SIMTRUM

Hyperspectral Video Camera
ULTRIS 5 HFR

2022 V1
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ULTRIS 5 HFR – True Video Spectroscopy in High-speed

The new ULTRIS 5 HFR (High Frame Rate) records and processes up to 75+ cubes per second with the 10 GigE version of our beloved ULTRIS 5 hyperspectral video camera. With a resolution of 290x275 Pixels and 51 channels in the range from 450-850nm, that's a staggering amount of >300 Million data points per second.

Features

- Hyperspectral Snapshot Camera based on Light Field HIS
- Dimensions: 60 x 60 x 99.7mm
- Weight: 495g
- Wavelength range: 452-850 (modifiable)
- Spectral bands: 51
- Spatial resolution: 290 x 275 Pixel
- Frame rate: up to 75Hz
- Readout: Global shutter

Compare with ULTRIS5

The camera features data cubes of 290 x 275 pixels and 51 spectral channels from 450 – 850nm, just like the standard version, but the difference is in the vastly increased frame rate, Equipped with a 10 Gigabit Ethernet port, the integrated Sony IMX250 sensor can unleash its full potential and deliver up to 89 fps, while retaining the typical 12bit depth, typically needed for hyperspectral applications.

Despite having a somewhat bigger size than the standard ULTRIS 5, the new 10GigE development is a huge leap forward and opens up many new use cases for hyperspectral video cameras.

Parameters	ULTRIS 5	ULTRIS 5 HFR
Technology	Light Field	Light Field
Wavelength Range	480 - 850 nm	480 - 850 nm (Modifiable)
Spectral Bands	50	51
Spatiatal Resolution	250 x 250 pixel	290 x 250 pixel
Total Spectra / Image	62 500	72 500
Total Data Points / Cube	>3 Million	>300 Million
Data Depths	12 Bit	12 bit
Readout	Global Shutter	Global Shutter
Max Frame Rate	15 Hz	75 Hz
Data Link	1 GigE	10 GigE
Weight	126 g	495 g
Size	29 x 29 x 49 mm	60 x 60 x 99.7mm

Performance on Different Computer Sets

The camera plugs seamlessly into the CUVIS software suite and although it can be used with a regular Gigabit Ethernet port, a port with a greater bandwidth is needed to get higher frame rates.

In our tests, we were able to record and save unprocessed hyperspectral cubes at 76 fps running on a desktop computer with a 10 Gbit/s PCIe network card and around 60 fps using a laptop with a 5 Gbit/s USB-C network dongle. (See the full specs in the following table). Live processing of the 290 x 275 single spectra was done at 33 fps on the desktop computer and with a little over 30 fps on the laptop respectively.

Parameters	Desktop PC Custom	Laptop e.g., Lenovo Legion 5 15ITH6H
Processor	AMD Ryzen 5 5600X / 3.7-4.6 GHz (6 cores)	Intel Core i7 - 11800H / 2.3 - 4.6 GHz (8 cores)
RAM	32GB DDR4 - 3200	32 GB DDR4 - 3200
SSD	Crucial P5 Plus SSD PCIe 4.0, NVMe	Micron 3400 SSD PCIe 4.0, NVMe
Network Adapter	Intel X550-T2 10 Gbit/s PCIe 3.0 x 4 Network Adapter	US5GC30 5GBit/s USB-C Network Adapter
FPS / Hz Recording	76	60
FPS / Hz Live Processing	33	32

In the tests, we recorded with a laptop and reprocessed the data into four different visualizations: RGB true color, live spectra of two ROIs, Chlorophyll Absorption Integral (CAI), and CIR colored infrared.

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