

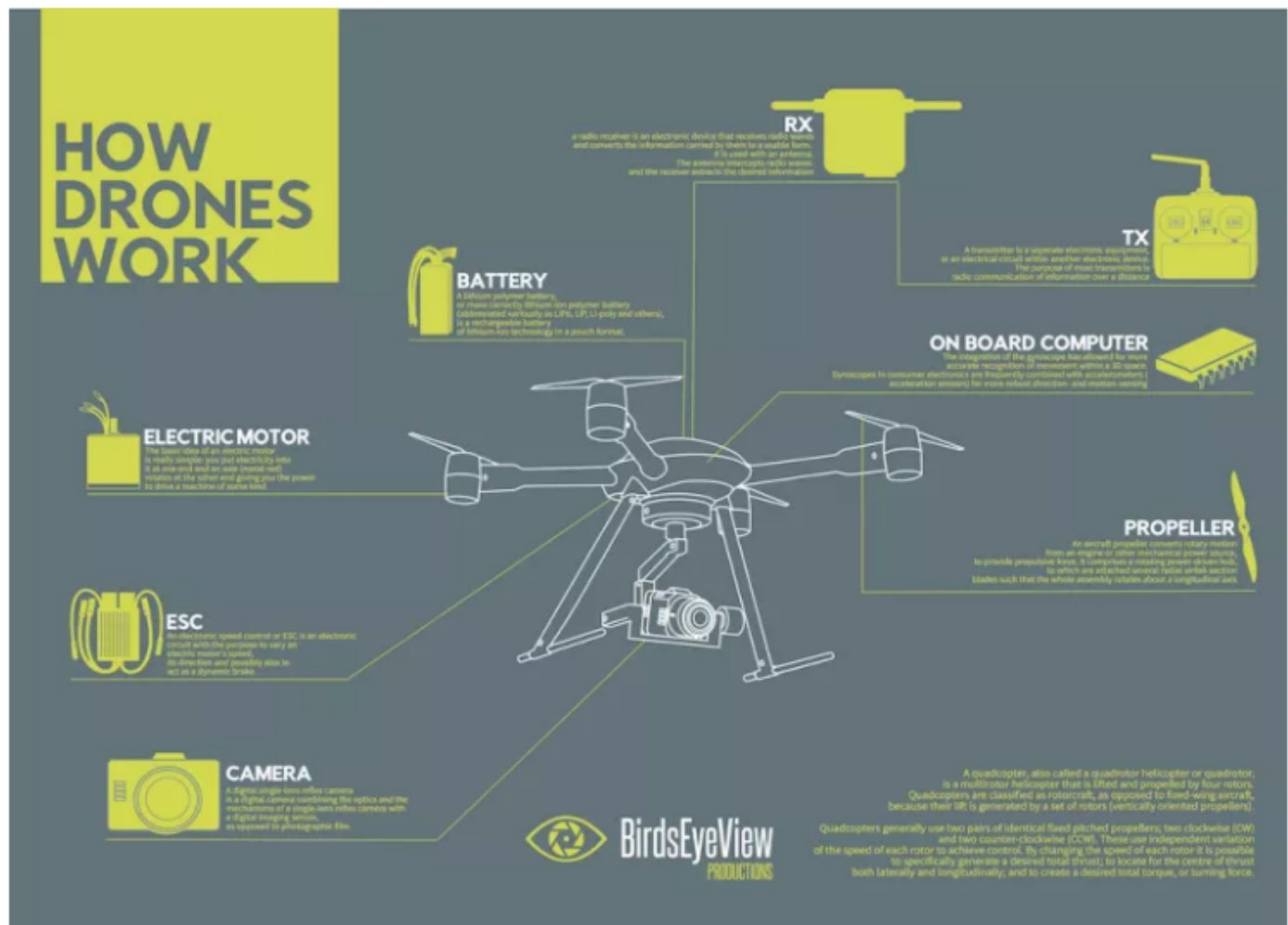
# [Infographic] How Do Drones Work?

by Alan Perlman on September 14, 2016

Unmanned aerial vehicles (UAVs) seem to have endless capabilities, and have become extremely popular in the media. They might look effortless, but how much do we really know about the components of a drone and how they work?

Remote controlled UAV's or drones follow similar principles as radio controlled model aircraft, such as planes and helicopters. However, a quadcopter is made from a lightweight alloy mainframe, four electric motors with propeller screwed to each, four electric speed controllers each connected to one motor, an onboard computer with MEMS and acceleration sensors, and a LiPo battery.

But how do these parts work together to create one of the best inventions since sliced bread?



## The Components of a Drone

### **The Transmitter (TX)**

The transmitter enables the user to control the aircraft from a distance. using 2.4 gigahertz

spread spectrum radio signals.

### ***The Receiver (RX)***

Receivers are electric devices with built in antennas that intercept the radio signals from the transmitters, and convert them into alternating current pulses. The receiver then produces information and sends it to the Flight Control Board.

### ***Flight Control Board***

After the transmitter is switched on, and the main power source – the Lipo battery – is plugged in, the receiver starts communicating with the transmitter. From this moment, the receiver will send every signal to the onboard computer.

The sensors on the computer will make sure the aircraft is stable, even under windy conditions, which makes controlling the aircraft easier – even for beginners.

As the transmitter sends signals to the aircraft, the onboard computer sends signals to the electric speed controllers. The e controllers can control the amount of voltage received by the motors, in order to control the speed of each propeller. This system allows the quadcopter to maneuver.

### ***The battery (lithium polymer battery)***

The LiPo battery is rechargeable and lightweight, capable of delivering high discharge rates to provide enough power to the brushless electric motors.

### ***Electronic speed controller***

The electronic speed controller is connected to the LiPo battery and controls the rotational speed of the motor by adjusting electric current (Amp) to ensure the motors are running smoothly and efficiently

The controller has a built in governor, which keeps the motor's RPM (rotation per minute) at a steady level, in every flight condition.

### ***The electric motor***

On the outside of the motor, there are magnets attached to the inner wall, called the rotor (the spinning part). There are also permanent magnets on the inside of the motor, called the stator.

As the electricity runs through these magnets, it creates an electromagnetic field that attracts and repels the magnets in the stator. The constant change of polarity keeps the motor spinning.

### ***The propeller (props)***

The propeller converts the motion into lifting power. Because of the special shape of the blades, the air pressure is uneven on two sides while they are in motion, what creates lifting power. The principle can be easily modelled by Newton's third motion law and Bernoulli's principle.

### ***Control surface***

The flight computer can individually control the speed of each motor. The propellers can create

an even lifting power in the four points of the model, making it lean towards a specific direction. For example, if the two propellers on the right side drop RPM, the lifting power will be bigger on the left side, therefore the right side will start descending in a quick motion and the model will start drifting to the right.

The onboard computer will increase RPM when the drifting speed reaches the limit, and position the model back into a stable hovering position even if the user takes his hand off the controls - his is what makes quadcopters easy to fly.

## What do drones do?

Quadcopters are very powerful and reliable pieces of engineering, making them a perfect choice for a variety of tasks. Some drones are mounted with cameras, are mounted with lifesaving equipment and others deliver pizza!

Model aircrafts have come a long way over the last 40 years, since the first was born and they are now ready to make their next step to serve various industries professionally and to help the general public, saving lives, and time.

[Birds Eye View Productions](#) are a professional aerial filming and drone specialist based in London. If you require more information on their services, you can [contact them here](#).

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