Energy Scavenging for Remote Wireless Devices

Motivation

- Wireless sensor systems require an independent power supply capable of operating for a significant duration.
- Typically, a dry-cell rechargeable Ni-MH battery is used as the source of power since these provide constant current output.
- Batteries however have a finite lifetime and are poor solutions for long-term storage of energy–depletion often occurs within 12 months.
- Batteries can also be expensive to replace when located in remote regions; when large numbers of wireless devices are employed the replacement cost can seriously impinge upon the economic viability of device deployment.
- In an ideal sensor system, energy sources would have a long life with little or no maintenance requirements.
- The ability of a wireless device to scavenge energy from the environment is crucial to the development of future sensor and monitoring systems.

Courtesy of Syngenta

Challenges

- Provision of power sources which do not require significant maintenance.
- Energy scavenging is by definition a low current, cumulative process, and the challenge is to scavenge as much energy as possible from the environment.
- Development of a capability to recharge Ni-MH batteries which will extend longevity of the sensor deployment.

The Proposed Solution

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Will utilise:

- Advanced microelectronics.
- Micro Electro Mechanical Machine (MEMS) Technology.
- Wireless sensor technology.
- High-density capacitors.

To provide:

- Long-life low-current sustainable power supplies, that can be integrated into remote sensor systems.
- Energy for in-situ field deployment, with the potential for use in hostile environments.

The project also aims to present :

- A link to the group's other sensor related developments through energy sources integrated into field-deployable systems.

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