

# SmalTec

Smart Flooring Technologies  
Preventing the Falling of Elderly People Worldwide

## Consortium

**SMART FLOOR**



## Sector

HEALTH

## Duration

**15**  
MONTHS

## Challenge

The costs related to falling accidents of elderly people (75+ years) are rising each year in Europe. In 2018 in the Netherlands, the costs amounted to approximately € 900 million. Not only are the costs a problem, but even more so the injuries and the emotional stress for the elderly, their families and healthcare workers, as a result of these falling accidents. Falling accidents can be prevented when health care workers know if the elderly are at risk of falling. When this is known, the elderly must use a rollator or, for example, airbag trousers while walking, in order to prevent falling and injuring themselves. Alternatively, they can get special physiotherapy treatment to improve their walking capabilities. In the 'SmalTec' experiment, an innovative sustainable technology (integrated in floors) is developed and tested to objectively measure (with aid of a wearable) the falling risk of the elderly while they are walking, which informs healthcare workers and their family when the elderly are at risk, so that the described interventions can be undertaken.

## DIATOMIC Support

DIATOMIC coaches helped us structure our project with 2 weekly Skype sessions, via email, as well as at the bootcamps that we attended. They also supported us by giving us advice with difficult issues and provided answers to any questions that we had. Our DIATOMIC coaches also challenged us to reach the optimal result within our experiments, and their (technical) network was available for any questions or issues that we were facing.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 761809.



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### Timeline

With a sensor foil (to tag feet positions) in the flooring, in combination with a small wearable (with motion sensors) around the ankles or on shoes, we can measure walking speed, step length, step frequency, step regularity, step acceleration and covered distance. In May of 2018, we obtained a worldwide patent for this new approach of measuring the KPIs of human movement. We are able to deliver specific information to the markets of Healthcare and Sports, such as the risk of falling, state of recovery and performance. Over the last 12 months, we have designed, developed and tested our wearable and software within the DIATOMIC project, and the acquired data is now being used to validate our falling algorithms. It looks very promising! We are currently in discussions about collaboration with large floorings companies on how to take our solution to market, and we have planned new pilot projects with these companies as well.

### Stakeholders

- Healthcare center tanteLouise: installation of Smart Floor foil in healthcare center and patient testing during our experiment.
- Imec Holst center: developed the antenna for the RF-reader
- Technical University Eindhoven: provided testing equipment for testing the interaction between RF- floor antennas and RF antenna of RF reader
- Bestronics: developed and produced the new wearables (pcb's with electronics + motion sensors + RF-reader + WiFi)
- Nora/Interface, Tarkett; important for research of Healthcare market

### End Users

Various Healthcare users (healthcare centers; private homes for the elderly; hospitals and rehabilitation centers; physiotherapists) and Sports users (top sport clubs; schools, etc).

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### Key Results

The miniature wearable which we named 'Heelable' is designed and produced with three separate 'modules', including electronics with motion sensors and microprocessor with Wi-Fi/Bluetooth, power and an RF-reader antenna. Data from the wearable can be transported through a stable Wi-Fi gateway to the cloud, analysed in cloud and send to the web application as information. The wearable can read RF-tags within an average of 150 ms per step.

The Smart Floor technology has been integrated into the floors of the nursing home tante-Louise and the physiotherapy centre Steenberg in the Netherlands, while it has also been integrated into the sports floorings of the PSV Performance Center Eindhoven and the Maaspoort arena in 's-Hertogenbosch, Netherlands.

Data of moving patients and sportsman can be measured and analysed, and the first Smart Floor App for fall prevention has been developed with relevant information for healthcare takers and specialists.

By the end of the DIATOMIC project, we shall have collaboration with 4 flooring companies to market and sell the Smart Floor, and we will have reached nearly 25,000 subscriptions.

### Impact

The ability to deliver KPIs of human movements with the aid of floorings in order to prevent human accidents, injuries or improve human performance, has turned out to be huge. All world leading flooring companies are embracing this solution. It is a big advantage for them to be able to offer their floorings powered by Smart Floor to their customers, and the customers have shown that they are willing to pay extra for this solution. This was the result of market research done by the flooring companies in cooperation with Connective Floor, covering Healthcare in the Netherlands and Germany, and Elite Indoor Sports in Europe and the USA. Flooring companies will market the Smart Floor solution, while Connective Floors will sell the foil, wearables and the software.

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## Testimonials

“Due to lack of personnel, we can't measure the mobility of our clients. Therefore fall incidents occur frequent, with all related misery and problems. With the aid of this system, the amount of fall incidents will reduce enormously.

– Board of Directors, tanteLouise

“This system makes it possible to obtain, in a patient friendly way, without specialists and expensive equipment are needed, more frequently human movement information to fine-tune treatment and lower hospitalisation time.

– Director, a geriatric rehabilitation centre

“This system gives us the possibility to validate and improve treatments.

– Director, Foundation Healthcare Centers Eindhoven

“I'm coaching on footsteps and I'm lacking that information now.

– Head coach from basketball team, former college champion USA

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