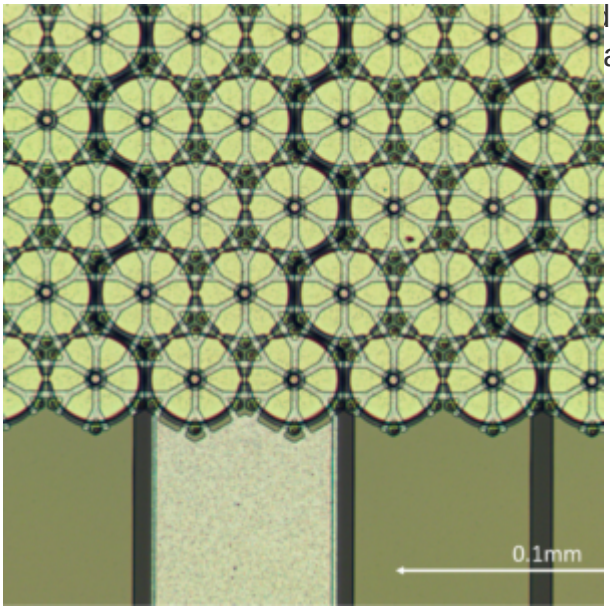
FONDAZIONE BRUNO KESSLER
MAGAZINE

An FBK sensor for the ultrasound scans of the future

March 21, 2022

The device was found to be one of the best in Europe in the Horizon 2020 Position II project

A sensor developed by **Fondazione Bruno Kessler** in Trento could be a game changer for endoscopic ultrasound scans.

The area of development is that of **micromechanical ultrasound sensors**, devices small enough to be mounted at the head of a catheter probe, **to perform ultrasound scans during endoscopie**s, therefore from inside the body. This is a long-awaited step in medicine since it could greatly improve the analysis ability using ultrasound, a mature technology that is totally


de, for example, the possibility of use in catheters that angioplasty procedures.

The test sensor designed by FBK is an effort aimed at achivieng this and is one of the best in its field in Europe. At the moment, its size is a few millimeters, to better enable performance measurement in the experimental phase; future development will include further miniaturization to make the device applicable in the medical field.

The results of the work were recently published in the final white paper of the Horizon 2020 Position II European project in which similar devices designed by major European research and development centers were compared. Each of the project partners – including Philips, IMEC, Fraunhofer, Cea Leti, Analog Devices, Sylex – made their own probes and comparative assessments were made. Fondazione Bruno Kessler participated with a sensor developed thanks to micro-fabrication technologies that have been in development at the Trentino-based research center for about ten years and placed among the best.

"FBK," points out FBK researcher Alvise Bagolini," is the only Italian research center that participated in this technology evaluation, in collaboration with the University of RomaTre. From the analysis, the device manufactured by Fondazione Bruno Kessler is among the best. And this among partners representing the best of European technology in this field".



In particular, the work was carried out at **FBK's MicroNano Facility**'s "Clean Room", a laboratory with cleaning procedures similar to those of an operating room.

"The device we made," Bagolini explained, "is a **micromechanical technology**-based ultrasound probe with a matrix of small membranes vibrating in the ultrasound frequency. It has a size of a few millimeters. Each membrane has a diameter of about 30 microns and a thickness of 2 and is made of silicon nitride and aluminum, typical materials used for microelectronic chips. The sensor generates a wave of ultrasound and then receives the return wave that returns an image of the tissues passed through."

"Good news for the enhancement of innovation-driven research, a good omen for increasingly precise diagnosis in ultrasound and a demonstration of the pervasiveness of technology based in silicon, a material that lends itself to offering revolutionary solutions in the most diverse application areas," concluded FBK Micro Nano Facility manager **Pierluigi Bellutti.**

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