Fully Networked, Digital Components for Photon-starved Biomedical Imaging Systems

SEVENTH FRAMEWORK PROGRAMME

SPADnet project

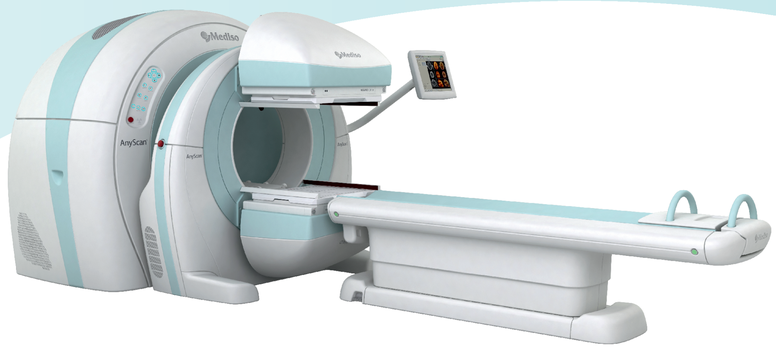
SPADnet – "Fully Networked, Digital Components for Photon-starved Biomedical Imaging Systems" – is a new collaborative research project funded by the European Union within the Information and Communication Technologies (ICT) Theme of its Seventh Research Framework Programme (Fp7).

SPADnet, launched on July 1st, 2010, was granted 3,700,000 EUR of funding over a 42 month period. The project is coordinated by EPFL and it includes seven leading European experts in image sensors, medical imaging and photonics.

SPADnet aims to develop a new generation of smart, large area networked image sensors, based on a conventional CMOS fabrication technology (the same as used for microchips or sensors in cell phone cameras, for example), for photon-starved biomedical applications. SPADnet will build ring-assembly modules for Positron Emission Tomography (PET) medical imaging, and carry out performance tests in a PET system evaluation test bed.

SPADnet members

- Ecole polytechnique fédérale de Lausanne (Switzerland)
- Fondazione Bruno Kessler (Italy)
- Delft University of Technology (Netherlands)
- University of Edinburgh (United Kingdom)
- STMicroelectronics (United Kingdom and France)
- Mediso Medical Imaging Systems (Hungary)
- CEA-LETI (France)
- Budapest University of Technology and Economics (Hungary)

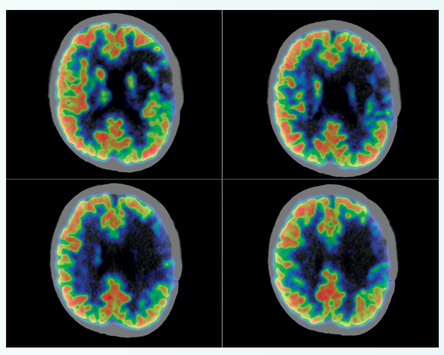


What is Positron Emission Tomography?

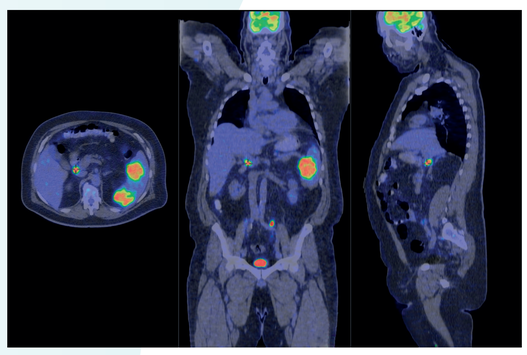
- PET is a nuclear medicine technique used to generate images of the body from the physiological point of view.

What is PET used for?

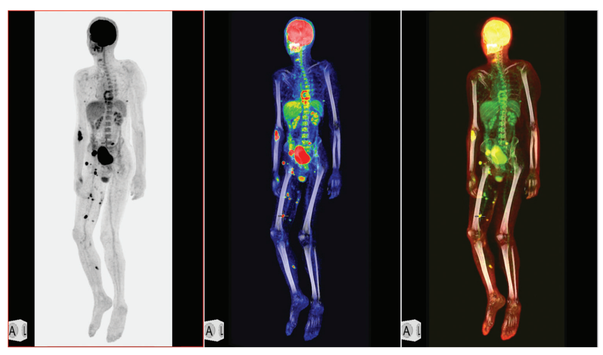
- Early diagnosis and monitoring of tumours
- Analyzing the function of the heart
- Studying brain diseases



PET-CT study of the brain



Whole body PET CT study



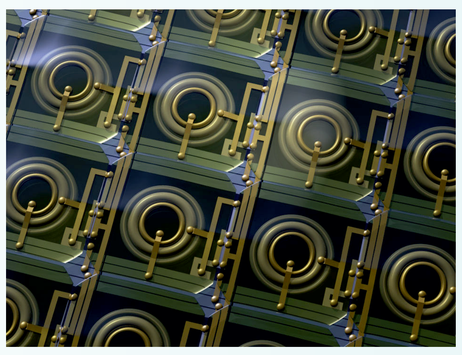
Whole body PET and fused PET-CT images in 3D

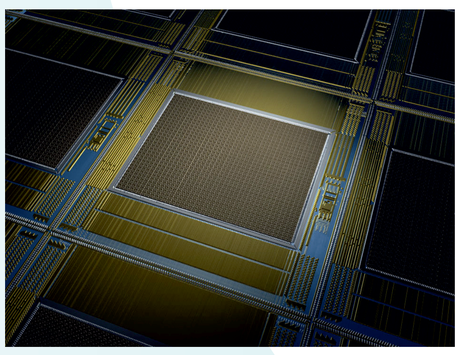
What are the current limitations?

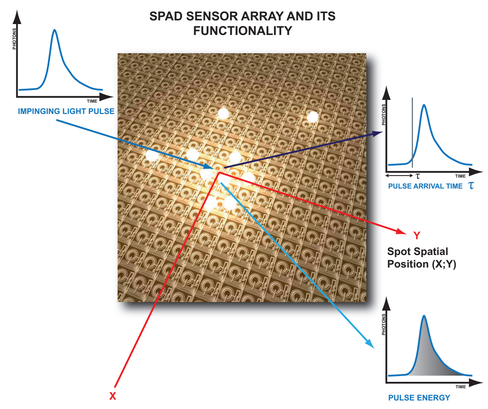
- Administration of harmful radiopharmaceuticals in high dose necessary
- Equipped with expensive, non-intelligent sensors with limited performance (so-called photomultiplier tubes)
- Non-compatible with Magnetic Resonance Imaging (MRI)

Our goals

- Improve system performance with intelligent sensors in order to reduce the dose of radioisotopes administered to the patient.
- Create a prototype based on a technology from consumer electronics to reduce costs







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