

Welcome to the first newsletter for Unmanned Aerial Systems activities at MSU. In this and future newsletters, we'll cover topics designed to provide you with actionable information related to UAS technology and its uses in agriculture. Let the fun begin!

First, it's important to understand that UAS technology in ag is not only new, but also unique—so unique, in fact, that implementing the technology in ag operations is not as easy as has been preached at the trade shows.

We'll cover several aspects of UAS technology in coming newsletters, but for now let's start with the basics.

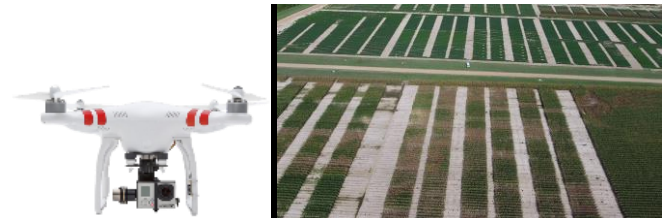


I always tell people that UAS is a *system* of components and not just the aircraft by itself. It's like a jigsaw puzzle. Each individual piece has a specific purpose and all the pieces have to fit together for the system to fly safely, gather the data, and then process that data into actionable information.

Besides understanding the UAS system, knowing and following the Federal Aviation Administration (FAA) safety regulations are the top priority, so they will be listed at the end of each newsletter. Before any flight, make sure you check off items from the regulations for a safe flight.

So where to start if someone is interested in trying out UAS technology in ag operations on their farm, scouting business, or a retailer selling the technology?

The simplest UAS you can purchase and fly is a multirotor with a visual camera or video camera. A quality video camera can reveal amazing information from the view above the crop. From the ground, you can see only 5 percent of the crop. From above, you can see nearly 100 percent of the crop. Patterns of variability show up that could never be seen from the ground, such as how different soil types influence crop growth or how different varieties perform during the season. All this can be seen from the air as this picture clearly shows.



The picture was taken from a video flown by the multirotor also pictured. An issue occurred in the field that no one knew about until the researchers saw the UAS video and realized a different soil type would cause problems, so they didn't harvest that "bad" spot. The seed company also saw the imagery and agreed to the change. An investigation revealed that twenty years ago a pipeline was removed and filled in with a sandy soil. The crop looked great at the beginning of the growing season but quickly wilted in the mid-summer heat.

On the next page are the FAA regulations for small UAS for commercial operations. Please become familiar with them. If you have questions, please call me at 662-325-4595 or email me at [lwasson@gri.msstate.edu](mailto:lwasson@gri.msstate.edu).

## 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](http://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 400ft 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 insure 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.