**POWERED BY AI**
# ELEVATED BY YOU

## Vivid™ E95
## Ultra Edition

### About GE Healthcare

GE Healthcare is a leading global medical technology and digital solutions innovator. GE Healthcare enables clinicians to make faster, more informed decisions through intelligent devices, data analytics, applications and services, supported by its Edison intelligence platform. With over 100 years of healthcare industry experience and around 50,000 employees globally, the company operates at the center of an ecosystem working toward precision health, digitizing healthcare, helping drive productivity and improve outcomes for patients, providers, health systems and researchers around the world.

Follow us on Facebook, LinkedIn, Twitter and Insights , or visit our website www.gehealthcare.com for more information.

†  Requires current cSound version
1.  Forecasting the Future of Cardiovascular Disease in the United State, AHA Policy Statement, 2011, source: CIR.0b013e31820a55f5
2.  Source: Healthcare Infrastructure and Procedural Volume for Ultrasound Imaging, Frost & Sullivan, 2018. Approx. 108.12 million echo exams are performed annually; Calculation based on 26% total global prevalence of CVD cases (422 million) undergoing echo exam; extrapolated from US study indicating roughly 26% of total prevalent CVD cases underwent echo exams percentage value validated from reports.https://www.prb.org/wp-content/uploads/2015/12/2015-world-population-data-sheet_eng.pdf
3.  Kurt M, Shaikh K, Peterson L, et al. Impact on contrast echocardiography on evaluation of ventricular function & clinical management in a large prospective cohort. J Am Coll Cardiol. 2009; 53(9):802-810
4.  Work Related Musculoskeletal Disorders In Sonography, Society Of Diagnostic Medical Sonography, 2018, Susan Murphey, BS, RDMS, RDCS, CECD https://www.sdms.org/docs/default-source/Resources/work-related-musculoskeletal-disorders-in-sonography-white-paper.pdf?sfvrsn=8
5.  The Role of AI in Streamlining Echocardiography Quantification White Paper, Kristin McLeod - JB80498XX
6.  Based on results of time and motion study conducted by GE "JB49055XX - Cardiac Auto Doppler"; study results indicated time savings related productivity increase up to ~8 on an annual basis for a facility per sonographer
7.  European Association of Echocardiography recommendations for standardization of performance, digital storage and reporting of echocardiographic studies (Eur Journal of Echo 2008 – Evangelista, Badano, Monaghan, Zamorano, Lancellotti).
8.  Recommendations for Quantification of Doppler Echocardiography: A Report From the Doppler Quantification Task Force of the Nomenclature and Standards Committee of the American Society of Echocardiography (JASE 2002)
9.  Centricity Cardio Workflow v7 Intelligent Reporting out-of-the-box configuration compared to 2017 IAC guidelines excluding doppler. CCW Intellgent Reporting Outcome - JB74831XX
10. EchoPAC Suite is a marketing name for EchoPAC Plug-in
11. With the DICOM SR support, Measures & Analysis (M&A) for an exam can be sent at the end of the exam or when exported from local archive. The destination can be either a server on the network (Storage SCP) or a removable media (DICOM Media) depending on the DICOM dataflow selected. Custom measurements supported only for Adult Echo (TID5200) and Pediatric Heart (TID5220).
12.  https://www.ncbi.nlm.nih.gov/pubmed/27689562
13. Data Breaches Will Cost Healthcare $4B in 2019, Threats Outpace Tech, healthitsecurity, source: t.ly/xrAA
14. 5 Tips for Controlling Costs in Hospitals and Biomed Shops, source: t.ly/l9n7
15. Errors in Sonography, DOI: 10.1007/978-88-470-2339-0_8. https://www.researchgate.net/publication/279616130_Errors_in_Sonography
16. e. a. M. Mårtensson, «High incidence of defective ultrasound transducers in use in routine clinical practice», European Journal of Echocardiography, vol. 10, no. 3, pp. 389-394, 2009. https://academic.oup.com/ehjcimaging/article/10/3/389/2396618 https://probehunter.com/wp-content/uploads/FULLTEXT01.pdf
17. A multicentre survey of the condition of ultrasound probes, Ultrasound. 2016 Nov, Published online 2016 Aug 1. doi: 10.1177/1742271X16662301. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5098704/
18. GE internal data

**gehealthcare.com/vivid**

*Your time is precious.*
*Save it.*

**AI** **AFI LV with AI View Recognition**

Fully automatic recognition of the apical imaging views and measurements of GLS and segmental longitudinal Strain for LV.

# POWERED BY AI

## Improve diagnostic speed and accuracy

Vivid E95 Ultra Edition introduces the latest AI-based technology to help reduce tedious tasks and improve workflow efficiency. You can diagnose more confidently and accelerate exams via automated (AI-driven) Cardiac Doppler and 2D LV measurements.

The results are impressive. Exam time is reduced, and operator fatigue minimized with up to 80% less clicks to get 2D measurements, and inter-observer variability diminished. [5]

Discover the many innovations brought by the Vivid Ultra Edition, and more importantly, how these can contribute to make clinical practice - Elevated by You.

Ultra Fast.
Ultra Precise.
Ultra Efficient.

**AI** **Cardiac Auto Doppler with AI**

| REDUCED TIME PER MEASUREMENT | LOWER INTER OPERATOR VARIABILITY | ACCELERATED WORKFLOW |
|---|---|---|
| UP TO **93%** | REDUCE VARIABILITY ~3x | |
| *Fewer Keystrokes [6]* | *Standardized exams with greater reproducibility [6]* | *Productivity improvement* |

## POWERED BY AI
# ELEVATED BY YOU

At GE Healthcare we strive to empower you by reducing wasted time and effort. We aim to remove tedious tasks and help make every moment count for your patients – seeing problems clearly and quickly, performing procedures with great precision... and providing quality of care for all.

Powered By
**Edison**

# CLINICAL EXCELLENCE
## for the Echo Lab

LESS CLICKS, UP TO[5]
**-80%**

**AI** **AI Auto Measure 2D**

With the power of AI, the manual caliper measurements can be completed with 3 clicks: **Freeze – Measure – Auto.** A full set of reproducible measurements will instantly appear on the screen.

| IVSd | 0.8 cm |
| LVIDd | 5.6 cm |
| LVPWd | 0.9 cm |
| IVSs | 1.3 cm |
| LVIDs | 3.8 cm |
| LVPWs | 1.4 cm |
| EF(Teich) | 61 % |
| EF(Cube) | 70 % |
| %FS | 33 % |

ACCURACY[5]
**98%**

**AI** **AI Auto Measure Spectrum Recognition**

With the power of AI, a wide range of Doppler measurements can be completed with 2 clicks: **Freeze – Measure.** A Doppler trace and full set of associated measurements will instantly appear on the screen.

| LVOT Vmax | 1.24 m/s |
| LVOT Vmean | 0.84 m/s |
| LVOT maxPG | 6.19 mmHg |
| LVOT meanPG | 3.28 mmHg |
| LVOT VTI | 26.6 cm |
| LVOT Env.Ti | 318 ms |
| HR | 43 BPM |

Spectrum Auto Recognized
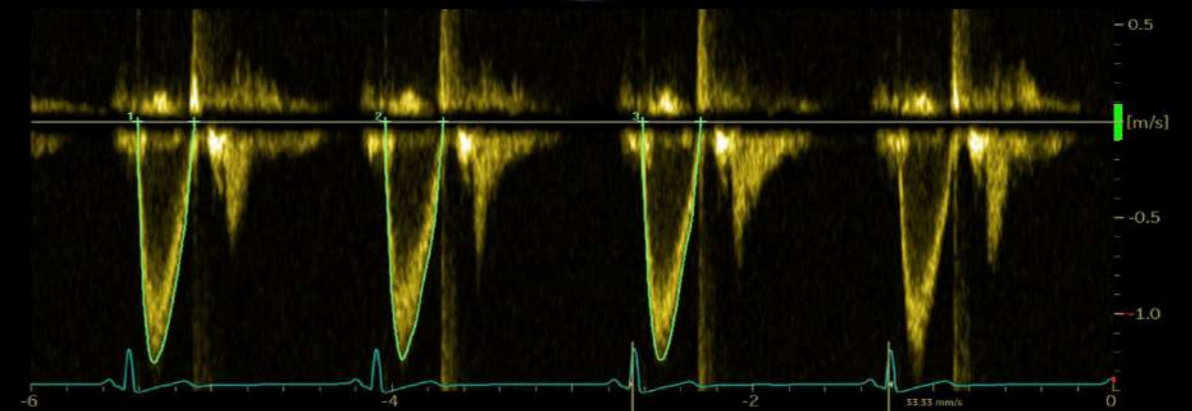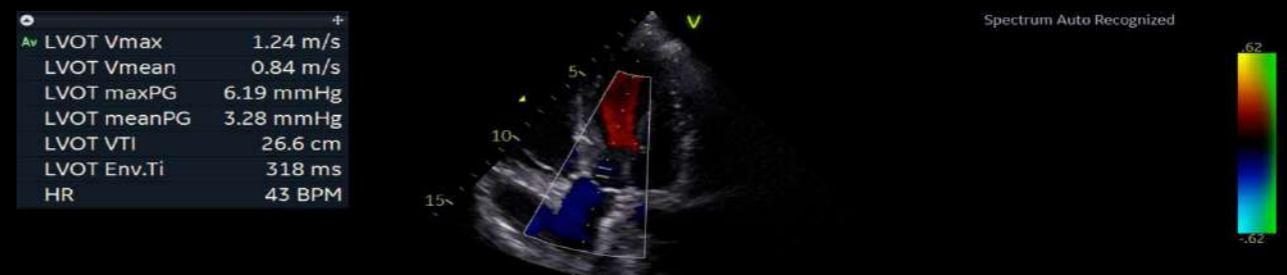
# CLINICAL EXCELLENCE
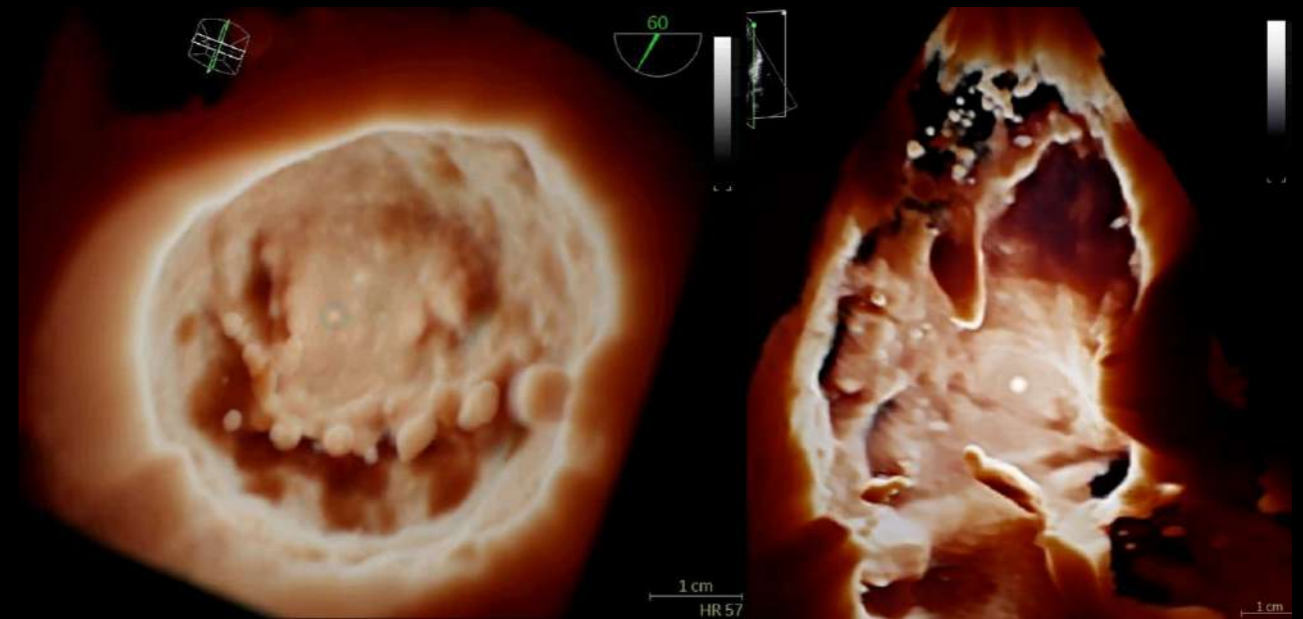## for Interventional Procedures

**Demand for interventional procedures is growing and so are expectations of the heart team. Grow your capacity and capabilities with advanced ultrasound and conquer difficult cases.**

Structural heart procedure success depends on preparation, collaboration and clear communication across the entire heart team.

Vivid E95 Ultra Edition offers precise and uncomplicated tools to plan your interventions. With new visualization and navigation techniques and uncompromised image quality, the heart team can see clearly, communicate quickly, and perform procedures with great precision.

**Introducing the new 4D TTE pediatric probe**

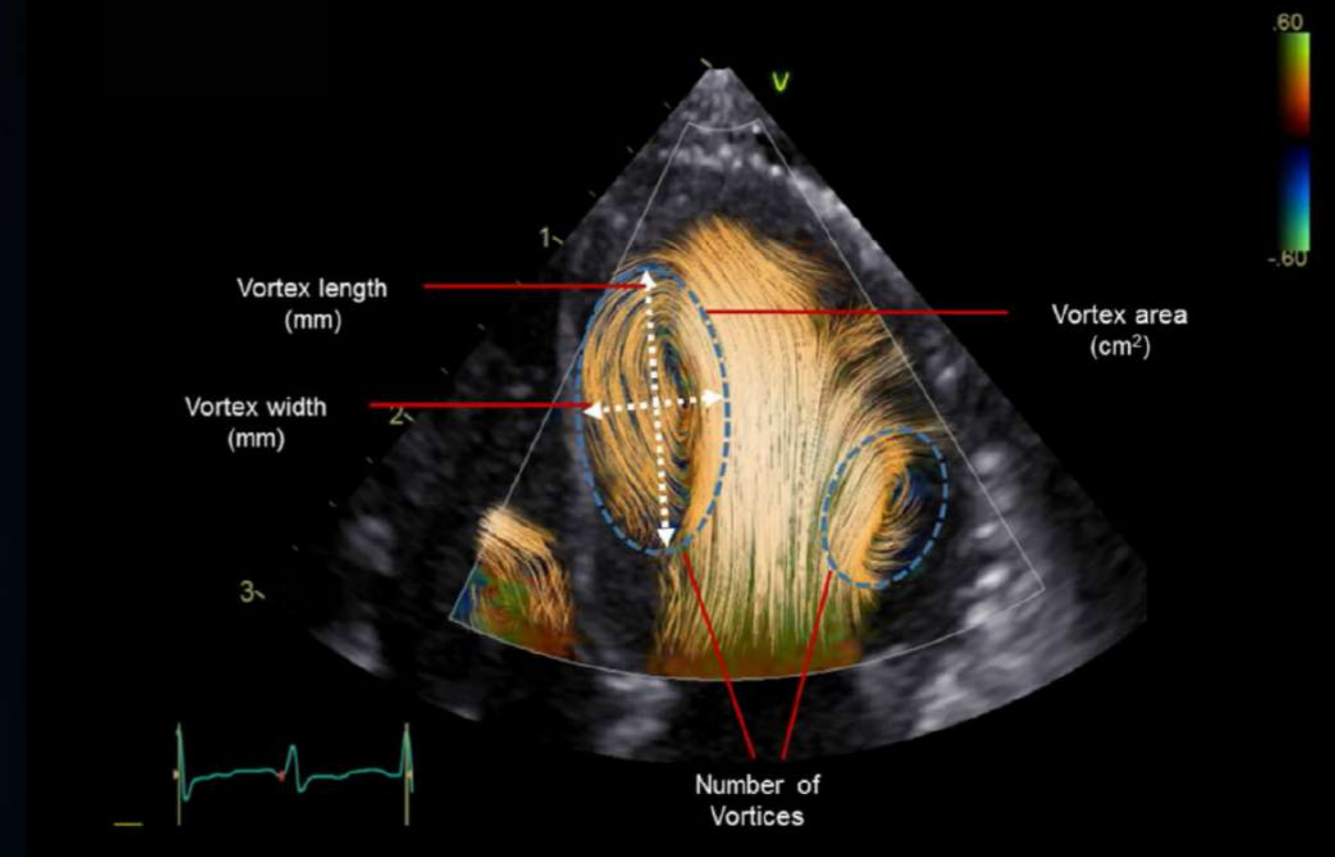6Vc-D – a lightweight single probe solution that provides excellent 2D and 4D imaging.
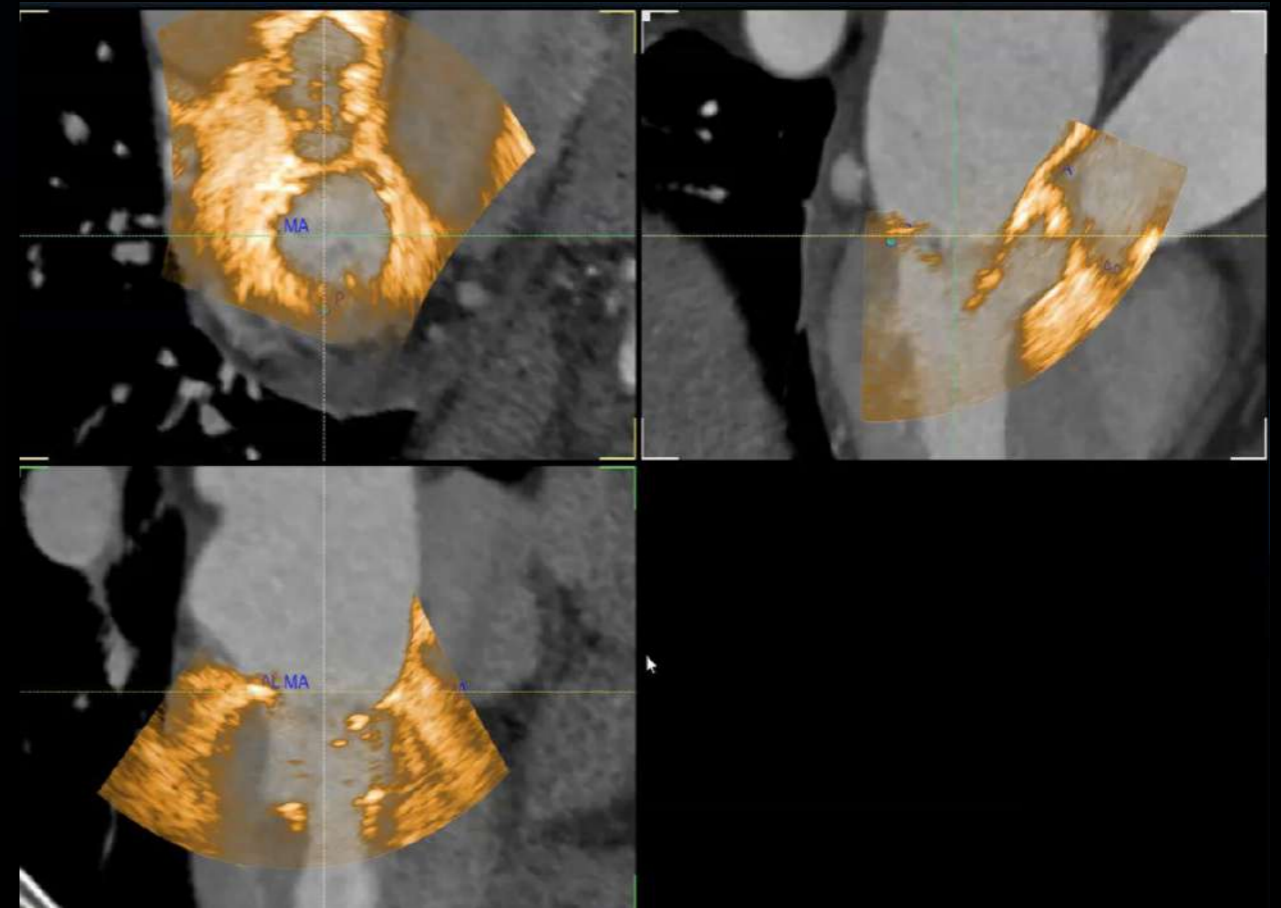
# CLINICAL EXCELLENCE
## for Pediatric 4D Imaging

**The smallest cardiac patients can pose the biggest care challenges with difficult to diagnose, severe conditions.**

To help clearly visualize small anatomies, the Vivid Ultra Edition offers a 4D TTE probe. This lightweight probe provides crystal clear imaging and a single probe solution for exceptional 2D and 4D exams.

Superb 4D imaging will help you evaluate and navigate the challenging complexities of congenital heart diseases with speed, clarity and confidence.
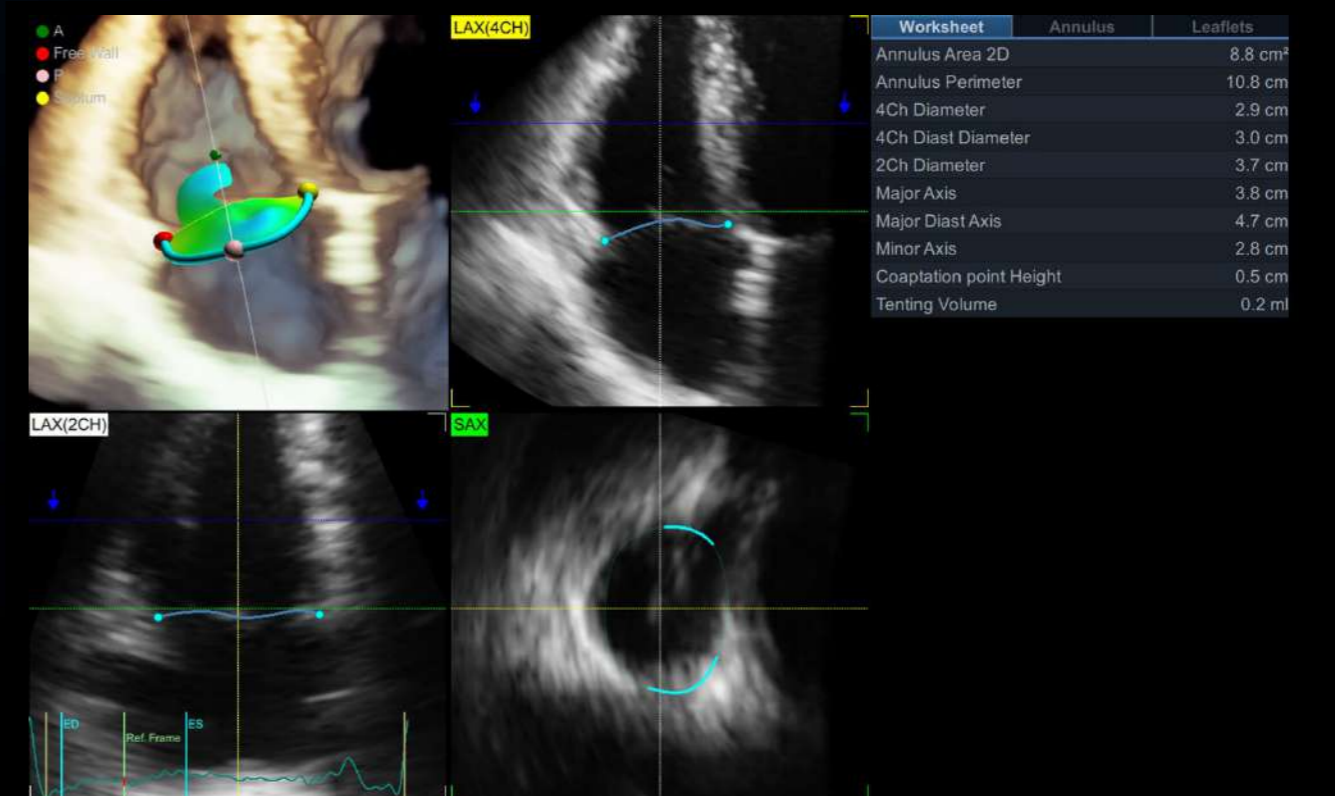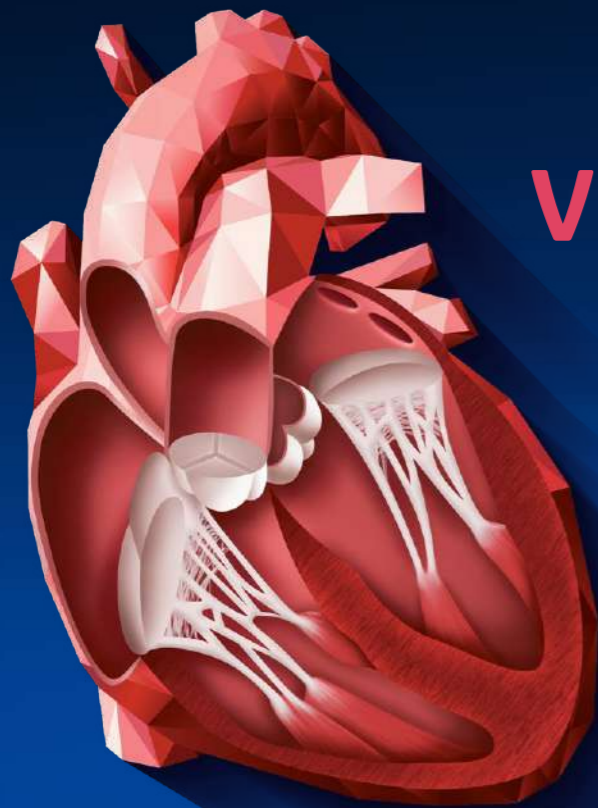
## BSI 2.0 (Blood Speckle Imaging)

Left ventricle vortex formation and size can be analyzed with BSI and has the potential to complement existing parameters of cardiac health.



## 4D Auto TVQ

Innovative semi-automatic quantification of the tricuspid valve in 4D.



# Recognizing the Clinical Research Community

**You are at the forefront of clinical research and need to rely on a leadership technology platform. You want to explore new ways of doing things, be the 1st one to publish on a topic and help the scientific community to push boundaries of what is possible.**

The Vivid Ultra Edition introduces many new innovative applications, empowering leading institutions to unleash their capacities.

Amplify the quantity and quality of your cardiovascular research to develop new diagnostic methods and support future therapeutic measures for the patients of the world.

**Vivid E95** Ultra Edition

# VIVID HEART
# APPLICATIONS

A wide range of clinical applications for use in Core Echo Lab, Interventional and Pediatrics.

## VISUALIZATION AND NAVIGATION

| | | |
|---|---|---|
| 4D Markers | Vmax | FlexiSlice |
| FlexiViews | HD*live* | View-X |

### Ultra Edition

| | |
|---|---|
| FlexiLight | HD Color |
| CT Fusion | |

## FLOW QUANTIFICATION

Cardiac Auto Doppler **AI**

### Ultra Edition

AI Auto Measure Spectrum Recognition **AI**

BSI

## VALVE QUANTIFICATION

4D Auto AVQ

4D Auto MVQ

### Ultra Edition

4D Auto TVQ

## CHAMBER QUANTIFICATION

4D Auto LAQ

4D Auto RVQ

4D Auto LVQ

### Ultra Edition

AI Auto Measure 2D **AI**

Auto EF **AI**

## AFI FUNCTIONAL IMAGING

AFI Stress **AI**

MyoCardial Work

### Ultra Edition

AFI LV with AI View Recognition **AI**

AFI RV

AFI LA

APPLICATIONS POWERED BY **AI**

VIVID **HEART**
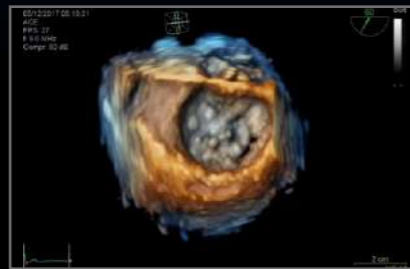**APPLICATIONS**

# VISUALIZATION AND NAVIGATION

*Why guess? When you can see.*
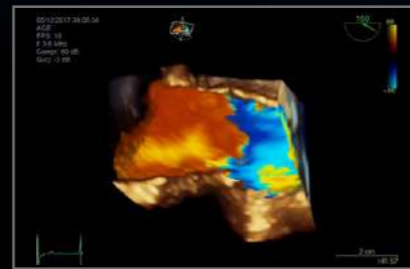
## New in Ultra Edition
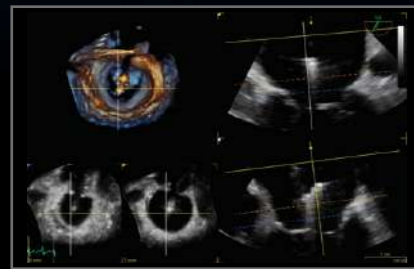
### FlexiSlice

With a distance gauge and two viewing layouts, this interactive tool for obtaining 2D or render views in live or replay mode may provide enhanced insight as well as save time.

### HD*live*

Enabled by cSound, HD*live*™ is an advanced visualization method that simulates light propagation and scattering through tissue.

### Vmax

Vmax enabled by cSound† offers ultra-high 4D volume rates acquired in single beat acquisitions. Elimination of ECG gated multi-beat acquisitions provides enhanced overview of structures and function in cases with irregular heart rhythms.
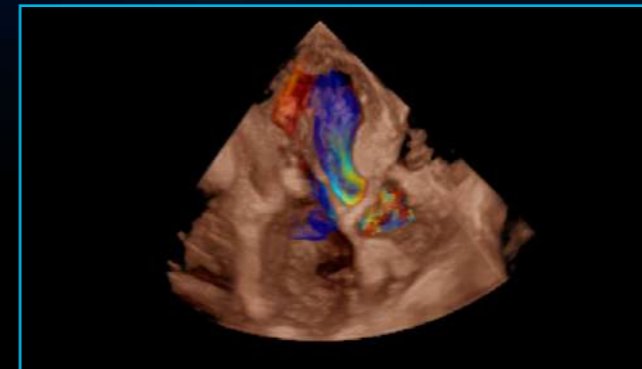
### Ultra Edition   HD Color

4D color flow rendering technique for semi-transparent visualization of origin and size of high velocity jets.

**Benefits:**
- Enhance spatial relationships between flow and the surrounding structures
- Suppress non-diagnostic low flow information
- Work seamlessly with other visualization techniques such as FlexiLight and 4D markers
- Supports 4D color flow data also from previous releases
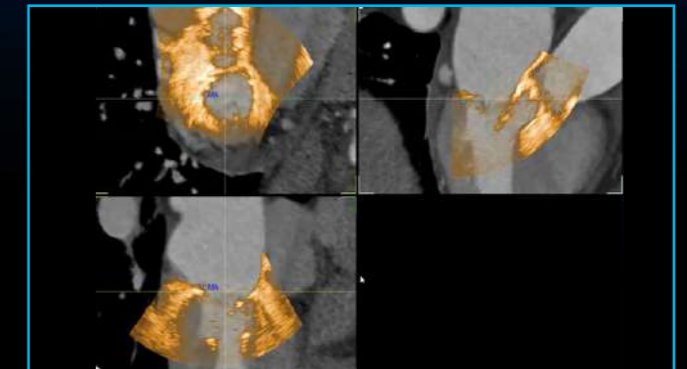
### Ultra Edition   CT Fusion

Cost effective and vendor independent solution for live co-registered navigation in 4D ultrasound and CT data.

**Benefits:**
- Improve awareness of calcified structures by fusing CT with 4D ultrasound
- Extend field-of-view beyond 4D ultrasound for better understanding of heart anatomy
- Increase your confidence during procedures with the CT based pre-procedure plan
- Enhance your team communication

### FlexiViews

Gain quick access to predefined 4D/multiplane views during live mode, potentially reducing scan time during complex interventional procedures.
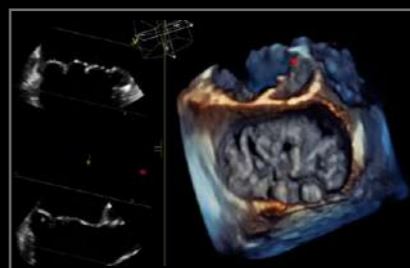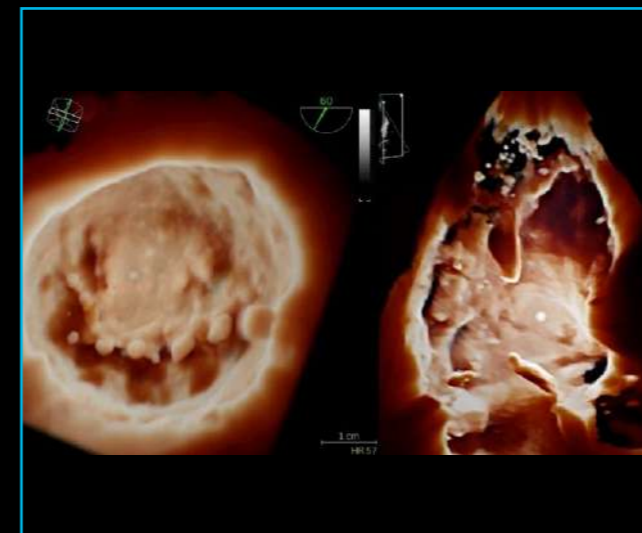
### 4D Markers

Make annotations that are viewable from all angles on 4D ultrasound volume data sets and their 2D views, facilitating communication in the echo lab, cath lab and OR.
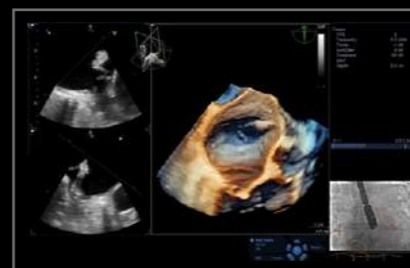
### View-X

See X-ray from fluoroscopy in real time right on your Vivid E95 Ultra Edition screen as a picture in picture, facilitating communication between team members.

### Ultra Edition   FlexiLight

Rendering technique for photo-realistic light-source based illumination of heart structures.

**Benefits:**
- Comprehensive visualization of leaflets, trabeculae, regurgitant orifices, clefts, aneurisms and thrombi
- Works seamlessly with other visualization techniques such as HD Color, 2ClickCrop and 4D markers
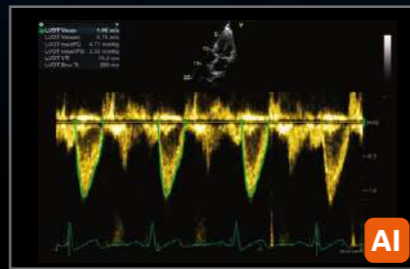- Supports 4D data also from previous releases

# FLOW QUANTIFICATION

*Your time is precious. Save it.*

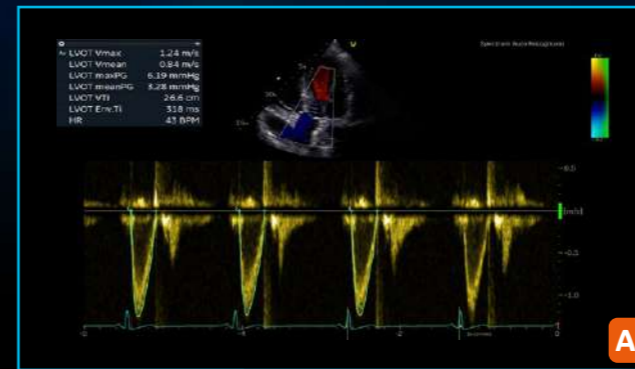# New in Ultra Edition



**AI**

### Cardiac Auto Doppler

Semi-automatic Cardiac Doppler measurements.

Benefits:
- Enhances reproducibility of follow-up studies when used in automated mode[6]
- Offers Doppler measurement in multiple cardiac cycles as recommended by guidelines for irregular heart rhythms[7,8]
- Supports less experienced users with advanced automation

| Ultra Edition | **AI Auto Measure Spectrum Recognition** |

Semi-automatic selection of appropriate spectral Doppler measurement tool.

**Benefits:**
- Enables fewer manual interactions by automatically opening the appropriate measurement tool[5]
- Works seamlessly with Cardiac Auto Doppler
- Enhances reproducibility of follow-up studies when used in automated mode[5]
- Supports less experienced users with advanced automation
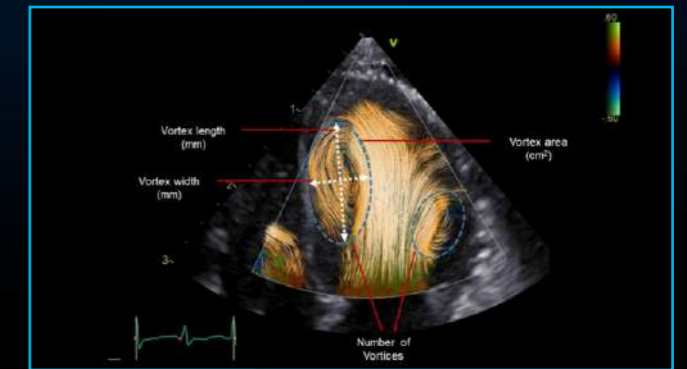
| Ultra Edition | **BSI 2.0** |

Insights into complex blood flow patterns such as vortex formation and duration.

**Benefits:**
- Provides multiple modes for visualizing blood flows, such as display of velocity vectors and pathway comets
- Provides complementary information for diagnosis of dilated cardiomyopathy and heart failure
- Opens new clinical research possibilities by providing measurements for studying vortex properties, such as vortex location, size and duration (time between 2 events)
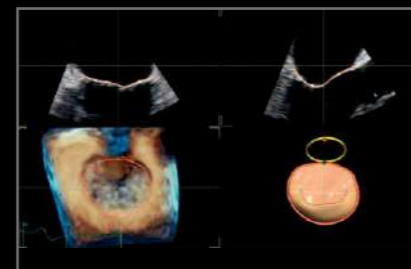
# VALVE QUANTIFICATION

*Precision at the heart of quantification.*

### 4D Auto AVQ

Automatically segment, align and quantify the aortic outflow tract – vital to device sizing and orientation for TAVI/TAVR procedures.

### 4D Auto MVQ

Supporting TEE images, this integrated package helps visualize and quantify the mitral valve via a semi-automatic, surface-detecting algorithm.

| Ultra Edition | **4D Auto TVQ** |

Semi-automated 4D tool enables fast visualization and quantification of the tricuspid valve anatomy.

**Benefits:**
- Supports TEE and TTE
- Offers renown Vivid 4D quantification user interface and workflow
- Handles the 3D shape of the tricuspid valve and provides 15 static and dynamic measurements
- Provides a cost-effective alternative to traditional tricuspid annulus assessment
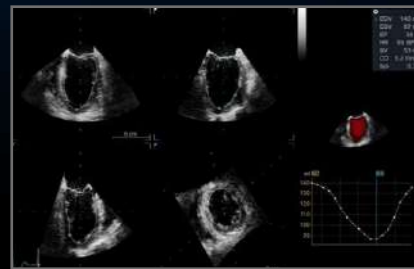- Supports 4D data also from previous releases

APPLICATIONS POWERED BY **AI**

# CHAMBER QUANTIFICATION

## New in Ultra Edition

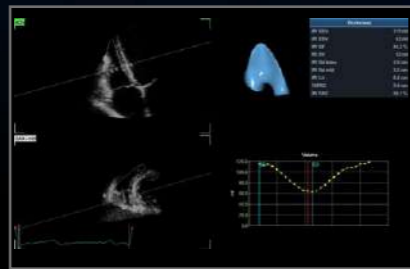*Precision at the heart of quantification.*

### 4D Auto LVQ

Adapted to work with full volume data sets acquired with the 4D TEE transducer, 4D Auto LVQ for TEE brings you a fast, easy, two-click method of placing points to define the initial endocardial border.

### 4D Auto RVQ

This package helps visualize and quantify the right ventricle in TTE images via a semi-automatic, surface-detecting algorithm. It's seamlessly integrated into the regular M&A menu, with results ready for immediate review.
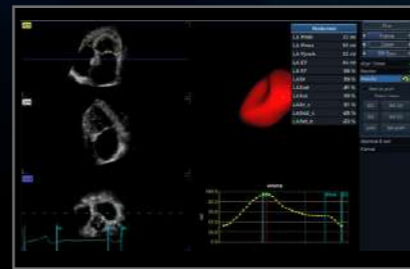
### 4D Auto LAQ

This semi-automatic surface detecting algorithm helps clinical users get fast, reproducible and accurate 4D quantification of the left atrium, acquired with 4D TTE probes. It provides left atrial volumes as well as ejection fraction, global longitudinal and circumferential strain.

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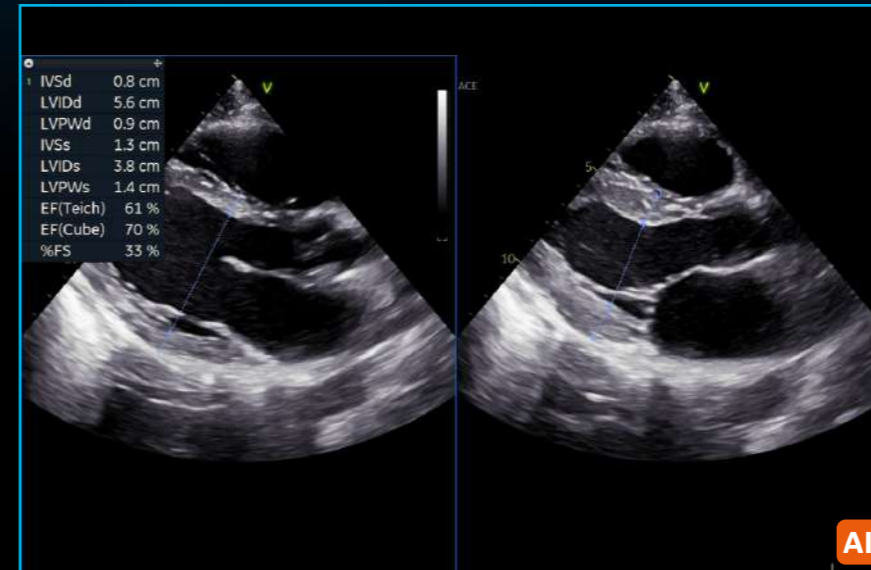
Ultra Edition

### AI Auto Measure 2D

Semi-automated LV dimension measurements (2D calipers) in the parasternal long axis view, reducing manual interactions.

**Benefits:**
- Achieves fast measurements of left ventricle dimensions:
  - Up to 80% less clicks [5]
  - No need to scroll to look for ED and ES frames
  - Reduce manual workflow during analysis of cardiac images
- Improves reliability and repeatability of measurements - potentially increasing reproducibility for follow-up studies

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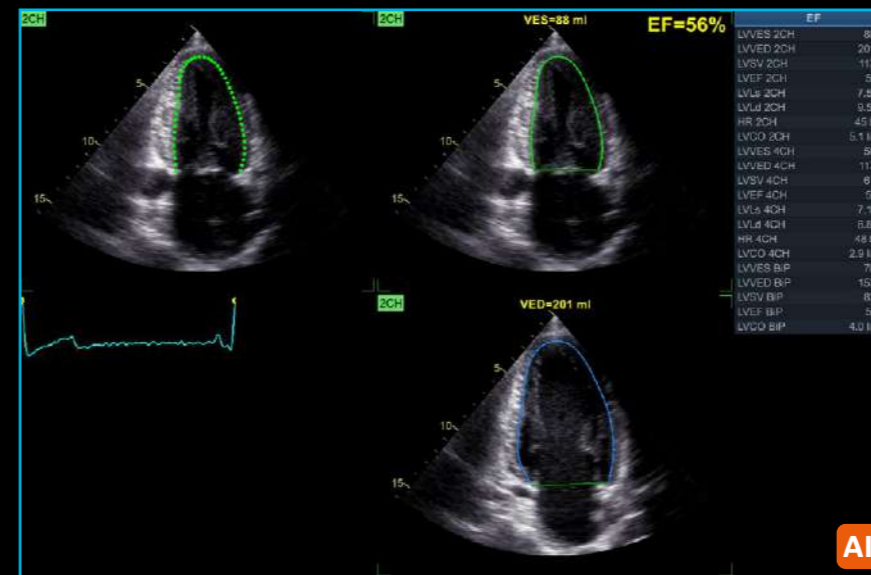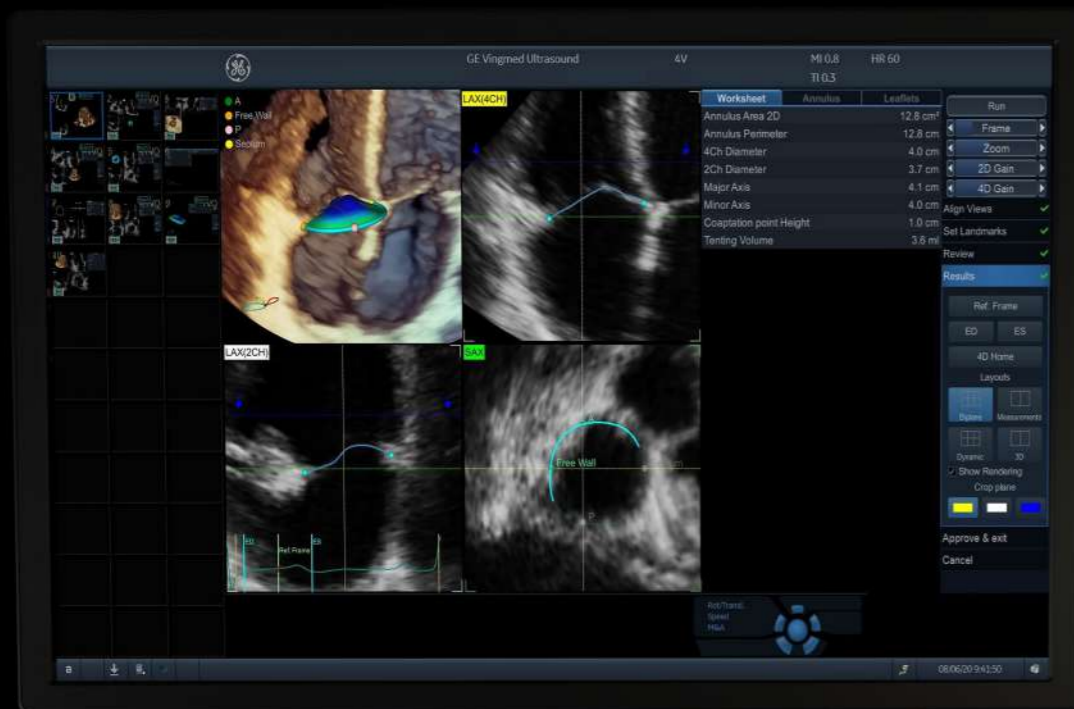
Ultra Edition

### Auto EF

Powered by AI-based View Recognition, Auto EF provides semi-automated quantification of left ventricular volumes and ejection fraction.
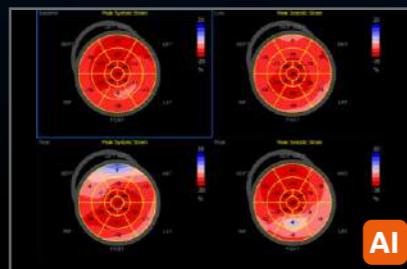
**Benefits:**
- Achieves fast measurements of ejection fraction
- DICOM support. Assessment of the left ventricle ejection fraction also on data sets acquired on other vendors' systems for follow-up studies

APPLICATIONS POWERED BY AI

# AFI FUNCTIONAL IMAGING

*From diagnosis to prognosis.*
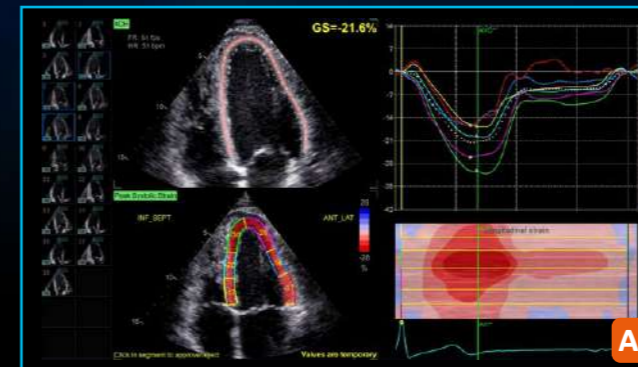
## New in Ultra Edition

### AFI Stress

Quantify wall motion at all stress levels. Integrated as part of a stress exam, AFI Stress protocols acquire standard apical 2D views and quantify both longitudinal segmental and global strain for contractility assessment at each stress level. Bullseye from the different stress levels can then be easily compared.
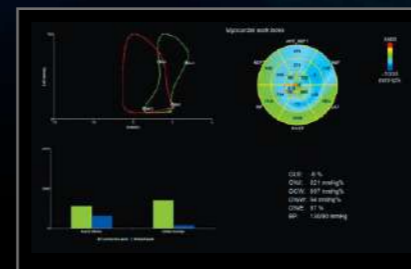
### MyoCardial Work

Using new and reduced load dependent parameters, Myocardial Work may provide more accurate and reproducible results, important especially for follow-up of patients over time. The new parameters are based upon the results obtained with AFI (longitudinal strain) by accounting for the systolic blood pressure measured at rest immediately prior to the echo exam, as well as the MV and AV opening and closure times.

### Ultra Edition — AFI LV with AI View Recognition*

Powered by AI-based View Recognition, AFI LV provides semi-automated quantification of left ventricular global and segmental strain.

**Benefits:**

- Offers advanced industry pioneered speckle tracking algorithm for quantifying myocardial deformation
- Works seamlessly - integrated ejection fraction calculation
- Supports Adult and Pediatric TTE and Adult TEE images
- Provides time savings via automatic selection of the appropriate 4-chamber, 2-chamber and APLAX images for analysis
- DICOM support. Assessment of the left ventricle ejection fraction also on data sets acquired on other vendors' systems
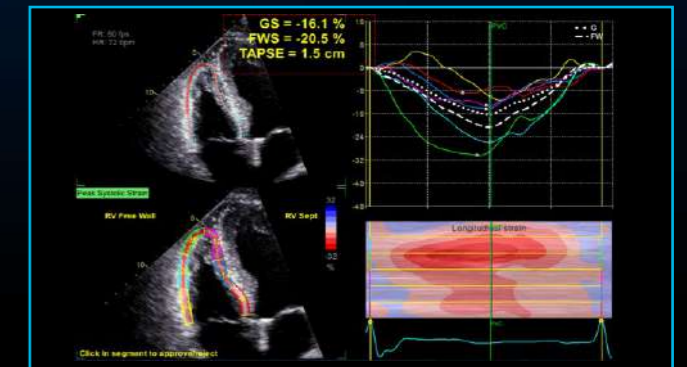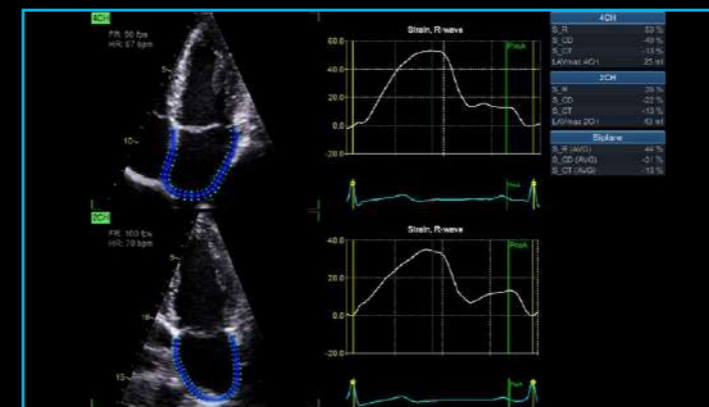
### Ultra Edition — AFI RV

AFI RV is a novel tool to assess the right ventricular function by advanced speckle tracking echocardiography.

**Benefits:**

- Offers renown Vivid AFI user interface and workflow to allow current and new users easy adoption
- Supports right ventricle free wall strain, global strain and Tricuspid Annular Plane Systolic Excursion (TAPSE)
- Follows the 2018 EACVI-ASE Strain Standardized Task Force guidelines
- Supports right ventricle images also from previous releases

### Ultra Edition — AFI LA

AFI LA Strain is a novel method to assess the left atrial function allowing global strain to be measured using speckle tracking echocardiography.

**Benefits:**

- Offers Vivid renown AFI user interface and workflow allowing users to easily adopt
- Supports left atrium strain, volumes and emptying fraction measurements
- Follows the 2018 EACVI-ASE Strain Standardized Task Force guidelines
- Supports left atrium images also from previous releases

*View Recognition is only applicable to images acquired with TTE probe on GE systems

APPLICATIONS POWERED BY AI