CTT Group:
Adding smarts to your driver's seat

A Smart Texile Use Case

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Motorized vehicles may not yet have the embedded intelligence to decide if their operator is fit to take control. But the day is not far off.

Transport in all its forms is becoming increasingly connected with onboard technologies meant to increase occupant comfort, convenience and safety. A big growth market is biometrics for health, wellness and well-being (HWW). This includes technologies for Advanced Driver Assistance Systems and to monitor for drug or alcohol impairment, fatigue, illness or medical distress.

Biometrics for the Connected Car, released in November 2017 by the U.K.'s Goode Intelligence, expects the market will take off by 2021. It forecasts a compound annual growth rate (CAGR) of 96 per cent over the next six years, for a global market worth almost US$1 billion by 2023.

Over at Frost & Sullivan, the forecast is for a CAGR of 38.3 per cent over the next eight years, with some form of biometrics present in one third of all automobiles sold globally by 2025.

The value of adding this kind of intelligence extends to the aircraft cockpit, from fighter pilots experiencing the emotional stress of combat and the physical stresses of extreme G forces, to civilian pilots responsible for hundreds of lives. Public transit and school bus fleets would also be an obvious application market to reduce the likelihood of an accident.

Multinational collaboration to overcome technical hurdles

France's THALES Group is one of many multinational companies in the defence and transportation industries pursuing development of these kinds of technologies.

Two years ago, THALES embarked on a development project with Quebec's CTT Group to add biometric intelligence to drivers seats for the transporation industry.

CTT Group is a technology transfer center specialized in the research, development and testing of technical textiles, advanced textile-based materials and geosynthetics.

The challenge was to adopt the sensor technologies already developed for use in wearables and smart garments for fitness and healthcare applications. Unlike sensors that make contact with the skin to measure heartrate and respiration, sensors embedded in seats are non-contact—they must be able to reliably detect and measure the occupant's vitals through layers of clothing. Redundant sensors must also be placed at different positions on the backrest to accurately read data from people of different heights.

"To overcome this challenge, we used volume conductive materials coupled with pressure sensitive materials to beneficiate from 3-axis sensitivity," said Justine Decaens, CTT's Group Leader for Smart Textiles.

Another development challenge related to creating the analytics platform to analyze and interpret the data in real-time. While companies in the wearables/healthcare space have already developed such analytics software, the core algorithms are proprietary and protected. In addition, algorithms developed for sensors in contact with the skin are not suitable for non-contact sensors. THALE's team of experts had to start from scratch.

Over a 12-month period, the partners developed a working prototype that was demonstrated as part of a complete in-flight pilot behaviour assessment system during THALES's annual InnovDays in March 2017. Other prototypes could be developed for road transportation.

The cost and perception barriers to adoption

What's holding up the mass adoption of this kind of technology? According to Decaens, it all comes down to cost – especially in automobiles. It takes more than a smart seat to make a smart vehicle. The vehicle must first be equipped with an embedded platform to support and manage these new technologies.

"It's hard to just take a seat like this and plug it into an existing vehicle due to the cost," she said. "You need that base system already in the vehicle to collect, interpret and act on the data generated by the seat."

But Decaens expects this barrier will soon be overcome as vehicle connectivity becomes mainstream over the next few years. The next hurdle will be one of education, for consumers to appreciate the benefits of this kind of smart technology versus any perceived drawbacks.

"What will it change for the truck driver or bus driver to have this type of recording device?" Decaens said. "How could this personal information be used against him or her by their employer? It is there to protect them but it may not always be perceived that way."

Insurance companies already offer driver monitoring tools that reward good driving habits with reduced insurance rates. Will a smart seat be next?

Learn more about CTT Group's work at **www.gcttg.com/en**
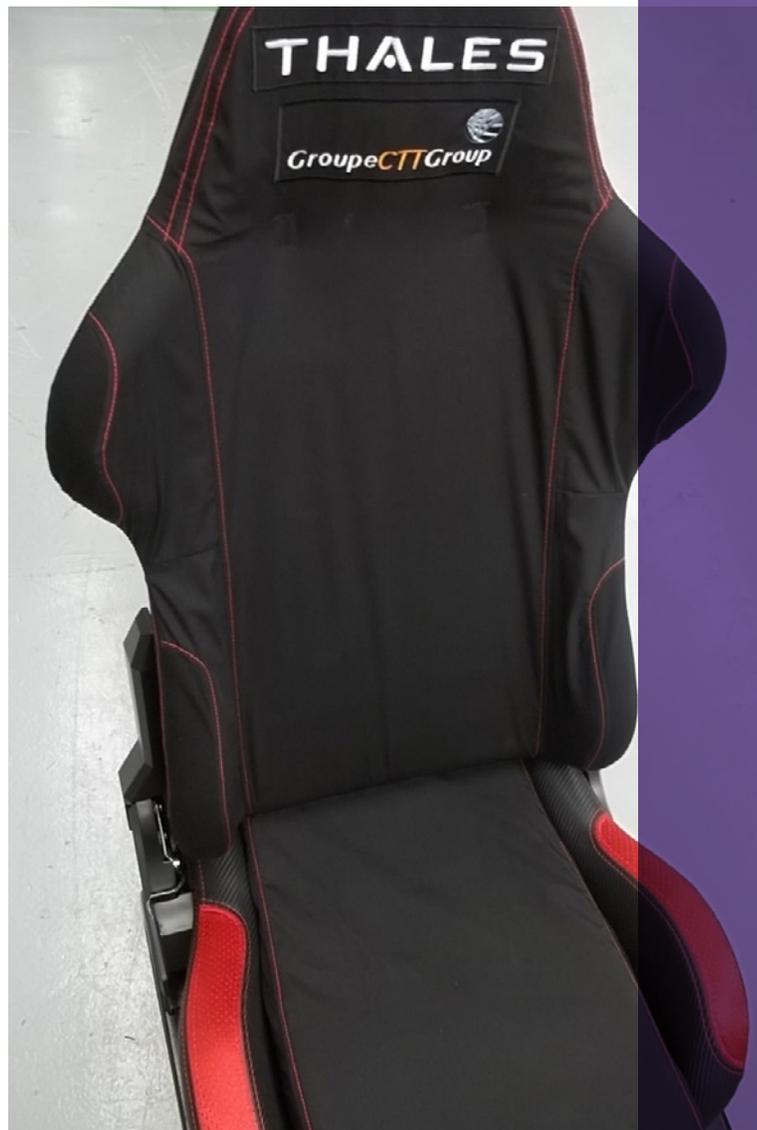
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Launched in fall 2017, intelliWEAR is a wearables and smart textiles accelerator program. Its goal is to bring together effective supply chain stakeholders to create awareness, educate, and facilitate the broad adoption of solutions enabled by printable, flexible or hybrid electronics for sports, fashion, health care and industrial applications. intelliWEAR unites leading organizations across value chains, to collaboratively explore, evaluate and mobilize innovative solutions. intelliWEAR serves North America while sharing solutions globally.
Learn more at intelliflex.org/intelliwear

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