How To Fly A Drone / Quadcopter

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Flying a quadcopter drone for the first time can be a daunting task especially if you have just spent a lot of money on your shiny new toy. The fear of crashing it will cause your pulse to race and maybe result in a cautious first few flights, which of course would be the smart thing to do. In this guide we will walk you through the main techniques that will keep you in the sky.

Although drones have different capabilities depending on the model being used the general concept of flying a drone or quadcopter are essentially the same.

Understanding the terms and definitions used for remote control drones is an important first step in your flying career and will help you choose the best quadcopter if you do not currently have one.

Definitions:

First Person View (FPV) – is when the system you are using allows the user to see exactly what the camera on the device is viewing. This is the most popular and useful system if you want to use your quadcopter for aerial photography or to record video footage. It also easier to fly and control when utilizing FPV as you have a better perspective of positioning and direction.

Line of Site – You will hear this term used many times if you converse with other UAV enthusiasts. It basically means that you can see the drone with your naked eye during flight. A lot of accidents and crashes that occur usually happen when the pilot has lot line of sight.

Remote Control / Transmitter – The controlling device used to navigate and communicate with your quadcopter or drone. There are many different types of controls than can be used. Some of them are advanced with various settings while other simply use their smart phone or tablet.

Drone Camera – The camera on the device is one of the biggest reasons why people buy and use UAVs as it is the eye of the flying experience, capable of recording extraordinary footage

that was previously only available to professional videographers. Today many of the devices are fitted with top of the range cameras or mounts to attach your own GoPro camera to your drone.

Yaw – The process of changing direction via left and right rotation. Yaw is usually controlled by the left stick (some devices all you to change which stick control yaw and throttle and which control roll and pitch) Pushing left or right on the yaw control will tilt the front of the device in that direction.

Throttle – The control of altitude, the throttle stick is activated pushing up and down on the left stick (unless the controls have been reversed).

Roll – Controlled by default by using the right stick either left or rights, roll does as it says it rolls the drone in the direction the stick is pushed.

Pitch – Moving the quadcopter forwards and backwards is controlled by maneuvering the right stick forwards and backwards which results in the device tilting in the desired direction.

Trim – Adjusting the sensitivity of the throttle, yaw, pitch and roll will give you better control of your quadcopter. This is achieved by using the "trim" function which is usually present in the form of buttons on the remote control.

Aileron – Directly related to right and left drone movement.

Elevator – Directly related to forwards and backwards movements.

Hover – As a result of throttle control, hovering is the ability to maintain your quadcopter / drone in a static position when airborne.

Bank Turn – Producing a circular turning movement either left or right.

Figure 8 – Flying your drone in the form of a figure 8.

Auto Level – Leveling out the quadcopter due to the sticks being returned to a central position.

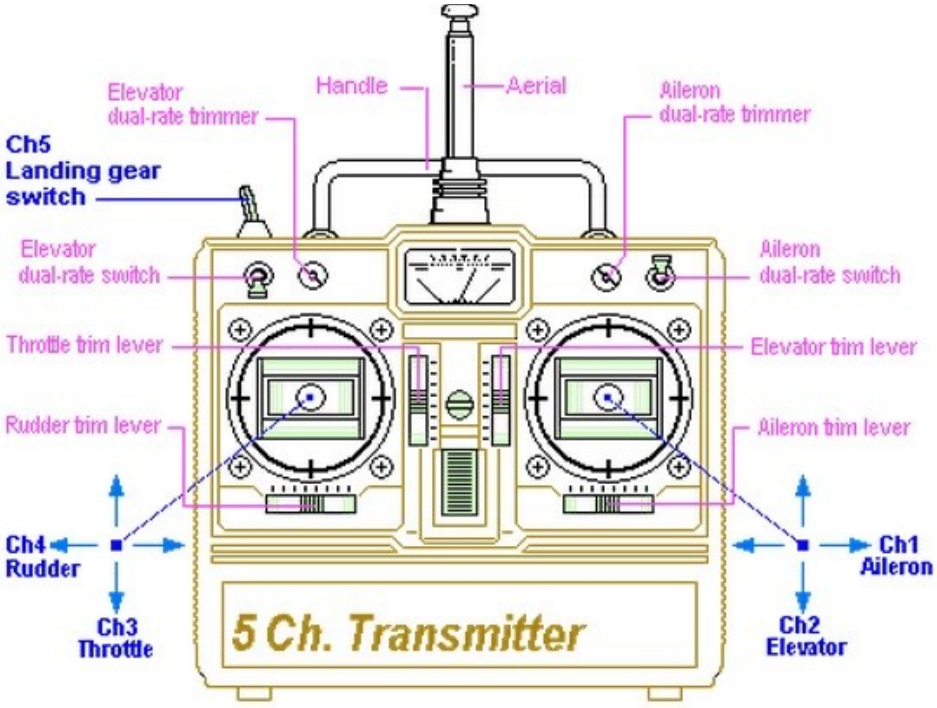
GPS Hold – As a result of the centering the sticks the quadcopters position is returned. Similar to auto level but as a result of GPS.

Know Your Drone Controls

Mastering the controls of your drone or quadcopter will be the difference between spending your time enjoying flying your drone and total frustration, struggling to keep it under control and airborne. Understanding each function of your remote controls will only take a little time and practice.

When you first start to use the controls aim for small and smooth movement of the sticks. This will give you a feel for how each movement will affect the movement of the drone.

The main functions which control direction and elevation are yaw, pitch, roll and throttle. As you become more familiar with your device you can adjust the sensitivity of each movement to suit your flying style. One of the biggest problems newbies have with the controls is that when the drone is facing towards you the operations of each stick is the opposite of when they are facing away from you. This is why it is so important to maintain line of sight at all times or you increase the chance of a fly away. Although losing your drone by it flying off is becoming less of a problem as more models have a “return to home” function that sends them back to you at a push of a button. I would still advise to not overly rely on this feature and to maintain a reasonable distance from it at least in the beginning until you become more experienced.



Find an area with a lot of open space to test each function of the drone transmitter. The default settings will at some stage need to be adjusted so learning them at the beginning is best practice.

Trim Function

The transmitter of the quadcopter will have a “trim” function which will be used frequently during flight.

Left Stick

Adjusting throttle and yaw is controlled via the left stick. This is essentially rotating or turning and going up and down.

Right Stick

Moving the drone backwards and forwards and left and right is performed on right stick and is also called roll and pitch.

Understanding Each Part of You Drone

Like any electronic device things can break and invariably go wrong at some stage so it is essential you have a decent understanding of the parts that enable the quadcopter to function.

Charger and Battery – Obviously the battery gives the device the power it needs to fly and the charger renews its energy. Each model of drone will have different battery life but I would recommend having a few extra batteries already charged with you when you go to fly. The flight time varies but expect between 8 – 15 mins flight time for a decent drone and less for cheaper drones.

Propellers – Quadcopter have four propellers which help it hover in a static position and move direction while airborne.

FCB – The Flight Control Board – Is the brain which controls how quickly the motors rotate and also control the gyroscopes and acceleration.

ESC (Electric Speed Controls) – Connecting the battery and the motors the ESC allows the motors to run at different speeds to enable the various movements of the device to take place.

Frame – Every component of the quadcopter is attached to the frame. It also used to mount various accessories.

Transmitter – Otherwise known as the remote controls send the radio signals to the drone to perform the different tasks via buttons and movement of the control sticks

Motor – The engines which power movement, there are four in a quadcopter and one motors powers a one propeller.

Checklist – Before You Take To the Skies

OK, so now you have an understanding of the various components that make up the drone and the functions which make it turn left and right, go up and go down, etc., it is time to do a preflight checklist to ensure we have the best chance of a smooth and incident free flight.

- Battery is charged and if spares are available they are with you and also charged
- Battery is inserted into the quadcopter and secured in place
- All parts of the device are secured properly with nothing hanging free or loose.
- Satellite lock is set and calibrated is needed
- Camera is secured and turned on and storage card if needed is inserted.
- Remote control is turned on
- All propellers are checked and functioning correctly
- You are in open space with no obstacles nearby
- Throttle stick is at bottom to prevent premature take off
- Safe distance is maintained from drone before launch

- Ok all done now so slowly and steadily launch with a little throttle and have some fun. Just remember these three words “LINE OF SIGHT”. Make sure you can see it all the time or you risk your first flight also being the last as it travels on, out of your control and will crash when the battery runs out.

The best advice for your first flight is to fly over a massive drone cushion! (also known as “GRASS”). It will provide better protection in the event of a crash than concrete will.

Safety Advice

Yes I know I can hear you groan as you read this but quadcopters can be dangerous in inexperienced hands. The propellers are rotating at high speeds and if your device is falling out of the sky and hits something or someone it could cause serious damage to both what it hits and your drone. Although crashes are almost inevitable when starting out, we can reduce the extent of that damage by following some practical advice.

- Like any electrical device, remove the power source (The Battery) before any maintenance is carried out or you could end up hanging from you garage roof.
- Only approach your drone when the propellers have fully stopped. Ask yourself this. Would I lift a lawnmower up by its spinning blades? No I didn’t think so. Treat your quadcopter with the same respect.
- Ok so you have lost control during flight and see it plummeting towards the earth. If there is no hope of recovering control reset the throttle to the bottom so that the blades are not turning after impact. This will increase the chances of your drone surviving.
- Do not fly in crowded areas and ensure you know the laws in your location for where flying a drone is permitted.

How To Hover

Hovering your drone in mid-air is easy enough once you get the hang of the sensitivity of the throttle and yaw. To achieve hovering starting from the ground increase the throttle slightly to gently get the quadcopter to rise into the air. When you reach the height you want the drone to hover at you will then adjust the right stick using small movements to stop it turning or rotating. A few small movements of the left stick may also be required to achieve the true hovering position. Just maintaining that position will allow you to record footage from when the drone is static which can result in better photographs. When the drone is a lot higher and you want to hover you will rely more on the FPV camera to perform the previous adjustments.

How To Land Your Drone

There are several methods for landing your drone depending on the position it is in. If you are at a high elevation some people find it easier to use the return to home function and the just ease off the throttle which will result in a landing. Landing from a hover just requires you to make some slight decreases on the throttle to slowly return to the ground.

How To Fly Your Quadcopter / Drone in Different Directions

Mastering the above hover is important to be able to fly your drone forwards and backwards and left and right. Maintaining throttle control allows you to keep the same elevation but travel in different directions. To fly forward you need to push up the right stick and pull it down to move backwards while keeping the throttle steady. By pulling left on the right control stick you will move to the left and pushing right on the right stick will move you to the right. It all sounds easy but it is only easy once you master hovering and throttle control. When you begin moving directions you wll notice the drone dropping in elevation. Just increase the throttle a little and you will regain the required altitude.

How To Rotate Position

A lot of beginners get confused with the difference between flying left and right and rotating left and right. The above paragraph explained turning left and right which essentially pitches the device in either direction resulting in a turn. This is all achieved through use of the right control stick. However rotating left and right is different. Rotating your quadcopter is done by using the left stick – right or left movements. You can rotate while hovering which is a good skill to learn as it enables you to change direction quickly

Training Techniques To Help You Be A Drone Jedi

- Master the art of hovering
- While hovering perform controlled rotations in both directions
- Fly your drone or quadcopter in both square and circle patterns while under complete control
- Practice the above at different altitudes
- Setup an 3 markers in an open space some distance apart and fly from zone a to b and c. Repeat until it is second nature.
- Complete Jedi Mode by mastering flying in a figure 8 and bank turns in both directions.

When you can comfortably perform all of the above tasks you can call yourself a Drone Jedi, well done!!