IPNI
Plant Nutrition TODAY
Better Crops, Better Environment...through Science

From Scientific Staff of the
International Plant Nutrition Institute (IPNI)
3500 Parkway Lane, Suite 550
Peachtree Corners, Georgia 30092-2844 USA
Phone: 770-447-0335 Fax: 770-448-0439
E-mail: info@ipni.net Website: www.ipni.net

Summer 2015, No. 5

UNMANNED AERIAL SYSTEMS FOR AGRICULTURE

Interest and excitement continues to grow around the potential uses for unmanned aerial systems (UAS) in agriculture. This interest is reflected in the increasing number of UAS-related exhibitors, sponsors, and speakers at the annual InfoAg Conference. The 2015 conference will be held in St. Louis, MO, July 28-30 (www.infoag.org) and will feature several companies, flight demonstrations during the pre-conference tour, and speaker sessions on equipment, data management, and regulations.

Not only will UAS's offer growers an opportunity to rapidly collect large amounts of data, but the potential economic impact of the technology is also noteworthy. In her 2014 presentation at InfoAg, Gretchen West, VP of Business Development and Regulatory Affairs for DroneDeploy, reported that the global UAS market was $11.3B and was expected to grow to $140B over the next 10 years. She also noted that the economic impact of US airspace integration had the potential to grow to more than $82B between 2015 and 2025, with precision agriculture uses expected to total approximately 80% of the commercial market.

While FAA regulations have slowed the development of a commercial UAS industry in the USA, there has been some recent progress. Earlier this year, the FAA released a Notice of Proposed Rulemaking (NPRM) detailing what commercial UAS regulations might look like for agriculture. While the NPRM is a step in a positive direction, several elements including line of sight restrictions, allowable flight times, restrictions on number of people in the flight area, and the limit of one drone per operator will continue to hinder growth of the US commercial market.

Less-stringent airspace regulations in other countries have allowed more rapid commercialization of UAS's and precision ag service providers are reporting favorable results with UAS agricultural applications. At InfoAg 2014, Dale Cowan, Senior Agronomist at AGRIS Cooperative, provided a comprehensive overview of his UAS learning curve and experiences in Chatham, Ontario, Canada. For his purposes, Dale chose a senseFly fixed-wing swinglet CAM, a ready-to-deploy mini UAS. He mentioned several factors that need to go into the decision to buy a UAS such as local support (training and technical support), fixed wing vs rotary, coverage needs, and durability. Durability and easily replaceable parts are not to be overlooked. According to Dale, "It's not how many times you fly, it's how many times you land" that determines the life of a UAS. In his recent ASA webinar on UAS's, Dr. Brian Arnall, precision ag specialist at Oklahoma State University, echoed this sentiment stating "They will crash. Period."

Despite the inevitable rough landings, "flying was the easy part," according to Cowan. The real challenge of a UAS, as for any other remote sensing approach, is in using the data to make a decision that leads to better crop management. The first step in utilizing a UAS is image collection and processing. The swinglet CAM can cover a 130-acre field in 19 minutes and takes a series of large (>350 MB) overlapping images that need to be mosaicked or stitched together. Most UAS's come with image processing software, but based on his commercial experience, Dale suggested a higher-end software package for final analyses. Dale and his group are using a UAS to assess winterkill in wheat, evaluate cover crop establishment, collect NDVI measurements for N management in corn, and to establish management zones to guide soil testing, fertilizer management, seeding, scouting, and yield evaluations.

The UAS is just another tool in the precision ag toolbox. It is a remote sensing platform that helps us identify and define the need for spatial management of agronomic variability. There is no doubt that the potential benefit of UAS's is huge. The opportunities for farmers to collect their own data, on-demand, have never been greater. But, just as we've seen over the years with yield maps, aerial or satellite images, or crop sensors, remotely-sensed data – in and of themselves – are useless until they are transformed into knowledge. As exciting as UAS's are, we cannot get caught up in the hoopla and forget that a successful precision agriculture program must be built on the foundation of strong, science-based agronomy.

– SBP –

For more information, contact Dr. Steve Phillips, IPNI Director, North American Program, Phone: (256) 529-9932.
E-mail: sphillips@ipni.net.

Note: ***Plant Nutrition TODAY*** articles are available online at the IPNI website: www.ipni.net/pnt