
## Technology Transfer in Computing Systems

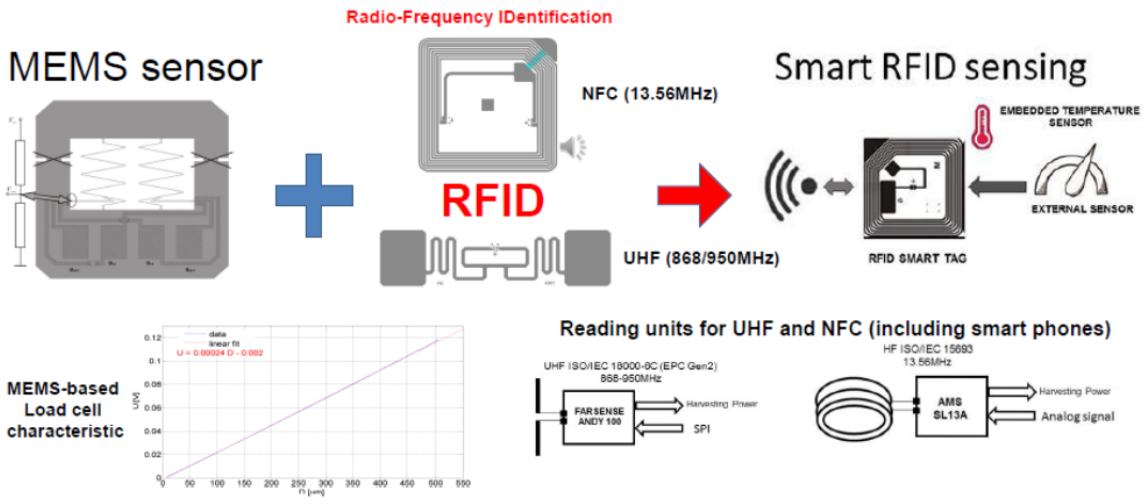
# D3.47: Individual TTP47 abstract

| | |
|---|---|
| **Project no.:** | 609491 |
| **Funding scheme:** | Collaborative project |
| **Start date of the project:** | 1st September 2013 |
| **Duration:** | 36 months |
| **Work programme topic:** | FP7-ICT-2013-10 |
| | |
| **Deliverable type:** | Report |
| **Deliverable reference number:** | ICT-609491 / D3.47 |
| **WP and tasks contributing:** | WP 3 / all |
| **Due date:** | 31/07/2016 |
| **Actual submission date:** | 12/07/2017 |
| | |
| **Responsible Organization:** | EPU |
| **Dissemination Level:** | Public |
| **Revision:** | 1.0 |

# TETRACOM D3.47: Contactless smart MEMS-based piezo-resistive sensor (COSMOS)

Marin Marinov – European Polytechnical University, Pernik, Bulgaria, Vladimir Stavrov – AMG-T, Botevgrad, Bulgaria

The synergy of Radio Frequency Identification (RFID) and Micro Electro-Mechanical Systems (MEMS) sensors technologies is one of the perspective ways towards real implementation of the Internet Of Things (IOT) concept. Exploiting of standard signal reading techniques, constrains novel sensor's applications due to the bulky and space-demanding electric wiring and power consuming components. In that sense the design of contactless, low power consuming, multifunctional sensors is a challenge for the nano-technological industry.
The implementation of RFID technology in MEMS sensors impacts on several aspects of the sensor characteristics:
1. Technical impact. The MEMS sensors will obtain unique capabilities such as:
* Wireless communication capabilities, both in short distance via NFC (using also smart phones) and in long distance via RFID in UHF (Ultra High Frequency) range
* Independent power supply, harvesting energy from RFID
* Identification/Personalization of the sensor by assigning to it a unique identification number
* Tracking record of measured parameters, which can be done in real time
2. Economic impact. The MEMS sensors with above characteristics become more competitive as:
* Cover wider range of applications beyond the traditional i.e. open new market niches for these sensors. It is planned to demonstrate force-meters applicable in the operating range between 100µN and 40kN, which can successfully replace currently exploited load cells.
* Lower energy consumption, as the sensor is supplied only during the measurement process when RFID is active.
* Lower materials consumption – the contactless communication saves the expensive and bulky wiring
* The new technology will facilitate the installation of the force-measuring units into existing base of equipment with significantly less efforts but adding unprecedented accuracy – this will ensure broadening the applications and potential customers. Due to unified installation and wireless data communication, the technical merit of the operating staff will become less critical for overall performance of the installed monitoring systems.




The University - EPU has developed a technology for off-chip contactless sensor communication via RFID standard channels. This technology provides the opportunity to upgrade the existing MEMS sensors with a contactless (wireless) remote data exchange capability without a change of the chip (sensor) design. It is done by in-sensor package incorporating of the RFID infrastructure, which is capable to process and transmit both digital or analog sensor signals.

The objective of the project was to transfer the described RFID/NFC technology for enabling wireless communication/identification and signal conditioning capabilities of the AMG-T's MEMS piezo-resistive sensors, thus reading them remotely.

Two RFID standards has been implemented: the NFC, because it is a part of the most of Android smart phones and can expand the field of applications and UHF range RFID for long distance reading. The process of transfer the technology was focused on providing skills, tools and knowledge for prototyping and production preparation of the MEMS sensors with contactless communication capabilities, training the company staff to implement it in its products, adaptation and transfer of the needed application software for both types of RFID standards and finished with test and qualification of the prototypes.

EUROPEAN UNIVERSITY
POLYTECHNICAL PARTNER OF MULTIVERSITY GROUP

AMG TECHNOLOGY CONTRACT MANUFACTURING OF MEMS