Gas Sensor for Medical Performance Diagnosis

Miniaturised ceramic gas sensors developed for in-situ measuring of oxygen distribution in Low Earth Orbit (LEO) outside the International Space Station ISS and during re-entry of spacecrafts into the earth atmosphere find under the support of the European Space Agency's Technology Transfer Programme applications in the medical and fitness market.

In 1993 the Institute of Space Systems (IRS) of the University of Stuttgart started to use ceramic gas sensors for measuring oxygen distribution in plasma wind tunnels where heat shield materials for re-entry spacecrafts are tested on their performance under most extreme temperature and flow conditions. The correct position of material samples in the stream can be determined on the basis of the oxygen distribution in the plasma open jet. This first application lead to further developments of the sensors for a multitude of space experiments, e. g. on board the Russian research capsule IRDT or for future use on the International Space Station ISS.

Demonstrator (IRDT-Inflatable Re-entry and Descent Technology) for re-entry technologies.

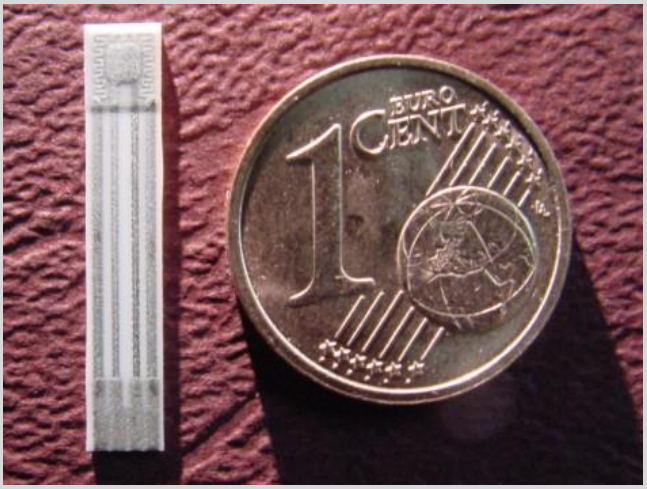
Started as a development for the aerospace industry, the technology met from 1998 on with very high interest with regard to terrestrial applications of the gas sensors after its presentation to wide sections of potential users in the frame of the Technology Transfer Initiative. Due to the enormous feedback on their technology in form of many requests and a number of development orders, three employees and the former head of institute of the IRS founded at the beginning of 2000 their own company ESCUBE Space Sensor Systems GmbH for marketing their achievements in the field of modern gas analysis. Since then high-quality sensor systems have been provided for multiple and increasing applications e. g. in vacuum, medical, household and environmental technologies.

The basic principle for the miniaturized ceramic sensors is solid state electrolysis. This make it possible to use the sensors in a variety of areas.

Their miniaturisation which is based on their use in aerospace industry makes the sensor systems especially interesting. It particularly reduces the sensor systems' power consumption. These systems allow for high time-resolved in-situ measuring of varying gas concentrations even in aggressive, reductive or oxidising environments. Innovative production methods and high grade materials furthermore guarantee the customers highest quality and robustness.

Currently ESCUBE GmbH focuses on innovation projects regarding control of small combustion plants (CarboSen) and safety inspections of fuel cells (HydroSen).

With long experience in clinical research and development, the Belgium company Medisoft designs, produces and sells the most complete range of equipment for functional respiratory and cardio-pulmonary exploration in the following market segments: hospitals and medical centres, revalidation centres, private medical cabinets (cardiologists and pneumologists), fitness and sports centres, high-level sports medicine, etc.



The miniaturisation of the ceramic sensor elements, which was essential for their use in aerospace activities, led to a variety of terrestrial uses. To meet the standards set by ESCUBE's customers, new manufacturing procedures are used in producing the sensor elements. This guarantees a high quality product also available in larger quantities.

End of 2002 the contact between ESCUBE and Medisoft was established with the support of the European Space Agency's Technology Transfer Programme and after negotiations with ESCUBE, Medisoft has joined the RND consortium of ESA's Microgravity Application Promotion (MAP) Programme to develop a new medical system for O_2/CO_2 human breathing analysis. Herefore, Medisoft makes its know-how and analytical expertise in the medical field available to the ESA MAP programme in order to serve space research with a view to developing new applications in the International Space Station: the measurement of the natural and artificial environment through the intervention of a single solid, miniaturised electrolyte oxygen capture (Sensor).

As well as the developments inherent in the future of inhabited space flight, the perspective of applications related to human respiratory functions (diagnostic) are very important and are practised in the medical and sports (fitness) market segments.

The Technology Transfer contract between Medisoft and ESCUBE will supply gas sensors for human respiration analysis to Medisoft exclusively. The general application for the medical market will be in autonomous and miniature systems for O_2 and CO_2 exchange control and flow exchanges. The target is fixed at 5000 to 10000 pieces.

Thanks to the essential advantages of this new technology (miniaturisation, low manufacturing costs, greater measuring capacity, etc.), the commercial potential gives Medisoft the opportunity to diversify and to broaden its export range.

New products are created from research. Important technological innovations will allow Medisoft to maintain its position on its current markets and above all to invest in new growth segments (Bluetooth technology, upgrade software, ECG-USB interface, etc.).