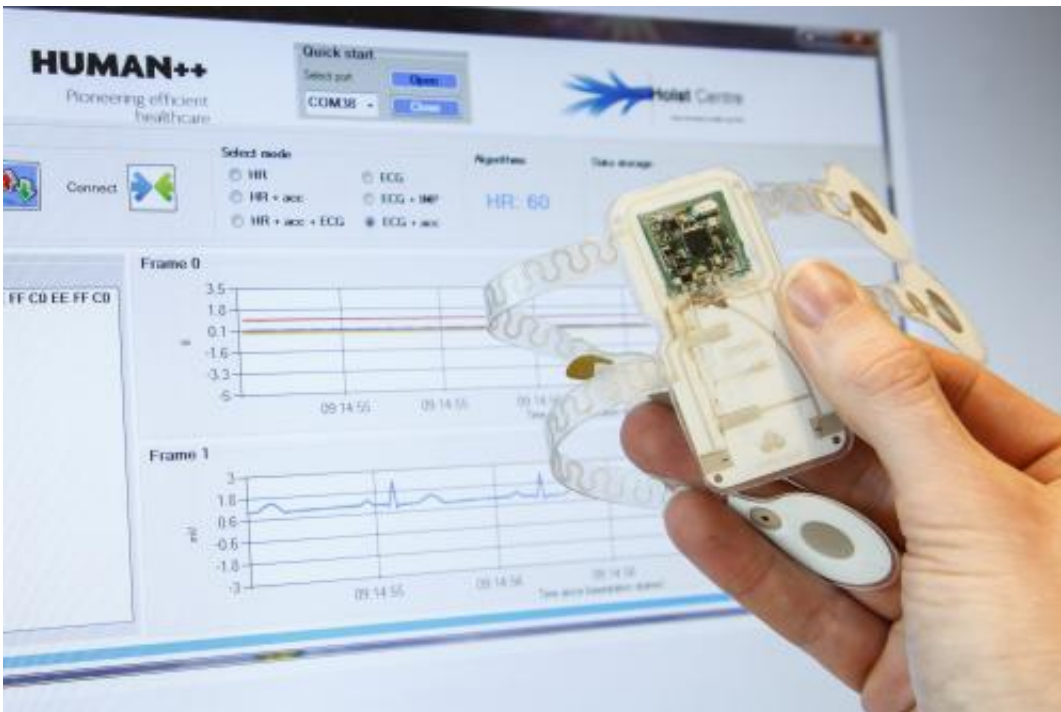


Small, light health patch with enhanced accuracy

April 9 2014, by Hanne Degans



Holst Centre and IMEC have unveiled a prototype flexible health patch weighing just 10g – half the weight of current products. The patch uses real-time electrocardiogram (ECG), tissue-contact impedance and accelerometer information to accurately monitor physical activity. Thanks to advanced system in package (SiP) technology from ShinkoElectric Industries, the electronics module measures less than two

by two centimeters. The high accuracy algorithms, low power consumption, and small size and weight make it ideal for consumer applications.

A growing public interest in healthy living is driving the emergence of activity monitors, with a number of devices already available that count the steps you take or the calories you burn. Heart rate is a key input in determining activity levels; hence monitors that can be worn comfortably on the chest offer the greatest accuracy. This increases the demand for small, lightweight monitors that can flex and move with your body.

IMEC and Holst Centre's novel [patch](#) makes such applications possible. The accurate patch combines ultra-low power electronics and flexible electrode technology, it includes a 1-lead ECG, a tissue-contact impedance sensor and a 3D accelerometer. Data is processed and analyzed locally, and relevant information is transmitted via Bluetooth Smart (BLS). The patch acquires, processes and communicates data on a minimal energy budget, allowing extended use with smaller batteries. Moreover, the Bluetooth Smart link provides a standardized communication channel to mobile devices such as smart phones and tablets.

Working with Shinko Electric Industries Co., LTD, researchers from IMEC used Shinko's SiP technology to integrate all this functionality into a module measuring just 17.4 mm x 17.4 mm. This represents a PCB area reduction of 52% compared to previous generations of the module. The module was then integrated into a flexible and stretchable patch designed by Holst Centre. The design combines system in foil technology with stretchable, integrated electrodes to create a lightweight patch that can be worn comfortably on the chest for extended periods. The module's small size and the flexibility of the patch reduce motion artifacts and thus provide more accurate and reliable monitoring.

"Our novel technology for packaging electronic devices uses a high-density organic substrate to reduce overall system size. Thanks to the experience we've gained in this joint initiative with IMEC and Holst Centre, Shinko can accelerate the development of next-generation body area network (BAN) products," said Tadashi Kodaira, corporate officer of Shinko.

"Comfortable, lightweight wearable systems for personal health monitoring are emerging, given their promise to better analyze patient's physiological parameters. We are excited about working with Shinko to successfully bring the technology closer to consumers' needs," said Chris Van Hoof, program director Wearable Healthcare at Holst Centre/IMEC.

The patch was developed in the framework of IMEC's and Holst Centre's Human++ program, addressing the need for better, more efficient healthcare monitoring systems. This first-of-a-kind demonstrator opens up new opportunities for companies in the wireless health and lifestyle segment. IMEC and Holst Centre are looking for partners interested in industrializing the concept.

Provided by IMEC

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