Workshop »Coatings for Optics and Optical Components«

Spectral imaging as new imaging modality in the operation theater

Wouter Charle

imec, Leuven

wouter.charle@imec.be

In image-guided surgery, the surgeon uses tracked surgical instruments together with preoperative or intraoperative images to guide the – minimally invasive – surgery. Hyperspectral images could soon take their place in this field, giving the surgeon real-time information on tissue chemical composition at the molecular level, and increasing the level of precision and efficiency of surgeries.

Imec's snapshot hyperspectral sensor and camera are ideally suited for use in minimally invasive surgeries (e.g. with laparoscopy, surgical robots) because of its compactness and video-rate capabilities. The imec sensor consists of interference-based optical filters on top of image sensor pixels. All is made using CMOS-based infrastructure and process technology, ensuring it to be a cost-effective and mass-producible solution. The imec solution has already been used in surgical feasibility studies and has been recognized as 'the only available video-rate capable multispectral sensor'. It has e.g. been used for the reliable discrimination of critical tissue during spinal fusion surgery in patients and for perfusion assessment in colorectal anastomoses in a porcine model.

In this presentation we will present the technology and unique capabilities of the imec hyperspectral sensors, specifically for the use case of minimally invasive surgeries. imec is looking for medical device companies and integration companies that want to use this hyperspectral technology to make next-gen surgical tools.