



## Wireless Sensors Push Smart Machines Into Green Revolution

*STMicroelectronics, ARaymond and Micropelt to Demonstrate Thermal-Energy Harvesting Solutions at Hannover Fair - Hall 8, D26*

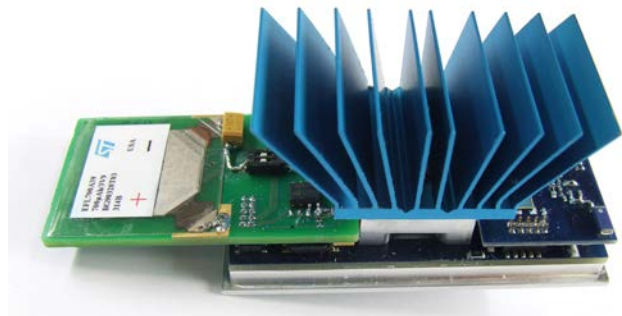
**Geneva, Switzerland, Grenoble, France, and Freiburg, Germany – March 17, 2011 –**

STMicroelectronics (NYSE: STM), ARaymond and Micropelt today announced that they are jointly presenting thermal-energy harvesting-based solutions to power “smart sensors” and “smart microsystems” at the Hannover Fair under the common theme of ‘Green Solutions.’ The three companies are partnering to exhibit the entire value chain of self-sustaining wireless systems in a joint booth (Hall 8, D26).

Wireless sensor and actuator systems are strong future contributors to energy and resource efficiency; the improvement of asset health and uptime; and more efficient condition-based maintenance and operating safety of machines and production equipment. Ubiquitous wireless systems are indispensable to achieving a huge green impact, however, they are a viable option only if local battery maintenance can be circumvented.

Micropelt has developed chip-sized thermogenerators (TEGs) which turn local heat fluxes into electrical energy for ultra-low-power systems. Due to the highest power density in a few square millimeters of footprint, Micropelt’s chip-sized thermogenerators have attracted many customers worldwide. STMicroelectronics, one of the world’s biggest chip makers, and ARaymond, a worldwide supplier to the Automotive and Solar industries, are presenting solutions they have co-developed with Micropelt.

ST focuses on components supporting energy harvesters in their complementary role of an energy generator with energy storage. Consequently, the development efforts between ST and Micropelt focused on an evaluation system featuring ST’s new robust and long-life solid-state thin-film rechargeable battery (EnFilm™) combined with Micropelt’s Thermal Electrical Generator (TEG) chip. The Perpetual Energy Module (PEM-TE01) system demonstrates how these two technologies can provide uninterrupted power and establish a virtual perpetual-energy solution to a long-life and maintenance-free wireless system.



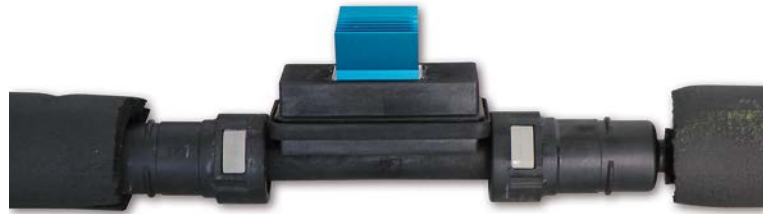
ST's Perpetual Energy Module (PEM-TE01)  
with thermoharvesting power supply

ARaymond's engineers teamed up with Micropelt to develop a new industrial approach to hermetically packaging Micropelt's energy-harvesting wireless-sensor evaluation platform, TE-Power NODE. The joint

effort has resulted in

ARaymond's fully energy-autonomous wireless temperature sensor Heat BiTe for use in solar-thermal and similar systems which carry a liquid that is warmer or colder than ambient. Micropelt uses a variation of this liquid harvester

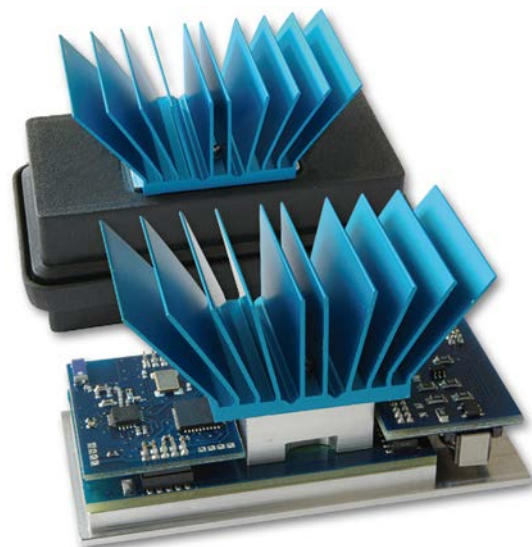
solution which features a flat interface for attachment to any warm surface to ruggedize their evaluation kit to IP47- and IP48-level. It is now called TE-Power MOTE.



ARaymond's Heat BiTe autonomous sensor for fluid systems as automotive cooling, solar water heating.

"Leveraging our expertise in power management and power saving, energy harvesting is a very attractive new opportunity for which we can apply existing ST technologies," said Igor Bimbaud, ST's New Energies BU director. "Our jointly developed PEM-TE01 demonstrates the concept of a perpetual self-sustained energy supply for low-power systems. Our thin-film cell stores every bit of energy that has been harvested, keeping it for years and working throughout the device's life."

"Many of our customers complain about wiring issues while asking for greater intelligence in the components. Wiring is expensive, resistive to automation and every interface can cause trouble," explained Dr. Hans-Jürgen Lesser, ARaymond's Executive Director for R&D. "We found Micropelt's thermoharvesting technology to be a perfect solution to these issues, because we already provide fluid handling solutions to many customers. Now we can integrate our thermoharvesting Heat BiTe into various fluid systems achieving a wireless and fully autonomous condition-monitoring system. This is one of the most versatile intelligent components available on the market and we're proud of it."



Micropelt's TE-Power MOTE, self.-powered wireless temperature monitoring sensor hermetically sealed for outdoor and harsh environments.

"New technologies evolve by evidence," concluded Wladimir Punt, Micropelt's VP Sales and Marketing. "We are very pleased with the results of our cooperations with ST and ARaymond which proves to our current and future customers worldwide that thermoharvesting is a solution to many of today's issues."

## **About STMicroelectronics**

STMicroelectronics is a global leader serving customers across the spectrum of electronics applications with innovative semiconductor solutions. ST aims to be the undisputed leader in multimedia convergence and power applications leveraging its vast array of technologies, design expertise and combination of intellectual property portfolio, strategic partnerships and manufacturing strength. In 2010, the Company's net revenues were \$10.35 billion. Further information on ST can be found at [www.st.com](http://www.st.com).

## **About ARaymond**

The first ARaymond company was established in Grenoble, France, in 1865. The company is still a Family owned business and the President is Antoine RAYMOND. ARaymond creates optimized products, using the specific advantages of metal, plastic and the combination of the two. The technological expertise has given the rise to new material, features, products and services.

Today ARaymond is among the worldwide leading companies in advanced assembly technology (engineered fastening systems, bonding, assembly process, electrical applications, fluid handling and communicating fasteners) and also the leading European FSP (Full Service Provider).

The company - located on 21 countries - represents 35 companies, 20 production sites and 1 design centers. More than 4,000 people are employed by ARaymond Network. Companies of ARaymond Network are mainly active in automotive industry and are present in all main OEM or related tier 1's design centers. However, the ARaymond Network's passion for fastening is not only dedicated to the automotive market; fortified by its success and innovation within the automotive sector, it has diversified to allow all sectors of industry to benefit from its expertise: agriculture, building, industrial equipment, energies and life.

Its mastery of engineering and leading position as a global expert in engineered fastening systems and bonding allows the ARaymond network to propose its customers adapted and personalized solutions through the creation of innovative products.

## **About Micropelt**

Micropelt GmbH, Freiburg, Germany, develops, produces and markets the world's smallest and most effective thermoelectric elements for clean-tech micro energy harvesting, thermal sensing, cycling and cooling. The company employs 20 staff and currently commissions their first million-unit production facility, also located in Germany.

Micropelt's thermoelectric chips are based on a patented scalable thin film [micro-structuring platform technology](#), which minimizes component size while maximizing power density for

energy harvesting, cooling or thermal cycling applications. Process-inherent economies-of-scale break previous cost and price barriers of conventional thermoelectrics. Batteries become obsolete as cost-free electricity from waste heat powers wireless sensor networks for their entire life. Chip-thermogenerators also boast unprecedented sensitivity, resolution and dynamics in sensing heat flux and temperature change. For more information contact Micropelt or visit the website <http://www.micropelt.com> .

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