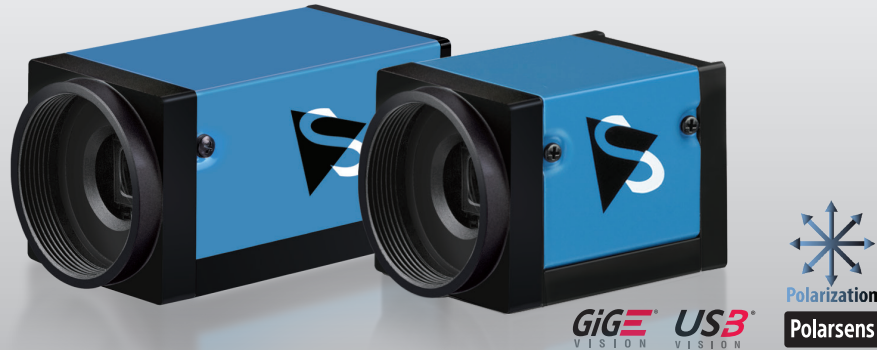


## Polarization Cameras

featuring IMX250MZR/ IMX250MYR Sensors



Sony's Polarsens™ 5.1 MP global-shutter CMOS image sensors (IMX250MZR/ IMX250MYR) capture visual data which cannot be obtained using other standard monochrome and color sensors. The sensor's Polarsens technology uses four-directional (0°, 45°, 90°, 135°) nanowire micro-polarizers placed in front of each 2x2 pixel array (calculation unit) to deliver multi-directional polarized images.

Many materials, such as plastics, glass, metals and liquids display intrinsic polarization properties. The sensors' polarization filters make use of this to visualize material stress and surface scratches as well as to reduce unwanted glare, improve edge detection or to enhance contrast in low-contrast materials. The supplied IC Measure software supports various methods of processing the 2x2 pixel arrays.

The 5.1 MP cameras are available as color and monochrome variants with either a GigE (max. 24 fps) interface or a faster USB 3.0 interface (max. 75 fps).

### USB 3.0 Polarization Cameras

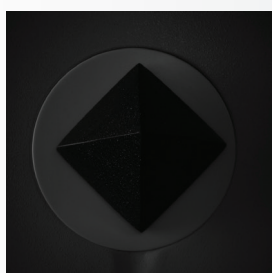
Dimensions: 29 x 29 x 43 mm Mass: 65 g

Model	Resolution	Frame Rate (max.)	Pixel Size	Sensor	Sensor Format	Shutter
DZK 33UX250 (mono)	5.1 MP	75 fps	3.45 µm	Sony IMX250MZR	2/3" CMOS	global
DYK 33UX250 (color)	5.1 MP	75 fps	3.45 µm	Sony IMX250MYR	2/3" CMOS	global

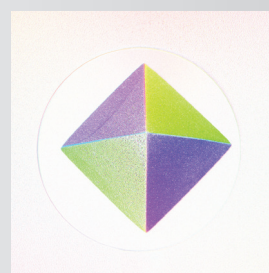
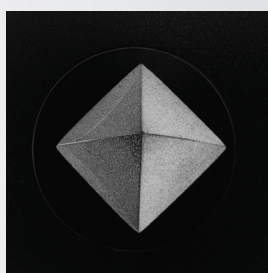
### GigE Polarization Cameras

Dimensions: 29 x 29 x 57 mm Mass: 65 g

Model	Resolution	Frame Rate (max.)	Pixel Size	Sensor	Sensor Format	Shutter
DZK 33GX250 (mono)	5.1 MP	24 fps	3.45 µm	Sony IMX250MZR	2/3" CMOS	global
DYK 33GX250 (color)	5.1 MP	24 fps	3.45 µm	Sony IMX250MYR	2/3" CMOS	global



**Visible-light intensity image.**  
Black pyramid displaying poor contrast overall with ambient light.



**Images from DZK 33UX250 camera with Polarsens sensor.**  
**Left:** image using DoLP image data, removes shadows and adds contrast.  
**Right:** image using AoLP image data and HSV color mapping for effective segmentation.

## Polarization Applications



### Glare Reduction

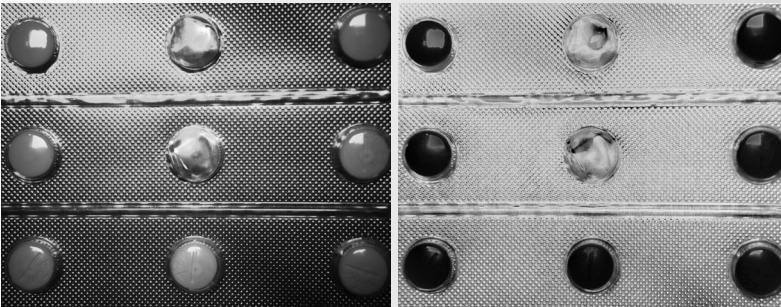
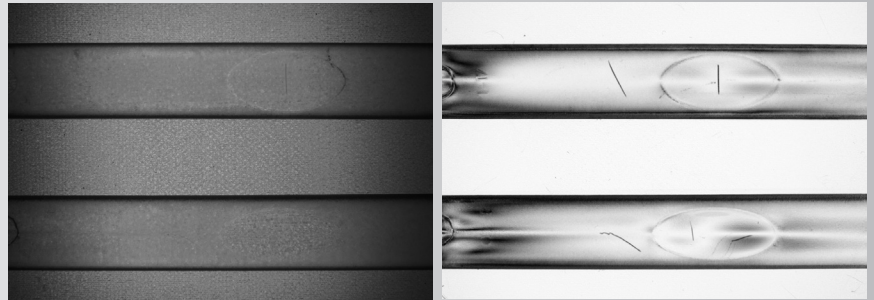
**Left:** Standard visible-light intensity image with glare on windshield obstructing view inside.

**Right:** Image from DZK 33UX250 camera: DoLP (Degree of Linear Polarization) image data to reduce glare, making inside-view of cabin possible.

### Defect Detection

**Left:** Standard visible-light intensity image of glass tubes showing no visible defects.

**Right:** Image using DoLP (Degree of Linear Polarization) data from DZK 33UX250 to visualize scratches in glass.



### Presence Detection

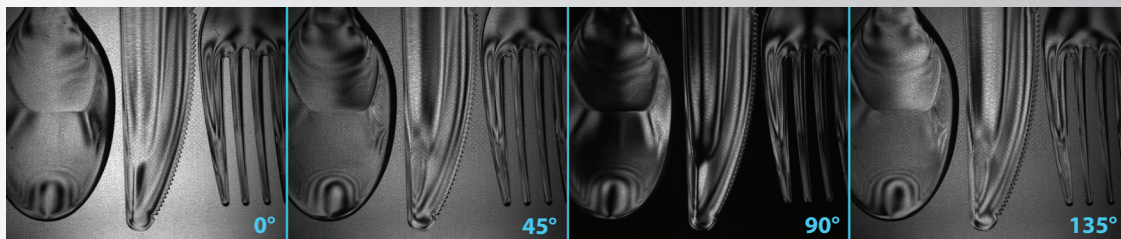
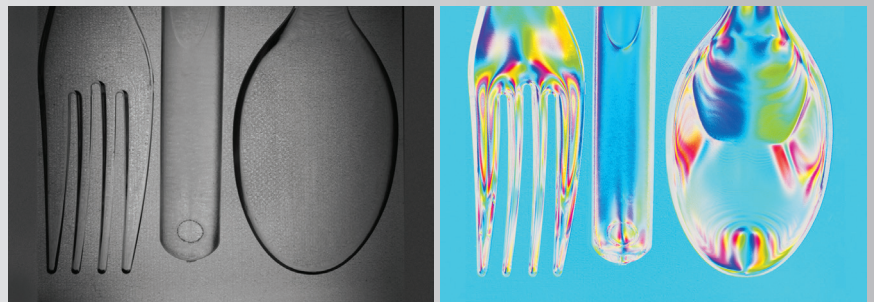
**Left:** Standard visible-light intensity image of pills in blister pack. Glare and low contrast make presence detection difficult.

**Right:** Image from DZK 33UX250 showing reduced glare and added contrast, enabling more precise presence detection.

### Visualization of Residual Stress

**Left:** Standard visible-light intensity image of plastic cutlery displaying almost no useful visual data.

**Right:** Image using AoLP (Angle of Linear Polarization) data from DZK 33UX250 and HSV color mapping visualizes residual stress in plastics and glass (birefringence).



**On-chip, four-channel polarization:** Users can isolate specific channels for additional image processing.