Drones – Exploring the Potential *using Agriculture as an Example*

*Photo Credits*

http://modernfarmer.com/2014/01/precision-hawk/

http://nimbus.unl.edu/projects/crop-surveying-using-aerial-robots/

http://hoosieragribusiness.wordpress.com/2014/09/22/are-drones-the-next-big-thing-in-ag/
Can I Fly a Drone Today?

• What are you using the drone for?
  – Recreation / Hobby
  – Business
Class G (uncontrolled) airspace is mostly used for a small layer of airspace near the ground, but there are larger areas of Class G airspace in remote regions.
Can I Fly a Drone?

- the aircraft is flown strictly for hobby or recreational use
- Fly below 400 feet and remain clear of surrounding obstacles
- Keep the aircraft within visual line of sight at all times
- Remain well clear of and do not interfere with manned aircraft operations

SEC. 336. SPECIAL RULE FOR MODEL AIRCRAFT – FAA Modernization and Reform Act of 2012

AC 91-57A - Model Aircraft Operating Standards - Including Change 1
Can I Fly a Drone?

- Don't fly within 5 miles of an airport unless you contact the airport and control tower before flying
- Don't fly near people or stadiums
- Don't fly an aircraft that weighs more than 55 lbs.
- Don't be careless or reckless with your unmanned aircraft – you could be fined for endangering people or other aircraft

SEC. 336. SPECIAL RULE FOR MODEL AIRCRAFT – FAA Modernization and Reform Act of 2012

AC 91-57A - Model Aircraft Operating Standards - Including Change 1
<table>
<thead>
<tr>
<th>Hobby or Recreation</th>
<th>Not Hobby or Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flying a model aircraft at the local model aircraft club.</td>
<td>Receiving money for demonstrating aerobatics with a model aircraft.</td>
</tr>
<tr>
<td>Taking photographs with a model aircraft for personal use.</td>
<td>A realtor using a model aircraft to photograph a property that he is trying to sell and using the photos in the property’s real estate listing.</td>
</tr>
<tr>
<td>A person photographing a property or event and selling the photos to someone else.</td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation of the Special Rule for Model Aircraft**

| Using a model aircraft to move a box from point to point without any kind of compensation. | Delivering packages to people for a fee. |
| Viewing a field to determine whether crops need water when they are grown for personal enjoyment. | Determining whether crops need to be watered that are grown as part of commercial farming operation. |
SUMMARY OF SMALL UNMANNED AIRCRAFT RULE (PART 107)

June 21, 2016
went into effect August 29, 2016
Operational Limitations

• Unmanned aircraft must weigh less than 55 lbs.

• Visual line-of-sight (VLOS) only;
  – the unmanned aircraft must remain within VLOS of the remote pilot in command and the person manipulating the flight controls of the small UAS.
  – Alternatively, the unmanned aircraft must remain within VLOS of the visual observer.
Operational Limitations Cont.

- Small unmanned aircraft may not operate over any persons not directly participating in the operation, not under a covered structure, and not inside a covered stationary vehicle.

- Daylight-only operations, or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time) with appropriate anti-collision lighting.

- Must yield right of way to other aircraft.

- May use visual observer (VO) but not required.
Operational Limitations Cont.

• First-person view camera cannot satisfy “see-and-avoid” requirement but can be used as long as requirement is satisfied in other ways.

• Maximum groundspeed of 100 mph.

• Maximum altitude of 400 feet above ground level (AGL) or, if higher than 400 feet AGL, remain within 400 feet of a structure.

• Minimum weather visibility of 3 miles from control station.
Operational Limitations Cont.

- Operations in Class B, C, D and E airspace are allowed with the required ATC permission.
- Operations in Class G airspace are allowed without ATC permission.
Operational Limitations Cont.

• No person may act as a remote pilot in command or VO for more than one unmanned aircraft operation at one time.

• No operations from a moving aircraft.

• No operations from a moving vehicle unless the operation is over a sparsely populated area.

• No careless or reckless operations.

• No carriage of hazardous materials.
Operational Limitations Cont.

• Requires preflight inspection by the remote pilot in command.

• A person may not operate a small unmanned aircraft if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of a small UAS.

• External load operations are allowed if the object being carried by the unmanned aircraft is securely attached and does not adversely affect the flight characteristics or controllability of the aircraft.
Remote Pilot in Command Certification and Responsibilities

• Establishes a remote pilot in command position.

• A person operating a small UAS must either hold a remote pilot airman certificate with a small UAS rating or be under the direct supervision of a person who does hold a remote pilot certificate (remote pilot in command).
Remote Pilot in Command Certification and Responsibilities

• To qualify for a remote pilot certificate, a person must:

  — Demonstrate aeronautical knowledge by either:

    • Passing an initial aeronautical knowledge test at an FAA-approved knowledge testing center; or

    • Hold a part 61 pilot certificate other than student pilot, complete a flight review within the previous 24 months, and complete a small UAS online training course provided by the FAA.

  — Be vetted by the Transportation Security Administration.

  — Be at least 16 years old.
The wind direction and velocity at KJFK is from:

1. 180° magnetic at 4 knots
2. 180° true at 4 knots
3. 040° true at 18 knots
Remote Pilot Knowledge Test – What to Expect

The wind direction and velocity at KJFK is from:

1. 180° magnetic at 4 knots
2. 180° true at 4 knots
3. 040° true at 18 knots
Remote Pilot Knowledge Test – What to Expect

What is the floor of the Savannah Class C airspace at the shelf area (outer circle)?

1. 1,300 feet AGL
2. 1,300 feet MSL
3. 1,700 feet MSL
Remote Pilot Knowledge Test – What to Expect

What is the floor of the Savannah Class C airspace at the shelf area (outer circle)?

1. 1,300 feet AGL
2. 1,300 feet MSL
3. 1,700 feet MSL
Remote Pilot in Command Certification and Responsibilities Cont.

• A remote pilot in command must:
  
  – Make available to the FAA, upon request, the small UAS for inspection or testing, and any associated documents/records required to be kept under the rule.
  
  – Report to the FAA within 10 days of any operation that results in at least serious injury, loss of consciousness, or property damage of at least $500.
  
  – Conduct a preflight inspection, to include specific aircraft and control station systems checks, to ensure the small UAS is in a condition for safe operation.
  
  – Ensure that the small unmanned aircraft complies with the existing registration requirements specified in § 91.203(a)(2).

• A remote pilot in command may deviate from the requirements of this rule in response to an in-flight emergency.
Aircraft Requirements

• FAA airworthiness certification is not required. However, the remote pilot in command must conduct a preflight check of the small UAS to ensure that it is in a condition for safe operation.
As of December 21, 2015, FAA is requiring drone registration
https://registermyuas.faa.gov/

Federal law requires owners to pay $5 to register their aircraft.
Do you need to register your drone?

You need to register your aircraft if it weighs between 0.55 lbs. (250 grams) and up to 55 lbs. (25 kg).

You will be subject to civil and criminal penalties if you meet the criteria to register a drone and do not register.

If you purchase your UAS after Dec. 21, 2015, you must register before you operate it outdoors.
Certificate of Registration

A certificate of registration will be available to download and will be sent to your email address at the time of registration. When operating your UAS you must be able to present the certificate in either print or electronic format if asked for proof of registration.

You must mark the registration number on your UAS by some means that is legible and allows the number to be readily seen. The registration number may be placed in a battery compartment as long as it can be accessed without the use of tools.
Certificate of Registration – Business Use

Small UAS Certificate of Registration

Name: University of Missouri Extension
Manufacturer: DJI
Model: Phantom 3 Professional
Serial Number: P77DCL18B26813
Certificate Number: FA34KPCRY9
Issued: 10/13/2016  Expires: 10/13/2019
Remote Pilot recurrent training and testing requirement

The first Remote Pilot certificates were issued in August 2016, and are nearing the end of their 24 calendar month currency. Remote drone pilots are required to complete a recurrent training course or pass a recurrent knowledge test within 24 calendar months to continue to exercise the privileges of their Remote Pilot certificates.

• If you are a drone and manned pilot (Part 61 qualified) you:
  – Retake the recurrent Part 107 Knowledge Test at a testing facility with modifications (test is only 40 questions in 90 minutes with no weather or loading questions) The majority of the test is on rules and airspace (reading sectional charts).
KNOw Before You FLY

knowbeforeyoufly.org

DID YOU KNOW?

Unmanned aircraft must follow temporary flight restrictions around stadiums and racetracks.

Click here to learn more.

DID YOU KNOW?

Universities need permission from the FAA in order to use unmanned aircraft for research.

Click here to learn more.

DID YOU KNOW?

The FAA Modernization Reform Act of 2012 required the FAA to create rules for the use of unmanned aircraft in the U.S.

Click here to learn more.

DID YOU KNOW?

Operators must keep unmanned aircraft in their sight.

Click here to learn more.
For more information contact:

Kent Shannon  
Field Specialist in Agricultural Engineering  
University of Missouri Extension  
Boone County  
1012 N. Highway UU  
Columbia, MO 65203-9545  
phone: 573-445-9792  
e-mail: shannond@missouri.edu

http://www.parrot.com/usa/companies/sequoia/