

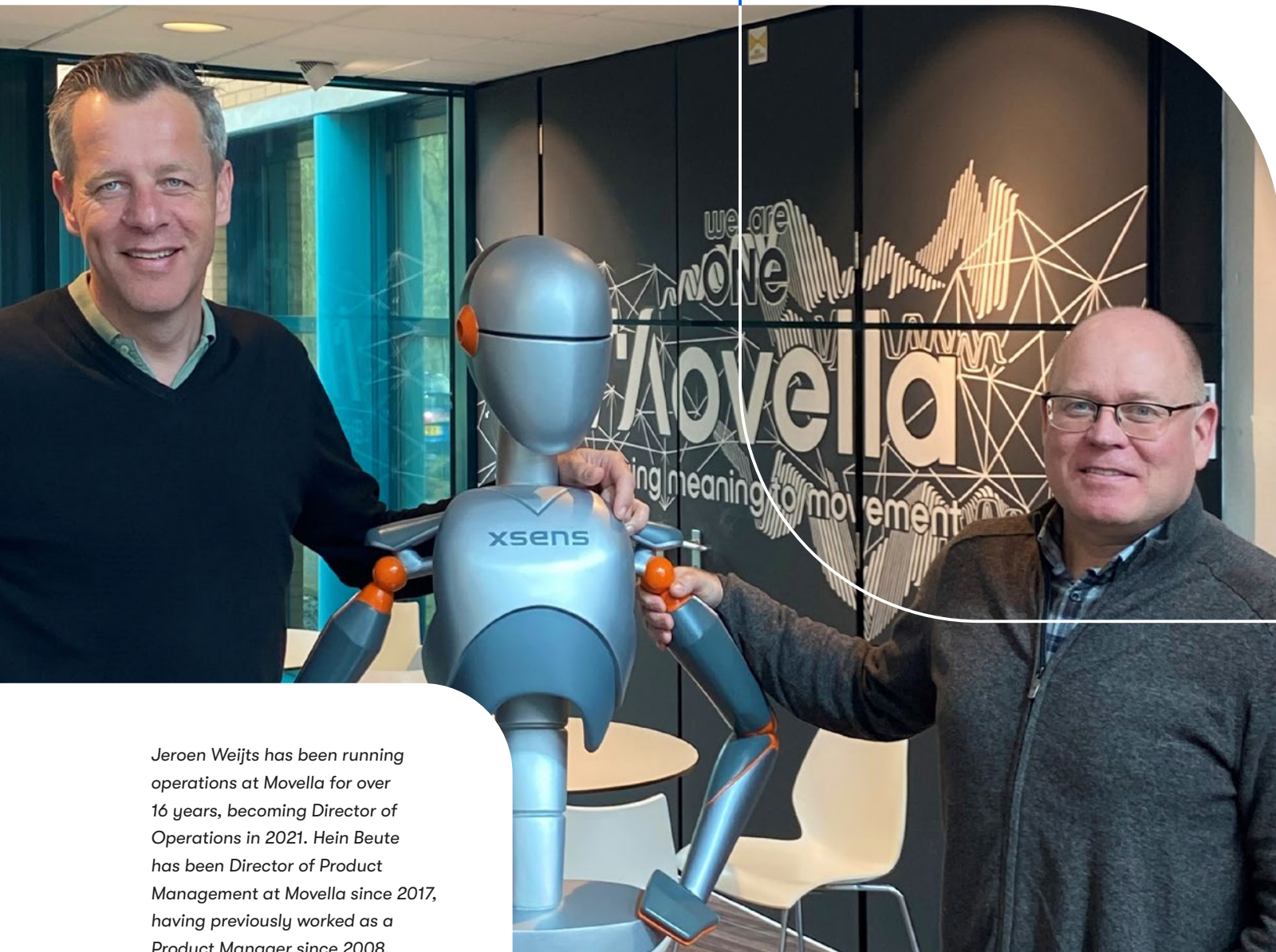
Transforming Motion

Movella captures motion in its most precise, lifelike form

An interview with Jeroen Weijts, Director Operations & Hein Beute, Director Product Management at Movella

In the days of “IoT” and automation, being able to capture and control motion is a critical capability for dozens of industries to master. In learning to do so, they’re joining a field the entertainment and medical industry previously took pioneering steps in. While we’ve likely all seen examples of motion capture in movies and video games – the applications beyond it are enormous. Whether it’s studying movement-related illness, ergonomics at the workplace, designing the next generation of autonomous robots and vehicles – or indeed simply sending Lionel Messi into a lifelike half-field dribble on FIFA, Neways customer Movella delivers the sensors and solutions that make it all possible. We spoke to Jeroen Weijts and Hein Beute about Movella’s origins, what makes their solutions special, and the many – many – applications in which they can be used.





Jeroen Weijts has been running operations at Movella for over 16 years, becoming Director of Operations in 2021. Hein Beute has been Director of Product Management at Movella since 2017, having previously worked as a Product Manager since 2008.

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Can you tell me a bit about Movella’s origin story? What sort of products do you produce today?

Movella, previously Xsens, is a spinoff of the University of Twente. Our founders set out to do something that was truly innovative at the turn of the century: make a runner’s watch equipped with an inertial sensor. Sadly, big players such as Adidas and Polar quickly showed up and crowded them out of their initial market. But the primary technology stayed: using sensors to capture movement in great detail. Our founders quickly realized that while one sensor made for a novel new runner’s watch, two sensors could capture an angle of a human arm or leg - with 17 an entire body’s movement could be captured. Capturing movement, human or otherwise, became the new business model. Today, the sensors we sell combine input from accelerometers, gyroscopes, magnetometers, GPS and barometers to capture as fine a picture as possible. We sell our products across three segments: Entertainment, Health & Sports, and Automation & Mobility, and we enable motion capture for actors, athletes, workers, and patients; but also for drones, various unmanned vehicles, and even satellites.

What makes your solutions different from others available in the market?

At Movella we deliver products for when measurement has to be as precise, and “lifelike” as technically possible, and we achieve that in two ways.

Firstly, we have made at least three critical innovations in the software and firmware. For example, we pride ourselves on the continuously improved algorithm we have to bring input from various sensors together reliably and consistently: something we call “Sensor Fusion”. From there, the input is interpreted through our self-designed biomechanical model. In addition, since 2018 we have an algorithm that compensates for the natural “drift” that occurs in gyroscopes. When determining heading, previously the only way to compensate for such drift was through magnetometers, but these are disturbed by metal objects or construction materials and thus never homogenous. We developed an algorithm that compensates for this. We are now “magnetically immune”, an innovation that drove sales up by over 30% in the first year alone.

Secondly, compared to other technologies, our solutions invite by far the most “life-like” experience and thus the most true-to-life data. Before inertial sensing, the best the industry could do was optical sensing. In other words: build a stage with cameras and have subjects wear suits with reflective markers on them. While this was certainly a huge innovation, both the expensive and often cramped stage, as well as the suit, do not exactly invite “normal” human behavior. What you record with optical sensors will be more calculated, more

cautious, which makes it less suitable for truly convincing motion capture for entertainment, and a poor match for studying human behavior. The same is true of new AI applications. While they do not require an expensive stage as simpler cameras will suffice, they work through interpretation rather than analysis. You’re looking at a guesstimation of what may have occurred rather than what actually did. For our customers, that often simply does not suffice.

Can you give me some examples of where your products are used?

I’ll give you one from each of our markets, and I’ll start with the one that speaks most to our collective imagination: the work we do in Entertainment. Our sensors have been used in blockbusters such as the movie Avatar 2, bringing lifelike movement to the Na’vi both on land and in the water. We’ve also worked on various “triple A” video game titles, from FIFA to the Call of Duty series.

In Health & Sports we have been doing cutting edge work on ergonomics for many years now, and it’s an area where we can make a really significant impact. Working with companies such as Toyota and BMW, we are able to review the work done by hundreds of thousands of factory workers, evaluating how their manual work affects their bodies, and removing activities or movements that cause unnecessary strain on employees. Other industries are luckily catching up fast, with warehouses, industrial laundry companies and even Porta Potty distributors recently following suit.

Our products’ applications in Automation & Mobility vary widely and easily fit into whatever use case an OEM has designed. For example, our sensors are facilitating vehicle automation in agriculture that is years ahead of what we see on public roads. While regulatory demands for such technology are understandably high for passenger cars, private fields and pastures can easily be worked by autonomous vehicles, provided they have precise enough sensing onboard.

Is there a particular case that stuck with you?

I would have to say that was FIFA. For many years, FIFA’s developer EA Sports relied on a facility they built specifically for motion capture in Vancouver. It’s an impressive place, built specifically to control vibrations, temperature: you name it. It is, however, also one that relies on optical motion capture, and the stage is only the size of roughly a quarter football pitch, limiting both the range of plays, as well as the number of players captured.

One day, EA decided they wanted to try to capture a full 11-on-11 game, on a whole field, and Movella’s technology was selected to attempt to do so, which required a lot of

internal development both on their end, as well as ours. We were present for the setup: 22 players on the field, as data was being live-captured and sent over to animators based in Vancouver who were on a Teams call. I'll never forget these seasoned animators' response after the initial plays: "Wow!" – they had never seen anything like it and were bewildered by the data coming in. "So this is a real tackle," said one. In all their years they had been "doing motion capture", but they hadn't been observing athletes who were really playing football. Who wanted to win. Who went in hard. It was a truly amazing day. The game turned out amazing, and EA even advertised it with real footage from our motion capture sessions.

How has your experience with Neways been?

We needed a supplier that could produce the entire hardware product. We selected Neways as only few suppliers could provide the technology in combination with the reliability and consistency that are such critical factors for our products. We needed a partner that held quality of production, soldering and testing in the highest possible regard. Our inertial sensors are extremely vulnerable to production conditions, soldering techniques, and material tension. In short: we needed a partner who could run an extremely controlled production process and who had very good quality processes around that production. We also needed a partner that had an affinity with high tech companies. We found both in Neways. Perhaps much to our initial frustration, Neways also had some lessons to teach us. Rather than allowing us to cut initial corners, Neways was our "good conscience", making us go through things "step by step" so we could guarantee the consistent quality we see today. Since the very beginning we have worked with a passionate, knowledgeable group of engineers and account managers as true partners. ●

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