imec

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# SNAPSHOT MOSAIC VIS / REDNIR / NIR RANGE HYPERSPECTRAL IMAGING CAMERA

Imec's hyperspectral evaluation system offers simple, fast and easy application set-up for your hyperspectral scanning and analysis of sample materials. Our solution is flexible and designed to enable application development using hyperspectral imaging technology, delivering relevant test data already within a few days after initial installation. It includes all required components, from imager to camera, lens, cable interface and software and can be easily rebuilt into different configurations.

HYPERSPECTRAL IMAGING TECHNOLOGY FOR REAL-TIME, VIDEO-RATE APPLICATIONS

Snapshot mosaic filter based hyperspectral cameras enable real-time, video-rate processing of spectral imaging data flux. This is key for applications where objects are moving (e.g. sorting some food on a conveyor belt), or where the camera is moving (e.g. when carried on a drone UAV) or simply in static mode to prevent any motion artifacts during long time acquisitions (e.g. respiration movements of tissues in medical imaging, or moving target in security & surveillance applications)

KEY BENEFITS

- **Video-rate** acquisition of hyperspectral imaging data cubes with no motion artifacts, perfectly suited for acquisition of moving objects or scenes"

- **Easy set-up** of the complete system

- **Flexible configuration:** quickly modify the set-up once you get more acquainted with the hyperspectral imaging snapshot technology hardware and software
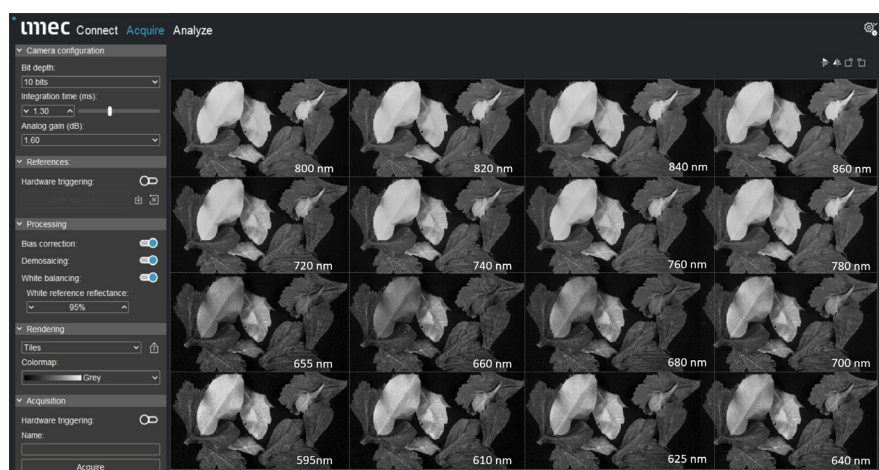
Hyperspectral imaging acquisition software of imec. Several green color objects are imaged (fresh leaf, dry leaf, plastic leaf) are shown in 4x4 = 16 spectral band tiled images view. The HSI data-cube is also classified in real-time at 120+ FPS according to NDVI vegetation index (see next page).

IMEC SNAPSHOT MOSAIC CAMERA SPECIFICATIONS
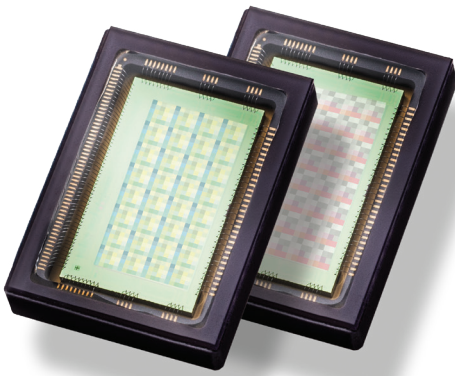
Snapshot mosaic hyperspectral image sensors with 16 and 25 bands channels - conceptual view of the per-pixel filter

Spatial resolution	512 x 272 RAW per band (SNm4x4 VIS version) 512 x 272 RAW per band (SNm4x4 RedNIR version) 409 x 218 RAW per band (SNm5x5 NIR version)
Spectral resolution	16 bands in 460-620 nm range (SNm4x4 VIS version) 16 bands in 595 – 860 nm range (SNm4x4 RedNIR version) 25 bands in 665 – 975 nm range (SNm5x5 NIR version)
Bandwidth per band (FWHM)	~10 - 15 nm (collimated)
Base imager type	CMOS imager, CMOSIS CMV2000 based
Acquisition speed	Up to 120 hyperspectral cubes/second (USB3.0 interface limited)
Pixel pitch	5.5 µm pixels, 2/3" sensor optical format
Bit depth	8 or 10 bits
Optics	16 / 25 / 35 / 50 mm lenses, F2.8, C-mount
Interface	USB3.0 + GPIO + I/O for triggering
SW acquisition modes	HDR modes (dual or multi-exposures for best SNR per band channel)
Power Consumption	1.6 Watt
Dimensions (WxHxD)	26 x 26 x 31 mm
Weight	32 g (without optics)

CAMERA DEMO SYSTEM ELEMENTS INCLUDE:

- Snapshot hyperspectral imaging mosaic image sensor
- USB3.0 camera read-out electronic
- Interface and triggering cables
- Rejection filters
- Gorilla tripod & mounts
- Hyperspectral imaging acquisition Software with permanent single user license and SDK / API

APPLICATIONS

- Optical sorting in machine vision
- Chemical analysis of material composition
- Food safety and inspection
- Medical & healthcare
- Pharmaceutical manufacturing
- Semiconductor & photovoltaic
- Waste recycling
- Human machine interface
- Minerology & mining
- Precision agriculture
- Security & surveillance
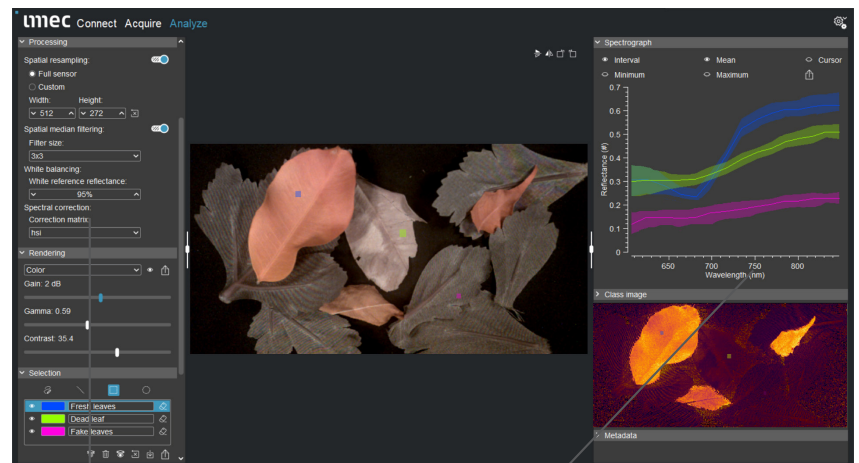
Main control panel

- Camera exposure time, framerate
- Hardware triggering
- Cube / frame export
- Light calibration
- Reflectance calculation
- Superresolution

Visualization panel

- Spectral plot
- Color reconstruction
- False color image
- NDVI
- Live view
- Classification

User interface of imec in house acquisition software, designed for user-friendly hyperspectral imaging operations.