A MULTIMODAL SYSTEM FOR BREAST CANCER

There is a clear need for an affordable and highly specific point-of-care system for substantially improved in-depth diagnosis of breast lesions.

SOLUS will develop a **multimodal tomographic system**, combining **diffuse optical tomography** and **ultrasound** to support the diagnosis of breast cancer.

More specifically, the project will:

- Develop an innovative high performance **smart optode** for in-depth diffuse optical tomography
- Develop a **multimodal probe** combining the smart optode and ultrasound
- Assess the **sensitivity**, spatial **resolution** and **quantitation** in laboratory settings
- Validate the multimodal system and demonstrate the advantages in **real clinical settings**

FOR MORE INFORMATION VISIT
WWW.SOLUS-PROJECT.EU

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731877.

The SOLUS project is an initiative of the Photonics Public Private Partnership.

www.photonics21.org

SOLUS

SMART OPTICAL
AND ULTRASOUND
DIAGNOSTICS
OF BREAST CANCER

RATIONALE BEHIND THE SOLUS PROJECT

Early diagnosis of breast cancer is essential to ensure a high chance of survival. Diagnostic tools with high sensitivity and specificity are crucial for early detection.

Currently, large-scale screening programmes result in a significant number of false positive cases, leading to unnecessary invasive procedures like biopsies or surgery, which have a negative impact on the patient's quality of life and are a burden on healthcare systems.

There is a clinical need for a non-invasive diagnostic tool to achieve a more specific breast diagnosis.

IMPACT OF SOLUS

SOLUS develops an affordable point-of-care system, which achieves substantially improved breast cancer diagnosis and avoids unnecessary biopsies.

The improvement in the characterisation of breast lesions also leads to higher specificity in non-invasive breast cancer diagnosis. Women receiving a negative report will be spared unnecessary additional examinations.

The SOLUS system will allow more effective treatment and therapy management. New and improved therapy response prediction and monitoring enable personalised decision-making, therapy planning and optimisation for each patient. This also contributes to a significant decrease of total cost of breast cancer diagnosis.

FIRST RESULTS AND ACHIEVEMENTS

The project is currently designing and developing system components. These will be integrated into the SuperSonic Imagine Aixplorer® to form the SOLUS demonstrator.

Early results of the project include:

- A fast, compact laser system
- A time-gated single-photon detector
- Design of the smart optode
- Highly automated image processing and reconstruction algorithms
- Design of the multimodal probe
- Design of multimodal phantoms for optical tomography and ultrasound
- A protocol for testing the SOLUS system

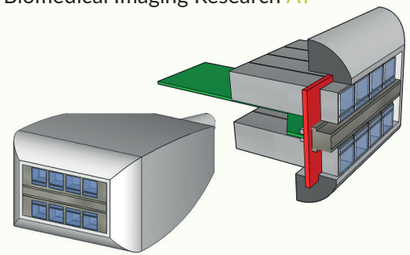
Image of a SuperSonic Imagine Aixplorer® Ultimate

FACTS AND FIGURES

SOLUS is a **four-year project** coordinated by Prof. **Paola Taroni** (POLIMI) running from November 1st, 2016 to October 31st, 2020. The project receives **€3,815,260** in funding under the Horizon 2020 research and innovation programme and is an initiative of the Photonics Public Private Partnership.

The consortium consists of **9 partners** from **5 European countries**:

POLIMI	Politecnico di Milano IT
CEA	French Alternative Energies and Atomic Energy Commission FR
SSI	SuperSonic Imagine FR
Vermon	Vermon FR
UCL	University College London UK
MPD	Micro Photon Devices IT
OSR	San Raffaele Hospital IT
EIBIR	European Institute for Biomedical Imaging Research AT
iCH	iC-Haus DE



Mockup of the multimodal probe with an ultrasound transducer and the smart optodes