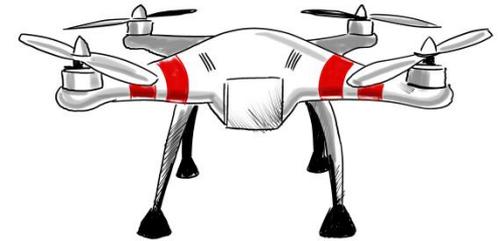


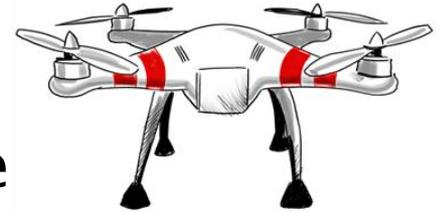
# Drones



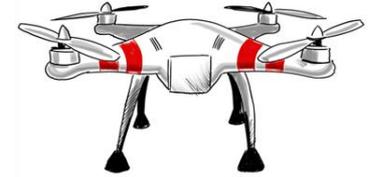
- ▶ Is there a drone in your future?
  - ▶ What drone should I buy
  - ▶ Different types of drones
  - ▶ What can one do with a drone
  - ▶ FAA Drone Regulations
  - ▶ Tips on shooting video with drone
  - ▶ Editing your drone video
- 
- ▶ Billy Walker
  - ▶ Co-President of CLL

# Features To Look For When Buying a Drone

- ▶ **Flight time or Battery Life**
  - Can Range from 4 Minutes to 42 Minute
- ▶ **GPS Capability**
  - One of the best Features to have
    - Will know where it is at all times
    - Allows return to home in case lose signal or battery life is expended
- ▶ **Camera**
  - Can choose up to 4K camera
  - Many of the best drones have at least 2K
  - Almost all can shoot 720p and 1080p



# Features To Look For When Buying a Drone



## ▶ Gimbal

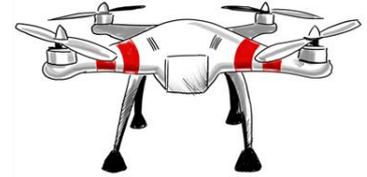
- A device that allows you to move camera independent of the drone body and keep it stable
- A must if you want to take good video or photos

## ▶ Obstacle Avoidance

- Allows drone to detect and maneuver around obstacles
- It is a combination of hardware and software
- sonar sensors
  - ultrasonic sensors, laser rangefinders, lidar (laser imaging)

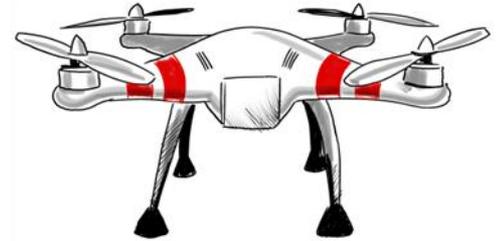


- ▶ Show flight of first drone

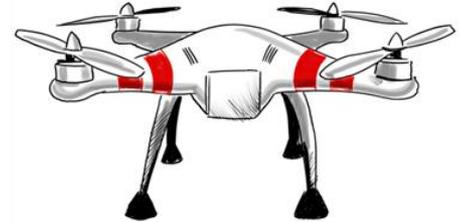


# Other Drone Features

- ▶ Automated Flight Features
  - Return to Home
  - Orbit
  - Follow
  - Waypoint
- ▶ Media Format
  - microSD
  - microSDHC
  - microSDXC
- ▶ Live Video Feed
  - 720p, 1080p

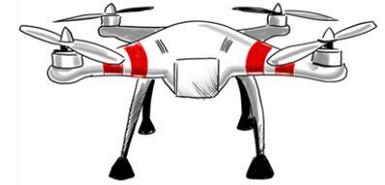


# Reasons To Buy a Drone



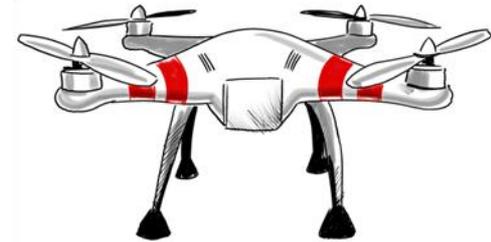
- ▶ Drone Flying is Fun–Fun–Fun
- ▶ They are Cheaper than you think
  - I bought my Phantom 3 Standard for less than 400\$ On Ebay
- ▶ They are not that hard to fly
  - Well maybe the cheap ones are in the beginning
- ▶ The Photos and Videos You Can Take Are Absolutely Stunning
- ▶ Drone Laws are Surprisingly Reasonable
- ▶ There's a fairly Large Market for Drone Pictures and Videos

# Photo from Drone

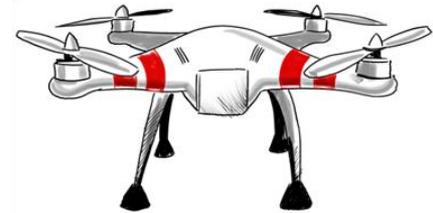


# What Drone Should You Buy

- ▶ Depends on what you plan to use it for
- ▶ The size of your budget
- ▶ How much experience you have



# What Drone Should You Buy?



- ▶ Will only discuss ready to fly models
  - Ready to fly right out of the box
- ▶ In most cases you'll need to bring your own Android or iOS device to view the camera feed in real-time, there a few models that have an Android tablet built into the remote control
- ▶ There are true pro (Do it Your Self)models, which require you to get out a soldering iron and install flight control systems and custom gimbals that can accommodate an SLR or mirrorless camera.
  - Can develop and write your own flight software on some models

# DJI Phantom 3 Standard



- ▶ Phantom 3 Standard
  - Best mix of Quality and Cost
  - Gets very high reviews; from beginners to drone enthusiasts alike
  - It flies incredibly easily, (it positions itself via GPS and compass)
  - Has a good camera (2.7 MP)
  - Comes with its own controller to control the drone

# DJI Phantom 3 Standard



- ▶ It uses the downloadable DJI Go app
- ▶ Can use any smart device , I use an old iPad
- ▶ Shows you the drone's view, take videos and pictures, and to give you other information and options.
- ▶ The drone warns you if your battery is running low
  - Then after it gets critically low it flies home to the take-off location.
- ▶ Battery lasts about 20 minutes
  - It takes about an hour and a half to charge

# DJI Phantom 3 Standard



## ▶ Cons

- Propellers intrude into footage.
- Battery requires more than an hour to recharge.
- Requires Android or iOS device.

## ▶ Bottom Line

- The DJI Phantom 3 Standard delivers the safety, reliability, and video quality you expect from a Phantom at a price that appeals to entry-level pilots.

- ▶ Show Grayton video

# What Kind of Drone Should You Buy?

## ▶ Pro Models

### ◦ DJI Inspire 2

- Best drone you can buy in this class(PC Magazine)
- Can buy a separate controller for the camera
- Landing gear rises up once the drone is airborne, allowing camera to look left, right, backward, and any direction in between, with an unobstructed view.
- MSRP – \$6200



# DJI Inspire2(cont'd)



- ▶ Aircraft features multiple redundant systems.
  - There are dual Inertial Measurement Units (IMUs) and barometers
  - The flight transmission system has a backup communication path in the event the main one fails during flight.
  - Additionally, there are two batteries, so you can safely bring the aircraft in for a landing if one fails.
    - The batteries are self heating, and can operate in temperatures as low as  $-4$  degrees Fahrenheit ( $-20$  degrees Celsius).

# DJI Inspire2(cont'd)



- ▶ Its cruising speed is about 40 mph in its standard operating mode and can it get up to 69 mph in the Sport Configuration mode
  - In the Sports Configuration Mode however it disables the obstacle avoidance system and requires extra room for stopping
- ▶ Camera has an interchangeable lens

# DJI Inspire2(cont'd)



## ▶ Optical Avoidance

- IR sensors in the nose ,can detect objects 100 feet away
- There are also upward facing IR sensors, though they have a much more limited 16-foot detection range.
- Sensors on the underside detect terrain, so altitude adjusts along with hills when flying low, and identify patterns beneath the drone

- ▶ Show inspire video and commercial

# Yuneec



## ▶ Tornado H920

- A huge drone with six rotors and room to hold three batteries, giving it an unheard of 42-minute flight capability
- Its CGO4 camera is essentially a custom version of the Panasonic GH4, a favorite of many a terrestrial videographer.
- It doesn't record uncompressed video like the Inspire 2, but it's less expensive.
- \$2900

# DJI Mavic Pro



- ▶ Can buy at Sam's club for \$1000.
- ▶ Small, affordable design.
- ▶ Obstacle avoidance system.
- ▶ Sharp, distortion-free stabilized 4K video camera. 12MP Raw and JPG stills.

# DJI Mavic Pro

- ▶ Records in portrait or landscape mode.
- ▶ Compact remote control.
- ▶ 23-minute flight time. Strong operating range. Orbit, follow, and other intelligent flight modes.
- ▶ Rotors/propellers fold up



# DJI Mavic Pro



## ▶ Cons

- Unable to take off from grass in testing.
- Not as steady in strong wind as Phantom models.

## ▶ Bottom Line

- With a sharp, stabilized, distortion-free 4K video camera, the \$999 DJI Mavic Pro is much more capable than you'd expect given its size.
  - It's an excellent choice for pilots looking for a more portable drone
- ▶ See Destin Drone Solutions for excellent video clips(Mr. Cole Thurman)  
<https://www.destindrone.com/>

# DJI Mavic Air



- ▶ Cheaper Version of the Mavic
- ▶ Available for Purchase Jan 28, 2018
- ▶ MSRP = \$799
- ▶ Capable of capturing 32 megapixel sphere panoramic images and 4K Ultra HD 100mbps video footage, 4K @ 30fps.
- ▶ Can fly for 21 minutes
- ▶ Equipped with three directional environmental sensors and the 4K Ultra HD camera is fitted to a 3-axis gimbal system providing users with smooth footage

# DJI Phantom 4 Standard

- ▶ Easy to fly.
- ▶ Extremely stable.
- ▶ Obstacle avoidance.
- ▶ Incredible operating range with 720p Live View.



# DJI Phantom 4 Standard

- ▶ Return-to-home and other safety features.
- ▶ Automated flight modes.
- ▶ High-speed Sport mode.
- ▶ Smooth 4K video capture.
- ▶ 20mm wide-angle lens.
- ▶ Subject recognition and tracking.
- ▶ Raw and JPG still capture



# DJI Phantom 4 Standard



- ▶ **Cons**
  - Pricy \$ 800
- ▶ **Bottom Line**
  - The latest version of DJI's top-end consumer drone, the Phantom 4, improves on its predecessor in many ways.
  - It's the best consumer drone on the market, and it's priced accordingly.

# DJI Phantom 4 Professional

## ▶ Comparison to Phantom 4 Standard

- Longer flight time
- Faster flight speed
- Much better camera
  - Larger Sensor
  - Can control ISO , Aperture and Shutter Speed in flight
- Better Optical Avoidance(360 degrees)
- Larger SD card
- More powerful video processing
- Has own Android Tablet built in the controller



## ▶ Cost

- \$ 1500 Amazon



## ▶ DJI Phantom 4 Professional

- Bottom Line
  - Some consider it the best quadcopter on the market
  - One of the top sellers
- PROS
  - One of the Best sellers in its category
  - Unmatched performance and overall reliability
  - Offers numerous high tech features
- CONS
  - Complicated instructions means a steep learning curve for many owners

# Best Drones Under \$100

- ▶ Holy Stone F181C \$99.99
- ▶ Force1 U49C 99.99
- ▶ Holy Stone HS170 39.99 Good choice  
for Drone Training
- ▶ DBPOWER MJX 69.90 Best seller at  
Amazon

# Other Drones to Consider

- ▶ Altair AA108 \$ 112
- ▶ Altair A18 Hornet 150
- ▶ Holy Stone F181W 120

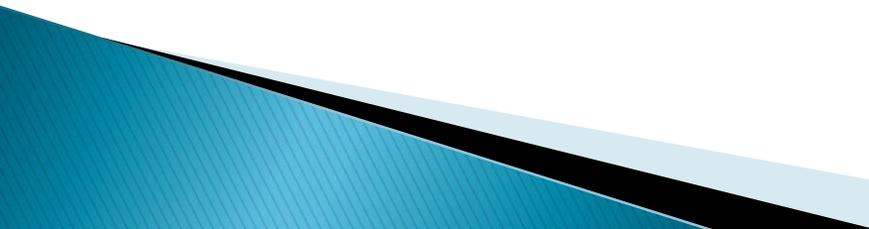
# FAA Regulation for Drones

- ▶ Applies to unmanned aircraft weighing less than 55 pounds (25 kilograms) that are being flown for “modeler or nonmodeler”.
- ▶ The Main Points are:
  - Drones have to remain in visual line of sight of the pilot — no first-person-view cameras
  - Pilots must be at least 16 years old
  - Operation is only allowed during daylight hours or twilight with appropriate lighting
  - Maximum groundspeed of 100 mph and maximum altitude of 400 feet

# FAA Regulations for Drones

- ▶ Pilots must hold a "remote pilot airman certificate" issued by the FAA
- ▶ These rules do not cover traditional model airplanes and nor do they apply to drone delivery operations being developed by the likes of Amazon and Google.
  - (That's because these are based on using autonomous technology guiding the drones, rather than human pilots.)

# FAA Regulations for Drones

- ▶ The rules govern simple tasks such as surveying, real estate photography, and site inspections. These may not be the most revolutionary drone uses, but they're still key to building up a new industry.
  - ▶ Delivery by drone will have to wait.
  - ▶ People say, 'OK, they're just toys. But these are actually aircraft.' So keep this in mind when flying your drone
- 

# Things to Do With Your Drone

- ▶ Flying for Fun
  - ▶ Photography and Filming
  - ▶ Racing
  - ▶ Exploring
- 

# Amazing Ways Drones are Being Used

- ▶ **Helping Farmers**
  - Survey large areas of Farmland
    - Monitor the growth of crops
    - Determine the crop health
    - Determine when fertilizer and pesticides to be applied
- ▶ **Forecasting the Weather**
- ▶ **Monitoring Country Borders**
  - US is using fixed-wing Predator class UAVs to check the Mexican border for illegal traffic

# Amazing Ways Drones are Being Used

- ▶ Inspecting Oil Rigs
- ▶ Inspecting Power Grids
- ▶ Bringing medical Aid
  - Doctors without Borders are testing the Matternet M2 quadcopter that carries 1kg of medical supplies over 20km on a single battery charge. It does not have a pilot. It uses a mobile app which uses a cloud-based routing system to find a safe route.
- ▶ Surveying Archeological Sites

# Tips on Shooting Video with Drone

- ▶ 1. Tilt Reveal—fly forward and tilt camera up to reveal the main subject
  - Tip— fly drone slowly and raise camera slowly
- ▶ 2. Pullback shot—fly drone backwards
- ▶ 3. Head over shot – raise drone up over a spot, hover and rotate



# Tips on Shooting Video with Drone

- ▶ 4. Overtake—overtake the subject and flyover , forward or backward
- ▶ 5. Coming into view—flying over terrain and object comes into view. Ex. car or human
- ▶ I recommend that you do a short test flight, return and look at your photos & videos to see if you want to change your settings.
  - Sometimes hard to tell in real time viewing mode if you are really getting what you want

# Editing your drone video

- ▶ Do not get audio , only video on drone footage.
  - So have to add your own music , voice over , captions etc
- ▶ Can use any good editing program to edit your footage. I use Sony Vegas Movie Studio