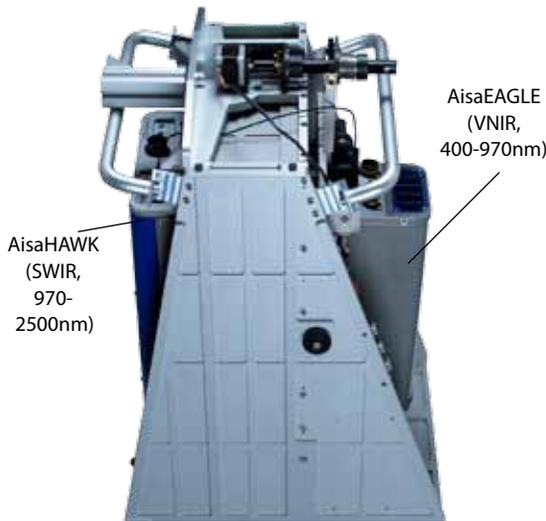


# *aisa* **DUAL** *hyperspectral sensor*

AisaDUAL is a high performance hyperspectral sensor system for simultaneous acquisition of VNIR and SWIR data. AisaDUAL combines the AisaEAGLE and AisaHAWK sensors in a dual sensor bracket mount and provides an economic imaging tool for remote sensing companies and researchers.



AisaHAWK  
(SWIR,  
970-  
2500nm)

AisaEAGLE  
(VNIR,  
400-970nm)

Mounted AisaDUAL sensor system,  
dimensions:  
L: 420 mm  
W: 490 mm  
H: 680 mm  
Mass: 50 kg

AisaDUAL is a compact sensor, which requires minimum maintenance, and is easy to install in small aircrafts. The sensor assembly will only require a single hole in the aircraft, and fits on a standard stabilized camera platform.

In the dual sensor assembly, the AisaHAWK sensor can be aligned with respect to the AisaEAGLE to make both sensors to look at the same swath on the ground. Also, the AisaHAWK fore lens is adjustable to match the SWIR ground pixel size to that in VNIR.

AisaDUAL sensor makes a high performance hyperspectral imaging system, when integrated with an AISA data acquisition computer, RSCube software, GPS/INS sensor and power supply. Several GPS/INS sensors are currently supported in the AISA systems, like C-MIGITS III, Oxford Technical Solutions RT3000 series, Applanix POS/AV series, and AeroControl GPS/INS.

CaliGeo software supports the post-processing of the AisaDUAL sensor data.

## Complete turnkey Dual System

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

- the AisaDUAL hyperspectral sensor
- Real time image acquisition computer with a user-friendly interface and image acquisition software (RSCube)
- GPS/INS sensor
- Power supply
- CaliGeo post-processing software

For more information about system solutions and computer and GPS/INS options available, please see the AISA Systems brochure and CaliGeo brochure.

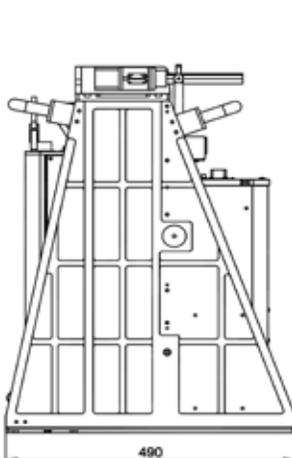


AisaDUAL system is perfect for geolocical applications. Sample data from Buddingtonite Outcrops, Cuprite, Nevada. (Courtesy of SpecTIR LLC.)

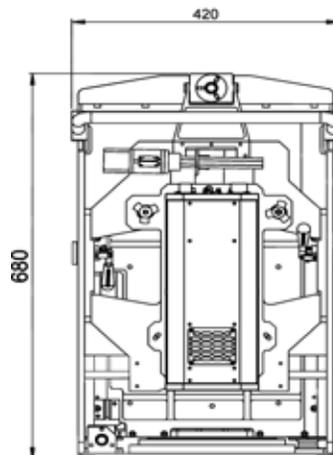
## AisaDUAL Sensor

OPTICAL CHARACTERISTICS	TYPICAL SPECIFICATIONS					
	VNIR			SWIR		
Spectral range	400-970 nm			970-2500 nm		
	Total 400-2500 nm					
Spectral resolution	3.3 nm			12 nm		
Spectral binning options	none	2x	4x	none	2x	4x
# spectral bands	244	122	60	254	127	63
Spectral sampling/band (nm)	2.3	4.6	9.2	5.8	11.6	23.2
FODIS (optional)	In VNIR channel					
Calibration	Sensor provided with wavelength and radiometric calibration file					
<b>FORE OPTICS</b>						
Swath acquisition, option 1	See data acquisition option 1 on right					
# spatial pixels	320			320		
FOV	24 degrees			24 degrees		
I FOV	0.075 degrees			0.075 degrees		
Swath width	0.43 x altitude			0.43 x altitude		
Swath acquisition, option 2	See data acquisition option 2 on right					
# spatial pixels	1024			320		
FOV	37.7 degrees			35.5 degrees		
I FOV	0.037 degrees			0.111 degrees		
Swath width	0.68 x altitude			0.64 x altitude		
<b>ELECTRICAL CHARACTERISTICS</b>						
Camera	CCD 12 bits			MCT 14 bits		
SNR	350:1 or 500:1 (peak)			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 in both channels, user controllable by software.					
Power consumption						815 W
Complete system with rack PC						695 W
Complete system with lightweight PC						

Specifications subject to changes without prior notice.



AisaDUAL sensor assembly, side view  
 (AisaEAGLE on the right, AisaHAWK on the left)



AisaDUAL sensor assembly, back view

## DATA ACQUISITION OPTIONS

### Option 1: Single computer data acquisition setup

This computer setup is used to collect both the VNIR and SWIR data with the same swath width of 320 pixels. The AisaEAGLE sensor data is spatially binned by 2 to provide 512 swath pixels. From these 512 swath pixels, 320 pixels are collected which overlap with the 320 AisaHAWK swath pixels. The VNIR and SWIR data are combined and saved in a single image covering the spectral range of 400 to 2500 nm.

This computer setup consists of a single computer with a dual input frame grabber. Images from both the AisaEAGLE and AisaHAWK are acquired synchronously with each other and with the GPS/INS data.

### Option 2: Dual computer data acquisition setup

This computer setup is used to acquire and save the full swath from both the VNIR and SWIR sensors simultaneously with 1024 swath pixels from the AisaEAGLE and 320 swath pixels from the AisaHAWK. Data streams from VNIR and SWIR are saved in separate images. The VNIR and SWIR images are also processed separately in CaliGeo software.

This setup consists of two independent computers in a single rack. A 2-port intelligent KVM (Keyboard/Monitor/Mouse) switch is used to allow two computers to share one keyboard, one monitor and one mouse. One computer acquires VNIR data stream and another SWIR data stream. VNIR and SWIR sensors are triggered to acquire data frames simultaneously with each other and with the GPS/INS sensor. One of the computers is running in slave mode starting data acquisition into a file simultaneously when acquisition is started on a master computer.

The optics can be selected also so that AisaHAWK pixel size is 3 x larger than AisaEAGLE pixel size. In this way, 320 AisaHAWK pixels cover the same area as 960 AisaEAGLE pixels and wider swath can be covered with both sensors.

## DATA STORAGE

In both of the above computer options, data is stored in a 200Gb (or larger) hot-swap hard disk during acquisition. The capacity is sufficient for ca. 4 hours of continuous acquisition.