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# 8<sup>th</sup> European Machine Vision Forum in Fürth/Germany – Key Takeaways

*Barcelona; October 30th, 2025.* Emphasizing the sensorial basis of machine vision, the focus topic of this year's 8th European Machine Vision Forum on October 16-17 in Fürth at the Development Center X-ray Technology of the Fraunhofer Institute for Integrated Circuits IIS was "Imaging the Invisible". The key here is to find an "information channel" that is able to transport the image information relevant to the task at hand. In contrast to "checking by looking," as humans do, machine vision exceeds human capabilities in some respects. This applies to the usable wavelength range of the spectrum (from Radar to Terahertz, IR, the visible range, UV, and X-rays), but also to other modalities such as acoustic data and methods for evaluating image data that are not accessible to humans like approaches based on machine learning. All of this year's forum contributions related to this focus topic and highlighted its various aspects.

### *Focal topic: Imaging the invisible*

The hosting Development Center X-ray Technology set a topical focus on sensor technologies based on X-rays. In several presentations and during an extensive tour of the laboratories, various technologies for using X-rays for imaging in industrial visual inspection were presented. In addition to simple images that provide a projection as a special view into

the material, X-ray videos and CT reconstructions of the internal structure of technical objects as 3D models were particularly impressive. These sensory insights were supplemented by contributions on imaging using radar and terahertz radiation. A second focus in the field of imaging using electromagnetic waves was the use of a large number of channels using multi- and hyperspectral sensor technology. These sensory impulses were supplemented by approaches such as the use of single photons (using SPADs), quantum dots for image capture in the short-wave IR range, and acoustic sensor technology. The presentations on sensory solutions were supplemented by two approaches to evaluate camera performance, e.g. by extending the EMVA1288 standard. Several contributions presented possible areas of application in industrial quality assurance, particularly for detecting defects inside materials and material classification, and in medical diagnostics, for example in dermatology.

### *Main topics of the keynotes*

The three keynote speeches highlighted different aspects of the focus topic “Imaging the invisible.” The presentation by Michael Salamon from the host Development Center X-ray Technology of the Fraunhofer Institute for Integrated Circuits IIS addressed the basics and the use of X-rays for imaging in various applications. Using the example of e-mobility, he showed how X-rays can be used to achieve the vision of flawless production by checking assembled components for completeness and defects with high resolution and accuracy, even without visual access. The sensor systems required for this were systematically developed at Fraunhofer IIS and transferred into applications. Other applications, such as the characterization of plant growth in the soil, can also be solved without intervention and thus without disruption. Jeroen Kalkman from Delft University devoted his keynote to optical coherence tomography. This technology can be used to examine the spatial and optical properties of object surfaces and partially transparent layers. Using the example of the art-historical examination of a painting, he demonstrated how repairs and restorations can be analyzed and documented in the image data. Insights into OCT research show that this

technology still has considerable potential for the spatial examination of partially transparent objects. Finally, Boris Landgraf from Cosine gave a keynote presentation on the use of satellite-based multispectral sensor technology for Earth observation and astronomy applications. Particularly impressive were the requirements for reliable operation of this sensor technology in space and the sensor systems implemented on various missions.

#### *Visit to the host institute and accompanying exhibition*

A particular highlight of the two-day forum was the detailed tour of the hosting Development Center X-ray Technology. The various applications of X-ray-based imaging were presented at several stations, including the creation of complete 3D models of large objects such as entire cars and the examination of plant growth in an automated laboratory. In addition to the presentations, more than 20 posters and company presentations showcased research results, activities, and products related to the focus topic “Imaging the Invisible.” In an evening session, working groups from the host institute and companies from the surrounding area presented their main areas of focus.

#### *Positive feedback from participants*

The focal topic of high significance to the industry discussed in-depth by leading research experts and a host institute specialized in this very technology; combined with the unique networking opportunities between company representatives and the research sector made the European Machine Vision Forum 2025 again to an event which was praised by the attendees for its professional approach and high relevance.

## About EMVA

Founded in 2003, the European Machine Vision Association (EMVA) is a non-for-profit and non-commercial association representing the Machine Vision industry in Europe that is open for all types of organizations having a stake in machine vision, computer vision, embedded vision or imaging technologies: manufacturers, system and machine builders, integrators, distributors, consultancies, research organizations and academia. The EMVA hosts four international vision standards, and all members – as the 100% owners of the association – benefit from the dedicated networking, standardization, and cooperation activities of the EMVA. [www.emva.org](http://www.emva.org).