

SMART TEXTILES IN DEFENCE: LOOKING AT THE SOLDIERS OF THE FUTURE (STILE)

Smart Textiles are a new generation of materials and systems with very interesting multifunctional properties (camouflage, moisture management, electronics integrated in textiles, etc.). These properties, together with the possibility of integrating the materials and systems in uniforms and platforms have drawn the attention of the defence stakeholders.

Throughout 2018, EDA launched the project "Smart textiles in defence: looking at the soldiers of the future", aiming at integrating different functionalities related to the field of smart textiles into a single smart combat system.

Objectives

The STILE Project was designed in two phases.

» The first phase of the project was focused on two main objectives:

- the development of a credible roadmap, with the final goal of establishing how to pass from the current state of the art to a full system that integrates several functionalities in a textile substrate.
- the fabrication of a proof of concept, integrating various functionalities: signature management, monitoring of environmental parameters and CBR threats, flame retardancy, water and dirt repellence and anti-mosquito solution, physiological monitoring, self-thermoregulation (heating and cooling), communication and wireless exchanging data.

» In the second phase the design of the proof of concept and the depth of the simulation formerly developed are refined. A full test campaign of the proof of concept is being carried out, considering different parameters in both controlled (laboratory conditions) and non-controlled (real conditions) environments.

Within the scope of the project, an **International Forum on Advanced and Digitalised Smart Textiles (IFAST)** will be held on 15-16 June 2021, with the objective to evaluate the development of advanced and digitalised smart textiles in the European defence sector, aiming at laying the foundation of a possible European future dual use programme for multifunctional smart textiles.

The event, initially planned in Lisbon, will probably take place online, due to the present pandemic evolution.

The International Forum IFAST will be composed of:

- an exhibition area, where the stakeholders involved in smart textiles can have their stand to show their products, services and projects, and
- a conference area, organised in the following panels:
 - Panel 1. Foresighting advanced and digitalised smart textiles in the European defence sector.
 - Panel 2. Visualising a European dual use programme for multifunctional smart textiles.

The event will gather relevant stakeholders coming from relevant governmental defence bodies, industry (dual use), academia and R&T communities, as well as European institutions and organizations.

This is a project funded from EDA Operational Budget. OB-Projects contracted by EDA are activities to further catalyse pMS investments in related defence R&T.

Consortia/Organization

AITEX - Textile Research Institute

CITEVE - Centro Tecnológico das Indústrias Têxtil e do Vestuário de Portugal

INEGI - Instituto de Ciências e Inovação em Engenharia Mecânica e Engenharia Industrial

Work Strands

The development of the smart combat system was based on the integration of electronic components in textiles, by means of smart textiles technologies, such as technical embroidery and printed electronics.

A textile with specific finishing processes was developed, using thermochromic formulations, studies of colour fastness to light, and measurements of colour coordinates.

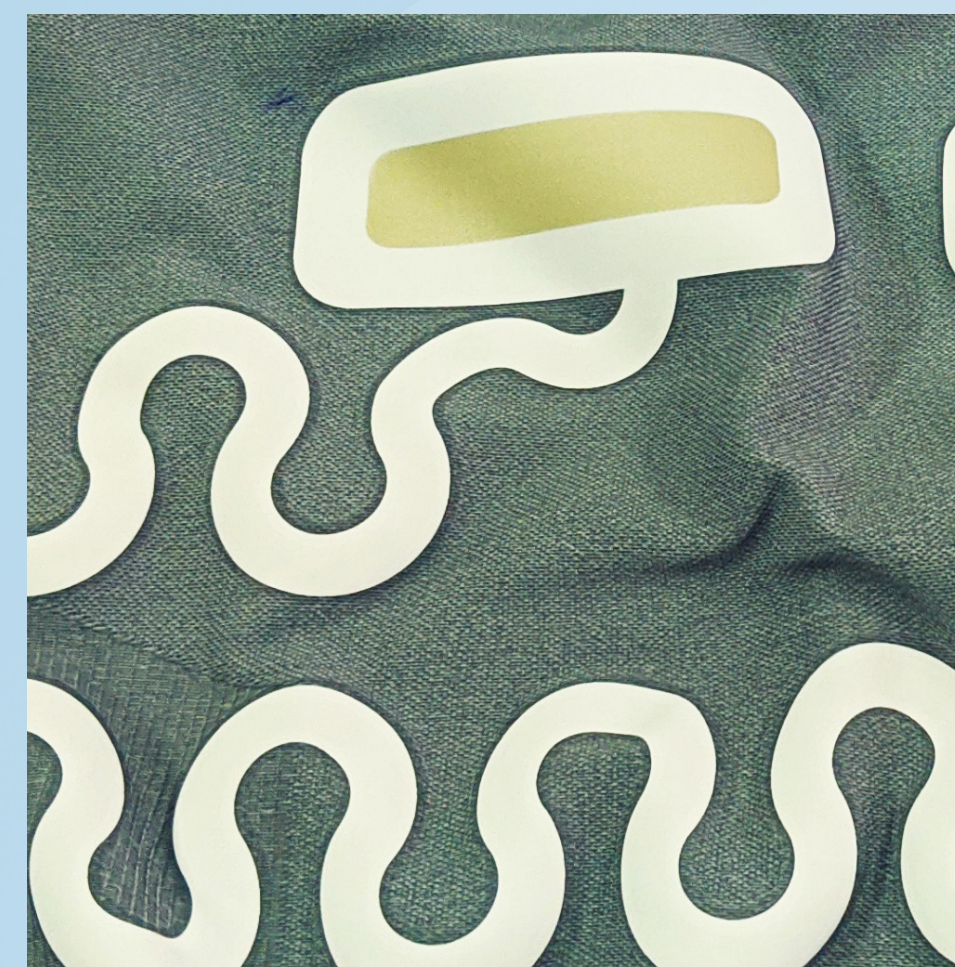
The smart multifunctional textile system was designed by taking into account parameters such as ergonomics, mobility, homogeneous distribution of weight, lightness, flexibility, comfort, freedom of movement and functional properties. To study these parameters, different ergonomic and fitting assessments have been carried out.

Two simulation models were also developed to evaluate the main concepts related to heat transfer phenomena, namely: the thermal protection capacity of the garment and the thermal signature under different ambient conditions. The integration of simulation activities within the STILE design is a pioneering process within the textile industry.

The design of the roadmap on smart textiles technologies was based on the technical knowledge of the consortium members and the collection of data coming from multiple sources: state of the art and comprehensive bibliographical review, a technology foresight workshop on Smart Textile Technologies, surveys and interactions with experts.

Related TBBs

- OSRA TBB92 – Advanced and smart textiles for platform monitoring



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