

**Meta-Antenna and Energy Harvesting/Storage Modules Development for Autarkic Sensors Arrays**  
**Acronym: METATHERM**

Mohamad ABO RAS - *Nanotest Berline*

METATHERM demonstrates a versatile energy harvesting and communication system for unattended environment sensors arrays, allowing the development of maintenance free and autarkic operation devices. The novelty builds up from several different innovations, an extremely high gain and an extreme compactness on metamaterials-based microwave antenna. The energy efficiency of the antenna allows the electrical power need to be decreased accordingly, which allows the consideration of novel energy harvesting technologies to be used to power the system. The energy of the sun is harvested using a novel thermoelectric device. A significant advantage in the context of the rapidly growing energy demand for IoT and mobile electronic systems. Used in addition to a supercapacitor to store the electrical energy and a thermal energy storage device, allowing continuous operation of the device day and night. Finally, the project aims to develop a platform integrating all these technology in a single device, and exploration of its potential applications.