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Smart Textile Structures for Medical and Industrial Applications

Vladan Koncar

ENSAIT, University of Lille, France

*Presenter's email: vladan.koncar@ensait.fr

ABSTRACT (NO MORE THAN 500 WORDS:)

New technologies, in the area of advanced textiles, focus on smart textiles, encompassing electronics combined with textiles also called textronics or e-textiles. They have a very promising realm in science and technology nowadays because of commercial viability and public interests. Smart textiles play a significant role as well in the European textile sector and assist the textile industry in its transformation into a competitive knowledge driven industry. Numerous materials and systems are available together with devices for sensing and actuation, but they are not compatible with textile substrates or with the textile production processes. They could be transformed into a textile compatible structure or even in a full textile structure.

Smart textiles can be defined as textiles that are able to sense and respond to changes in their environment.

They are able to detect different signals from the environment (temperature, light intensity, pollution...), to decide how to react and finally to act using various textile based, flexible or miniaturized actuators (textile displays, micro vibrating devices, LED, OLED ...). The “decision” can be taken locally in case of embedded electronic devices (textile electronics) to smart textile structures or remotely in case the smart textile is wirelessly connected to clouds containing data base, servers with artificial intelligence software etc. and may be a part of Internet of Things (IoT) concept.

This study focusses on latest research results within GEMTEX smart textiles research team concerning following ENSAIT - GEMTEX projects:

- PHOS ISTOS, FP7 EU Project in the field of light emitting textiles structures used for a Photo Dynamic Therapy of skin cancer in its initial phase;
- @HEALTH, B2B project, concerning ECG monitoring in real time, with the system embedded into underwear aiming at the development of the predictive medicine concept;
- CONTEXT, ANR, French collaborative scientific project, in the area of textile metamaterials for energy harvesting and data transfer, using high and low frequency (2,4 GHZ and NFC frequency 13,56 MHz) textile antennas; and
- LITEVA, FUI, French industrial project dealing with the new generation of autonomous vehicle dashboards.