



# Exploring the Rise of UAS in Aerial Application:

## Are They Beneficial for Your Business?

*By Jan Tegler, NAAA Contributing Writer*

**D**rones, also known as uncrewed aircraft systems (UAS), are currently a major topic of discussion in agriculture and many aviation sectors. In agricultural circles, it's nearly impossible to have a conversation without the subject of drones eventually being brought up.

Over the last decade, UAS adapted for aerial application have appeared more and more over American cropland. What at first was a trickle has become a steady flow with spray drones, mostly manufactured in China, penetrating the aerial application industry at the margins.

Traditional aerial applicators increasingly acknowledge that UAS can be complementary to manned aircraft. Leaders in the nascent American aerial application drone industry predict that the number of unmanned aircraft treating crops will expand significantly, challenging the economics of manned aircraft.

Safety is top of mind for many aerial applicators who operate manned aircraft, wary of hard-to-spot spray drones proliferating in areas they service. Since September 2017, there have been 12 collisions between UAS and crewed aircraft. But thus far, there have been no collisions involving ag drones in the United States.

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Crewed aircraft and UAS.

According to a webinar on June 25, 2024, presented by the Federal Aviation Administration (FAA) Safety Team (FAASTeam), there were 1,938 drones registered for aerial application services and more than 900 drone Part 137 operations (this compares to 137 approved prior to June 2023).

Matt Beckwith, the vice president of business development at American ag drone maker Guardian Agriculture says that based on drone industry reports, the total number of spray drones that have been imported to the United States over the last four to five years “is somewhere in the neighborhood of six to 8000.”

He adds that it appears that only a third of these are registered with the FAA.

A segment of people new to aerial applications are acquiring and operating spray drones—from growers who previously relied on manned aerial applicators to entrepreneurs from other walks of life taking advantage of what

they see as a business opportunity. Drone manufacturers, dealers and ag drone service companies are actively courting them and offering various types of support.

Meanwhile, aerial applicators with decades of experience using manned aircraft are starting to employ and experiment with spray drones in a range of scenarios, figuring out how to use them best, where they may be suitable alternatives to manned aircraft and where they may not be appropriate.

### The Spray Drone Learning Curve

Robert Ching of Aura LLC in Zeeland, Michigan, Jim Perrin of Agricaire Flying Service in Bancroft, Wisconsin, and Corey Fransen of JBI Helicopters (based at the company’s Abbeville, Louisiana office) are legacy manned ag aircraft users who are integrating spray drones as alternative tools for their aerial application businesses. Early adopters Ching and Perrin offered

thoughts on their initial experience employing drones in the Summer 2023 issue of *Agricultural Aviation* magazine.

We caught up with them this year to get further insights into their evolving strategies for the effective use of aerial application drones and how the new technology is impacting their bottom line. Fransen adds his perspective, having spearheaded JBI’s experiments using spray drones in 2024.

Currently, operators integrating drones into their businesses are not looking to replace manned aircraft. Instead, they’re leveraging drones in fields with hazardous obstacles, areas inaccessible to traditional manned aircraft, or to complete corners of a field or around obstacles. This practical approach is helping them bend the learning curve for employing drones and understanding how they fit into their businesses.

“The drone is a value-added tool in the toolkit,” Ching explains. Now going



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summer, which holds 40 liters (10.57 gal.) in its spray tank and 75 liters in its spreader tank, to keep up with the demand of drone work in his area.

“The T50 should be a good piece of equipment, and we will be using it on some contract work. We purchased a larger drone to conduct more work because there is a lot of pressure from other drone operators in Michigan. We are competing with a lot of drone operators.”

Perrin, now in his second year of using a DJI Agras T40 with a 40-liter spray tank/70-liter spreader tank, shared his reliance on the drone in certain circumstances. Agricaire sprayed 4,317 acres with the drone from July 17, 2023, until the end of their spraying season in the fall of 2023.

first day we were approved to drone, we started with an easy field next to the airstrip to get us running it,” Perrin recalls.

“On the second day, we took on a challenging field that the grower had attempted to use drones on a couple of years prior with no success. The field is surrounded by obstacles on all four sides, and I anticipated the drone to be working in that field all day. To my surprise, the drone operator rolled into the driveway at 10 a.m. after completing the job. The grower was very happy with our success in that field with the drone, and we kept a pilot safe by keeping an airplane out of the field with obstacles.”

Fransen says that JBI has experimented with drones in Louisiana primarily spraying herbicides. “Work typically done by ground applicators—with backpacks, skidders, four-wheelers and with a boat for cases

like aquatics—those are the areas we’ve targeted. Most of the stuff we’ve focused on with drones is counter to what we do with helicopters.”

For 2023, Ching says his operation sprayed a little more than the previous year and treated between 200 and 300 acres, including wetland aquatics. Most of the drone work was on corn, soybeans, dry beans, and some vegetables. The drone has been helpful in reaching parts of fields that aircraft have trouble reaching, such as corners.

“For herbicide work, the AT-402 sprays the large areas of the field and then we use the drone on more secluded or smaller areas that are hard to reach with a manned aircraft but work great for the T10,” Ching notes. “In the past, I might have had to tell the grower, ‘We can’t do that part of the field with herbicide because it’s just not possible with an aircraft.’ Now we can say, ‘Yes, we can do that with the drone.

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our drone? Absolutely not,” he adds. “It has paid for itself but will not be a main moneymaker for us. We want to do the best job we can for our customers, and we believe we have a duty to provide what we can to do the best job. We have a lot of small fields in Michigan, and we want happy customers, so the drone is a value-added tool for those acres.”

“I would classify it as strictly exploratory right now,” Fransen says describing JBI’s work with drones. “It’s not a major business segment.”

Like Ching, Perrin says that his drone is useful in smaller fields. “The growers that need the drone really do need it. They are thrilled that we have this tool because it means we can treat fields that we could not treat previously due to obstacles or they were not economical to spray. We picked up a couple of niche market-type jobs, including organics, right-of-way, ditches, some aquatics, and timber that we would not have previously done with the airplane. Some of those niche jobs made the drone profitable.”

JBI’s experiments so far have been carried out using drones not made in China. “I wouldn’t say they’ve offset any actual helicopter work,” Fransen reports. “From a capacity perspective, the drones can’t keep up yet. We have a lot of geography that we cover in a single day. It’s hard to cover that ground with a single drone, even with a very efficient ground set-up.”

The operators we spoke with conclude that drone profitability depends on identifying the right application tasks for them. And they

using drones selectively can revenue by allowing manned to focus on larger jobs.

For example, Perrin says that once a drone was added to the fleet, his crew no longer had to use the 500-gallon turbine-powered aircraft to spray a 12-acre blueberry patch or five-acre pumpkin patch. Those types of jobs are perfect for the drone because the fields are smaller, and the drone is quicker to clean in between the smaller jobs.

Ching and Perrin both employ two licensed drone pilots and Ching planned to hire a third. Perrin’s drone pilots are private pilots but not agricultural pilots.

“I found that operating the drone is a great tool for a young pilot who intends to become an [manned] ag pilot,” he says. “Last year, our primary drone pilot did not have much ag flying experience or agricultural background, but he has a multi-engine commercial instrument rating. By training early on and working this spring with the drone, he became knowledgeable about labels and crop identification. He worked to learn this part of agriculture and has a great base knowledge of specialty crops.”

Based on his experience, Fransen feels that drones can be advantageous for manned aerial applicators in the right circumstances. However, he notes that effective application using a drone is subject to the same considerations that affect manned aircraft.

“I think it really depends on the market you’re in and if there’s an opportunity of adjacent work that you have to turn down with an airplane or helicopter, and if you have the people available to do that [drone work.] I think there’s value in manned aerial

applicators getting into the business from a professional perspective and understanding what it takes. But the fundamentals of aerial application haven’t changed and drones don’t change them.”

Ching has been very open in saying that he realizes that many ag operators are not interested in using drones, and there is no issue with that. The usage of drones can be impacted by the location and size of the fields.

“Here in Michigan, the drone makes sense with some of our smaller fields. If an ag pilot is spraying large fields in the middle of the country, a drone may not make sense. But talk to your customers and see if this technology is something that they would be interested in because we all want satisfied customers. Also, it is important for operators to get in front of technology, learn about it, and play around with it. An overall benefit is understanding the technology and how it works to answer your customer’s questions.”

### Setting the Price

Using a drone helped Perrin raise the prices for his manned aircraft because “I realized that I am sending the drone out to do a job for X amount of dollars. Meanwhile, I have a pilot flying an airplane who is risking his or her life, so why isn’t the plane making the same amount of money?”

Ching says that Aura LLC tries to treat most of the fields it sprays exclusively with aircraft.

“If the customer asks for the drone, we will use it, but pricing may be different,” he notes. “We have tier pricing for our drone and tier pricing for the fixed-wing airplane. We are surprised by the growers who are willing to spend more money to have their fields sprayed with a drone.”

“If we have a reliable customer giving us thousands of acres of work, and they have several acres that are not conducive for an airplane, we say, ‘Hey, we’re going to treat those acres with the

**Talk to your customers and see if this technology is something that they would be interested in because we all want satisfied customers.**



PHOTO COURTESY AGRICAIR

*Agricair Flying Service's DJI Agras T40 UAS is used for a variety of aerial application tasks, such as smaller fields and the UAS is used in areas of fields that are difficult to reach for aircraft, such as corners.*

drone, and this is the cost.' And they are more than happy to pay a little extra to have all of their acres treated."

Perrin adds, "We use the drone a lot on little acreage. It's a flat rate to show up and do the job, and in some cases, it's more economical for the grower because I was charging them by the hour with the airplane to do that job. Now I'm charging a flat rate for the drone and in some cases, it is cheaper for the grower."

Fransen thinks aerial application customers will gradually come to understand the cost differences between aircraft and drone spraying when employing manned applicators who can offer both options

"Generally, if you have a manned applicator operating a drone, the cost of the drone is going to be a lot higher," he says. "It puts price discovery back on the table for a lot of growers. In

previous years, they haven't had that comparison. And if you can weigh that against the more challenging acres and the acres have more wires or houses, whatever it may be, now we have a method to deal with those more challenging acres, and we can charge for it."

### Pattern Testing

While significant strides have been made in terms of UAS airframe and avionics capabilities, there is currently a lack of publicly accessible data on the application characteristics for commercially available UAS equipped for aerial applications. This data is critical not only in demonstrating application performance and efficacy but also in developing UAS-specific models to assess the risk of drift.

Pesticide products must have risk assessments performed to be registered and the drift risk profile of aerial

applications determines if that product may be applied aurally. The Spray Drift Task Force conducted scores of field trials with fixed-wing and single-rotor aircraft 30 years ago to build this risk profile. UAS travel at lower speeds and may have multi-rotor configurations, so their risk profile may be quite different and may merit separate labeling considerations.

Ching is the co-creator of DropFlight, an iPhone/iPad app that enables aerial applicators to perform their own spray pattern testing. Aerial applicators, after laying a swath upon water-sensitive spray cards can quickly scan and analyze them on their mobile devices to assess their aircraft's spray pattern uniformity, effective swath pattern and droplet size across the swath. While DropFlight was primarily developed to pattern-test fixed-wing aircraft, it can be a tool for learning to spray with a UAS.

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drone and wind conditions to maintain a good, programmed swath width. I would say, in most cases, it does work as well as an airplane. Obviously, it is much, much slower.”

“If you are utilizing the UAS correctly, it can do a good job, and if you are using it incorrectly, it won’t

,” he adds. “We have done 40s at a few drone clinics and learning more each time. There know about how to spray well with a drone and you can’t just use the manufacturer brochure’s numbers and assume you will do a good job. Operators should pattern test their drones to learn what works and does not.”

Fransen says that JBI is focused on pattern testing, trying to find ways to make the drones he’s testing work best.

“A lot of the work we do is herbicide next to sensitive areas,” he explains. “I think that’s a great place for drones. But using the stock set-up you would get using a DJI or XAG, I would be very concerned about using that next to sensitive areas, particularly with any sort of wind.”

Fransen has also tried different application techniques, spray nozzles, pump systems and configurations to reduce drift. “We’ve been really

## Heinen Brothers Agra Services is the First U.S. Customer of Pyka’s Pelican Spray for Aerial Applications



In August, it was announced that NAAA member Heinen Brothers Agra Services of Seneca, Kansas, would become the first U.S. customer to use Pyka’s Pelican Spray for aerial applications. The Pelican Spray joins the Heinen Brothers fleet of several Air Tractors, including the 402B, 502B, 602, and 802A, and an MD500 Helicopter. Their operation also conducts aerial firefighting and maintenance.

The Pelican Spray is an advanced, autonomous electric crop protection UAS, which is noted as the largest authorized by the FAA for commercial operations. The Pelican Spray can carry up to 540 lbs. (70 gallons) of liquid and apply up to 240 acres per hour. It has a 400-pound max payload in 70 cubic feet of cargo volume. Its range with max payload is 200 miles / 320 km (+20 min reserve). The Pelican Spray’s required runway is 820 ft x 27 ft / 250 m x 8 m with a takeoff run with a max payload of 500 ft / 150m.

NAAA will continue to provide UAS updates in future publications and the NAAA eNewsletter on the advancement of drones for aerial applications.

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mounted below the props, a decent space away from them to keep the boom out of the prop wash. We've been using different types of nozzles that give a little larger droplet but a very consistent droplet size."

Fransen prefers using a boom rather than the rotary atomizers that are standard on many spray drones including DJI models. "Rotary atomizers have settings that go up to 600. And yeah, you get some 600-micron droplets, but there will also be a lot of 200 and 100-micron droplets that have a lot of drift potential."

"With a lot of the work we do around obstacles, we might have to have a higher release height. Anything over 10 feet would be a major concern with a rotary atomizer-type nozzle," he says.

## Perspective

Fransen has years of experience as a trained applicator for JBI, piloting both helicopters and drones. "But at this point, I spend my time with drones far more than helicopters," he notes.

"I'm trying to gauge whether I'm being biased toward manned helicopters. I think at least in the Midwest, in your low-gallon markets—two gallons or one-gallon per-acre application markets—I don't see how they couldn't continue to see a rise in the use of application drones. It's hard to deny at this point as long as the accessibility of the drones remains the same from a cost perspective."

But as they proliferate and gain the ability to treat more cropland by carrying more products, Fransen thinks some of that cost advantage will be eroded.

"Drones have had a small advantage, at least in the short term.

Because of the acquisition cost of most drones they can operate cheaper in some cases. I do struggle with the idea of the larger size drones being cost effective and I would argue that a lot of drone applicators probably don't know their costs very well and should figure that out."

He adds that as more spray drones are sold and more people enter the industry, particularly in the low-gallon markets he mentions, increased competition among drone applicators could squeeze profitability.

"Manned aerial application has been kind of up against a wall in terms of profitability for a number of years as costs have risen and insurance has become more expensive," Fransen says.

But drone applicators could face cost pressures too. "If there are lots of drones in an area, it could be kind of a race to the bottom in some of these markets," he observes.

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market is well known. On its own, Shenzhen, China-based DJI, short for Da Jiang Innovations, accounts for 70 percent of commercial drone sales worldwide according to Drone Industry Insights, a commercial drone business intelligence company. Fellow Chinese aerial application drone makers XAG and Autel Robotics also sell their wares globally and are an increasing presence in America.

But due to national security concerns, the U.S. Department of Defense, U.S. Department of the Interior, the FAA and the Department of Homeland Security have banned the purchase and operation of drones from these companies by their respective agencies.

Nevertheless, Chinese spray drones continue to sell well in the U.S., boasting a large dealer and service/support network. Sales of American-made aerial application drones represent a very small fraction of total drone sales domestically.

U.S.-based drone makers are trying to increase their market share. We spoke with three spray drone manufacturers that are selling their products in America now or will be by the end of 2024.

Each of the firms—Hylio, Guardian Agriculture and Rotor Technologies—are focused on growing the capability of UAS for aerial application using a combination of new technologies, larger drones with more capacity, and UAS swarms to capture a greater share of America's aerial application market.

They're also working with the FAA to establish new regulations that will enable spray drones larger than 55 pounds to fly under a new rule (tentatively known as Part 108) rather than their current 44807 exemption, to operate 24 hours a day, should weather conditions allow it, and eventually fly beyond visual line of sight.

Erickson, the CEO of Houston, Texas-based Hylio describes his company as “the most established non-Chinese company that’s making spray drones.”

He says more than 500 of Hylio's AgroDrones are in operation currently with the firm producing its lineup of 2.5-gallon, 4.5-gallon, 8-gallon and 18-gallon rotor-driven models at a rate of 500 to 600 per year, currently. Erickson says the company plans to rapidly increase its production rate as demand for spray drones rises “precipitously”.

“I don't remember the last time I saw an industry or product that took off like this,” he adds.

The company's most popular model is its 8-gallon AG-230 according to Erickson. “With three of those and a nurse trailer setup that's appropriate, you're going to be at about a \$200,000 cost altogether. With that turn-key setup, you can probably do 500 to 600 acres per day at about 2.5 gallons per acre.”

AgroDrones utilize shapefiles, KML files and CSV files to direct their application flights with artificial intelligence helping to optimize flight paths above different fields. Similar to manned aircraft technology, the drones also have a spray recording capability.

Flight data can be stored for record-keeping or analysis locally on the user's computer or uploaded to Hylio's cloud.

Erickson says Hylio's drones use mostly non-Chinese components and that the firm designs and builds its own software. “Anything that can carry or transmit data is non-Chinese; our radios, for example, come from a Canadian company.”

Hylio sells roughly half its drones to growers Erickson notes, “especially larger farms that field a number of staff and machinery. They have the infrastructure in place to buy and use these drones themselves.”

The other half are purchased by people getting into agri-business with drones.

Further development of autonomy and the capability to swarm AgroDrones for simultaneous use on one application job is in progress Erickson notes.

“The swarm stuff is our bread and butter. It was in our earliest commercial drone models in 2017. But regulations didn't catch up until the FAA gave us the first-ever exemption for swarm flying drones above 55-pounds last February.”

“We can fly up to three drones with a single operator onsite,” he explains. “They don't need a [secondary] visual observer or anyone else on staff.”



PHOTO COURTESY OF HYLIO

HYLIO AG-230 is 8 gallons and the company also has 2.5-gallon, 4.5 gallon and 18-gallon UAS.



“So when the drone comes back there is a landing pad, a shipping container type of thing you can imagine, something pretty big. The drone comes in and lands, automatically recharges, automatically mixes and refills and goes back out. It does that every 10 minutes ad infinitum.”

He says Hyllo, like other American drone makers, is also working to get FAA approval for beyond visual line of sight operations. Asked if any manned aerial applicators have purchased AgroDrones, he says a “fair amount” of them have.

“The resounding feedback I get is that they are extremely complementary. Almost every single one of them says they are really good for about 30 percent of the work that they otherwise would have hated to do with a helicopter or airplane.”

Looking into the future, Erickson says, “I’ve got my sights set on virtually replacing every single airplane and helicopter I could in the industry. But that’s going to take some time. I don’t think you have to match them volume to volume necessarily, but if you have enough drones out there working around the clock through full automation, then you could have four or five 40-gallon drones doing a heck of a lot of work.”

### Guardian Agriculture

Woburn, Massachusetts-based Guardian Agriculture was founded on the idea of producing entirely American-made aerial application drones.

“Our goal is to build farm equipment-quality drones, Guardian’s Matt Beckwith says. “We expect our drone to last for many years, not many months. And we made the intentional decision not to tap into Chinese supply chains because we feel like they are potentially uncertain. Should there be a conflict, we



PHOTO COURTESY OF GUARDIAN

GUARDIAN’S SC1 has a 20-gallon capacity with an 18-foot spray boom and a 650-pound maximum takeoff weight.

don’t want our drones to be bricked and shut down like DJI’s drones may be.”

Guardian’s rotor-driven SC1 has a 20-gallon capacity with an 18-foot spray boom featuring swappable TeeJet nozzles and a 650-pound maximum takeoff weight. It’s the only model the company has developed so far and isn’t operational yet.

But Beckwith says the first two SC1s will deliver to agricultural products and services giant Wilbur-Ellis at the end of September. “They’ve placed an order for more than \$100 million worth of units,” he explains. “But it’s going to take us a while to get there because we’ve got to build the factory, then the machines.”

Guardian is making the tricky transition from technology developer to manufacturer, Beckwith admits. “This year we’ll deliver fewer than 10 units. Next year we will produce about a drone per day, between 250 and 300. In 2026 we’ll be producing 1,000-plus drones per year.”

The cost of the SC1 is not a subject Guardian was willing to talk about when we asked but it’s safe to assume the company’s large drone will be more expensive to purchase than other rotor-driven ag UAS.

Beckwith says the firm “obsesses over cost of operation” and maintains that the SC1 will be competitive with the total cost of a Chinese drone, including capital equipment, trailers,

tendering, charging equipment, replacement batteries and labor.

“If you take that all in as the total cost of ownership, not over one year but over the lifetime of that drone and perhaps multiple drones, that is where we aim to be cost competitive,” he asserts.

“A million-dollar tractor doesn’t pay for itself in the first year of ownership. But over its lifetime, including its resale value, is where it delivers economic value. That’s the model we’re targeting with our drones.”

SC1’s ability to spray more accurately than other rotor-driven spray drones and its heavy-duty construction are two qualities Guardian emphasized in its development, according to Beckwith.

“We spray with a boom. We spent most of the first quarter of this year running nearly 100 spray quality tests. We found that with the boom, you get a much better pattern, better deposition. You get sharper edges. One of the challenges with the rotary atomizer-style drones is that you don’t have a great way of controlling the pattern to avoid areas you shouldn’t be spraying. We think that having a boom, particularly for applicators who come from manned aviation, is a much better tool which should ease the learning curve for them.”

Beckwith says that Guardian is convinced that the market for spray drones will expand impressively.

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safer. And, the ability of software to make an average pilot a good pilot and mitigate the need for quite as much experience and quite as much training will mean that more people can do this. Those are two huge factors.”

### Rotor Technologies

When most of us think of spray drones, we picture the whirring, rotor-driven UAS typically available to industry and consumers. But what if instead of designing and building a rotary or fixed-wing drone, someone automated a manned aircraft, transforming it into unmanned aircraft?

That’s what Nashua, New Hampshire-based Rotor Technologies partnered to do with Robinson Helicopter Company, using its own flight control software to turn the manned R44 into the unmanned “Sprayhawk.”

Remotely-piloted, Rotor claims the Sprayhawk is the “largest agricultural drone available in the world.” Capable of carrying 110 gallons of chemicals and spraying over 240 acres per hour, Hector Xu, Rotor’s CEO says, “that’s about 30 or 40 percent more than a manned R44.”

“We think we can be kind of transformative here at a tipping point where drones are clearly on the cusp of taking over,” he opines. “We’re offering the big drone that is the right fit for U.S. aerial applicators.”

On sale now at an introductory price of \$990,000 through December 15, Sprayhawk is designed for large industrial farms and for aerial applicators who want to cover “tens of thousands, if not hundreds of thousands of acres in a season,” Xu says. He adds that this could include existing manned aerial applicators or drone applicators who are looking for a larger unmanned platform.

He explains that Rotor will deliver five unmanned R44s in the first half



**ROTOR TECHNOLOGIES** Sprayhawk is a remotely-piloted UAS carrying 110 gallons of chemicals and spraying over 240 acres per hour.

PHOTO COURTESY OF ROTOR TECHNOLOGIES

of 2025, though not all of them will be Sprayhawks as the platform is designed to conduct utility, maritime, and cargo operations as well as agricultural missions.

“What we’re doing is opening up orders for delivery in the second-half of 2025 and early 2026. Our target is to deliver around 20 Sprayhawks by the beginning of the 2026 season,” Xu says.

He asserts that the Sprayhawk will make a big difference in productivity and bottom-line unit economics “primarily from reducing the cost of the pilot.” He adds that the operating cost of the Sprayhawk will be significantly cheaper than that of manned aircraft.

“The all-out direct operating cost, including the pilot and the visual observer for the Sprayhawk, is going to be about \$2.50 per acre. And that’s about 40 percent less than the nearest competitors, which are the manned R44 and the Air Tractor.”

Rotor is partnering with AG-NAV for “cutting edge navigation solutions and path following capabilities,” Xu reveals. “So, AG-NAV will be key for that and how Sprayhawk will work in operation.”

Xu says the concept of operations for Sprayhawk is very similar to today’s large agricultural drones where, rather than ferrying an aircraft initially from

your home base to a spray site, you trailer it and drive it.

Sprayhawk will be joystick-controlled by its remote pilot with no cyclic, collective or pedals to worry about. In fact, Xu says a commercial helicopter pilot’s license will not be required to fly the Sprayhawk, likening its operation to existing drones.

“You’d have a typical deployment set-up of a helicopter trailer, a tow truck with a ground control station and the pilot. You’d also have a nurse truck or a spray truck and you know a customer will be able to use an existing solution. Once you get to the field, there’s going to be a two person set-up process of unloading a trailer, doing your typical aircraft pre-checks.”

“The big difference for us,” he adds, “is that many of those pre-checks are automated. Because we’ve digitized all of the flight controls and all of the engine control and telemetry systems rather than go through the entire engine startup procedure of an R44, which might take 10 to 15 minutes, you flick a switch from off to idle and then to flight.”

Asked how Sprayhawk operators will service the drones which, like manned helicopters, are maintenance-intensive, Xu says Robinson will provide maintenance services for the

to clear the Sprayhawk for night operations and automate the dynamic object detection system, which may eventually enable it to fly without visual observations.

“I think we’re in the sweet spot of the ratio between aircraft and personnel, in the sweet spot between the cost to purchase versus the operating economics of drones. Actually, we think this 2,500-pound or 100-gallon size aircraft will become very dominant, particularly in the U.S.”

### Rantizo

Iowa City, Iowa-based Rantizo is the largest spray drone network and service provider in America, company CEO Mariah Scott says.

“Last year we did about 200,000 acres. We were active in a little over 30 states and we did more than 30 different crops. We have been doubling our acres year on year every year for the last four years and we’re on path to double our acres again this year.”

Rantizo combines a network of independent spray drone operators with employee pilots in regions where the firm has strong demand for aerial

on, or a partnership with an ag or a grower base.

independent operators in its network. Rantizo provides software and a range of consulting services.

“We do insurance, we help them get advanced waivers,” Scott explains. “We’ll do training on safe application techniques or best practices, how to use the equipment, things like that. Think of it more as product orientation or workshops. If we sell you a piece of equipment, we’ll show you how to use the drone.”

“And because we know that some people are going to be new to being commercial applicators, we’ll provide the resources for how to get your pesticide applicator license and how to get your Part 137.”

Scott notes that Rantizo sells both DJI and XAG aerial application drones and flies both. “We’ve done side-by-side testing with Hylio and DJI and XAG to look at how many acres per hour, what’s the efficacy, what’s the coverage, what’s the spray quality, trying to really understand them. They’re different kinds of tools for different kinds of use cases. We make those resources available to the operators in our network so they can be educated.”

This year Rantizo introduced an app called “Acre Connect” that works

on cell phones. “You can use that to manage the work of conducting a flight operation or an application,” Scott says.

Acre Connect also enables drone operators in Rantizo’s network to create and compile detailed usage reports integrated with Telus Agriculture.

“So all the chemicals are accurately reported, whatever you’ve been applying - how many acres, wind, weather—everything that you need for documenting a safe application report. And then we are the only provider of as-applied maps for drone data.”

“Using Acre Connect, you can fly your mission, record your product usage, create your applied map, and then import that data into either John Deere OP Center or field view so you get a complete picture. For an operator, it’s a great way to deliver better service and really verify the accuracy of the work that you’re doing.”

Scott says that based on Rantizo’s talks with a coalition of aerial application drone CEOs, “we think that last year somewhere between 3.5 and 4 million acres were covered with spray drones.” NAAA’s 2019 industry survey estimated that 127 million acres were treated by manned ag aircraft.

“I’m hoping there will be more opportunities to work together with crewed aviation because I feel like they’re very complementary services. And there’s a potential to use the same software platform to connect that, to say, ‘Ok, I have a big job, and you know, 1,000 acres of it are going to be with the plane. And then I’ve got another couple hundred I need to pick up with the drone.’”

“Let’s dispatch that service request and then make it available to people in the network to pick up.”

As you read, some big statements have been made by UAS companies on their projected growth and potential elbowing of manned operations. The future will tell whether it is cocky marketing or educated clairvoyance. ■



PHOTO COURTESY OF RANTIZO.

**RANTIZO** In 2023, Rantizo’s spray drone network and service providers in the U.S. treated about 200,000 acres in 30 states and more than 30 different crops. Pictured is the DJI Agras T40.