

# Making the difference with Philips Live Image Guidance

in treating structural heart disease

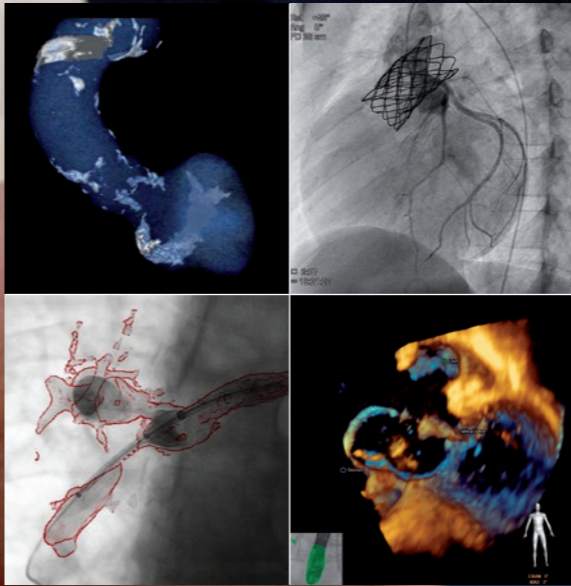
**PHILIPS**



# Making the difference with Philips Live Image Guidance

A paradigm shift is under way in the treatment of Structural heart disease. Effective, minimally invasive interventional procedures are proliferating. New devices are emerging, enabling a transition to less invasive care.

With Philips Live Image Guidance we aim to remove the barriers to these safer, effective and reproducible treatments, delivering relevant clinical value where it's needed most – at the point of patient treatment. Intuitive, procedure specific tools and integration of imaging modalities in the interventional or surgical suite enhance communication and workflow among the heart team and help to enhance real time navigation through soft tissue anatomy.



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# Structural heart disease a rapidly changing field

What that could once only be treated by open surgical procedure can now be treated percutaneously thanks to innovative transcatheter devices. The result – high-risk patients have new hope for successful treatment. There is a convergence between physicians, patients, and treatment options. Interventional cardiologist, cardiac surgeon, echocardiologist, and others are teaming up in heart teams to enhance patient care for structural heart disease. As partners, they can combine their skills and expertise to address the undertreated SHD patient population.

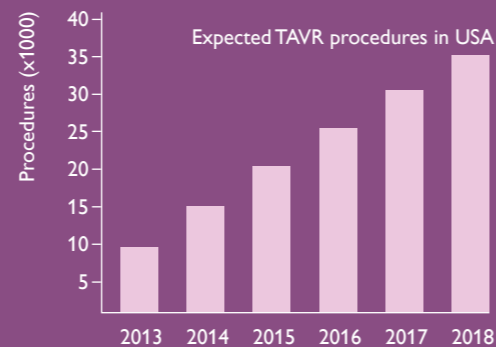
For the treatment environment hybrid operating rooms or suites are increasingly common. Designed to accommodate open, hybrid, minimally invasive, and endovascular procedures, they are tuned to the new paradigm. Philips Live Image Guidance solutions that support this team must help, not hinder. Every tool must be intuitive to use and must deliver relevant clinical data where it is needed most.

### Visualization is critical

A shift to less invasive therapies would not be possible without Live Image Guidance. New procedures require innovative use of technology. Philips imaging modalities are well integrated and can be fused together to offer an understanding of cardiac anatomy. A percutaneous left atrial appendage closure requires exceptional anatomical detail and good live visibility for the precise sizing and placement of the device. Similarly, implantation of a transcatheter aortic valve for TAVI needs careful planning based on CT imaging and live TEE echocardiography for sizing and verification of paravalvular leak. These structural heart procedures benefit from fusion imaging in addition to fluoroscopy, to guide the device to the site of the treatment.



Expected TAVR procedures in USA



Source: MRG - US Markets for Heart Valve Devices 2014

For each procedure, advances in multimodality Live Image Guidance, interventional tools, and imaging systems, are helping to confidentially manage your procedures. As an example, clipping of the mitral valve can now be accomplished percutaneously, thereby helping to avoid operative mortality in frail patients. This procedure relies heavily on live 3D TEE as well as fluoroscopic guidance. The fusion of both techniques with EchoNavigator simplifies the procedure.

However, none of this is possible without a rapid increase in treatment options and devices designed to assist.

In fact, between 2010 and 2020, procedures such as TAVI, LAA occlusion, and transcatheter mitral valve repair or replacement, are estimated to grow at a combined annual rate of 30%.

Philips is at the forefront of this growth trend. We make the difference where it really matters in the treatment of structural heart disease by providing innovative Philips Live Image Guidance to help clinicians remove the barriers to effective, reproducible therapy.

# Greater insight and confidence in finding and treating the problem

Work with clinical confidence by having access to superb quality images, unique live 3D imaging capabilities and innovative imaging solutions. This will support you in planning, visualization and Live Image Guidance of even the most challenging procedures.

## EchoNavigator

Increasing numbers of patients with structural heart disease (SHD) can be treated with catheter-based techniques. One of the main challenges is visualization; Live 3D transesophageal echocardiography (TEE) imaging provides critical insights into soft tissue anatomy, and function and flow information. At the same time, X-ray is invaluable for visualizing devices. Both images, however, are represented separately in a different orientation and so valuable time is spent mentally aligning them.

“We’re integrating two separate medical images and bringing them together in a way that makes performance of these interventions more straight-forward.”

Professor John Carroll, MD, Interventional Cardiologist, University of Colorado, Denver

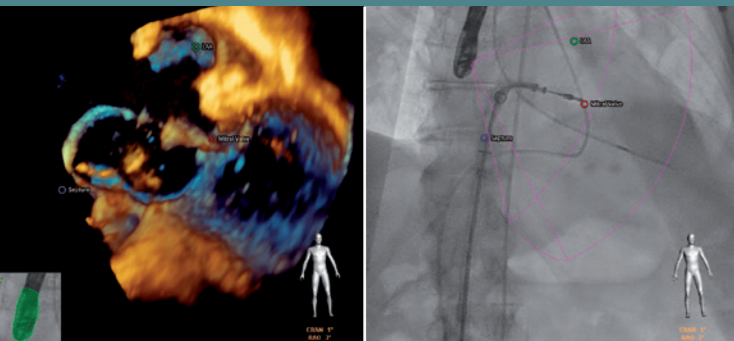
EchoNavigator tackles this issue head-on by intuitively bringing live 3D TEE and fluoroscopic images together, in real-time, for a quick understanding of the 3D space. Images from both modalities are automatically aligned by tracking the TEE transducer position and orientation in the X-ray image. As a result, relevant soft tissue anatomy can be visualized in the X-ray. Markers placed on the soft tissue structures within the echo image, automatically appear on the X-ray for context and guidance. This provides clear targets for catheter navigation. The interventional operator can directly control the EchoNavigator at tableside, which facilitates communication with the echo operator. All of this is designed to simplify navigation, device placement and promotes communication within the heart team during structural heart disease procedures.

## Training

Our Peer to Peer training programs offer an interactive program on site with experienced users. These training programs provide in depth details on how to use the technology in clinical practice, and provide you with the confidence to implement these advanced imaging functionalities in your daily routine and to take your expertise to the next level. We also provide excellent training of Live 3D TEE and EchoNavigator to help develop a rapid and thorough understanding of these breakthrough SHD treatments.

## Key benefits

- Intuitively combines live 3D TEE echocardiography and fluoroscopic images. Brings TEE echocardiography and fluoroscopic images together, in real-time.
- Understand where you are in the 3D space more quickly.
- Anatomical landmarks in Echo are overlaid on X-ray for guidance of devices.
- Directly controllable at tableside, which facilitates communication with the echo operator.
- Promotes teamwork within the heart team in the lab.

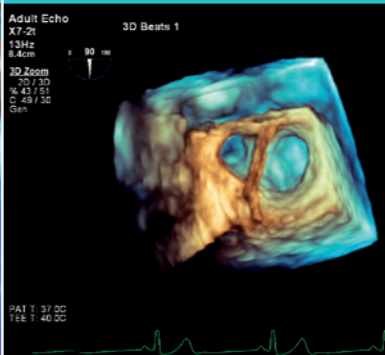


“The beauty of good imaging is that you don't have to imagine too much”

Professor J Zamorano, Head of Cardiology, University Hospital Ramon y Cajal, Madrid

Philips EPIQ 7 ultrasound system

Live 3D TEE of appendage



3D zoomed appendage and pulmonary vein.

- Live 3D transesophageal echocardiography allows the viewing of mitral valves, aortic valves, inter atrial septum, the left atrial appendage and all chambers of the heart with unique perspectives.
- Philips Live 3D TEE provides real-time 3D and live xPlane views. These tools provide many beating-heart views that were previously seen only during cardiac surgery.
- Live 3D TEE features prominently in recent professional society recommendations regarding echocardiography in trans-catheter interventions. (EAE/ASE\* Recommendations for the Use of Echocardiography in New Transcatheter Interventions for Valvular Heart Disease.)

\* Journal of the American Society of Echocardiography Volume 24, Issue 9, September 2011, Pages 937–965 EAE/ASE Recommendations for the Use of Echocardiography in New Transcatheter Interventions for Valvular Heart Disease • Jose L. Zamorano et al.

## EPIQ 7, a new era in premium cardiovascular ultrasound

It's our most powerful architecture ever applied to ultrasound imaging –touching all aspects of acoustic acquisition and processing, allowing you to truly experience ultrasound's evolution to a more definitive modality. Supported by our family of proprietary xMATRIX transducers and our leading edge Anatomical Intelligence, this platform offers our highest level of premium performance. Philips pioneered advanced technologies such as xMATRIX and PureWave. The revolutionary nSIGHT architecture of EPIQ 7 makes xMATRIX and PureWave even more powerful. xMATRIX is leading-edge, versatile ultrasound transducer technology. No other premium ultrasound system can run the complete suite of the world's most innovative ultrasound transducers. With the touch of a button xMATRIX offers all modes in a single transducer:

2D, M-Mode, color Doppler, Doppler, iRotate, Live xPlane, Live 3D, Live 3D Zoom, Live 3D Full Volume. nSIGHT Imaging makes powerful xMATRIX technology even more so. Use Live xPlane imaging to create two full-resolution planes simultaneously, allowing you to capture twice as much clinical information in the same amount of time.



EPIQ 7: Designed to reinvent the user experience

# EchoNavigator Case Study: Mitral Valve Regurgitation

Catheter based mitral repair for symptomatic mitral regurgitation requires advanced interventional skill and is highly dependent on guidance by echocardiography in conjunction with fluoroscopy. Live 3D transesophageal echo (TEE) imaging provides critical insights into soft tissue anatomy, while X-ray finds its strength in visualizing the catheters and clip.

Dr. Corti, Dr. Biagi, and Dr. Grünenfelder at the Herzklinik Hirsland, Zürich, Switzerland had the opportunity to demonstrate the benefits of EchoNavigator in a mitral clip procedure.

### Patient

An 81-year old female presented with dilated cardiomyopathy with normal blood and pulmonary pressures and in sinus rhythm. The patient was classified NYHA III and had an ejection fraction of 30% with progradient dyspnoea over the past few months. Angiography showed no coronary stenosis.

### Echo Findings

2D Echo done before the procedure showed severe left ventricular and left atrial dilatation in four-chamber view. A two-chamber view showed a low ejection fraction of 25-30%. 2D echo also showed moderate to severe mitral regurgitation and that the mechanism of the regurgitation was tethering of both leaflets due to the dilated LV.

“I can mark the locations of interatrial septal puncture and the optimal location for clip placement on the screen, and these markers are then automatically updated on the fused echo-angio images. With the use of EchoNavigator, catheter steering and targeted clip placement becomes much easier.”

Dr. med. Patric Biaggi, Echocardiologist, Herzklinik Hirslanden, Zürich,

3D Echo confirmed the severity of mitral regurgitation. The location for clipping was identified as the medial part of A2P2 segment. Coaptation length of 4 mm was confirmed to be good for clip placement.

### Method and equipment used

- X-ray system: Philips Allura Xper FD20 with FlexMove
- Echo system: Philips iE33 xMatrix with live 3D TEE
- EchoNavigator

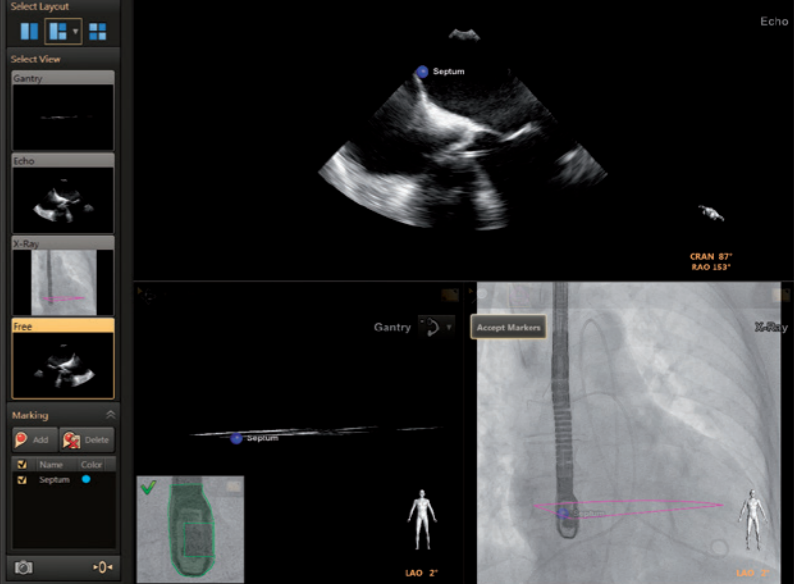
### Transeptal puncture

A transeptal sheath was introduced and guided towards the superior vena cava. Two angulated views were taken and registration was done with EchoNavigator as indicated by the probe in the left bottom corner turning “green”. The X-ray C-arm was moved to LAO view for visualization with the echo image following the C-arm orientation in real-time, automatically.

A mark was placed using EchoNavigator to indicate the septum in 2D (top image right page) followed by visualization in 3D. The puncture site selected for this case was 3-4 cm above the mitral annulus and in a posterior position in order to steer the delivery system to the mitral valve. Puncture and advance of the needle was done by standard technique.

“The development of a more sophisticated imaging technology such as EchoNavigator will definitely help to provide us with a better understanding of the complex structures of the heart and their repair.”

Prof. Dr. Roberto Corti, Herzklinik Hirslanden, Zürich



Marking the septum in 2D x-plane (blue marker). The marker becomes visible in X-ray and remains in the correct location even if Echo probe or the X-ray system is moved to another location.

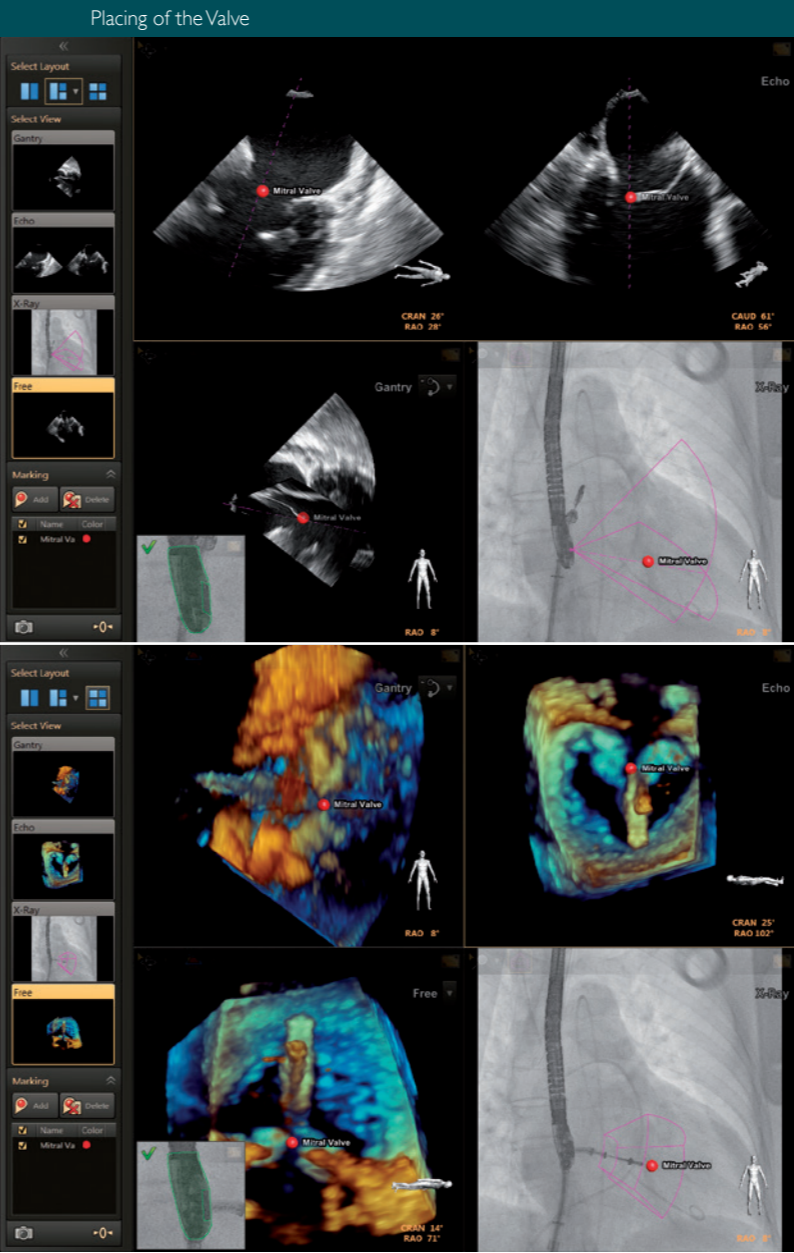
### Placement of Clip

The Steerable Guide Catheter and Clip Delivery System (CDS) of the Mitraclip® device were positioned in the left atrium for clip deployment using echocardiographic and fluoroscopic guidance.

Once the guide was in place the mitral valve was re-visualized using 3D echo. A mark was placed on the mitral valve using the EchoNavigator, and using both X-ray and echo (middle image), the clip was steered towards the mark (bottom image). The clip arms were opened and the clip was positioned, deployed in the standard way.

### Final results

The delivery system and catheter were removed and groin access was closed with a cutaneous purse string. Postoperative echo confirmed that the clip had been effectively placed to reduce the mitral regurgitation. Patient follow-up was similar to conventional repair.



Placing a marker (red dot) on the mitral valve in 2D x-plane. Marker is shown in overlay on X-ray helping in catheter guidance to target position. Visualization of the marker (red dot) in 3D echo multiple 3D views enabled visualization of depth of the marker and helped move the clip towards the valve.



### Segmentation and measurement

Once the pre-operative CTA is loaded, and the 3D volume rendered, the software automatically segments the left ventricle, the aortic valve, and the aorta, including the coronary ostia. Measurements can be performed, for example, to calculate the distance between the ostium of the LCA and the valve plane. This is to provide the replacement valve does not occlude one of the coronary arteries.

In the 3D CT volume rendering of the aortic root, calcifications are automatically highlighted. Assessment of valvular calcification is important to help allow device sizing/anchorage and avoid dislodgement. It also helps determine the severity and location of aortic ring calcification to avoid possible rupture of the aortic annulus or assess calcification on the leaflets which may block the coronaries.

### Device selection and view planning

It is critical in a TAVI procedure to select a device with the proper dimensions. Therefore, HeartNavigator allows the clinician to visualize the 'virtual' device by choosing from a set of templates, modeled in cooperation with leading device manufacturers.

HeartNavigator automatically calculates views in line with the valve plane. The excellent X-ray view is determined, showing the origin of the left coronary artery. This view is stored for use during the procedure.

### Live guidance during the procedure

Following transapical or transfemoral access, the C-arm is automatically positioned based on the previously stored LAO/Cranial view. Planning beforehand precludes the need for acquisition of multiple procedural angiograms.

The live fluoroscopy image is overlaid with the 3D CT volume rendering of the ascending aorta to show the exact position of all catheters and the valve device. It demonstrates the relationship between the device as seen on X-ray and the anatomy as seen on CT.

This provides real-time feedback for navigation through the vasculature. The 3D CT volume rendering automatically follows the orientation of the C-arm during the course of the procedure and the C-arm can be moved automatically to the planned views.

Movements of the table or L-arm are compensated, meaning that the 3D image will stay matched with live fluoro during movement. Placement of the device can be evaluated while the patient is still on the table.

### An effective tool

For a surgeon or interventional cardiologist, HeartNavigator assists and simplifies structural heart disease procedures. It helps shorten procedure length and increase diagnostic confidence.

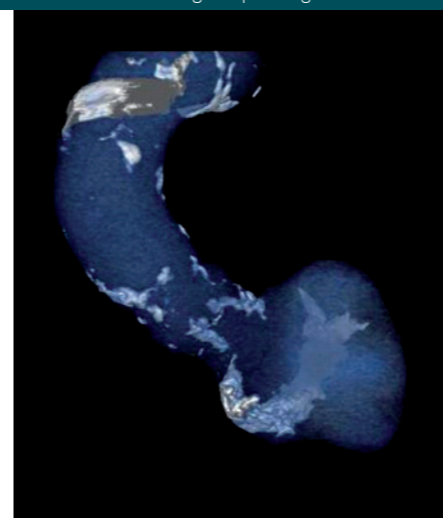
## HeartNavigator assists with TAVI planning

TAVI procedures benefit from careful planning using CTA data. Typical anatomical distances and diameters can be measured easily on (pre procedure) CT data to help in device selection and sizing. Moreover, the interventional view angle can be prepared, using 3D CT data. Next to this, calcification is well visible on CT data and assessment of calcification is very important in preparing a TAVI procedure.

### A simple tool

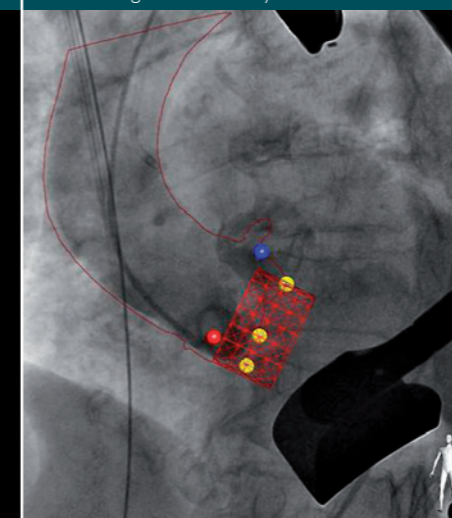
HeartNavigator interventional planning tool helps simplify planning, device selection, and projection angle selection in preparation for a TAVI procedure. It creates an excellent 3D image from the previously acquired CTA datasets and overlays this volume rendered data with live fluoro. This allows for correct sizing of the annulus measurements of the ascending aorta and enhance positioning of the valvular device.

HeartNavigator planning



Calcification visualisation, showing calcification of the aorta and valves.

HeartNavigator live overlay



Outline of the 3D CT volume overlaid over live fluoroscopy, showing the landmarks of the 3 valve cups and left and right coronary ostium and an overlay of the virtual device, to check the correct placement and size on beforehand.

“Planning a TAVI procedure with the HeartNavigator is almost entirely objective, rather than the conventional subjective judgment we used in the past.”

Dr. H. Schröfel, Senior Cardiac Surgeon,  
Klinik für Herzchirurgie Karlsruhe  
(Karlsruhe Heart Surgery Clinic), Karlsruhe, Germany



# Multimodality 3D for quick visualization and guidance in congenital disease

Enhanced 3D visualization and navigation techniques help determine the course of treatment with greater precision. This is critical for instance in pediatrics, as the variety in patient anatomy and congenital heart defects can be significant. The ability to capture and reuse 3D data during a procedure is important, as it helps to manage dose.

Three innovative interventional tools in the Allura family of X-ray systems can help. They may be used alone, or in a combined multimodality solution. In the skilled hands of an interventionalist, these tools may potentially:

- Enhance diagnostic confidence of the intervention
- Manage overall radiation exposure
- Requires substantiation.

## Three-dimensional rotational angiography (3D-RA)

3DRA provides fast, high-resolution 3D images of the cardiac anatomy from any angulation and rotation. It helps visualize complex vascular anomalies to facilitate decision making for treatment strategies. Rather than multiple 2D views, which require multiple contrast injections, a 3DRA provides a complete 3D overview of the anatomy with a single injection. The 3D image can be inspected in any view, even those that cannot be reached with regular 2D projections.

3D-RA is particularly useful in congenital cardiology applications, for example:

- **Diagnosis of the branch pulmonary artery** – 3D-RA facilitates a detailed visualization of the pulmonary vasculature and the anastomosis that may reveal a narrowing not seen in 2D
- **Planning of Melody valve implantation** – 3DRA provides visualization of potential compression of coronary arteries and the location/distance between the Melody valve and the coronary arteries
- **Treatment decision of aortic coarctation** – 3DRA provides insight into the complex spatial relationship between the aortic arc and its branching vessels, assisting in the decision between surgical repair or intervention

## 3D Roadmap

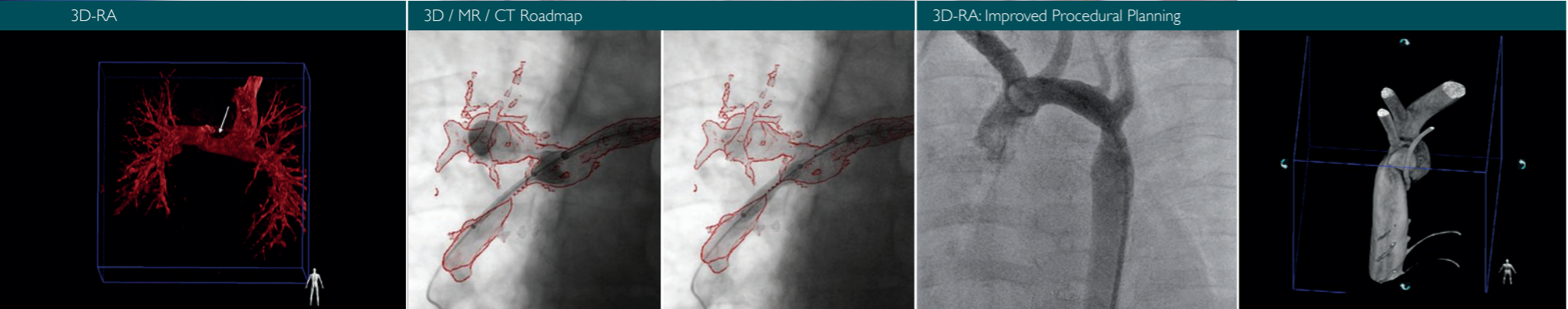
This tool facilitates complex interventions by providing live 3D image guidance for navigating vascular structures anywhere in the body.

Dynamic 3D Roadmap overlays real-time 2D fluoroscopy images and a 3D reconstruction of the vessel tree acquired with the 3D-RA feature of the AlluraClarity family of X-ray systems. It enhances visualization of anatomical structures and device navigation.

## MR/CT Roadmap

Imaging from a previously acquired MR or CT scan can be reused and overlaid by fluoroscopy to guide procedures. MR/CT Roadmap lets clinicians follow the advance of guide wires and catheters real-time, thereby managing X-ray dose during interventions.

Both 3D Roadmap and MR/CT Roadmap automatically adjusts the 3D images to gantry changes and any lateral or longitudinal table movements. For superb visualization, it offers enlarged full-screen mode and 4x digital zoom.



3D-RA of the aortic root for TAVI procedure.

Live overlay on 3D/MR/CT Roadmap improves visualization of anatomical structures and device navigation by re-using preoperative CT or MR angiographic images.

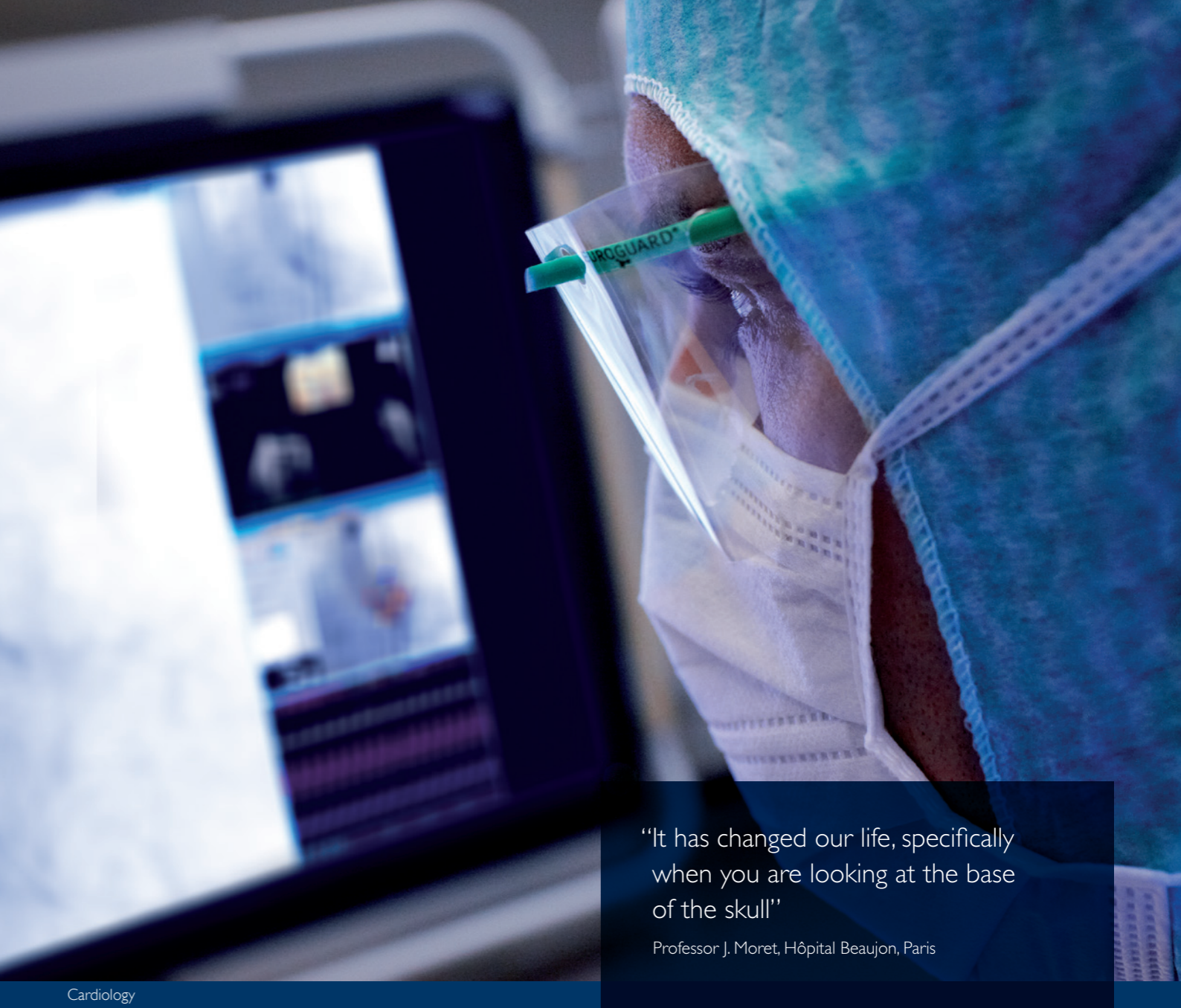
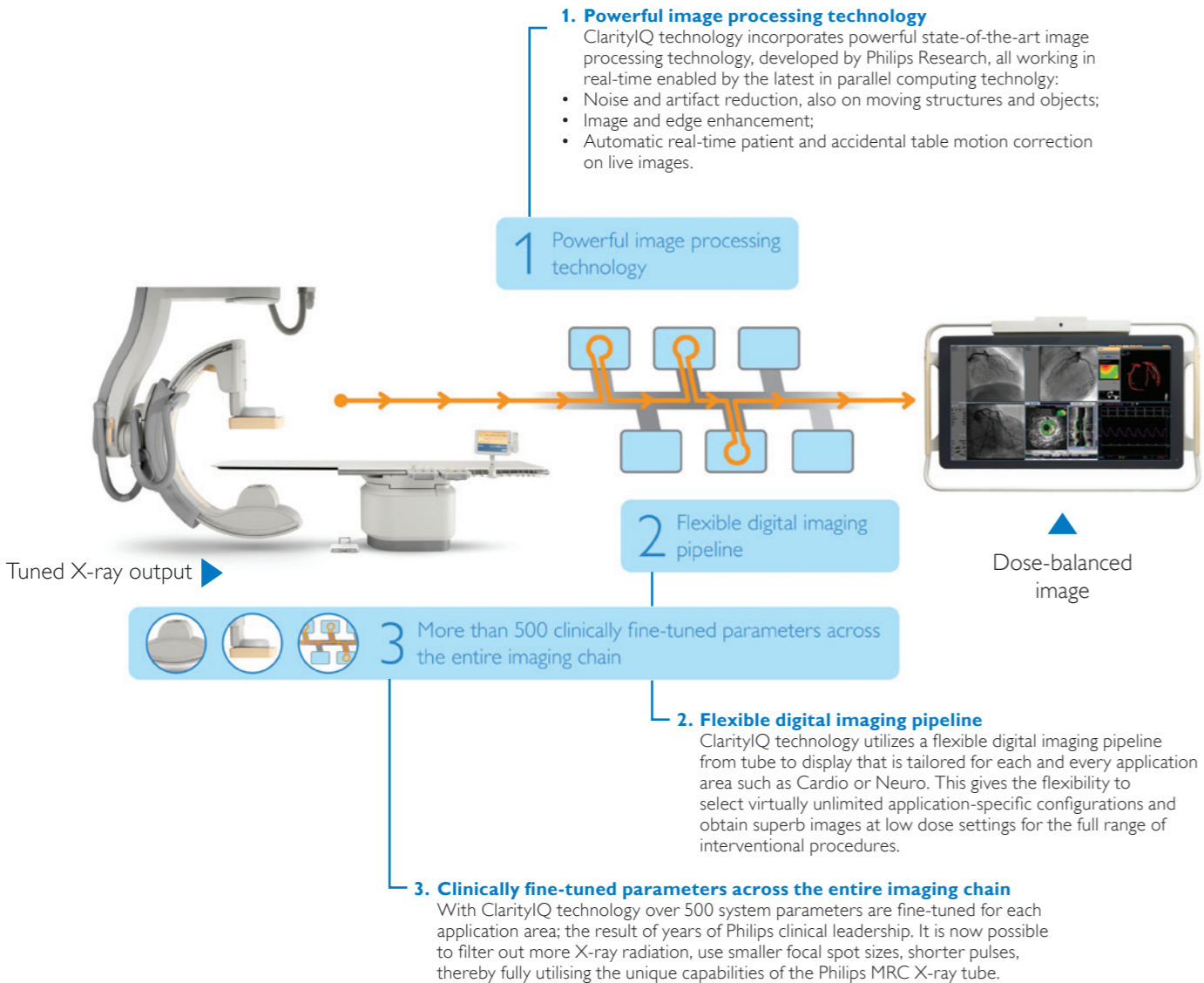
Rotational scan gives input for 3D reconstruction.

3D visualization in a single rotation for assessment of complex anatomical structures, allowing you to plan the optimal therapeutic approach.

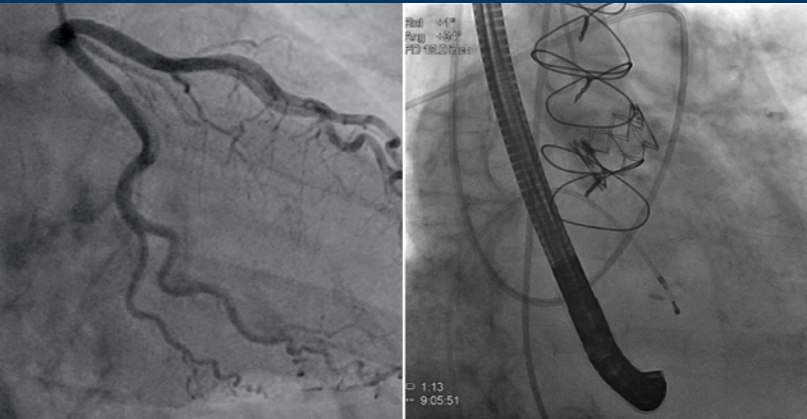
# Lower barriers for minimally invasive interventions

**AlluraClarity with ClarityIQ technology**  
 ClarityIQ is our breakthrough technology which maintains image quality while managing dose. Leveraging our imaging expertise and excellent technology, we collaborated with top interventional physicians in the development of ClarityIQ technology. Together, we redesigned the entire digital imaging pipeline.

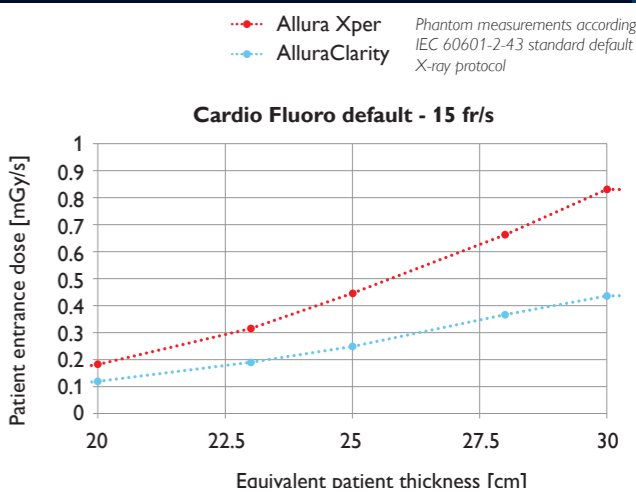
The result is high quality imaging for a full range of clinical procedures at low dose levels.



“It has changed our life, specifically when you are looking at the base of the skull”  
 Professor J. Moret, Hôpital Beaujon, Paris



51 year old female (BMI 28) with angina pectoris      61 year old male (BMI 31) with diabetes and hypertension 2nd attempts CTO in RCA.



# AlluraClarity in the treatment of Congenital Heart Disease

“Especially for pediatric patients it’s extremely important to manage radiation dosage, conserving at the same time the required imaging quality, which is necessary to perform successful interventional procedures in this specific patient population.”

Prof. Dr. Oliver Kretschmar, University Children’s Hospital, Zürich, Switzerland

Perhaps nowhere are the low dose benefits of AlluraClarity more applicable than in pediatrics. Young patients often need to undergo repeated complex interventional procedures with an accumulation of dosage. Therefore, it is extremely important to work with a low dose.

Two cases from the University Children’s Hospital in Zürich, Switzerland demonstrate the AlluraClarity advantage.

### Managed dose balloon angioplasty

In the case of an 11-month-old female, suffering from univentricular heart syndrome, interventional balloon-dilation of a residual aortic coarctation after Norwood stage II procedure was indicated. Retrograde balloon angioplasty of the coarctation was performed and the gradient eliminated.

As this child may require further intervention in the future, managing radiation is of critical importance. The total cumulative dose area product (DAP) achieved in this clinical situation was only 1074 mGy.cm² with a frame rate of 15 fps. The whole procedure lasted just 60 minutes.

### Low dose valve replacement

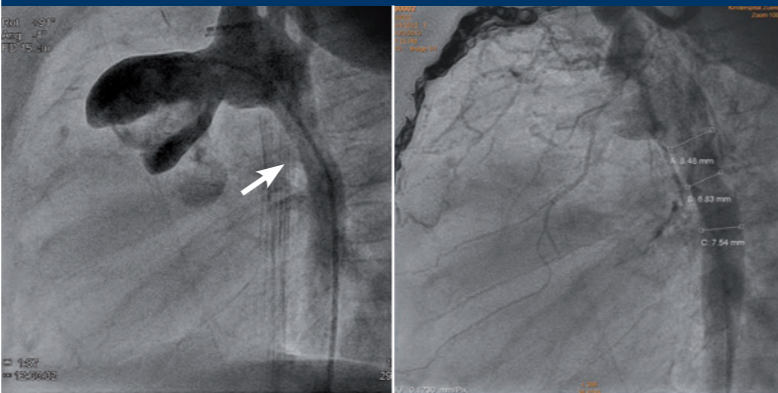
In a second case, a 10-year-old boy was suffering from severe pulmonary graft stenosis and moderate insufficiency. During the procedure time of 85 minutes a Melody™ valve was placed into this failing graft while exposing the patient to only 8311 mGy.cm² with 15 fps. This intervention replaced a surgical valve replacement to hopefully provide the patient with enough capacity to stay out of the OR for the rest of his childhood.

### Conclusion and final results

The AlluraClarity with ClarityIQ technology provides high quality imaging for a full range of clinical procedures. This provides the flexibility to use the system in a personalized way for each procedure and patient.



Case 1: Coarctation of aorta

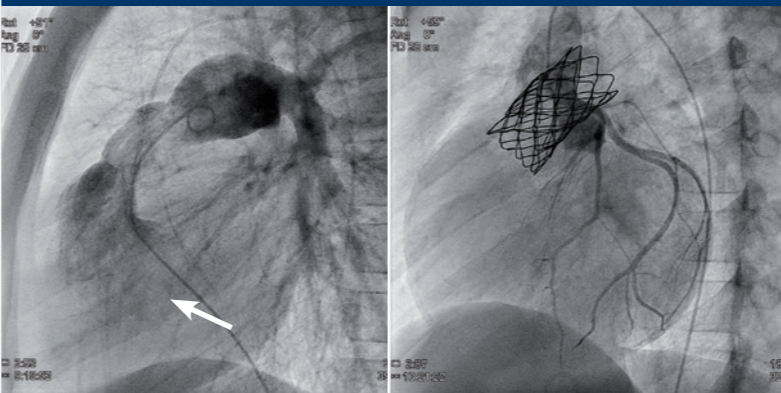


LAO 91 Cranial 1, 15 fps  
Field of view: 15 cm  
Angiography image demonstrating the coarctation in the aorta (arrow).

LAO 91 Cranial 1, 15 fps  
Field of view: 15 cm  
Result after dilation of the coarctation. The result was satisfying with an aortic diameter at the level of the coarctation of almost 7 mm and insignificant residual systolic pressure gradient (2 mmHg).

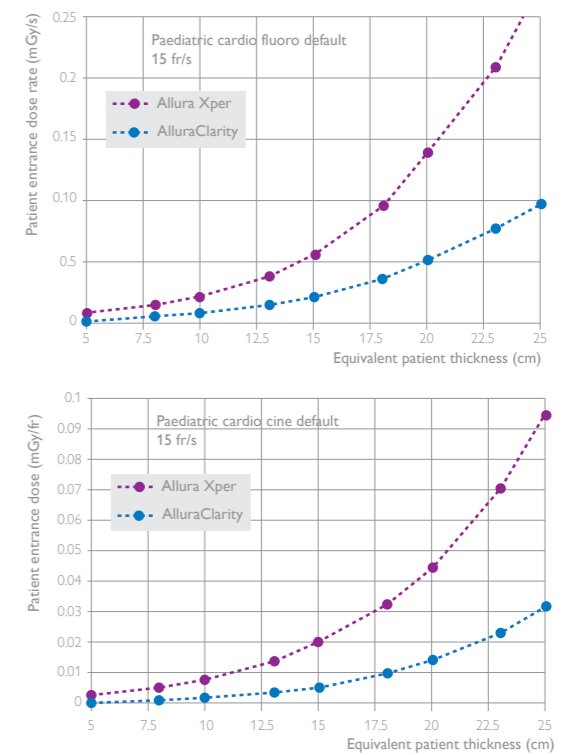


Case 2: Melody™ valve implantation




LAO 91 Cranial 0, 15 fps  
Field of view: 25 cm  
Angiogram demonstrating the stenosis within the pulmonary valve (arrows). Measurements revealed a minimal diameter of 12-13mm measured in the mid 1/3 of the graft, and a distal diameter of 18-20mm just before the pulmonary bifurcation.

LAO 91 Cranial 0, 15 fps  
Field of view: 25 cm  
A final exposure run was made to exclude any compression of the left coronary artery using a selective injection. The images demonstrate patent left coronary artery.



Dose report	Case 1	Case 2
Fluoro time [mm:ss]	14:41	12:46
Acquired exposure runs [N]	18	10
Exposure images [N]	3150	1034
Cumulative Frontal Air Kerma [mGy]	36	13
Cumulative Lateral Air Kerma [mGy]	36	8
Cumulative DAP (fluoro) [mGycm²]	2924	780
Cumulative DAP (exposure) [mGycm²]	5387	294
Total Cumulative DAP [mGycm²]	8311	1074



“DoseAware is one of the most important tools available to help manage occupational medical radiation exposure to physicians and staff. It’s a much easier and practical way to monitor levels than conventional methods. Creating a better work environment is not only the right thing to do but our obligation.”

J. Kiah, MS, RN Lab Manager, Director Cardiac and Vascular Services, Baptist Cardiac & Vascular Institute, Miami, USA

## Pushing the Boundaries of ALARA

Our AlluraClarity family with ClarityIQ technology is the latest breakthrough in our commitment to manage radiation exposure for patients and clinical staff. It sets a new standard by pushing the boundaries of ALARA (As Low As Reasonably Achievable). ClarityIQ maintains equivalent image quality at low dose. This may help remove dose as a barrier to new procedures and techniques.

### Philips DoseAware\* family

Philips DoseAware family offers immediate feedback on dose to increase radiation awareness and help manage occupational medical radiation exposure to physicians and staff. It provides real-time dose feedback in the examination room to track an individual’s radiation exposure during each shift, as well as procedure-based data for deeper insight into staff exposure trends and behavior.

### DoseAware Xtend – dedicated room solution

DoseAware Xtend is a dedicated solution for rooms with Philips FlexVision XL display. Its integration with the Allura Xper FD X-ray imaging system allows it to provide detailed feedback on scattered X-ray dose levels per procedure.

### Increases radiation awareness

- Identifies the cumulative amount of X-ray dose received right after each procedure
- Reminds clinicians to take secondary lead precautions

- Sends weekly or monthly reports automatically on procedure-based staff dose to help identify individual exposure trends
- Sends procedural data on X-ray dose in DICOM RDSR format to PACS or RIS to simplify data analysis.

### DoseAware – flexible solution for different rooms

DoseAware can be used in any X-ray room to provide real-time feedback on scattered X-ray exposure so staff can immediately adjust their working habits to manage radiation exposure.

### Advantages of a real-time dosimeter

- Provide the information necessary to manage individual X-ray dose exposure
- Show when and where X-ray dose was acquired to allow for appropriate action
- Check exposure level on the colored display in the examination room
- Archive, report, and analyze radiation data to manage high levels of occupational safety.

### SpectraBeam Intelligence

Using SpectraBeam, AlluraClarity helps to manage dose by taking a more intelligent approach to the use of X-rays. To this end, the AlluraClarity uses special SpectraBeam filters in fluoro and exposures to remove unwanted ‘soft’ radiation, i.e. those X-rays that hit the patient but do not have enough energy to reach the image detector. The soft radiation is replaced by higher-energy radiation which increases image quality. Alternatively, you can ‘trade off’ some of this increased quality to further manage dose.

\* DoseAware does not replace the thermo-luminescent dosimeter (TLD) as a legal dosimeter.



# Better user experience to promote consistency and efficiency

## Hybrid Suite – Meeting the challenges of tomorrow's structural heart interventions

In structural heart disease, the availability of new devices expands the number of treatment options. Some new procedure will be hybrid, requiring a combination of surgical access and catheter based techniques. With the Hybrid Suite from Philips, a full range of procedures can be performed in a single room, virtually without compromise.

## FlexMove for greater flexibility and enhanced patient access

A high-quality Philips Allura Xper FD X-ray system can provide critical support during these procedures, but it is important to be able to position it flexibly around the room to accommodate the workflows of minimally invasive, open surgical, and hybrid procedures. FlexMove addresses this requirement. In a Philips Hybrid Suite, the ceiling-mounted X-ray solution allows increased image coverage and provides exceptional access to patients because there is no fixed foot mount to get in the way.

Using the unique FlexMove, the C-arm can be easily moved as required anywhere around the table – and then conveniently parked out of the way during open surgery. This gives the team room to work close to the patient and frees up the head area so the anesthesiologist/echocardiologist can work with ease. Lateral movement of the FlexMove allows instant access to the patient at any point during the procedure. There is no need to worry about driving over cables on the floor with other equipment. And a ceiling-mounted system is very easy to clean.

The FlexMove XL alternative (for larger rooms) is mounted on extended ceiling rails so the X-ray system can be parked even further away when not in use. With this type of solution, long and often complex procedures can be carried out with a high degree of comfort and confidence by the interventional team.

## MAQUET MAGNUS operating table

The Allura X-ray and MAQUET table combination seamlessly integrates best-in-class interventional X-ray with best-in-class OR table for a truly multifunctional room suitable for conventional surgery, hybrid surgery or interventions. The two are completely synchronized and benefit from automatic position control (APC), bolus chase procedures, and 3D software tools. The table can be outfitted with a radio translucent tabletop for endovascular and hybrid procedures, or a modular tabletop for open surgery.

Tabletops can be easily exchanged using the transporter, allowing smooth transfer of patients between procedures.

*“In the hybrid room you feel completely relaxed. You know every time you can switch from open surgery to catheter-based or from catheter-based to open surgery. So you feel great.”*

Prof. Dr. M. Lachat MD, vascular surgeon,  
Zürich University Hospital, Switzerland



MAQUET MAGNUS operating table



FlexMove



## Key benefits

- Works around the staff and allows full body coverage on both sides of the table. Easy lateral standby position to free up operating area for quick and unobstructed access to the patient for anesthesia, patient draping and any part of the procedure where imaging is not needed.
- Saves space and time. During open surgical procedures, FlexMove can be completely parked in the corner, opening up space for the surgery.
- Can accommodate laminar air flow units and frees up floor space to simplify room cleaning.

## Translating your needs into a visionary Hybrid Suite design

Philips partners with you to design a Hybrid Suite that meets your clinical needs – an excellent care environment where medical specialists can work smoothly together.

Based on experience from designing over 600 Hybrid Suites around the globe, our comprehensive design and project teams simplify the entire process from initial idea to realization, working closely with alliance partners and other third-party vendors to provide a Hybrid Suite specifically designed for you.

### Identifying clinical needs and workflow

The ideal care environment is one where all procedures can be smoothly carried out, now and in the future. It is critical that all key stakeholders should be involved in defining the clinical, logistic, safety, and hygiene requirements. We have experience in guiding this process and can support and advise in each phase of the process to guarantee the desired result, while avoiding costly oversights.

### Translating needs and workflow into the best design

What's the best layout for all equipment? How do you integrate multi-vendor equipment? Our global Hybrid Suite design center leverages experience from around the world to create the infrastructure and interoperability that optimally supports the hospital specific needs. Based on clinical procedures, caseload and clinical workflow, we create an integrated design that incorporates lighting, booms, the OR table, monitor configuration, video switching, sterility measures, and the X-ray system. 3D room drawings are provided to help better assess the workflow in the lab and make sure that equipment can be easily moved out of the way to support different procedures.

### Built to suit

A wide range of options allows for a high level of customization. Choose a monoplane or bi-plane system. Select a MAQUET MAGNUS operating table or Philips Allura Xper table. Select from many versatile ceiling options to fit your room size and layout, from regular and extended ceiling rails to the unique FlexMove/FlexMove XL system for excellent freedom of movement.

And enhance the viewing of your clinical images, on single 19" or 21" monitors, right up to the large 56" FlexVision XL monitors with advanced video switching capabilities.

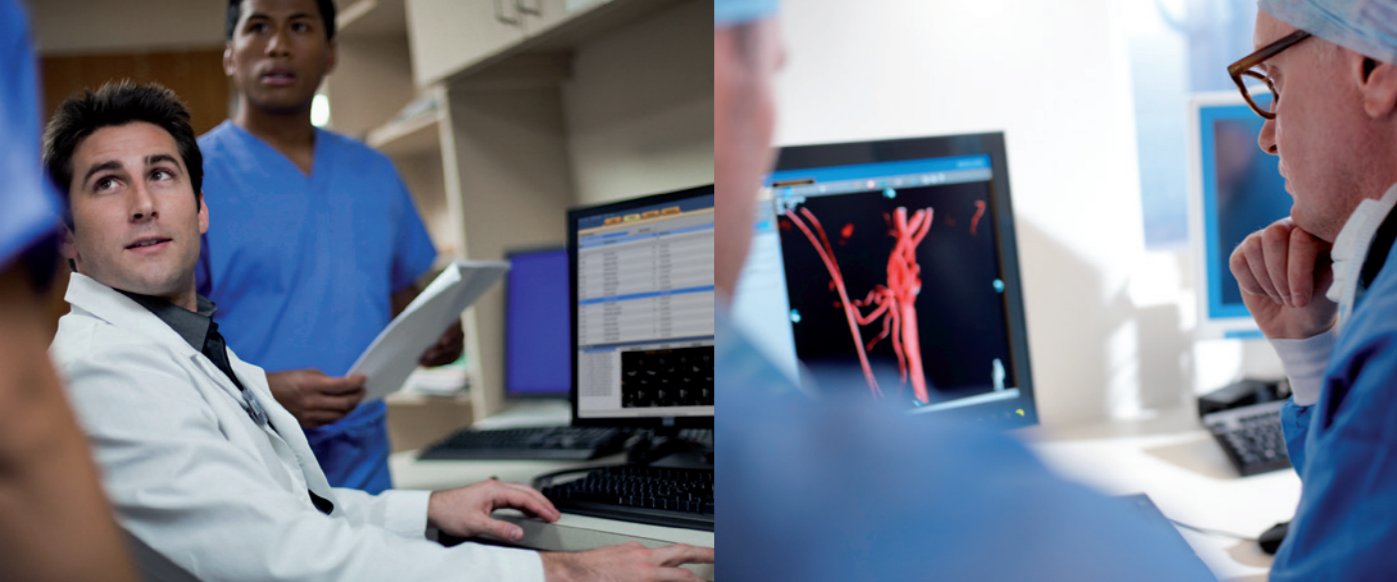
### Project management

Our project managers understand all the issues involved in the complete realization of a Hybrid Suite. They can facilitate collaboration with all internal and external stakeholders to help safeguard the process, budget, and final results.

"We were looking to design an OR that had dual functionality, where we were able to do both open and endovascular procedures.... I can start with an open case and add endovascular techniques because I have the imaging right there. And if I'm doing an endovascular procedure and there is a problem, then I can open immediately and take care of the patient."

Dr. M. Lukens MD, director vascular services,  
Heartland Health Regional Medical Center St. Joseph, Missouri, USA





### Multi-modality image management

Xcelera cardiology PACS or the enterprise-wide IntelliSpace PACS solutions can handle image management, clinical analysis, and reporting. IntelliSpace is a powerful tool for advanced image review and analysis. It offers the flexibility to diagnose and collaborate virtually anywhere. In addition, iSite PACS integrates into existing infrastructure, enabling all departments to realize a return on investment at each stage of deployment.

“We needed a strategic partner who could keep us up to date with the rapidly changing technological developments. Philips Healthcare was the obvious choice.”

Drs. R.E.A. Gaffin, member of the board,  
Orbis Medical Center, Sittard Geleen, The Netherlands

## Workflow improvement

Philips offers many flexible ways to enhance workflow in the lab/hybrid environment. These solutions contribute to a well organized, well run interventional department.

### Large, high-definition monitor

The FlexVision XL monitor allows for easy viewing and magnification of any image in the lab – from X-rays to pre-acquired patient CT and MR scans – at tableside.

The SuperZoom feature clearly brings small aspects of anatomy and data into focus without sacrificing resolution. With this feature, the screen can be placed further from the table, thereby freeing up space.

This large, high-definition eight-megapixel LCD screen layout can be adapted on the fly to physician preferences and examination requirements – per procedure type or case. Information from several multi-modality imaging sources is integrated into one view. This allows the entire team to understand and share information during each step of the procedure.

### Physiomonitoring

Philips Xper Flex Cardio, a small hemodynamic system, seamlessly interfaces with the Allura portfolio. It enhances workflow and improves the productivity in the lab through easy exchange of data. Xper Flex Cardio offers interfaced fractional flow reserve (FFR) with Volcano and

St. Jude catheters, and provides advanced ECG analysis in the cath lab with ST mapping and STEMI-CA.

### Relevant information at hand

In this flexible, fully integrated environment, Philips cardiology informatics, tools and real-time information are all within reach, making it easy to carry out all aspects of procedures.

### Managing cardiology information throughout the care process

Philips CVIS (Cardiovascular Information Management System) is a unique software solution that enhances the clinical and financial performance of the cardiology department. It unifies silos of discrete cardiac information collected at the point of care into a single powerful database.

This cardiac database is searchable and actionable to support clinical, qualitative, and business analysis and reporting needs.

### Cath lab workflow solution

Xper IM and Xper Flex Cardio feature intuitive innovations that creates a more efficient workflow in the cath lab department, including direct access to acquired images, physiomonitoring, scheduling, inventory management reporting, and statistics.





### Exceptional support is a priority

The Philips global service network is ready to assist when necessary. Field engineers, remote service technicians, and front line call-agents support all systems with a world-class services network. The goal is to help customers succeed in every phase of system ownership, from planning to start-up, through peak usage and renewal.

A Remote Services option provides advanced system troubleshooting that helps lessen downtime even further. Equipment remains reliable through remote system diagnoses and fast repair.

### Education and training

Regular training is critical to help the medical staff to master clinical procedures, get more out of the equipment, and build professional and clinical skills. Well-trained staff enhances the overall level of service and operation.

As an example, Philips has established Peer-to-Peer training programs for physicians interested in learning about EchoNavigator. Participants visit peers in the hospital, who are experts in the clinical use of EchoNavigator, and receive a comprehensive two-day program combining class room tutorials, hands-on training. They work closely with these experienced users during real cases.

### Financial options are plenty

Philips Medical Capital makes it surprisingly easy to arrange financing to address capital budget requirements and manage increasing patient volume. Philips ProPlus combines equipment, service, and financing in one simple offering to help:

- Stretch capital budget and enhance monthly cash flow
- Lock-in equipment and service costs for up to five years
- Avoid unexpected equipment or maintenance costs
- Simplify financial management and reduce administrative burdens
- Get the equipment necessary to deliver a high level of quality care
- Enhance organization's reputation and profit potential

While the treatment of structural heart disease continues to rapidly evolve, one thing remains the same – Philips leadership. Our Live Image Guidance solutions stand at the forefront of interventional care. For planning, diagnosis, and therapy, they support the skills of clinical professionals like you.

Making the difference where it really matters.

## Increased economic value

Philips is committed to working closely together with customers. The purchase of a new interventional suite and interventional tools demonstrates a long-term commitment to patients and personnel. We offer a comprehensive portfolio of service options, training programs for staff and deliver financing options to help enhance the economic value across the total life-cycle of the systems.

### RightFit Service agreements

From premium service plans to standard service support, there is a RightFit Service Agreement to suit every need. The perfect mix of on-demand support, immediate parts and service, and comprehensive business solutions help hospitals deliver quality patient care.

Appeals to patients and staff



Enhances patient care





This brochure is only for distribution in North America.  
[www.philips.com/structuralheartdisease](http://www.philips.com/structuralheartdisease)



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