Docket #: S19-416

Creation of a flexible ultrasound system for real time acquisition of large fields of view

Stanford researchers at the Ferrara Lab have developed a volumetric ultrasound imaging that uses a motion controller to realize 3D imaging. This invention introduces a new transducer architecture with significantly improved image resolution. The prototype has been tested on phantom with plans for human trials.

Figure

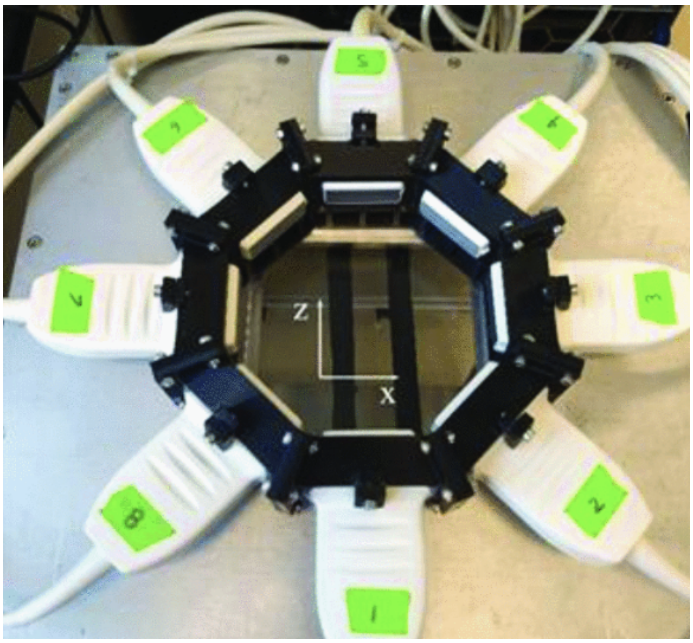

Figure description - The ring array assembled by eight L7-4 linear arrays and the orientation of the image grid.
In one embodiment, the invention uses a 1024-element matrix array transducer combined with 3D printed manifold to create arrays of calibrated and aligned transducers. A motorized system is incorporated to scan large regions of a subject under test, to enable use of software for 3D imaging and 3D passive acoustic mapping, and for combining imaging and therapy.

Image Credit-Publication below

Video:

type="video/webm">

type="video/mp4">

Figure Description:

Realtime In vivo human imaging with the ultrasound tomography system. The volunteer moved the right hand and forearm up and down in the water tank.

Stage of Development

- Prototype
- Preparing for human trials

Applications

- 3D ultrasound monitoring and control
- Examples include but are not limited to:
  - Microbubble cavitation for gene delivery for bone healing
  - 3D imaging in pediatrics of the kidney, urogenital system, musculoskeletal system, hip, spine, liver
  - 3D contrast agent imaging in adults
  - Guiding ultrasound-based tomography

Advantages

- Significantly improved image resolution, contrast, contrast-to-noise ratio
- Customizable tailored geometry
- Can combine different types and different operating frequencies

- Excellent image quality

Publications

- Cai, Xiran, Josquin Foiret, Joseph Roth, Zulma Gazit, Gadi Pelled, Dan Gazit, and Katherine W. Ferrara. "3D monitoring and control of microbubble cavitation for gene delivery." In *2019 IEEE International Ultrasonics Symposium (IUS),* pp. 888-890. IEEE, 2019.

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