

# What connects the elderly and sports people? Smart sensor technology

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Innovative smart sensing devices promise to boost mobility and quality of life for the elderly, reduce healthcare costs and even give sports people an edge through more effective training.

The wireless devices are currently being sold by McRoberts, a Netherlands-based company that developed them as part of the SensAction-AAL project, an EU-funded initiative to create remote mobility monitoring solutions coordinated by the University of Bologna.

Unlike many health monitoring systems that require multiple [sensors](#) as well as separate components for [data storage](#) and transmission, the DynaPort Hybrid device and MoveMonitor application developed by the SensAction-AAL researchers carry out movement sensing, data collection and data transmission in a single compact package. Worn on the user's waist in a special elastic belt, the devices monitor and record a person's physical movement and body posture, assist them in performing rehabilitation exercises, and can be configured to automatically alert emergency services in the event of a fall.

## More data, better treatment

“These devices respond to a growing demand from the medical community for the long-term collection of data from people with mobility problems and motor disorders. The information they gather allows doctors to better understand a patient's symptoms and in turn treat

them more effectively,” explains Rob van Lummel, the founder and president of McRoberts, whose devices are now sold in more than 20 countries.

Van Lummel points to the case of [neurologists](#) attempting to treat sufferers of Parkinson’s disease. Until now they have had to mostly base their assessment of the severity of the patient’s mobility problems on the patient’s own descriptions. However, such accounts often provide an incomplete picture as people vary in how they interpret events affecting their mobility, from falls to difficulty standing, and may not remember all of them. Objective information, gathered by sensors, fills the gaps, providing a more detailed picture and ultimately leading to more accurate diagnosis and more effective treatment.

“A key feature of our devices is that they allow data to be gathered over a longer period of time, from three to seven days. This is important because doctors need to see how mobility problems affect people during their daily lives and while performing different activities,” Van Lummel says.

McRoberts’ DynaPort Hybrid device runs for 75 hours on a single battery charge and, at just 14mm thick and weighing just 74 grams, it is light and comfortable to wear. Movement and posture data, gathered from internal gyroscopes and accelerometers, is stored on flash memory and can be transmitted to a doctors or user’s PC via the Bluetooth wireless protocol.

Besides improving the diagnosis of mobility problems, the devices can also greatly assist patient rehabilitation by translating movement data into audio and/or tactile signals that let a patient know if they are performing exercises correctly, thereby improving their motion and posture awareness. Used as part of a comprehensive rehabilitation programme, the application allows patients to carry out exercises at

home with remote supervision rather than having to visit hospitals and rehabilitation centres.

## **Cost savings for healthcare providers**

“We are certain that, in the future, more and more healthcare services will be provided remotely in the home rather than in hospitals,” Van Lummel says.

Such a shift seems inevitable in light of demographic changes. Today, nearly 14 percent of Europe’s population is older than 65, but by 2050 that proportion is expected to double, necessitating dramatic changes in the way healthcare is provided if spiralling costs are to be avoided. And because mobility problems are more likely to occur in old age, whether as a result of deteriorating eyesight and balance or due to age-related diseases, such as Alzheimer’s and Parkinson’s, it is a field of research that is drawing increased interest from both public healthcare systems and private healthcare providers.

“We are seeing a lot of interest in remote monitoring solutions,” notes Lorenzo Chiari, the coordinator of the SensAction-AAL project at the University of Bologna in Italy. “Patients like the sense of safety and reassurance they provide, while healthcare providers see the potential to provide better treatment at lower cost.

Van Lummel notes that the price of remote monitoring using McRoberts’ products averages out to about 25 euros per patient per week if they are used just 30 weeks a year, a relatively small sum compared to the time and financial cost of gathering mobility data in a hospital or having patients visit a clinic for rehabilitation sessions.

McRoberts is focusing on selling its products in the “huge” healthcare market, although Van Lummel and Chiari note that they could equally be

put to use in the sports world, in ergonomics or to monitor workers in hazardous environments.

“A similar application to that used for rehabilitation could be used for training athletes, or a gymnast or dancer could use it to improve balance,” Chiari says.

One of the project partners, STMicroelectronics, is even incorporating research from the SensAction-AAL project into its MotionBee range of wireless sensors for remote motion recognition and tracking in many different application areas, including healthcare, security, industrial control and environmental monitoring.

**More information:** [cordis.europa.eu/ictresults](https://cordis.europa.eu/ictresults)

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