

# MRI SAFE MICRO ENDOSCOPE SYSTEM WITH INTEGRATED ULTRASONIC FUNCTION



## Contact

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Project partners



within the ENIAC project



In the ENIAC project DENE COR we have developed a MRI safe endoscopic probe demonstrator for brain surgery. The so-called "μendoscope" integrates ultrasonic and optic components into a single device for use in intraoperative procedures.

The optical functionality (light and image fibers) is used to guide the μendoscope's tip and locate the tumour tissue. Once temporarily implanted, the μendoscope is fixed in the desired position for the duration of examination. Ultrasound functionality of the μendoscope is then employed to obtain high resolution and depth scans of the target and identify tiny areas of the brain tissue. This approach also allows for a therapeutic application of the μendoscope, so that by delivering the sufficient acoustic energy the tumour cell destruction can be achieved. The diameter of the current probe is 5 mm. Further miniaturization will enable positioning the tip much closer to the affected tissue and detect much smaller lesions.

As MR safety considerations have been taken into account in the design and operation procedure of the μendoscope, MRI could be performed while the μendoscope is inserted into the brain. This way, these two powerful modalities complement each other and increase the accuracy of diagnosis and therapy.

Highlights:

- Combination of ultrasonic and optic functionalities
- Diagnosis and therapy application
- MR safe

Main specifications:

- Ultrasound
  - » Transducer: PZT based with quartz lens
  - » Focal length: 3.8 to 4 mm
  - » Lateral resolution: 0.2 mm
  - » Frequency range: 15–20 MHz
- Optic
  - » Resolution: 10,000 px
  - » Visual field: max. 120°, 70° in focus
- Housing
  - » PEEK