



# Snapshot SWIR spectral video imaging camera

Imec's snapshot SWIR range spectral imaging camera offers a simple, fast and easy solution for the spectral acquisition of sample materials and their subsequent analysis. Our system is flexible and designed to enable application development using spectral imaging technology, delivering relevant field data within a few minutes after initial installation. It includes all required components, from imager to camera, lens, illumination, interface cables and software that can be easily rebuilt into different configurations.

## Spectral imaging technology for real-time, video-rate applications

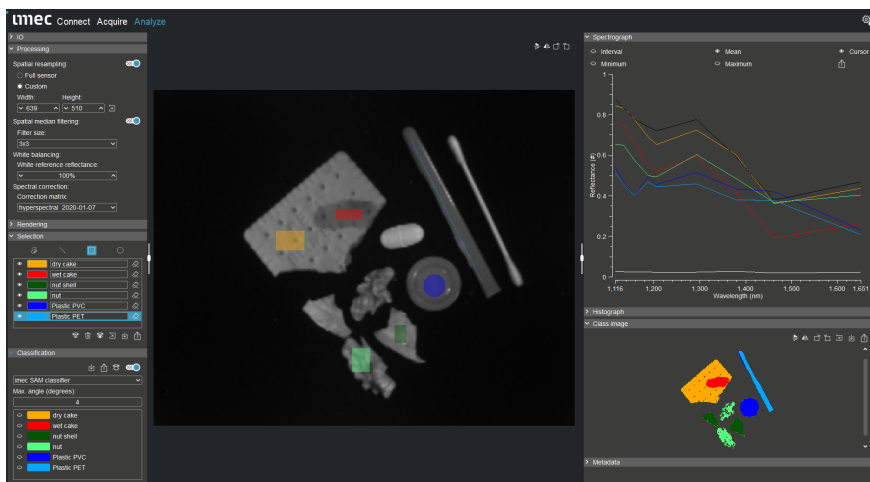
Imec's snapshot spectral cameras enable real-time, video-rate processing of spectral imaging data. This is key for applications where objects are moving or where the camera is moving or simply in static mode to prevent any motion artifacts during long time acquisitions (e.g. sorting and recycling or moving target in security & surveillance applications)

## Key benefits

- **Video-rate** acquisition of spectral imaging data cubes with no motion artifacts, perfectly suited for acquisition of moving objects or scenes and in conditions of vibrations of the field of view
- **Easy set-up** of the complete system
- **Flexible configuration:** indoor or outdoor image acquisition with light calibration tools
- **API:** for integration in automated systems

## Customized filters : Bringing the technology to the final application

**Spectral filters** can be developed to match specific application requirements. This customization can be achieved by modifying the design of our filters over the sensor pixel array providing solutions optimized for size, cost and performance.



Spectral imaging acquisition software of imec: several objects including plastic PET and PVC, nuts and their shells, and dry and wet cookie. The data cube can be classified in real-time.



Snapshot spectral imaging sensor integrated inside the SWIR range camera with 9 spectral bands. Imec's spectral camera can be used for spectral analysis in a lab setting or in an outdoor environment.

## Snapshot camera evaluation kit

- Snapshot spectral imaging mosaic camera
- Lens
- Full lab setup including illumination
- HSI Mosaic software with permanent user license
- C & Python API for acquisition and data pre-processing in custom software
- Support on installation, software and application

## Applications

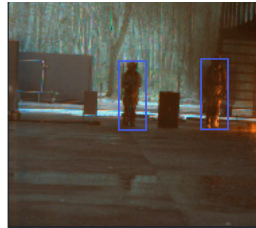
- **Medical diagnosis**
  - Image guided surgery
  - Tissue regeneration monitoring
  - Histology analysis
- **Space**
  - Global scale monitoring and sensing
  - Disaster management
- **In-field detection**
  - Robotic anomaly detection
  - Security & surveillance
  - Precision Agriculture
  - Mining & mineralogy
- **Advanced machine vision**
  - Waste management
  - Food safety and inspection
  - Textile discrimination
  - Recycling & sorting
- **UAV Remote Sensing**
  - Environment sensing
  - Marine plastic pollution

## Imec spectral snapshot camera specifications

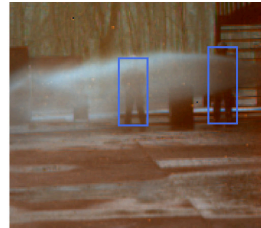
<b>Spatial resolution</b>	640 x 512 (raw sensor resolution)
<b>Spectral resolution</b>	9 bands
<b>Spectral range</b>	1100-1650 nm (SWIR)
<b>Spectral bands</b>	1121, 1140, 1162, 1193, 1211, 1299, 1386, 1469, 1658
<b>Base imager type</b>	InGaAs based, Cardinal 640 sensor with TEC cooler electronic
<b>Acquisition speed</b>	up to 120 spectral cubes per second (SCD Cardinal 640 InGaAs detector)
<b>Pixel pitch</b>	15 µm
<b>Bit depth</b>	13 bit
<b>Optics</b>	C-mount
<b>Interface</b>	USB3.0 + GPIO for triggering
<b>Software</b>	HSI Mosaic software for raw image acquisition, pre - processing, data cube visualization and classification & API for acquisition and pre-processing in custom software
<b>Power Consumption</b>	2 Watts at 60 FPS
<b>Dimensions (W x H x D)</b>	68 x 68 x 98 mm
<b>Camera weight</b>	680g (without optics)
<b>Included accessories</b>	USB 3.0 and power + trigger cables
<b>Cooling</b>	Passive & active cooling (fan-based +TEC)
<b>Mechanical</b>	Integrated mechanical shutter for automatic dark-counts, tripod mount (1/4" - 20) + side-mounting M5 holes

## Real - world spectral imaging applications

### Spectral detection and tracking



Black smoke

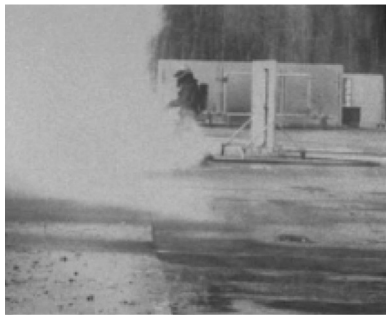


Rain



White smoke

The detection and tracking of search and rescue personnel under hindered light conditions, such as white/ grey smoke, black smoke, haze and rain. Thanks to the video capabilities of our snapshot camera, spectral SWIR image sequences of dynamic outdoor scenarios can be captured in real-time.



Scenes with white smoke, left: VIS range and right: SWIR range. Unlike VIS range, SWIR range allows for visualization of people in spite of the presence of white smoke.

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