Symbiotic Wireless Autonomous Powered system (SWAP) combines the energy-efficient paradigm of wireless sensor networks with the self-sustainable capabilities of harvesting systems. SWAP aims at providing a novel sensor board consisting of

1) a high efficiency RF transceiver

2) a low power micro controller

3) an energy accumulator

4) modular harvesting systems.

To this aim SWAP will study advanced solution for RF circuits and antennas, will use state of the art micro controllers, will implement highly efficient accumulator and will investigate on harvesting techniques. In particular, the different harvesting modules will be applied to standard sensor networks scenarios: for instance, environmental monitoring networks are more likely to use photo voltaic cells, while urban sensor networks can use instead vibrations, and harvest the available ambient electromagnetic (EM) energy. SWAP will also study communication protocol from the physical to the network layer in order to implement the techniques offering the highest efficiency as well as taking into consideration the temporary availability of energy sources. Also, the SWAP system will be realized and tested on the field; applications will be developed in order to provide the basic services for the new platform. As a final result, SWAP aims at obtaining a new wireless sensor paradigm totally independent from batteries and, moreover, having as little an impact on the environment as possible.