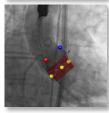




# Making the difference with Philips Live Image Guidance



Hybrid Suite solutions

# PHILIPS



# Making the difference with Philips Live Image Guidance

Together we make the difference in minimally-invasive treatment to improve patient outcomes and save lives. With our Live Image Guidance we aim to remove barriers to safer, effective and reproducible treatments, delivering relevant clinical value where it's needed most - at the point of patient treatment.

Intelligent and intuitive integration of live imaging, patient information and disease-specific tools in a single Hybrid Suite allows you to quickly and confidently determine the optimal course of treatment across a broad range of procedures. Move from EVAR stenting to a TAVI case, or clip a complex cerebrovascular aneurysm. Perform endovascular as well as hybrid and open surgery in a single room.

## Contents

experience to promote consistency and efficiency	6
es provide you with an exceptional care environment that accommodates	
open to endovascular procedures.	
ers for minimally invasive interventions	10
stry-leading image quality at a fraction of the dose.	
ht and confidence in finding and treating the problem	16
aging solutions support you in the planning, visualization and Live Image Guidance	
challenging procedures.	
nomic value	22
ou need to realize a visionary, efficient and viable Hybrid Suite.	

## Hybrid Suite – Seamlessly perform a wide range of open and minimally invasive procedures in a single room

With the true Hybrid Suite from Philips, you can perform a full range of procedures – from endovascular to hybrid to minimally-invasive or open surgery – in a single room, virtually without compromise.

Our Philips Hybrid Suite is designed to meet your needs, providing uncompromised access to the patient as well as excellent image quality. Using our FlexMove ceiling suspension system, the C-arm can easily be moved in and out of the working space, with minimal interference to you, your staff or your patient. Our AlluraClarity X-ray systems with ClarityIQ technology enable excellent image quality at a fraction of the dose, making the Hybrid Suite a less harmful environment to work in.Together, we open doors to new procedures and techniques that truly make a difference to people's lives while reducing the cost of care.

#### Combining resources in the Hybrid Suite\*

A traditional cath lab environment provides superb infrastructure for endovascular treatment. The OR, on the other hand, is optimized for surgical treatment. Our Hybrid Suite combines the best of both worlds in a single room. As one of the leading innovators in the hybrid space, we can help you create a truly hybrid environment that is completely in tune with your clinical needs and budget.

#### Trends in the Hybrid Suite environment:

- In vascular surgery, the number of minimally-invasive endovascular aneurysm repair (EVAR) procedures has risen, year-on-year, by between 5 and 12% (depending on the region), and will continue to grow in the foreseeable future.
- In cardiac, transcatheter aortic valve implant (TAVI) procedures are on the rise. According to EACTS, ESC and EAPCI, the Hybrid Suite is the most suitable environment for TAVI.
- The adoption of endovascular treatment by neurosurgeons, as well as the need for intra-operative imaging during spinal surgery, is increasing.
- Hybrid Suites are increasingly being used in orthopedics, oncology, trauma, thoracic and even hybrid electrophysiology procedures.



The surgical environment is rapidly evolving as interventional treatment and surgery come together in hybrid procedures. Interventions are performed for increasingly complex diseases, while surgical procedures are becoming less invasive. In addition, the availability of new devices expands the number of treatment options on offer.

\*The Hybrid Suite is often located in the OR and referred to as the Hybrid OR. In some cases it can be found in the cardiology or radiology department, and the term Hybrid Lab is then used. In this brochure we will use the term Hybrid Suite throughout, regardless of where it is situated.

# Better user experience to promote consistency and efficiency

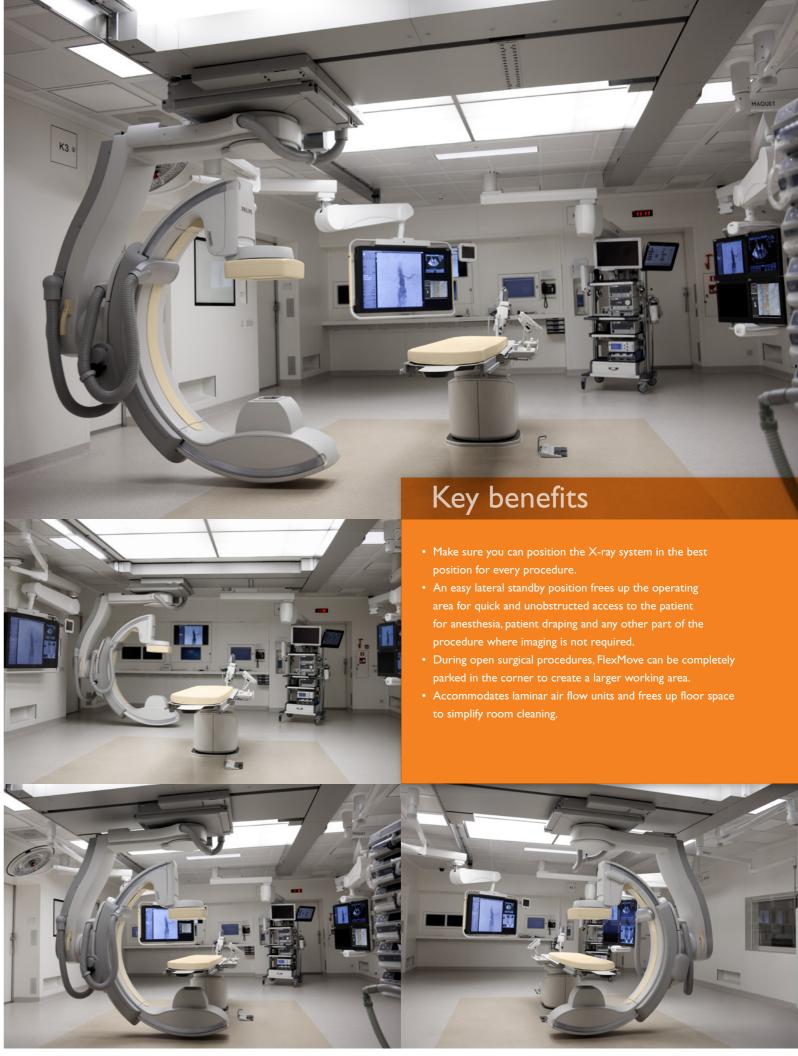
A high-quality X-ray system can provide critical support during your procedures, but you need to be able to position it flexibly around the room to accommodate the workflows of minimally-invasive, open surgical and hybrid procedures. A ceiling-mounted X-ray solution allows you to increase your image coverage and provides exceptional access to your patient because there is no fixed foot mount in the way. You can easily move the system to reduce inconvenience for the medical team, and you don't have to worry about driving over cables on the floor with your equipment. A ceiling-mounted system is also easy to clean.

**Greater flexibility, enhanced patient access** With FlexMove, you can easily move the C-arm anywhere it's required around the table - and then conveniently

park it out of your way when it's not required during open surgery. This gives the team more room to work around the patient and frees up the head area so the anesthesiologist or echocardiologist can work there with greater ease. Lateral movement of the FlexMove allows instant access to the patient at any point of the procedure. Solutions like these mean long and often complex procedures can be carried out with a high degree of comfort and safety by the teams.

In order to meet the growing demand for Hybrid Suites and offer greater flexibility in configuration, an XL version of FlexMove is now available. Mounted on extended ceiling rails, it can be used in larger rooms. The X-ray system can be parked further away when not in use, giving even more freedom when moving around the table.





#### Creating an exceptional care environment

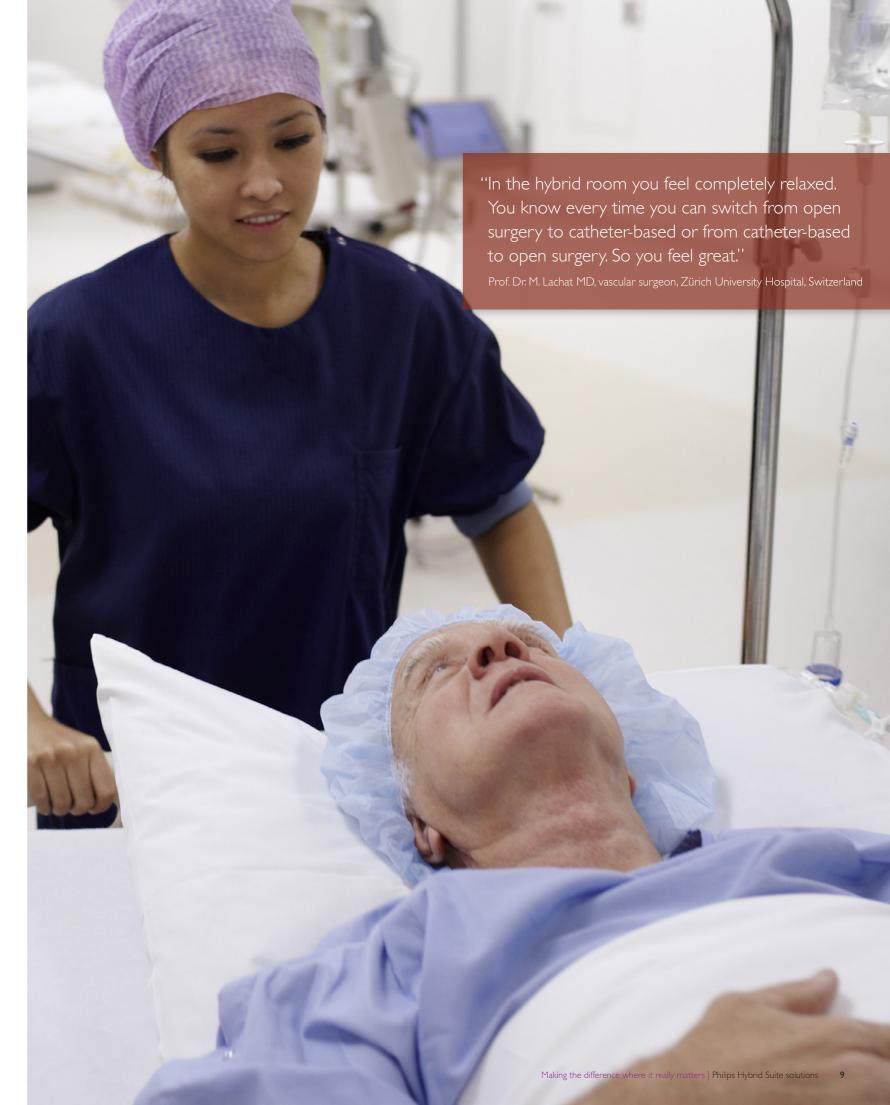
A well-designed Hybrid Suite enhances the patient and staff experience. Integration is crucial for creating a smooth workflow. Whether it is the table system, video-switching or IT solutions for scheduling, reporting and archiving, Philips understands that interoperability is the key to creating an exceptional care environment. Seamless integration with the MAQUET MAGNUS OR table provides a smooth operational flow to further streamline procedures.



The Allura/ MAGNUS combination seamlessly integrates bestin-class interventional X-ray with a best-in-class OR table for a truly multifunctional room suitable for conventional surgery, hybrid surgery or interventions. The Allura and MAGNUS table are completely synchronized, so you benefit from automatic position control (APC), bolus chase procedures and 3D software tools. The table can be outfitted with a radiotranslucent 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.

The Xper Table is a dedicated cardiovascular table that provides exceptional support for a wide range of interventional procedures. This table can make large floating movements and support patients of up to 250 kilograms. It can also support CPR without the need to move the patient. An optional cradle feature allows the table to be tilted side-to-side for easier surgical access. The optional Xper Table Tilt feature enhances the accuracy and efficiency of gravity-oriented procedure; ideal for interventional head-down procedures.

"The patient suffered a cerebral hemorrhage after a rupture of an aneurysm, and we needed to decide whether to coil or clip it in an emergency situation. We could do everything in the OR without transferring the patient to the angio suite or to the CT Room." Prof. Dr. J. Fandino MD, neurosurgeon, Kantonsspital Aarau, Switzerland



## Lower barriers for minimallyinvasive interventions

#### AlluraClarity with ClarityIQ

Our AlluraClarity family with ClarityIQ technology is the latest breakthrough in our commitment to minimize radiation exposure for patients and clinical staff working in the Hybrid Suite. ClarityIQ maintains equivalent image quality with a radically-reduced dose level. This helps improve outcomes and reduces dose as a barrier to new procedures and techniques.

Leveraging our imaging expertise and proven technology, we collaborated with top interventional physicians in the development of ClaritylQ.Together, we redesigned the entire digital imaging pipeline.

- I. Powerful image processing technology

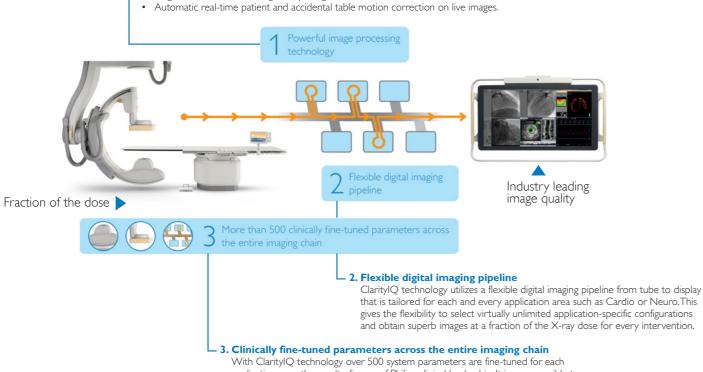
• Image enhancement and edge sharpening;

all working in real-time enabled by the latest computing technology:

• Noise and artefact reduction, also on moving structures and objects;

The result is industry-leading image quality which optimizes current treatments and expands possibilities. All to significantly reduce radiation exposure for patients and staff.

For added convenience, ClarityIQ protocols are tuned for different procedures, for example vascular, cardiac, neuro, pediatrics and electrophysiology.



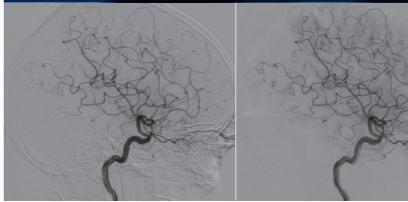
With ClarityIQ technology over 500 system parameters are fine-tuned for each application area; the result of years of Philips clinical leadership. It is now possible to filter out more X-ray radiation, use smaller focal spot sizes, shorter pulses, thereby fully utilising the unique capabilities of the Philips MRC X-ray tube.

ClarityIQ technology incorporates powerful state-of-the-art image processing technology, developed by Philips Research,



Allura Xper system

AlluraClarity system



### 90% 'excellent' image quality in neuroradiology at Karolinska University Hospital, Stockholm, Sweden

The results were overwhelmingly positive. Physicians described the image quality of the ClarityIQ technology DSA run as 'excellent' 90% of the time.

This independent study was conducted in the interventional neuroradiology department at Karolinska University Hospital during 2011. A group of patients underwent aneurysm repair and arterio-venous malformation treatment, as well as other interventions. These procedures are among the most demanding in the interventional neuroradiology world, requiring images which show very fine anatomical details



### "It has changed our life, specifically when you are looking at the base of the skull"

Professor J. Moret, Hôpital Beaujon, Paris

Sharper images with fewer motion artifacts, even the smallest vessels and device details are clear at 73% less radiation dose in neuroradiology.

### Images of equal diagnostic quality obtained using 50% less dose in cardiology at Radboud University Hospital, Nijmegen, the Netherlands

The ClarityIQ images, obtained using 50% less dose, were of equal diagnostic quality to images acquired at a higher dose and without ClarityIQ.

In this study, conducted between September and November 2012, diagnostic angiography images of the left coronary artery of 40 patients were monitored. The dose reduction also diminished the likelihood of sporadic effects of radiation for the cath lab personnel.

#### 83% less radiation exposure in radiology at St.Antonius Hospital, Nieuwegein, the Netherlands

"Preliminary results show that ClarityIQ offers major advantages for interventions because we can perform our procedure exactly as we normally would, but with 83% less radiation exposure. We have performed 200 iliac cases in the past few months with the ClarityIQ technology and the images look the same as what we were used to.

The best part is that we use ClarityIQ and it works just like our normal interventional system. We don't necessarily realize we are even using it." Dr. Marco van Strijen, interventional radiologist, St. Antonius Hospital, Nieuwegein, the Netherlands.





Our long-standing commitment to reducing dose is founded in DoseWise; a set of techniques, programs and practices that focus on providing excellent image quality while maximizing the safety of patients and clinical staff in X-ray environments. DoseWise has the three pillars - Smart Beam (see below), less time and more awareness - and is integrated into every level of our new product development.

### Pushing the boundaries of ALARA

Our AlluraClarity family with ClarityIQ technology pushes the boundaries of ALARA (As Low As Reasonably Achievable) by delivering equivalent image quality while reducing radiation levels by up to 83%. This allows you to comfortably treat radiation-sensitive patients and reduce staff exposure.

In addition to ClarityIQ,AlluraClarity incorporates the following dose reduction technologies:

#### DoseAware\*

The 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 their radiation exposure during each shift, as well as procedure-based data for deeper insight into staff exposure trends and behavior.

A personal dose meter helps you track when and where dose was acquired, so you can take appropriate action during a procedure. Colored displays in the examination room also help you easily check your exposure level with one glance.

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

"DoseAware is one of the most important new tools available to help reduce 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

#### Smart Beam

With Smart Beam, the dose is reduced 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 significantly improves image quality. Alternatively, you can 'trade off' some of this improved quality to further reduce dose.



### Flexible ways to enhance workflow

Our FlexVision XL monitor allows 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 lets you clearly bring small aspects of anatomy and data into focus without sacrificing resolution. This also allows you to locate the screen further away, freeing up space around the table. 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 in one view. This supports the entire team in understanding and sharing information during each step of the procedure.

#### 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 your cardiology information throughout the care process

Philips CVIS (Cardiovascular Information Management System) is a unique software solution that empowers you to enhance the clinical and financial performance of your 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 your clinical, qualitative, and business analysis and reporting needs.





#### Cath lab workflow solution

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

#### Multi-modality image management

Your image management, clinical analysis and reporting can be handled by Xcelera or our enterprise-wide IntelliSpace PACS solutions. IntelliSpace is a powerful tool for advanced image review and analysis. It offers the flexibility to diagnose and collaborate virtually anywhere. What's more, our iSite PACS integrates into your existing infrastructure, enabling all departments to realize a return on investment at each stage of deployment.

#### **Physio-monitoring**

Philips Xper Flex Cardio, a small hemodynamic system, seamlessly integrates with the Allura portfolio. It optimizes workflow and improves the productivity in the lab through easy exchange of data. Xper Flex Cardio offers integrated fractional flow reserve (FFR) with Volcano and St. Jude, and provides advanced ECG analysis in the cath lab with ST mapping and STEMI-CA.

These solutions offer specialists access to patient-centric, digital data and examinations stored in a database, from various locations within the hospital and beyond.



# Greater insight and confidence in finding and treating the problem

Work with greater 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.

### 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.
- Improves teamwork within the heart team in the lab.



"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 by 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 improve 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 providing in depth details on how to optimally use the technology in clinical practise. Providing you with the confidence to implement these advanced imaging functionalities in your daily routine and brining 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.



3D zoomed appendage and pulmonary vein

#### A new era in premium cardiovascular ultrasound

The Philips EPIQ 7 ultrasound system incorporates our most powerful architecture ever applied to ultrasound imaging - touching all aspects of acoustic acquisition and processing. Supported by our family of proprietary xMATRIX transducers and our leading-edge Anatomical Intelligence, this platform offers you accurate diagnosis, first-time right, which is faster and easier to perform than before. You get improved clinical information from each scan and a higher level of confidence; even for technically difficult patients. For example, the Mitral Valve Navigator A.I. (MVNA.I.) takes a live 3D volume of the mitral valve and turns it into an easy-to-interpret model in eight guided steps. Compared to previously-available tools, the MVNA.I. models and measures with 89% fewer clicks.



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

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





## Simplify planning and intraoperative decision-making

Our innovative imaging solutions support confident decisions in every step of your procedures - from planning to treatment and posttreatment verification. Image fusion that combines 3D data with live X-ray provides real-time image guidance. Three-dimensional imaging capabilities provide exceptional intra-operative CT-like visualization of anatomy.

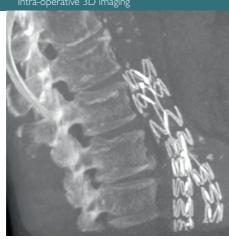
### "We find it extremely accurate and a great help for super selective catheterization of vessels."

Roadmap feature.

Market-leading 3D solutions guide the way towards enhancing conventional procedures and carrying out exciting and rewarding new ones.We offer a number of tools that help you simplify planning and intra-operative decision making using previously acquired CT and MR data to reduce the use of contrast medium and radiation exposure.

"By using FD20 with XperCT we can obtain CT-like images quickly without needing to move to the imaging room. We can check for small amounts of staining or leakage, and if there is a problem we can go on to perform secondary treatment."

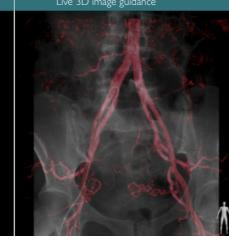
Dr.T. Fukuda, National Cerebral and Cardiovascular Center in Osaka, Japan



The XperCT reconstruction is created from a rotational acquisition performed on the Allura Xper system. This reconstruction can be overlaid with the 3D vascular image.

An XperCT slice can be overlaid with the 3D vessel tree to help clinicians determine the treatment option when treating aneurysms and stenoses.

The Allura 3D-RA (Rotational Angiography) provides high-resolution, 3D insight into vascular pathologies. It helps visualize the structure of devices in 3D, during and after deployment, to aid treatment planning. The unique Reconstruction Zoom technique lets you enlarge your region of interest with higher spatial resolution for excellent image quality.



Live 3D MR CT Roadmap fuses live 2D fluoroscopy on a pre-acquired MR or CT image to reveal hidden anomalies and enable real-time, motion-compensated navigation through vessels and soft tissue.

"This is a great tool that we use for virtually every case," says Dr. Thomas when describing Philips Dynamic 3D Roadmap feature.



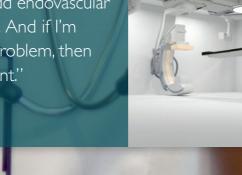
HeartNavigator assists you in your TAVI and other Structural Heart Disease procedures. It provides automatic segmentation and landmarks, plus optimal view planning with device template selection. This leads to greater confidence in procedure planning and assessment of calcification around the valve, while helping avoid procedure complications.

Dr. J. Thomas, CPMC, San Francisco, describing the Dynamic 3D

"I plan all my cases with the HeartNavigator. I trust the measurements with HeartNavigator."

Dr. H. Schröfel, cardiac surgeon, Heart Surgery Clinic, Karlsruhe, Germany





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 thirdparty 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.

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 complete freedom of movement.

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.

### 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

#### Translating needs and workflow into the best design

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

## Increase economic value

The Philips Hybrid Suite goes beyond the technology to create a completely integrated operating room that can be configured as a multi-purpose space. This adds clinical and financial value to your facility. Where necessary we enjoy strategic collaborative relationships with alliance partners including MAQUET, Steris and Skytron. This helps our experienced consultants and project teams provide a complete, turnkey offering that meets your business goals and keeps you at the forefront of excellence.

#### Increases utilization of your room

Creating a Hybrid Suite with Philips unique FlexMove and integrated MAQUET MAGNUS operating table supports high utilization by allowing you to perform a full range of vascular, cardiac, spinal, orthopedic, oncological, neuro or even hybrid EP and trauma procedures in a single space.

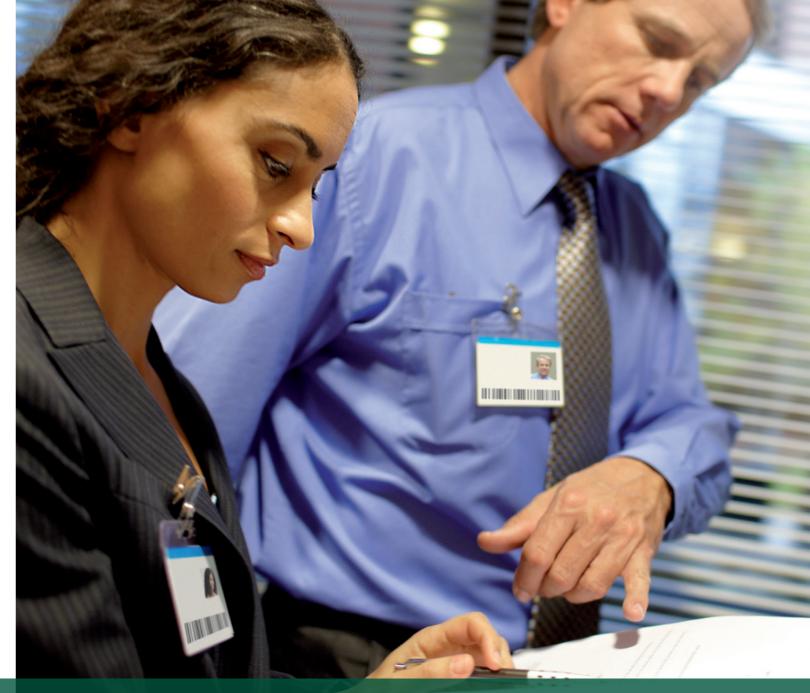
We appreciate that the Hybrid Suite environment is different from traditional fixed imaging interventional suites.We therefore offer a comprehensive applications training program, run by one of our clinical specialists, so you have all the information and instruction you need for getting the best out of your system.

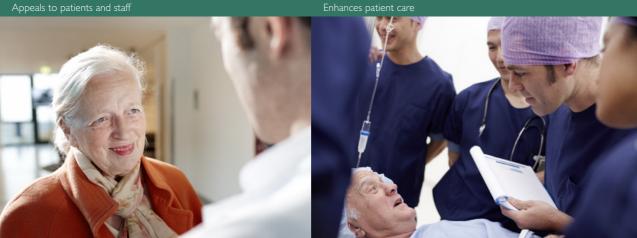
#### Saves critical time

The Philips Hybrid Suite can help provide critical time by allowing you to draw upon high resolution X-ray imaging when needed and use a MAQUET MAGNUS operating table to position the patient for exceptional accessibility. Using Philips FlexMove, seamlessly integrated with third party ceiling booms, the surgical team can start a minimally-invasive procedure and move to an open procedure, or vice-versa, in a controlled environment to avoid lengthy delays in the treatment process.

#### Philips Medical Capital provides equipment,

service and financing for one low payment It's surprisingly easy to arrange financing so you can make the most of your capital budget, manage increasing patient volume and achieve clinical superiority.





New hybrid and minimally-invasive procedures are pushing the boundaries of healthcare. With the world-class Philips Hybrid Suite, you can therefore enhance the reputation of your facility. This will help you attract patients and can make it easier to tempt highly sought-after medical professionals. Once operational, we provide ongoing training and expert technical support so you can maintain a consistently high standard of care.

Cross-functional surgical and radiological teams work together in the Hybrid Suite. This gives patients access to the joint expertise of different specialized medical disciplines, which in turn may increase your case load volume. Philips ProPlus from Philips Medical Capital combines equipment, service, and financing in one simple offering to help you:

- Stretch your 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 you need to deliver a high level of quality care
- Enhance your organization's reputation and profit potential

- "With the Hybrid Suite you are opening the window to the future. There is very little doubt that, in the future, there will be less open surgery and more catheterbased or remotely-accessed surgery. We have new borders but they are very far away and we have to discover where they are."
- Professor M. Lachat MD, vascular surgeon, Zürich University Hospital, Switzerland



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