Docket #: S12-227

Capacitive Micromachined Ultrasonic Transducers for High Variable Pressure Applications

Stanford researchers patented a capacitive micromachined ultrasonic transducer (CMUT) with a pressurized cavity for use in environments with extreme pressure variations. The CMUT has an active pressure controller that is capable of varying a pressure differential across the CMUT plate. Controlling the pressure inside the cavity maintains stable CMUT operation under pressure extremes, making it ideal for applications such as, flare gas metering or oil field bore hole non-destructive testing. CMUT cavity pressure control also improves transmit and receive bandwidths in medical imaging applications.

Stage of Research
Researchers have successfully built and tested a variety of CMUTs tuned for various applications.

Applications

- Ultrasound based flow metering (e.g. flare gas metering)
- Ultrasound based non-destructive testing of mechanical structures under hazardous conditions (e.g. borehole in an oil field)
- Wide and variable bandwidth for medical imaging ultrasound transducers

Advantages

- More stable than conventional CMUTs when operating under varying and elevated ambient pressures and temperatures.

- A robust sensing solution for applications where photoelectric sensors struggle (glare, translucence, liquids, etc.)
- More precise - tunable bandwidth and sensitivity with better control over pull-in voltage of the CMUT.

Patents

- Published Application: 20140239770
- Issued: 9,586,233 (USA)

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