

Press Release

Medically monitoring premature babies with cameras

Lausanne/Neuchâtel April 10, 2017 - A contactless and wireless camera system developed by EPFL and CSEM researchers continuously monitors premature babies' vital signs. This system could replace skin sensors, which cause false alarms nearly 90% of the time. Preliminary tests will be run shortly on newborns at University Hospital Zurich, a partner in the project.

Someday soon, premature babies kept warm in neonatal incubators may be medically monitored by a camera system rather than by sensors attached to their skin. This system is about to be tested on preemies at University Hospital Zurich (USZ). The underlying technology was developed by [EPFL](#), [CSEM](#) and [USZ](#) as part of the Swiss research program Nano-Tera.

The camera system was developed to improve monitoring of babies' heart rate and breathing. "Skin sensors placed on the babies' chest are so sensitive that they generate false alarms nearly 90% of the time, mainly caused by the babies moving around," said Jean-Claude Fauchère, attending neonatologist at USZ's division of neonatology. "This is a source of discomfort for the babies, because we have to check on them every time. It's also a significant stress factor for nurses and a poor use of their time – it distracts them from managing real emergencies and can affect quality of care."

With the camera system, no physical contact is required. The babies' pulse is detected through their skin color, which changes ever so slightly every time their heart beats. And their breathing is monitored through movements in their thorax and shoulders. At night, infrared cameras take over, which means non-stop monitoring.

The optical system was designed by the CSEM researchers, who chose cameras that are sensitive enough to detect minute changes in skin color. They teamed up with the EPFL researchers to design algorithms for processing the data in real time. CSEM focused on respiration, while EPFL worked on the heart rate. "We ran an initial study on a group of adults, where we looked at a defined patch of skin on their forehead," said Sibylle Fallet, a PhD student at EPFL. "With our algorithms we can track this area when the person moves, isolate the skin pixels and use minor changes in the color of these pixels to determine the pulse. The tests showed that the cameras produced practically the same results as conventional sensors."

University Hospital Zurich is about to test the system on premature babies. Virginie Moser, the CSEM researcher who is in charge of the set-up at USZ, said: "We plan to take measurements on as many preemies as possible to see whether, under real-life conditions, the results we get from our algorithms match the data collected by the on-skin sensors."

If so, the camera system could one day replace skin sensors. In addition to cutting down on false alarms, it would also be more comfortable for the babies.

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About EPFL

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About CSEM

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 450 highly qualified specialists from various scientific and technical disciplines work for CSEM in Neuchâtel, Zurich, Muttenz, Alpnach, and Landquart.

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