imec

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# Snapshot VIS / RedNIR / NIR hyperspectral imaging evaluation kits

Imec's hyperspectral snaphot evaluation kit offers a fast and user-friendly solution to users of hyperspectral imaging for application research and development. Our solution is flexible and designed to make spectral imaging easy to use, delivering relevant snapshot and video data already within minutes after initial installation. It includes all required components, from imec spectral image sensor to Ximea camera and imec HSI Mosaic software.

Hyperspectral imaging technology for real-time, video-rate applications

Snapshot hyperspectral cameras enable real-time, video-rate output hyperspectral images. This is key for applications where objects are moving (e.g. in traffic observation or object sorting), or where the camera is moving (e.g. robot or UAV mounted) 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).
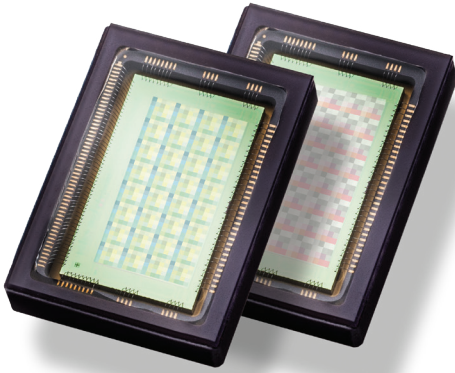
Key benefits

- **Video-rate** acquisition of hyperspectral imaging data cubes with no motion artifacts, perfectly suited for acquisition of moving objects or scenes. Compact and light Ximea camera

- **Easy set-up** with all standard components (USB3, C-mount optics)

- **Easy to use even for new users of spectral imaging**, with full software for image acquisition, cube pre-processing, visualisation and classification

- **API** , for integration in automated systems
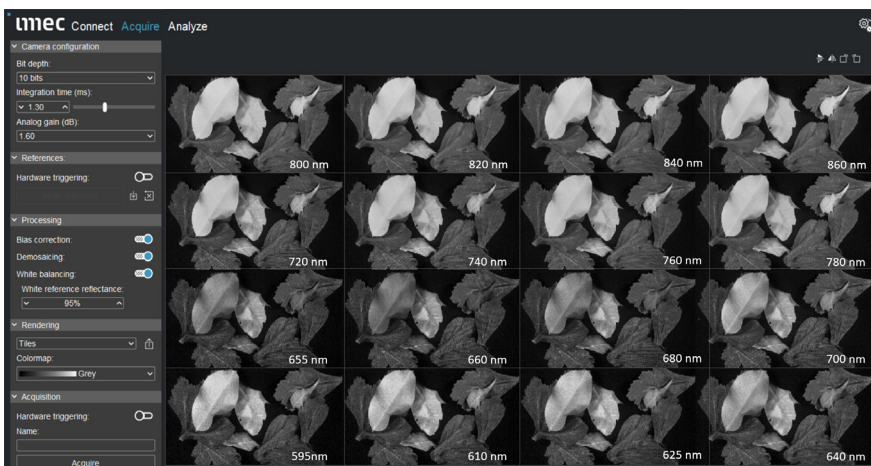
Hyperspectral imaging acquisition software of imec. Several green color objects are imaged (fresh leaf, dry leaf, plastic leaf) are shown in 4x4 = 16 spectral band tiled images view. The HSI data-cube is also classified in real-time at 120+ FPS according to NDVI vegetation index (see next page).

Snapshot hyperspectral image sensors conceptual view of the per-pixel filter deposited mosaic.

XISPEC2 snapshot camera evaluation kit

- Snapshot hyperspectral imaging mosaic image sensor
- USB3.0 camera read-out electronic
- Interface and triggering cables
- Rejection filters
- HSI Mosaic Software with permanent single user license and C & Python/ 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

Hyperspectral snapshot USB3 camera evaluation kit specifications
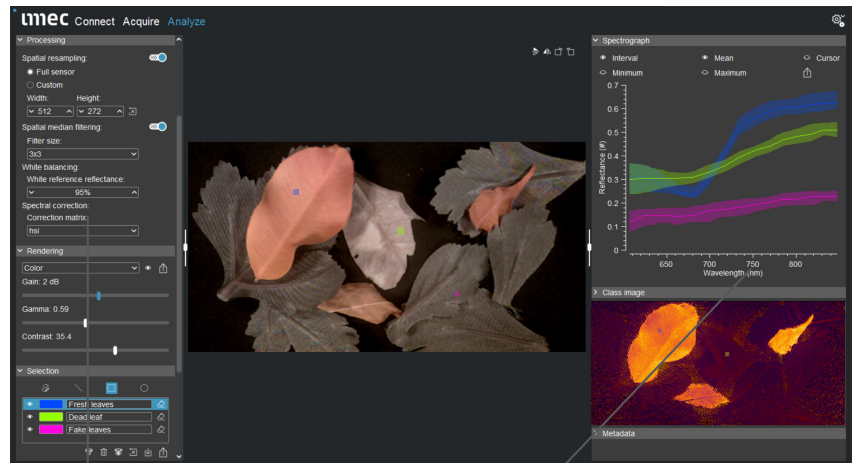
Spatial resolution	2048x1080 RAW (2MP after reconstruction)
Spectral resolution	16 bands in 450-600 nm range (SSM4x4 VIS) 15 bands in 600 – 780 nm range (SSM4x4 RedNIR) 24 bands in 660 – 960 nm range (SSM5x5 NIR)
Bandwidth per band (FWHM)	~10 - 15 nm (collimated)
Base imager type	AMS CMV2000 CMOS detector
Acquisition speed	Up to 120 hyperspectral cubes/second
Pixel pitch	5.5 µm pixels
Bit depth	10 bits
Optics	16 / 25 / 35 / 50 mm lenses C-mount
Interface	USB3.0 + GPIO for triggering
Software	HSI Mosaic software for raw image acquisition, data pre-processing, hypercube visualization and classification; C and Python API for acquisition and data pre-processing in custom software
Power Consumption	< 1.8 Watt
Dimensions (WxHxD)	26.4 x 26.4 x 26 mm
Weight	27 g (without optics)
included accessories	USB3 and trigger cable

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.