



Reveal more

Philips iE33 xMATRIX echocardiography system

PHILIPS
sense and simplicity

Extraordinary

At Philips, we believe in meaningful revelations. Our product development decisions are based on your insights, and respond to your needs.



Not just a revolution, a revelation

This focus is what spurred the development of xMATRIX technology. Clinically advanced and thoughtfully designed, the iE33 xMATRIX system brings extraordinary clinical utility to every setting where echocardiography is used.

While many technology companies call their innovations revolutionary, we know that innovation means nothing if it doesn't help you. That's why we won't call the iE33 xMATRIX system a revolution, despite its cutting edge technology. Instead, we call it a revelation. It will change how you see ultrasound. More importantly, it will change what you see with ultrasound.



Philips xMATRIX technology provides the iE33 xMATRIX system with the power to bring exceptional clinical utility to every setting where echocardiography is used.

clinical utility



The iE33 xMATRIX provides:

- Flexible and intuitive workflow based around the user
- Clear views of the cardiac anatomy, enabling accurate EF calculations
- Live 3D volumes with excellent image quality and high frame rates - no more stitch artifacts with single beat
- Fast and easy measurements of Live 3D and MPR views
- More clinical information in one view with Live 3D and tools such as Dual Volume Display
- A new approach to cardiac mechanics quantification using the next generation of SmartExam for echo studies
- A simplified vascular exam with Auto Doppler, to assist with image and sample volume placement

3D proves value

In recent years, many studies have investigated the value of 3D imaging. Clinical experts have declared that it is both complementary and supplementary to 2D imaging. In particular, 3D echocardiography appears to improve accuracy and reproducibility over 2D echo in LV volume and function calculation, as well as the derivation of the mitral valve area in patients with mitral stenosis. 3D echocardiography is also becoming the standard of care in the interventional lab.

Innovations in image quality and workflow

You've come to expect image quality revelations from Philips. And with good reason. Philips innovations contribute to nearly every aspect of cardiac imaging. Now, we bring you a new revelation: changing imaging modes from 2D to 3D can be as easy as touching a button, without any compromise in image quality.

3D without 3D hassles

As the evidence mounts that volume imaging can provide highly relevant information, more and more clinicians are searching for a way to incorporate 3D imaging into their exams. The iE33 xMATRIX system removes the barriers to 3D imaging, giving clinicians the power to choose 2D, 3D or combination imaging without disrupting workflow. With the highly-ergonomic new X5-1 transducer, a simple push of a button brings Live 3D imaging to any exam.

Focused on image quality

While much of the iE33 xMATRIX system is cutting-edge, we've retained all the imaging advantages that made the iE33 a best-in-class system:

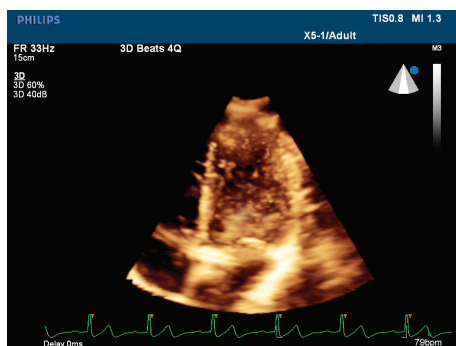
- **PureWave Transducer Technology** is the foundation for a host of imaging advances. The iE33 leverages PureWave crystal's acoustic efficiency in transducer tuning and system optimization, facilitating imaging of a wide range of patient types with fewer artifacts and better penetration than conventional transducer technology. PureWave technology also enables miniature crystals, which require less stimulation to achieve high image quality,

and make it possible to incorporate the power of xMATRIX in ergonomically sized transducers that can perform both 2D and 3D exams.

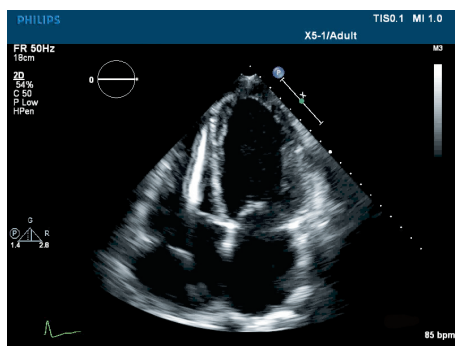
- **Advanced XRES** performs 350 million calculations per frame of image data at rates of up to 500 frames per second, removing the noise from the LV cavity to make it easier to define the endocardial border.
- **Adaptive Broadband Flow** uses the entire broadband frequency range within color Doppler, automatically adapting the frequency to the ROI to enhance spatial resolution. This is particularly useful when imaging the pulmonary vein, aortic insufficiency, and mitral regurgitation flow.

Access data from your PACS on the iE33

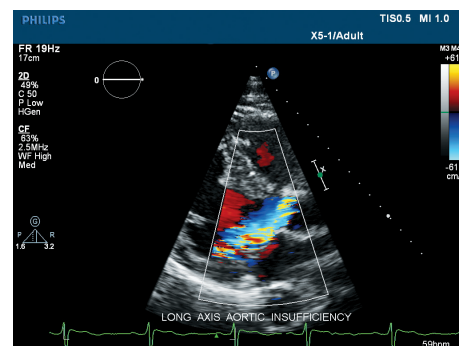
DICOM Query/Retrieve makes it possible to retrieve images from the PACS on the iE33 xMATRIX system. This feature enables easy comparison of past and current studies without use of a reading station. Users can choose to review previous studies before an exam, or use LiveCompare to view past studies in a loop while imaging the patient.



Live 3D imaging enables clear visualization of the cardiac structures at a high volume rate.



Even in technically difficult heart failure studies, the myocardium and endocardium are displayed with superb detail and contrast resolution from the apex to the atria.



Eccentric aortic insufficiency can be clearly identified with excellent color sensitivity and resolution.



Workflow-driven exams

Advances that increase efficiency can be revelations as well.

- Next generation SmartExam guides are designed for echo and vascular exams
- Swift protocols drive focused exams ranging from a full echo study to a longitudinal strain protocol
- SmartExam protocols simplify and speed up 2D image acquisition for QLAB CMQ quantification
- All X5-1 functionality can be incorporated into SmartExam protocols to aid with consistency from exam to exam

One-button solutions enhance ease of use

Ease of use is one of the top requirements for a premium performance ultrasound system, because it impacts both workflow and diagnostic confidence. That is why the iE33 xMATRIX is designed to operate via a small number of one-button controls that help you acquire high-quality images with the least amount of effort.



iSCAN one-button optimization quickly and automatically adjusts system parameters in both 2D and Doppler modes based on patient and exam types. It decreases keystrokes while allowing for the best image clarity possible in each exam.



iFOCUS Intelligent Focusing Technology automatically computes beam characteristics for a selected region of interest, and then provides the best detail resolution and tissue uniformity.



iOPTIMIZE Intelligent Optimization instantly adjusts system performance for different patient sizes, flow states, and clinical requirements.

Revealing new ways to speed echo lab workflow

As the utility of echocardiography grows, echo labs are faced with increased patient loads. The iE33 xMATRIX system is designed to ease a demanding schedule without compromising quality.



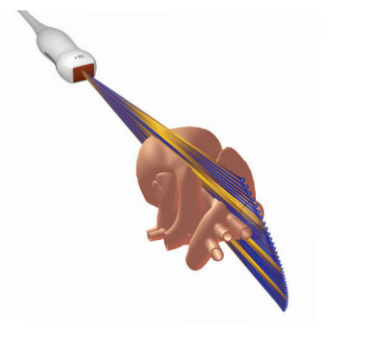
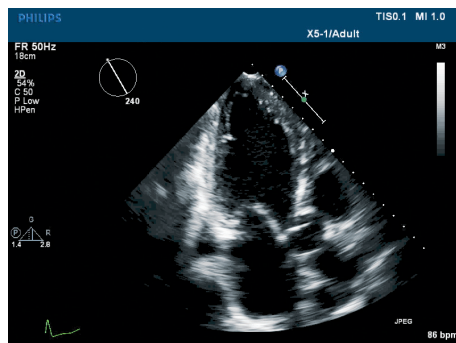
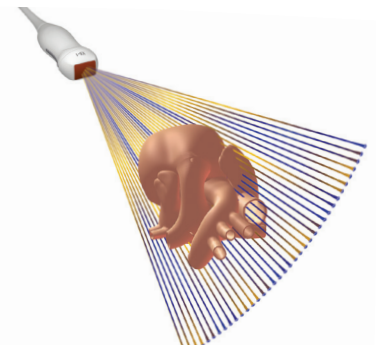
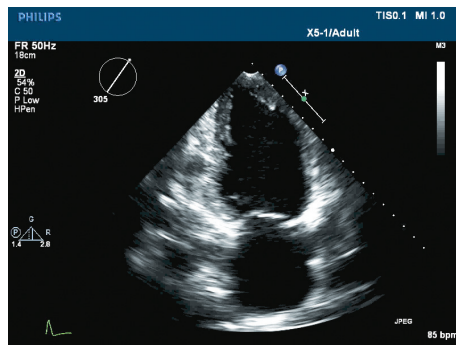
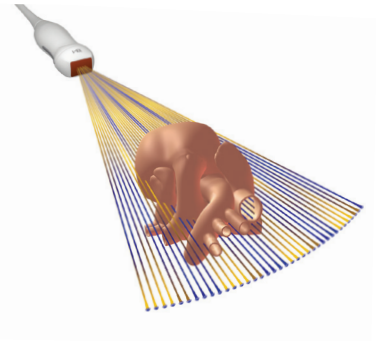
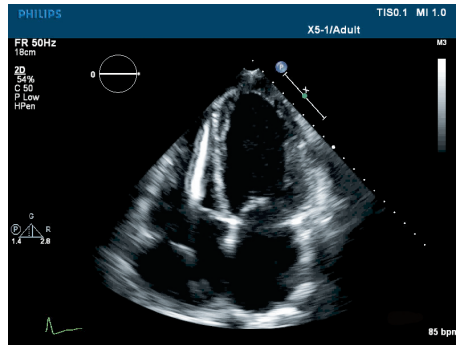
With the iE33 xMATRIX, you can:

- Incorporate 3D into any exam at any time, moving seamlessly between imaging modes with one transducer
- Increase accuracy in measuring LV volumes, as well as calculate the area and grade the severity of aortic stenosis
- Display more clinical information, such as simultaneous views of the mitral valve from both the LA and LV aspect
- Use calibrated measurements on the Live 3D volume or MPR views without using a quantification program
- Image the entire heart, in 3D and in real time in one cardiac cycle
- Use iCrop to easily focus on structures within a volume
- Provide strong clinical decision support to your colleagues in other cardiac sub-specialties, such as surgeons and interventionalists



X5-1 transducer delivers ease of use, effortless 3D

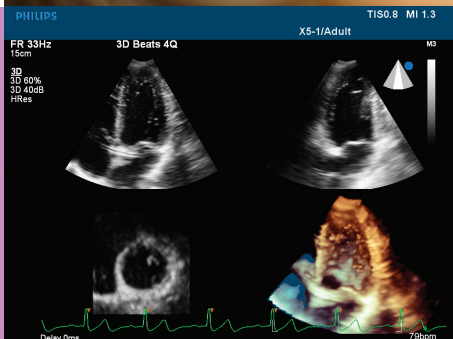
In many ways, the X5-1 transducer is a marvel. Inside this ergonomic, easy-to-handle tool is the technology that delivers outstanding 2D image quality on your most difficult-to-image patients, and then, with the touch of a button, converts to 3D imaging for applications such as evaluating a prolapsed mitral valve or assessing global left ventricular function. With another button, you can call on Live 3D color to assist with assessing blood flow. You can also obtain challenging views, such as apical two-chamber, more easily. Rather than manually rotating the transducer and searching for a window that isn't obscured by ribs, you can use iRotate to electronically access the view within the acoustical window between ribs. This can increase accuracy in measuring LV volumes, because you are less likely to foreshorten the image. iRotate also can be added into any SmartExam protocol to increase consistency among different users. With 3,000 elements and breakthrough PureWave xMATRIX technology, the X5-1 supports 3D, 2D, color flow, M-mode, PW/CW Doppler, Tissue Doppler imaging, and contrast-enhanced exams.



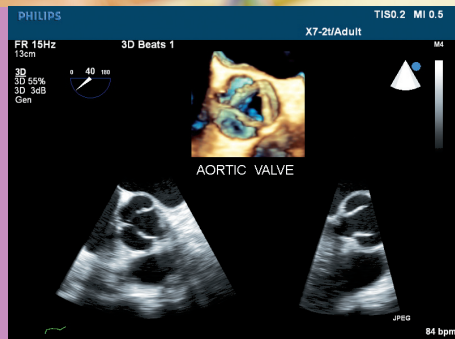
iRotate electronic rotation

Rather than manually rotating the transducer to search for a non-obscured window, iRotate can electronically achieve the best view within the acoustical window between ribs.

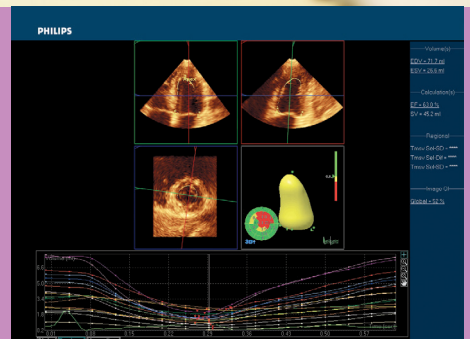
Workflow tools designed around you



Live Full Volume mode provides the versatility to capture a whole left ventricle and eliminate foreshortening, supporting accurate volumetric analysis of dyssynchrony and ejection fraction.



Subtle valve leaflets can be visualized in 3D and seen in the 2D MPR previews by simply applying and sizing the iCrop region-of-interest; the zoomed volume display is automatically updated.



3DQ Advanced uses all the voxels to generate a full 3D endocardial border. Additionally, 3DQ Advanced allows simultaneous display of 17 regional waveforms, enabling temporal comparisons between segments.

Live xPlane supports improved 2D EF calculation

With Live xPlane, you can acquire two simultaneous orthogonal views without manually rotating the transducer. Because the views are from the same heartbeat, you can more accurately calculate ejection fraction by Biplane MOD.

Live Full Volume reveals the whole heart in 3D in one beat

With Live Full Volume, you can obtain real-time images of the entire heart in a single beat, with excellent image quality and fast volume rates.

iCrop zeros in on region of interest (ROI)

iCrop zooms in on the volume region of interest using two live MPR views. It instantaneously changes view direction, making it possible to evaluate the mitral valve followed by the aortic valve with just one touch.

Cardiac 3DQ Advanced provides true LV volumes and global timing data

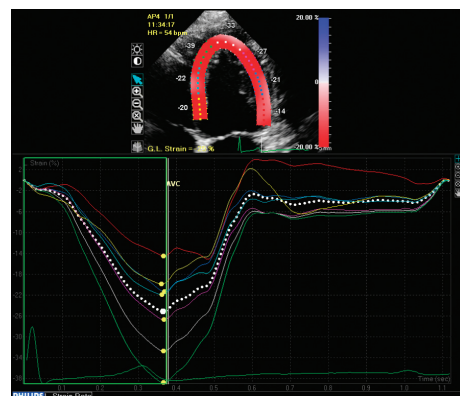
3D Quantification Advanced (3DQ Advanced), a semi-automated, on-cart and off-cart analysis tool for quantification of true LV volumes, uses all the voxels in the full volume to generate a full 3D endocardial border with exceptional accuracy and less dependency on LV shape assumptions than conventional methods, which make geometric assumptions. 3DQ Advanced waveform display provides accurate data for assessing global function based on LV volume, ejection fraction and stroke volume. Additionally, 3DQ Advanced allows simultaneous display of 17 regional waveforms, enabling temporal comparisons between segments. 3DQ Advanced also allows off-cart manipulations to be saved into the study by using subpages.

Cardiac Motion Quantification

Cardiac Motion Quantification (CMQ) is based on 2D speckle tracking technology. CMQ provides a method for assessing global and regional cardiac function. Using the 17-segment ASE left ventricular model, CMQ provides additional information for many clinical applications such as ventricular wall motion and mechanical synchrony assessments.



The excellent 2D image quality provided by PureWave crystal technology allows robust multi-cycle tracking of ventricular tissue. You can place, observe and edit the tracking points at any time. Multi-directional strain computations can be derived from longitudinal and circumferential strain measurements. CMQ also offers the unique “free strain” feature. This easy, quick, and accurate method provides the ability to assess user-defined information from the speckle tracking. TMAD (Tissue Motion Annulus Displacement) is also included in CMQ. This is a validated way to acquire a fast assessment of global ventricular function – especially useful for technically difficult patient studies.



CMQ-derived longitudinal strain of an apical 4-chamber view obtained with the X5-1 transducer.

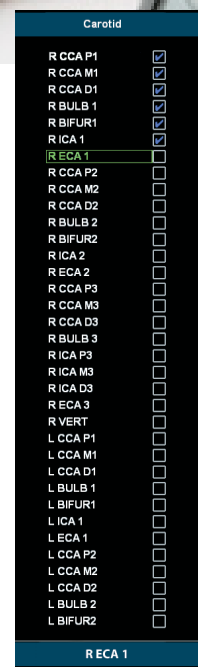
Take command of your vascular imaging workflow

We continue to push the boundaries and take vascular ultrasound to new levels of performance, application and utility. The iE33 xMATRIX system provides essential tools for vascular imaging.



The diagnostic demands of an aging population, global obesity epidemic, restricted budgets, and a shortage of qualified personnel require new levels of performance, efficiency and simplicity in vascular imaging. With unparalleled user ergonomics, Auto Doppler and customizable SmartExam protocols, you can now experience workflow efficiencies with every vascular exam.

The view list is continuously displayed and instantly updated as views are accepted. You always have immediate feedback on exam status.



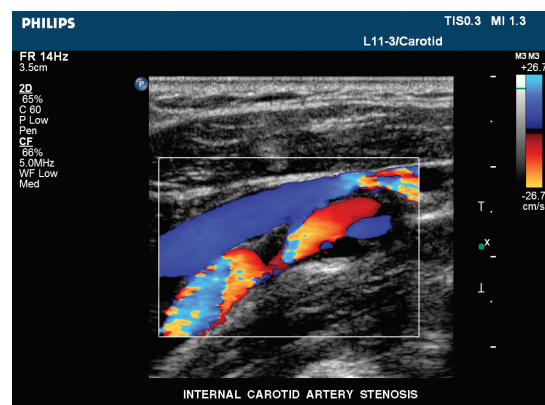
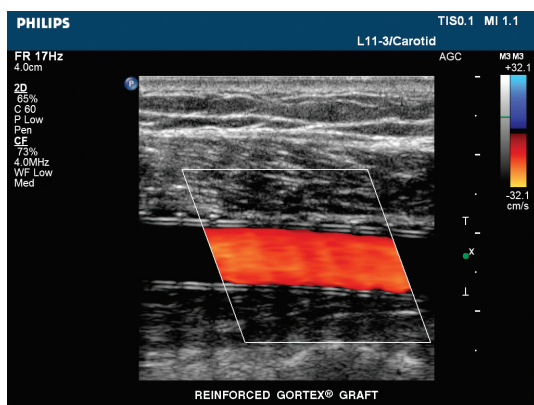
Easy and consistent

We asked you to help us identify aspects of ultrasound that needed improvement – what problems could we help you solve to make your day easier. Your overwhelming response: make exams easy and consistent, and help us keep staff healthy and able to fulfill schedules. Now you can see your suggestions integrated into the iE33 xMATRIX system with new levels of automation and smart features designed for busy vascular labs.

The iE33 xMATRIX system's Auto Doppler feature simplifies vascular studies by reducing the number of steps to complete exams. In fact, a decrease of 67.9% in manual steps was seen in a recent study.* Auto Doppler increases consistency among exams, regardless of the expertise of the clinician. It results in enhanced image quality and increased patient throughput.

Vascular exams also benefit from exam-specific, workflow-driven SmartExam protocols. SmartExam protocols make your exams consistent, from patient to patient as well as across your entire department. You can use system-defined protocols, or easily create your own. You can also share SmartExam protocols with other iE33 systems at the same software level, gaining new levels of department consistency and efficiency.

Fast and easy customization, consistent and accurate annotation, automatic mode switching, and missed view alerts streamline exams. Studies show that SmartExam protocols save exam time – up to 50% for some types of exams.** The result is more time to focus on your patients, increased confidence in complete studies, less focus on requirements, less repetitive motion, less stress, and improved schedule maintenance and department efficiencies.



The iE33 xMATRIX system supports a full range of vascular exams for the CV lab with linear transducers for superficial and deep vessel studies.

* NYCVA Auto Doppler Workflow Study, Jan Stoves, NYCVA, 2011

** SmartExam comparison study, University of Colorado Hospital, Ultrasound Department, 2007

Stress echo: making the most of that critical minute

In every stress echo exam, there comes that critical moment of peak stress when you have a minute or less to get quality images that replicate the angle of the resting images, and that will enable confident wall motion analysis.

The iE33 xMATRIX is designed to ensure that the moment of peak stress for the patient isn't one for the clinician as well. A host of thoughtful innovations work together to enhance speed and reproducibility.



With the iE33 xMATRIX, you can:

- Save time and increase consistency
- Complete an entire stress echo protocol from the standard windows following peak exertion without manually rotating the transducer
- Re-label any view after acquisition for total flexibility
- Quantify 2D stress echo studies and communicate global and regional LV function during each stage
- Add Live 3D Stress with single-beat acquisition to your 2D protocols with the touch of a button
- “Slice” the volume to find the best views and content for making diagnoses



Q-Station software, which enables advanced quantification on any PC, can be used to view, quantify and report on stress echo. When used with Philips StressVue Stress Testing System, Q-Station can integrate stress echo and ECG ST elevation maps into one report, for easier diagnosis and communication with referring physicians. Q-Station also includes a smart wall motion scoring tool that is linked to stress stages and views.

Image challenging patients with the X5-1

The X5-1 transducer delivers high image quality in both 2D and 3D modes. Optimized for the most difficult-to-image patients, it features three harmonic and two fundamental 2D settings for the high resolution and the deep penetration. The touch of a button enables Live 3D Stress, making it easy to add 3D imaging to your stress protocols with single beat acquisition and fast volume rates.

Automatic rotation with iRotate Stress

Used in combination with the X5-1, iRotate allows you to complete an entire stress echo protocol, including acquisition of 4-chamber, 2-chamber and 3-chamber 2D images, from the standard windows following peak exertion without rotating the transducer. Simply push the Enter key to automatically rotate to the next required view. iRotate decreases wrist strain while providing more accurate acquisitions for analysis of wall motion abnormalities.

Quantification tools to increase diagnostic confidence

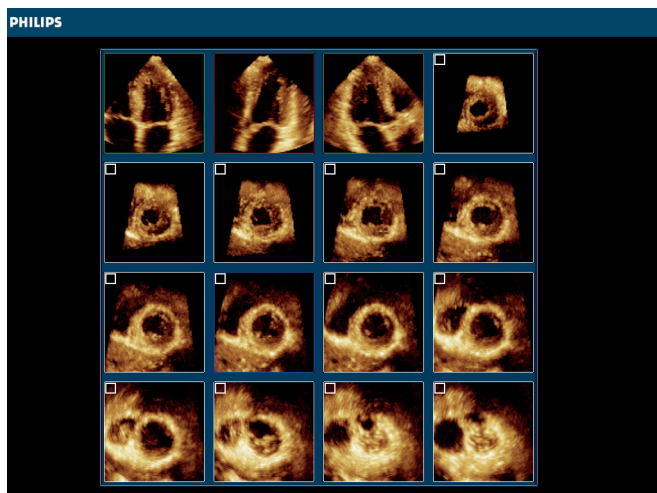
Cardiac Motion Quantification Stress (CMQ-Stress) is based on 2D speckle tracking technology. With CMQ-Stress, you can quantify 2D stress echo studies and communicate global and regional LV function during each stage. The comprehensive summary page that displays side-by-side LV 17-segment bull's-eye plots from each stress stage is especially helpful when communicating results to referring physicians.

iSlice aids diagnosis

iSlice is another innovation that makes 3D imaging practical. With iSlice, you can “slice” the volume to find the best views and content for making diagnoses. Rotating the volume view also instantaneously updates the 2D view to match perspective. More than just a workflow enhancer, iSlice can aid decision-making and diagnosis. In fact, one hospital reported using the 9-slice display because that slice thickness helped visualize the apical C planes, providing new information not previously attainable.

To make stress echo less stressful, the iE33 xMATRIX system includes several additional features that save time and increase consistency:

- A pre-loaded 2D/3D Stress protocol ensures that 3D and 2D images are labeled and correlate with each other
- Views can be re-labeled after image acquisition
- Defer Select provides the option of deferring selection of views until the end of the stage, saving valuable time
- Electronic steering re-orientes off-axis images
- Automatic saving of angle adjustments and changes in gain and depth setting for the next stage of the exam increases consistency of views
- iSlice, iCrop and Crop Box enable easy re-slicing of images
- Ability to utilize contrast enhances the LV borders of technically difficult patients
- Stress echo automation and quantification provides more objectivity to exam reports



From one Live Volume captured during a stress echo exam, clinicians can use iSlice to derive standard 2D views, as well as a series of C plane short axis views, from the apex to the base.

Clinical value for interventional cardiology

With the iE33 xMATRIX system, echocardiography now has more power than ever to reduce surprises during and after interventional procedures. Live 3D TEE images, combined with the advanced capabilities of QLAB Mitral Valve Quantification (MVQ), reveal information once only available after an incision was made.



With the iE33 xMATRIX, you can:

- Show more clinical information of structures in real time with dual volume display
- Obtain calibrated measurements of 3D and 2D slices without QLAB
- Reveal information once only available through surgery
- Evaluate blood flow with Live 3D color before closing an incision, and make any repairs necessary
- Use clear, accurate images and quantitative data to support care planning
- Use 3D modeling to help determine if a valve should be repaired or replaced

More informed valvular procedures

Philips Live 3D TEE and MVQ quantification bring the value of 3D echo to transesophageal imaging, without the complexity often associated with volume imaging.

- Surgeons can use Live 3D TEE to obtain multiple perspectives of the complete valve and perform quantification that aids decisions about valve repair or replacement.
- During surgery, anesthesiologists can use Live 3D TEE to perform analysis and assess procedure outcomes.
- Surgeons can evaluate blood flow with Live 3D color before closing and make any repairs necessary.
- When patients are ready for follow-up, cardiologists have clear, accurate images and quantitative data from procedures to help with care planning.

Ultrasound guidance for interventional procedures

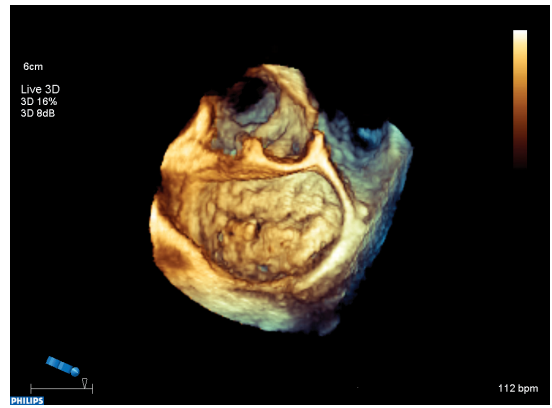
Interventional cardiologists have more information for percutaneous valve repair and replacement, as well as complex ASD, VSD, and LAA closures.

- Live 3D Zoom with color assists with assessment by providing a close-up view of the structures pre- and post-intervention.
- Dual volume display provides the user with opposite views of the same structure in real time.
- During procedures, users can easily perform immediate 2D measurements on the 3D volume without entering a separate quantification program.

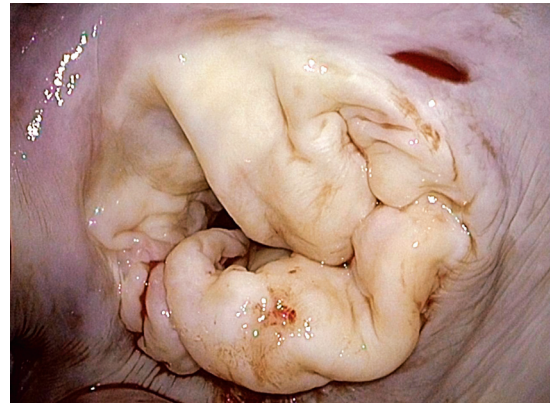
MVQ reveals new ways of assessing valvular function

MVQ's 3D modeling provides measurements that can aid valve decision-making. With MVQ, you can:

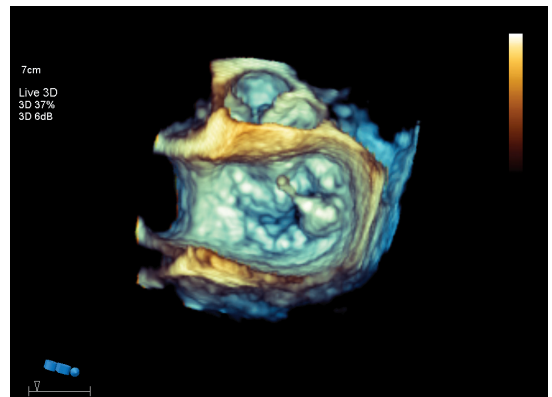
- Build a 3D model of the mitral valve annulus, anterior and posterior leaflet, leaflet segmentation, coaptation line and potential coaptation defects, as well as mitral valve spatial relationship with the papillary muscles and aortic valve.
- Manipulate the MVQ 3D model in the 3D space and overlay it on the anatomical 3D view of the mitral valve.
- Create and display a measurement set, and generate a comprehensive report.



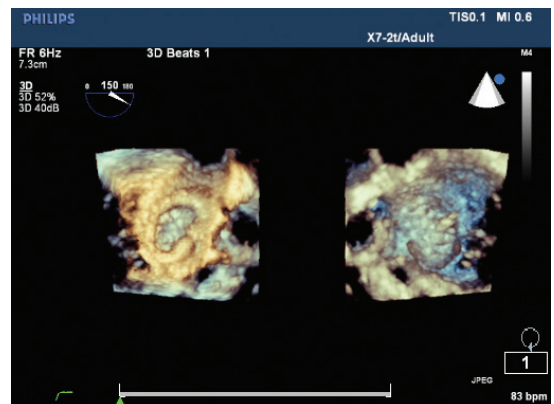
Real-time Live 3D TEE view of Barlow's mitral valve



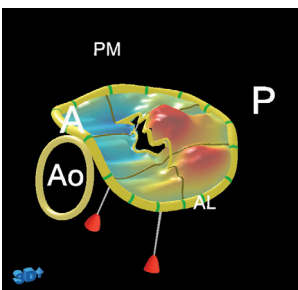
Surgical view of Barlow's mitral valve



Real-time Live 3D view of P3 prolapse/flail of mitral valve



Dual volume display provides two Live 3D TEE images from the same volume.



QLAB MVQ 3D model allows objective assessment of mitral valve structural and functional defects.

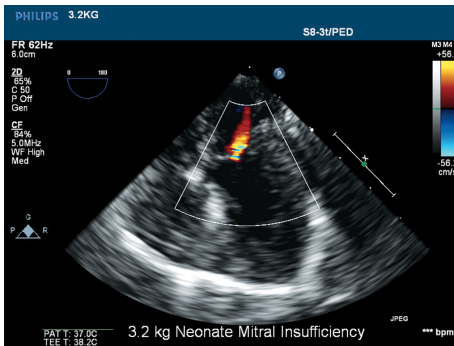
Capturing the pediatric heart

With pediatric echocardiography, speed is critical. Inside and out, your patients are perpetual motion machines. Philips designed the iE33 xMATRIX system with a suite of pediatric transducers and workflow that respond to your need to capture data for confident diagnosis.

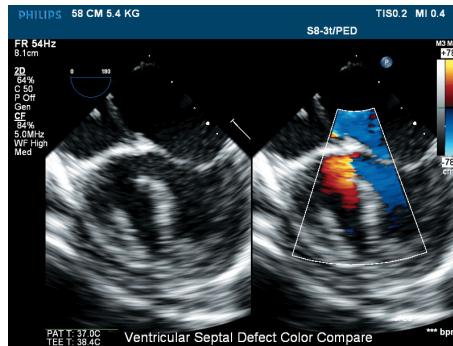


With the iE33 xMATRIX, you can:

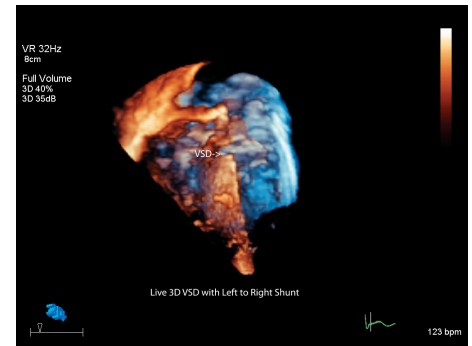
- Obtain real-time 3D views of cardiac structure in a single beat, with high frame rates and excellent image quality
- Use analysis packages designed specifically for the challenges of congenital heart disease
- Perform transesophageal echo on patients weighing below 3.5 kg
- Quickly access views without manual manipulation of the transducer using iRotate
- Perform TDI strain analysis on small hearts
- Assess flow defects with confidence using Live 3D zoom and 3D color
- See more information about the structures and anatomy with dual volume display
- Use Live xPlane to acquire two simultaneous orthogonal views without manually rotating the transducer



High image quality enables visualization of minute structures, as evidenced in this image of mitral insufficiency in a 3.2 kg patient.



View of ventricular septal defect from a 5.4 kg neonate. The S8-3t is a fully-functional multiplane TEE with color flow, Doppler, HD zoom, and comparison capabilities, making it a critical tool for the care of tiny patients.



Live 3D Echo with the X7-2 transducer, elucidates structural relationships throughout the heart, including valves, walls, and interventional devices.

X7-2 transducer delivers versatility

The X7-2 transducer is the only pediatric 3D transducer on the market. It also provides real-time views of cardiac structure in a single beat. By benefit of 2500 element xMATRIX technology, the X7-2 delivers remarkable Live 3D Echo. PureWave crystal technology reveals the details of tiny structures, while advanced XRES imaging reduces artifacts. The X7-2 supports Live xPlane imaging, Live 3D, 3D iCrop and 3D full volume imaging.

iROTATE makes challenging views easier to obtain

The small ribcage of most pediatric patients can make it difficult to obtain views that aren't obscured by ribs. iROTATE solves this problem by electronically obtaining the view within the acoustical window – without manual manipulation. iROTATE enables the user to focus on maintaining acoustic contact, rather than sacrificing image quality by angling off the chest to manually obtain the desired view.

MicroTEE transducer brings the light of imaging to tiny patients

The benefits of transesophageal echo are now available to the smallest patients, with the microTEE transducer. A miniaturized multiplane transducer designed specifically for patients weighing below 3.5 kg, the microTEE supports 2D, Doppler, color flow, harmonic imaging, M-mode, and 2D analysis.

The transducer can be used to identify residual defects in need of repair while patients are still in-suite. In a study of 42 patients,* the microTEE transducer was used successfully to image 100% of the patients, with no complications or clinically significant changes in hemodynamic or ventilation variables. Information from microTEE assessment during surgery resulted in surgical revision for 6 of the 42 patients.*

Dedicated pediatric analysis

Our pediatric analysis package contains tissue specific imaging presets (TSIs) designed for the challenges of pediatric imaging. Because we understand that children are not mini-adults, we've also designed specifically fetal echo and pediatric analysis to separately measure inflow and outflow, making it easier to follow your patients' progress.



Shown actual size, the microTEE transducer brings transesophageal echo to your smallest patients.

* Zybelski SC, Shirali G, Graham E, et al. Initial Experience With a Miniaturized Multiplane Transesophageal Probe in Small Infants Undergoing Cardiac Operations. *Annals of Thoracic Surgery*. 2010; 89:1900-4

Support that enhances productivity

What if Philips could provide advanced service features that promote uptime and improve business efficiencies?

Balancing quality patient care with financial responsibility and efficient workflow can be a challenge. In today's tightening global economy, it is critical to realize the full potential of every resource. To enable that potential, Philips has invested heavily in comprehensive support services to keep your ultrasound systems up and running without getting in your way, so you can deliver uninterrupted quality care. A remote connection with Philips allows for many advanced service features, including enhanced clinical and technical support allowing for faster resolutions to both workflow questions and technical issues.



Remote services

Remote desktop

Allows Philips service engineers to gain a live view of your system's console. This enables remote operation, real-time clinical troubleshooting, and issue resolution.

iSSL technology

An industry standard security and encryption protocol that meets global privacy standards and provides a safe secure connection to the Philips remote services network using your existing internet access point.

Online support request

System users can place a technical or clinical support request directly to Philips from the ultrasound system to help reduce workflow interruption.

Utilization reports

Data intelligence tools that can help you make informed decisions to improve workflow, deliver quality patient care, and reduce the total cost of ownership.

Proactive support

Philips can continually monitor key system parameters, detecting anomalies before they impact performance. Corrective action can be taken quickly, often with no impact to patient schedules.

Service rated #1 by customers

The success of your organization depends on people. Philips Services are designed with that in mind – creating healing environments, developing your staff, improving your organization’s performance, and increasing patient satisfaction. Philips Healthcare ultrasound is #1 in overall manufacturer performance based on customer rankings in the 2011 IMV ServiceTrak™ All Systems survey. Part of the annual IMV ServiceTrak surveys, the report reflects the responses of over 1,800 imaging professionals measuring satisfaction with manufacturer, system, and service personnel.

Innovative financial solutions

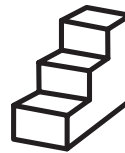
Philips Medical Capital delivers financial solutions to help you place a new system in your facility or practice. Our financial experts understand your unique financial needs and provide flexible solutions that optimize asset utilization, reduce costs, and increase financial flexibility.

Philips SmartPath assures you easy access to solutions and innovations for the full life of your ultrasound system, so you can boost your clinical and operational potential and achieve your organizational goals.



Optimize

Optimize your system’s performance both now and in the future with regular and ongoing updates, including functionality improvements and remote technical support.



Enhance

Enhance your equipment with regular technology upgrades, and take advantage of the newest features and capabilities.



Transform

Transform your investment at the end of your system’s life by transitioning seamlessly to a next-generation solution or refurbished option.

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