CONVERGENCE
Frictionless Energy Efficient Convergent Wearables for Healthcare and Lifestyle Applications

Main area: High-Efficiency Sensor Networks
Keywords: Low power wearable sensors, bio-sensors (sweat and breath), activity sensors, environmental (gas and particle) sensors, energy harvesting, energy efficient wearables, energy efficient autonomous systems, signal processing, data analytics, preventive healthcare strategies, energy harvesting, energy efficient computing and communications, heterogeneous integration on flex, silicon-in-foil.

Duration: 36 months
Total project funding: € 2,522,547

Abstract
The wearable sensor platform proposed in CONVERGENCE is centred on energy efficient wearable proof-of-concepts at system level exploiting data analytics developed in a context driven approach (in contrast with more traditional research where the device level research and the data analytics are carried out on separate path, rarely converging). Here we choose realistic wearable form factors for our energy efficient systems such as wrist-based and patch-based devices. Their advancements, as autonomous systems is foreseen in CONVERGENCE to offer unique solutions for new generations of frictionless (non-invasive) quasi-continuous healthcare and environmental monitoring, and for forthcoming smart apparel with embedded autonomous sensing. At long term, the CONVERGENCE platform will form the basis for new generations of human-machine interfaces. Such energy efficient, wireless and multifunctional wearable systems will beneficially track and interact with the end-user through appropriate feedback channels on a daily basis. They will enable personalized advice and assistance promoting healthier lifestyle and improved healthcare prevention, far beyond what today’s wireless sensor networks are capable of providing. The project includes and addresses all the value chain needed for the energy efficient body-area networks and wearables, with particular attention to requirements made by health care and healthy life style.

The CONVERGENCE project supports holistically - by multiple efforts at technology, system integration, algorithms and data analytics levels - the advancement of early detection, minimisation of risks and prevention-based healthcare and lifestyle, based on the deployment of some focused embodiments of wearable technology for interactive monitoring and assessment.

CONVERGENCE advocates success via a multidisciplinary and holistic vision of convergent wearable technology designed by engineers with the insight of medical professionals and exploiting strong scientific expertise of academic partners. The proposal address concrete healthcare needs and requirements and promotes the idea that energy efficient wearable components will become crucial for feedback aiming at healthy lifestyle and will be integrated in the future in the healthcare chain for self-use and/or in scenarios involving healthcare professionals.

CONVERGENCE endeavours to exploit these new technologies potential of multi-parameter continuous monitoring in everyday life for true preventive medicine and a new Quality-of-Life. Moreover, this initiative has the ambition to create and develop at European scale a diverse community and network of research partners to generate new research ideas and innovation. We are planning collaborative efforts with some other initiatives such as the former FET Flagship Pilot ITFoM, which will provide strong medical expertise and an advanced platform for field trials of the wearable sensing technology.

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