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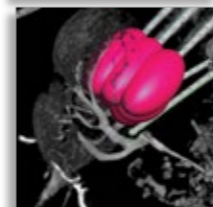
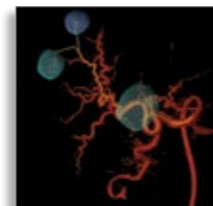
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## Making the difference with Philips Live Image Guidance

OncoSuite: All interventional Oncology in one room

# PHILIPS





# Making the difference with Philips Live Image Guidance

OncoSuite: All interventional oncology in one room

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

Interventional oncology is one of the fastest growing areas in interventional radiology because of the advantages minimally invasive oncology interventions offer to cancer patients and the healthcare system. Advances in Live Image Guidance, loco-regional cancer therapy, and knowledge of tumor biology help make these interventions possible. As a physician you still face critical challenges when performing these procedures. How do you improve your chances of treating the entire tumor and all its feeder vessels, without affecting healthy tissue or organs? Groundbreaking new visualizations from Philips show the way forward.

## Key advantages

- First complete solution for embolization and ablation procedures
- Dedicated 3D oncologic DualPhase imaging
- Live Image Guidance for treatment of multiple lesions

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# Greater insight and confidence in finding and treating the problem

## OncoSuite

Gain new clarity and risk management capabilities with OncoSuite\* – the world's first complete solution for tumor embolization and percutaneous ablation procedures in interventional oncology. Its unique 3D Live Image Guidance with XperCT Dual advances in-lab imaging to provide lesion information comparable to the gold standard CE-MRI.<sup>2</sup> These 3D visualizations are used in our new EmboGuide tool to improve the detection of small hepatocellular carcinoma (HCC) and their feeding branches.<sup>3</sup> EmboGuide supports Live Image Guidance in various embolization procedures, such as transarterial chemoembolization (TACE), selective internal radiation therapy (SIRT), and prostate embolization.

To support percutaneous tumor ablations, OncoSuite combines enhanced XperCT visualizations with a new version of XperGuide Ablation which can also include MRI, CT, and PET/CT information. XperGuide Ablation provides reliable and accurate Live Image Guidance to reach small ( $\leq 1$ cm) lesions,<sup>4</sup> while allowing clinicians to plan the full coverage of the tumor lesion with multiple needles.

## Key advantages

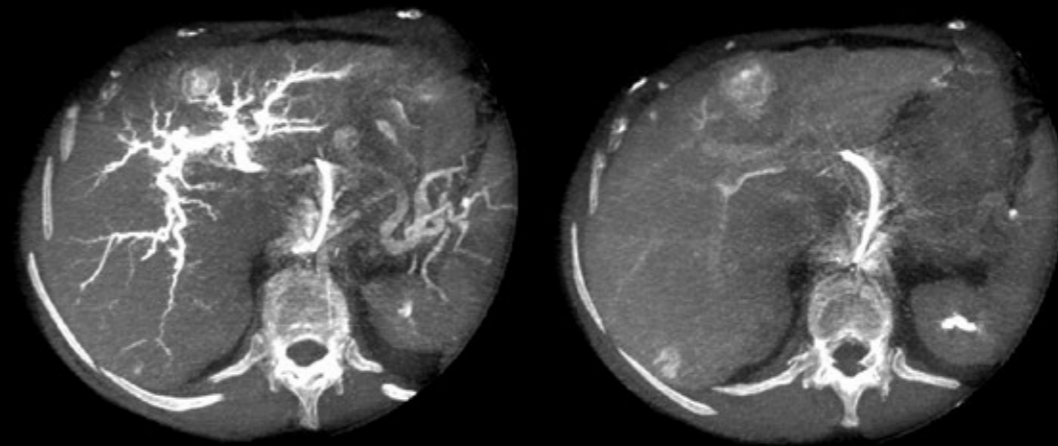
- 20% higher soft tissue contrast in abdominal imaging
- 30% higher image resolution with instant 3D reconstruction
- MRI-like lesion detection with DualPhase imaging
- A study showed 50% higher feeder detection than standard DSA\*<sup>3</sup>
- A study showed accurate and reliable Live Image Guidance to reach small ( $\leq 1$  cm) lesions \*<sup>4</sup>

OncoSuite's tools aim to help you carry out minimally or non-invasive procedures more consistently and precisely. This treatment environment can offer life-changing opportunities for your patients.

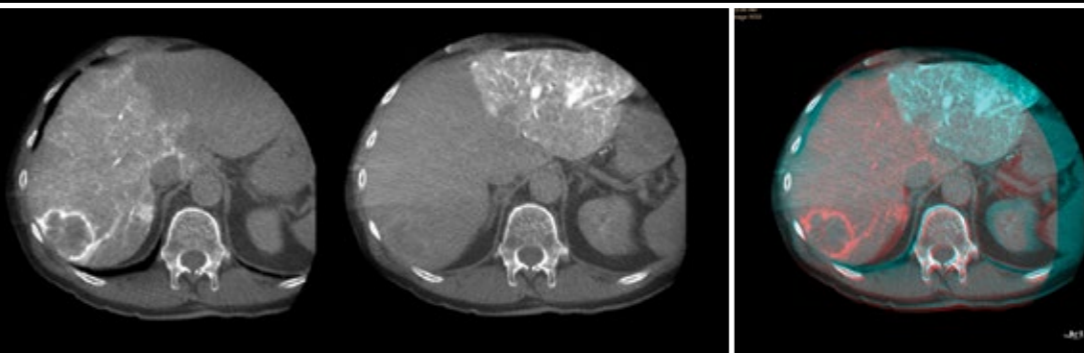
Together, we open doors to new procedures and techniques that truly make a difference in people's lives.

\*All features referred to in this Product Overview are based on the Allura X-ray systems release 8.2 or higher.

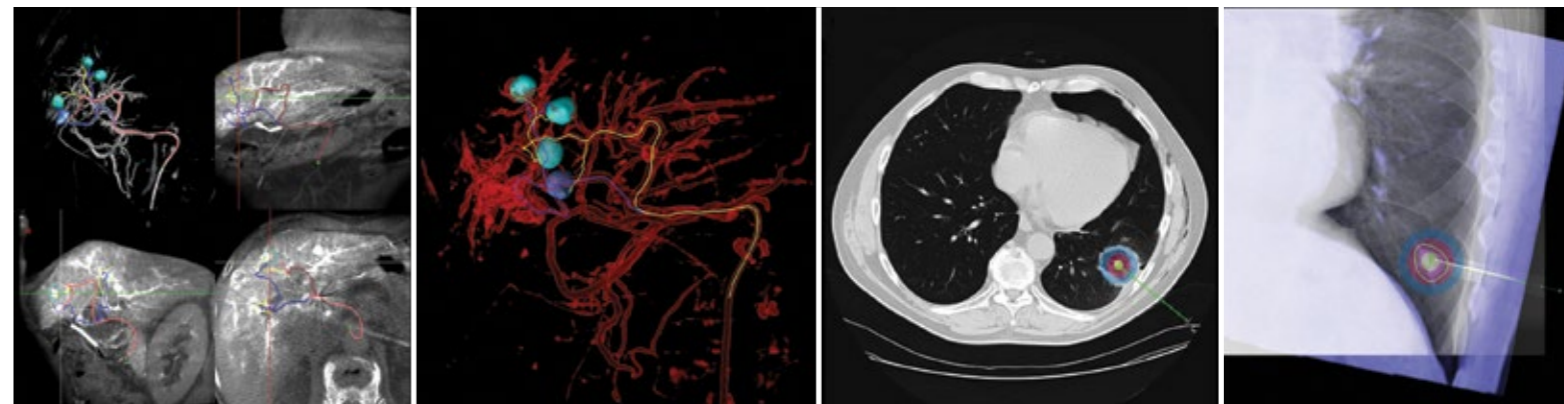
\*\*The 3D visualizations of XperCT Dual improve lesion detection compared to standard DSA<sup>2</sup>, and provide comparable lesion detection compared to CT<sup>1</sup> (but with less dose) and MR.<sup>1</sup>



XperCT DualPhase contrast enhancement of the vascular structure (arterial phase) and lesion (post-arterial phase).



XperCT angiography of right and left hepatic artery next to each other and merged in DualView.



EmboGuide automatically detects feeding vessels to multiple segmented lesions

EmboGuide roadmap with multiple lesions and automatically highlighted feeding vessels

Ablation zone planning with XperGuide Ablation on a previous acquired CT dataset

Live Image Guidance towards ablation zone

# Unique 3D Live Image Guidance and workflow support for tumor embolizations

See details of lesion pathology never seen before 20% higher contrast-to-noise ratio and 30% higher spatial resolution

XperCT Dual brings MRI-like lesion<sup>1</sup> detection to the oncology suite. It is the next evolution of XperCT, which offers CT-like imaging to visualize bone, soft tissue, and vessels (for contrast-enhanced acquisitions). The DualPhase acquisition<sup>\*\*\*</sup> and DualView functions allow simultaneous visualization of two sequentially acquired 3D data sets, such as the arterial and post-arterial contrast enhancement in oncologic liver imaging.

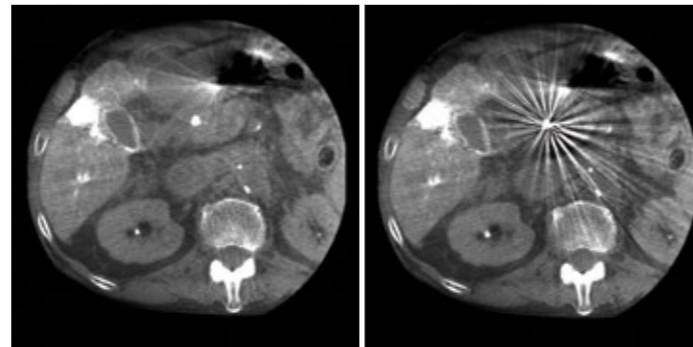
These acquisitions are almost instantly available as high resolution and high contrast 3D visualizations to support fast assessment at bedside. The DualView functionality of XperCT Dual allows you to display both acquisitions next to each other and to segment multiple lesions in the viewed data sets. XperCT Dual with its dual phase acquisition and DualView also supports the determination of treatment end-points in TACE and SIRT and allows you to predict the tumor response.<sup>5,6,7,8</sup>

During Live Image Guidance, XperCT Dual allows you to combine and overlay 3D information from previously acquired data, such as MRI, CT, PET/CT, and XperCT volumes to gain additional anatomical insight.

\*The DualPhase functionality is available with Allura systems release 8.2 or higher. It allows XperCT to perform two rotational scans with a user defined delay between them.

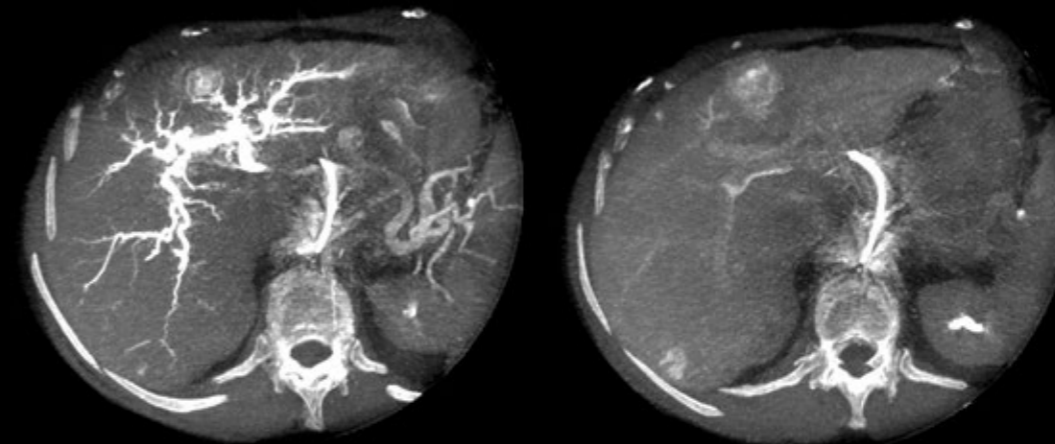
\*\*The improved contrast to noise resolution is available with Allura systems release 8.2 and higher

XperCT volumes with and without Metal Artifact Reduction

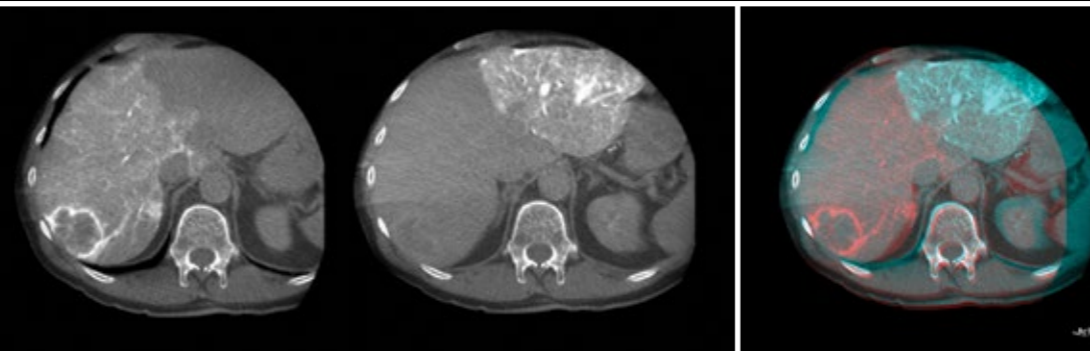


## Unique capabilities

- DualPhase acquisitions with XperCT Dual from head and side position to visualize arterial and delayed phase of contrast injection
- Fast 5 second, high-resolution protocols for abdominal 3D acquisitions with instant reconstruction
- DualView to assess 3D information in region of interest acquired at different times during the intervention for outcome control.
- 50% higher lesion detection rate compared to standard DSA<sup>3</sup>



XperCT DualPhase contrast enhancement of the vascular structure (arterial phase) and lesion (post-arterial phase).



XperCT angiography of right and left hepatic artery next to each other and merged in DualView.



# Unique 3D Live Image Guidance for percutaneous ablation procedures

## EmboGuide – workflow-based embolization guidance

TACE is one of the most frequently performed oncology interventions. However, detecting small (less than 2 centimeters) HCCs is difficult using conventional 2D digital subtraction angiography (DSA) because of limited tumor vascularity or overlapping vessels.<sup>1,5</sup> Now EmboGuide with XperCT Dual provides the first workflow-based 3D tool to guide each step in the detection and treatment of tumors and vessel feeders to multiple lesions. One study showed that EmboGuide has sufficient sensitivity to detect small HCC feeders and it detects 50% more feeders compared to standard DSA.<sup>2</sup>

## EmboGuide improves detection of lesions and their feeding vessels by 50% compared to standard DSA\*

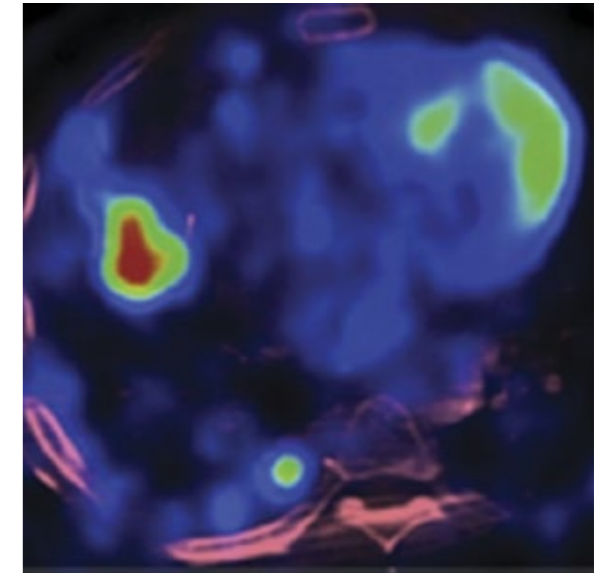
EmboGuide is designed to provide a consistent workflow to support consistent TACE treatments. A key challenge with any embolization procedure is making sure to identify all of the feeder vessels to a tumor. Three dimensional imaging can be very helpful in revealing the hidden nature of overlapping vasculature. Based on MR or CT data, or a DualPhase XperCT rotational scan volume, EmboGuide creates a 3D image of the relevant patient anatomy.

\*As shown in a study of Miyayama et al.(3)

## XperGuide Ablation – towards controlled results in the interventional suite

Performing successful tumor ablations, without compromising adjacent tissue, requires a clear understanding of the tumor size, the specific needle's ablation area, and the optimal path to the target. The new version of our XperGuide Ablation provides comprehensive assistance for treatment planning and live needle guidance during percutaneous ablation procedures (RF, microwave, and cryo-ablation) by displaying the isotherm of the chosen ablation needle.

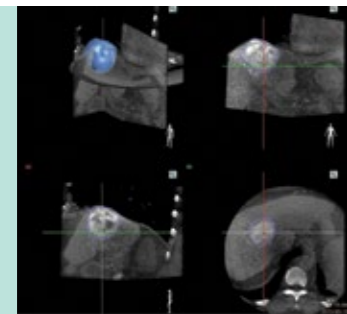
During planning, XperGuide Ablation visualizes the specific ablation zones and distance between multiple ablation needles in 3D, based on their thermal characteristics. This allows you to assess their combined impact in the ablation zone. The virtual ablation needle and its isotherm are displayed on a 3D XperCT volume or previously acquired CT, MR, or PET/CT data. This visualization allows you to verify the optimal position of one or more needles to obtain total tumor coverage. With the introduction of OncoSuite, PET/CT data can now be imported to XperGuide Ablation. The boundaries of various tumors are shown with a higher degree of specificity in PET compared to CT or MR. This supports you in accurately and reliably reaching small lesions, less than or equal to 1cm.



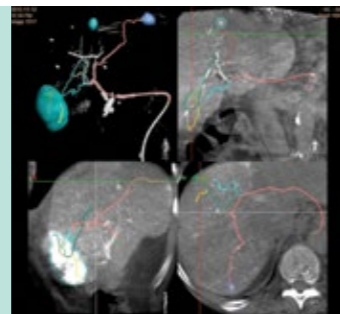
This image shows a XperCT lung volume in XperGuide Ablation overlaid with a PET/CT to show the metabolic activity of the tumor.

## Unique capabilities

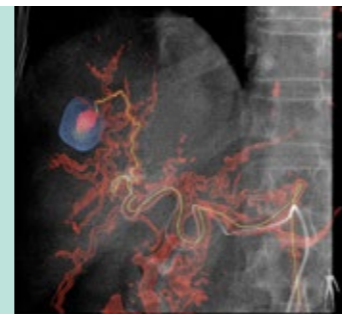
- Workflow-guided manual tumor segmentation of multiple treatment targets
- Provides real-time 2D/3D overlay during Image Guidance, using 3D data from multiple data sources (CT/MR/XperCT)
- Provides a feeder detection tool for automatic and manual detection of feeding vessels to each identified lesion
- Overall workflow guidance allows clinicians to follow a pre-selected protocol and switch between treatment phases



**1 Segmentation** | A lesion segmentation tool can be used to define the lesions to treat in the regions of interest.



**2 Planning** | EmboGuide automatically detects feeding vessels to multiple lesions allowing you to analyze the vasculature of the lesions and determine and highlight the vessels feeding the lesion. Feeder vessels can also be manually added or removed. The path of each annotated feeder vessel can be traced to verify whether it feeds into a targeted lesion.



**3 Live Image Guidance to reach the target** | It is important during a selective or super-selective embolization to reach the verified feeders with minimal collateral damage. EmboGuide offers unique 3D Live Image Guidance during the procedure to support precise navigation. This Live Image Guidance provides the foundation for consistent TACE procedures.

## Unique capabilities

- Define target point and entry point for multiple virtual needles
- Visualize thermal characteristics of RF, microwave antennae, and cryo-ablation needles to support planning that aids in obtaining full lesion coverage and sparing critical structures
- Visualizes the thermal profile of a combination of multiple ablation needles
- Live Image Guidance of each needle to target position along pre-planned trajectory

# Lower barriers for minimally invasive interventions

### AlluraClarity FD20 interventional system – new 3D imaging chain engineered for interventional oncology

To improve the speed and clarity of lesion visualizations, our Allura Xper FD20 and AlluraClarity FD20 interventional system offers a new 3D imaging chain designed to meet the demands that oncologic pathology and procedures place on an X-ray imaging system. It offers a number of unique technologies and interventional tools to support clinicians in better seeing, reaching, and treating tumor lesions.



AlluraClarity in the mesenteric area



Kidney perfusion under AlluraClarity

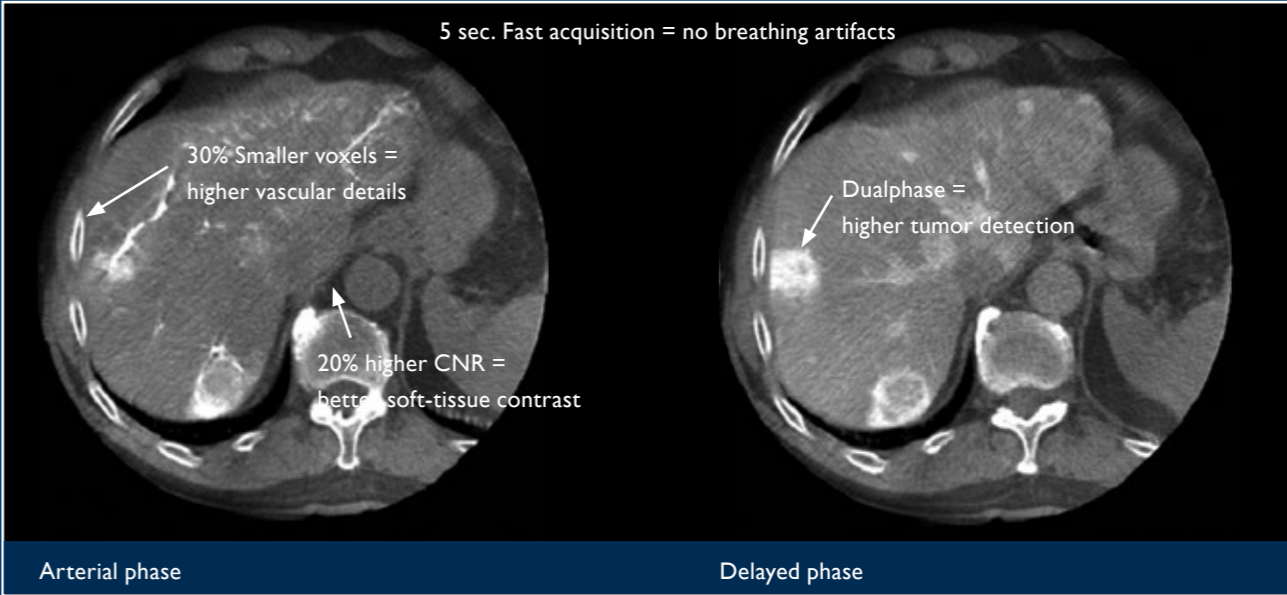
### Never before seen visualizations of lesions

The excellent visualizations provided by the 3D Live Image Guidance of the AlluraClarity FD20 is possible thanks to two new Philips patented technologies: next generation 16 bit FD20 detector technology and the DualPhase C-arm. Our powerful new general processing unit reconstructs these acquisitions into high resolution, high contrast 3D images four times faster than normal to support fast decision making during oncology interventions.



### Next generation 16 bit FD20 detector

With its broad dynamic range, our 16 bit FD20 detector technology takes our XperCT Dual interventional tool to a new level of specificity. This is possible due to a higher X-ray to image conversion efficiency (DQE), more homogeneous images, and increased gray levels (16 bits). The FD20's 16 bit grayscale provides up to 20% higher contrast-to-noise ratio (CNR) for abdominal imaging. This enhances visualizations of soft tissue and vasculature and reduces respiratory imaging artifacts, thereby eliminating the need for a pre-scan. At the same time, our 16 bit Flat Detectors have a thicker scintillator layer compared to 14 bit Flat Detectors, which improves detector efficiency for oncology interventions. Consequently, our FD20 provides up to 30% more efficient X-ray to Image conversion (DQE) at 120 kV to reduce dose.



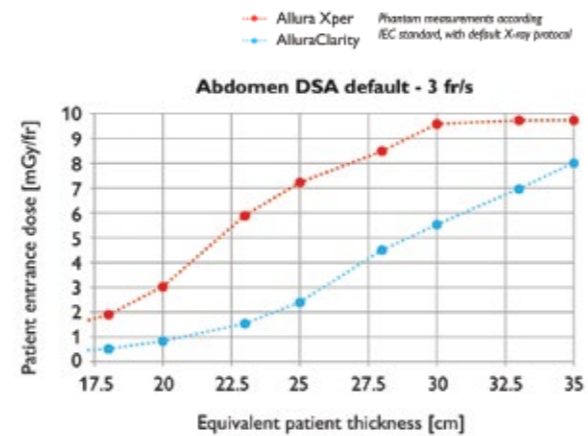


### First DualPhase C-arm for oncologic imaging

DualPhase acquisitions are now possible thanks to the new Wiper movement provided by our DualPhase C-arm. Simply put, it acquires images as the C-arm rotates both forward and backward over the patient. That allows 3D data sets to be acquired at two moments in the procedure, such as the arterial and post-arterial phases. The delay interval can be defined by the user. The fast acquisition time of 5 to 10 seconds reduces respiratory artifacts in the resulting images. Additional processing can be applied to remove metal artifacts and to reduce BMI noise in large patients. DualPhase images can provide new insights into perfusion dynamics.

### Better definition of vessel structure

ClarityIQ is our breakthrough technology which allows you to obtain high quality imaging at low dose levels. This expands your treatment options for challenging cases, may reduce complications with lengthy cases and helps you efficiently manage staff exposure. Several clinical studies have confirmed the high image quality at low settings can be achieved for oncology interventions using ClarityIQ technology.



Patient entrance dose vs. equivalent patient thickness Abdomen DSA

### Consistent imaging performance

Consistent imaging performance is provided by our exclusive Advanced Conductive Cooling technology which eliminates the complex liquid cooling systems of earlier generation Flat Detectors. In the next generation of detector technology the heat from the detector is channeled away from the X-ray generator to avoid temperature fluctuations that can affect image quality.

### Integrated CX50x ultrasound system

3D Echo is frequently used to assist when performing RF ablation procedures and biopsies. Great benefit is derived when soft tissue anatomy of echo is combined with catheter images of X-ray. The CX50x CompactXtreme ultrasound system is an option for OncoSuite that has been designed specifically for diagnostic adult and pediatric echocardiography as well as interventional and surgical applications. xMATRIX technology enables acquisition of remarkably high quality 2D and 3D images. Live 3D TEE provides accurate, reliable, real-time dynamic information.


The CX50x fits smoothly into the oncology workflow. It integrates with the AlluraClarity FD20 and Allura Xper FD20 systems and can be controlled from the tableside. Patient data is automatically transferred from the X-ray to CX50x system eliminating duplication.



## Unique capabilities

- Increased efficiency by displaying display ultrasound images on exam room monitors
- Control the ultrasound system via the tableside Xper module
- Automatically share data between the X-ray and ultrasound system
- Easily control the ultrasound system via the Xper module tableside control
- High quality ultrasound images combined with 2D and 3D X-ray information





## Increased economic value

We partner with you to reduce readmissions, streamline workflow, and increase patient volume by opening the door to new procedures and techniques. Our suites provide the flexibility to support a wide range of procedures and via our Utilization Consulting services, we can help you increase system utilization and reduce your total cost of ownership. Our flexible service contracts are tailored to your budget to protect your interventional or surgical suite investment over its entire lifecycle by increasing uptime and providing easy access to the latest upgrades and innovations.

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