Anywave

Anywave cameras are designed for vegetation surveys, where images will be used for 3D reconstruction and mapping. They are the highest resolution multispectral sensors on the market, so you can cover the most land with best precision.

Anywave measures specific wavelengths of light, inaccessible to the human eye. When used correctly, it allows the user to draw conclusions about the state of land and vegetation. Our sensors can capture data about leaf area, plant height, chlorophyll concentration, growth rate, senescence, water amount and photosynthetic light use efficiency.

Using inbuilt light sensors it automatically manages exposure, which means you will get consistent results in any sane lighting conditions. Anywave is controlled over Wi-fi. After setting the system, wireless connection is disengaged and system can go airborne. At the end of the flight images in standard GeoTiff format are available over SMB, commonly known as Windows File Share.

Customisable

Unlike other multispectral sensors Anywave is configurable, you can explore out knowledge base and select any of the 17 indices using our Tool. Alternatively you can contact us for an entirely custom configuration.

Sensor

Images:

- 16 bit Geotiff format, you can save all channels in a single file, or as individuale monochrome files.

- Channels are physically aligned to 0.2° accuracy, and digitally corrected to perfection
- Global shutter mean that there is no distortion no matter how fast you fly
- Gamma of one means that you will can perform calculations with bands with ease (insert link to something that explains gamma)

Lenses:

- Geometric Distortion
- IR corrected
- 104 degree view angle
- At 110 m height you are covering 200m with GSM of 10 cm
- At 50m height you are covering 100m with GSM of 5 cm
- Bright F 1/1.8 aperture ensures optimal image acquisition

In-built GPS:

- Resolution: 10cm
- Accuracy: 1.5 m
- Refresh rate: 10 Hz
- Combined GLONASS and GPS, 32 channels

Chipset: Telit SL869

Storage & Data:

- 256 GB of storage, enough to store > 30,000 images!
- Unlike SD cards it's protected against data corruption from sudden power failure
- Data retrieved over Wi-Fi

Power:

- 5.5mm / 2.5mm centre positive plug
- 12 v – 25v, can be powered directly from 4s and 6s batteries on your UAV

- 10 w nominal power consumption

Body:

- Dimensions:
- Material:
- Temperature range:
- Humidity range:

Spectral command

Our application allows you to set setting from your Windows laptop or tablet with ease.

Easily align images

Multi-camera arrays like Anywave produce a separate image for each channel. These images need to be aligned, this process is known as registering. This need comes from tiny tolerances in the manufacturing process, which make each camera point in a slightly different direction.

For example if the circuit board with the CCD is held by two supports, and the difference in their height is just 0.1mm, it results in 0.2° misalignment. It may not sound like much, but with a 60° lens and 1920p wide image, the image will be out of alignment by 6 pixels! If we leave it uncorrected, the images will look like anaglyph 3D.

Exposure correction

When imaging in infrared and red with equal exposure, we obtain a very bright NIR image and a dim red channels which contains very little information. This happens because plants appear so much brighter in infrared light than they do in visible. This reduces the amount of information you can extract from an image, and quality of indices such as NDVI

Anywave implements exposure correction that lets you set individual exposures for each channel. Read how it works, or used manual to find out how to use it

Control with a phone (coming soon)

FAQ

Will Wi-Fi interfere with other transmitters on my drone?

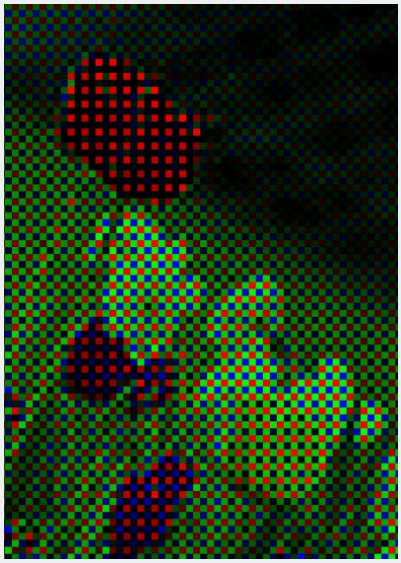
It will not. Wi-Fi is only used to configure the sensor before the flight, and to retrieve images after. During the flight Wi-Fi is disengaged, and does not occupy the spectrum.

Will we have atmospheric correction?

Eventually. We plan to make a module for Anywave, it would be similar to the light sensors it uses currently, but instead of measuring overall light levels it would consist of many tiny light sensors, each measuring the exact same channels Anywave is imaging. When released, it will be compatible with current version of Anywave, after a software update.

Why does it have less Megapixels than a mobile phone?

That's because the marketing department of camera companies counts like this:



$$Mpixels = Red\ pixels + Green\ Pixels + Blue\ pixels$$

We count like this:

$$Mpixels = \frac{IR\ pixels + Red\ pixels + Green\ Pixels + \cdots}{Number\ of\ channels}$$

A 16 megapixel camera only has 8 million green pixels, 4 million blue pixels, and 4 million red pixels. For every spot on the image, the camera only knows one out of three colours. The raw (hence the format, RAW) image looks like this. To get 16 MP images, cameras do something called interpolation: for every pixel, the missing colours are estimated using information from the nearby pixels. This is fine for producing photographs, but it will not produce a scientific measurement. Without this process, your 16MP camera would be producing 4 MP photographs.

Anywave has a separate sensor dedicated to each channel. In the resulting images each pixel has a real measurement for every colour/channel. If we counted the Megapixels the way ‘normal’ cameras do, a 6 channel Anywave would have resolution of 17 Megapixels.

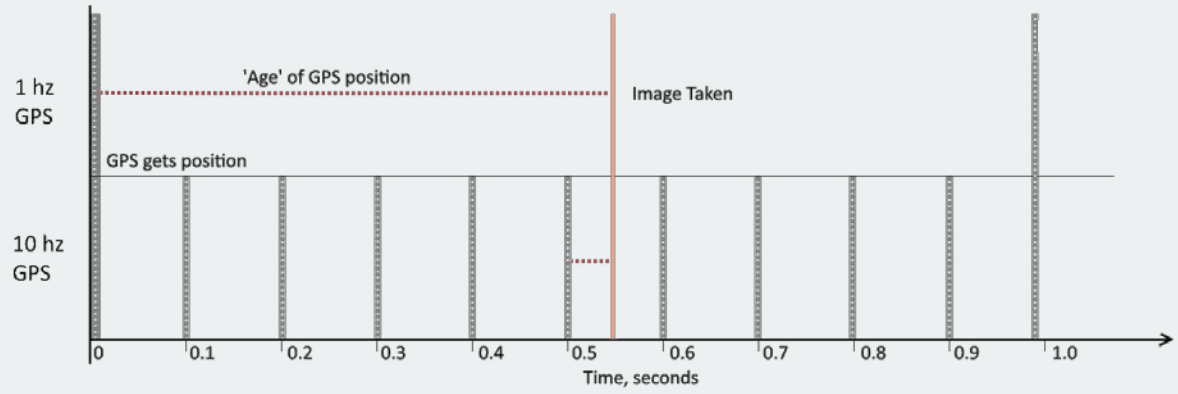
{Read Mode}

What is the real accuracy of your GPS?

When stationary, and with good signal you have 50% chance (CEP50) of getting a position within 1.5 meters your actual location, and 95% chance of getting a position within 3.1 meters.

The receiver works with both GNSS and GPS satellites with 32 channels, and we supply a good antenna to maximise your chances of getting good signal.

Of course drones are not stationary. Vast majority of GPS receivers update their position once a second. If you drone is flying at a moderate 40 km/h, it will travel 11 meters in one second. When you use such GPS to geotag an image, it could be off by many meters!



That’s why Anywave uses the highest-speed GPS receiver we could get our hands on. It updates position 10 times per second and minimises these errors.

At the end of the day what we need is not a single image, but a 3D model or an orthomosaic that is accurately geo-referenced. In producing them 3D reconstruction software matches hundreds of images pixel by pixel, and combines all geotags to obtain more accurate location and orientation. Random errors cancel each-other out, while systematic ones such as using out of date GPS position, do not.

Will GPS on Anywave interfere with GPS already installed on my drone?

No, GPS receivers are passive, meaning they only ‘listen’ and do not ‘talk’ back to the satellites. You can have any number of GPS active at the same time.

What are the limitations of the GPS?

You shouldn’t have issues unless you are mounting Anywave on a rocket. Standard COCOM limits apply, GPS will keep working unless you exceed one of the following:

- Velocity greater than 515 m/s AND altitude above 18,000 m
- Altitude: 100,000 m (max) or -1500 m (min)
- Speed: 600 m/s
- Acceleration: 2 G

Why don’t you have RTK?

RTK GPS would add a lot to the cost to Anywave, and in most cases it is unneeded and impractical.

Besides, RTK needs its own radio link and there are already many transmitters on a drone. Radio control, FPV video and telemetry all compete for spectrum. Many find the signal to be unreliable and just another thing that can go wrong. We prioritise reliable over fancy.

If your project absolutely requires centimetre precision, we recommend that you use ground control points and a total station.