OPTOSKY
www.optosky.com

Datasheet

Lab Hyperspectral Imaging System	ATH8500

Feature:

- Spectral Range: 400-5300 (Customized)
- Max. Spatial Channels: 2048x2048 (Different by model)
- Max. Spectral Channels: 1088 (Different by model)
- Superior imaging performance
- Compatible with ENVI;
- Dimension: 162 x 80 x 60 cm;
- Weight: 60kg (Different by model)
- Built-in smart calibration white version;
- A variety of stray light elimination design, high imaging quality;
- High-definition VIS camera, capable of image fusion;
- High responsibility.

Application:

- Artworks and ancient paintings;
- Criminal investigation and document inspection operations;
- Pharmaceutical companies: anti-counterfeiting of Chinese medicinal materials;
- Textile: copy of patterns, copy of pictures;
- Mineral screening;
- Forensic appraisal: document examination appraisal;
- Agriculture: Scanning of leaves and tobacco;
- Scanning and restoration of cultural relics, mural restoration

Description:

The equipment combines technologies of hyperspectral imaging and HD camera, and it can acquire data possessing high spectral resolution and high spatial resolution, as a result of exploring spectral and spatial feature of materials. It can apply to sort out materials of tabaco, pharmaceutical drugs, foods, minerals, criminal document inspection, and true or fake identification etc.

The system consists of many components of hyperspectral camera ATH1500, high accuracy scanning platform, HD camera, and high stability light source, precision camera obscura etc.

The core components are self-developed by Optosky, and they use 1-inch CCD image sensor, with high sensitivity, high spectral resolution, large FOV, and superior imaging performance.

The system can acquire hyperspectral data through precision scanning workbench, and coordinate with self-developed linear light source and dark enviroment can obtain stable standardize hyperspectral data.

It employs 24-mega pixels HD camera, and combine technologies of hyperspectral imaging and HD camera taking, in order to realize perfect spatial resolution and hyperspectral resolution.

1. Selection

ATH8500 Series	Feature	Application
ATH8500	400-1000nm VIS-NIR hyperspectral imaging camera	Precision agriculture, agricultural and forestry diseases and pests, vegetation analysis, planting area evaluation, crop yield evaluation, water quality analysis, artwork scanning, cultural relic identification, pattern scanning, industrial sorting, oil pollution detection, etc.
ATH8500-17	1.0-1.7 um SWIR hyperspectral imaging camera	Semiconductor, industrial sorting, food sorting, construction waste sorting, meat sorting, plastic sorting, geological prospecting, mineral exploration, cultural relic identification, judicial identification, document inspection.
ATH8500-25	1.2-2,5 um SWIR hyperspectral imaging camera	Precision agriculture and food analysis, dark plastic sorting, geological prospecting, mineral exploration, national defense and military industry, cultural relic identification, judicial identification, document inspection, moisture content analysis, medicine and material sorting, mineral mapping, medical identification, waste recycling.
ATH8500-50	2.5-5.0 um MWIR hyperspectral imaging camera	Geological survey, national defense and military industry, camouflage investigation, mineral sorting.
ATH8500-12-50	1.2-5.0 um SWIR hyperspectral imaging camera	Geological survey, national defense and military industry, camouflage investigation, mineral sorting.
ATH8500-04-17	0.4-1.7 um VIS-NIR hyperspectral imaging camera	Precision agriculture, agricultural and forestry pests and diseases, artwork scanning, cultural relic identification, pattern scanning, industrial sorting, oil pollution detection, etc.
ATH8500-04-25	0.4-2.5 um VIS-NIR hyperspectral imaging camera	Precision agriculture, agricultural and forestry pests and diseases, artwork scanning, cultural relic identification, pattern scanning, industrial sorting, oil pollution detection, etc.

2. Principle

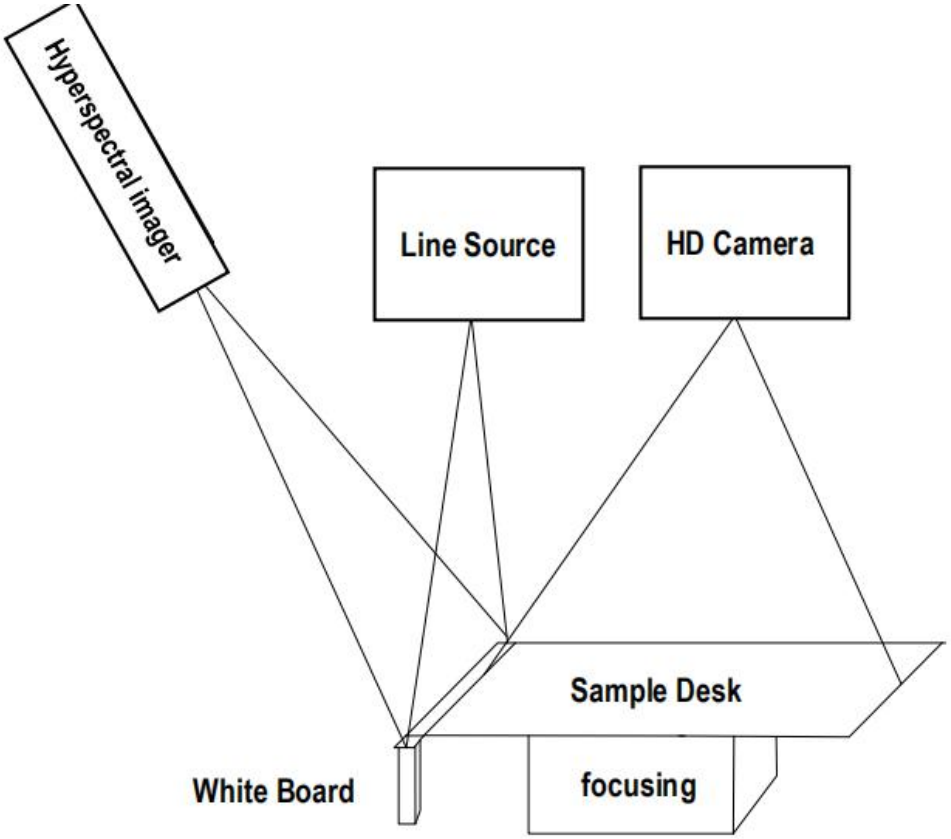


Figure 1 Lab hyperspectral imaging internal function diagram

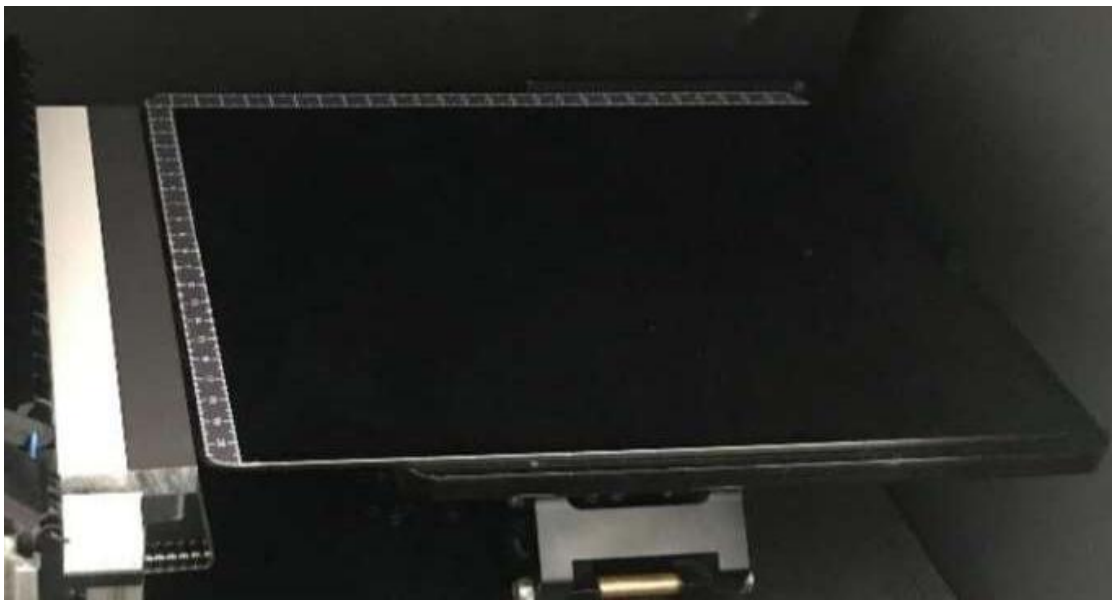
3. Specification

Items	Specification			
	ATH8500	ATH8500-17	ATH8500-25	ATH8500-50
Spectral Range	400-1000nm	1000-1700nm	1.2-2.5um	2.5-5.0um
Detector	CCD	InGaAs SWIR Detector	Deep Cooling IR Detector	Deep Cooling IR Detector
Max. Spatial Channels	2048	640	640	640
Max. Spectra Channels	1088	512	512	512
Data Quantification Class	12bits	14bits	14bits	14bits
Max Frame Rate	330fps	240fps	80fps	80fps
Scan range	0-280mm	0-280mm	0-280mm	0-280mm
Reflectance	50%	50%	50%	50%

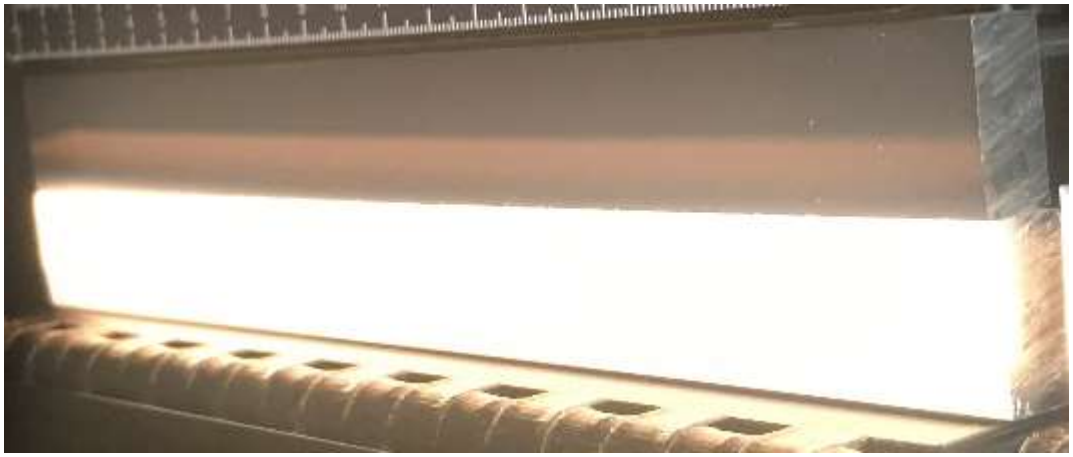
calibration board				
Interface	USB3.0	USB3.0	USB3.0	USB3.0
Power Supply Type	12V±10%, 60W			
Dimension	162cm x 80 cm x 60 cm			
Weight	<60kg			
Working Temp.	-20-50 ℃			
Storage Temp.	-30-70 ℃			

4. ATH8500 Physical Picture

Time and Space radiance intensity correction, greatly improve radiance calibration accuracy of time correction plus space correction.



Line source design matches field of view can improve light energy efficiency.

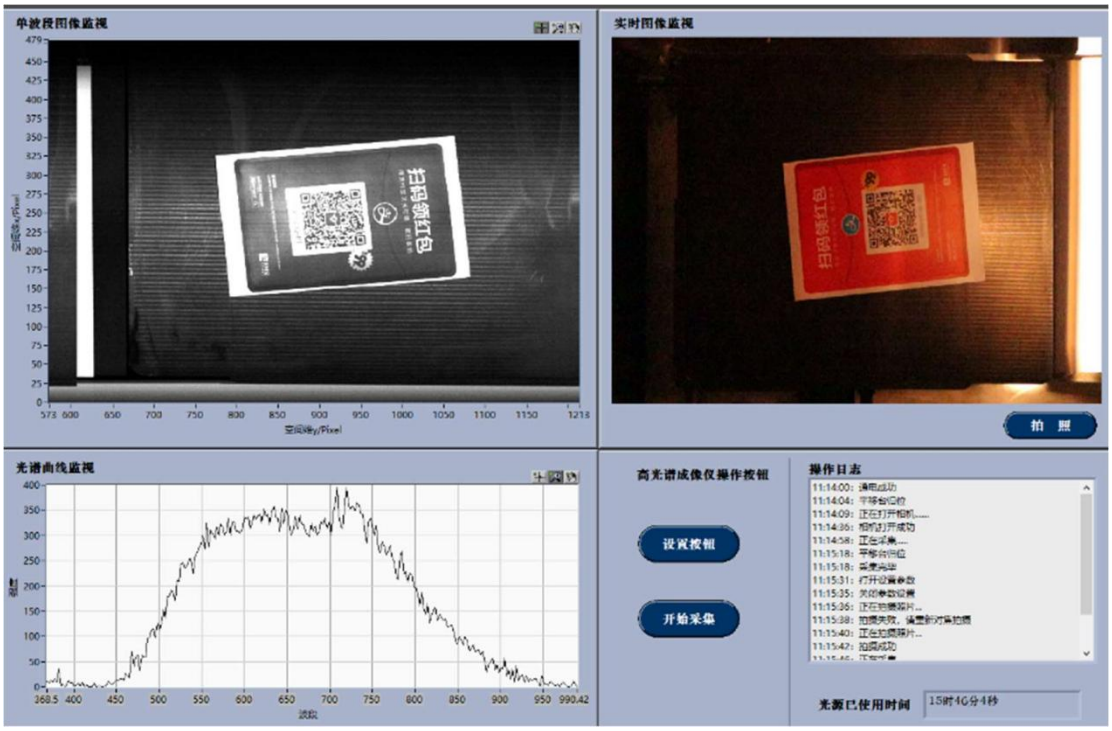


Auxiliary focusing, sample thickness adjusting to rise or descend in order to ensure clear image.

Auto-integration time, exposure time suit to sample reflectance

Auto scan, auto complete data acquisition

Integrated HD camera can improve spatial resolution, which makes easy matching among huge database.



5. Accessiories List

Standard Accessories:	
1	ATH8500 Hyperspectral Camera
2	USB wire
3	220V power cable
4	Standard board
5	25mm lens
6	PC data acquisition software
Optional Accessories:	
1	Time Reflectance Boards(Reflectance10%/20%/30%/40%/50% customized)
2	Spatial Reflectance Boards(Reflectance10%/20%/30%/40%/50% customized)
3	Lens (Focal Length16mm/25mm/35mm)
4	Controlled PC

6. Other Hyperspectral Imaging Products:

ATH1500 Series	Feature	Application
ATH1500	400-1000nm	Precision agriculture, agricultural and forestry diseases and

	VIS-NIR hyperspectral imaging camera	pests, vegetation analysis, planting area evaluation, crop yield evaluation, water quality analysis, artwork scanning, cultural relic identification, pattern scanning, industrial sorting, oil pollution detection, etc.
ATH1500-17	1.0-1.7 um SWIR hyperspectral imaging camera	Semiconductor, industrial sorting, food sorting, construction waste sorting, meat sorting, plastic sorting, geological prospecting, mineral exploration, cultural relic identification, judicial identification, document inspection.
ATH1500-25	1.2-2,5 um SWIR hyperspectral imaging camera	Precision agriculture and food analysis, dark plastic sorting, geological prospecting, mineral exploration, national defense and military industry, cultural relic identification, judicial identification, document inspection, moisture content analysis, medicine and material sorting, mineral mapping, medical identification, waste recycling.
ATH1500-50	2.5-5.0 um MWIR hyperspectral imaging camera	Geological survey, national defense and military industry, gas analysis, VOCs inspection, water temperature detection, land cover type identification, camouflage investigation, mineral sorting.
ATH1500-12-50	1.2-5.0 um SWIR hyperspectral imaging camera	Geological survey, national defense and military industry, gas analysis, VOCs inspection, water temperature detection, land cover type identification, camouflage investigation, mineral sorting.
ATH1500-04-17	0.4-1.7 um VIS-NIR hyperspectral imaging camera	Precision agriculture, agricultural and forestry pests and diseases, vegetation analysis, planting area evaluation, crop yield evaluation, water quality analysis, artwork scanning, cultural relic identification, pattern scanning, industrial sorting, oil pollution detection, etc.

7. Examples

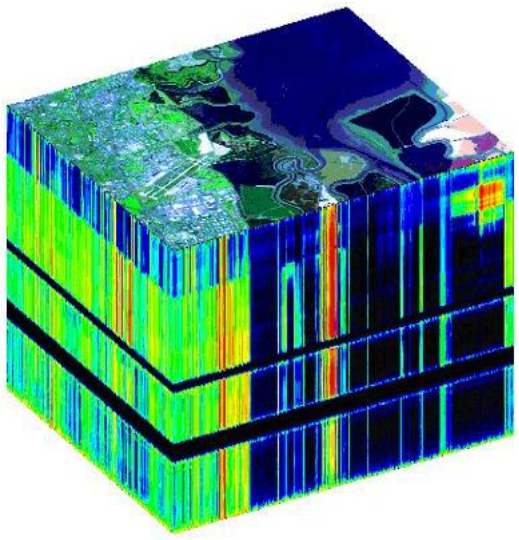


Figure 1 Hyperspectral imaging data cude

Figure 2 Airborne hyperspctral retome test

Figure 3 Ground imaging test_1

Figure 4 Ground imaging test_2

Figure 5 Ground imaging test_3

Figure 6 Ground imaging test_4

Figure 7 Ground imaging test_5

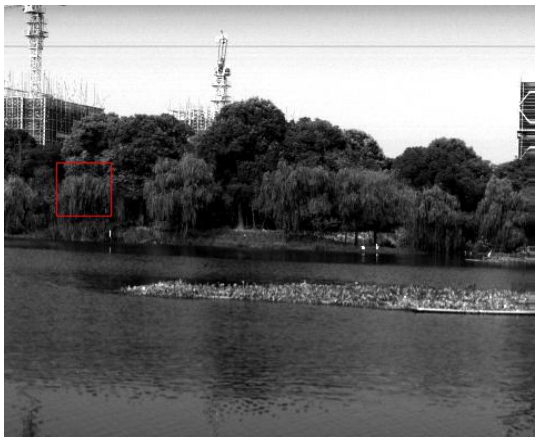
8. Case Study by Portable Ground Hyperspectral Imaging System

1. Plant Measurement

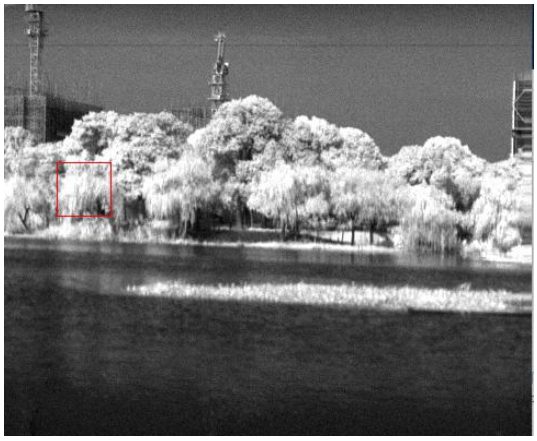
ATH8500 portable hyperspectral imaging system is used to acquire spectral data of field plants,tower crane,and soil etc. Based on single wave band image and color images to display, compare and analyze spectrum. Seen through single wave band image, different ground

materials have obvious differences reflected in the different wave bands to differentiate different materials.

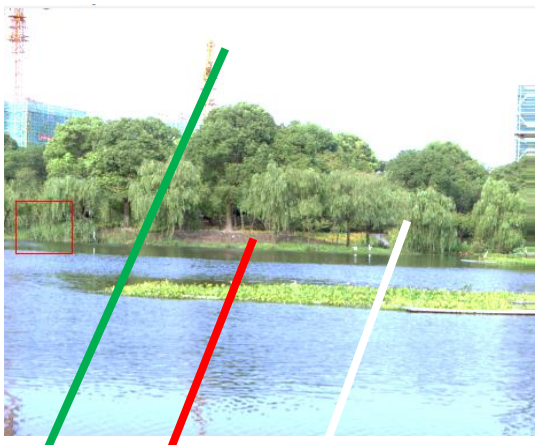
The 50th Wave Band



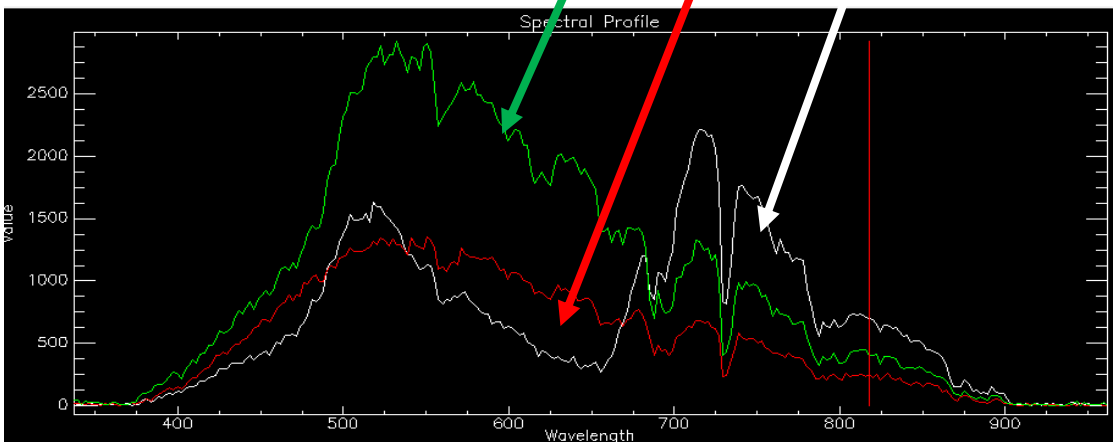
The 100th Wave Band



The 200th Wave Band



RGB composit image

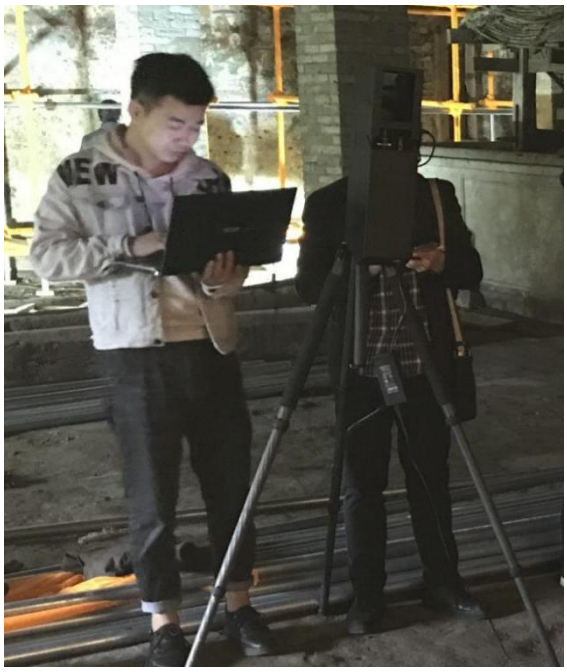


Spectral Curve Comparison

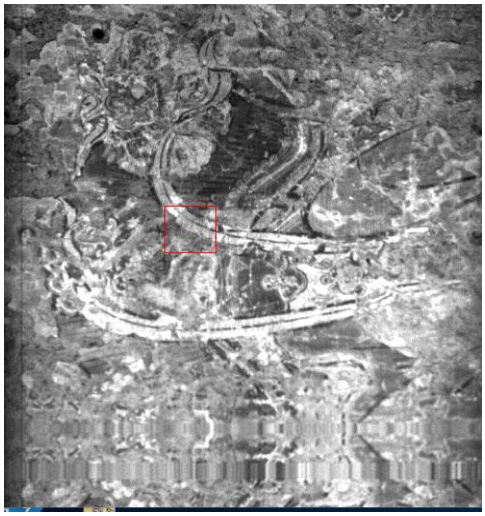
2. Archeological Mural Measurement

At present, hyperspectral camera has a unique feature of obtaining materials of "fingerprint

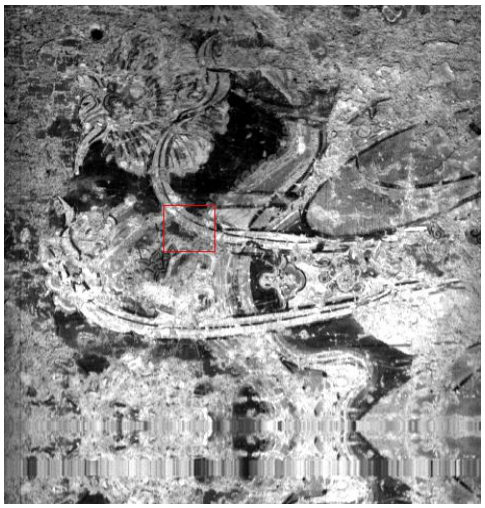
spectra", especially fit for archeology, mural, oil painting, and archaeological site spectral image data. Here exhibiting a temple mural measurement spectral image data, we depends on spectral image analysis can vividly restore color and mural condition, provide a solution to solve fades, covered places, damages. Hyperspectral technology is confirmed to provide new clues to analyze cultural relic repairs, identification and protection.



On site picture



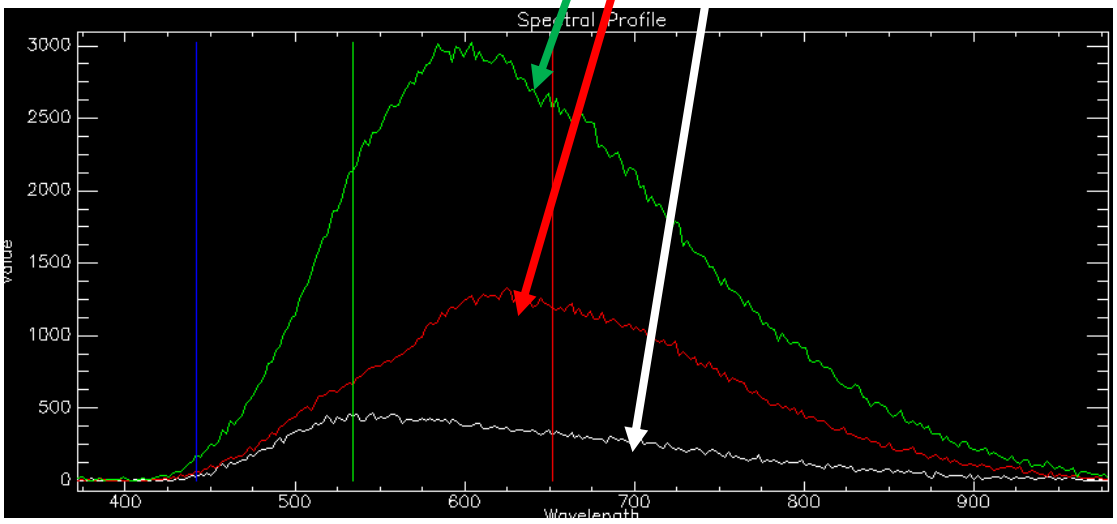
The 50th Wave Band



The 150th Wave Band

The 200th Wave Band

R GB Composite Image

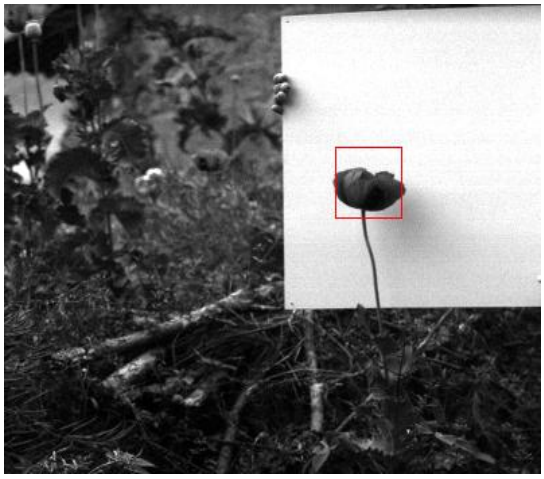


Spectral Curves Comparison

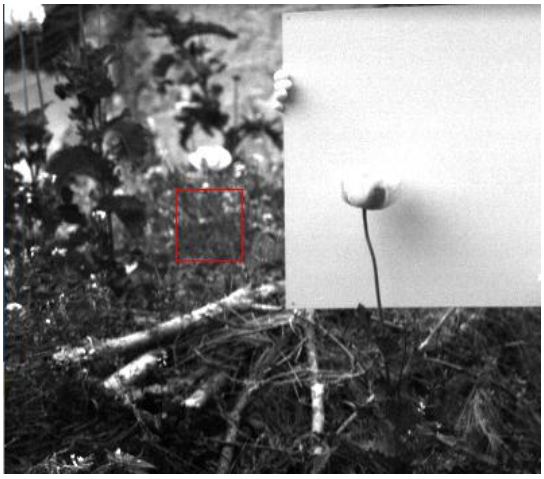
3. Opium Poppy Measurement

Papaver Somniferum, the Opium Poppy has certain medicinal value,but they are also raw materials to produce drugs. China has strict law to prohibit any person or community from planting opium poppy plant, but there are still a large number of illegal opium poppy garden distributing in mountain & forest areas, and even hided in crop land, which bring difficulties to positioning and monitoring illegal plantation. Many countries take advantage of satellite imagery reflecting spectrum and eye seeing explaining suspect area, but plant spectral signal has a high similarity, so that

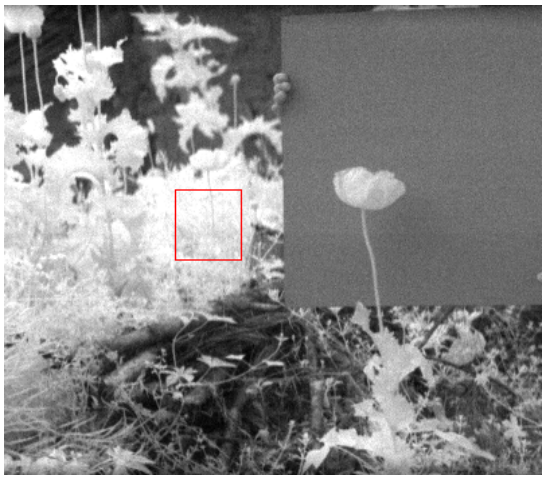
hyperspectral imaging possessing higher identification. After cooperation with relative departments, Optosky performed a field measurement on opium poppy by hyperspectral imaging system, and it provide a fast and efficient solution to investigate illegal plantation and result a positive result. You can refer to opium poppy spectral image as shown below:



The 50th Wave Band

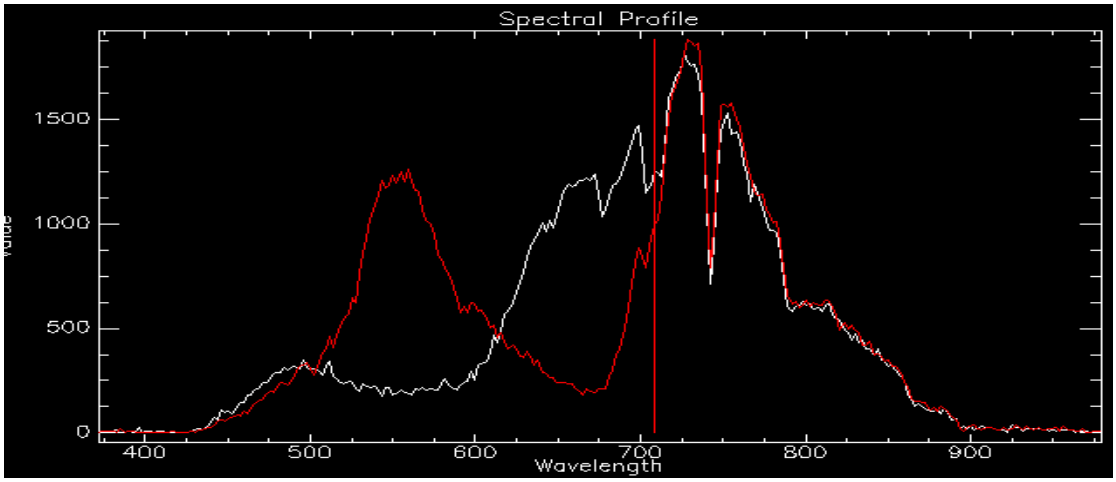


The 130th Wave Band



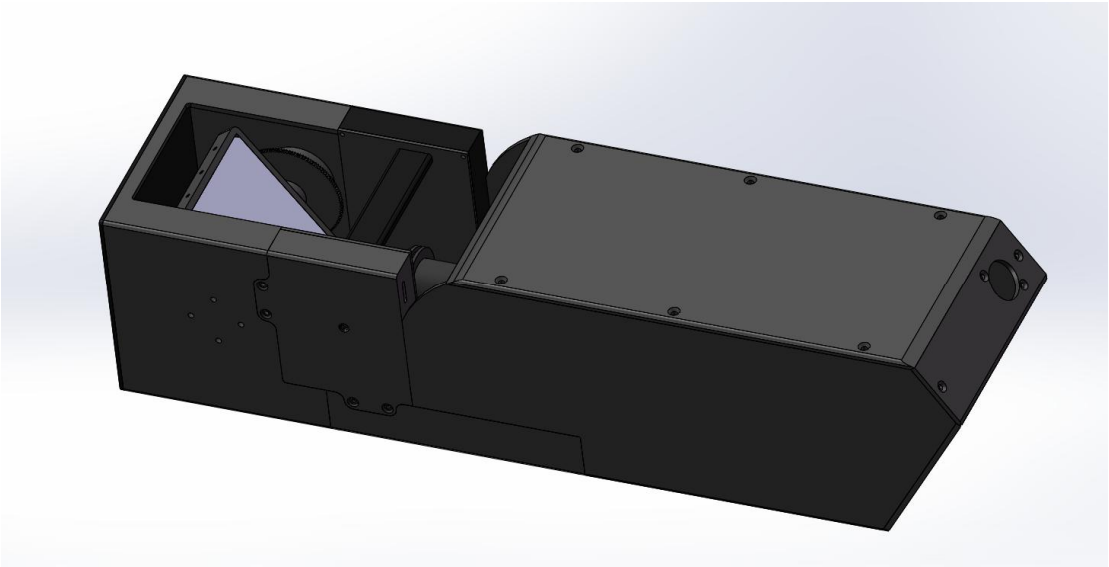
The 200th Wave Band

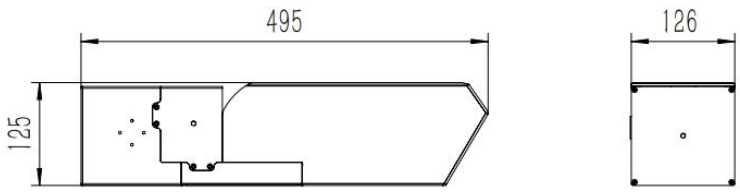
RGB Composite Image



Opium poppy spectral curve

Outlook dimension, 3D drawing:





9. Company Profile

Optosky company is an first-class spectroscopy solution provider, with the headquarter locates in the 7th floor of the research institute of the Chinese Academic of Science at an area of 2500 square meter in Xiamen city where successfully held the international 9th BRICK summit in 2017.The subsidiary company locates in Wuhu city with an area of 2035 square meter.

The company founder Dr.Hongfei,Liu graduated Docter degree from Chinese Academic of Science and postdoctral degree from Xiamen University, by integrating both of top Universities' spectroscopy technology background into Optosky company aiming at developing the leading spectroscopy equipment in the world.

The company bases on unique technologies of Optomechatronics, Spectroscopy Analysis, Process Weak Optical and Electrical Signals, Cloud Computing, and have been developed wide products line of the competitive Raman spectroscopy instruments, micro spectrometer, hyperspectral imager, field spectroradiometer, fluorescence spectroscopy, LIBS etc. Driven by advanced technologies and products, Optosky brand has been well-known to customers all over the world.

Optosky company base on technologies innovation, market driven direction, customer first, provides first-class products and services, and one-stop solutions to many fortune 500 companies in many industries. The company received praise from different industries companies, as well as many innovative intellectual property, software copyright, qualification certification, and winner awards over hundred numbers.

Optosky receives top class A introduced high-tech company to international Xiamen city, the national high-tech and new innovative technology company award. The founder Dr.Hongfei Liu receives the innovation talent award by ministry of science and technology.

The company is currently conducting the exclusive project of major industrialization national oceanic administration with a total fund of five million us dollar. The company in charge of drafting national industry standard of VNIR and SWNIR Field Spectroradiometer, and six national standard drafter, including China National Standard Drafter for Hazmat detector based on Raman spectroscopy, China National Standard Drafter for Buoy-type

Monitor eco-environment, China National Standard Drafter for water quality monitor in unmanned boat, China National Standards drafter for online water quality monitor by spectroscopy, China National Standard Drafter for UV-absorbent measure fabrics.

The company has over 70 IPs and over 20 innovative patents.

The company received ISO9001:2015 certification, CE certification, Police Administration Certification, FDA approval compliant, IQOQPQ compliant.

Figure 8 Optosky (Xiamen) Photonics Inc. Company Headquarter

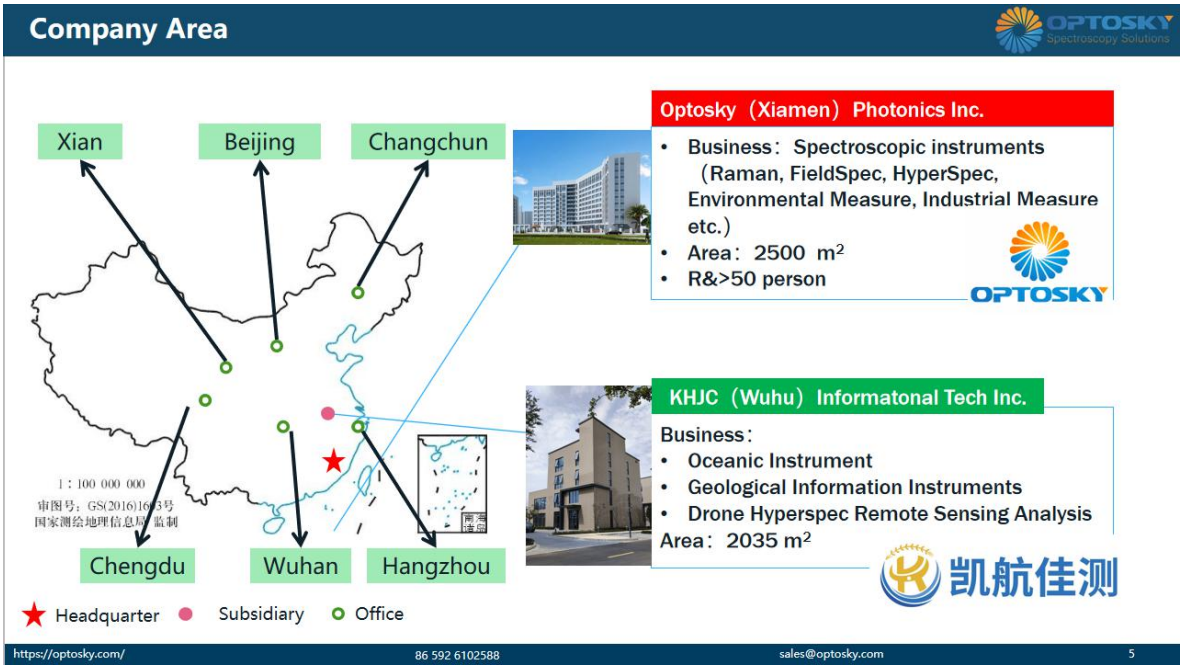


Figure 9 Optosky Company Area

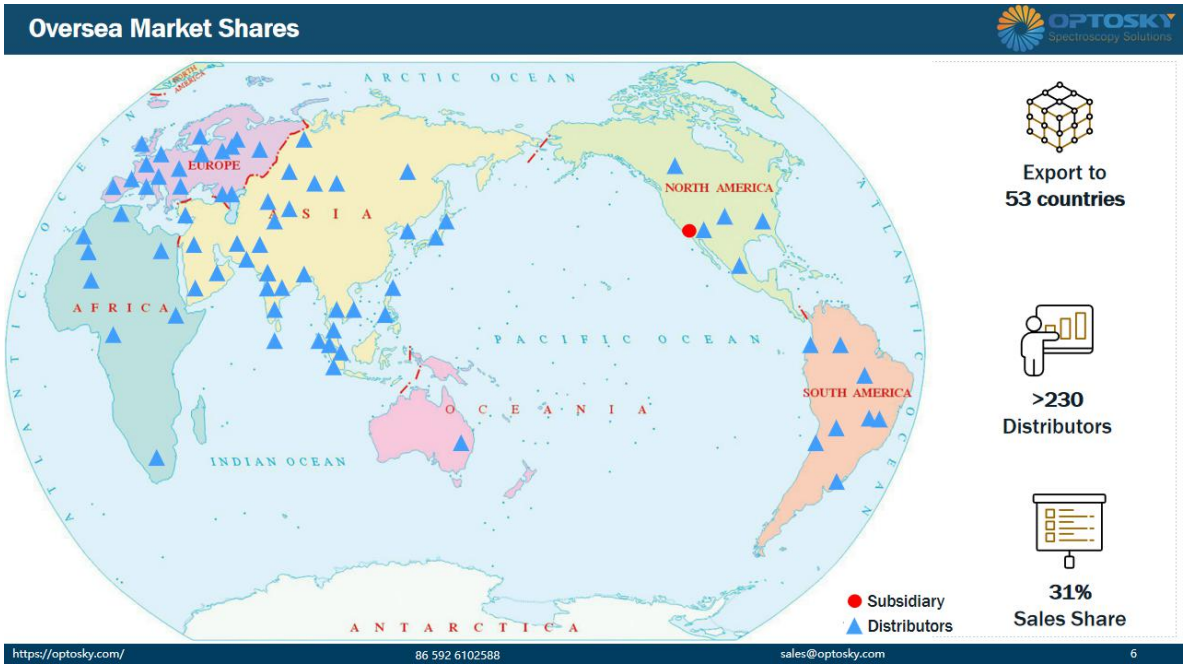


Figure 10 Oversea Market Shares

Figure 11 Optosky Chair and Draft National Standards Lists.

Figure 12 Qualification

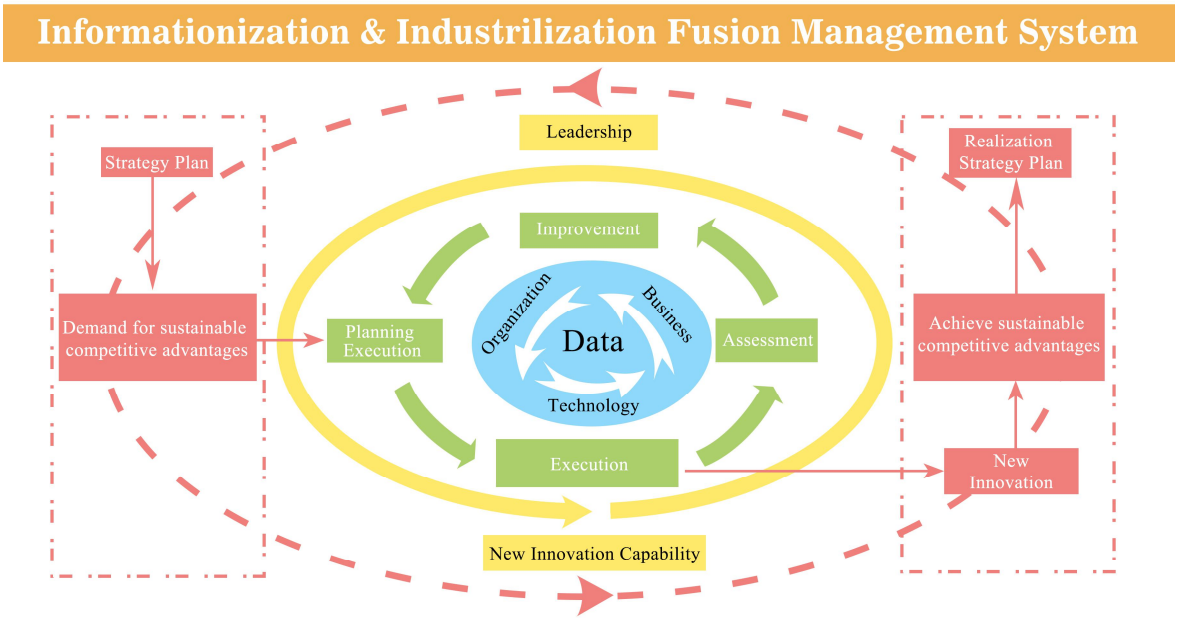


Figure 13 GB/T 23001_Informationization & Industrilization Fusion Management System

Figure 14 Optosky's Co-founder_Dr. Hongfei Liu

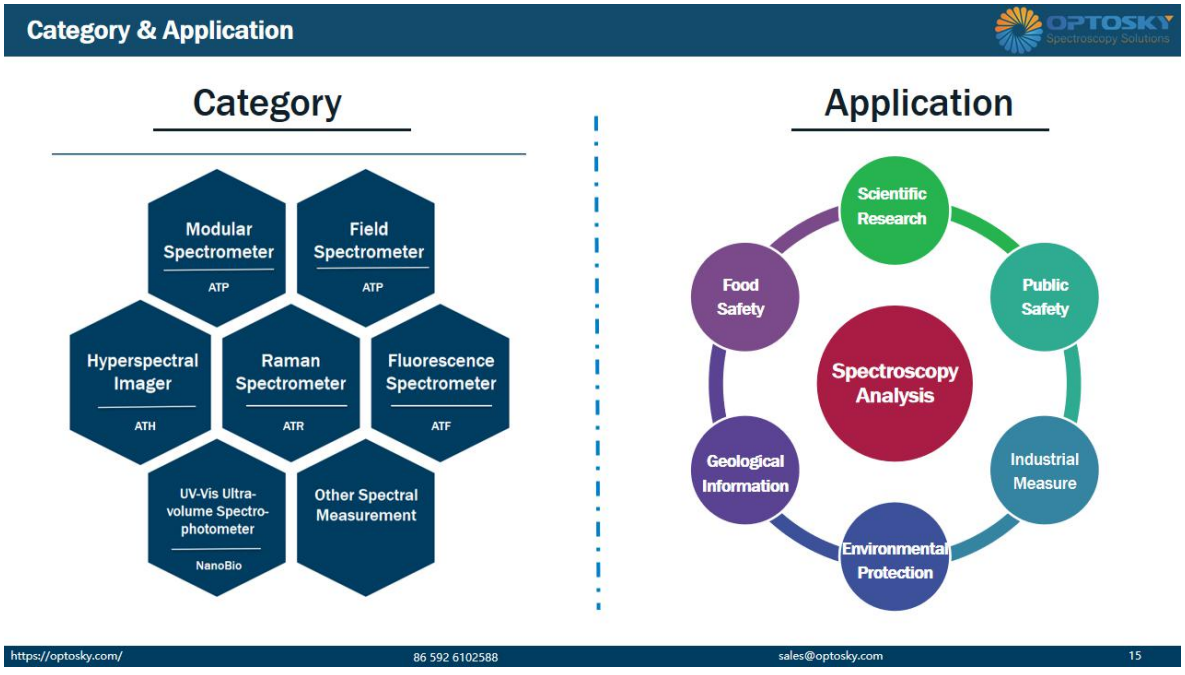


Figure 15 Category & Application