

PHILIPS

Image guided therapy

Azurion

Congenital Heart Disease suite

Gentle care. Powerful insights.

1 In 28 individual comparative studies, Philips ClarityIQ was associated with reductions in patient radiation exposure.

2 Relationship between radiation exposure and risk complications, long-term health risk, procedure time and patient characteristics, procedure complexity, as reported in medical guidelines.

3 Results obtained during user tests performed in 2017/2018 by Philips Healthcare and Use-Lab GmbH, an independent company. The tests involved 17 physicians from Europe and the USA, who performed simulated procedures in a simulated OR environment.

4 It is the user's responsibility to ensure that Philips network requirements (such as performance, VPN) for IntelliSpace Cardiovascular are met.

5 Caas is a trademark of Pie Medical Imaging BV.

6 These functionalities may not be available in all territories. Please contact your Philips representative for more details.

7 The Photo Realistic Volume Rendering (PRVR) and 3D Modeling are not intended for diagnostic image review.

8 Results obtained during user demonstrations performed in December 2017 with the EPIQ CVx and the iE33 systems. The research was designed and supervised by Use-Lab GmbH, an independent and objective engineering consultancy and user interface design company. The tests involved 42 clinicians from 17 countries. The various types of cardiac customer segments represented were adult diagnostics and interventional, adult diagnostics, and pediatric diagnostics and interventional. (Based on responses from 38 respondents).

9 Evaluated with clinical users in a simulated lab environment with a total of 17 teams consisting of a physician and a radio-tech, and 1 physician without a radio-tech, with different levels of experience.

10 The user level of expertise required is described in the Instructions for Use as the Intended Operator Profile.

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How to reach us

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healthcare@philips.com



Defining the future of image-guided therapy

Innovative solutions across the health continuum

At Philips, we look beyond technology to the experiences of patients, providers and caregivers across the health continuum, from healthy living to prevention, diagnosis, treatment and home care. We unlock insights leading to meaningful innovations from hospital to home.

Our integrated solutions – packaged suites of systems, smart devices, software and services – combine broad and deep clinical expertise, technology and services, actionable data, consultative new business models and partnerships. Together, with our customers, we can transform how care is delivered and experienced, to deliver upon the Quadruple Aim: improved patient experience, better health outcomes, improved staff experience, and lower cost of care.

At Philips Image Guided Therapy, we have played a pioneering role in image-guided minimally invasive therapy for cardiovascular disease since the inception of the field back in the 1950s, thanks to our expertise in X-ray imaging systems. We aim to both improve existing procedures and introduce new procedures so that more patients can benefit from image-guided therapy. We also develop new business models to cater for new care settings, such as ambulatory surgery centers and office-based labs, and drive improved lab performance. Today our clinical partners benefit from complete procedural solutions to treat a wide range of diseases – from cardiovascular disease to stroke, cancer, and spine conditions.



Clinical demands are getting more specific. And so are we.

During an interventional procedure you are focused on making the best decisions you can for your patient. Each patient and each disease has very specific challenges, complexities, and needs. As the number of procedures and patients grows, you see the need for better image guidance and interventional devices to help make treatment and decision-making more effective. At the same time, you're looking to enhance workflows as the key to improving efficiency. That's why we created our clinical suites; a flexible portfolio of integrated technologies, devices and services for a broad range of interventional procedures.

Each of our clinical suites offers specific image guided therapy solutions to provide more choice and flexibility for exceptional care. So you can be confident in your performance and in the fact your patients are receiving exceptional care. Together we aim to shape and create the future of image guided therapy.

Introducing Clinical Suites

Helping to bring across our comprehensive clinical propositions

| | | | | | | | | |
|--|--|---|---|---|--|---|--|---|
| Coronary suite Transforming complex PCI procedures into confident care | EP suite Greater insight and confidence in EP procedures | SHD suite Confidence and Efficiency in Structural Heart Interventions | CHD suite Gentle care. Powerful insights. | Vascular suite Redefine outcomes for vascular treatment | Neuro suite Neuro decisions are based on what you see, so see more | Onco suite Critical insights for superior care in interventional oncology | Lung suite All-in-one diagnosis and treatment of lung cancer | Spine suite Perform spine surgery with confidence and precision |
| | | | | | | | | |

Key benefits

- **Gentle care.**
High image quality at ultra-low dose levels. Reduce the risk of complications from radiation exposure for patients without changing your way of working^{1,2}.
- **Powerful insights.**
Live fusion imaging and in-room 3D pediatric visualization and analysis tools enhance assessment and guidance through unique anatomy.
- **Easy workflow.**
Make fast, informed decisions within the sterile field – size devices, measure heart chambers, and create roadmaps at table side.

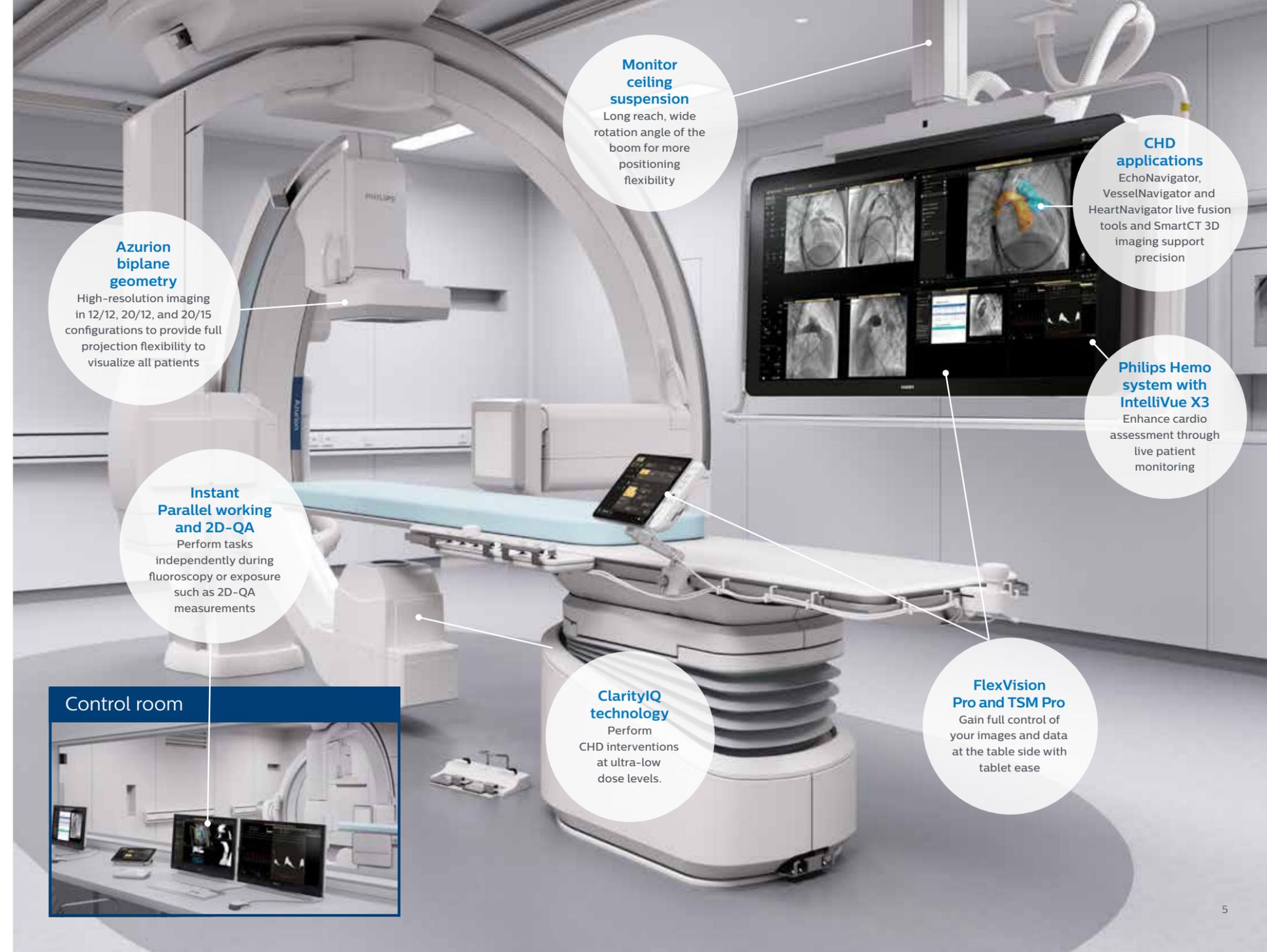
CHD suite Gentle care. Powerful insights.

Minimally invasive congenital cardiac interventions are changing the therapeutic outcomes for young patients, and for the rising number of adults with CHD. Philips is doing everything it can to help. Our congenital heart disease (CHD) suite is designed to adapt to your workflow needs, letting the system work seamlessly around you so that you may focus on your patient.

CHDs present the distinct challenge of uniquely complex pathoanatomy in some of the most vulnerable patients. Our CHD suite is designed to provide profound imaging insights, while dramatically lowering the burden of radiation and contrast load on patients. Clinicians can decide with confidence, based on intuitive 3D imaging tools, multimodality fusion imaging and ultra low-dose protocols.

The CHD suite enhances communication and patient access, enables efficiency and supports confidence in anatomical guidance, device navigation and accurate device placement.

Let the Azurion platform work for you, so that you can confidently focus on your patient



Azurion biplane geometry

High-resolution imaging in 12/12, 20/12, and 20/15 configurations to provide full projection flexibility to visualize all patients

Monitor ceiling suspension

Long reach, wide rotation angle of the boom for more positioning flexibility

CHD applications

EchoNavigator, VesselNavigator and HeartNavigator live fusion tools and SmartCT 3D imaging support precision

Philips Hemo system with IntelliVue X3

Enhance cardio assessment through live patient monitoring

Instant Parallel working and 2D-QA

Perform tasks independently during fluoroscopy or exposure such as 2D-QA measurements

ClarityIQ technology

Perform CHD interventions at ultra-low dose levels.

FlexVision Pro and TSM Pro

Gain full control of your images and data at the table side with tablet ease

Control room



Azurion with FlexArm

The advanced suite with unlimited imaging flexibility

Philips Azurion with FlexArm – a revolutionary new approach to image guided therapy that gives you the freedom to improve and grow your minimally invasive care. This ceiling-mounted system provides unlimited imaging flexibility for diverse procedures and exceptional positioning freedom for medical teams. With the full flexibility and compact set-up of the FlexArm stand you have a highly cost-effective environment ready for the procedures of the future.

Key benefits

Optimal patient access during complex cases

- Flexibility in gantry position offers optimal workflow especially for ultrasound and anesthesia.

3D image fusion in any 45° position

- Overlay of CT and Ultrasound images in any 45 degree position with HeartNavigator, EchoNavigator and VesselNavigator

“ The system moves around us, instead of us having to move around the system.”

Dr. Carlos E. Ruiz, M.D., Ph.D., FACC, FESC, MSCAI Director, Structural and Congenital Heart Center, Hackensack University Medical Center and The Joseph M. Sanzari Children's Hospital, Professor of Cardiology in Pediatrics and Medicine



Optimal patient access



Improved workflow



3D Image Fusion in any 45 degree position

100%

of physicians who participated in a simulated use study agreed that FlexArm offered uncompromised access to the patient's head end³

Work efficiently and consistently

When treating congenital heart disease, workflow standardization and streamlining help boost efficiency, save time, and enhance teamwork. Philips offers many flexible ways to enhance workflow and help reduce distractions and clutter in the treatment environment. These solutions contribute to a well organized, smooth running procedure.



Procedure Cards

- One-click procedure set up
- Customize per procedure, physician and department
- Based on RIS / HIS / CIS code of scheduled procedure
- Including pre-procedure checklists, hospital protocols, lab layouts, device sizing charts, or any other customizable information



Instant Parallel working

- Perform tasks independently during fluoroscopy or exposure (e.g. perform 2DQA then share with the exam room).
- Review two series side by side.
- Prepare the next patient or report on previous patient



Touch Screen Module Pro

- Perform measurements
- Collimate on clinical image with a fingertip
- Annotate and mark anatomy on live images
- Pinch, zoom, pan, and flag images for processing
- Store and recall system positions
- Use pointer to indicate items on screen



"The FlexVision Pro is fantastic! I can control everything from table side without sterility breaks."

Marco van Strijen, MD, PhD, interventional radiologist, St. Antonius Hospital, Nieuwegein, The Netherlands

Create unlimited number of screen layouts

Perform measurements at table side

View and control all connected applications, like MR/CT images in PACS at table side

Live re-size and single-click image capture

Connect and control 3rd party applications

Dose Management

Several Azurion features have a positive impact on dose. Our DoseWise management solutions help you take control over patient care, staff safety, and regulatory compliance with a comprehensive suite of radiation dose management tools, training, and integrated product technologies.

ClarityIQ technology – significantly lower dose for pediatrics

Our novel ClarityIQ X-ray imaging technology provides superb image quality with significantly lower dose across clinical areas, patients, and operators.^{1,2}

Our Azurion with ClarityIQ technology enables physicians to deliver fast, effective and simplified procedures with an efficient clinical workflow. All while providing high image quality at ultra-low dose levels.

“I think now this is the gold standard for interventional cardiology, for structural interventions – for sure. I have no doubt about that”

Dr. Bruno Garcia, Interventional Cardiologist, Hospital Vall d’Hebron, Barcelona, Spain



Zero Dose Positioning

This table-side function lets you pan the table and change table height or field-of-view on your Last Image Hold (LIH) image. This means you can already see the effect of these changes on your region of interest to prepare your next run without using fluoroscopy.

DoseAware – Making the invisible visible

DoseAware helps manage occupational radiation to physicians and staff by providing real-time dose feedback. Advanced reporting and detailed procedure-based feedback are also available with DoseAware Xtend.

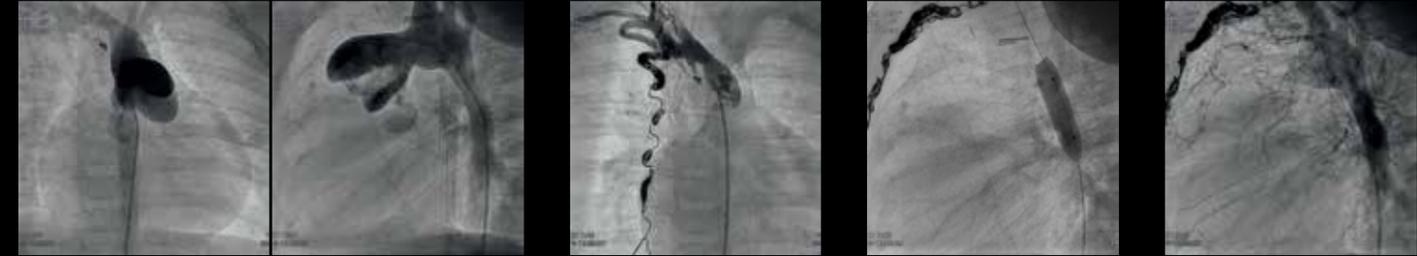


ClarityIQ case examples

Interventional balloon-dilation of aortic coarctation and coiling of internal mammary arteries

Imaging of 11 months old female with hypoplastic left heart syndrome and atrioventricular septum defect after Norwood stage II, showing residual aortic coarctation (25mm Hg gradient) and diffuse bilateral aortopulmonary collaterals, treated with balloon dilatation and coiling, respectively. Extra low pediatric dose settings allowed a total cumulative DAP of 1074mGycm².

| Dose report | |
|---|-------|
| Fluoro time (mm:ss) | 12:46 |
| Acquired exposure runs (N) | 10 |
| Exposure images (N) | 1034 |
| Cumulative Frontal Air Kerma (mGy) | 13 |
| Cumulative Lateral Air Kerma (mGy) | 8 |
| Cumulative DAP (fluoro) (mGycm ²) | 780 |
| Cumulative DAP (exposure) (mGycm ²) | 294 |
| Total Cumulative DAP (mGycm ²) | 1074 |



Pulmonary Valve replacement

Imaging of a 10 year old male after Ross Konno operation at 7 months, showing severe pulmonary valve stenosis (25mm Hg gradient), treated with percutaneous valve replacement. Using ClarityIQ the procedure lasted 85 minutes with only 8311mGycm².

| Dose report | |
|---|-------|
| Fluoro time (seconds) | 14:41 |
| Acquired exposure runs (N) | 18 |
| Exposure images (N) | 3150 |
| Cumulative Frontal Air Kerma (mGy) | 36 |
| Cumulative Lateral Air Kerma (mGy) | 36 |
| Cumulative DAP (fluoro) (mGycm ²) | 2924 |
| Cumulative DAP (exposure) (mGycm ²) | 5387 |
| Total Cumulative DAP (mGycm ²) | 8311 |



Connected cardiology workflow

The cardiovascular information you need, all in one place

IntelliSpace Cardiovascular provides a single point of access anytime, virtually anywhere⁴ to a patient-centric repository of comprehensive cardiovascular information that helps to support clinical decision-making, streamline workflow, and reduce costs.

- Analyze, assess, and manage your patients' vital cardiovascular information from a single Workspace
- Access advanced clinical tools to perform comprehensive analysis and reporting, allowing for fast and informed cardiac care treatment decisions
- Configure a single-modality, departmental solution that can grow into a comprehensive multi-modality, enterprise-wide cardiovascular image and information management solution
- Interface with IntelliBridge Enterprise, for interoperability with your ADT, EMR, and existing specialized clinical information systems.



Key benefits

- Single point of access anytime and virtually anywhere to support informed decision-making by providing a comprehensive multi-modality overview of a patient
- Improve information exchange across your clinical ecosystem, by providing quick and easy access to images and information
- Access a variety of systems and applications from a single location, and analyze data to streamline efficiency
- Azurion Integration automatically launches the same patient as on Azurion
- Azurion IntelliSpace Portal integration launched and controlled from the exam room or the control room



Improving hemodynamic workflow with continuous monitoring Philips Hemo System with IntelliVue X3

Stay focused on task at hand by visualization of calculations in the exam room

Control of Philips Hemo on Touch Screen Module

Improved communication between control room and exam room

New graphical interaction and user guidance through the procedure



Key benefits

- Improved communication in the lab by visualizing the analysis the exam room
- Enhanced workflow through integrated valve gradient assessment
- Developed to be confidently used by all staff members with minimal training

IntelliSpace Portal Cardiovascular applications for CHD

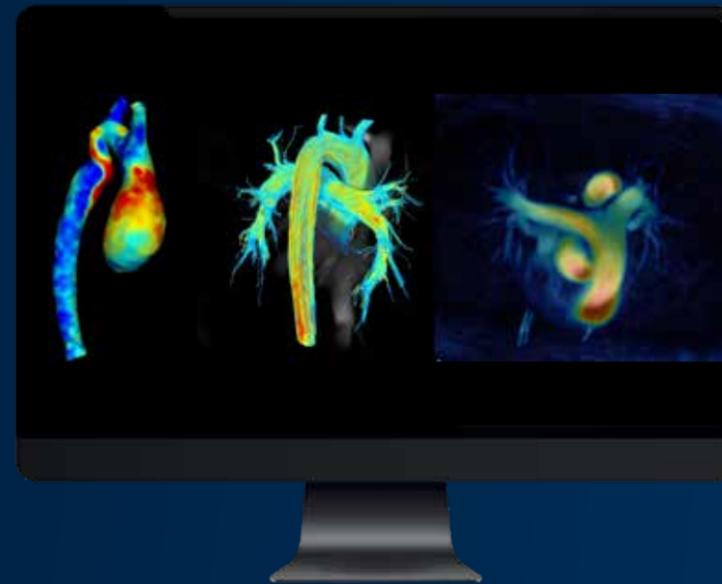
“Using virtual or printed 3D images, even an untrained eye can perceive anatomy more readily. For a parent, to see their child hold a model of their heart in their hand, it is truly amazing”

Dianna Bardo, MD., Phoenix Children's Hospital



Comprehensive Multimodality Advanced Vessel Analysis

- Automatic bone removal, **vessels extraction and labeling**
- Automatic **lumen and centerline** calculation
- New robust vessel editing tools for convenient **one-click corrections**
- **Findings management** for capturing and communication in a **structured manner**
- **Template-based measurements** tailored to various pathologies and **stent planning**



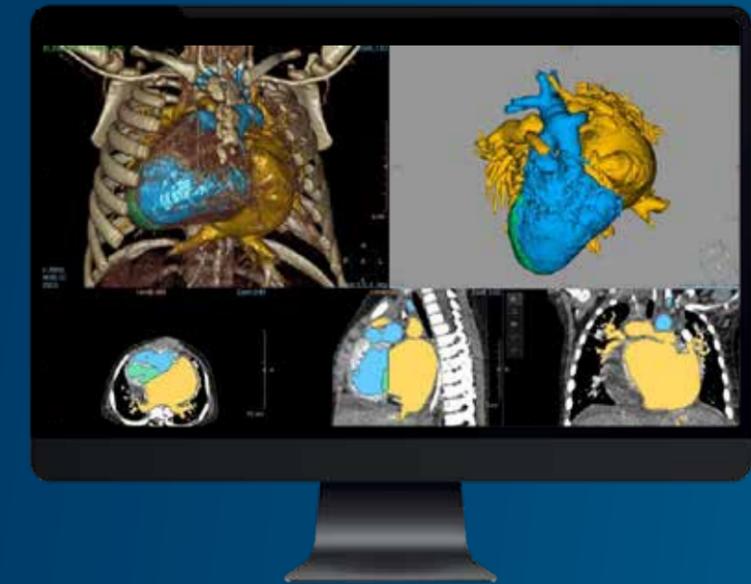
ISP MR Caas^{5,6} 4D flow

- Extensive and flexible measurements and visualisation
- Non-invasive, no radiation, and no contrast needed
- Potential clinical application:
 - Congenital heart disease
 - Aortic valve and Pulmonary valve stenosis
 - Aortic aneurysm and Aorta dissection
 - Pulmonary hypertension
 - Valvular regurgitation



ISP Photorealistic volume rendering⁷

- Boost your educational and communication tools
- Assists in understating of depth and relation between key anatomy structures
- Interactive performance and visualization tools availability uncompromised
- Seamless integration within main general, cardiac viewers, and AVA
- Interact with virtual light source to enhance visualization depth
- > 20 visualization protocols optimized for different anatomies



3D Modeling⁷

- Segment multiple anatomies and component parts in a single workflow
- Enhanced mesh libraries for cleaner printable files
- Tools for optimized 3D editing and tissue management
- Export to even multiple STLs for print easily
- Save models as 3D PDF for communication and annotation



Benefits:

- Better anatomical understanding
- Clinical training
- Patient education

Interventional Ultrasound in Congenital Heart Disease

Philips Ultrasound provides a wide range of transducers, from fetal to adult congenital, with dedicated imaging capabilities, workflow simplification, and powered by Anatomical Intelligence for routine simplification.

Acquisitions in a single beat

The X8-2t brings true one-beat acquisitions and our highest volume rates in Live 3D and Live 3D color flow to transesophageal imaging, without compromise to image quality. Its handle is designed with a real-time configurable function button, allowing for additional functionality while imaging.

Flexible image alignment in real time with MultiVue

MultiVue allows one-click cropping of a Live 3D image during interventional procedures, and one-click alignment of the catheter within cardiac anatomy. Get better visualization of cardiac structures for procedure guidance in fewer steps, confidently visualize the region of interest for echo-guided interventional procedures, and obtain faster 3D measurements for device sizing.

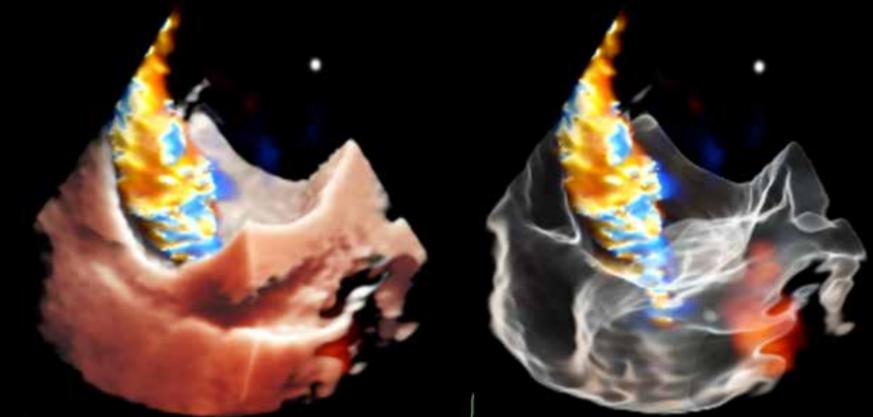
Better visualization of interventional devices

TrueVue photorealistic 3D rendering is designed for better visualization of interventional devices. The lighting of TrueVue can make it simpler to visualize the location of catheters and devices relative to anatomy during interventional procedures.

Aids collaboration in the suite

By illuminating tissue detail and creating depth perception like never before, TrueVue can help with the communication of complicated echo images among caregivers in the interventional suite, providing viewing context for the echo image to enhance procedural confidence.

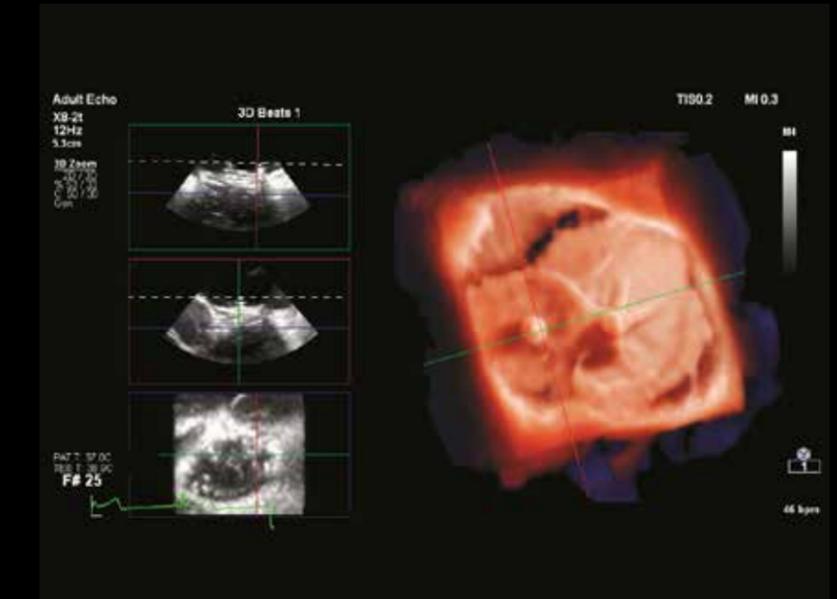
High performance imaging for any patient with S8-2t, S7-3t, and X8-2t TEE transducers



TrueVue Color and TrueVue Glass visualization

100%

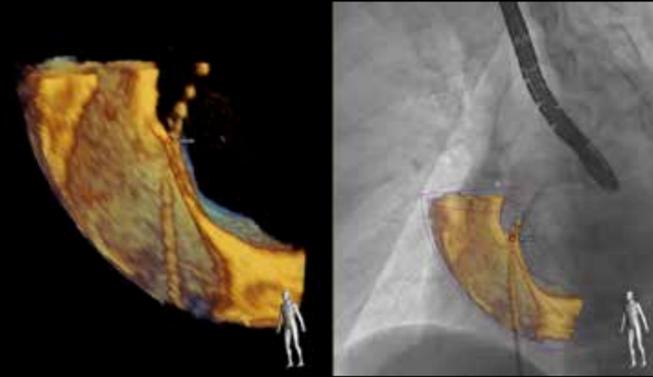
of clinicians who saw the EPIQ CVx believed that using the EPIQ MultiVue alignment tool would simplify echo guidance for complex procedures.⁸



Cardiac TrueVue photorealistic rendering with MultiVue image alignment

Key benefits

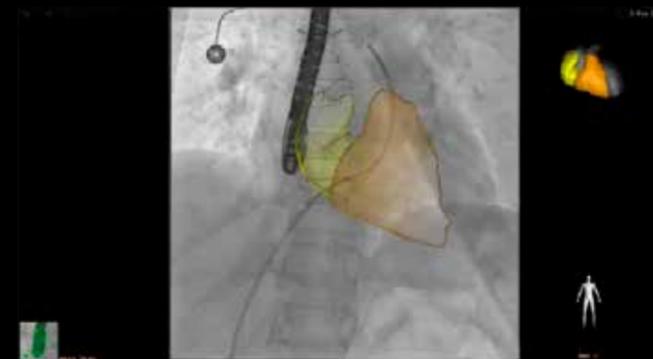
- Automatic continuous alignment of ultrasound with C-arm orientations simplifies image interpretation and facilitates communication
- Control of fusion image from ultrasound system or tableside provides workflow flexibility
- EchoNavigator helps to enhance confidence in device manipulation and in understanding anatomical structures. It also aids to improve efficiency through the automation of imaging views and fusion.



Guide fine positioning by visualizing soft tissue and devices together, in real-time.



Visualize flow on fluoroscopy to target pathologies or assess interventional results



Navigate safely and optimize views based on ultrasound-derived heart models

EchoNavigator

Unparalleled visualization of anatomy and devices.
Together.

EchoNavigator

EchoNavigator reorients and combines ultrasound and X-ray information into a single augmented visualization for guidance and device-tissue relationship assessment.

EchoNavigator enables

- Importing ultrasound targets or critical structures as fluoroscopic annotations
- Live-on-live fusion of both modalities including 2D, 3D, and color flow
- ECG-gated dynamic segmentation of cardiac structures for view optimization and orientation
- Flexible workspots at both tableside and on the EPIQ CVxi console

EPIQ CVxi

The EPIQ CVxi interventional ultrasound provides easy, single-cable connection enabling full lab integration and EchoNavigator R3 control. Interventional tools such as flexible MultiVue including 1-click catheter alignment, AutoVue for 1-click access to anatomical Live 3D zoom views, and TrueVue for high resolution photo-realistic rendering of 3D, enhancing the efficiency in getting interventional views and the confidence in anatomical insights⁸



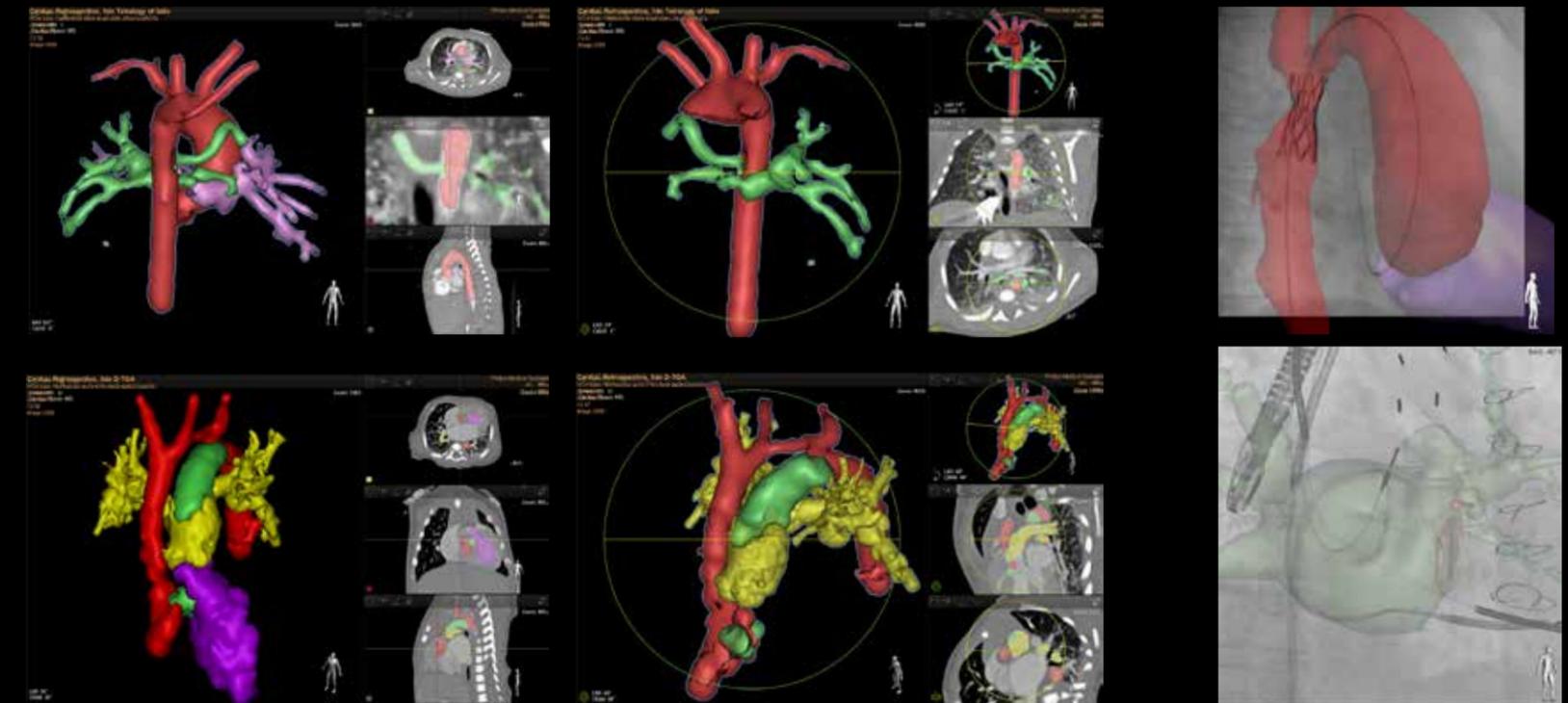
Multimodality planning and fusion of live X-ray with CT/MRI

Philips multimodality fusion tools allow planning and tableside recall of interventional views and selective overlay of anatomy, annotations, and critical structures for guidance

VesselNavigator allows vascular segmentation from CTA or MRA and adds the ability to overlay landing zones and bifurcations using centerline ring markers onto live fluoroscopy to support catheter navigation and device positioning.



HeartNavigator is a planning and live guidance solution offering automatic segmentation of normal anatomy together with powerful editing tools for complex pathological anatomy analysis. HeartNavigator adds automatic shortcuts to valve and septal planes MPRs and intuitive measurements tools to facilitate planning, as well as flexible rendering modes for overlay of planned structures.



SmartCT

Simplify rotational angiography acquisition, easily control analysis and visualization at tableside, and increase clinical confidence with 3D imaging

Guided 3D Acquisition



Facilitate your rotational angiography workflow with step-by-step guidance including:

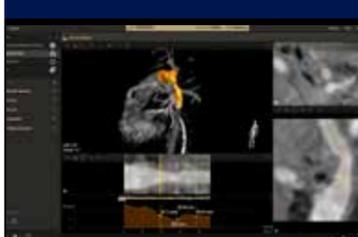
- Room layout
- Customizable acquisition and injection protocols
- Isocentering and setup guidance
- Acquisition timing feedback

Easy table side control



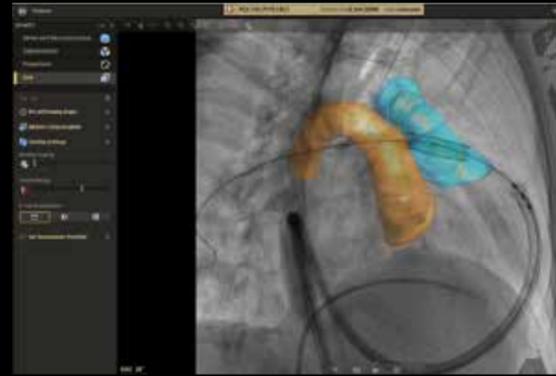
Intuitive control on the touch screen to avoid breaking sterility and facilitate workflow.

Advanced CT like 3D tools



Semi-automatic vessel analysis:

- Specify start and end of each segment
- Straight and curved reformat
- Diameter measurements along vessel centerlines
- Landing zone marking



When working with multiple lesions, you can use the touch screen overlay control to hide/show different vessels (annotations), landing zones and markers.



When working with shortening stents, you can use vessel endpoints to mark and visualize the length of the undeployed stent, and the ring markers to define the landing zone of the deployed stent

The Philips image-guided therapy clinical application software SmartCT, part of the Azurion image guided therapy platform, enriches our exceptional 3D interventional tools with clear guidance that is designed to remove the barriers to acquiring 3D images in the interventional lab

It allows any clinical user to perform 3D imaging with SmartCT, regardless of their level of experience with 3D imaging.¹⁰ Via the touch screen at the table, you can access clinically tailored 3D acquisition protocols and advanced visualization and measurement tools that depict the type and extent of disease with great detail.



Provide superb care

Increases clinical confidence with advanced 3D imaging, visualization and measurement tools.



Optimize lab performance

Easily control advanced 3D acquisition, visualization and measurements at table side to improve lab flexibility and efficiency.



Outstanding user experience

Acquire 3D images and interact with all SmartCT 3D features in a more natural and effortless way.

100%

think SmartCT technology brings valuable insights to support them in providing high quality care⁹

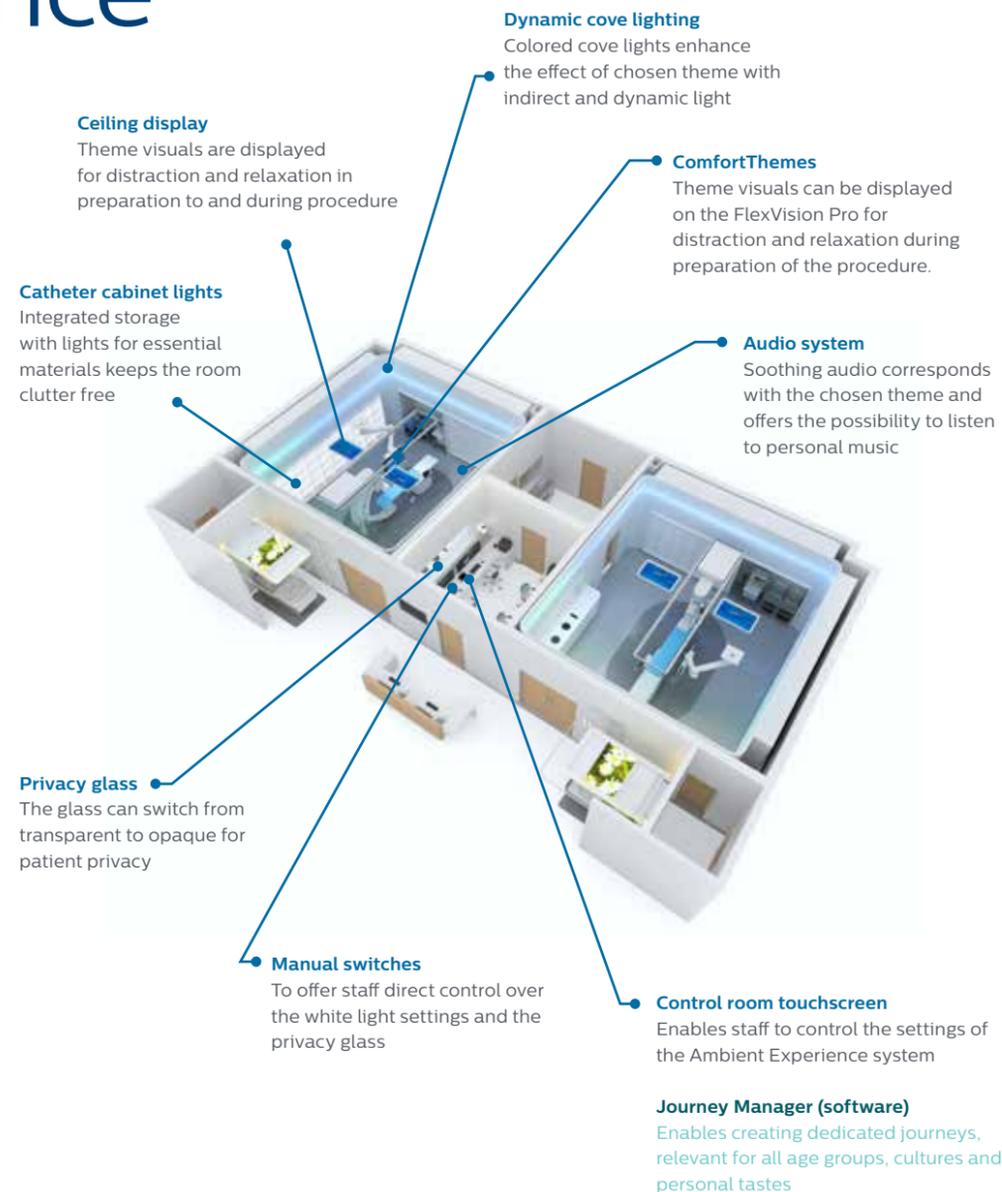
82%

think that the ease of using SmartCT will increase their utilization of 3D imaging in interventional procedures⁹

Ambient Experience

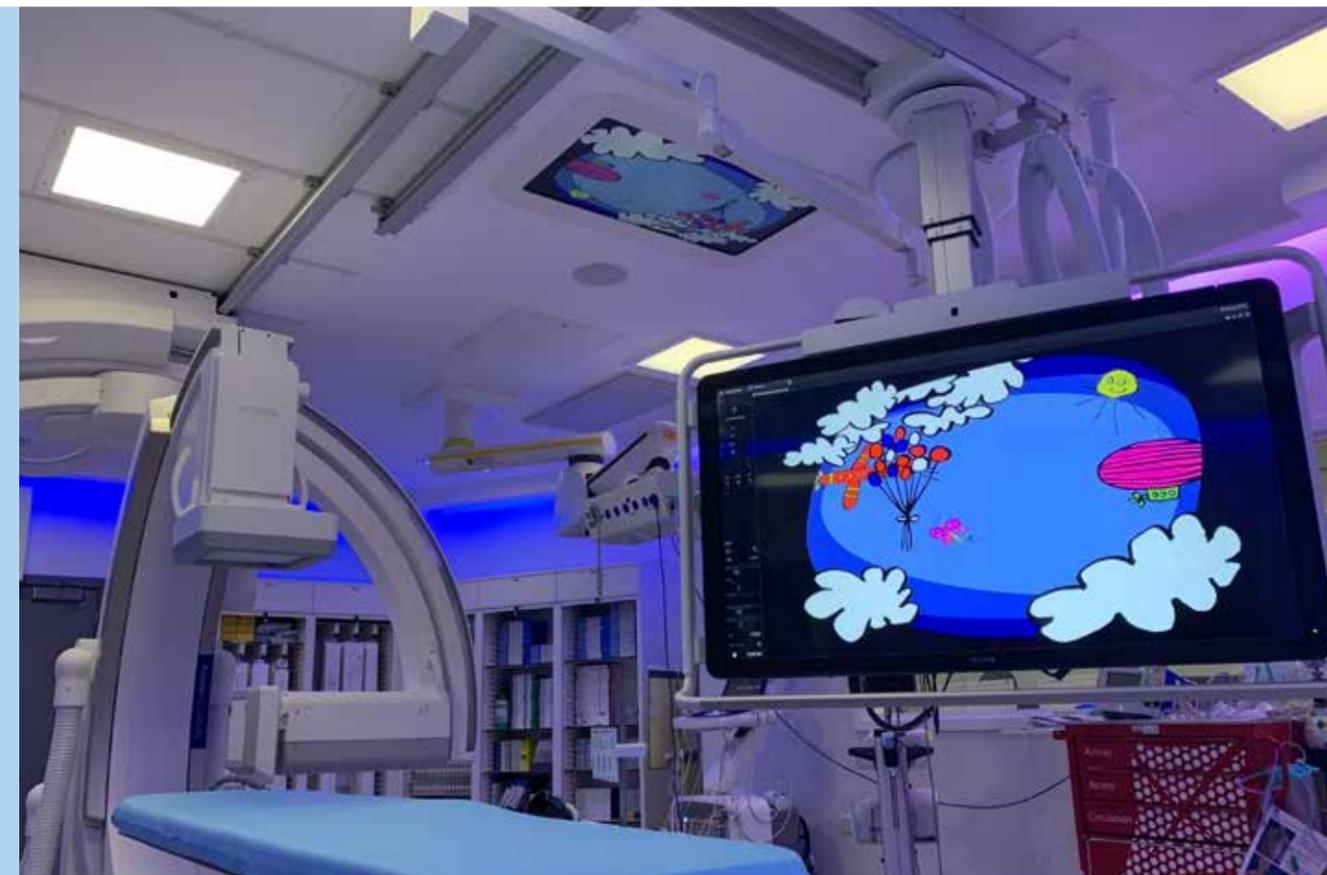
Young CHD patients and their parents often experience anxiety leading to a procedure, peaking when entering the unfamiliar cathlab environment.

Ambient Experience creates an engaging, multi-sensorial environment that helps distract and relax patients. They can influence their own experience by selecting themes in dynamic lighting, music and video. Ambient Experience also improves staff satisfaction, as well as the reputation and perception of hospitals through the testimonials of satisfied patients.



Key benefits

- Improved patient experience (reduces stress)
- Increased staff experience (working comfort for staff)
- Improved patient and staff satisfaction
- May attract and retain clinical staff
- Differentiates the hospital



“Although patients will go under GA and are awake for only 10-15 min, we utilize the system with every patient and see great benefit from distraction as compared to our traditional cath labs. The Ambient Experience solution helps tremendously in specific situations where otherwise it would sometimes take 45 minutes to calm patients down for GA. Our team keeps the Ambient system active during intervention as they prefer working in this ambient environment as compared to other labs.”

Katrina Kimberly - Radiographer team lead NHS Leeds general Infirmary, Leeds, UK

Congenital Heart Disease

Portfolio overview

Lab performance and dose management



Azurion



Procedure cards, checklists, protocols



Flexible workspots



Zero Dose Positioning

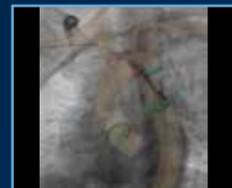


ClarityIQ

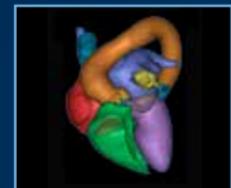
Dedicated CHD applications



EchoNavigator



VesselNavigator

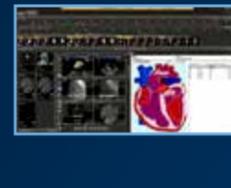


HeartNavigator



SmartCT

Integrated solutions



IntelliSpace Cardiovascular



IntelliSpace Portal



Philips Hemo with IntelliVue X3



EPIQ CVxi



Ambient Experience



DoseAware and DoseWise Portal

Increase value throughout your CHD Suite lifecycle

Stay clinically and operationally relevant with Technology Maximizer

To keep your Image image-guided therapy suite state-of-the-art with regards to cyber security, clinical, and operational advancements, subscribe to IGT Technology Maximizer - Plus, Pro or Premium offer – for a standard duration of 4 years at point of sale.

Technology Maximizer secures all your eligible Philips imaging equipment with the same technology release level reducing maintenance complexity and simplifying lifecycle management across hospital departments. Maintain peace of mind with imaging equipment that is always up to date, and enhance patient care knowing you will always be first to take advantage of technology innovations.

Learn more about Technology Maximizer



| | Standard offer | Mid-level offer | Premium offer |
|--|--|--------------------------|---|
| | Technology Maximizer Plus | Technology Maximizer Pro | Technology Maximizer Premium Cardiac/Vascular |
| | Azurion system SW version upgrade | | ✓ ✓ ✓ |
| | State-of-the-art security | | ✓ ✓ ✓ |
| | Latest available Operation System | | ✓ ✓ ✓ |
| | Computer HW refresh to support software upgrade | | ✓ ✓ ✓ |
| | Application training for new or enhanced functionality (days) | 1 | 2 2 |
| | New version of existing iApps | | ✓ ✓ ✓ |
| | Future iApps in one clinical suite (Coronary, EP, SHD, Vascular, Neuro, Onco, Spine or Lung) | | ✓ ✓ |
| | Future iApps in one clinical domain (Cardiac or Vascular) | | ✓ |