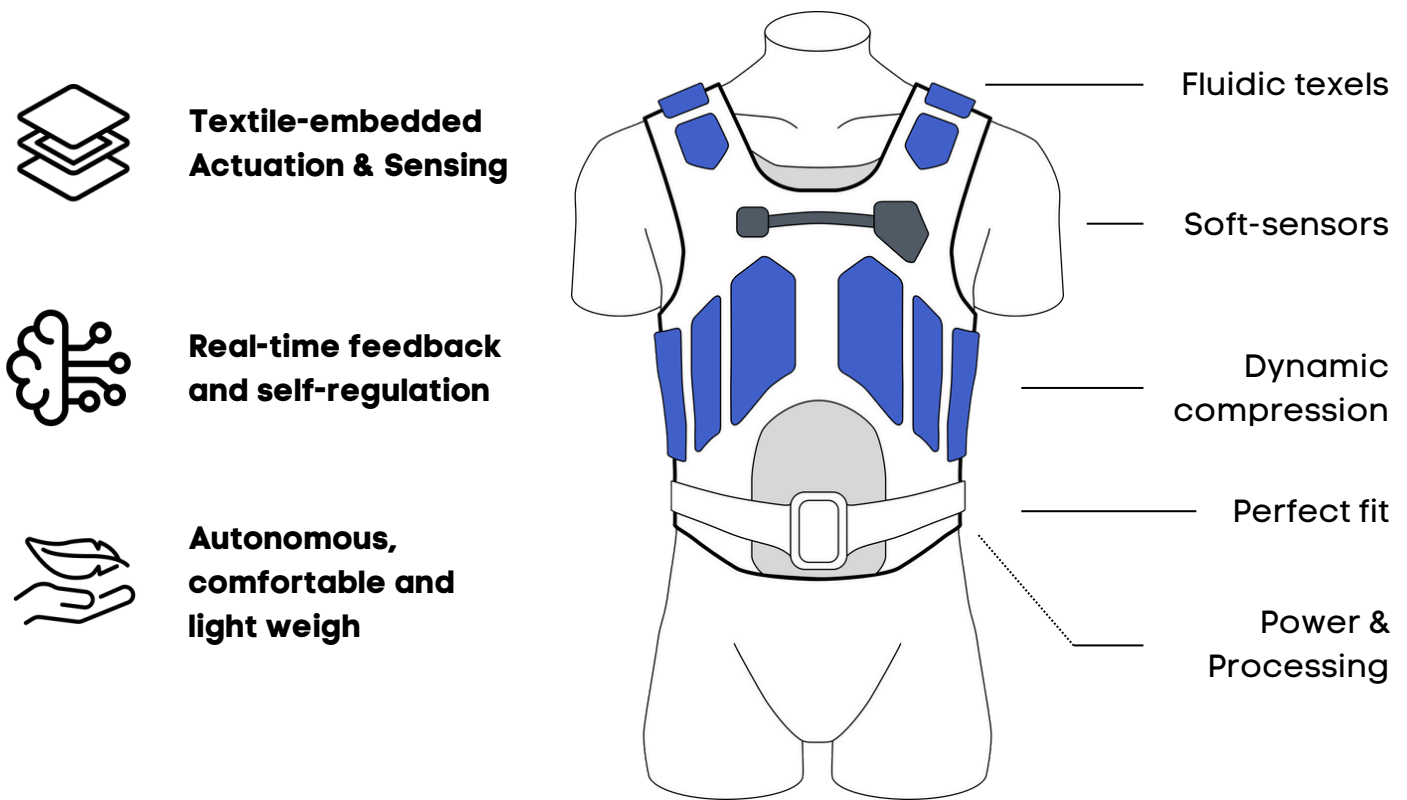


# DeepVest

## Dynamic compression for mental health management

MotorSkins, BORN Germany and The Smart Textiles Hub have joined forces to bring to reality DeepVest: the first dynamic garment designed to actively monitor, manage, and mitigate stress and mental health challenges.

Its unique technology can not only monitor the vitals of the user through **soft sensors** embedded in the textile, and learn from the user to predict potential anxiety peaks or sensory challenges through its **AI real-time analysis**, but it can also physically actuate over the users body with **dynamic compression** to prevent them.



## TOWARDS THE FUTURE OF ROBOTIC WEARABLES



Fluid-driven  
Robotic Textiles

high-performance  
knitting engineering

E-textiles and  
Wearables

# Mental health: the pandemic of the 21st century

**In Europe it is estimated that 25% of the population is affected annually by stress or anxiety.** This has great negative impacts in health and quality of life as well as in productivity and the overall economy.

Currently there are no comprehensive solutions for actively tackling this problem. In the last few years we have seen an increasing number of wearable technologies that can monitor, analyse and give advice regarding physiological stress and its impact on mental health. This has helped to bring awareness to the problem. However, there are almost none available solutions that can physically intervene to alleviate the negative effects of anxiety attacks and, through predictive analysis, eventually prevent them altogether.

## A positive Impact

*DeepVest* improves the quality of life of individuals with stress and anxiety disorders, post traumatic syndrome (PTS), neurodivergent populations requiring sensory regulation tools, and professionals in high-stress environments. These benefits are particularly impactful for underserved populations and those in high-stress occupations.



**Improves well-being & emotional resilience**



**Lower healthcare costs**



**Promotes inclusivity**

## DeepVest

Is a cutting edge wearable technology that seamlessly integrates in one knitted garment soft-sensors for the monitoring of vitals with pneumatic actuators that can provide dynamic even compression as well as localized pressure taps. As a result, the user has a portable, autonomous proactive management garment that can provide deep pressure stimulation and rhythmic tapping for sensory safety strategies.

**MONITORING + ANALYSIS + ACTUATION = PREVENTION**

- **User Friendly:** All the technology is textile Integrated, resulting in a low-profile, non-stigmatizing garment for daily use.
- **Comfortable:** Non-invasive sensing, lightweight pneumatic actuation, untethered actuation.
- **Affordable:** Produced with scalable technologies that ensure economies of scale.

# Technology: a holistic approach

DeepVest seamlessly integrates three technical systems that can sense, think, and actuate into a performance engineered knitted vest.



## SENSING

The **soft sensors** integrated into the knitted garment enable real-time detection of stress and anxiety events.

- **Heart rate** (HR) and (HRV) via Electrocardiography (ECG).
- **Respiration rate** (RR) using stretch sensors around the chest.
- **Skin conductance** sensors (EDA) for stress response tracking.



## PROCESSING

**DeepVest's AI** architecture learns user-specific physiological baselines, adapting actuation dynamically to context and individual preferences.

- **Dynamic Personalization:** AI tailors actuation patterns based on real-time sensor data.
- **Context awareness:** Integrates contextual data to adjust responses



## ACTUATION

Actuation is based on **MotorSkins' pneumatic, wearable muscles**. A series of chambers are distributed across the vest. Dynamic control of these chambers allows for:

- **Even Compression:** Inflatable chambers apply uniform pressure for calming deep pressure stimulation.
- **Localized Actuation:** Texels operate independently to deliver rhythmic tapping or oscillating patterns, aiding sensory grounding and breath pacing.



## INTEGRATION

**Custom made knitted garment** provides comfort and simplicity to the user, enhancing the user adoption

- **Fit & Comfort:** Knitted structure with areas of low and high elasticity that ensure a perfect fit and breathability.
- **Conductivity and Channeling:** All the connection elements are incorporated into the garment through conductive yarns and knitted channels.
- **Modular design:** Allows various system configuration and sustainability.

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