

## **ECOPLUS - Energy Harvesting for Mobile Eco-Efficient Wireless Sensor Networks**

Within the national funded FIT IT Embedded Systems project ECO-SENSOR, the project partners from Austria (Profactor, Pöttinger, University of Linz, Exler Elektronikentwicklung) break up the critical dependency of remote wireless sensor networks from traditional battery technology. Based on the concepts of retrieving electrical energy from vibrating machinery and enabling ultra-low power wireless transmission of arbitrary sensor information, the design of this embedded modular base unit opens a variety of technological challenges going far beyond the state-of-the-art. Since ECO-SENSORS are energy-autonomous, no additional energy has to be provided for both, sensing operation and wireless transmission. The ECO-SENSOR project enables the reliable integration of dense wireless sensor networks for optimal condition monitoring and process control, accelerates engineering and integration times by totally eliminating wiring efforts, increases operational machine safety, dramatically reduces machine break-downs and maintenance costs and allows for accessing sensors in otherwise not reachable areas.

The resulting prototype was able to supply the WTU and the sensor during working conditions. Projects at the international level will be initiated in the near future and will lead to consistent development of the base technology with respect to requirements from different applications.

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### **SWOT ANALYSIS**

#### **Strengths:**

- A new, innovative base technology for next-generation energy-autonomous wireless sensor networks was developed (reliable process control and condition monitoring in future mobile agricultural farming machines);
- Innovative mechatronic decision - A full demonstrator consisting of the elements Mechanical Energy Conversion Unit (MECU), Electric Harvesting Unit (EHU), WTU (Wireless Transmission Unit) as well as Base Stations has been developed and tested within field -tests (Poettinger);
- Many relevant publications/one patent;
- Project partners have gained large experience in leading national and European funded research projects (FIT-IT ES MESACTIF, FIT-IT ES VIBE-LESS, FP6 IP DECOS, etc);
- Research team with punctually defined responsibilities;
- Product enables reduction of environmental pollution.

#### **Weaknesses:**

- The project is still on the research stage;

- Lack of co-financing description;
- There is not a clear vision about the potential market;
- There are no market experts involved directly in the project;
- Usage of the product is limited to special environment (which produces vibrations necessary for product's functioning).

### **Opportunities:**

- Innovative product which can be used in various applications (steel industry, agricultural machinery, combustion engines, etc.);
- Development team consists of different profiles of experts (professional electronic developers, technology transfer experts, industrial end users). This is an opportunity that the product can meet all requirements at the end of its development lifecycle;
- Possibility for reaching commercial market acceptable price by using standard electronic elements during the industrialization phase of the product's life cycle process.

### **Threats:**

- There is not a vision about the proper product price on the market;
- The producer isn't able to perform the expected technological enhancements;
- The product is applicable only as a power source for limited set of devices with very low electric power demand.