

Wow! What a difference a few years can make in the Unmanned Aerial Systems industry. So much emphasis was made on UAS being a boon to ag producers that everyone jumped on the bandwagon. Some companies worked on a shoestring budget, while others took a more robust approach. Unfortunately, none of these companies really understood agriculture, and the few UAS companies still working in the industry admit to their earlier naivety. Ag is very complex, and Mother Nature can be very unforgiving.

This lack of understanding resulted in wasted time and money spent by growers that resulted in negative attitudes about 'drones'. Their analytics continue to present problems: A grower and his consulting team know the field's good and bad spots. The grower knows when and where to apply nutrients based on the crop, the soil maps, and yield monitor data. So, why does a grower need a NDVI image with red, yellow, and green colors like a stop light?

The Federal Aviation Administration (FAA) hasn't helped matters either when it comes to understanding UAS in agriculture. The FAA is only concerned about safety, and I'm proud they are! The skies over our country are the safest in the world, with more than 1 million people safely flying in the United States air space every day!

Regrettably, the slow adoption of UAS by the FAA has hindered UAS research and development by universities, which may have their own set of rules and regulations that restrict research flights by unmanned aircraft. All this hasn't made Extension's job easy in extending accurate information to the people of Mississippi and other states. But we've learned a lot since July 2015 and in this newsletter, we'll go over what you can do right now and the research being conducted in the 2017 growing season.

Let's get started!

I have to again mention how important it is to obtain your FAA Part 107 Remote Pilot Certificate if you plan on flying a UAV in any commercial endeavor. Safety first!

WHAT YOU CAN DO NOW

Real-Time Field Monitoring. UAS are great at getting your feet off the ground to have a quick look at your fields. You can fly the UAV manually or program a flight. It's easy, and you see what the aircraft is looking at in real-time. With a wide panorama of your field, you can easily spot issues.

Damage Assessment. In real-time you can access damage caused by hogs, deer, and weather. Crop emergence can be seen with a simple flight, which may help you see how well your planter is performing. You could also spot weeds between the rows. No post-processing or special sensors are required for these types of observations. Always remember, your eyes and brain are the best remote sensors and analytics in the world. We know that multispectral sensors are valuable, but don't discount the use of standard RGB sensors.

UAS AG RESEARCH 2017

We are really excited about this growing season because the cotton, corn, soybean, and peanut commodity boards are funding several UAS projects designed to produce quick answers for the use of UAS in these crops for specific applications. We are fortunate to partner with other MSU Extension and research faculty to conduct these projects. We are also working with cooperating producers, local ag consultants, USDA-ARS scientists, and other universities to find practical applications in production ag.

Some of the projects we have planned for this year include using the UAV as a tool to get a better look at crop stressors. This includes scouting for damage from

insects, disease, and herbivory; monitoring crop moisture to schedule irrigation; and working through a growing season with our trusty UAV by our sides to see if we are able to augment crop scouting services. We look forward to sharing results of these efforts at fall and winter meetings.

Commercial rules and regulations governing legal flight operations

The Federal Aviation Administration (FAA) released its final rules for small UAS flight operations in the United States airspace. The rules are simply known as Part 107 for small UAS (www.faa.gov/uas). Part 107 can be divided into three main categories:

1. Flight Operations
2. The Aircraft
3. Pilot Certification

Below is a summary of the FAA Part 107 sUAS regulations:

Flight Operations

- Aircraft must remain within Visual Line of sight (VLOS).
- Daylight operations only.
- Maximum speed of 100 mph.
- Maximum altitude of 400 ft above ground level (AGL) or above structure(s).
- Operations **outside** controlled airspace are allowed without permission.
- Operations **in** controlled airspace are allowed with permission.
- Operations from a moving vehicle permitted in sparsely populated areas.
- Preflight inspection required.
- Visual Observer (VO) not required.
- Certain conditions can be waived.

The Aircraft

- Registration required.
- Aircraft marking required.
- Preflight inspection required.
- Suggested maintenance program.
- Airworthiness not required.
- Remote pilot in command required to ensure aircraft is safe for flying.

Pilot Certification

- Must be 16-years-old.
- Earn Remote Pilot Certificate (RPC).
- Certificate requires passing an Aeronautical Knowledge Test.
- Part 61 pilots need to take an online training course.
- Person controlling the aircraft only needs to be supervised by someone with a RPC.