Drone Promises Advanced Data Collection

As precision agriculture evolves, the right technology can make all the difference. To keep pace with innovation, Farm Eagle, a small Kansas-based start-up, is developing the "Prototype One-P1" drone, a cutting-edge solution designed to transform how farmers and agronomists gather critical crop management data.

The fixed-wing prototype is built from a combination of polypropylene, carbon fiber and balsa wood, ensuring both durability and lightness, and features an 8-ft. wingspan. Removable wingtips add flexibility, and the use of both lithium polymer (LiPo) and lithium-ion (Li-ion) batteries provides 90 min. of continuous flight at speeds up to 20 mph.

"One of the main selling points is that the drone has longer endurance than any other options, plus I'm working on another battery to provide up to 3 hrs. of flight time," says Farm Eagle founder Kale Macormic.

While the prototype is a fixed-wing model, the Farm Eagle is also a hybrid capable of vertical takeoff and landing, so a runway isn't required, making deployment possible in virtually any field condition.

Macormic explains, "The Farm Eagle is more than just a flying machine; it's a data-collection powerhouse."

The company offers a pair of sensor packages to meet diverse agricultural needs.

The first is a multispectral imaging system that captures data across eight bands, enabling users to assess crop health, monitor vegetation indices (such as NDVI), detect disease and mold, and evaluate water and stress levels. With this information, agronomists can focus on specific areas of concern rather than walking entire fields, saving time and improving efficiency.

The second sensor option is an advanced hyperspectral camera package that provides detailed insights into soil moisture, mineral content and organic matter before the planting season begins, giving farmers an edge in planning and resource management.

The Farm Eagle can also be purchased without sensors, allowing for maximum customization.

Macormic is building the prototype in Kansas and accepting pre-orders through his website with a 10% deposit. Deposit pricing starts at $1,200 for the drone alone, $3,000 for the multispectral package, and $6,000 for the hyperspectral system.

"We're focused on being a data collection platform, not into dispensing chemicals and doing other things that water down our capabilities," Macormic says. "We're ready to deliver the data-driven insights today's farmer needs, with a focus on endurance, advanced sensing and user-friendly operation."

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Supported by a USDA climate-smart commodity project, Helical Solar expects to expand from the pilot to a feedlot-wide deployment serving 19,000 head of cattle.

New Generation Dual-Use Solar Underway

By Bruce Derksen, Contributing Editor

As climate-smart solutions and energy efficiency return to the forefront, Helical Solar is stepping up to integrate utility-scale solar energy with traditional feedlot and farming operations. Their agrivoltaic systems are proving to be a renewable energy infrastructure where agriculture can coexist and succeed.

Helical Solar's approach is truly dual-use. The company's elevated, bifacial solar arrays are designed to maximize both energy production and land use. Feedlot cattle benefit from protective shade, while farmers profit by generating competitive levels of clean energy with minimal land disruption.

A demonstration of this technology is underway in Harrington, Kan., where Helical Solar is piloting the world's first feedlot in-pen agrivoltaics (Agri-PV) installation. The system's 13.5-ft. high arrays allow cattle to move freely underneath, providing essential shade during the hot summer months. This not only reduces heat stress on the animals but also contributes to their average weight gain.

"Cattle get shade and lower their body temperature in the hot summer months, which helps with weight gain of about 19 lbs. per cow," says Helical founder James McKinion. "It all adds quite a bit of money. Right now, we're getting our summer trial data back from our control group feedlot pens and our PV-installed pens."

The Harrington project's comparative data will provide additional insights into the real-world benefits.

Helical Solar's panels use dual-axis sun tracking and Tier 1 bifacial technology to maximize terrestrial solar energy production. Their patented helical pile installation avoids soil compaction and eliminates the need for concrete foundations or guywires, enabling rapid deployment with minimal land disruption. The panels are engineered to withstand extreme conditions, with automated features that endure wind and snow. They're designed for quick installation, shipped preassembled and ready to be torqued into position with a derrick truck.

Supported by a USDA climate-smart commodity project, Helical Solar expects to expand from the pilot to a feedlot-wide deployment serving 19,000 head of cattle.

The company's flexible system is also tailored for row crops, with offset grid spacing that accommodates common North American crops, including corn, soybeans, cotton and wheat, ensuring standard agricultural practices remain uninterrupted.

"Helical Solar delivers utility-scale agrivoltaics that empower farmers and ranchers with true dual-use solar. With superior shading and energy yield, minimized land disruption, and competitive LCOE, we make solar energy and working lands function as one high-performing system, proving that renewable energy infrastructure and agriculture can coexist without compromise," McKinion says.

From net-metering opportunities to scalable, megawatt-level installations, the company is poised to help shape the future of sustainable agriculture, bringing new revenue streams and energy hardiness to cattle and grain farmers nationwide.

"We're a small start-up but competitive with existing solutions in the market," McKinion says. "We're partnering with different large-scale manufacturing across the U.S. to be able to use economies of scale to be competitive with current solar. Contact us through the website to discuss pricing and zero in on how this approach can work for your operation."

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University-Tested Mower Slashes Inter-Row Weeds

Cornell University is testing a mowing strategy to control weeds in grain crops without the drawbacks of tillage or herbicides.

"We're focused on the practice of inter-row mowing," says Matthew Ryan, PhD, Professor of Sustainable Cropping Systems at Cornell. "It's a novel weed management practice for controlling weeds between rows of crops. Unlike herbicides, which are the dominant way that farmers manage weeds, inter-row mowing is a mechanical control practice."

As Ryan explains, the inter-row mower functions as a rotary mower that cuts a 24-in. swath between 30-in. rows and has an adjustable height. Because the device is front-mounted, there's no worry about the tires rolling down the weeds and then trying to pick them up.

"It stands out from other mechanical practices by not disturbing the soil," Ryan says. "In that way, it's compatible with no-tillage production."

The Cornell research team is collaborating with Dr. Erin Silva and Dr. Brian Luck at UW-Madison.

"We've found inter-row mowing helps reduce weed competition when used early in the season and reduces weed seed production when used later in the season."

Ryan started working on inter-row mowing after learning that it was used to mow alfalfa between rows of the perennial grain Kernza (intermediate wheatgrass) at the Land Institute in Kansas.

"People have been building inter-row mowers for years in their shops," Ryan says.

His team is merely building on existing research.

"We're using an R-Tech IRM-X4 in our experiments. This multi-row, tractor-mounted inter-row mower has a hydraulic motor that spins four swing blades, attached to a central disk, at 1,800 rpm. The individual mower units have narrow top shields that extend outward at the bottom. Cutting height is adjustable, ranging from 2 to 7 in. above the soil surface."

Ryan's team began testing the mower during the 2021 growing season. They collaborated with R-Tech, a custom ag equipment manufacturer in Manitoba, to tweak the design for crops planted in 30-in. rows. Even in its early stages, the research has broad implications.

"The practice of inter-mowing is scalable and can be applied to small and larger operations," Ryan says. "Our unit is 10 ft. wide, but R-Tech makes larger units."

"We've found inter-row mowing helps reduce weed competition when used early in the season and reduces weed seed production when used later in the season," says Ryan.

The mower reduced weeds, and more research is underway to control herbicide-resistant weeds and weeds in organically grown crops, including corn, soybeans and dry beans.

The team is eyeing another inter-row mower. This one's an autonomous robot.

"We're also working with a company to explore the use of robots for inter-row mowing," Ryan says. "Multiple robots can be deployed as a swarm to cover larger acreage. Small-scale farmers can use lawnmowers and mow weeds between crop rows."

As Ryan is an independent researcher, any mention of specific companies does not constitute an endorsement from him.

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