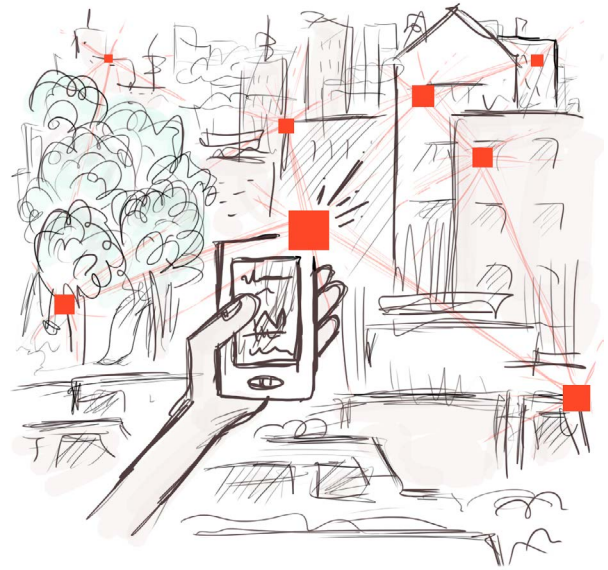


Air quality is invisible and strongly affects our health and performance. Also, air quality in cities changes dramatically from one hour to the next and from one block to another. A dense mesh of mobile miniaturized sensors reporting air quality, in real time, will help us to make informed decisions and in the long run to improve air quality.

Distributed and networked gas sensing is rapidly growing in importance for industrial, safety, and environmental monitoring applications. Optical gas sensors offer the highest sensitivity, stability and specificity in the market, but for most applications, the existing sensors are too bulky and expensive. To enable the broad utilization of high-performance gas sensor networks, there is a critical need for small, low-power and networked gas sensor systems.

In ULISSES, we will develop an integrated optical gas sensor and the networking technology required to bring it onto the Internet of Things (IoT). ULISSES will deliver the wafer-scale mass production methods necessary to enable production volumes of millions of sensors per year, and thus provide an order of magnitude reduction of sensor module cost. By leveraging recent breakthroughs of the ULISSES partners on waveguide integrated 2D materials-based photodetectors, 1D nanowire mid-IR emitters, and mid-IR waveguide-based gas sensing, we target a three-order-of-magnitude reduction in sensor power consumption, thus permitting maintenance-free battery powered operation for the first time. Finally, we will implement a new edge-computed self-calibration algorithm that leverages node-to-node communications to eliminate the main cost driver of low-cost gas sensor fabrication and maintenance.



The ULISSES team is hand picked to solve this delicate task. Experts with competence ranging from 2D-materials to optical gas sensing and cloud-based data handling will develop miniaturized and low-cost gas sensors.

Senseair AB	Delsbo	SE
AMO GmbH	Aachen	DE
KTH Royal Institute of Technology	Stockholm	SE
Oxford Instruments Nanotechnology Tools Ltd	Abingdon	UK
Graphenea	San Sebastián	ES
Universität der Bundeswehr München	München	DE
Catalan Institute of Nanoscience and Nanotechnology	Bellaterra	ES
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