Above the Field with UAVs in Precision Agriculture

Discover How and Why UAVs are Set to Impact and Change the Way Precision Agriculture Professionals Operate

By Jeremiah Karpowicz
You don’t have to look far to find favorable predictions around what sort of impact drones are set to have in precision agriculture. The Association for Unmanned Vehicle Systems International (AUVSI) recently published a report that offered some especially ambitious estimates around the influence that drones are going to have on various industries. Their research concluded that precision agriculture was one of the top two most promising markets for commercial drone applications, and that agriculture along with public safety would comprise close to 90% of the total demand.

These predictions mean that the economic impact of UAV integration in agriculture is conceivably in the billions, and if you look at the logistics, it’s easy to see how they got there. In the precision agriculture market, the average price of the UAS is a fraction of the cost of a manned aircraft, such as a helicopter or crop duster, without any of the same safety hazards. Prices for ready-to-fly drones range from $1,500 to over $25,000 right now, which means there are affordable options, regardless of scale or intention.

Leaving aside questions about whether or not these predictions are too ambitious, you won’t find many people arguing about the sheer potential this technology represents. That potential is already being seen and explored by people like Nolan Berg, Precision Systems Agronomist at Peterson Farms Seed. He’s watched the literal ways drones have changed the approach that professionals can take.

“Drones are adding more of a real-time view of the field,” Berg said. “In the past, a lot of people were driving by their fields at 40mph, and that served as their overview of the field. Now they can get out, pop a drone into the air and get a view of the entire field. That’s pretty empowering for the growers. A lot of times they don’t like what they see, and they can make decisions around that to make themselves a better grower.”

It’s easy to get caught up in the hype when words like billions are being thrown around, but drones can improve processes that farmers are currently using and open up new capabilities for them as well. That said, there are numerous factors which will impact the economics and logistics of how these tools are used in 2016 and beyond.
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The Right Approach on the Ground and in the Air

WHEN IT COMES TO UTILIZING UAVS in precision agriculture, there are two main approaches. Farmers can purchase or rent a drone to operate themselves, or they can hire an agriculture service provider who will fly the drone and then pass along or even help interpret the data that’s captured. Farmers need to be able to look closely at the pros and cons for each approach before making a decision, but growers also need to ensure they know what they want to do with a drone before they even consider such details.

Chad Colby works with progressive farmers and companies to provide a deeper understanding of drone technology and the ways such technology can be utilized. For him, questions around what a farmer wants to accomplish with a drone needs to be answered before the farmers can even begin to worry about the implementation logistics.

“The fundamentals of aviation don’t change whether you’re trying to run an international airport in Los Angeles or you’re trying to do crop-dusting in Illinois,” Colby said. “It’s all about the mission, and unmanned is no different. What are you trying to fly? Where are you looking to fly? What sorts of info are your sensors gathering? What’s the terrain like? It comes back to the question around the mission. People need to ask themselves, ‘what am I trying to do?’”

Some farmers have been flying drones as a glorified hobby, and there’s nothing wrong with that. Not all drones are created equally though, and whether you’re using a multi-rotor or a fixed wing drone, it comes back to the question of what someone is looking to accomplish with a drone.

“I’ve seen people using the quad copters to do crop scouting,” Berg continued. “They can be used for quick, real-time visual scouting of a field, and more people have been doing that than anything else. A few of us are using drones to map fields and actually do some prescription mapping. We’ll use them for variable rate fertilizer prescriptions and things like that. That’s why it’s absolutely essential that we identify what can be done with these tools.”

Asking the basic question of what a drone is going to be used for is critical. Those answers will guide precision ag professionals in their attempt to take advantage of the UAV capabilities that exist now and ones that will be created in the future. Before we can get there though, the logistics around regulation need to be sorted out, and that day is coming soon.
The FAA Opens the Floodgates

THE FAA’S LIMITATIONS around commercial operation have mitigated the enthusiasm of agriculture professionals who might otherwise be inclined to see what drones can do for them. This impacts both the farmers, anxious to discover how drones can improve their business, and drone service providers, aiming to offer their services to farmers who prefer not operating the drones themselves. With the FAA set to issue a final ruling around commercial regulation in 2016, all of that will change very soon.

“Once the new regulation gets posted in 2016, we’ll see another wave of folks come on board who don’t have the desire to become a full-fledged pilot and use our airspace in that capacity,” Colby mentioned. “Without question, there will be a lot more activity in the commercial unmanned area once the new regulations come, and we have faith in the FAA that this stuff is coming soon.”

That activity will come from both farmers and service providers, and the enthusiasm for the drones is absolutely there. To qualify for a section 333 exemption, applicants needed to consider how they were going to handle the requirements around having a licensed pilot on location, and there was a considerable spike in the number of people applying for and receiving a pilot’s license over the past few years. Pilot certification is a significantly complicated prerequisite, but with that requirement set to be removed with the FAA’s final ruling, farmers and service providers will soon be able to discover how drones can and will impact their businesses.

“The regulations are the biggest hurdle right now,” Berg continued. “When regulation comes down, things will definitely be uncertain for a little bit as service providers figure out what can be charged. There’s going to be some stiff competition that will be market driven and ultimately make those services affordable. There are a lot of farmers who see the value, and they want to use the service, they just would rather have someone else do the flying.”

Whether farmers themselves are doing the flying or they outsource that task to experienced operators, the final ruling from the FAA will give them the ability to more easily pursue whichever is their preference. A lot of people have been holding off because of the uncertainty and difficulty around regulation, but with such consideration mostly removed, farmers and service providers are going to be able to explore countless opportunities.
Something Old and Something New

RIGHT NOW, MOST FARMERS aren’t doing anything inherently different than they did before UAVs came along. Precision agriculture professionals have been using soil maps and satellite images for a long time, but the difference a drone can make is around the speed of that information. When you have to rely on satellites and airplanes, there’s a substantial lag in terms of getting the data quickly enough. With drones, information is instantly accessible, allowing growers to make immediate decisions.

It’s not just about making current processes that much more efficient though. Sensors and software are being developed which will fundamentally change the approach growers can take, and these new capabilities are as varied as they are powerful.

“Something Old and Something New”

“I’m anxious to see some of the new tech that’s in the pipeline,” Berg said. “A lot of the controlling software like mission planners and photo stitching are being developed to make those programs lot easier to use. It will be interesting to see where that type of technology can go, and a lot of opportunities are going to be opened up by it. The possibilities really are endless.”

For a long time, just being able to get a drone into the air was a challenge for operators, and so much time and energy was spent on just getting them to stay in the air as intended. Today though, automation and redundant system capabilities have been built into these systems to make flying a UAV much simpler. It’s allowed developers and operators to focus on the benefits that can be realized. Nutrient management and water drainage are two key areas where drones can make an impact, but new tools will allow farmers to have better control over that much more of their operation and process.

“Thermal is going to be huge, and there are some other new sensors being developed that will be beneficial, but it’s just the tip of the iceberg,” Colby, who owns AgTechTalk, concluded. “There’s still a lot more in this space that’s going to come at us quickly now that we don’t really need to worry about the actual flight for the most part. Now we can ask questions like what can we haul? What can we actually do? What are the features? How can it benefit us? It’s a pivotal time in this space, because this is new technology that will change the game of agriculture.”

About the Author:
Jeremiah Karpowicz is the Executive Editor for Commercial UAV News. He has created articles, videos, newsletters, ebooks and plenty more for various communities as a contributor and editor. He has also worked as the Executive Editor for ProVideo Coalition where he was first introduced to UAV technology.

All images courtesy of Colby AgTech
If you say “jump”, Nolan Berg won’t just ask ‘how high’… he’ll show you. Nolan pole vaulted for NDSU’s track team (his personal best is 16’ 2”), and his drive and determination carry over into his ever evolving position as Precision Systems Specialist. With a master’s degree in Plant Sciences and tenure as track team captain, Nolan is a great fit to lead our precision ag activities, work with zone creation and UAV imagery, and assist with the seed increase program for new genetics. In his downtime, Nolan enjoys hunting, mountain biking, running, and photography.

When agriculture’s leaders seek superlative insight and expertise in new and emerging technologies, they turn to Chad Colby. Chad is the founder and principal of Colby AgTech, where he works with progressive farmers, leading companies and government agencies around the world to provide deeper understanding of new technology and recommendations on its practical applications. He is also well known for his industry-leading work as an advocate for commercial unmanned aerial system use in agriculture.

Chad Colby grew up on his family’s Central Illinois farm; he says he was always the tech “geek,” and that has not changed. Chad spent several years in Los Angeles working with an aviation construction company that designed, developed and built airport hangars across the U.S. It was during this time that Chad earned his pilot’s license and grew his passion for aviation. Most recently, he served as lead of product support for 360 Yield Center.

Chad Colby developed AgTechTalk.com in 2013 to provide ag technology experts and enthusiasts with on-time information about the latest in technology advances. This provided a platform for him to share his insights and knowledge at meetings and conferences, as well as through media programs, around the world.

In 2015, Chad established Colby AgTech to further reach and inform agriculture’s most progressive farmers, companies and organizations. To date, Chad has provided information and demonstrations at a majority of U.S. agribusiness companies and organization meetings, presented at hundreds of conferences and meetings, such as National Association of State Departments of Agriculture, Association for Unmanned Vehicle Systems International and Farm Progress Show, and conducted hundreds of media interviews, including This Week in Agribusiness, WGN Radio, RFDTV Market Day Report, XM Satellite Rural Radio and Iowa Public Radio Market to Market.
About Commercial UAV Expo

Commercial UAV Expo is a conference and exhibition exclusively focused on the commercial sUAS (small Unmanned Aerial Systems) market for:

- Surveying & Mapping
- Civil Infrastructure
- Process, Power & Utilities
- Mining & Aggregates
- Construction
- Law Enforcement, Security & Emergency Response, Search & Rescue
- Precision Agriculture

In the Conference Program, UAV industry experts share key insights into the issues large enterprise asset owners face when implementing UAS, including systems selection and integration; developing enterprise workflows, guidelines and policies; data management and integration; and legal, safety and regulatory considerations. Plenary sessions and panels cover topics of interest to all end-users regardless of industry while breakout sessions focus on UAV technology, applications and opportunities in the vertical markets listed above.

The international Exhibition includes airframe manufacturers, component suppliers, software suppliers and service companies.

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