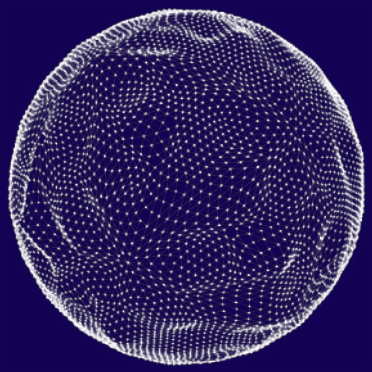


VISIR2

Novel VISible-InfraRed imaging system in two dimensional arrays

PUBLIC SUMMARY

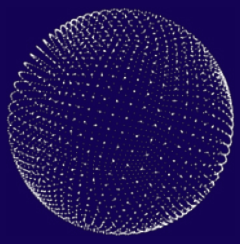
VISIR2 aims at realizing a novel dual-band solid state imager prototype by scaling the innovative technology validated in the ATTRACT phase 1. Being based on Ge-on-Si back-to-back photodiodes, our technology allows to cover most of the visible (VIS) and of the short-wave infrared (SWIR) spectral ranges with a single sensor and to easily discriminate the two spectral bands just by switching the polarity of the voltage applied to the device. The imager will be realized in a fully-qualified CMOS pilot line, using the same materials, processes, and methods normally employed for the production of consumer microelectronics.

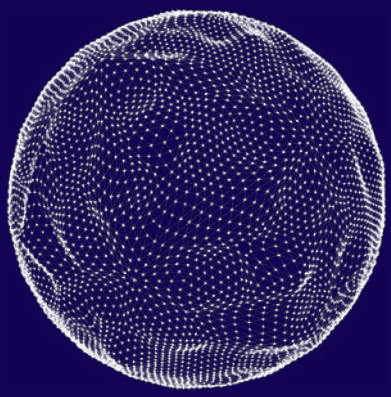
The SWIR light reflected by an object carries valuable information about its composition, with countless applications in automotive, industrial automation and environmental conservation. Such information is even more valuable if combined to those coming from VIS, enabling novel functionalities such as early detection of wildfires avoiding the interference of sunlight or discrimination between water and ice on the road.

Nowadays only InGaAs and PbS quantum dots-based imagers allows to cover the VIS-SWIR spectral ranges. Being based on expensive materials, not compatible with the monolithic integration of silicon-based read-out circuitry, such imagers are commercially available at prices well above 10 k€/device, thus making VIS-SWIR imaging technology available only for niche markets (mainly defense and astronomy) where the cost of the single device is not relevant. By leveraging on the cost-effectiveness, the high production volumes, and the reliability typical of the microelectronic industry, VISIR2 will surpass this bottleneck deploying a new class of affordable, high-performance imagers with an additional dual-band functionality, paving the way toward a widespread adoption of the VIS/SWIR imaging technology.

The main objective of VISIR2 will be the production of a VIS/SWIR camera prototype with VGA resolution and its demonstration in operational environments (TRL 7). Being particularly interesting for the automotive market, we will mount our prototype in a car to test its capabilities for night vision, to assisted driving in bad weather conditions (heavy rain, fog, smoke, ice on the road), and to monitor driver fatigue. The imager will be employed also to address two worldwide, still unsolved societal challenges such as early detection of wildfires and plastic detection in natural environments.

The consortium is led by EYE4NIR, an Italian start-up, recently founded by some of the members of the original VISIR. The imager will be produced in the SiGe BiCMOS pilot line of the Leibniz Institute for High Performance Microelectronics (IHP). IMASENIC, a Spanish innovative SME developing CMOS image sensors, will design the read-out integrated circuit as well as the camera electronics. IDNEO, a global engineering company developing products for automotive, industrial systems and healthcare, will test the prototype in an automotive environment.





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