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Growing UAS research fields

Research efforts connecting unmanned aircraft systems (UAS) with precision agriculture applications continue to mount. Research initiatives led by both the private and public parties are highlighting the connection between UAS and ag.

By UAS Magazine Staff | April 25, 2015

Research efforts connecting unmanned aircraft systems (UAS) with precision agriculture applications continue to mount. Research initiatives led by both the private and public parties are highlighting the role UAS will play in future agriculture applications. And, with two of the Federal Aviation Administration (FAA) selected unmanned aircraft systems test sites now offering major access to airspace—North Dakota allows UAS research flights over two-thirds of the state, Kansas allows UAS research flights above the entire state—precision agriculture-based UAS offerings appear to have a long runway. These research efforts have already begun.

In Missouri, researchers affiliated with the University of Missouri's Wurdack Research Center are using the Maverick fixed-wing unmanned aircraft vehicle (UAV) outfitted with cameras and special sensors to monitor cattle, forage, timber and agroforestry systems. The flights are taking place in rural Cooks Station, Missouri, on a 1,200-acre site. The university received a certificate of authorization (COA) for the research. Dusty Walter, Wurdack superintendent, said the school will be applying for additional COAs for other research centers. "I hope that this can help spur new industries in Missouri to not only benefit the producers, but the rest of the state as well," he said.



Iowa, the nation's largest corn producer, has great interest in UAV use. A recent report provides insight into how the state may accept greater UAV use.

Farmspace Systems LLC, a Tennessee-based UAV firm with an agriculture focus, is utilizing experience gained from Argentina research for its U.S.-based UAS offerings. Formed by former U.S. Marine Corp. Lt. General John Castellaw, the company is providing clients with consulting services, platform options, flight training and service after the sale. Earlier this year, the company spent time in Argentina surveying fruit tree fields and other agriculture areas of the country in an effort to help its Argentinian affiliates, and to perfect its flight modeling for U.S. clientele. The company has also formed a working relationship with Middle Tennessee State University and its team of UAS experts including Doug Campbell, operations manager for MTSU's aerospace department of UAS.

Two years after receiving its first FAA COA, Mississippi State University has advanced its UAS efforts from sUAV operation to its current work with automated computer programs capable of recognizing individual seedlings to quickly determining plant density in a given field. Robert Moorhead, director of MSU's Geosystems Research Institute and a professor of electrical and computer engineering, said the school's current UAS work is like applying prescriptions to fields using site-specific data. The work relies on remote-sense imaging and near-infrared capture. Last year, in a study of acres planted in three separate areas, UAVs were used to collect plant population data showing emergence progress, plant heights, growth stages, plants per acre and numbers of unfurled leaves. "Precision ag is one of probably six areas in which commercialization will occur early," Moorhead said. "There's a ton of cost-savings that could be had if the FAA would just accept the technology."

Texas public institutions have also officially entered the UAS research field. At Texas A&M-Corpus Christi through Texas A&M AgriLife Research, a team has been granted a COA to use a fixed-wing UAV to capture images to help in determining crop health. Although the current COA is for a fixed wing UAV for state agency use only, Michael Starek, assistant professor of geographic information science and geospatial surveying engineering, said the school is already awaiting word on a permit to use a roto-copter for individual field problem monitoring. "I see small-scale UAVs becoming an integral tool for growers, big and small, enabling them to target their needs to better manage crops," he said.

Iowa gauges future UAS use

The Iowa Department of Public Safety has issued a report on the state's view and regulatory stance on unmanned aerial systems. The report came at the request of legislators looking for answers regarding the state's stance on UAVs. "There are several factors that must be balanced when looking at private use regulations. It is important that we protect our citizens from bad actors in such a way that does not overly inhibit First Amendment rights and the free market," the report said. "It was apparent from the responses received to the UAS questionnaire that the commercial potential for unmanned aircraft in Iowa's future is broad," and that, "there was a general consensus among stakeholders against the blind overregulation of an industry that has the potential to benefit growth in Iowa."

A questionnaire used to create part of the report was sent to 31 applicable entities—11 responded. On the idea of regulation, the report said, "It may be beneficial for Iowa to take a page from the history books and regulate unmanned aircraft technology as regulation is needed rather than a preemptive manner."

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