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**SOUNDPET NEWSLETTER**

**ISSUE 4**

**Providing with news on MRI guided Focused Ultrasound technology in the field of oncology, in the framework of the SOUNDPET project!**

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**Software for MRI guided Focused Ultrasound therapy**

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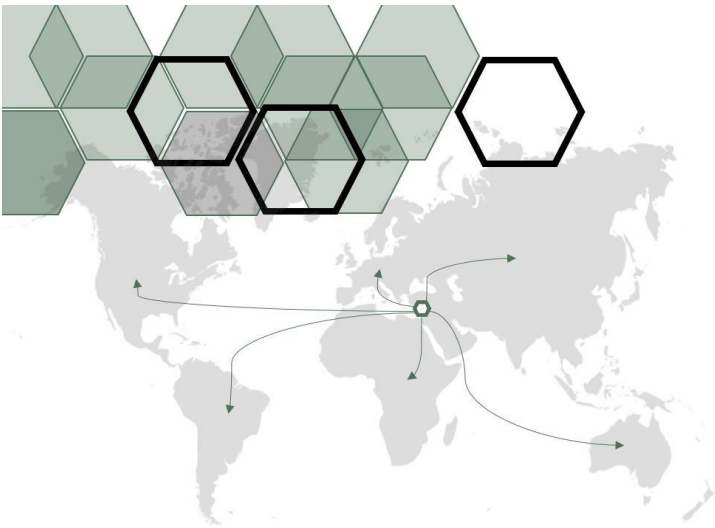
**Ευρωπαϊκή Ένωση**  
Ευρωπαϊκό Ταμείο  
Περιφερειακής Ανάπτυξης



Κυπριακή Δημοκρατία



**Διαρθρωτικά Ταμεία**  
της Ευρωπαϊκής Ένωσης στην Κύπρο



## Software Development

An advanced software platform was developed to integrate with the SOUNDPET system for MRI guided Focused Ultrasound therapy. The software platform interfaces with the amplifier, electronic driving system and robotic device (as placed within the table of the MRI scanner) offering functions for treatment planning, therapy and monitoring. The software was mainly developed using the C # language (Microsoft Corporation, Washington, USA) with some scripts written in Python (Python Software Foundation, Wilmington, Delaware, USA). Emphasis was placed in the development of a modern and user-friendly interface that integrates the following features on a single panel:

- I. Precise robot localization
- II. Ultrasonic parameters control
- III. Treatment planning on MRI images
- IV. Treatment monitoring with MR thermometry

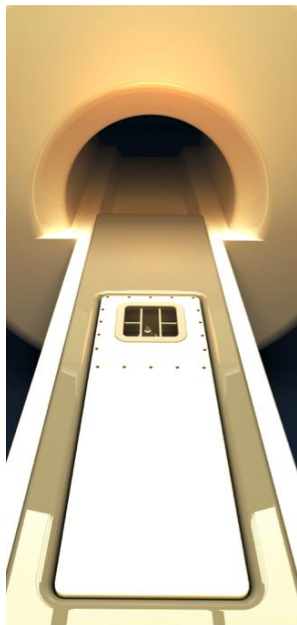
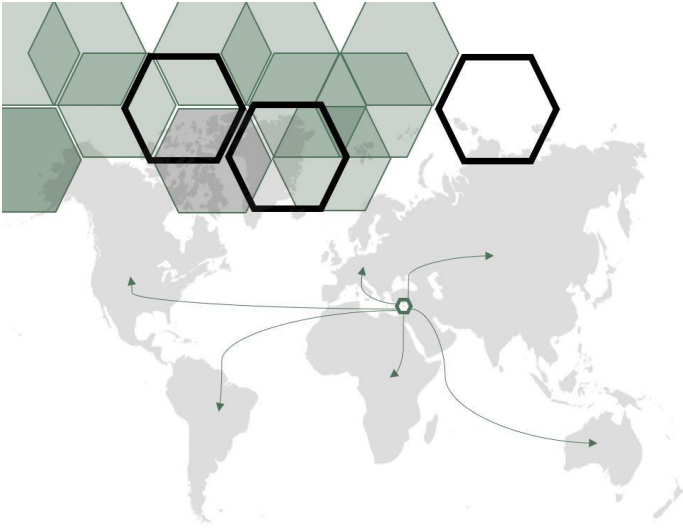


Photo of the robotic device within the table of the MRI scanner.

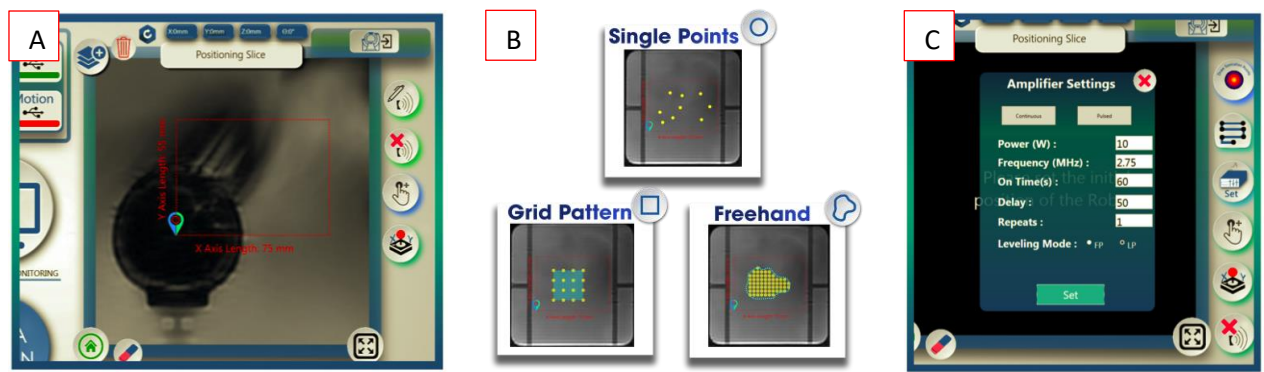


Photo of the developed software platform interfaced with the electronic driving system.



## Software Features

Precise robot localization is initially achieved by simply clicking on the center of the transducer as visualized on MRI images. A marker automatically appears on the center, translating the position of the transducer on the image. Complex treatment plans can be performed on MRI images using various drawing tools. The single points, grid pattern and freehand drawing tools can be respectively employed to design random point, grid operation or non-uniform sonication areas overlaid on the MRI image. Ultrasonic treatment parameters can be easily defined by the user on a simple pop-up panel. The treatment procedure is then executed according to the user-defined treatment plan and monitored with MRI. The software interfaces with the MRI, enabling MR thermometry calculations for near-real time monitoring of the temperature increase through display of thermal maps and temperature graphs.



Photos of the software features. A) Robot localization, B) the three sonication area drawing tools, and C) pop-up panel for ultrasonic treatment parameter setting.

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