

Final Publishable Executive summary

The FP7 project MSP - Multi Sensor Platform for Smart Building Management started on 1st September 2013 and ended 30th April 2017. Materials Center Leoben (MCL), an Austrian COMET K2 Competence Centre, coordinated this € 18.5 million project which was designed to strengthen the leadership of European industries in the highly competitive area of smart sensing systems in wireless mobile and building applications.

The MSP consortium comprises 17 partners from 6 European countries: Materials Center Leoben, ams AG and EV Group (EVG) from Austria; Applied Sensors GmbH (now: ams Sensor Solutions Germany GmbH), Fraunhofer Gesellschaft, Siemens AG and the University of Freiburg from Germany; Boschman Technologies B.V. and Holst Centre from the Netherlands; the University of Oxford, the University of Cambridge, the University of Warwick, Cambridge CMOS Sensors (now: ams Sensors UK Limited), and Samsung R&D Institute UK from the United Kingdom; the University of Louvain and VITO from Belgium; and Università degli studi di Brescia from Italy.

The MSP consortium successfully developed the most challenging full manufacturing chain for 3D system integration including overmolding. A complex manufacturing chain, which has never been realized before, enables flexible “plug-and play” 3D-integration of sophisticated sensor devices on a CMOS electronic platform chip. The MSP team decided to head for a wearable wristband application as ultimate MSP demonstrator device being the most challenging demonstrator system with respect to required minimum footprint, minimum power consumption, and maximum number of sensor devices.

The final MSP demonstrator system integrates a variety of highly sophisticated gas sensors based on nanowires, nanoparticles, and graphene, as well as optical sensors for ultraviolet, visible and infrared light. The MSP demonstrator system implemented in a wearable wristband application comprises a total of 57 sensors – this is a worldwide unique sensor system! Several innovative technologies, processes and devices ranging from a TSV-based CMOS chip integrating 16 gas sensors on a single chip to a highly complex overmolding technology were successfully realized on the road to the final MSP demonstrator system.

The MSP consortium elaborated a comprehensive exploitation plan including a market study. A variety of highly innovative potential products are the outcome of the MSP-project for applications in Smart Buildings, Smart Home, Safety & Security, Environmental Monitoring, Health, Consumer Electronics, and Internet-of Things. The MSP-team has been able to publish a total number > 70 of contributions to peer reviewed journals including high impact journals such as *Nano Energy* and *Nature Scientific Report*, as well as *Nanoscale* and *Nanotechnology*. A total number of > 130 dissemination actions such as presentations at international conferences and workshops was achieved. Successful organization of two *nanoFIS* “Functional Integrated nanoSystems” conferences in Graz, Austria, in 2014 and 2016, was among the highlights of the dissemination activities.

Demonstrating the ultimate state-of-the-art in multi-sensor system integration worldwide, the MSP project paves the way for future integrated sensor systems. The MSP consortium is proud to announce that the MSP project contributes to reinforce European industrial leadership through miniaturization, performance increase and manufacturability of innovative smart systems.