OPTOSKY
Spectroscopy Solutions

Datasheet

VIS-NIR Hyperspectral lmager | **ATH9010Z**

Features

- Wavelength range: 380~1700nm or 380~2500nm
- Wide wavelength range, high spectral resolution
- Transmission grating, push-broom type
- Low-temperature cooled camera
- Flight altitude: 50~1000 meters, recommended 100 meters
- Onboard I7 computer, supports up to 2TB storage, can store up to 100 hours of imaging data
- Large multi-rotor UAV with a 1.5m wingspan, high payload, highly expandable
- Ultra-long flight time: about 45 minutes, covering a large area during cruise

Application

Geological and mineral resource exploration, soil monitoring

Precision agriculture, crop growth, and yield assessment

Forest pest monitoring and fire monitoring

Coastline and marine environment monitoring

Grassland productivity and monitoring, ecological environment protection, and mine monitoring

Remote sensing education and research, meteorological research, disaster prevention

Lake and watershed environment monitoring, water quality testing

Quality inspection of agricultural and livestock products

Military, defense, and homeland security

Description

The ATH9010Z series hyperspectral drone, launched by Optosky, is the third generation of UAV-based multispectral imaging instruments with a wide wavelength range. It comprises 2-3 compact, lightweight hyperspectral imaging devices of different wavelength bands, integrated with high-performance wavelength fusion algorithms to achieve wide-band hyperspectral imaging. The system consists of a hexacopter with high stability, a high-stability gimbal, hyperspectral imaging devices, a large-capacity storage system, a wireless image system, a GPS navigation system, a ground receiving workstation, and a ground control system.

The ATH9010Z-4-17 and ATH9010Z-4-25 models use Optosky's self-developed hyperspectral imaging devices and optical modules, providing clear imaging with low noise. The ATH9010Z series also includes high-performance hyperspectral data acquisition and processing software.

The ATH9010Z-4-17 and ATH9010Z-4-25 hyperspectral drones can be used for real-time measurement of the spectral information of plants, water bodies, soil, and other ground objects, obtaining spectral images. By analyzing these spectral images, relationships with the physicochemical properties of plants can be established, which is useful for plant classification, plant growth status, and other research areas. The entire system is compact in design, with the main imaging spectrometer offering high spectral resolution. It uses an external push-broom imaging method and can form an independent measurement system with a field rotary platform and an indoor linear scanning platform, or be mounted on a UAV for aerial remote sensing operations.The system is particularly useful for UAV-Based Forest Health Monitoring, agriculture drones, food security, and other applications requiring multispectral imaging.

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1. Parameter

	ATH9010Z-4-17	ATH9010Z-4-25
Hyperspectral Imager		
Data Interface	USB 3.0	USB 3.0
Imaging Method	Push-broom imaging	Push-broom imaging
Spectral Range	380-1700nm	380-2500nm
Best Spectral Resolution	Visible spectrum: <1.5nm Near-infrared spectrum: <4.5nm	Visible spectrum: <1.5nm Near-infrared spectrum 1: <4.5nm Near-infrared spectrum 2: <9.7nm
Number of Bands (Before Binning)	Visible spectrum: 1920 (spectral) × 1200 (spatial) Near-infrared spectrum: 640 × 512	Visible spectrum: 1920 (spectral) × 1200 (spatial) Near-infrared 1: 640 × 512 Near-infrared 2: 320 × 256
Number of Bands (After Binning)	Visible spectrum: 300 (spatial) × 480 (spectral)	Visible spectrum: 300 (spatial) × 480 (spectral)

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Maximum Frame Rate	Near-infrared spectrum: 640 × 512 270 Hz	Near-infrared 1: 640 × 512 Near-infrared 2: 320 × 256 80 Hz
Sensor Type	CMOS, InGaAs	CCD, InGaAs, InGaAs II
Data Bit Depth	12-bit, 14-bit	12-bit, 14-bit
Acquisition Method	Software Binning or Hardware Binning (software selectable)	Software Binning or Hardware Binning (software selectable)
Onboard Computer	Intel I7 CPU, 16GB RAM	Intel I7 CPU, 16GB RAM
Onboard Storage	512 GB SSD, up to 2TB	512 GB SSD, up to 2TB
Visible Light Camera	5 megapixels	5 megapixels
Power Supply	12V, 3A	12V, 5A
Reliability		
Operating Temperature Range		
Storage Temperature Range	-20 ~ 65°C	-20 ~ 65°C
Operating Humidity Range	≤85% RH	≤85% RH
Software		
Basic Functions	Flexible exposure, gain, and speed settings; dynamic display of real-time hyperspectral images and spectra;	Flexible exposure, gain, and speed settings; dynamic display of real-time hyperspectral images and spectra;
Focus	supports transmission, reflection, and other measurement modes; adjustable exposure time, speed, and other parameters; includes spectrum library and user-defined libraries; enables image cropping and spectrum recognition	supports transmission, reflection, and other measurement modes; adjustable exposure time, speed, and other parameters; includes spectrum library and user-defined libraries; enables image cropping and spectrum recognition
Software System	Dynamic real-time display of hyperspectral images for precise focusing, avoiding manual visualization errors	Dynamic real-time display of hyperspectral images for precise focusing, avoiding manual visualization errors

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	Data acquisition software with real-time display of hyperspectral images and spectra; supports various measurement modes and parameters; includes spectrum library and user-defined libraries	Data acquisition software with real-time display of hyperspectral images and spectra; supports various measurement modes and parameters; includes spectrum library and user-defined libraries

Flight Platform Parameters

ATPL606 Heavy Duty 6-Rotor UAV		
Flight Platform	Custom long-duration, heavy-load large 6-rotor UAV	
Gimbal	High-stability three-axis DC brushless motor gimbal	
Number of Rotors	6	
Take-off and Landing Method	Vertical take-off and landing	
Wheelbase	1500 mm	
Maximum Payload	6 Kg	
Maximum Ceiling:	5000 m	
UAV Dimensions	1650 X 1410 X 500 mm	
GPS Positioning Accuracy	0.5 m，RTK（0.1m）可选	
Endurance Flight Time	>45 分钟	
Ground Station Working Range	10 Km	

2. Accessories List

No.	Item	Quantity	Optional
1	Hyperspectral Imager Main Unit	1 unit	Standard
2	6-Rotor UAV	1 unit	Standard
3	High-Reliability UAV Gimbal and Landing Gear	1 unit	Standard
4	Airborne Data Acquisition and High-Capacity Data Storage System	1 unit	Standard
5	Battery Pack	1 unit	Standard
6	Objective Lens	1 set	Standard
7	Hyperspectral Imaging System Workstation (Including Controller and Control Software)	1 set	Standard
8	50cm Diameter 95% Field Calibration Whiteboard	1 unit	Standard
9	High-Precision Indoor Scanning Gimbal	1 set	Optional
10	High Blue Stable Halogen Lamp	4 units	Optional
11	Standard Calibration Plate	1 unit	Optional
12	Factory-Imported Field-Specific Calibration Cloth (1.2m×1.2m)	1 unit	Optional
13	360-Degree Field Rotation Platform	1 unit	Optional
14	Tripod	1 unit	Optional
15	Field-Specific High-Capacity Lithium Battery	2 units	Optional
16	Measurement Darkroom	1 unit	Optional

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17	Field Portable Transport Case	1 unit	Optional
18	Push Broom Device	1 unit	Optional

3. Flight Data Sample

Figure 1. Hyperspectral Flight Diagram of ATH9010Z Series UAV

Figure 2. Hyperspectral Flight Data of ATH9010Z Series UAV (Flight Location: Institute of Rare Earth Materials, Chinese Academy of Sciences, Jimei District, Xiamen, Fujian Province; Flight Altitude: 100m; Airspeed: 6m/s; Wind Speed: Level 3)

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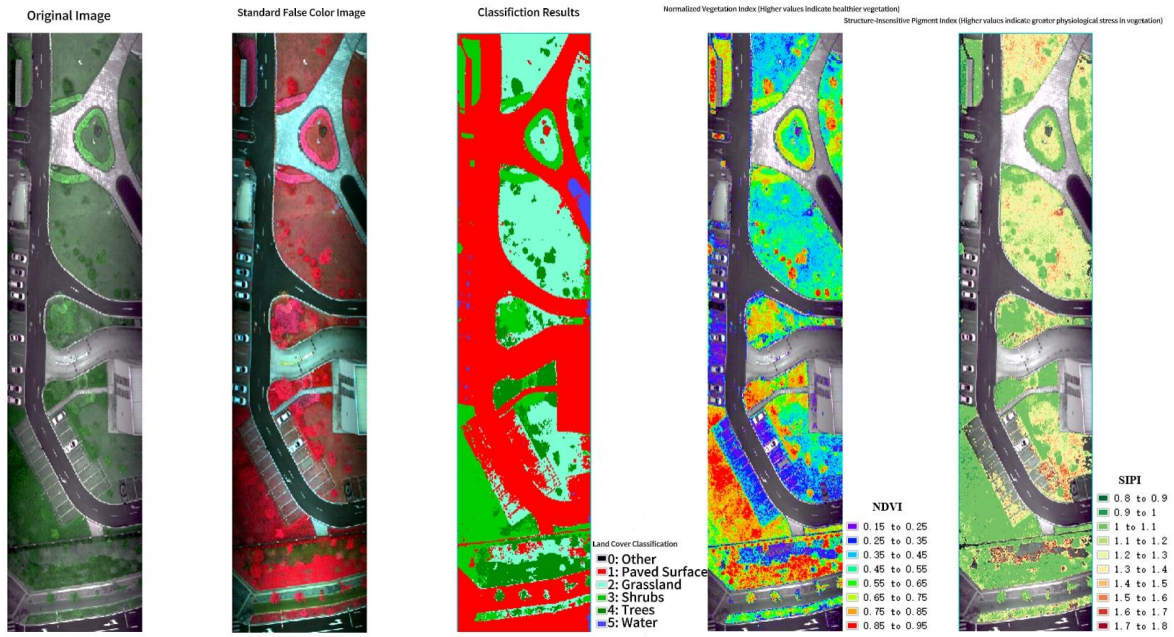

Figure 3. Figure 4. Hyperspectral Data Inversion Results of ATH9010Z Series UAV (Flight Location: Institute of Rare Earth Materials, Chinese Academy of Sciences, Jimei District, Xiamen, Fujian Province; Flight Altitude: 100m; Airspeed: 6m/s; Wind Speed: Level 3)

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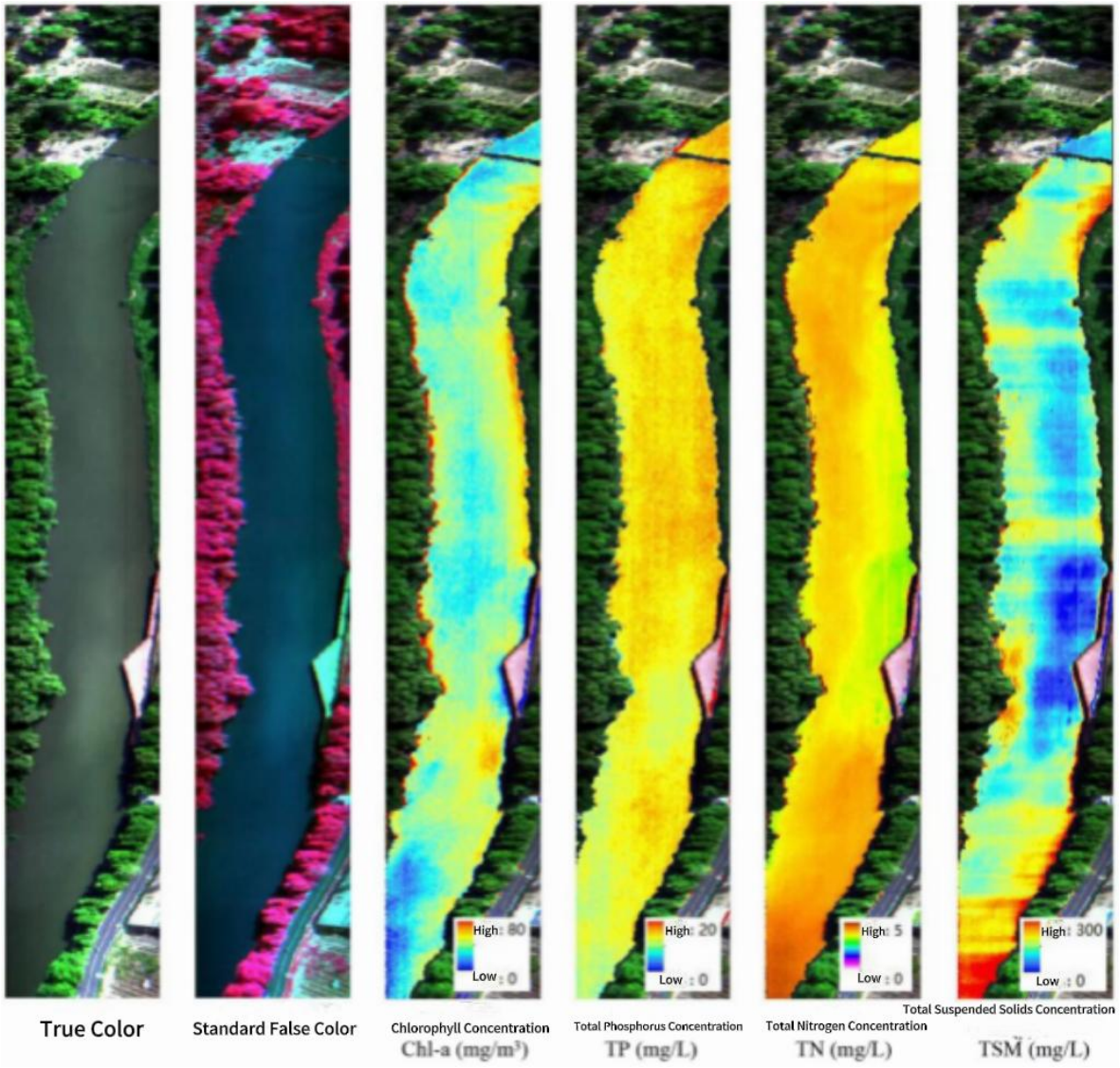

Figure 5 ATH9010Z Series UAV Hyperspectral River Water Quality Inspection Data Inversion Results (Flight Location: Xiamen City, Fujian Province; Flight Altitude: 100m; Airspeed: 6m/s, Wind Speed: Level 2)

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Figure 6 ATH9010Z Series UAV Hyperspectral Imager Flight Large-Area Tobacco Leaf Plantation Multi-Flight Strip Hyperspectral Mosaic Data (Flight Location: Changting County, Longyan City, Fujian Province; Flight Altitude: 100m; Airspeed: 6m/s, Wind Speed: Level 3)

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