

Industrial Wireless Temperature Transmitter Powered by Heat

ABB and Micropelt Prove Thermal Energy Harvesting to Solve the Battery Issue of Wireless Sensors

Freiburg, Germany, March 10th 2010, Wireless sensors are rather inexpensive and can be deployed almost anywhere. Deploying more sensors would lead to safer and more efficient process control, and much reduced maintenance cost – if cost and effort of battery maintenance could be obviated.

Energy harvesting is used by the ABB R&D Centers Ladenburg, Germany and Daettwil, Switzerland, and Micropelt, Freiburg, Germany to replace the battery with an unlimited, green, sustainable, maintenance-free power supply. As the result of a joint development project an ABB WirelessHART temperature transmitter has been equipped with a thermal energy harvesting unit containing two Micropelt Thermogenerators MPG-D651 with a footprint of 6 mm² each. A temperature gradient of 30°C between the sensed medium and ambient air is sufficient to fully cover the power demand of the mesh-networked wireless instrument. Dr.



ABB and Micropelt introduce world's first thermal energy harvesting wirelessHART sensor prototype (photo © ABB)

Marco Ulrich, ABB's project leader, sees a major breakthrough: "Wireless instruments provide for a much more flexible and comprehensive use of sensors at much reduced total cost, particularly under difficult conditions. However, none of our customers can accept having to exchange batteries with hundreds or thousands of instruments on a regular basis. Our technology demonstrator proves the concept of large, complex sensor networks at a fraction of the previously accrued total cost of ownership."

Dr. Joachim Nurnus, Micropelt's CTO, adds to the point: "We certainly save some hundreds of thousands of high power batteries, but far more important are all the additional sensing

points which will help producing more energy-efficiently, optimize the utilization of process equipment, and shift to the highly cost-efficient condition-based maintenance. We have only just begun to understand the enormous economical and ecological potential of ubiquitous wireless sensing. Now, we very much look forward to sharing this with our customers along with a host of other self-sustaining wireless demonstrators and prototypes at the upcoming sensors shows in Nuremberg, Germany, in May and Chicago, IL, in June.”

About Micropelt

Micropelt GmbH, a 2006 spin-off from the research cooperation between Infineon Technologies and the Fraunhofer Institute IPM Freiburg, develops and markets the world’s smallest and most effective thermoelectric elements for clean-tech power generation (energy harvesting) for sensing, cycling and cooling. Readily available standard products from the pilot-production plant at the company’s headquarters in Freiburg, Germany are currently being evaluated by and incorporated into the products of more than 40 customers. A large-scale production facility, fully financed and currently under construction in Halle, Sachsen-Anhalt, Germany, is expected to raise capacity to some 10 million devices per year by mid 2010.

About Micropelt’s Thermoelectric Solutions

Micropelt’s thermoelectric elements are based on a proprietary scalable MEMS (Micro Electro-Mechanical Systems) [micro-structuring platform technology](#). Compared to conventional thermoelectric elements, Micropelt’s unique and patented technology reduces component and feature sizes by orders of magnitude, yielding 10 times higher cooling or heating power densities. Economies of scale through volume production break the existing cost and price barriers of conventional thermoelectrics, enabling Micropelt’s devices to scavenge free electric power from waste heat to replace or recharge batteries in [low power](#) wireless sensor networks.