



FPV Drone Simulator Comparison: Physics, Graphics, Little Things

No matter where you are in your FPV journey the universal thing that will make you better is practice. It's a no brainer that there is positive relationship between stick time and ability wherever you fall on the spectrum. Drone Simulators can help you speed things up a bit, gain confidence and test various maneuvers.

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For most of us the problem is that we can't get as much stick time as we would like either be it work or family constraints, weather or location issues or a lack of quads and batteries to smash up.

Thinking logically lets be generous and say that a standard quad flight lasts for three minutes (if my quads get 2 minutes I'm happy!). If I play on the sim for an hour that is the equivalent of flying 30 lipos, that is about two of my weekly flying sessions for me in only one hour.

Even if you say that an hour in the sim half as effective as real practice then an extra hour a week would make a huge difference to your ability as a pilot. This is why I suggest everybody should practice on a sim as often as possible.

Check out some of my Velocidrone flights after approximately one hour a day for an entire year [Velocidrone VRL Season 4 | Best Laps](#)

WHAT YOU NEED TO PLAY DRONE SIM?

To play a simulator you will need:

- A PC, Mac or Android device
- A Controller (Either a real transmitter or gaming controller)
- An interface between your controller and device
- A sim itself

Let's cover these in a little more detail:

HARDWARE

Most sims are available for PC or Mac and a few are available for Android Devices. Using low settings some sims can run on basic machines with dedicated graphics cards and even some modern ones with integrated systems.

Some sims let you try them out before you buy to see if they are suitable however most sims list minimum specs that you should always follow.

An underpowered machine will result in a low frame rate which will make flying far more difficult and frustrating. No sim really uses cutting edge graphics but for the best experience you should look for a PC with a Nvidia GTX1050 or better.

If you are looking to push the boat out, look for a GTX1070 and pair it with a 144hz display.

Different quad sims have different graphics requirements so pick one to suit your needs. Some sims are even available for Android on the Google Play Store (FPV Freerider and Hotprops)

Personally I use a 2016 Macbook Air for my sims. It will run the best sims on the lowest settings smooth enough but I would recommend something with a little more graphical power.

CONTROLLERS

The best controller for any drone sim is going to be a real transmitter. You can use a generic gaming controller however the precision it gives you is severely limited and you will find things much harder.

The other issue is that gaming controllers tend to have centering sticks. For flying a drone we really want no spring on the throttle. Could you imagine driving a car with the throttle sprung in the middle?

The problem is that most people don't have a transmitter to begin with but do have a computer and want to give it a try. My advice would be to order a transmitter and use a gaming controller if you really can't wait for it to arrive. Just bear in mind that controlling the quad will be far harder.

For recommendations on transmitters please see our [Drone Controller Guide](#)

INTERFACE

Using a transmitter is great however the problem many users run into is getting them to work with their device.

For Android a USB O2G adaptor is the only way I can think of to get this working.

BEST FPV DRONE SIMULATORS

So lets move on to the Sims themselves! I'm going to try and make

you aware of as many sims as possible but please bear in mind that firstly these are my personal opinions and secondly I haven't got the time to try all of them.

This means for a few I will going off what I have heard and since most sims are dropping regular updates I may not be completely up to date with the latest physics/features. I suggest for any sim researching it yourself and if possible downloading a trial version.

Velocidrone

*** Time tested 427 hours**

I'm not going to beat around the bush here, after a couple of years of independent testing I can confidently say that this sim is the best I have tried.

Need some persuasion?

Among racers it is a regular practice tool for the 2018 Multi GP

champion Evan Turner and the insanely fast MinChan Kim (look them up if you want to see some mind blowing speed).

In fact if you play online you will regularly end up in sessions with top pilots around the world from the MultiGP or DCL leagues. It is not a coincidence that this also is the sim of choice for freestyle legend Mr Steele. A pilot known for wanting a very consistent flight experience. The point is that some of the best guys in the world are using this sim and here's why:

Physics

The physics in Velocidrone are the most realistic I have ever seen in a sim, they feel true to life and are very customisable. The creator Ashley Davis regularly posts flight comparisons between a real life track and a simulated version to test and demonstrate the similarities between the two.

The physics seems to be based around a racing quad so you may wish to add some weight if you are using the sim for freestyle purposes. In terms of setting your rates Velocidrone features a simulated version of Betaflight so you can directly get the same stick feel in game as you do in real life.

Graphics

The graphics on Velocidrone are good for a sim but on the other hand in no way class leading, this suits me on a low powered setup

but some may be after a little more. There is a cool 'True Lens' option that simulates the distortion of an FPV camera lens which really does improve the look and makes flying feel more natural.

Online

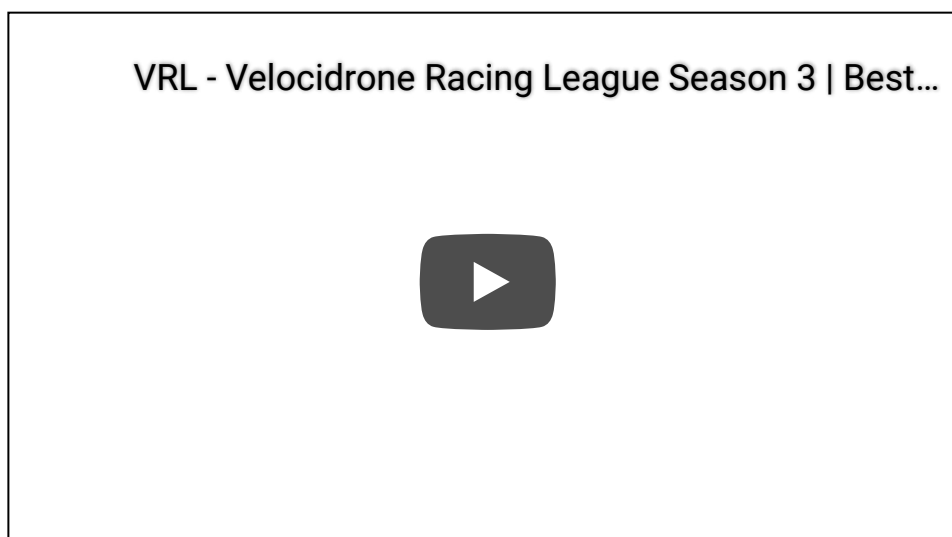
The online system on Velocidrone is what keeps me coming back as it is fast paced and fun. Races happen very quickly and it is highly competitive. A ranking system is used when you play on single class.

An online tournament known as VRL also exists where teams compete in head to head races and leader board smashing

competitions on a new track each week. This is intense and an awesome experience if you can qualify for it!

Perhaps one downside to online play is the intimidating level of the pilots who regularly log on. The guys you'll regularly see are normally the top 50 ranked players and their skill level is out of this world.

Don't expect to win any races for a while!



Maps

The Velocidrone maps are very good but in general quite empty with most of the interesting features being provided through the movable track features. Racing wise there are some fantastic tracks however I would like to see some more freestyle orientated ones. Coastal, a harbour/construction site, is the exception and is full of cranes to play with but this does get boring after a little.

Little Things

For me it's the little things that make this sim so much fun and so much easier to play than some of the others. It's not perfect but some of its rivals such as Liftoff or DRL have their own annoyances that Velocidrone doesn't seem to have. These aren't headline features in anyway but trust me they make a huge difference in the overall enjoyment of the sim.

1. **Resets** - when you crash you want to reset as fast as possible with Velocidrone this is instant (and can be set to a switch on your tx) other sims have a few seconds waiting time or even worse if you are going for a timed run on DRL.
2. **Continuous Play** - Once you are on a map you stay on that map there is no returning to the menu to change the track or quad settings, it just all happens instantly from the side menu.
3. **Continuous Online Play** - The same applies to online play, the map is your

lobby and races can be started or stopped whenever. Liftoff has a separate lobby and kicks you out after each race. (BTW the race ends the second you crash as there are no resets) when doing a timed run on DRL you return to the menu when you crash.

I could go on but I think you get the picture... Going from Velocidrone to any of the other sims can be a frustrating experience to say the least.

- ⊕ Excellent Physics
- ⊕ Superb and Fun Online
- ⊕
Official Tracks updated regularly
- ⊕ Excellent overall playability

- ⊖ Maps could be more interesting for freestyle
- ⊖ Weighty at forefront
- ⊖ Lack of create a quad mode

Price: £15.99 - velocidrone.com

Liftoff

*** Time tested 100 hours**

Liftoff was the second sim I ever bought after FPV Freerider and I have put around 100 hours into it. I used it mainly to practice freestyle and taught myself moves like Matty flips before taking them out to the real world.

Physics

The physics in Liftoff are very good, Velocidrone is a little better but the Liftoff team have done a great job and any practice you get on the sim will have a strong carryover to your real life flying.

Graphics

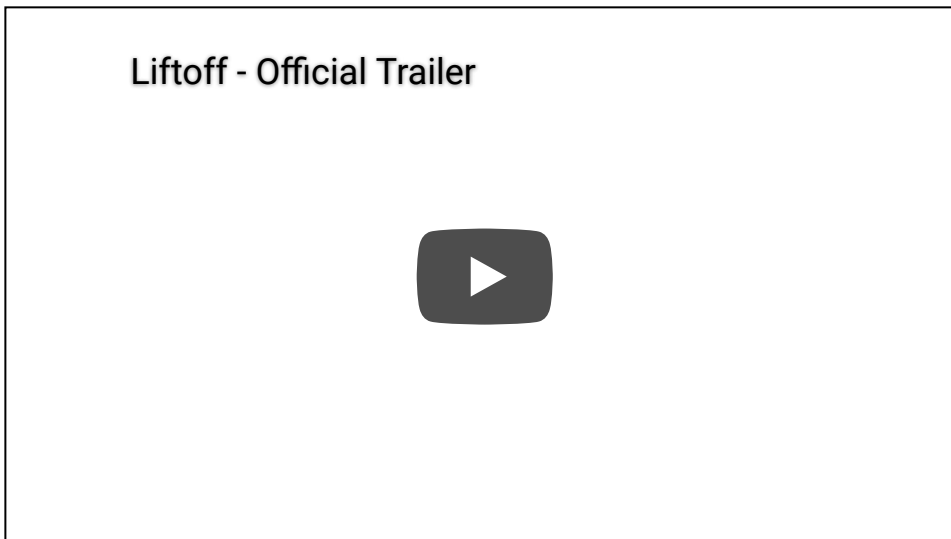
Liftoff is probably the best looking sim out there, if you have a high end PC the visuals are very impressive and realistic this may be the one to go for. Standout maps for me were the more natural forest ones with realistic looking trees and plenty of light bloom and motion blur.

Maps

Liftoff has some really nice built in maps with one particular being Hanover, an enormous freestyle environment based on the real life convention centre. The game offers a few different environments which all look great.

Everyone raves about being able to fly Joshua Bardwell's back yard however I personally found it a pretty boring area to fly in and more of a novelty if I'm honest. It may appeal more to you.

Despite having some nice maps the track editor is a little limited and all the good maps that are raced online are based on the drawing board map. This is a completely blue environment that really doesn't do the games graphics any justice.



Online

The online on LITTOFF IS where it fell down for me and I started to get bored and look for another sim. Racing itself is fine but the games quad editor means that everyone uses 6s high kv quads that are completely unrealistic and turn it into an arcade like experience.

Couple that with getting kicked out to the lobby after every race and waiting for new races to start and it becomes a rather painful experience. Maybe I've been tainted by Velocidrone's slick online implementation but I'd recommend just having an online freestyle session with your friends opposed to actually trying to race.

Other Features

The build your own quad feature is fun and kept interesting with real life parts being added regularly my one complaint would be that this is the only place you can change your camera angle. You can however update your Betaflight settings in the game just like Velocidrone which is excellent.

Liftoff is the only sim I know of that supports 3D mode (as in reversing your motors in flight) which is great to see and fun to play around with.

- ⊕ Great Physics
- ⊕ Excellent Graphics
- ⊕ Quad Customization
- ⊕ Hannover map!!!

⊕ Joshua Bardwell's House

⊖ Online lobby/race system needs improvement (load screens)

⊖ Online is like playing an arcade game with the best players using unrealistic quads to win

⊖ Hard work to find good tracks

Price: £14.99 on Steam - often on sale for less! [liftoff-game.com](https://www.liftoff-game.com)

DRL

***Time Tested 2 Hours**

The DRL sim has been around a long time and is very well known

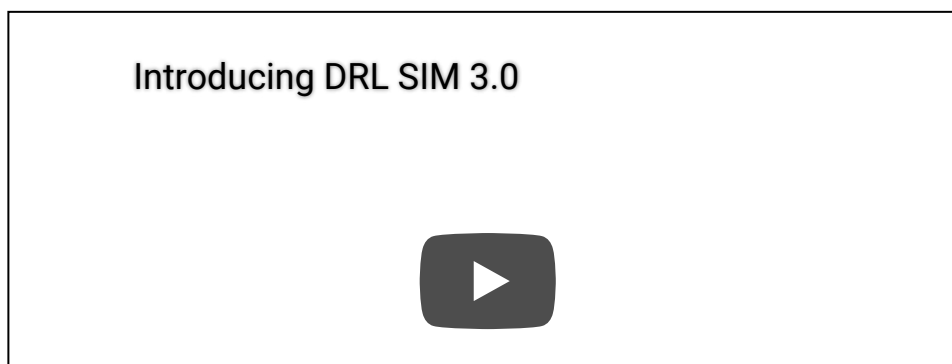
due to it's online draft that gives players the chance to be drafted for a real life contract to fly on the show. This is epic and a real motivation to play but the sim does (I should say did) have a problem with the physics.

Physics

DRL uses their own custom drones, these drones are designed to be easily visible and carry extra video equipment for the show. The bottom line is that these things weigh approximately 1000g which is double the weight of a typical racing drone and the sims physics replicates this.

After getting top 10 times on some Velocidrone tracks I thought I would have a shot on the tryouts so downloaded the game. After 2 hours of pain trying to adapt to the weight and relative lack of power compared to what I was used to I'd had enough and uninstalled the game.

Thankfully DRL have now released version 3.0 which gives players the option to choose to use normal quads and even customise them. I've yet to try version 3.0 but the list of new feature makes it sound like a much more exciting proposition:





Graphics

DRL has some great graphics perhaps only second to Liftoff. In general the game is very polished with slick menus and online integration showing rivals and leaderboards. DRL looks and feels like a premium game throughout and should be commended for it.

Maps

The DRL maps are truly excellent! Fans of the series will be able to race real life environments and tracks from the series whilst exploring enormous and detailed environments. A good example would be the 'Gates of Hell' map, you start in a shipyard with cranes and boats yet are able to fly a few miles out to find a bridge, a city and so much more. This is as close as it gets to open world exploring and it is great fun, especially with friends.

Online

Of course the highlight and golden feature of DRL is the opportunity to become a real DRL pilot. This overshadows the fact that DRL also has a good online multiplayer mode that allows for custom tracks. An annoyance however has to be the crash detection that will painfully show your drone getting smashed into bits at the slightest

collision. It is slow, repetitive and frustrating to reset!

Price £15.49 on Steam [thedroneracingleague.com/drl-sim-3/](https://www.steam.com/app/1056000/the-droneracing-league)

HotProps

Hot Props although no longer developed was a free sim that was greatly popularized by the pilot Mattystuntz who used it as a training tool for his mind bending maneuvers. Although not competitive with the premium sims and is great for someone on a tight budget or who is looking for something that will run on Android.

Graphics

The graphics are average with no real stand out effects and nothing offensive. This sim is more functional rather than pretty but it gets the job done.

Maps

Mattystuntz Freestyle World is one of the highlights of the sim. The entire level is based around fantasy Matty objects like buildings and freeways and is great fun to play on. It is large and expansive and really outshines the other more standard maps.

Online

I tested this about two years ago with a friend and it was ok for general freestyle. I would be shocked if you could find a lobby these days so essentially this one is a single player game.

Price Free [Hotprops](#)

FPV Freerider / FPV Freerider Recharged

*** Time Tested 10 Hours**

FPV Freerider was the first sim I ever tried, I played it with an Xbox controller and put around 10 hours in on the demo map whilst I waited for my transmitter to arrive. Joshua Bardwell made some excellent tutorials for beginners learning to fly for the first time which formed the foundation for the way I fly now! [How To Fly A FPV Quadcopter / Racing Drone](#)

FPV Freerider Recharged is the deluxe version of FPV Freerider. It is focused on bigger and more detailed sceneries and costs a little more to buy. If you intend to purchase the game I would recommend Recharged as the maps are far more interesting to fly which adds to the enjoyment and longevity of the game.

The sim itself is pretty basic with decent physics but nothing spectacular. From what I can tell there is not much of a race scene with one but it is a lot of fun for freestyle. In general the resource requirement for this sim is lower than sims such as Liftoff or Velocidrone.

Graphics

Like Hot Props the game isn't the prettiest but nor is it bad. For a functional trainer you can't complain and it may be a good option for players with very low spec machines.

Maps

You get what you pay for with the maps and the ones on recharged are certainly more interesting than the ones on the basic version. Recharged maps feature for 3d environments you can interactive with more however in general the selection is small compared with other offerings.

- ⊕ OK Physics
- ⊕ Cheap Price
- ⊕ Joshua Bardwell Tutorials
- ⊕ Available on Android

- ⊖ No way to directly enter rates
- ⊖ No online

Price: Standard \$4.99 - fpv-freerider.itch.io/fpv-freerider
Recharged \$9.99 - fpv-freerider.itch.io/fpv-freerider-recharged

Trials are available for both

FPV Air 2

*** Untested**

FPV Air 2 is a fairly new budget FPV simulator available for just \$5. It features good physics with Betaflight settings and a fun online mode. This one definitely takes the budget pick at the moment and additional maps can be purchased online. To me this one looks great to use as race practice but seems to lack any interesting freestyle features.

[FPVAir2 Trailer](#)

Price: £3.99 on Steam store.steampowered.com

DCL the Game

*** Untested (No Mac Version)**

DCL the Game is a very new simulator from the Drone Champions League, a new racing league who starting to gain some traction. This sim is very new with only a Windows trial currently available however what we have seen so far looks promising.

The graphics look strong and they offered users a chance do qualify for a real life tournament and ultimately the chance to get drafted for a real DCL team.

The trial was free however there is no word yet on the price of the final product. The website promises 30 tracks in the full game which sounds great however my main concern is similar to DRL's initial problem of their custom quads.

Like DRL, DCL uses custom built larger and heavier quads that just don't fly the same as a regular 5" quad. I've held one and they are just heavy and in the words of many of their real life pilots, they suck. Hopefully the game will provide players with an option to fly a regular quad like DRL has now done.

- ⊕ Supposedly good physics
- ⊕ Excellent graphics
- ⊕ Interesting real life tracks
- ⊕ Real life draft opportunities
- ⊕ Race your competitors modes

- ⊖ Full version not yet released
- ⊖ Trial version is Windows only for now
- ⊖ DCL quads handle differently to regular racers which may become apparent in the sim

Price: TBC - Only prerelease demo available at time of writing
game.dcl.aero

Rotor Rush

*** Untested**

I nearly forgot this one from the list but was reminded about it when I saw they were a sponsor for Weston Park last year. Rotor Rush is a premium simulator that has a £4 monthly or £40 annually and supposedly flies very well.

A trial is available so I would suggest testing it out for yourself. I personally can't see myself subscribing for that price with so many great simulators available to own forever so haven't tested this one.

If you are looking for the very best this may be a good option. Interestingly they also have a TinyWhoop quad and specific map which is a cool thing to see.

- ⊕ Features real tracks from real events
- ⊕ Supposedly excellent physics
- ⊕ Very race specific
- ⊕ Ability to fly TinyWhoops

- ⊖ Subscription based model

GTA V

* Untested

This has to be one of the most exciting options about for people who have a high spec PC. Someone has actually created a mod for GTA V that allows you to fly an FPV drone! This gives you the entire GTA world to fly through and wins the graphics category hands down. I believe the physics is acceptable but not the best but if you

have GTA you've got to give this one a try!



CONCLUSION

Hopefully by now we have established that sims are an excellent tool that should be used and **even the most expensive sims will improve your flying** far more than any quad parts you could spend comparable money on.

Many people are unwilling to spend money on software and neglect it for something physical. That being said some of you will still look towards cheaper options so here are my recommendations:

If you are just dipping your toes or don't want to spend any money you should go for the free options like Hot Props or some of the demos. They'll get the job done but there is far better available for a small price.

Anyone looking towards a budget sim should head for FPV Air 2

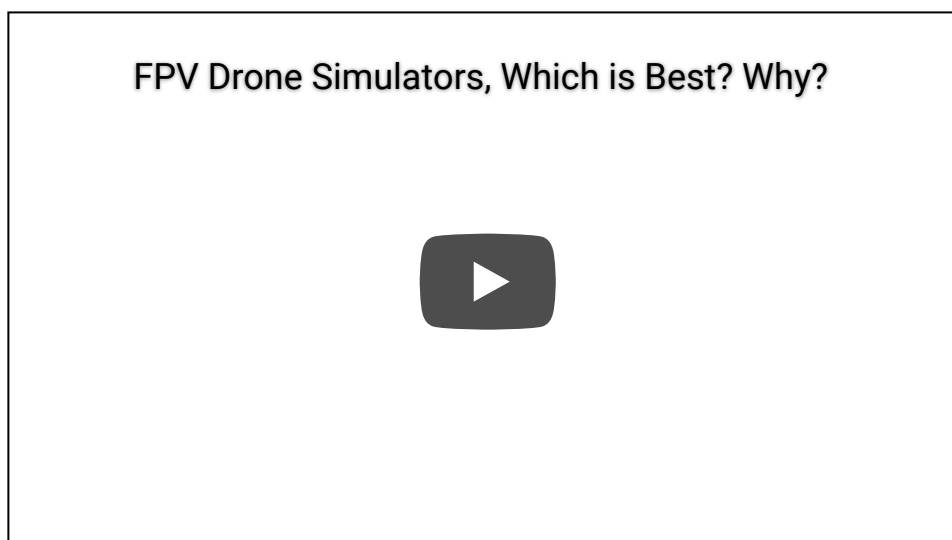
Anyone looking towards a budget sim should head for **FPV 7** or **2**.

From what I've heard it is excellent and a real bargain for the price. Sims like Freerider were previously great options at a similar price but have become a little dated.

For almost everybody looking for a serious sim I would recommend one of the big three: **Velocidrone; LiftOff or DRL**. These still cost next to nothing in this hobby at under £20 but are all feature rich and great to play.

If racing is your focus just go and buy Velocidrone, it can't be beat here in terms of performance, playability and price. Of course if you have the time try out the Rotor Rush demo and see if you'd like to

spend the extra cash on the more premium sim. I've said enough about it, if you need any further convincing check out what Mr Steele has to say on the subject:



If you are into freestyle all three would make a good option with

Liftoff being the one for people with high end PCs and DRL making a great choice for fans of the series. You can't go wrong with any of these so pick the one which appeals most to you.

In general with all of these sims the more time you put into them the better you will get. They are all slightly different means but to the same end. My final advice would be to go for the one that **looks the most fun for you** as that will be the sim that encourages you to put the most time in.

Just for reference here is the amount of time I've put into fpv drone sims throughout a three year period of flying. The hours represent my preferences and what I wanted to play. What's interesting is that IRL represents my flying in real life, the majority of my experience has been from a sim and has made a huge difference to how I fly.

As one final bit of inspiration I want you to see this video... [Session 5](#). It is from a pilot called **Robogenesis** and despite being over a year old it is still possibly the pinnacle of freestyle flying in my eyes. Funnily enough the same guy won the DRL sim tryouts that year, see the coincidence? Now go get practicing!



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