

Internet of Things

The Promise of Printed Electronics

By Janelle Weaver

Imagine being able to test the freshness of your produce or the potency of your medicine simply by scanning it with your smartphone. A world in which every object is tagged with chips that can interact with networks, dubbed the “Internet of Things,” is the futuristic vision held by Davor Sutija, M&T’83, Chief Executive Officer of Thin Film Electronics ASA. This Oslo-based company, launched in the mid-90s, has pioneered the development of flexible, wafer-thin printed tags that store electronic information in rewritable memory.

Less expensive and more amenable to mass production than standard silicon microelectronics, this non-toxic, low-power, polymer-based technology is also ideal for personalized toys and games, allowing children to program characters to have specific names and features. For businesses, the technology means protecting their brands with printed radiofrequency identification tags and tracking customers’ behaviors and preferences for interactive marketing campaigns.

The printed electronics company demonstrated its first prototype of an integrated printed system last October together with PARC, a Xerox® company that manufactures transistors used to construct the circuits. And this summer, Thinfilm announced that it will partner with the Fortune 500 Wisconsin-based packaging company Bemis®, paving the way for introducing freshness indicators into grocery stores and pharmacies by 2014. By monitoring individual packages to ensure that their contents have been kept at a safe temperature over time, the printed sensor systems can alert consumers if their milk or medicine is past its prime.

“This technology will allow consumers to check the quality of perishable goods inside packages, as well as companies to check the environmental conditions that packages are exposed to during transport, so that they know when and where the quality of the material they ship is compromised,” Sutija says. “It’s a significant



In 2011, Thinfilm’s manufacturing partner InkTec® opened a dedicated printing line to produce Thinfilm rewritable memory. In the photo, InkTec CEO K.C. Chung and Davor Sutija hold the first roll of fully printed memories from the new line.

step in the direction toward an ocean of smart tags that I believe will form the basis for the long-heralded Internet of Things.”

Launching Success

Among the first batch of graduates from Penn’s Jerome Fisher Program in Management and Technology, Sutija credits this unique interdisciplinary program—and his past Chemical Engineering advisor Eduardo Glandt, now the Nemirovsky Family Dean of the School of Engineering and Applied Science—for fostering his sense of entrepreneurship. “Dr. Glandt was adamant in his view that a degree in engineering was not a hindrance to participating in technology management, rather quite the opposite—that it would give me a unique perspective and credibility in leading technically entrepreneurial teams and organizations,” Sutija says. “It’s rare to combine a top-notch engineering education and business education into one program, and this interdisciplinary education was critical for launching my career.”

After receiving his Penn degree, Sutija studied History and Philosophy of Science at the University of Cambridge and then earned a Ph.D. in Chemical Engineering from the University of California at Berkeley. Based in Norway for the past 20 years, Sutija co-founded SiNOR AS (now REC-SiTech), a producer of photovoltaic ingots, was on the management team of FAST, an enterprise software company bought by Microsoft® in 2008, and joined Thinfilm in 2010. Through these diverse entrepreneurial experiences, he has focused his efforts on making energy consumption more environmentally friendly, improving the way we search for information, and developing smart tags that can lead to a better quality of life. “I’m excited about being at the forefront of creating technology that affects the way we live,” Sutija says. ▾