

aisa **HAWK** hyperspectral sensor

AisaHAWK is the smallest airborne SWIR hyperspectral sensor on the market. It is designed to provide high quality data in SWIR (970 to 2500 nm) range. AisaHAWK employs the highest sensitivity cooled MCT SWIR detector technology and temperature stabilized optics in order to guarantee the highest stability and signal-to-noise ratio during long flight missions.



Hawk II sensor
 L: 220 mm
 W: 275 mm
 H: 470 mm
 Mass: 18 kg

AisaHAWK is the first small and low maintenance SWIR (970-2500 nm) hyperspectral sensor, which provides high speed data acquisition at high sensitivity. The major advantages of the AisaHAWK are its distinctive size, high quality of data and low investment cost. AisaHAWK is the most compact SWIR hyperspectral sensor on the market, and can be quickly and easily installed in any aircraft. The AisaHAWK sensor is designed and tested to meet MIL vibration and shock specifications.

HIGH PERFORMANCE

The AisaHAWK sensor employs Mercury Cadmium Telluride (MCT) SWIR detector technology which provides the highest sensitivity and signal-to-noise ratio over the full SWIR range of 970

to 2500 nm. The transmissive imaging spectrograph is nearly independent of the polarization in the incoming light, and provides high diffraction efficiency and uniform spectral resolution of 10 nm over the full SWIR range.

All the optics (fore optics and imaging spectrograph) and the detector assembly are temperature-stabilized. It ensures the highest radiometric stability and image quality during flight missions.

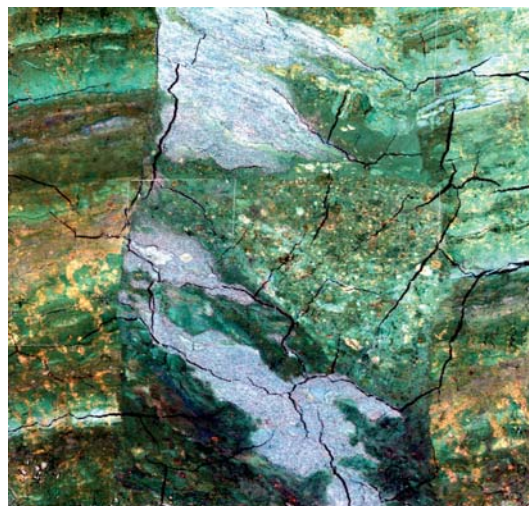
AisaHAWK can be integrated with the AisaEAGLE sensor to make a dual sensor system, which provides seamless hyperspectral data in the full range from 400 to 2500nm. For more information, please see the AisaDUAL data sheet.

AisaHAWK Airborne Hyperspectral Imaging System

SPECIM supplies the AisaHAWK sensor with all the system components needed to make a turnkey, ready-to-use airborne imaging system. The complete AisaHAWK system consists of

- The AisaHAWK sensor
- Real time image acquisition computer with a user-friendly interface and image acquisition software (RSCube)
- High performance GPS/INS sensor
- Power supply
- CaliGeo post-processing software

For more information about the complete system, please see the AISA Systems brochure and CaliGeo brochure.



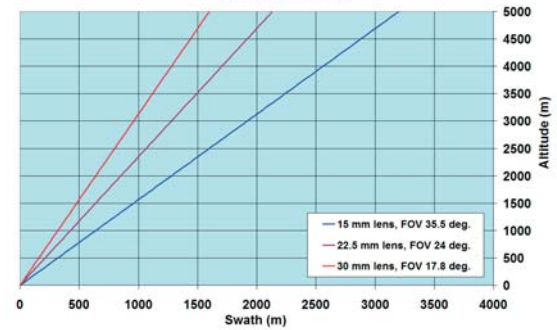
All AISA sensors can also be used for ground-based hyperspectral imaging. Ragona, D et al. have studied the classification of sediments of very similar composition and grain size using the SWIR sensor. (Courtesy of Ragona, D., Minster, B., Rockwell, T., Jasso, H.)

AisaHAWK Sensor

OPTICAL CHARACTERISTICS	TYPICAL SPECIFICATIONS		
Spectrograph	High efficiency transmissive imaging spectrograph. Throughput practically independent of polarization. Smile and keystone < 5 microns. Spectrograph is temperature stabilized.		
F/#	F/2.0		
Spectral range	970 - 2500 nm		
Spectral sampling/pixel	6.3 nm		
Spectral resolution	12 nm		
Slit width	30 microns		
Calibration	Sensor provided with wavelength and radiometric calibration file.		
FORE OPTICS			
Focal Length	30 mm	22.5 mm	15 mm
FOV	17.8 degrees	24.0 degrees	35.5 degrees
I FOV	0.054 degrees	0.075 degrees	0.111 degrees
Swath width	0.31 x altitude	0.43 x altitude	0.64 x altitude
Ground resolution @ 1000 m altitude	0.97 m	1.34 m	2.0 m
ELECTRICAL CHARACTERISTICS			
Camera	MCT camera with maintenance-free cooler		
# of Spectral bands	254		
Spatial pixels	320		
Output	14 bits digital		
SNR	800:1 (peak) More detailed SNR data in various conditions available from SPECIM.		
Integration time	Adjustable, independent of frame rate		
Image rate	Up to 100 images/s		
Shutter	Electromechanical shutter for dark background registration, user controllable by software.		
OPERATING MODES			
Hyperspectral	254 spectral bands with max speed		
Programmable multispectral	Yes		
Power consumption			
Complete system with rack PC	640 W		
Complete system with lightweight PC	515 W		

Specifications subject to changes without prior notice.

Swath width vs altitude



Ground pixel size vs. altitude

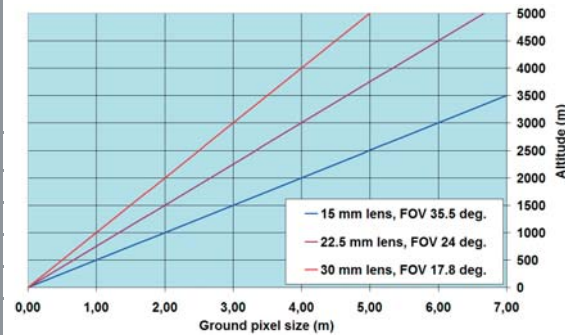
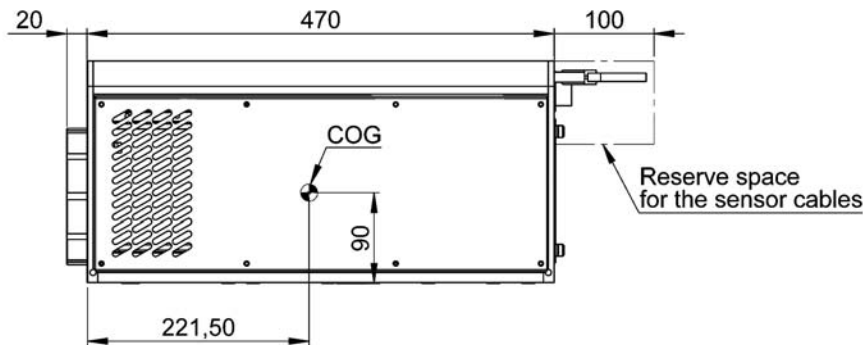
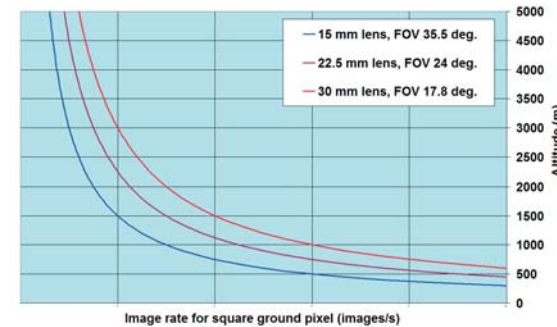
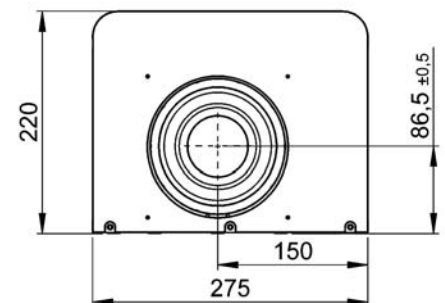


Image rate at aircraft velocity of 60 m/s (120 knots)



AisaHAWK sensor, side view



AisaHAWK sensor, front view