

Introduction to FPV

by Allen Perez

What is an FPV drone?

Is a drone equipped with a camera and video transmitter (VTX) that transmits the video signal through paired goggles and allows the pilot to experience an immersive first person view (FPV) of the flight. Most FPVs have the capability of attaching an action camera, such as a GoPro or DJI Osmo, to record high-definition video.

Video transmitters come in HD or Analog. An HD VTX, such as the DJI Air unit or Caddx Vista, gives you a clearer transmission, with no snow, and can record 720p resolution video from either the goggles or the VTX itself. Analog is less expensive and have more choices of VTXs and goggles.

Most FPV drones have a carbon fiber frame, with some 3d printed parts such as, the antenna holder and action cam holder. They have plastic propellers ranging from 1.5" to 7". These props come in inverted pairs to allow motors to spin in opposite direction for a stable flight and maneuvering.

Motors come in different sizes, depending on the drone size, its purpose, and battery size.

Batteries are LiPo type and range in size, from 1S to 6S. The average FPV battery size is a 4S 1300mah or 6S 1100mah. They don't provide a lot of flight time, 3 to 7 minutes, so be prepared to invest in a lot of them.

Types of FPV drones

There are different types of FPV drones. Such as:

- **TinyWhoop**
 - *Small size (1" to 2" props)*
 - *Small battery capacity (1S or 2S)*
 - *FPV camera only*
 - *Prop guards*
 - *Can be used indoors*
 - *Less than 250g*
 - *Better used for indoor flying/racing in small spaces*
- **CineWhoop**
 - *Ducted props*
 - *Small prop size (2.5" to 4")*
 - *Can carry an action camera*
 - *Low PID rates*
 - *Battery capacity (4S or 6S)*
 - *Some can be used indoors*



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- *Better used for cinematic footage due to its low rates and ability to carry an action camera*
- *Freestyle/Racing*
 - *Come in 3" to 7" props*
 - *No prop guards*
 - *Can carry an action camera*
 - *Battery capacity (4S or 6S)*
 - *High rates*
 - *For outdoor use only*
 - *Better used for racing, freestyle, or cinematic outdoor footage.*



FPV components

- *Frame*
- *Motors*
- *Propellers*
- *ESC (Electronic Speed Controller)*
- *PDB (Power Distribution Board)*
- *FC (Flight Controller)*
- *VTX (Video Transmitter)*
- *FPV Camera*
- *Battery*
- *Receiver*
- *Transmitter*
- *Goggles*
- *Action Camera*

How does it work?

The radio transmitter (Tx) sends the signals to the receiver (Rx). The receiver will tell the flight computer (FC) what the instructions are. The FC will then send the signals to the motors via the electronic speed controller (ESC) and determine how fast each motor will spin to accomplish the maneuver. The power distribution board (PDB) determines how much power is needed from the battery in order to spin the motors, power the FC and VTX.

How to get started?

There are many ways to get started flying FPV. It all depends on how much you are willing to invest

- *Invest in a simulator (\$5 - \$20)*
 - *FreeRider FPV*
 - *Velocidrone*
 - *Liftoff*

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- *DRL (Drone Racing League)*
- *Buy an Emax TinyHawk 2 (\$90 - \$130)*
- *Buy an RTF or BNF FPV from (\$500+)*
 - *RotorRiot.com*
 - *GetFPV.com*
 - *Banggood.com*
 - *GepRC.com*
 - *DJI.com*
- *Buy a DIY kit*
 - *GetFPV.com*
 - *Banggood.com*
- *Invest in repair tools and supplies*
 - *Soldering kit*
 - *Wrenches*
 - *Props*
 - *Batteries*
 - *Battery chargers*
 - *Glues*
 - *Heat gun*
 - *Electrical crimpers and strippers*
 - *Wire cutters*
 - *Small pliers*
 - *Tweezers*
 - *Magnifying glasses*
 - *Fireproof bags for batteries*
 - *USB cables (USB-C and Micro)*

Why FPV?

- *It's immersive. Flying FPV through goggles removes your surroundings and immerses you into the flight allowing for a different flight experience*
- *It's exhilarating. It is as close to flying an acrobatic plane or fighter jet without leaving the ground. You can perform power loops, split s maneuvers, deep dives, yaw and pitch spins, etc.*
- *You can fly indoors. TinyWhoops such as the TinyHawk can fly indoors without causing damage to walls and property*
- *No special requirements. FPV drones can be flown on any class G airspace and do not require a runway to take off. They can be flown in parks, empty parking lots, and other open areas*