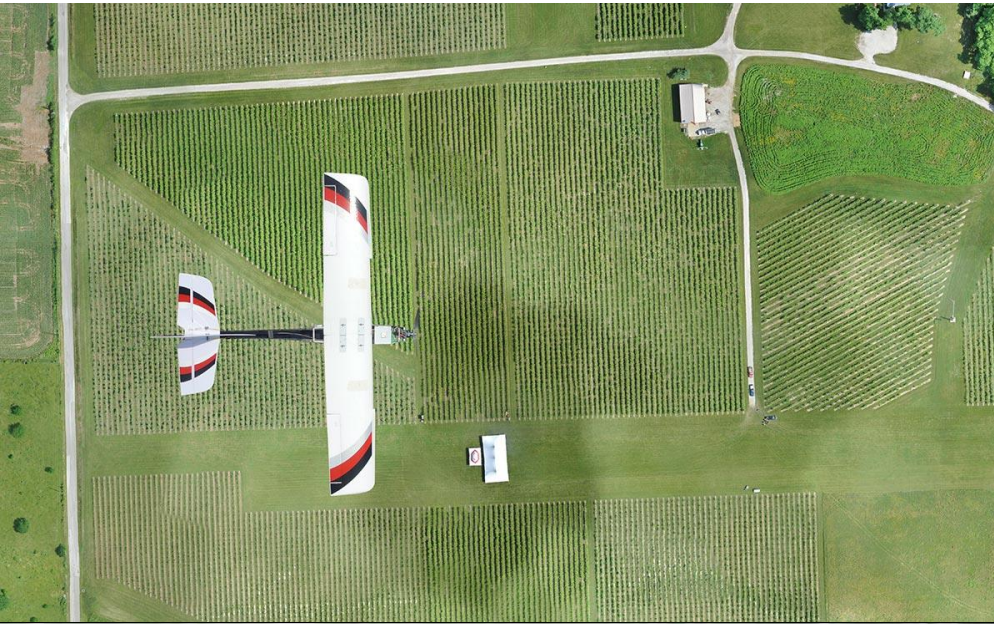


# Drones – Exploring the Potential *using Agriculture as an Example*



## ***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/>

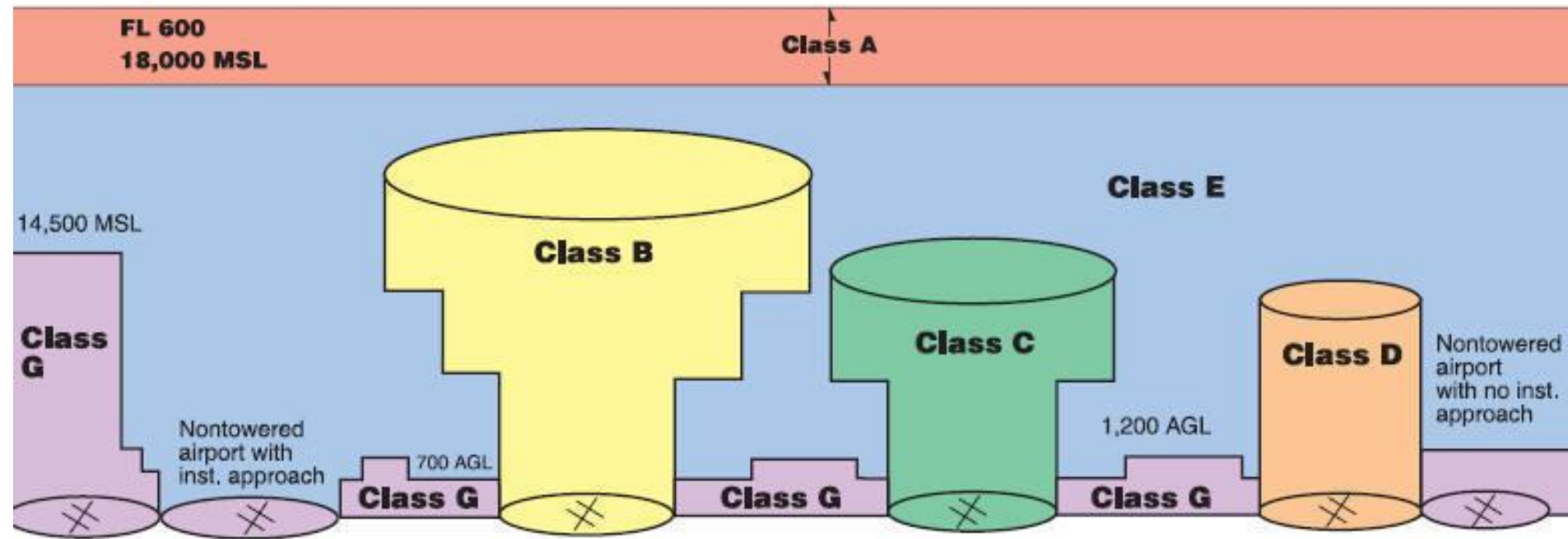
# Can I Fly a Drone Today?

- What are you using the drone for?
  - Recreation / Hobby
  - Business



# The National Airspace - Classes

## Airspace Classification



**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***

# Further Interpretations – June 25, 2014

Hobby or Recreation	Not Hobby or Recreation
Flying a model aircraft at the local model aircraft club.	Receiving money for demonstrating aerobatics with a model aircraft.
Taking photographs with a model aircraft for personal use.	<p>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.</p> <p>A person photographing a property or event and selling the photos to someone else.</p>
Using a model aircraft to move a box from point to point without any kind of compensation.	Delivering packages to people for a fee. <sup>6</sup>
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.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 91

[Docket No. FAA-2014-0396]

Interpretation of the Special Rule for Model Aircraft

# 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.

# Remote Pilot Knowledge Test – What to Expect

```
METAR KINK 121845Z 11012G18KT 15SM SKC 25/17 A3000
METAR KBOI 121854Z 13004KT 30SM SCT150 17/6 A3015
METAR KLAX 121852Z 25004KT 6SM BR SCT007 SCT250 16/15 A2991
SPECI KMDW 121856Z 32005KT 1 1/2SM RA OVC007 17/16 A2980 RMK RAB35
SPECI KJFK 121853Z 18004KT 1/2SM FG R04/2200 OVC005 20/18 A3006
```

FIGURE 12.—Aviation Routine Weather Reports (METAR).

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

```
METAR KINK 121845Z 11012G18KT 15SM SKC 25/17 A3000
METAR KBOI 121854Z 13004KT 30SM SCT150 17/6 A3015
METAR KLAX 121852Z 25004KT 6SM BR SCT007 SCT250 16/15 A2991
SPECI KMDW 121856Z 32005KT 1 1/2SM RA OVC007 17/16 A2980 RMK RAB35
SPECI KJFK 121853Z 18004KT 1/2SM FG R04/2200 OVC005 20/18 A3006
```

FIGURE 12.—Aviation Routine Weather Reports (METAR).

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



FIGURE 23.—Sectional Chart Excerpt.

Chart is not to scale and should not be used for navigation. Use associated scale.

# 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

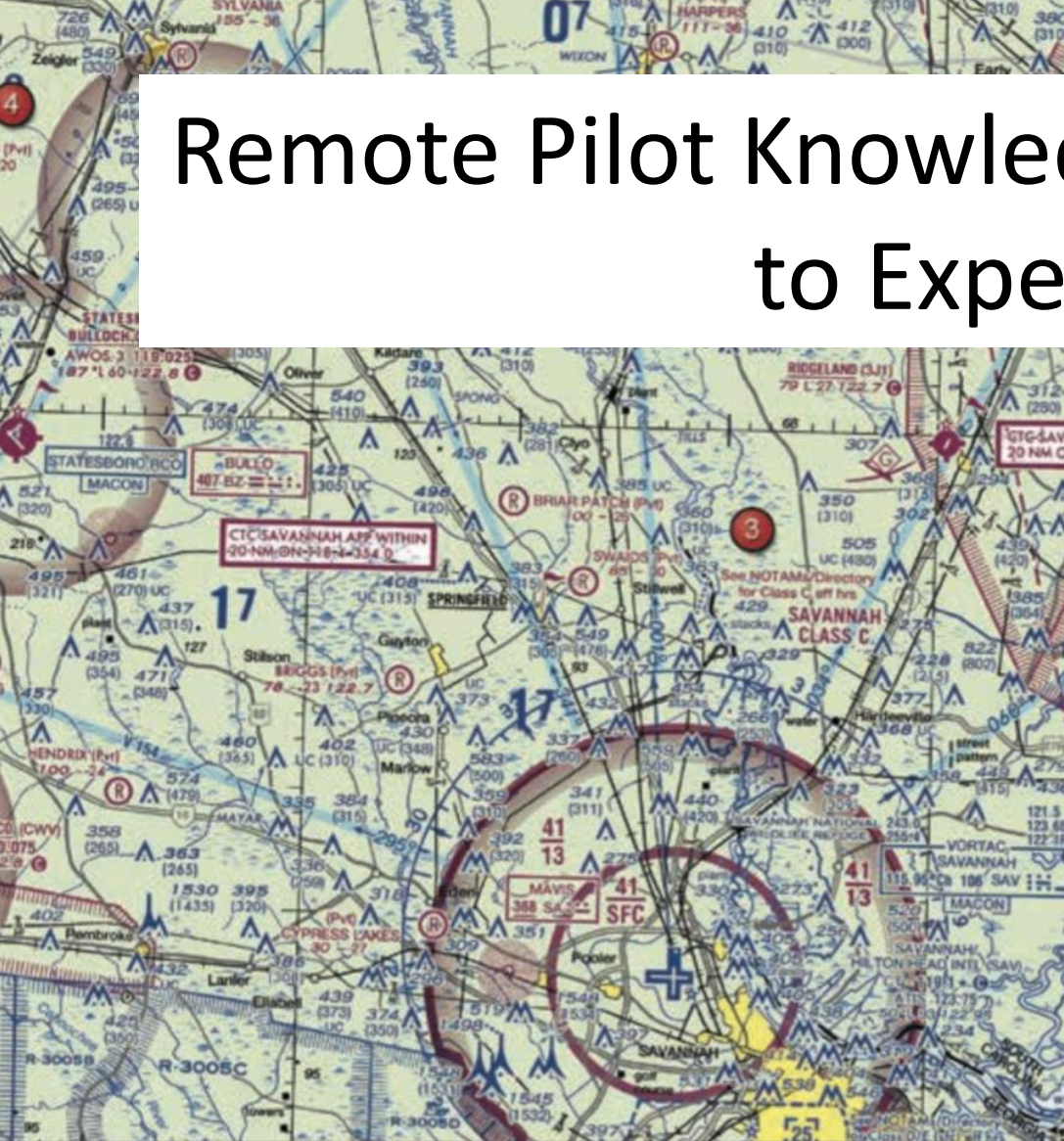


FIGURE 23.—Sectional Chart Excerpt.

Chart is not to scale and should not be used for navigation. Use associated scale.

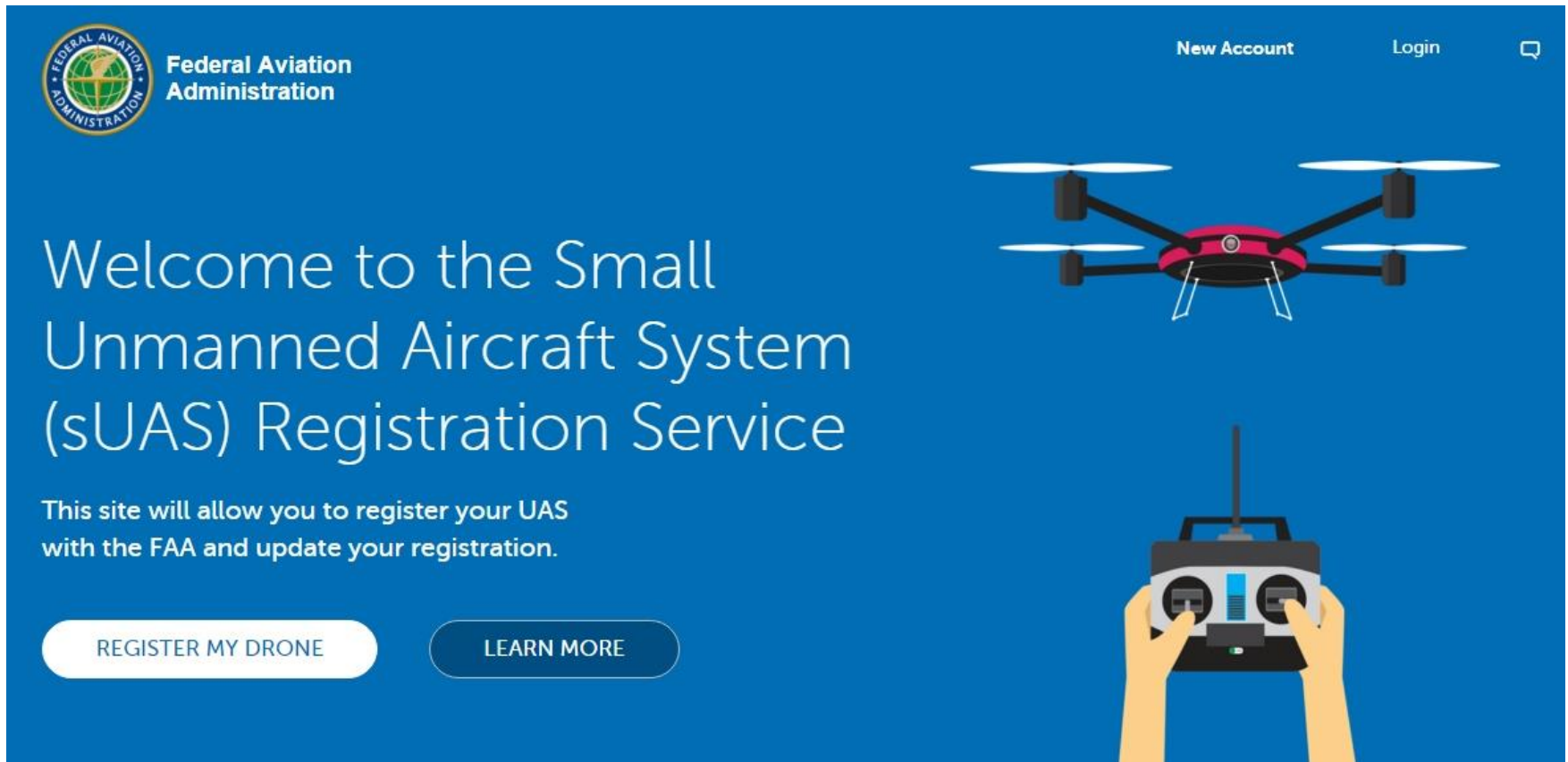
# Remote Pilot in Command Certification and Responsibilities Cont.

- 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/>

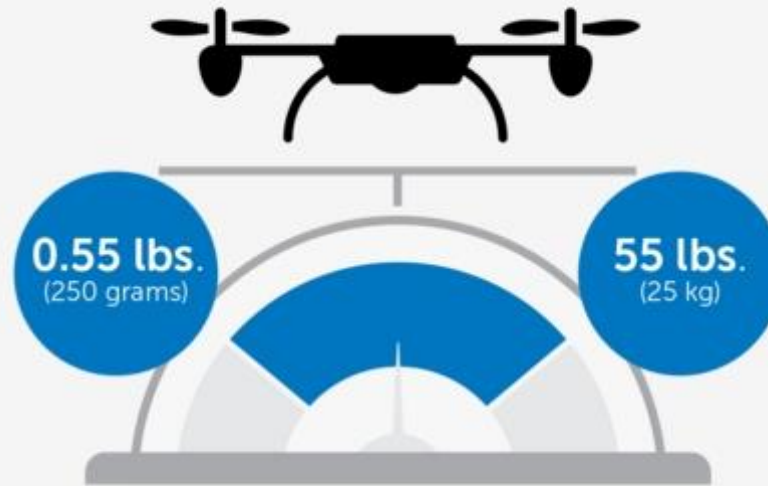


The image shows a screenshot of the FAA's Small Unmanned Aircraft System (sUAS) Registration Service website. The background is a solid blue color. In the top left corner, there is the Federal Aviation Administration logo, which consists of a circular emblem with a globe and the text "FEDERAL AVIATION ADMINISTRATION" around it, followed by the text "Federal Aviation Administration" in white. In the top right corner, there are two links: "New Account" and "Login", both in white. Below the logo and links, the main heading reads "Welcome to the Small Unmanned Aircraft System (sUAS) Registration Service" in large, white, sans-serif font. Underneath the heading, a smaller line of white text states: "This site will allow you to register your UAS with the FAA and update your registration." At the bottom of the page, there are two buttons: a white button with rounded corners that says "REGISTER MY DRONE" in blue, and a blue button with rounded corners that says "LEARN MORE" in white. On the right side of the page, there is an illustration of a red and black quadcopter drone with four white propellers, and below it, a pair of yellow hands holding a black remote control with two joysticks and a central screen.

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

 <b>Federal Aviation Administration</b>	<p><i>For U.S. citizens, permanent residents, and certain non-citizen U.S. corporations, this document constitutes a Certificate of Registration. For all others, this document represents a recognition of ownership.</i></p> <p><i>For all holders, for all operations other than as a model aircraft under sec. 336 of Pub. L. 112-95, additional safety authority from FAA and economic authority from DOT may be required.</i></p> <p><b>Safety guidelines for flying your unmanned aircraft:</b></p> <ul style="list-style-type: none"><li>• Fly below 400 feet</li><li>• Never fly near other aircraft</li><li>• Keep your UAS within visual line of sight</li><li>• Keep away from emergency responders</li><li>• Never fly over stadiums, sports events or groups of people</li><li>• Never fly under the influence of drugs or alcohol</li><li>• Never fly within 5 miles of an airport without first contacting air traffic control and airport authorities</li></ul>
<b>Small UAS Certificate of Registration</b>	
CERTIFICATE HOLDER: <b>Donald Shannon</b>	
UAS CERTIFICATE NUMBER: <b>FA3EWPY3LC</b>	
ISSUED: <b>01/15/2016</b> EXPIRES: <b>01/15/2019</b>	

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 **FLY** BEFORE YOU

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?

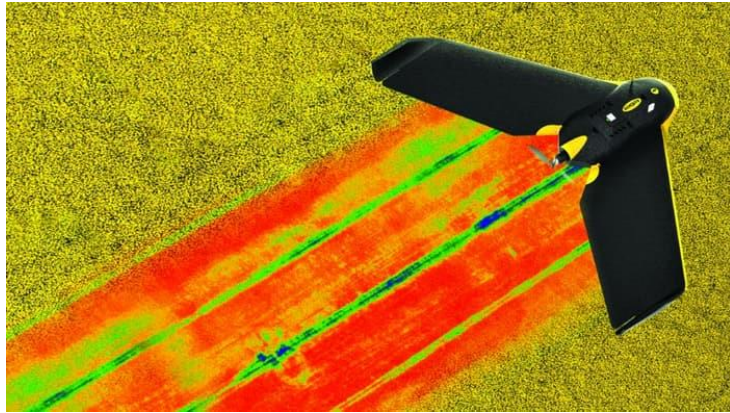
Operators must keep unmanned aircraft in their sight.



[Click here to learn more.](#)



<http://www.precisionhawk.com/DJIFarmer>



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

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