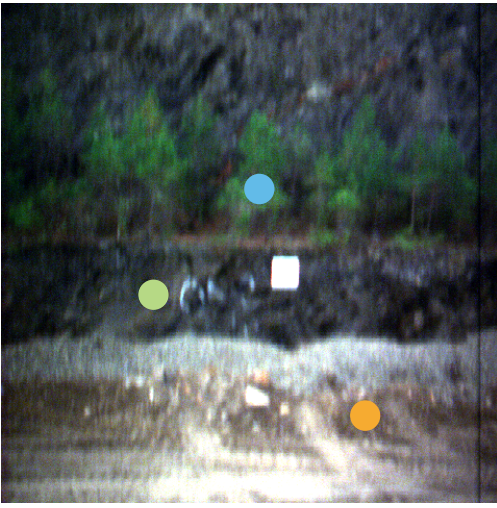# BLACKBULLET
VNIR Sensor

HAIP Solutions BlackBullet VNIR Sensor is the base model for a whole range of applications. With a weight of less than 300g, it is designed for easy implementation onboard various platforms such as UAVs, field and lab measurements on tripods or mounted on scanning rail systems.
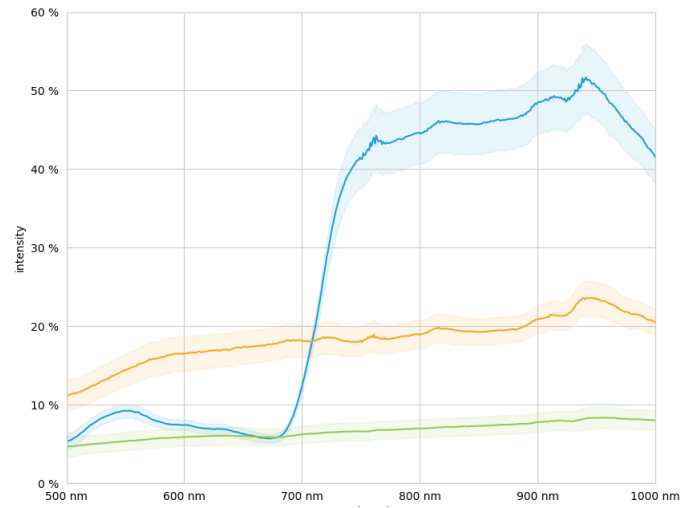
BlackBullet can take images of RGB and HSI simultaneously through the same light channel with the same spatial dimension. The hyperspectral sensor provides a native image resolution of 540x540 pixels with 250 spectral channels, continously covering the wavelength range from 500 nm to 1000 nm.

Features

- Smart Hyperspectral Line-Scanner

- No external movement needed

- VNIR (500-1000 nm)

- High Signal-to-noise ratio in NIR range

- 250 spectral bands

- Super lightweight design (<300 g)

- RGB + HSI simultaneously

- Internal CPU for pre-processing

BlackBullet True Color, native resolution, mounted on UAV. The corresponding spectra inside the circles are given on the right.

High spectral quality with low noise. The diagram above shows the standard deviation of all averaged pixels inside each drawn circle.

Spectral Properties	
Wavelength range	500-1000 nm
Number of bands	250
Spectral resolution	5 nm
Spectral sampling	2 nm
Spatial Properties	
Resolution RGB	1080 * 1080 px
Resolution Spectral	540 * 540 px
Optical Properties	
Field of View (FOW)	28°
Sensor Properties	
Detector	CMOS
Sensor size	2 Megapixel
Radiometric resolution	10 bit
Integration time (cube)	< 4 seconds
Data size (raw)	600 MB/ Data cube
Camera Properties	
Connection	GigE
Operation temperature	-10 - +50°C
Protection class	IP 40
Power consumption	5V DC / 15 W
Size	60 * 60 * 82 mm
Weight	280 g

World's lightest HSI camera

BlackBullet is based on a hyperspectral line-scanner, but there is no need to move the sensor during image acquisition to get a full hyperspectral data cube. With this feature your use case can benefit from a compact and lightweight measuring setup.

The BlackBullet camera was especially designed for UAV implementation with its lightweight design, but of course there is a multitude of other applications. Camera control works via Gigabit Ethernet, which opens up to a wide range of mounting options.

The desired spectral ranges can be individually selected. Additional pre-processing on camera is possible, as the camera has a build in computing unit. A special rugged housing is also available with higher IP ratings to ensure robustness depending on your needs. If you need external lighting, BlackBullet is optimised for combined use with seperate broadband LED lighting unit BlackBright.