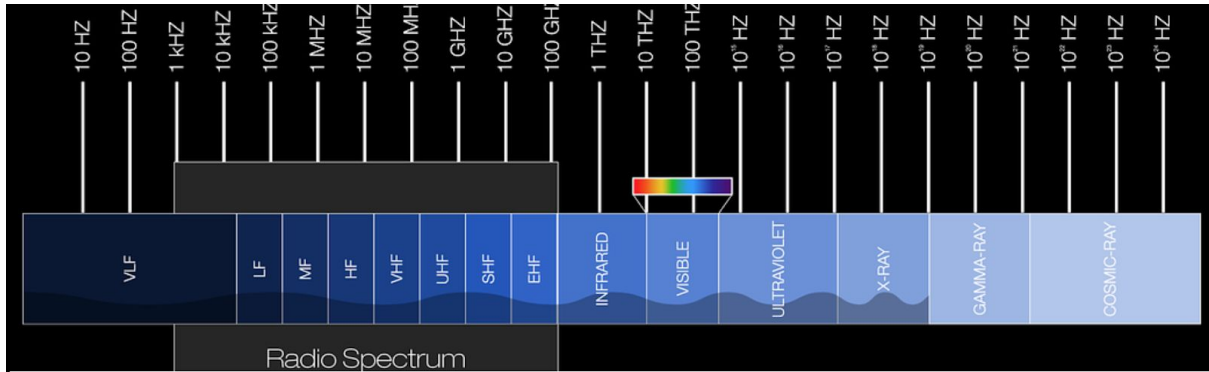




## HOW DO DRONE CONTROLLERS WORK?

A drone controller works by sending a radio signal from the remote control to the drone, which tells the drone what to do. Radio signals are sent from the radio transmitter in the drone controller and received by the drone's receiver.

# WHAT ARE RADIO WAVES?



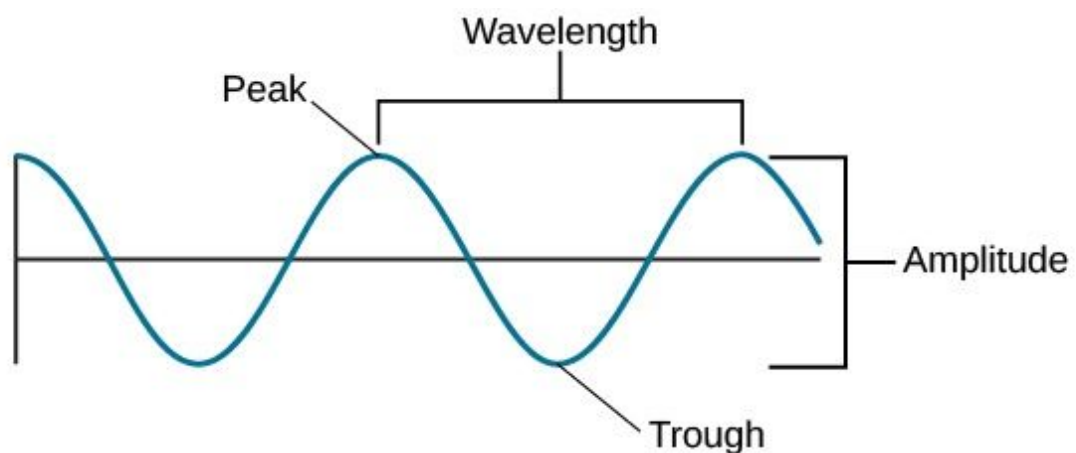
Radio waves have the longest wavelengths in the electromagnetic spectrum. They range from the length of a football to larger than our planet.

A radio wave is generated by a transmitter and then detected by a receiver. Transmitters and receivers are typically designed to operate over a limited range of frequencies.

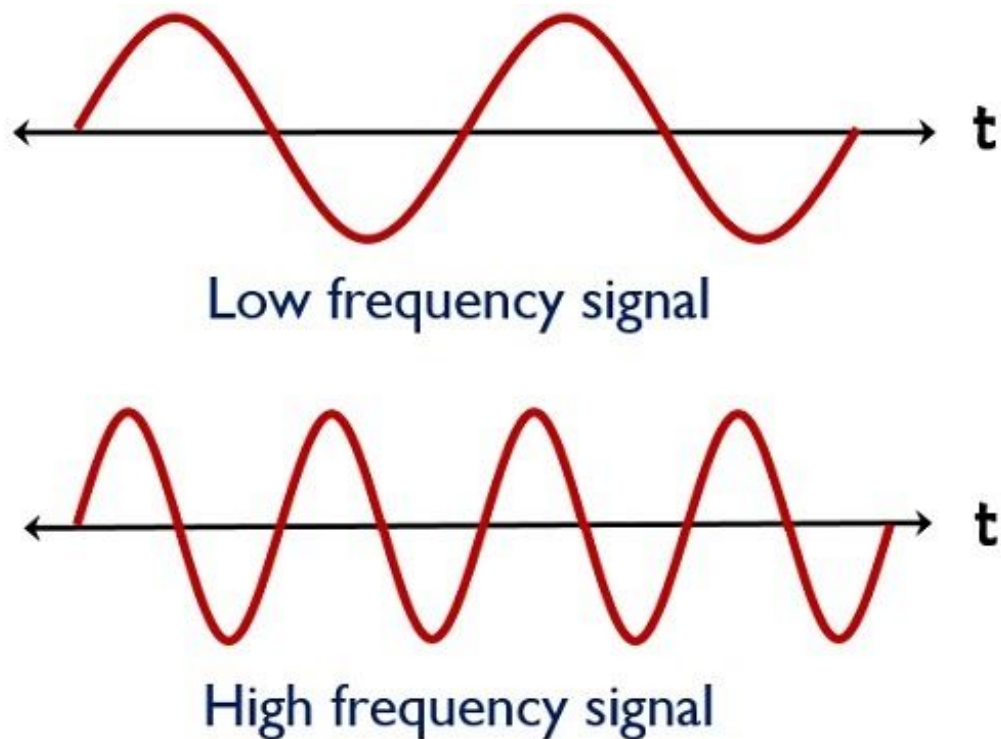
Like waves on a pond, a radio wave is a series of repeating peaks and valleys.



The entire pattern of a wave, before it repeats itself, is called a **cycle**. The **wavelength** is the distance a wave takes to complete one cycle. The number of cycles, or times that a wave repeats in a second, is called **frequency**.



Frequency is measured in the unit **hertz (Hz)**, referring to a number of cycles per second.

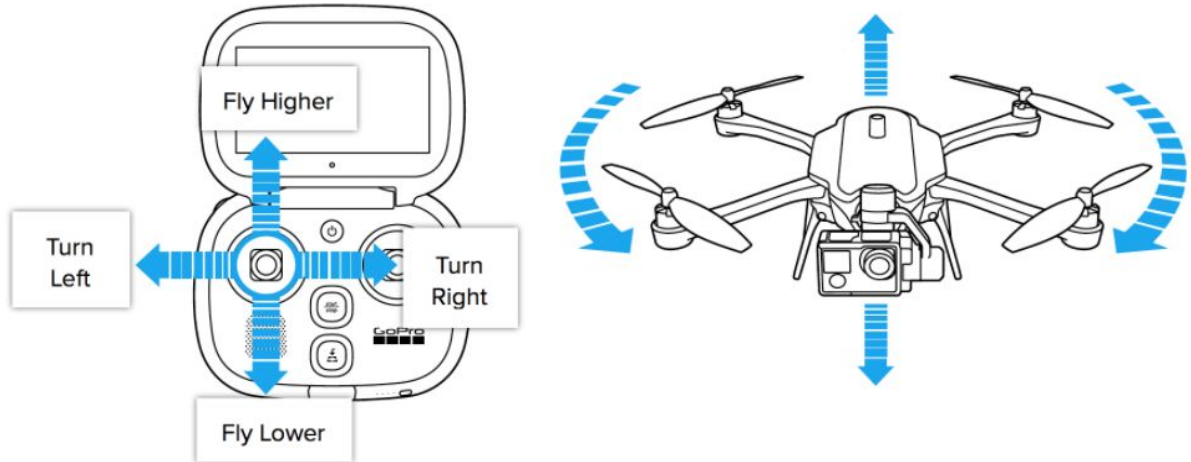


Circuit Globe

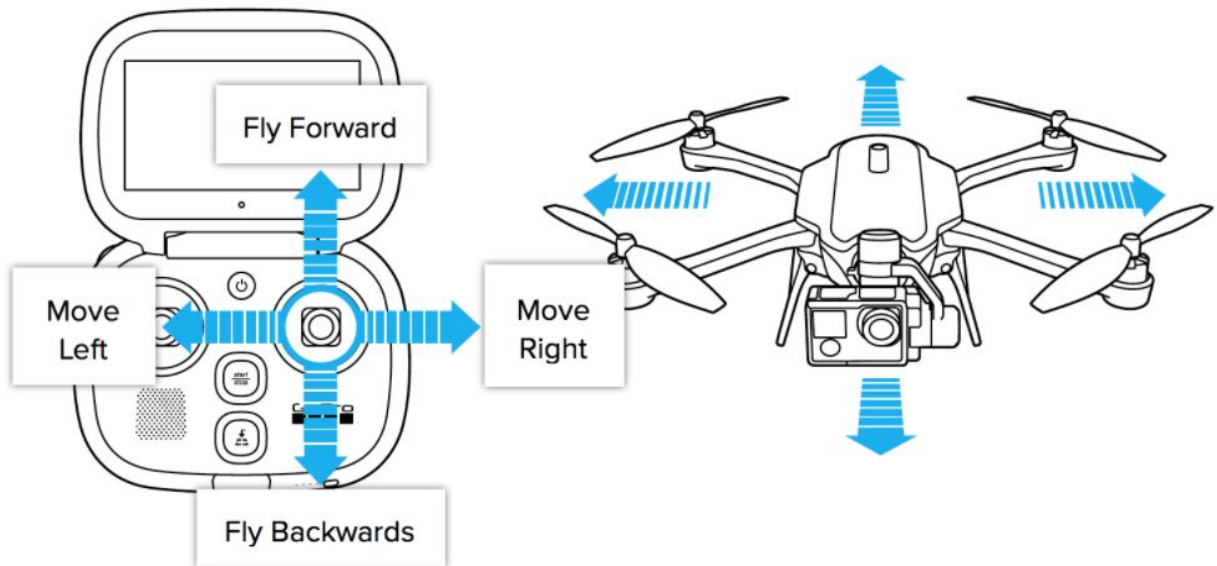
One thousand hertz is referred to as a kilohertz (KHz), 1 million hertz as a megahertz (MHz), and 1 billion hertz as a gigahertz (GHz). The range of the radio spectrum is considered to be 3 kilohertz up to 300 gigahertz.

# DRONE CONTROLLERS

Left joystick controls (Controls the altitude and rotation)

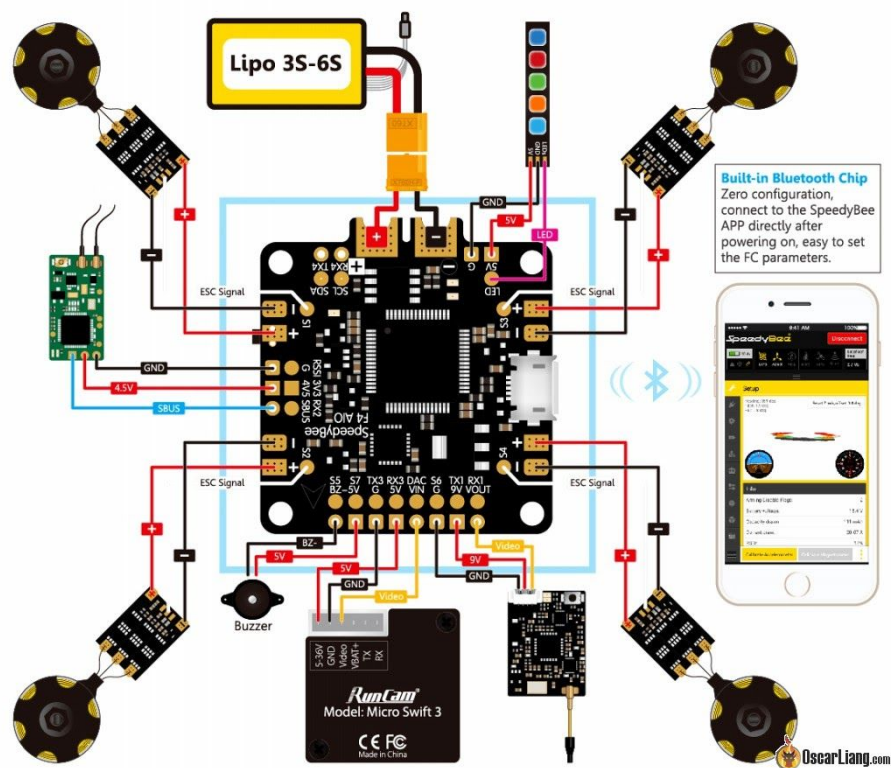


Right joystick controls (Controls the positioning of the drone)



# WHAT IS A QUADCOPTER FLIGHT CONTROLLER

The flight controller is the brain of the aircraft. It's a circuit board with a range of sensors that detect movement of the drone, as well as user commands. Using this data, it then controls the speed of the motors to make the craft move as instructed.



Some flight controllers include more advanced sensors such as barometer (barometric pressure sensors) and magnetometer (compass). The flight controller is also a hub for other peripherals, such as GPS, LED, and sonar sensor.

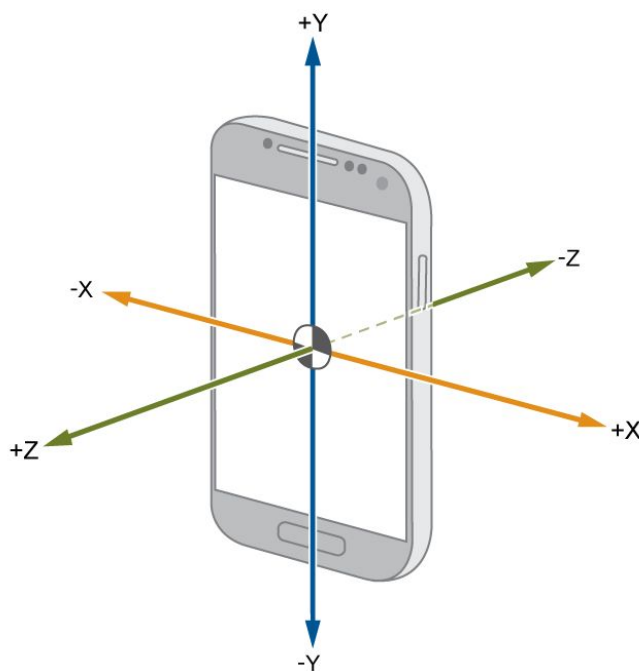
# GYROSCOPES AND ACCELEROMETERS

Nearly all flight controllers have basic sensors such as Gyroscopes and Accelerometers.

**Accelerometer:** an instrument for measuring the acceleration of a moving or vibrating body. (An object is accelerating if it is *changing* its velocity.)

[How does an accelerometer work?](#)

[Make your own accelerometer](#)



**Gyroscope** : a device consisting of a wheel or disc mounted so that it can spin rapidly about an axis which is itself free to alter in direction. The orientation of the axis is not affected by tilting of the mounting, so gyroscopes can be used to provide stability or maintain a reference direction in navigation systems.



[What does a gyroscope do?](#)