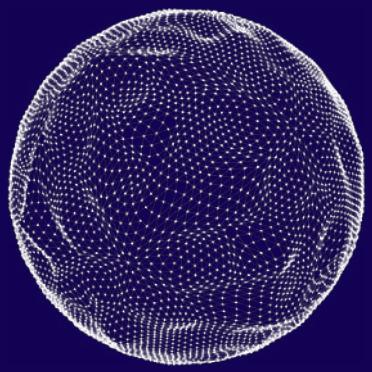


POSICS-2

Position-sensitive SiPM Compact and Scalable beta-Camera (Phase 2)

PUBLIC SUMMARY

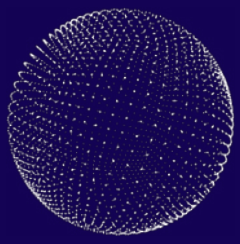
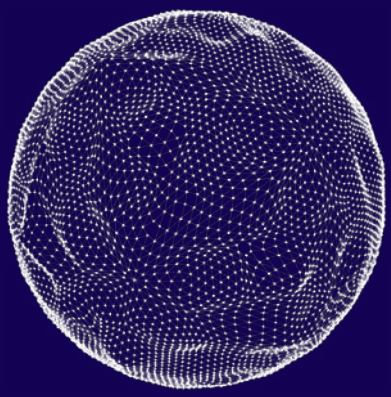
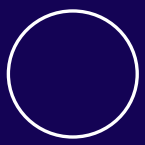
In the continuous pursue of minimal invasive interventions, while ensuring a radical excision of lesions, thereby improving patient outcome and quality of life, the Radio-Guided Surgery (RGS) has been for years the standard for image-guided surgery procedures such as the Sentinel lymph node biopsy (SLN), Radio-guided Occult Lesion Localization (ROLL) and Radio-guided Seed Localization (RSL). Nonetheless, RGS is an ever-evolving part of nuclear medicine, as it actively bridges non-invasive molecular imaging with surgical care. The success of RGS relies mostly on the imaging modalities and concepts available for the surgical setting, more than the availability of disease-specific radio-pharmaceuticals.

The POSICS-2 proposes a breakthrough approach in the intra-operative practise for RGS and move away from the current probe approach. POSICS-2 aims at realising a dual use, cheap, handle-able, wireless, compact and lightweight camera. As it was demonstrated within ATTRACT Phase 1, the POSICS-2 custom position-sensitive sensor will achieve sub-millimeter spatial resolution with less than eight readout channels for a surface of 3.0 cm_3.0 cm. The approach is completely scalable to larger areas and the number of channel scales approximately linearly with the array linear size, instead of quadratically as usual.

Numerical simulations have shown that POSICS-2 camera can efficiently detect even very small tumors (3 mm in radius) in few seconds and also deep into the tissue. The use of a camera reduces the localization time by allowing the mapping of a larger field of view, and allow to adapt the exposure time to choose the desired trade-o_ between the statistical noise and the real-time feedback. Although a full 3D insight is not possible, the capability of reconstructing tomographic images from different views, will already help increasing the diagnostic accuracy when lesions are located relatively deep in the tissue or multiple lesions are overlapping.

POSICS-2 camera has an extremely wide potential range of applications, not only in RGS, given the capability of working both with beta or low-energy gamma emitters, and both in outpatient treatments or intra-operative surgery.

The project aims building a full-scale prototype, ready to be used in real-life application and reach at least a TRL 6. As benchmark application we will use the SLN biopsy and mammal cancer, being representative of a larger class of applications based on low-energy gamma radio tracers. It also allows to use the camera both in the pre-operative outpatient phase and in the intra-operative phase. Given the project timescale and budget limitation, it is not possible to guarantee clinical trials being involved more protocols and limitation. Pre-clinical trials, instead, can ensure a validation of the system on real biological tissue and give a real-life validation of the concept and reach the project goal of a TRL 6.

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