Spectrum Link Everything

V.20221009

WeCha official account

彩谱® FIGSPEC®

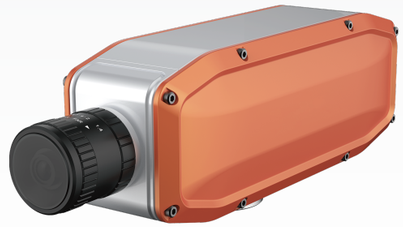
Leading Hyperspectral Camera Manufacturer

Hyperspectral Camera FS1X Series

Imaging Hyperspectral Camera FS2X Series

Microscopic Hyperspectral Imaging System

UAV hyperspectral measurement system



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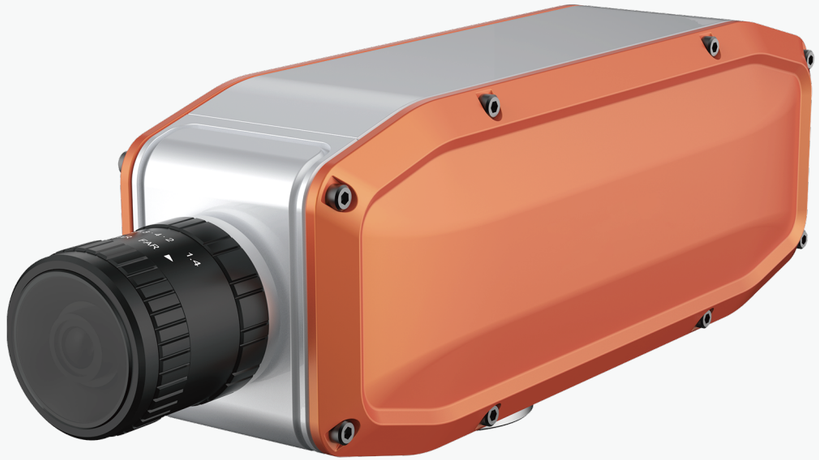
Hyperspectral Camera FS1X Series (Line Scan)



Visible spectrum/NIR：

● Spectral range: 400-1000nm, wavelength resolution better than 2.5nm, up to 1200 spectral channels.

● Acquisition speed: up to 128FPS across the whole spectrum, up to 3300Hz after band selection (support multi-region band selection)

● Widely used in printing, textile and other industrial products surface color, texture detection. The repeatability of color measurement single pixel is up to dE* AB <0.1

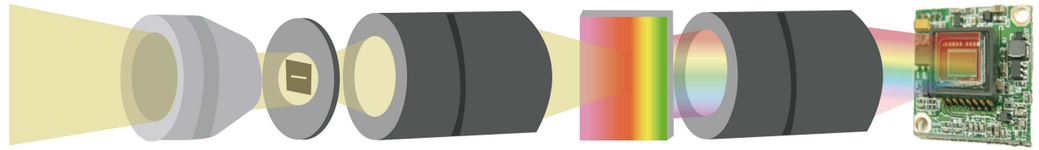
SW-NIR：

● Spectral range: 900-1700nm, wavelength resolution better than 8nm, up to 254 spectral channels

● Acquisition speed: up to 200FPS across the whole spectrum

● Widely used in composition identification, material identification, machine vision, agricultural product quality and other fields

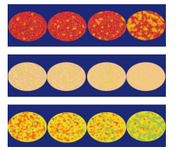
Measurement principle



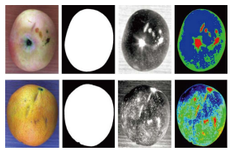
Typical application

Print inspection

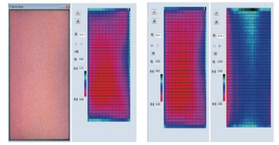
Textile inspection



Drug composition analysis



Fruit and vegetable sorting



Screen detection

Technical parameter

Model	FS-10	FS-12	FS-13	FS-15
Spectroscopic method	Grating	Grating	Grating	Grating
Spectral region	400-700nm	400-1000nm	400-1000nm	900-1700nm
Spectral band	600	1200	1200	254
Spectral resolution	2.5nm	2.5nm	2.5nm	8nm
Slit width	25um	25um	25um	25um
Transmission efficiency	> 50%	> 60%	> 60%	> 60%
Stray light	< 0.5%	< 0.5%	< 0.5%	< 0.5%
Spatial pixel number	1920	1920	1920	320
Pixel size	5.86um	5.86um	5.86um	30um
Imaging speed	Full band 41Hz 390Hz can be achieved after ROI	Full band 41Hz 390Hz can be achieved after ROI	Full band 128Hz 3300Hz can be achieved after ROI	200Hz
Detector	CMOS	CMOS	CMOS	InGaAs
SNR(Peak)	500/1	600/1	600/1	600/1
Camera output	USB3.0	USB3.0	USB3.0	Gigabit network
Camera interface	C-Mount	C-Mount	C-Mount	C-Mount
Accessories	USB3.0 transmission line	USB3.0 transmission line	USB3.0 transmission line	USB3.0 transmission line
ROI	Single area	Single area	Multiple area	Single area

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FIGSPEC FS2X Series
Imaging Hyperspectral Cameras

FigSpec® series of imaging hyperspectral cameras adopt transmission grating splitter module with high diffraction efficiency and high sensitivity surface array camera, combined with built-in scanning imaging and auxiliary camera technology, which solves the difficult problems of traditional hyperspectral cameras, such as external push scan imaging mechanism and complex focus. It can be directly integrated with standard C interface imaging lens or microscope to achieve rapid spectral image acquisition.

Visible spectrum/NIR:

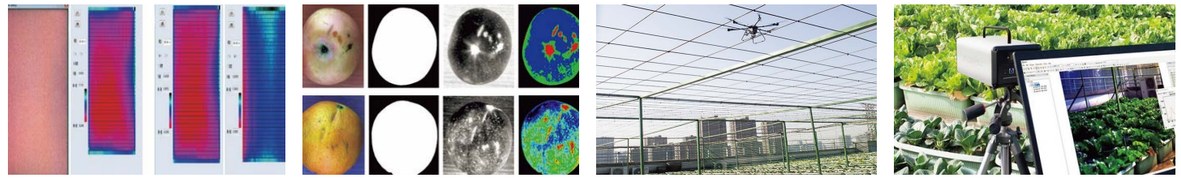
- Spectral range: 400-1000nm, wavelength resolution better than 2.5nm, up to 1200 spectral channels.
- Image resolution up to 1920*1920

SW-NIR:

- Spectral range: 900-1700nm, wavelength resolution better than 8nm, up to 254 spectral channels
- Image resolution up to 320*320

Application fields

Spectral analysis, material sorting, fruit and vegetable analysis, agricultural remote sensing, industrial detection, UAV-borne hyperspectral imaging analysis, portable hyperspectral imaging analysis



Technical parameter

Model	FS-20	FS-22	FS-23	FS-25
Spectroscopic method	Grating	Grating	Grating	Grating
Image resolution	1920*1920	1920*1920	1920*1920	320*320
Dynamic range	12 bits	12 bits	12 bits	14 bits
Imaging speed	≤15 seconds	≤15 seconds	≤5 seconds	≤5 seconds
Spectral channels number	600	1200	1200	254
Spectral region	400-700nm	400-1000nm	400-1000nm	900-1700nm
Spectral resolution	2.5nm	2.5nm	2.5nm	8nm
Slit width	25um	25um	25um	25um
Transmission efficiency	60%	60%	60%	60%
Stray light level	0.5%	0.5%	0.5%	0.5%
Pixel size	5.86um*5.86um	5.86um*5.86um	5.86um*5.86um	30um*30um
Detector type	CMOS	CMOS	CMOS	InGaAs
Sensor imaging surface size	11.3*7.1mm	11.3*7.1mm	11.3*7.1mm	9.6mm x 7.68mm
Standard lens focal length	25mm	25mm	25mm	25mm
Minimum working distance	100mm	100mm	100mm	100mm
Field angle	25°	25°	25°	17°
Minimum exposure time	34us	34us	21us	1us
Maximum exposure time	10 seconds	10 seconds	10 seconds	1 seconds
SNR	600/1	600/1	600/1	600/1
Data interface	USB3.0	USB3.0	USB3.0	Gigabit network
Camera lens interface	C	C	C	C
Accessories	USB3.0 transmission line	USB3.0 transmission line	USB3.0 transmission line	Gigabit network transmission line
Imaging features	With ROI function Single area ROI can be achieved	With ROI function Single area ROI can be achieved	With ROI function Multi area ROI can be achieved	With ROI function Single area ROI can be achieved
Auxiliary imaging features	Auxiliary framing camera to monitor the shooting area	Auxiliary framing camera to monitor the shooting area	Auxiliary framing camera to monitor the shooting area	Auxiliary framing camera to monitor the shooting area
Power supply mode	Built-in battery	Built-in battery	Built-in battery	Built-in battery
Host engine size *	255mm*138mm*107mm	255mm*138mm*107mm	255mm*138mm*107mm	335mm*182mm*143mm
Weight**	Less than 2.8KG	Less than 2.8KG	Less than 2.8KG	Less than 5.3KG

* size without lens and handle ** weight without lens

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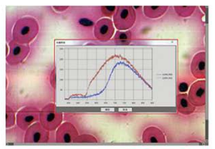
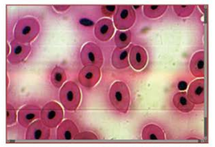
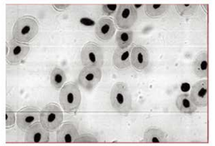
Microscopic hyperspectral imaging system



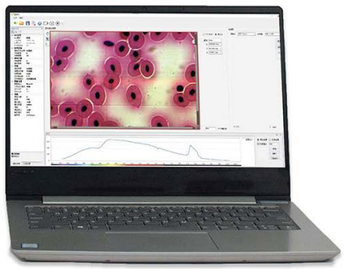
Any point spectrum



400-1000NM
Hyperspectral imaging



single spectrum imaging



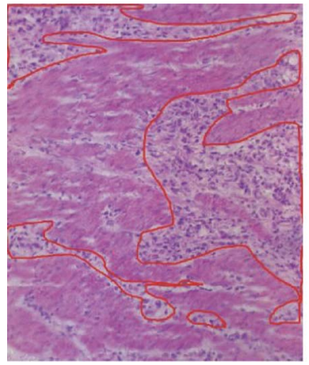
- Combining the advantages of microscope and imaging spectrometer, hyperspectral data acquisition of microscopic images can be performed at any time.
- It can transform existing biological microscopes, fluorescence microscopes, stereo microscopes, metallographic microscopes, etc., and easily transform ordinary microscopes into hyperspectral microscopes.
- Customers can customize microscope models according to their needs.
- The FigSpec® series of imaging spectrometers integrate a visual camera and a hyperspectral camera internally. The visual camera can be used to quickly preview the sampled images, and the hyperspectral image data collection can be performed after confirming that the images meet the requirements.

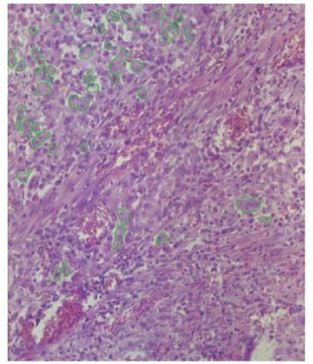
System composition

Hyperspectral imaging spectroscopic camera (optional FS-20/FS-22/FS-23)*1，Lens*1，
Microscope (any manufacturer's model can be specified)*1，PC application software*1

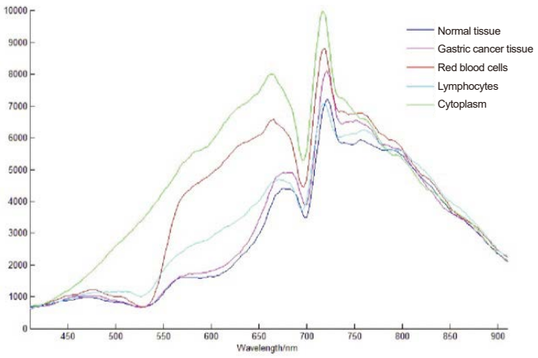
Applications

Example 1: Hyperspectral detection of gastric cancer tissue





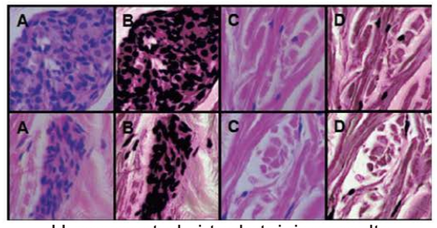
△Gastric cancer tissue markers and gastric cancer cell markers



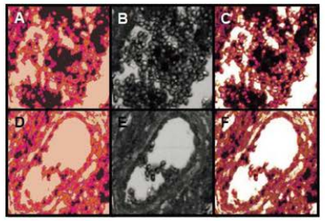
△Comparison of spectral derivatives between gastric cancer tissue and normal tissue

Example 2: Virtual staining of pathological sections based on hyperspectral technology

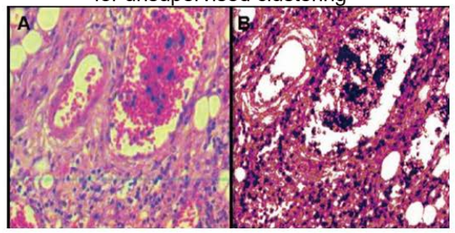
Hyperspectral pseudocolor images of unstained sections



Hyperspectral virtual staining results for unsupervised clustering



Hyperspectral virtual staining results of unsupervised clustering combined but spectral images



Comparison of hyperspectral virtual staining results and H-E staining

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FS60- UAV hyperspectral measurement system

- Dji M300RTK (DJI M600Pro optional) is used as the flight bearing platform.
- Ultra-high speed spectral scanning imaging device with high signal-to-noise ratio provides high stability of spectral image acquisition.
- A self-developed high efficiency and low power image processing algorithm is adopted to greatly prolong the flight time of the whole machine and reduce the power consumption of the system.
- Through real-time measurement of spectral image information of plants, water, soil and other ground objects, it can be applied to precision agriculture, crop growth and yield assessment, forest disease and insect pest monitoring and fire monitoring, coastline and marine environmental monitoring, lake and watershed environmental monitoring and other applications.
- The system design is compact and the main spectral resolution of the imaging spectrometer is up to 2.5nm. Components: high stability head, hyperspectral imager, embedded data acquisition and processing storage unit, wireless image transmission system, GPS-RTK navigation system, ground receiving workstation, ground control system, reflectance calibration board.

Applications

Precision agriculture, crop growth and yield assessment

Forest pest monitoring and fire prevention monitoring

Shoreline and Marine environment monitoring

Lake and watershed environmental monitoring

Technical parameters

Flight unit parameters (M300RTK)

Size	Dimensions (expanded, excluding blades) : 810 x 670 x 430 mm (L x W x H) Dimensions (folded, including blades) : 430 x 420 x 430 mm (L x W x H)
Symmetrical motor wheelbase	895 mm
Weight (including lower single head bracket)	Air weight (without battery) : 3.6kg Air weight (including dual batteries) : 6.3kg
Maximum load of single gimbal damping ball	930g
Maximum takeoff weight	9 kg
Working frequency	2.4000-2.4835 GHz 5.725-5.850 GHz
Transmit power (EIRP)	2.4000-2.4835 GHz: 29.5 dBm（FCC）；18.5dBm（CE）18.5 dBm（SRRC）；18.5dBm（MIC） 5.725-5.850 GHz：28.5 dBm（FCC）；12.5dBm（CE）28.5 dBm（SRRC）
Hover accuracy (P-GPS)	Vertical: ± 0.1m (when visual positioning works normally) ± 0.5m (when GPS works normally) ± 0.1m (when RTK positioning works normally) Level: ± 0.3m (when visual positioning works normally) ± 1.5m (when GPS works normally) ± 0.1m (when RTK positioning works normally)
RTK position accuracy	RTK FIX: 1 cm+1 ppm (horizontal) 1.5 cm+1 ppm (vertical)
Maximum angular velocity of rotation	Pitch axis: 300°/s Heading axis: 100°/s
Maximum pitch angle	30° (P mode with forward-vision system enabled: 25°)
Maximum rate of rise	S mode: 6 m/s,P mode: 5 m/s
Maximum velocity of descent (vertical)	S mode: 5 m/s,P mode: 4 m/s
Maximum sloping descent rate	S mode: 7 m/s
Maximum horizontal flight speed	S mode: 23 m/s,P mode: 17 m/s
Maximum flight altitude	5000 m (2110 blade, takeoff weight ≤7 kg) / 7000 m (2195 plateau quiet blade, takeoff weight ≤7 kg)
Maximum wind speed tolerance	15m/s (12m/s during takeoff and landing)
Maximum flight time	55 min
Supports the gimbal installation mode	Single holder set at the bottom, single holder set at the top, double holder set at the bottom, single holder set at the bottom + single holder set at the top, double holder set at the bottom + single holder set at the top
IP protection level	IP45
GNSS	GPS+GLONASS+BeiDou+Galileo
Operating ambient temperature	-20°C to 50°C

Hyperspectral camera parameters

Lighting system	Passive lighting (without light source)
Spectroscopic methods	Grating
Spectral range	400-1000nm
Spectral band	1200
Resolution of spectrum	2.5nm
Slit width	25um
Transmission efficiency	＞60%
Stray light	＜0.5%
Number of spatial pixels	Maximum 1920 (software configurable)
Pixel size	5.86um
Imaging speed	Full band 128Hz, 3300Hz can be achieved after ROI
Detector	CMOS
SNR(Peak)	600/1
The camera output	USB3.0 or Gigabit network
The camera interface	C-Mount
Accessories	USB3.0 transmission line or Gigabit network transmission line
ROI	Multiple regions
Embedded data acquisition andprocessing storage unit	I7 processor 512GSSD storage

- Easy to operate, it can achieve single operation without professional drone operator.
- The ground station can be used to observe the sampling location of the aircraft in real time, and the ground station can be used to set the preview and correction functions of the route data collected point-by-point: radiosity correction, reflectance correction and regional correction support batch processing.
- Real-time common vegetation index calculation function.
- Support custom real-time analysis model input function.
- ENVI is perfectly compatible with multiple data formats.