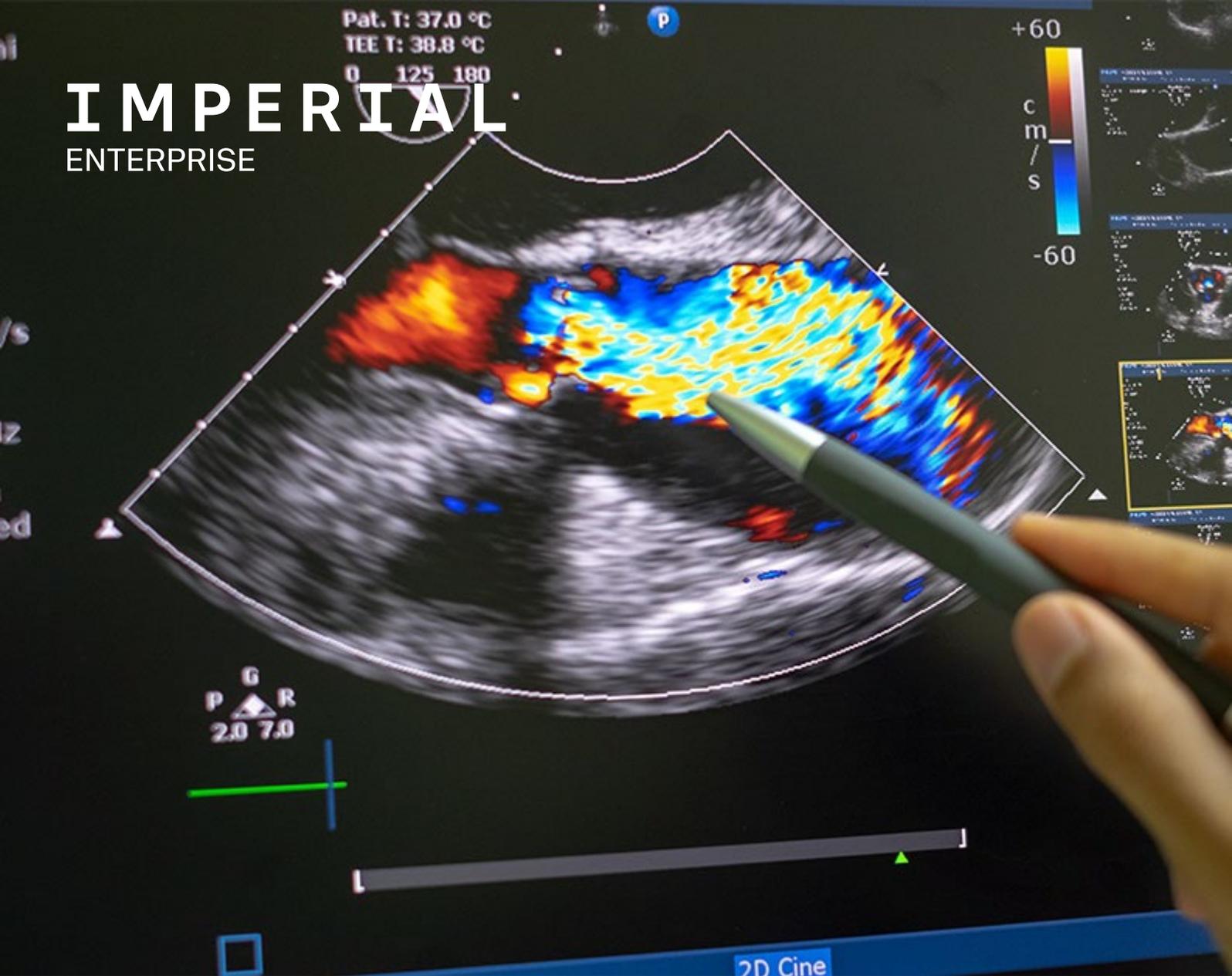


# IMPERIAL

ENTERPRISE



## Echocardiography System Requiring Minimal Sonography Training: Increasing Clinical Access

**A new echocardiography system that produces high quality, precise measurements that can be used by medical personnel with minimal sonography or cardiology skills.**

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**Technology reference: 12078**

Intellectual property information  
Proprietary software and  
echocardiography system design

Inventor information  
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# IMPERIAL

## ENTERPRISE

### Summary

Echocardiography requires skilled sonographers, who are in short supply. Many patients in the UK wait for weeks for a scan, while those in the Emergency Room wait for many hours, jeopardizing their health. Many public healthcare systems in other countries have the same problem, in developing countries, the lack of skilled sonographers is even more severe. We have developed a new echocardiography system that can be used by medical personnel with minimal sonography or cardiology skills, but which can produce high quality, precise measurements. This allows echo to be performed in many more venues by many more clinicians, significantly increasing access to echo, as well as demand for portable point-of-care ultrasound (POCUS) devices.

### Proposed Uses

The developed echocardiography system uses a combination of hardware improvements and deep learning computations that drastically reduces the skills needed to perform echocardiography scans.

### Problem addressed

Despite high and increasing demand, echocardiography is not always readily available to patients. This is because, traditionally, performing echocardiography requires years of specialist training and experience. To acquire high quality images sonographers must place the transducer accurately at specific angles and positions, failure to do this results in inaccurate scans of limited clinical use. They also need knowledge and experience to interpret images when performing quantifications. Shortages of skilled sonographers are why patients may wait for weeks for a scan, or many hours in the emergency department, jeopardizing their health.

Our system reduces the skill level needed for echo scans and quantifications, allowing a wider range of medical personnel, such as emergency doctors and even general practitioners to conduct scans and enabling more scans to be conducted, in many more places. This opens up access to echocardiography in scenarios that were previously difficult and should create a new and substantial market for echo devices.

AI is used to enable better precision when compared to traditional echocardiography, and because the system performs 3D reconstructions from a sparse few 2D scans, it benefits from the higher precision and accuracy of 3D approaches.

### Technology Overview

The unskilled user is asked to perform a few 2D Bmode scans of the heart without the need for accurate positioning of the ultrasound transducer. Next, our echo system quickly reconstructs the 3D shape of the heart accurately, and then performs rapid and automatic quantification of various measurements, such as ejection fraction, chamber volume, wall thicknesses, chamber dimensions and myocardial strains, etc. The invention combines years of expertise from clinical cardiology, Computational Bioengineering, and AI. We are seeking industry collaboration opportunities to accelerate commercial development and shorten time to market.

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### Benefits

- Reduce skills needed to perform echocardiography, allowing many more clinicians to perform echo, and many more times, at many more places. This can expand the market for traditional echocardiography systems.
- Can be incorporated with the low-cost, portable point-of-care ultrasound (POCUS) devices, to drastically increase access to echo. This will significantly expand the POCUS device market.
- Automatic quantifications from images removes the need for human steps and thus reduces the associated imprecision and inaccuracy.
- Quantifications are based on 3D reconstructions, which can give precision advantages over direct measurements from 2D images