



# EXOSKELETON REPORT

**VOL 1**

**OCTOBER 6, 2023  
ISSUE NO 4**



## **COUNTDOWN**

**THERE IS STILL TIME TO  
ATTEND WEARRACON  
EUROPE AT A+A**

## **INTERVIEW**

**JONAS GRAU THOMSEN  
ON MEDICAL  
EXOSKELETONS**

SEE YOU AT

WearRAcon  
EUROPE

25-26 OCTOBER 2023

DURING A+A 

Partner:



# CONTENTS

# NO.4

## PAGE 3

### COUNTDOWN TO A+A

Turns out there is still time to choose to attend WearRAcon Europe and Exo Park at the A+A Trade Fair

---

## PAGE 6

### HEADLINE NEWS

Shorter summaries of important events relevant to the exoskeleton industry.

---

## PAGE 7

### INTERVIEW

Hands-on with medical exoskeletons with Jonas Grau Thomsen @ Nordic Bionics

---

## PAGE 11

### ON THE HORIZON

Upcoming exoskeleton-related development, shows, conferences, and events.

---

 Cover Image: CarryOn™ courtesy of Newndra Innovations

 Header Image (above): WearRAcon Europe at A+A Banner Ad



📷 Photo: Messe Düsseldorf/ctillmann

# JOIN US: WEARRACON EUROPE AT A+A

This October, the Exoskeleton Report team is going to Europe. First stop, WearRAcon Europe and Exo Park at the A + A Trade Fair at Messe in Düsseldorf, Germany.

Despite being focused exclusively on occupational and industrial exoskeletons and exosuits, this event is quickly shaping up to be the largest gathering of exo producers since the start of the COVID-19 pandemic!

The A+A Trade Fair has a thorough list of exhibitors and products registered to attend.

EXHIBITORS &  
PRODUCTS AT A+A 2023

Sponsored Content



Author: Borislav Marinov

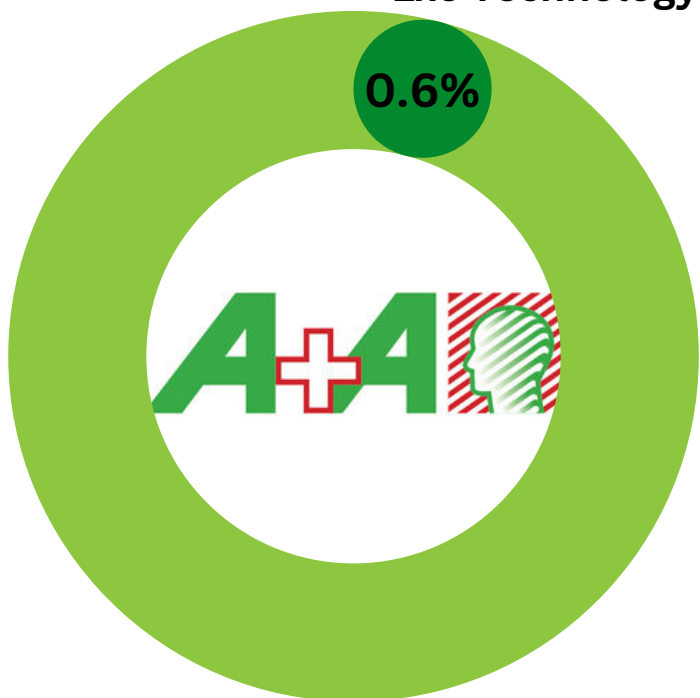
*“A self-experience space will be set up within the nearby Exo Park industrial exhibition, where exoskeleton systems from various manufacturers can be tested in realistic work scenarios. At the same time, the live-study Exoworkathlon® will take place, during which data will be collected to assess the effects of using exoskeletons when performing various holding, lifting, and assembling tasks.”*

Thomas Sugar, Executive Director WearRA

Currently, 12 companies have registered for the Exo Park, featuring exoskeleton producers from China, Japan, Germany, France, and more. They are complemented by additional general floor presenters, bringing the grand total to 15 exhibitors: Agade, Auxivo, Auxsys, Dignity, Ergosanté, exoIQ, Fraunhofer IPA, hTRIUS, HUNIC, Innophys, Japet, Ottobock, ULS Robotics, Virgo Wave, and WearHealth. Collectively, these exoskeleton companies are showcasing over 20 wearables and digital tools.

While the exoskeleton companies are numerous, they represent only a small fraction of the A+A Congress, organized by the German Federal Association for Occupational Safety and Health, and the broader A+A Trade Fair. To date, there are over 2.5K exhibitors and nearly 6K products registered. The exoskeleton companies, although plentiful, account for just over half a percent (0.6%) of the innovative technology aimed at ensuring worker safety.

### Exo Technology



There is still time to book your flights and tickets. One tip that we received from the Automotive Exoskeleton Group via WearRA is to book a flight to the main airport hub in Frankfurt, Germany, then take the train down to Düsseldorf. I did this yesterday, and the airline automatically handled the train ticket. Plus, there were still plenty of seats left on the plane!

This has the added benefit of arriving at the Düsseldorf train station with significantly more available hotel rooms. The area is connected to the main event space by public transport, including bus line 722, which directly connects the train station to the Messe Center.

WearRAcon Europe runs on Wednesday and Thursday, 25-26 October, with over 30 presentations already scheduled! However, having worked as a manufacturing engineer, I am also looking forward to the additional day of the A+A Trade Fair before and after to explore the newest safety, security, and health equipment for work.

See you all at Hall 1!!

**25-26 OCTOBER 2023**

**WearRAcon**  
EUROPE

**CONFERENCE**

**LINK**

Photography: Courtesy Auxivo AG



International trade fair and congress for  
safety and health at work.

SEE YOU AT

Wear**RA**con  
EUROPE

25-26 OCTOBER 2023  
DURING A+A

24 - 27 OCTOBER 2023  
DÜSSELDORF, GERMANY

People matter. [www.AplusA-online.com](http://www.AplusA-online.com)

Partner:



Fraunhofer  
IPA



University of Stuttgart  
Institute of Industrial Manufacturing  
and Management IFF



Wear**RA**  
WEARABLE ROBOTICS  
ASSOCIATION



Messe  
Düsseldorf

# HEADLINES



Newndra Innovations has been recognized as one of the top ten startups in Rajasthan. This accolade was awarded by Backstage with Millionaires, a prominent source for English content on Indian startups, known for its in-depth insights into India's entrepreneurial ecosystem.

Backstage with Millionaires YouTube channel, which has over 650k subscribers, does an elegant job at presenting occupational exoskeletons purely from the point of view of the users and how they may benefit from the wearable technology. The 2-minute segment can be found on YouTube [here](#).



Arne Urskov from the occupational exo distributor EXOSKELETTER\_DK presented exo technology at the HI-MESSEN fair in Herning, HI Tech & Industry b2b event with over 600 exhibitors with business in Scandinavia. The event was held October 3-5, 2023.



Proteso sets its sites on revolutionizing airport baggage handling. Selected for a Proof of Concept program, the company recently participated in the Delivery Phase of the 2nd edition of the Acceleration Program RunwaytotheFuture at Fiumicino Airport's InnovationHub. This initiative sees Proteso partnering with Aeroporti di Roma to envision a future airport where workers' well-being is paramount.



Over the upcoming six months, Proteso will be rigorously testing and refining its wearable exoskeleton. This technology is designed to assist airport operators in safely managing heavy loads, with the primary objective of reducing low-back injuries and biomechanical overexertion disorders. The evaluation phase will involve real-world stress testing in an operational airport setting, extensive feedback collection, and product development.



# Interview with Nordic Bionics

📷 Header: Old Microphones by Brat\_Pikachu via Getty Images

## 1. Who are you, what did you study, where do you live?

I am the kid in a wheelchair who looked up upon the moon and dreamt of becoming an astronaut – if they could drive a car on the moon, I could drive my wheelchair there as well.

My name is Jonas Grau Thomsen, and I am a dad, husband, and stereotypical entrepreneur. I struggled to find an education that made sense to me, and I dropped out of several before making my own. The foundation for this was a bachelor's in innovation and entrepreneurship. On top of that, I studied exoskeletons extensively when I was in my early twenties.

I live in Fredericia, Denmark, with my wife and my 4-year-old son, who loves to tell people that his dad can walk in an exoskeleton suit, which is incredible!

## 2. When and how did your mobility capabilities change?

When I was around one year old, I got sick and was paralysed from the waist and down. It remained so for a year, and then as suddenly it had come, it disappeared again.

Something the doctors still struggle to understand – typically, paralysis is a definitive diagnosis. Unfortunately, the areas that had been paralysed were heavily affected by spasticity. In a bit, to reduce this, I underwent several surgeries. In the most extensive and far-reaching surgery, they wanted to cut the most affected motor nerves to my lower body – they had expected to cut around 30 per cent of the nerves, but it turned out that they had to cut 80 per cent, effectively making me an incomplete spinal cord patient.

The expectation then was that I would probably only be able to walk another ten years. This was back in 1992 – luckily, I was able to walk for much longer than they had expected. But I knew it was a question of time, and I actively looked for solutions that would allow me to keep walking.

## 3. When and how did you discover (first hear about) exo technology,

I have always been a fan of sci-fi books and films, so the idea of using technology to overcome limitations was always in my mind. I especially found the idea of exoskeletons and exosuits.

Fifteen years ago, I realised that I would have to find a solution that would allow me to keep walking. I had been aware of the research and early prototypes of exoskeletons that had been shown, but I was not impressed. The problem was that the exoskeleton walked with the person and not, as I wanted it, the person controlling the exoskeleton. It was, from the beginning, essential for me to that I was in control of the exoskeleton and not the other way around. I wanted to augment my existing abilities rather than being a passive passenger. The first exoskeleton that caught my attention was the HAL exoskeleton from Cyberdyne. I immediately realised that this was the technology I had been waiting for. I wanted to test it right then and there. Unfortunately, there were a couple of problems. First of all, it was still very much a prototype and was only built to support a maximum height of 160 cm – even though I am not the tallest person in the world, I could not fit my 175 cm into the exoskeleton.

The other problem was that I was a nobody and had no actual knowledge about exoskeletons – So I decided to dedicate all my spare time to researching exoskeletons.

#### **4. How did it compare vs what you expected?**

Given that I had spent 15 years researching exoskeletons prior to me testing an exoskeleton for the first time, I had formed a relatively accurate picture of what I could expect. For the most part, I ended up being right. I had expected that I would need around 35 percent assistance, which turned out to be right on the mark.

The first exoskeleton I tested was the SMART Powered Knee Orthosis which worked perfectly. It created much attention around the world when I posted the first video of me testing the exoskeleton – a relatively short affair, ten seconds to be exact. But the interest from around the world was enormous.

The most common question was how did it feel to wear the exoskeleton? I would probably also have asked that question, but the honest answer was that it felt normal. The more interesting question is how it felt to get out of the exoskeleton.

Honestly, it was the worst feeling I have ever felt in my entire life. I had to get used to being in the exoskeleton, but after a short while, it felt like it had been done 20 years ago. I was quickly able to get back to the rhythm of walking again. But when I had to take off the exoskeleton, I immediately felt the decline I had been through over the 20 years. My body was weak, and I felt all the pain in my back.

#### **5. What is the exo technology of today vs what you expected it to be when you first heard about it?**

There have, of course, been many improvements in the technology that goes into the exoskeleton. However, I would say that the exoskeleton themselves are still very much in the first generation. We have seen that they can be a way to allow people to walk again. But they are still very much a proof of concept.



As I see it, the problem is that it is very much an engineering project. We must see it from a multidisciplinary viewpoint with a user-centric design philosophy.

Fortunately, I am not the only one championing this view; it is a global trend.

## **6. Where does medical exo technology need to be to serve you better?**

The perfect solution for me would be a combination of an exosuit and an exoskeleton. I want something that gives me the needed support but also allows me to have a much freer range of movement. As I mentioned earlier, I want to augment my existing abilities. I predict my condition will improve substantially when I finally get an exoskeleton. In a perfect world, it would be something I could wear under regular clothes. I have been conceptualizing this extensively and have some concrete ideas on how to do it. It would be a true 2nd generation exoskeleton.

## **7. What is Nordic Bionics?**

I started Nordic Bionics to test and showcase exoskeletons and become a trusted voice in the industry. I saw a need for a person that could act as a bridge between the industry and the end users. I aim to be that person. Nordic Bionics is also a consultancy company specialising in creating opportunities for companies wishing to enter the assistive device market.

Formally Nordic Bionics has existed for a year, but I have worked with this for at least three years.

## **8. How is Nordic Bionics making exos better?**

The combination of my unique condition and my knowledge of exoskeletons enables me to work with companies and universities developing exoskeletons. I have been told that I am the “perfect test person” to test exoskeletons. The reason for this is the fact that my condition is very unique as a result of the surgeries. I am perfectly able to walk; I just need support from an exoskeleton.

## **9. Why aren't we seeing more medical exoskeletons for walking assistance being used?**

As I have mentioned before, the exoskeleton industry is still very much in its early start, and most of the attention has been allocated to developing the technologies that either need to be invented or modified to fit the purpose. Exoskeletons have only begun to emerge from laboratory testing and are slowly being adopted by the first adopters. As with any new technology, the cost is prohibitively high, which is one of the main issues regarding broader adoption. A related issue is the question of who will cover the cost of the exoskeleton. The problem is that the way we traditionally have defined assistive devices is coming to an end. The reality is that assistive devices and robot technology are combining to form something new – a situation the systems put in place to handle these questions worldwide are woefully unprepared for.

As I live in Denmark, I can give an example showcasing the problem.

As I have mentioned earlier, I can walk, just not for very long without support. I can walk a bit further with crutches, but it does not make a big difference. I can, on the other hand, walk much longer in an exoskeleton. Walking in an exoskeleton would improve a whole host of bodily systems, which in term would decrease the risk of me developing further complications related to a sedentary lifestyle.

In short, getting up in an exoskeleton would improve my quality of life immensely and would potentially allow me to live and fitter and longer life with greater freedom of movement. There is just one problem, the way the legislation sees an assistive device is like this – an assistive device is only meant to be an answer to a limitation – I can walk, but not for long; I get a wheelchair.

The wheelchair might not be the best solution, but it allows me to get from A to B. If I got an exoskeleton, I run the “risk” of getting better. That is a problem, as it becomes a training device that cannot be granted as an assistive device. So even though it would be better for me and cheaper for society, I cannot be granted an exoskeleton because the legislation is outdated.

So, if we want to see broader adoption and implementation of exoskeletons, we need to look at the legislation and update it for the current century.

## 10. What wisdom would you like to impart to exo developers, those looking at exo physical assistance or rehabilitation, or anyone else?

The most important advice I can give to any developer is to remember that the device is meant to be developed around a person. It should be a multidisciplinary approach from a user-centric starting point.

Follow Nordic Bionics on LinkedIn: [link](#)



Special thanks to Jonas Grau Thomsen for taking the time to share his first-hand experiences and advice. You can follow him on LinkedIn: [follow](#)





Header: Road to Horizon by quickshooting via Getty Images

# On The Horizon

ExoBerlin has moved from October 2023 to April 16-17, 2024. This way, the 4th International Forum on Human Assistive and Sensing Technology no longer collides with ErgoX 2023 in the US and WearRAcon Europe.

In addition to the change in date, the conference organizers are adding a brand new track on human-centered sensing. This additional track will focus on wearable sensors for exoskeleton and human-machine interfaces.



HeroWear is a contender for the National Safety Council's New Product Showcase "Best in Show" award for 2023. Voting is open until October 23 at 5 p.m. EST, and the winner will be announced before the Occupational Keynote on October 24. Interested parties can cast their votes [here](#).



The NSC National Congress, where HeroWear will be prominently featured, is set to take place in New Orleans from October 23-25th.

# EVENTS CALENDAR



OCT 23 All day  
**ErgoX 2023**



OCT 24 October 24 - October 25  
**WearRAcon Europe 2023**



NOV 20 November 20 - November 22  
**IBERDISCAP 2023 Conference**  
245€



APR 16 April 16, 2024 - April 17, 2024  
**ExoBerlin 2024**



OCT 10 October 10, 2024 - October 12, 2024  
**13th Meeting of Committee F48 on Exoskeletons**  
Free



DEC 9 December 9, 2024 - December 12, 2024  
**14th Meeting of Committee F48 on Exoskeletons**  
Free



Find out more about these upcoming events at the [ExoskeletonReport.com](https://www.ExoskeletonReport.com) Events Calendar.

If you know of any upcoming exo-focused events that are not listed above, let us know by sending an email to: [hello@ExoskeletonReport.com](mailto:hello@ExoskeletonReport.com)



## ©Exoskeleton Report 2023

The Exoskeleton Report (ExR) e-magazine is written and produced by Borislav (Bobby) Marinov and the Exoskeleton Report.

The material was prepared with the aid and assistance of Daniel Walker, Gus Vogel, and Inna Marinova.

Special thanks to Tri Dao, without whose support this publication wouldn't exist.

Visit us at [ExoskeletonReport.com](https://ExoskeletonReport.com)

### Reach out:

We welcome all feedback, comments, suggestions, news submissions, or inquiries regarding advertising or consulting! Contact us using our email:

- [Borislav.Marinov@ExoskeletonReport.com](mailto:Borislav.Marinov@ExoskeletonReport.com)
- [Hello@ExoskeletonReport.com](mailto>Hello@ExoskeletonReport.com)

Or by utilizing our contact form at:

- <https://exoskeletonreport.com/contact-us/>

**Above:** About Us... by Rolling Camera via Getty Images