



## **Ultrasound Innovations: Hand-held ultrasound imaging devices**

Portable 'lap-top' sized ultrasound imaging devices have been available now for about two decades and are well established in point-of-care applications. They have been shown to have a very useful role in emergency departments, operating theatres, labour wards and military settings to answer specific diagnostic questions.<sup>1</sup> Such systems normally include imaging and Doppler functions and are self-contained units with a dedicated display and physical user interface features such as control knobs and keyboard, to which the transducer is connected.

More recently, a new breed of pocket-sized, app-based devices has appeared on the market. They consist of a self-contained probe which includes the scanning and image formation system. The image display and user interface functions are via a smart device such as a phone or tablet running a dedicated app. Some such units connect to the smart device via a USB or iOS/lightning cable, while others communicate wirelessly.<sup>2</sup> Harnessing the power of a smart device in this way has slashed the cost of hand-held ultrasound imaging systems as well as giving access to the connectivity functions of the smart device. The smart device can be used to give remote access to the real-time ultrasound image at the same time as live video from the device camera showing the probe position, and two way voice communication – a true tele-ultrasound solution, which could make it safer to use and even more popular in remote locations.

The recently introduced Vscan Air from GE uses an augmented reality display to show the position of the probe.<sup>3</sup> Several manufacturers offer separate linear, curved and phased array or even endocavity probes. The Vscan Air uses a wireless, double ended curved / linear probe. While most app-based devices employ standard piezoelectric transducer technology, the Butterfly iQ, manufactured by Butterfly Network Inc. USA, uses silicon based CMUT technology, which allows a single probe to be used over a wide range of frequencies. It can also be configured as a linear, curved or phased array, giving a single probe solution.<sup>4</sup> Hand-held devices are rapidly gaining acceptance and it is anticipated they will become cheaper, smaller and more powerful as technology improves.

1. [ESR statement on portable ultrasound devices | Insights into Imaging | Full Text \(springeropen.com\)](#)
2. [Best Handheld Ultrasound – Reviews of the top portable ultrasound scanners \(bestportableultrasound.com\)](#)
3. [GE Healthcare | Vscan Extend™ - Product](#)
4. [Portable ultrasound - This Changed My Practice](#)