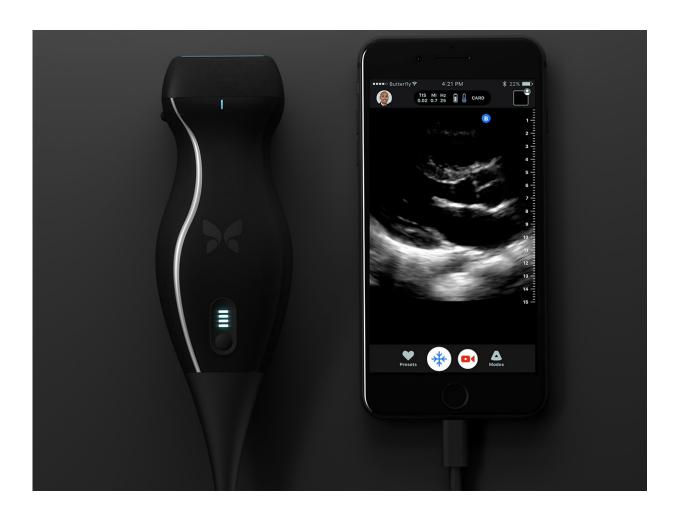# Team focus is on ultrasound window into the human body

October 30 2017, by Nancy Owano

Credit: Butterfly Network

(Tech Xplore)—A surgeon diagnosed his own cancer with the help of a

phone. That is the attention-grabbing line that has turned people's attention to a new device to ship next year. It is the Butterfly iQ, a portable ultrasound machine that is smartphone-based.

MIT Technology Review in a cross-head posed the question: "Can a smartphone-enabled ultrasound machine become medicine's next stethoscope?"

The Hindu and other sites relayed the story of how the diagnosis happened. John Martin, chief medical officer at Butterfly Network, discovered a mass in his own throat while testing the device.

He had been having an uncomfortable feeling of thickness in his throat, said *The Hindu*.

He used the device, connected to his smartphone, to obtain images.

As it turned out, the diagnosis turned out to be cancer.

The researchers are from Butterfly Network and the pocket-sized device is called Butterfly IQ.

It's described as ultrasound on a chip, "where medical imaging meets semiconconductor engineering." You could not ask for a more straightforward home page for Butterfly Network. "Meet. IQ. Whole body imaging. Under $2k."

According to the site, it will start shipping units in 2018.

How it works:

Antonio Regalado, the senior editor for biomedicine for *MIT Technology Review*, said the device uses capacitive micro-machined ultrasound

transducers, or CMUTs, "tiny ultrasonic emitters layered on a semiconductor chip a little larger than a postage stamp."

Regalado wrote that ultrasound works by shooting sound into the body and capturing the echoes and usually, the sound waves are generated by a vibrating crystal. Butterfly's machine, though, "uses 9,000 tiny drums etched onto a semiconductor chip."

Their company release said their ultrasound-on-a-chip technology combines capabilities of the typical three probes into a single, ultra wide-band, 2-D matrix array comprised of thousands of microelectromechanical systems. The sensors are overlaid on an integrated circuit encompassing the electronics of a high-performance ultrasound system.

"Just as putting a camera on a semiconductor chip made photography accessible to anyone with a smart phone and putting a computer on a chip enabled the revolution in personal computing before that, Butterfly's Ultrasound-on-a-Chip technology enables a low-cost window into the human body, making high-quality diagnostic imaging accessible to anyone," said Dr. Jonathan Rothberg, founder and chairman of Butterfly Network.

Butterfly iQ is FDA 510(k) cleared for diagnostic imaging across 13 clinical applications, said the Butterfly Network site, spanning the body. Storage is HIPAA-compliant. (The Butterfly iQ is paired with a HIPAA-compliant cloud for image storage and collaboration among clinicians and connectivity with traditional hospital medical record systems.)

The site carries the supported iPhone models.

Butterfly Network's "About Us" statement on their site said, "We are dedicated to democratizing ultrasound. Our dream becomes reality at the

[intersection](link) of semiconductor engineering, artificial intelligence, and the cloud."

Eliza Strickland in *IEEE Spectrum*, meanwhile, said "Beyond price and portability, the Butterfly iQ's other big selling point is its incorporation of artificial intelligence for both image acquisition and analysis."

She said its engineers trained the software on vast datasets of [ultrasound](link) images, teaching it the difference between a high- and poor-quality image for body parts. For example, when "the user brings the probe to a patient's chest for a cardiac exam, the iPhone display helps them find the right [spot](link)."

More information: www.butterflynetwork.com/index.html

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