

SensFloor® and NaviFloor® - Large-area Smart Textile Systems for Building Automation Ambient Assisted Living, and Robot Navigation

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The **SensFloor®** system that will be described in this presentation will give floors added functionality. It is based on a smart textile underlay with built-in microelectronic components and capacitive proximity sensors, and it can be installed under virtually any floor covering. Future-Shape has developed a radio module on a flexible substrate which is specially designed for integration into textile surfaces and can be connected to as many as eight sensors. The layer structure of the *Smart Textile* is suitable for reel-to-reel production. When someone walks across the floor, the built-in sensors are activated, and a central controller receives a sequence of sensor events in a time and space context. Pattern recognition and motion vectors generated on the basis of these signal patterns can then be used to identify different events. Footprints that start at a window, for example, can be interpreted as evidence of a break-in. More intelligence can be built into automatic door control systems, which open a door only if someone is walking straight towards it. If a person is just standing next to the door, or is walking parallel to it, the door remains closed. The same applies to offices and public buildings where lighting, air conditioning and ventilation systems can be optimized in accordance with the demand, as long as the number and location of users are known. Pattern recognition can be used to detect falls and make an emergency call if the person who has fallen fails to move.

NaviFloor® is an RFID floor for robot navigation and the second *Smart Textile* system that will be presented. Keeping track of robots in enclosed spaces is no easy task. NaviFloor® provides a way of placing invisible landmarks on a floor using RFID tags. RFID stands for Radio Frequency Identification. These tags use an electromagnetic field to retrieve or store information. Since they are passive devices, they do not require a power supply. Robotic vehicles or other moving objects only need an RFID reader and map loaded in the controller to indicate the position of the tags in the floor. Equipped in this way, the robot can determine its exact position whenever the reader comes within range of a tag. The NaviFloor® impact sound insulating underlay based on a Polyester fleece is suitable for installation beneath all kind of elastic flooring, laminate or parquet. The NaviFloor® reinforcement glass fiber fabric is specially developed for installation beneath artificial resin or terrazzo flooring, tiles or elastic flooring. It is pressure-resistant up to 45N/mm² and withstands even fork lift trucks.

In this presentation the principle of both systems, the textile/microelectronic integration technique and suitable applications will be discussed.