useful information for plant breeding, crop modeling and precision agriculture. Progeny Drone rapidly turns images taken by unmanned aerial vehicles into custom-zoned quality-controlled growth and development metrics. Credit: Purdue University

Progeny Drone Inc., a Purdue-affiliated startup, has created software that rapidly converts aerial crop photos into useful information for plant breeding, crop modeling and precision agriculture.

Anthony Hearst, co-founder and CEO of Progeny Drone and Ph.D. candidate in agricultural and biological engineering at Purdue University, says the agriculture industry has been overwhelmed trying to obtain actionable data about crop health and development in real time from unmanned aerial vehicles.

"Progeny Drone can do this fast with our software," Hearst said. "Rather than taking days to weeks, we can do it in minutes, and it is very affordable. We don't need to rely on supercomputers or cloud computing. We can do it on a laptop. This will help us provide a much faster turnaround time at a lower price than our competitors."

Progeny Drone rapidly turns images into custom-zoned, quality-controlled growth and development metrics. The ability to quickly collect, interpret and analyze the data is vital in agriculture because field conditions can change rapidly, Hearst said.

Progeny Drone also can take previously collected data, even from previous growing seasons, and glean useful information. It can process image backlogs or new imagery and automatically extract images of

research plots or management zones within minutes.

Katy Rainey, co-founder and chief technology officer of Progeny Drone and assistant professor of plant breeding and genetics in Purdue's Department of Agronomy, say the hype about drones has led many crop researchers and producers to buy drones without knowing exactly what to do with the images to get a return on their investment. Progeny Drone can solve that problem by quickly providing plant growth and development metrics.

"We can provide growth and development metrics that are relevant, whether that be for plant breeding, crop modeling or precision agriculture," Hearst said. "We can quantify different traits that are valuable for selection of the best varieties or other physical properties related to crop health and yield potential that will be useful for field management."

Other companies rely on supercomputers and cloud computing to do such work but they often do not provide automated custom-zoned precision metrics.

Rainey said being able to depend on Progeny Drone to gather information for decision-making should free up manpower to do other work.

"The goal is to provide data to people so they can be more efficient and effective when they are in the field," she said.

Hearst and Rainey said another advantage of Progeny Drone is that it doesn't need ground control points.

"You can just go out and fly your drone. You don't need to set up anything in the field beforehand," Hearst said.

Rainey believes agricultural drone technology is in the "trough of disillusionment" – that period after the peak of inflated expectations has ebbed and interest is waning as people become disenchanted with results.

"So we've found our potential clients are very skeptical and we really have to prove ourselves," she said. "The other general feeling is that drones are toys. People need to understand that this is complex interdisciplinary work that can provide essential information. We have a real passion for what these tools can add."

Hearst added that he and Rainey aren't simply interested in the commercialization process.

"We want to keep research going as well," Hearst said.

Progeny Drone initially is targeting seed companies and agronomic research groups that are looking for information that could help them in plant breeding to select new varieties or to understand fertilizer rates, Rainey said. The company plans to expand eventually into making its services available to individual farmers to maximize yields.

The company, which has intellectual property that is patented through Purdue's Office of Technology Commercialization, recently received a $60,000 award from AG-Celerator—a $2 million plant science innovation fund designed to provide critical startup support for Purdue innovators wishing to commercialize Purdue intellectual property. They were also accepted into the National Science Foundation I-Corps Program which provides a $50,000 grant to support initial customer discovery and market validation research.

Hearst and Rainey developed a business plan for Progeny Drone after going through the FireStarter Program at the Purdue Foundry, an entrepreneurship and commercialization accelerator in Purdue's Burton

D. Morgan Center for Entrepreneurship in Discovery Park.

"It was a big step for us to go from thinking as researchers to thinking about how to run a company," Hearst said.

Hearst has been on the leading edge of using drones since starting his graduate research at Purdue University in 2013.

"I wanted to demonstrate the value of drones in agriculture and show just how powerful this technology could be," he said. "I saw an opportunity and I thought the best way to invest myself fully in that mission would be to start up a company."

Provided by Purdue University