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Imec demonstrates combined VIS & NIR spectral camera system, complemented with hi-res RGB imaging, for data acquisition at video rate

LEUVEN (Belgium), JANUARY 26, 2023 — *At this week's SPIE Photonics West, imec – a world-leading research and innovation hub in nanoelectronics and digital technologies – showcases the world's first multi-sensor hyperspectral camera system that covers both the visual and red/near infrared spectral ranges, while coming with a high-resolution RGB sensor. Even in scenarios with inherent motion, the system supports data acquisition at video rate and helps assess which spectral resolution and range best suit a given application using a single device.*

A growing number of companies are investigating how hyperspectral imaging (HSI) technology can enhance their product and/or service offerings. For some, it is clear from the start which spectral range best suits their needs. For others, however, it is a journey that involves testing several camera options. While these camera options are available, it's a proven challenge to fuse their data into one dataset to draw learnings and conclusions.

"Imec has an extensive track record in the domain of HSI research and prototyping. Exemplary of this is our acclaimed series of hyperspectral *snapshot* cameras. Coming in several flavors, each variant covers a specific spectral resolution and range – from the visual (VIS), over the near-infrared (NIR), to the short-wave infrared (SWIR) ranges, all while supporting real-time data acquisition, even in motion," says **Wouter Charle**, program manager of imec's spectral imaging on-chip activities. "Today, we expand this portfolio with the **imec multishot VNIR+RGB** – a multi-sensor system that covers the VIS to NIR spectral range, complemented with a high-resolution RGB sensor. It is specifically aimed at companies and research groups engaging in HSI application development."

Three sensors in one housing for unmatched application research

A world's first, imec's new hyperspectral camera comes with **three sensors**, integrated into **a single housing**, and equipped with **a standard F-mount lens**. It will allow partners to flexibly assess the pros and cons of different spectral resolutions and ranges without needing to invest in a myriad of devices or duplicate experiments.

Inside the camera, the light is directed to three channels. Two of them are equipped with an imec off-the-shelf two-megapixel sensor – together covering the **VIS** and **NIR** spectral ranges. A third channel sports a **high-resolution RGB** sensor. As such, the device covers **30 bands** in the **460 to 870nm range**, complemented by a **true-color, five-megapixel image** – all working in sync at **video rate speed** for real-time data acquisition (even of dynamic scenes).

"The imec multishot VNIR+RGB is a real game-changer for companies still in doubt about which sensor best suits their needs. Thanks to the system's flexibility and the software that comes with it, experimenting with HSI technology has never been easier. It allows partners to focus on their core business, i.e., application validation and development, without having to worry about HSI's underlying complexity," claims Charle.

<u>From assisted surgery, and machine vision to quality inspection</u>

Like the other flavors in imec's snapshot offering, the new system particularly lends itself to supporting use cases involving an uncontrollably dynamic scene. Examples include assisted surgery, environmental monitoring, anomaly detection, automotive vision, precision agriculture, and crop inspection – just to name a few.

Wouter Charle: "We know there is much interest in this type of solution. Yet, so far, the underlying complexity has prevented the industry from building a fully functional multi-sensor hyperspectral camera. So that is where imec comes in, exploring and prototyping the required components and helping the industry overcome all related hurdles. As a next step, we are ready to share our learnings and a complete development kit with camera builders and systems companies to support the system's further commercialization."

Interested in experimenting with imec's multi-sensor snapshot and/or snapscan hyperspectral cameras? Or want to learn more about imec's R&D activities and bilateral projects? Discover the technology's potential in domains as diverse as Space, agriculture, sorting, or a variety of medical applications at this year's SPIE Photonics West (imec booth 4614), or have a look at our hyperspectral webpages.

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About imec
Imec is a world-leading research and innovation center in nanoelectronics and digital technologies. Imec leverages its state-of-the-art R&D infrastructure and its team of more than 5,000 employees and top researchers, for R&D in advanced semiconductor and system scaling, silicon photonics, artificial intelligence, beyond 5G communications and sensing technologies, and in application domains such as health and life sciences, mobility, industry 4.0, agrofood, smart cities, sustainable energy, education, … Imec unites world-industry leaders across the semiconductor value chain, Flanders-based and international tech, pharma, medical and ICT companies, start-ups, and academia and knowledge centers. Imec is headquartered in Leuven (Belgium), and has research sites across Belgium, in the Netherlands and the USA, and offices in China, India, Taiwan and Japan. In 2021, imec's revenue (P&L) totaled 732 million euro.

Further information on imec can be found at www.imec-int.com.

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