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Smart floor navigates smart service robots **CeBIT 2006, Exhibition Hall 9, Booth A60**

Today highly accurate navigation of mobile robots over long distances is no longer a problem, given one is ready to pay the price for expensive sensor equipment. "The best available sensors for large scale navigation of mobile service robots may easily cost several times as much as the manufacturing of a professional cleaning robot may cost." says Dr. Erwin Prassler, CEO of InMach Intelligente Maschinen GmbH. The company located in Ulm, Germany, therefore focuses its business on the development of low-cost guidance systems for mobile service robots.

In a joint venture with German floor covering manufacturer Vorwerk & Co. Teppichwerke GmbH & Co. KG InMach has developed a low-cost guidance system for mobile service robots based on RFID technology. The guidance system uses the RFID transponders embedded in the so-called *Smart Underlay* developed by Vorwerk Teppichwerke for position estimation. This Smart Underlay is a specially designed tissue containing a dense network of hundreds and thousands of RFID transponders. The Smart Underlay can be placed between the floor pavement of a building and almost any arbitrary floor covering. The transponders act as a sort of radio beacons, which show the robots their way. They are passive electronic devices, which create an electro-magnetic echo with a certain ID. Unlike radio beacons they do not actively send out a signal themselves but only respond to signal requests. Using the transponders, which can be arranged in arbitrary patterns, the guidance system developed by InMach determines the position and orientation of a robot with a constant accuracy of a few centimeters and degrees, respectively; and this not only for a few meters but over arbitrary distances.

The advantage of the navigation solution developed by InMach and Vorwerk Teppichwerke lies not only in its constant accuracy but also in its economic efficiency. The additional cost caused by the deployment of a Smart Underlay under a regular floor covering are compensated by the significantly reduced cost for the robots' sensor equipment and will amortize after a very short time.

The first application, in which InMach's RFID based guidance system together with Vorwerk Teppichwerkes' Smart Underlay is used, is a professional cleaning robot, which InMach has developed jointly with Swiss Cleanfix AG. This product is ready for serial production and will be released to the market in fall 2006.

Prototypes of Vorwerk Teppichwerkes' Smart Underlay and the cleaning robot powered by InMach's RFID based guidance system can be seen in action from at CeBIT 2006 in Exhibition Hall 9, Booth A60, March 9 through 15.

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