

NEW WEARABLE 'PARTNER' VIQTOR TO SMARTQARE AND DEMCON READY FOR MARKET

'PREVENTING CARE IS EVEN BETTER THAN PROVIDING CARE'

For the development of viQtor, a device for continuous monitoring of various body functions in patients and clients, smartQare joined forces with Demcon. The Demcon facility in Best, near Eindhoven, was responsible for designing the hardware and integrating hardware, firmware and the associated portal to facilitate smartQare's algorithms. Demcon Investment stepped in earlier, as a shareholder in the company. Now that the prototype is ready and the CE mark is in, Demcon's production facility, in the eastern Dutch town of Enschede, is assisting smartQare in a further scale-up.

the skin and the light is collected on the other side. Each heartbeat creates a surge of blood in your limbs, and the more blood in your finger, the less light it lets through. A wrist is too thick to send light through, hence the move to a wearable,' says Harm den Dekker, mechatronic systems engineer at Demcon in Best. 'Because smartQare wanted to incorporate multiple functionalities and technology into the device, it became too

large for a wrist and is now worn around the upper arm.' Resorting to the upper arm had another reason, Goldman says. 'You want to measure as accurately as possible. And since people move their wrist much more than their upper arm, the upper arm is a better place. Then people can also just keep wearing their watches and the device, under clothing, is invisible to the outside world.'

FULLY-FLEDGED PRODUCT

Use on the upper arm did present Demcon and smartQare with new challenges. Together, the development teams did the final iteration to improve the existing prototype and make it suitable for this purpose. 'That resulted in a configuration of LEDs and photo-diodes that works specifically for on the upper arm,' Den Dekker says. Another challenge was working with two Polish software companies, in corona time. 'Normally there are physical meetings about, for example, the

interfaces between hardware and software. We now held those consultations over a live connection. Moreover, a medical product involves more steps than an industrial product and you have to deal with different software development requirements. In the end, we managed to deliver a fully-fledged product on time.' In addition to pulse rate and oxygen saturation, the device is also suitable for fall detection. Not a simple application, Goldman said. 'Motion data shows how people move and that is linked to the height they are at. A change in height and acceleration may then indicate a fall. That is a very delicate thing, because you want to filter out all the movements that are not falls, for example, when someone flops down on the couch.'



Cecile Goldman (smartQare) and Harm den Dekker (Demcon) with viQtor. This device, co-developed by Demcon, and part of a total solution including software, continuously collects data from the wearer via a wearable on the upper arm. Photo: Bart van Overbeeke

BY WILMA SCHREIBER

SmartQare has now existed for more than five years, has about twenty employees, including students from TU Eindhoven, and has offices in Eindhoven and Noordwijk (located on the South Holland coast). The company stems from a personal quest both founders had for a device to improve care for a vulnerable family member. A fitness-like wearable on the wrist that could monitor certain body functions. Soon this idea developed more towards a medical application, which required certification: viQtor. Investors, including Demcon Investment, helped develop the idea into a product. Beyond money, they also contributed

crucial knowledge and expertise. 'As a result, we now have a technological solution that continuously collects data from the wearer via a wearable on the upper arm. This is done through light sensors on the back that make contact with the skin. Every minute the average values of, for example, pulse rate or blood saturation are measured, and every 5 minutes that data is transmitted to a portal,' explains Cecile Goldman, CEO of smartQare.

MORE FUNCTIONALITIES

In its development, smartQare gained early experience with photoplethysmography (PPG), a technology based on light sensors (LED) that is also used in the finger clips that hospitals use. 'The two LEDs shine through

The fact that viQtor features transmission technology is what Goldman calls a differentiator from existing technology. 'Data is sent directly over an IoT network and a SIM card with good coverage, not via mobile phone, Bluetooth or Wi-Fi. So a patient doesn't have to have a phone. Such a wireless solution is still fairly unique. In addition, viQtor has a battery life of five days.' Furthermore, GPS sensors are integrated, so that someone can be tracked in case of an emergency. Den Dekker: 'That data is immediately sent along with the data on, for example, a fall during a walk in the woods or when the wearer presses the help button. That GPS technology is thus a significant advantage over existing solutions that typically only work indoors or within a defined area.'

SHIFT IN TARGET AUDIENCE

The underlying idea is to offer patients and clients a 'partner' to help them stay in control of their own lives. Hence the personal name viQtor, with the same Q as in smartQare (chosen because the name smartcare had already been claimed). Initially, smartQare focused the device on caring for frail elderly people at home. 'Based on further research into where it currently adds value and cost savings, we've moved up a bit in terms of target audience,' Goldman says. 'Elder care

still makes relatively limited use of measurements, while hospitals are already used to remote monitoring. The rise of single rooms, which require more supervision because patients can no longer keep an eye on each other, contributes to this. So we now focus first and foremost on monitoring patients during their admission and in the first vulnerable weeks to discharge. Our device can then help shorten the number of in-patient days and prevent admission.'

GOOD DREAMS

After three years of joint development, a usable prototype equipped with CE marking is now ready. In achieving this, Demcon translated smartQare's ideas into functionalities and was responsible for system integration of software, hardware and the portal. 'First you have the discussion of what your first product should be able to do. smartQare had the necessary wishes. Our advice was to leave out or push forward certain things, in order to obtain the CE mark quickly and gain market experience.' The coming time will be devoted to starting up production at Demcon in Enschede. Goldman: 'We have already had small batches produced to see if the design can be produced in larger numbers without too much waste.' For now, smartQare is focusing on the European market; in addition,

a distribution agreement with South Africa has been concluded through its own network. A certification application is also pending with the FDA, after which the US and Asia will be open territory.

MORE SCORES

In addition, research continues to make viQtor ever better, cheaper and smaller. Den Dekker also mentions adding Bluetooth. 'Then you can also connect other devices to it, such as a blood pressure monitor, and present even more scores in the same portal.' Goldman also sees various opportunities. 'Before summer, we want to get to the point where we can measure respiratory rate and core temperature. Then you should also be able to detect infections, which makes it a lot more interesting for doctors. However, the solution must then be recertified,' she says. 'To add a blood pressure monitor, we applied for a grant. And who knows what other useful data you can surface. If someone has a heart attack, are there any signs of it beforehand? And can we then develop predictive algorithms for that? Because, of course, preventing care is even better than providing care.' ●

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