

Welcome to FPV!

Chaos Communication Congress : rc3 : 2021

NOW/HERE



Welcome to FPV

whoami

• Before We Get Started



My Name:

S. Fleming aka "nuxnik" /n'ʊksnik/

What I do professionally:

Freelance Software Developer and
Consultant



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Welcome to FPV

whoami

• Before We Get Started



Things I do for fun:

- Reverse Engineering Hardware
- Electronics Repair
- Woodworking (building furniture)
- Playing music
- Amateur Radio (KC5BJM / DO5JBM)



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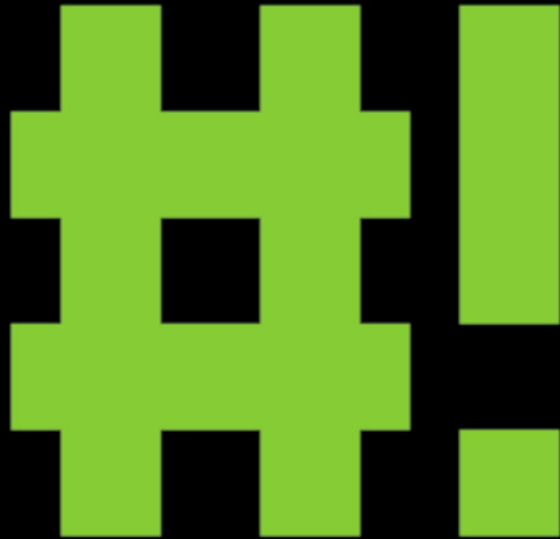
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• Before We Get Started

whoami



Online Presence:

- Blog.....<https://nuxnik.com>
- Mastodon.....@nuxnik@mastodon.social
- Peertube..<https://tube.nuxnik.com/a/nuxnik/video-channels>
- YouTube.....<https://youtube.com/nuxnik>
- Email.....nuxnik@nuxnik.com



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• Before We Get Started

Disclaimer!

- I am NOT an FPV Know it all! ¹
- Push in the right direction
- Subjective opinions



• Before We Get Started

Goals and Objectives



What we're gonna learn

- Hardware
- Software
- Configuration
- Equipment
- Flying
- ...Let's go!



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• What is FPV?

F.P.V. = First Person View



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<https://oscarliang.com/ctt/uploads/2014/05/helmet-fpv.jpg>

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• What is FPV?

What can I pilot in FPV?

- Not just quads¹
- Planes
- Cars
- Boats
- Submarines
- ...



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- **What is FPV?**

First Person View

FPV is a multifaceted collection of skills and disciplines.

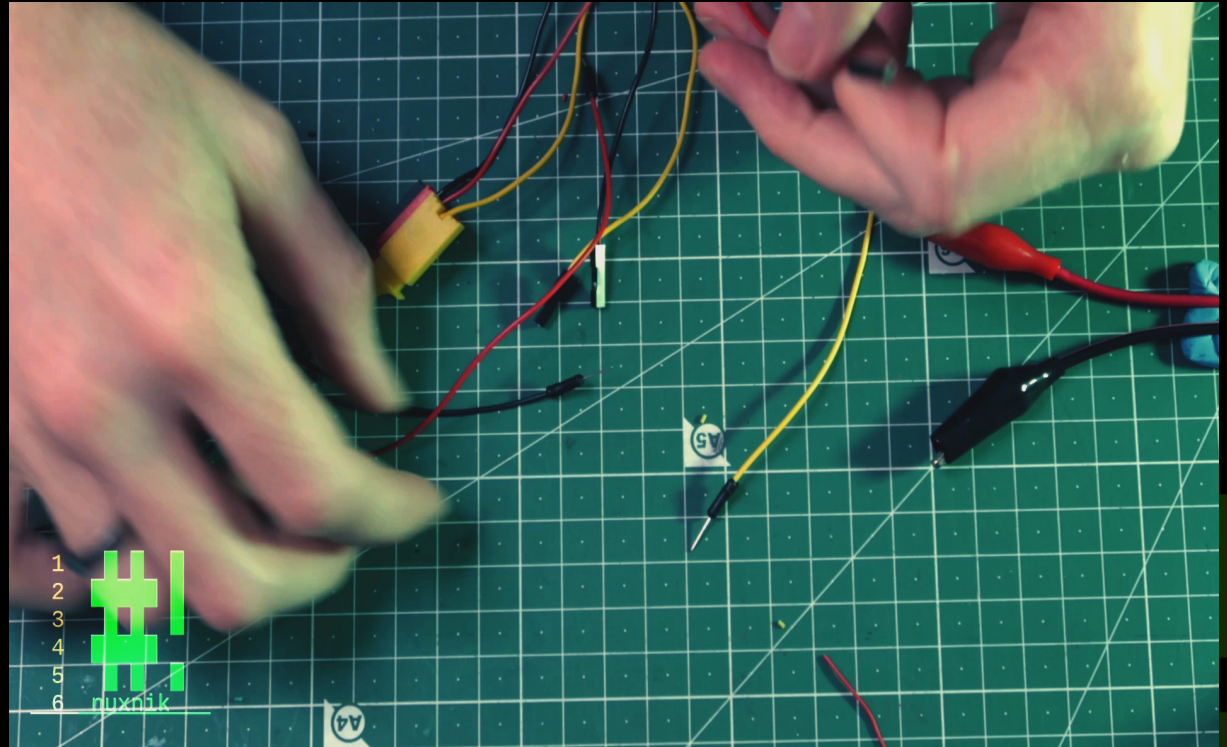


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• What is FPV?

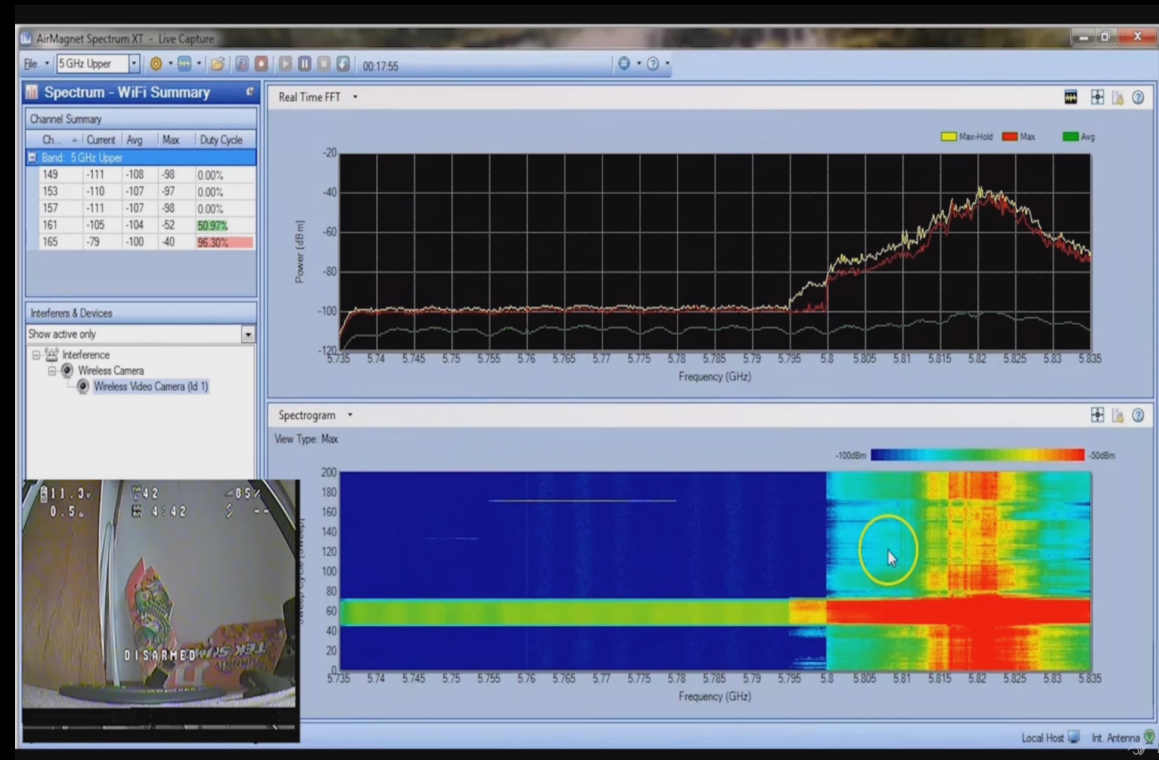
First Person View

- General Electronics



• What is FPV?

- General Electronics
- Wireless Technologies



• What is FPV?

- General Electronics
- Wireless Technologies
- Software

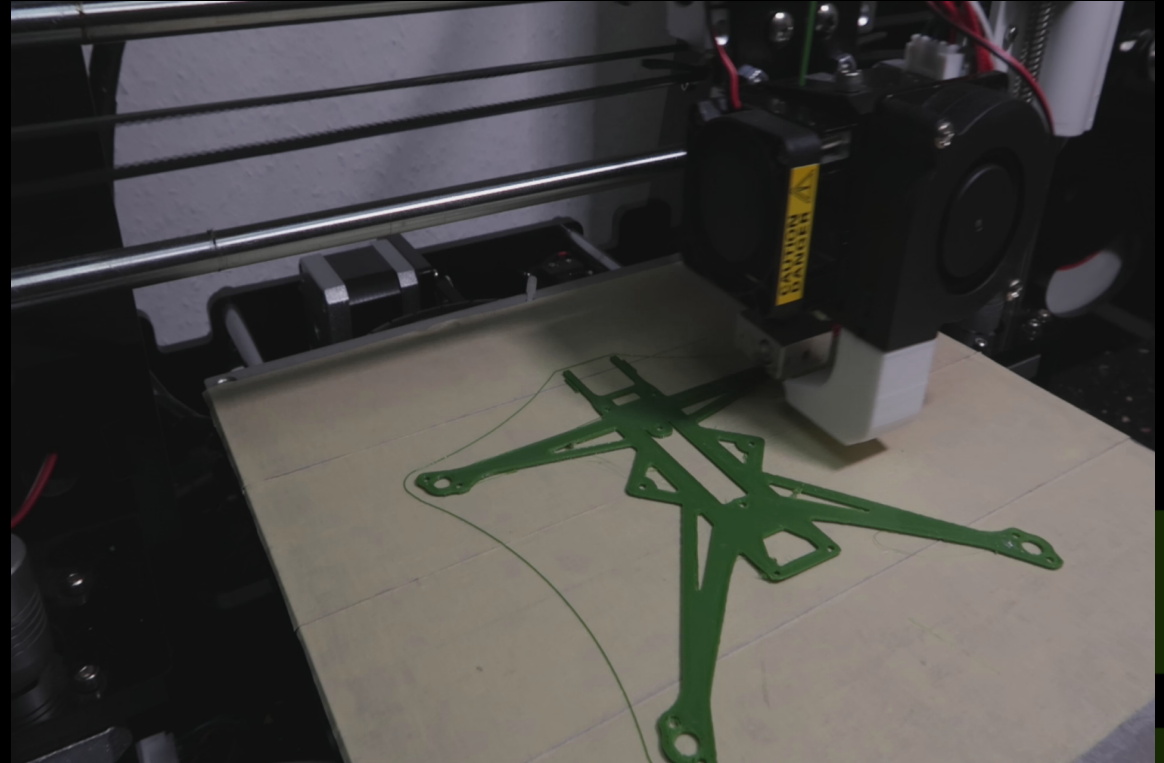


```
" Press / for help

.. (up a dir)
~/src/betaflight/betaflight/
├── docs/
├── downloads/
├── lib/
├── make/
├── obj/
├── src/
├── link/
├── main/
├── blackbox/
├── build/
├── cli/
├── cms/
├── common/
├── config/
├── drivers/
├── fc/
├── flight/
├── io/
├── msc/
├── msp/
├── osd/
├── pg/
├── rx/
├── scheduler/
├── sensors/
├── startup/
├── target/
├── telemetry/
├── vcp/
├── vcp_hal/
├── vcpfd/
├── ctype.h
├── main.c
├── platform.h
└──
```

• What is FPV?

- General Electronics
- Wireless Technologies
- Software
- 3D Printing

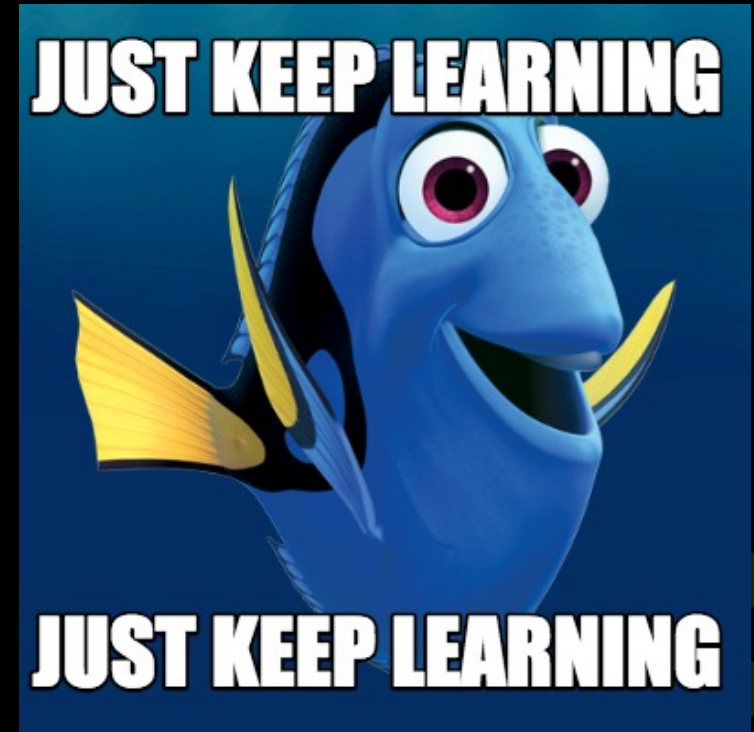


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• What is FPV?

What is required in FPV?

- Be willing to learn
- No PHD Required



• What is FPV?

What I get out of it:

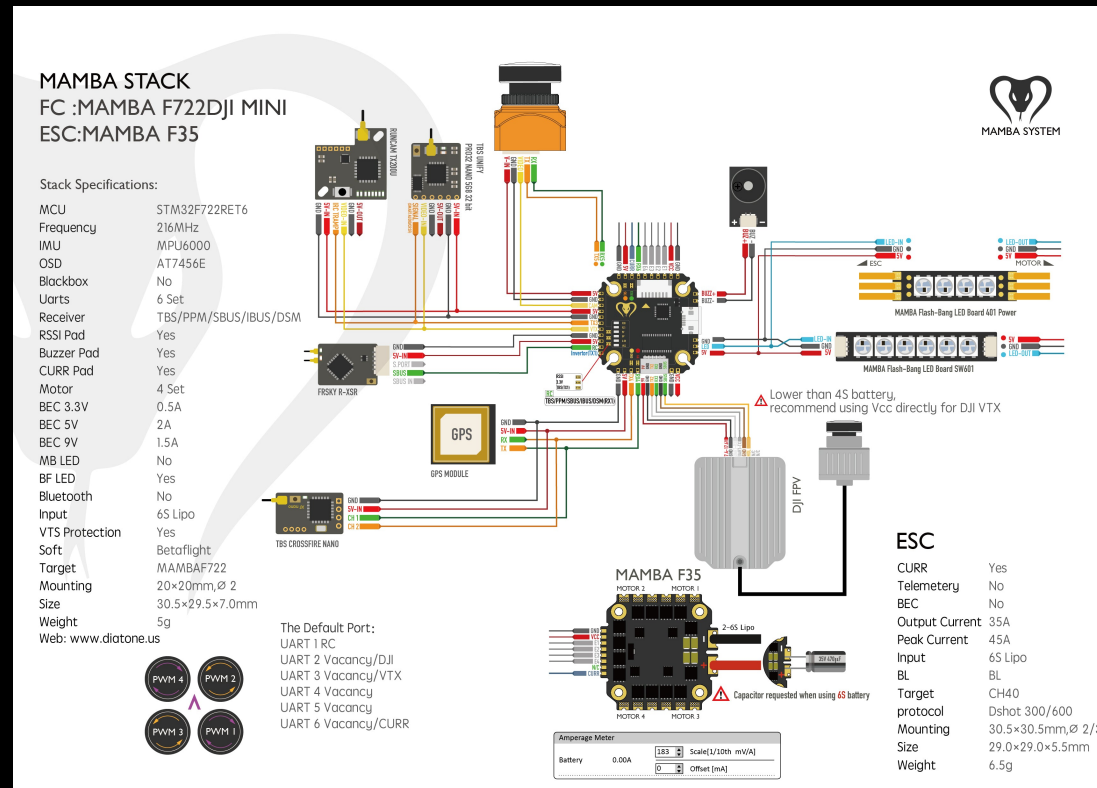
- Build...
- Crash...
- Fix/Upgrade...
- Crash...
- Fix/Upgrade...
- Build...



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Hardware

• What is an FPV drone?



- Flight Controller
- Motors
- ESCs
- RX (receiver)
- FPV Camera
- VTX (video transmitter)
- Antennas
- Frame
- Props



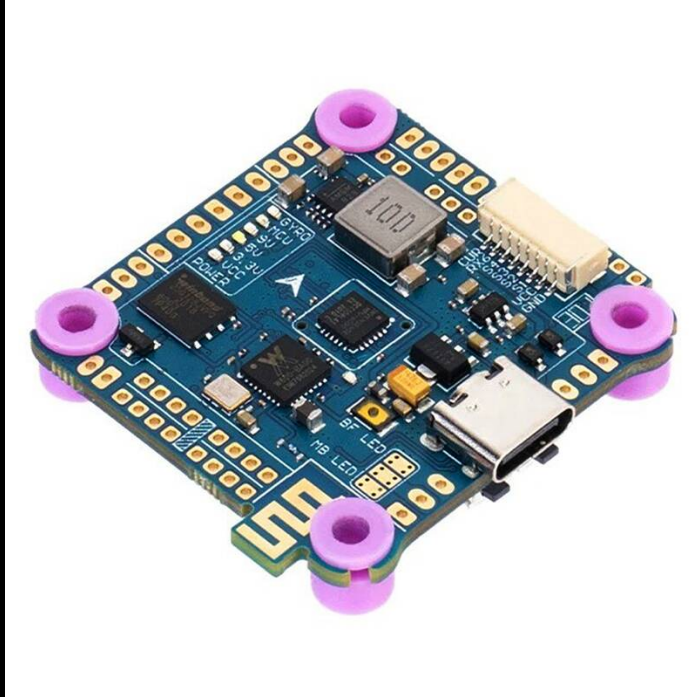
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• What is an FPV drone?



Flight Controller

- Brain
- Sensors



• What is an FPV drone?

ESC (Electronic Speed Controller)

- Input: PWM signal from FC
- Output: 3 phase A/C signal
- AIO – “All in one”



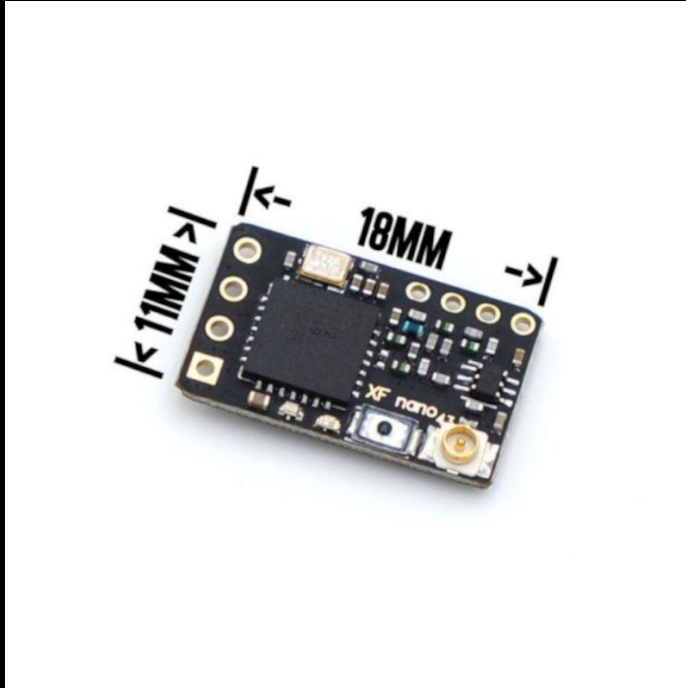
• What is an FPV drone?

Motors

-
- Brushless
- 3 phase A/C signal



• What is an FPV drone?



RX (receiver)

- Receives pilot controller signal
- Outputs signal to FC



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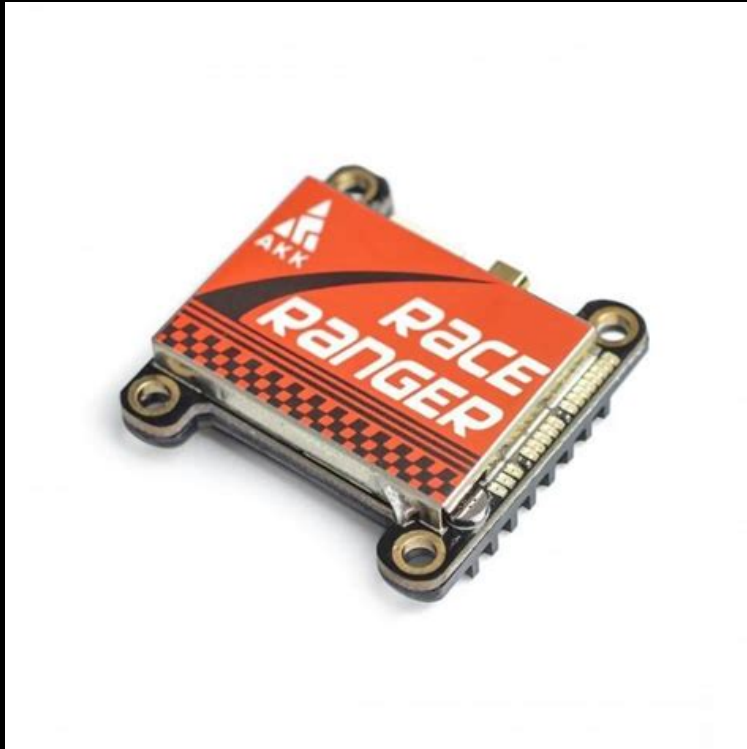
• What is an FPV drone?

FPV Camera

- Outputs video signal to FC



- What is an FPV drone?



VTX (video transmitter)

- Transmits video signal to pilot



• What is an FPV drone?

Antennas

- Transmit video signal to pilot
- Receive pilot controller signals



• What is an FPV drone?



Frame

- Binds the quad together
- Carbon fiber
- Hard Plastic



- What is an FPV drone?

Propellers



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- What is an FPV drone?



Overview



• What is an FPV drone?

Betaflight

- Open Source
- Betaflight FC software
- Betaflight configurator



- What is an FPV drone?

Betaflight FC Software

<https://github.com/betaflight/betaflight>



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- What is an FPV drone?

Betaflight Configurator

<https://github.com/betaflight/betaflight-configurator>

DEMO



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- What is an FPV drone?

OPEN
TX

OpenTX

- Open Source
- Firmware for transmitters



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Overview

OPEN
TX



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- What is an FPV drone?

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- Equipment

...



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• Equipment

Shopping Cart

- FPV simulator
- Transmitter (controller)



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• Equipment

Velocidrone

- Linux, Mac and Windows
- 20.00€
- <https://www.velocidrone.com>



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- Equipment

TX (Transmitters)



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• Equipment

FrSky QX7

- External modules
- Limited to FrSky protocols
- ca. 130.00€



• Equipment



Jumper T-Lite

- External modules
- Standard Protocols Built-In
- ca. 90€



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• Equipment

BetaFPV LiteRadio 3

- External modules
- ELRS or FrSky protocols
- ca. 60€



• Equipment

Shopping Cart

- Tiny Whoop
- FPV Goggles



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• Equipment

Tiny Whoops

- Mobula 6 HD
- Mobula 6
- Moblite 6



- **Equipment**

- **FPV Goggles**

- Analog
- Digital



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• Equipment

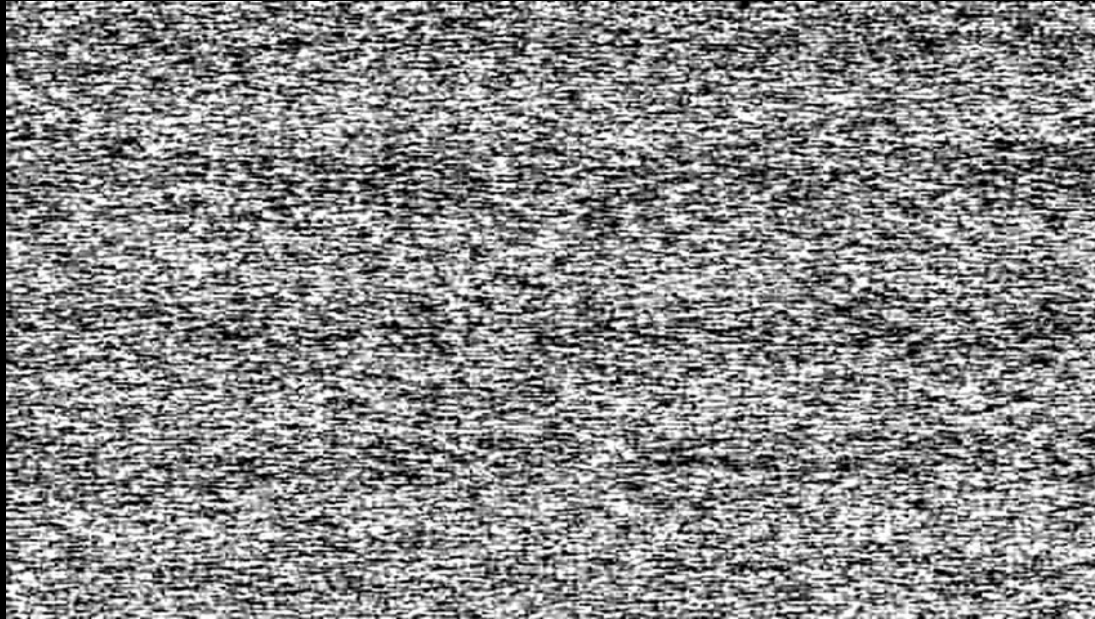


Analog FPV Advantages

- Equipment Compatibility
- Low Latency
- Low Cost
- Low Bandwidth



• Equipment



Analog FPV Disadvantages

- Video Clarity



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• Equipment



Digital FPV Advantages

- Video Clarity



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- Equipment



Digital FPV Disadvantages

- Higher Latency
- High cost
- Equipment Compatibility



- **Equipment**

What Kind of Goggles do I get?



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• Equipment

Shopping Cart

- Freestyle
- Long Range
- Cinewhoop
- Everything else



• Equipment



Freestyle Quads

- UZ80
- Tinyhawk Freestyle
- 3" Tyro79
- 3" Babytooth
- 5" Freestyle



Equipment

Long Range Quads

- Flywoo Explorer LR
- NanoLongRange



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<https://nuxnik.com/nanolongrange-build-guide/>

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• Equipment

Cinewhoop Quads

- BetaFPV 85x



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- **Equipment**

Everything Else

- Batteries & Chargers
 - Cameras
 - Tools



• Equipment



Batteries

- Lithium Polymer
 - S number
 - Chargers
 - Safety



• Equipment

Cameras

- Insta360 Go
- Go Pro Hero 6 (naked)
- Runcam Orange 5



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- Equipment

Tools!



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- **Equipment**

3D Printing



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- Demo Time



Test Flight



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Welcome to FPV

- **EOL**



Thank you!

<https://nuxnik.com/chaos-communication-congress-rc3-nowhere/>



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