



## Smart Textiles in Vehicles: A Foresight

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### Abstract

*After technical textiles and functional textiles, also smart textiles came into force a few years ago. The term 'smart textiles' covers a broad range. The application possibilities are only limited by our imagination and creativity. This paper gives an overview of the functions that can be achieved by smart textiles in general. In vehicles as well, smart textiles can introduce new features. Two examples are described, namely climate control based on comfort of the passengers, and detection of reduced attention of a driver.*

*Keywords: Smart textiles, functional textiles, automotive textiles*

### 1. Introduction

*What does it mean exactly, 'smart textiles'?*<sup>1</sup>

Textiles that are able to sense stimuli from the environment, to react to them and adapt to them by integration of functionalities in the textile structure. The stimulus as well as the response can have an electrical, thermal, chemical, magnetic or other origin.

Advanced materials, such as breathing, fire-resistant or ultrastrong fabrics, are according to this definition not considered as intelligent, no matter how high-technological they might be. The first applications of smart textiles can be found in clothing.

<sup>1</sup> X ZHANG and X TAO, *Smart textiles: Passive smart*, June 2001 p 45-49, *Smart textiles: Active smart*, July 2001 p 49-52, *Smart textiles: Very smart*, August 2001, p 35-37, Textile Asia

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The first generation of intelligent clothes uses conventional materials and components and tries to adapt the textile design in order to fit in the external elements. They can be considered as e-apparel, where electronics are added to the textile. A first successful step towards wearability was the ICD+ line at the end of the 90ies, resulting from a cooperation between Levi's and Philips. This line's coat architecture was adapted in such a way that existing apparatuses could be put away in the coat: a microphone, an earphone, a remote control, a mobile phone and an MP3 player. The coat construction at that time did require that all these components, including the wiring, were carefully removed from the coat before it went into the washing machine. The limitation as to maintenance caused a high need for further integration. Infineon <sup>2</sup> has developed a miniaturized MP3 player, which

<sup>2</sup> [http://www.wearable-electronics.de/intl/fotos\\_vorbereitungen.asp](http://www.wearable-electronics.de/intl/fotos_vorbereitungen.asp)