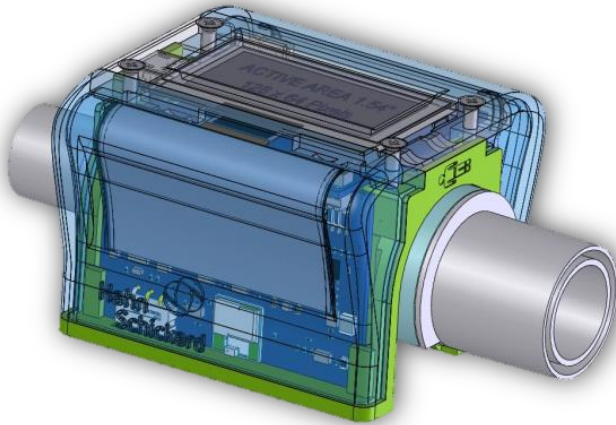


Show-Case “Smart Respiration System”

Smart Sensor Platform for patient-side resuscitation / artificial respiration



The Smart Respiration System (left) improves patient care (right)

With actual spirometry systems the breath of a patient is not monitored directly at his mouth. The air needs to go through long tubes to a complex and relatively cost intensive apparatus that analyses the breath amount and frequency, but does not analyse the composition of the breathing gas.

Within the SMARTER-SI project a new type of respiration system will be manufactured that combines electronics as medical device (regulated market) with respiration tubes as disposable (low price!).

The main advantages are:

- Safe measurement of CO₂ concentration and flow in the moist breathing gas with thermal MEMS sensors patient-side directly on the mouthpiece with minimal dead volume
- Increase of the device security by reducing the complexity of patient hoses
- Expandable sensor platform with a high integration density allows easy integration into other systems, as well as an expected reduction in price, thus enabling new applications

The manufacturing is a challenge due to the complexity and high miniaturization of the module while considering medical exigencies.

The project partners of SMARTER-SI can provide all necessary technologies and building blocks to realise this innovative sensor system with the desired TRL: A temperature sensor (building block by **CiS**) and MEMS-sensor elements for flow and CO₂ (building block by **Hahn-Schickard**) using assembly technologies by **IK4-IKERLAN** and **Tyndall National Laboratories**. The electrical contact system for medical application to connect the disposables is provided as building block by **Swerea IVF**.

The German SME **Karl Küfner** contributes e.g. housing, tubes and tools for the production of the disposables. The company, as specialist in injection molding technology and biocompatible materials, will also implement the end-user testing and the commercialisation of the final product.