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Non-Confidential Description - PSU No. 2329
"Micro-Indexed High Frequency Ultrasound Imaging Array"

Keywords:

Ultrasound imaging, high frequency, arrays, medical imaging

Links:

Inventor website

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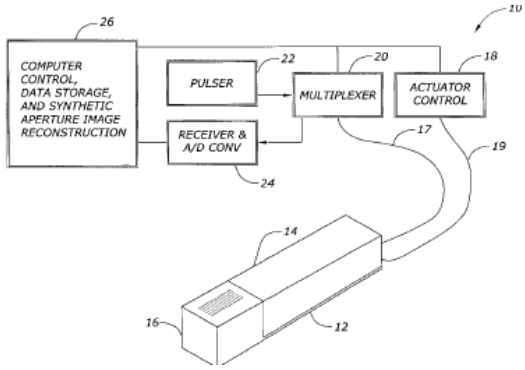

Fig 1: Block diagram of the actuated synthetic array according to one embodiment of the present invention.

Background

Ultrasound imaging is widely used in non-destructive evaluation and testing, including medical applications. In ultrasound imaging, typically a probe having ultrasound transducers is used to create sounds and then listen for echoes. The received signals of the echoes are then analyzed or otherwise processed to create images or for other analysis. The frequency used is related to the depth of the imaging, so the frequency of the ultrasound used will vary from application to application. The frequency is proportional to the resolution; therefore these higher frequencies also result in the ability to resolve smaller structures. However, several problems have thus far prevented the use of higher frequencies within ultrasound arrays, meaning such arrays do not yield the highest-possible resolution. Therefore, it is a primary object of the present invention to provide for an ultrasound-imaging array that improves upon the state of the art.

Invention Description

The present invention discloses a method and apparatus for ultrasound imaging with improved spatial sampling. The device includes a plurality of ultrasound imaging elements each having a pitch defined by the center to center spacing of the ultrasound imaging elements; and a motion mechanism operatively connected to the plurality of ultrasound imaging elements and adapted to move the plurality of ultrasound imaging elements over a distance to increase the spatial sampling of the plurality of ultrasound imaging elements. The method of the present invention includes transducing a signal from one or multiple ultrasound imaging elements within an array of ultrasound imaging elements; moving the array of ultrasound imaging elements a distance less than the pitch; and transducing at least one additional signal from the ultrasound imaging element.

Advantages/Applications

- Improved ultrasound-imaging array allows the center-to-center element distance to increase
- Provides an ultrasound-imaging array that allows for increased separation between elements
- Provides for sampling rates and signal to noise ratios suitable for imaging
- Capable of use at frequencies at or above 30 MHz

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