

UAV Hyperspectral Imager + LiDAR

ATHL9010

Features

- Wavelength Range: 380–1000 nm
- Hyperspectral Resolution: <1.5 nm
- Wide FOV: 23.4°@f=25mm (lens-dependent)
- Flight Altitude: 50–1000 m, recommended 100–300 m
- Solid-state LiDAR, non-mechanical scanning, high reliability
- LiDAR Range: 1–300 m
- LiDAR Height Accuracy: ± 20 mm
- Onboard I7 computer, supports up to 2T storage, 100 hours of imaging data
- 1.5 m multi-rotor UAV, high payload, expandable
- Long flight time: ~45 m

Application

- Geological and mineral exploration
- Precision agriculture, crop growth and yield assessment
- Forest pest and fire monitoring
- Coastal and marine environment monitoring
- Lake and watershed monitoring, water quality testing
- Military, defense, and homeland security
- Military, defense, and land security
- Disaster prevention and management

Description

ATHL9010 series UAV-based Hyperspectral Imager + LiDAR is a compact, lightweight third-generation UAV-mounted hyperspectral imager from Aopu Tiancheng, now integrated with a LiDAR module. The system consists of a hexacopter with high stability, a hyperspectral imager, LiDAR, large storage, GPS navigation, ground receiving workstation, and ground control system. The addition of a line-scanning LiDAR enables precise ortho-rectification of images and provides 3D terrain data, which can be analyzed alongside spectral data for new research perspectives.

ATHL9010 integrates high-resolution solid-state scanning LiDAR, hyperspectral imager, and high-precision inertial navigation, generating true-color point clouds in real-time. A single flight can quickly capture over 2 km² of point cloud data.

This UAV-based hyperspectral imager is ideal for real-time measurement of spectral information from plants, water bodies, and soil, and for obtaining spectral images. By analyzing these images, it enables studies on plant classification and growth conditions. The system's compact design allows for both standalone measurement with a rotating platform or linear scanning system, and UAV-based remote sensing operations.



1 Model Selection

Model	Features
ATHL9010	Standard Configuration
ATHL9010P	High SNR
ATHL9010W	Wide FOV

2 Parameter

Parameter	ATHL9010	ATHL9010W
Flight System		
Flight Platform	Custom long-duration, high payload, large 6-rotor UAV	
Gimbal	3-axis DC brushless motor high-stability gimbal	
Number of Rotors	6 rotors	
Takeoff and Landing	Vertical takeoff and landing	
Wheelbase	1500 mm	
Max Payload	6 kg	
Max Ceiling	5000 m	
UAV Dimensions	1650 x 1410 x 500 mm	
GPS Positioning Accuracy	1.5 m	<0.3 m, RTK
Remote Imaging Parameter Adjustment	No	Yes
Flight Endurance Time	>45 minutes	
Ground Station Working Distance	5 km	10 km
Hyperspectral Imager		
Data Interface	USB 3.0	
Imaging Method	Push-broom imaging	
Resolution (Before Binning)	1920 (Spectral) × 1200 (Spatial)	4096 (Spectral) × 3000 (Spatial)
Resolution (After Binning)	480 (Spectral) × 300 (Spatial)	750 (Spatial) × 512 (Spectral)
FOV	11.5° @ f=35 mm	16.8° @ f=35 mm 23.4° @ f=25 mm

Max Frame Rate	270 Hz	80 Hz
Onboard Computer	Intel I7 CPU, 16 GB RAM	
Onboard Storage	512 GB SSD, up to 2 TB	
Image Resolution	1920 × 1200	4096 × 3000
Power Supply	12V, 3W	12V, 5W
LiDAR		
Radar Working Principle	TOF time-of-flight distance measurement	
Laser Wavelength	1550 nm, eye-safe class 1	
Measurement Speed	500,000 points/sec, up to 1 million points/sec (distance-dependent)	
Scan Lines	1750 lines	
Field of View	Horizontal: 15°	
Angular Resolution	Horizontal: 0.009°	
Scanning Frequency	500 Hz	
Altitude Measurement Range	1~300 m, max 600 m	
Laser Return Mode	Multiple echoes	
Height Measurement Error	<20 mm	
Weight	1.5 kg	
Reliability		
Operating Temperature Range	-10 ~ 45°C	
Storage Temperature Range	-20 ~ 65°C	
Operating Humidity Range	≤85% RH	
Optical		
Spectral Range	380~1000 nm (customizable)	
Spectral Resolution	<1.5 nm	
Spectral Line Curvature	<1/3 pixel	
Spectral Distortion	<1/3 pixel	
Lens Focal Length	35 mm	
Field of View Range	15.2°	21.6°

Slit Width	30 μm	
System Numerical Aperture	0.19 (F/2.6)	0.2 (F/2.4)
Optical Design	Full transmission lens, scientific bright/dark focusing	
Sensor		
Sensor Type	CMOS	CCD
Detectable Range	350~1100 nm	
Effective Pixels	1920 × 1200	2048 × 2048
Dynamic Range	60 dB	72 dB
Data Bit Depth	12 bit	
Acquisition Mode	Software or hardware binning (software selectable)	
Onboard Data Acquisition System	I7 processor, 16 GB RAM, 512 GB SSD, upgradeable to 2 TB	
Camera		
Resolution	2 million pixels	
Frame Rate	20 FPS	
Software		
Basic Functions	Flexible exposure, gain, speed settings, real-time dynamic display of hyperspectral images and spectra	
Focusing	Dynamic real-time display, scientific bright/dark focusing to avoid human visual focusing errors	
Software System	Data acquisition software, real-time dynamic display of hyperspectral images and spectra, transmission/reflection measurement modes, flexible parameter settings, spectral library and user-recorded library, image cropping, and spectral identification	

3 Accessory List

No.	Item	Quantity	Optional/Standard
1	Hyperspectral Imaging System (380-1000nm)	1 unit	Standard
2	LiDAR Module	1 unit	Standard
3	6-Rotor UAV	1 unit	Standard
4	High Reliability UAV Gimbal and Landing Gear	1 set	Standard
5	Onboard Data Acquisition and High Capacity Storage System	1 unit	Standard
6	Battery Pack, Objective Lens, and Accessories	1 unit	Standard
7	Hyperspectral Imaging System Workstation (includes Controller and Software)	1 set	Standard
8	50cm Diameter 95% Outdoor Calibration Whiteboard	1 unit	Standard
9	High Precision Indoor Scanning Gimbal	1 set	Optional
10	High Blue Stable Flow Halogen Lamp	4 units	Optional
11	Standard Calibration Plate	1 unit	Optional
12	Original Imported Outdoor Calibration Cloth (1.2m × 1.2m)	1 unit	Optional
13	360-Degree Outdoor Rotating Platform	1 unit	Optional
14	Tripod	1 unit	Optional
15	Outdoor High Capacity Lithium Battery	2 units	Optional
16	Measurement Darkroom	1 unit	Optional
17	Outdoor Portable Transport Case	1 unit	Optional
18	Pushbroom Device	1 unit	Optional