

*Press release*

## **Reducing pressure on hospitals by monitoring Covid-19 patients' vital signs remotely**

**Neuchâtel, 11 December 2020 – Doctors at Luigi Sacco University Hospital in Milan are testing a new system that monitors Covid-19 patients' vital signs remotely using a chest belt initially developed at CSEM for space applications. The hope is that the system can help reduce the burden on hospitals and health-care professionals. The project is being led by Swiss startup Vexatec and includes EOS of Italy and CSEM.**

Emergency rooms and intensive care units are under pressure once again as a result of the second wave of the Covid-19 pandemic. Beds are running short, the risk of cross-infection at hospitals is increasing, and capacity levels have reached a critical stage.

Under a project being carried out jointly by Vexatec (project lead), EOS (an Italian company specialized in system integration) and CSEM, engineers are working hard to ease the burden. They have developed a device consisting of light, comfortable sensors that Covid-19 patients can wear and allow doctors to track their vital signs. The sensors are incorporated into a CSEM-designed chest belt and take continual readings of a patient's heartbeat, breathing rate and body movements. The system also includes wireless devices that periodically measure the patient's blood oxygen-saturation levels (SpO<sub>2</sub>) and skin temperature.

The measurements are sent instantly to a central system through an app installed on the patient's smartphone; doctors can then view the data and monitor the patient's condition. If one of the patient's readings falls out of a preset threshold range the system can send a notification to the health-care team. With this system, patients can stay at home and receive personalized medical and psychological care as and when they need it.

### **Clinical trials under way in Milan**

The system is currently undergoing clinical trials at Luigi Sacco University Hospital in Milan, under a protocol and program headed by Prof. Dr. Maurizio Viecca, the director of the departments of Cardiology. The platform was approved by the ethics committee, and Prof. Viecca notes: "I am very satisfied with the technological content in terms of reliability and precision, and happy for the patients who finally have access to a tool that is not an option, but a valid therapeutic tool."

The project is called COMO – for COronavirus remote MONitoring of outpatients – and is being run by an Italian-Swiss consortium with funding from both the European Space Agency (ESA) and the Italian Space Agency (ASI).

### **Equipping astronauts**

COMO draws on technology that CSEM had initially developed for ESA to take measurements of physiological parameters during research expeditions at the Concordia research base in Antarctica. CSEM

had also improved the sensing technology to make it compatible with conditions in the International Space Station, so that it can monitor astronauts. Now the technology is back in use, albeit in an updated version, through the R&D partnership with Vexatec. “ESA’s programs aim to support the development and marketing of innovative products and services that draw on the knowledge and technology developed through our various space missions and research projects,” say Elena Razzano and Arnaud Runge, who oversee the COMO project at ESA. “We would be delighted if our space-related research can be redeployed to help save lives” they add.

### **Dry-electrode sensors**

The belt contains two sensors on each side that are placed directly on the patient’s skin. Each sensor contains all the electronics needed for signal processing. The data are sent to the patient’s smartphone via Bluetooth and subsequently to a cloud platform where the patient’s health-care team can view them. A smartphone app is also available for doctors.

“Our system can perform accurate electrocardiograms that cardiologists can work with directly,” says Pascal Heck, the project head at CSEM. Another advantage to COMO is that it employs dry-electrode sensors, which are more comfortable for patients to wear and easier to remove, such as when the patient wants to take a shower. “The electrodes usually used in ECGs are adhesive and can irritate the skin. We decided to use dry electrodes made of stainless steel and then develop the necessary electronics to achieve the same signal quality as doctors get in a clinic, but with less irritation for patients,” says Heck.

Vexatec plans to market the new system, based on the results of this development work. “Our system has a lot of advantages for medical monitoring in general and for remote health care,” says Urs Ruggaber, CEO of Vexatec. “We are developing a new generation of sensors and aim to launch them next year.”

**Vexatec AG** is a privately owned Swiss technology company with focus on Vital Sign Parameter (VSP), Data Ecosystems, Wearables and Smart Textile solutions for dedicated areas of use such as professional sports, health and wellness. Founded in 2016, Vexatec AG is based in Lugano.

For more information visit: [www.vexatec.com](http://www.vexatec.com)

### **CSEM—technologies that make the difference**

CSEM, founded in 1984, is a Swiss research and development center (public-private partnership) specializing in microtechnology, nanotechnology, microelectronics, system engineering, photovoltaics and communications technologies. Around 500 highly qualified specialists from various scientific and technical disciplines work for CSEM in Neuchâtel, Zurich, Muttenz, Alpnach, and Landquart.

Further information is available at [www.csem.ch](http://www.csem.ch)

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**ESA European Space Agency** is Europe's gateway to space. Its mission is to shape the development of Europe's space capability and ensure that investment in space continues to deliver benefits to the citizens of Europe and the world. ESA Space Solutions aims at reaching commercial exploitation of space assets, data and capabilities addressing incubation, proving technical feasibility and business development. This includes the development of operational services for a wide range of users through the combination of different systems, and support in creating viable companies as well as to existing companies.

For more information about ESA visit: <https://www.esa.int>

For more information about the project COMO visit: <https://business.esa.int/projects/como>

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