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Artis Q.zen

Visionary Intervention

Ultra-low dose

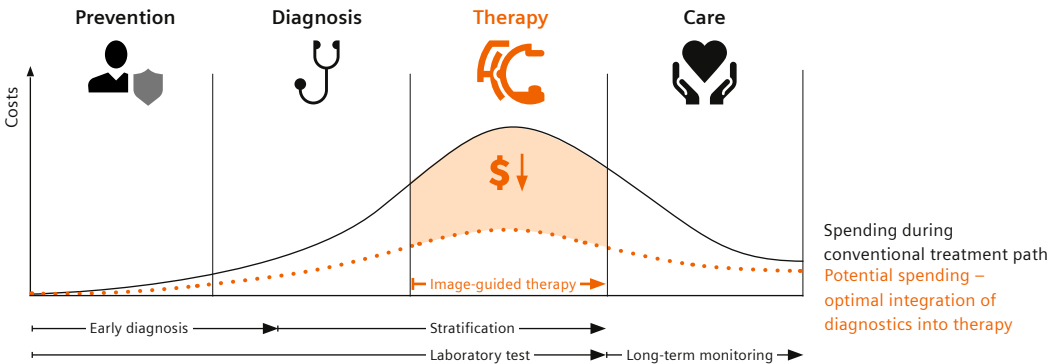
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Investing intelligently for long-term sustainability

Healthcare today faces a predicament. Simply put, costs are increasing, budgets are not. In light of declining reimbursement rates and evolving technology, it is clear that an investment such as an angiography system must be not only cost effective; ideally, it should also serve you reliably for many years to come.

Imaging is essential in therapy and can result in better patient care and lower cost



Only when they deliver correct and reliable results, medical imaging and clinical lab tests can enable optimized and individualized treatment – and help lower costs.

Reimbursement cuts



Percentage of European institutions operating with a significant reduction in reimbursement¹⁾.



A growing population puts enormous pressure on healthcare systems around the globe. As a result, many have responded with significant cuts in reimbursement.

¹⁾ European Society of Radiology. The consequences of the economic crisis in radiology, Insights Imaging (2015)

All set for future trends?

New technical developments and techniques are constantly changing the face of care delivery. What's customary today can be outdated tomorrow. Only a flexible angiography system that can easily adapt to new ways is a future-safe investment.

Trends in Cardiovascular Disease Therapy

 ARR	Therapy of atrial fibrillation continues to be the challenge in terms of numbers and outcome. The Artis ultra-low dose settings in EP optimize clinical operations for the increasing numbers of AFib ablations.	 Procedure mix The procedure mix in the cath lab is getting broader: 2/3 of all cath labs are used for noncardiac procedures, and the treatment of resistant hypertension is one of the biggest challenges.	 US Integration Intracardiac echo and 4D TEE add important information to EP and SHD interventions. Smart interfaces between ultrasound and angiography systems increase workforce productivity.
 SHD	The highest growth rates in cardiology are seen in structural heart disease (SHD). TAVI was just the beginning; further transcatheter approaches are on the rise.	 Stroke Increase of interventional stroke treatment due to superiority of mechanical thrombectomy.	 3D imaging Complex procedures require multimodality approaches. 3D imaging and image fusion become increasingly important for advancing therapy outcomes.
 CAD	The number of complex procedures to treat bifurcation lesions and CTOs is increasing, also leading to a greater need for diagnostic devices (OCT, IVUS, and FFR).	 CLI Use of endovascular recanalizations to minimize amputations in patients with CLI.	 Digitalization Integration of digital technologies and data can help to transform unrelated and scattered data into associated and potentially valuable information to improve outcomes and reduce costs in healthcare.



Artis Q.zen

Visionary in performance.
Visionary in sensitivity.

The Artis Q.zen product line for interventional imaging is a visionary breakthrough in X-ray detection with a unique sensitivity that enables ultra-low-dose imaging. It takes performance in X-ray generation and image quality to the next level.

Artis Q.zen inaugurates a groundbreaking new detector technology based on crystalline silicon that reduces electronic noise and allows imaging at ultra-low dose levels.

The system’s powerful new GIGALIX X-ray tube offers unparalleled performance for a high-contrast resolution at any angle and any patient size. In the fight against the most threatening diseases such as structural heart and coronary artery disease, arrhythmias, and tumors, Artis Q.zen delivers innovative applications offering precision for enhanced guidance during interventional therapy.

Experience the future of interventional imaging.

Not all features shown are necessarily standard and available in all countries

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Visionary in sensitivity

Continuously reducing radiation exposure for both patients and staff is fundamental in interventional imaging, especially during long-lasting procedures with fluoroscopy guidance or when treating children. For enhanced dose sensitivity, Artis Q.zen introduces crystalline silicon detector technology to angiography, which allows device guidance using ultra-low-dose imaging.

High sensitivity for ultra-low dose imaging

Crystalline silicon detector

The active matrix of the Artis Q.zen detector allows the signal to be amplified directly where it is generated at each pixel of the matrix. This on-pixel amplification significantly enhances the signal-to-electronic-noise ratio compared to amorphous silicon detectors and, for the first time, enables imaging at very low radiation, down to only 6 nGy per pulse.

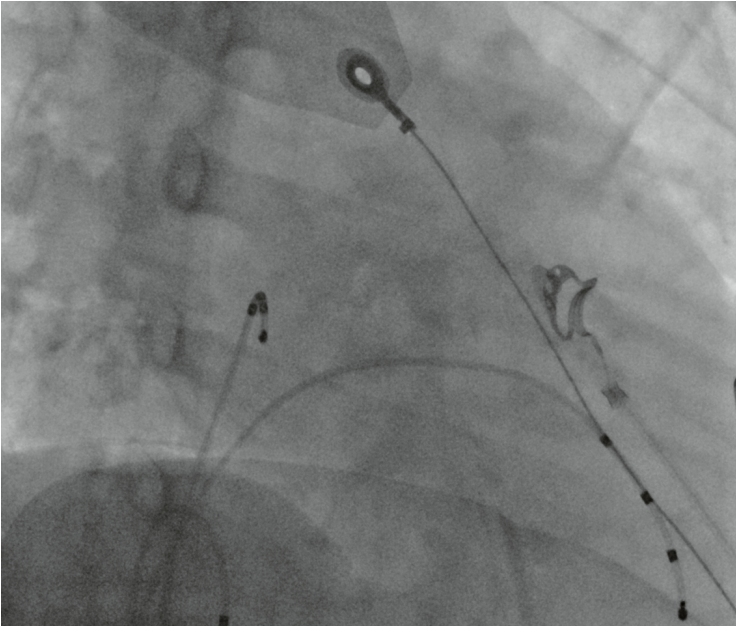
We call this new acquisition mode “ultra-low-dose imaging.” The image guidance of EP catheters can now be done using ultra-low-dose imaging.

This reduces radiation to the patient and personnel in the room, which is especially important for complex, long-lasting procedures such as pulmonary vein isolations. The detector delivers clear image quality even when using other systems in the room, such as mapping systems, without additional shielding.

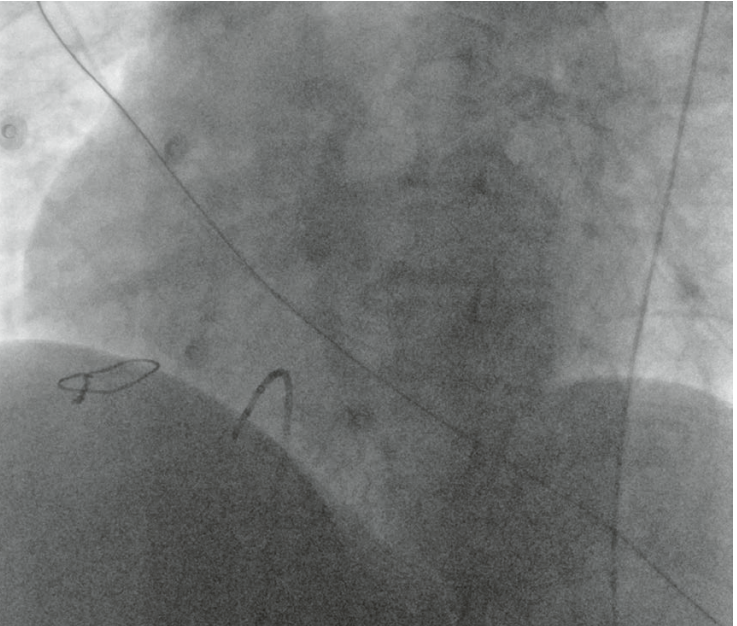
When treating babies and children, reducing radiation is of particular importance. Especially for complex interventional procedures in pediatric cardiology and radiology, ultra-low-dose imaging might help to reduce the radiation significantly.

The ultra-fast readout technology of the new crystalline silicon detector allows for higher frame rates in 3D imaging, up to 99 f/s. In addition, the crystalline silicon detector provides more coverage compared to small cardiology detectors, allowing views of the entire heart.

- Active matrix with on-pixel amplification increases the signal-to-electronic-noise ratio and enables ultra-low-dose imaging
- Ultra-low-dose imaging reduces radiation for both patients and staff, especially in long-lasting procedures with fluoroscopy guidance
- More coverage compared to small cardiology detectors



Amorphous silicon: 39 nGy / pulse



Crystalline silicon: 10 nGy / pulse

University Hospital Basel, Switzerland; comparison of fluoroscopy images of a pulmonary vein isolation procedure.



Visionary in performance

To see any device and anatomical structure in any patient and at any angulation is one of the main challenges in interventional imaging. For better performance and image quality, Artis Q.zen provides enhanced visualization to see small devices. It offers high-contrast resolution even at steep angulations. And it enables sharp images of moving objects such as coronary arteries, while the optimized X-ray pulse helps to reduce radiation by up to 60%.

How to optimize X-rays with the GIGALIX tube

The GIGALIX X-ray tube has been designed around a unique flat emitter technology that generates powerful short pulses. Compared to filament technology, the higher maximum current of the flat emitter enables CLEARpulse and enhances image quality in challenging situations such as with obese patients or in steep angulations. The small square focal spots of the GIGALIX result in higher spatial resolution for all clinical applications and help to better visualize small devices and vessels.

Together with the higher contrast resolution, this results in up to 70% better visibility of small devices.*

With CLEARpulse, the pulse length can be shortened. This allows visualizing moving objects such as coronary vessels more sharply.

CLEARpulse also optimizes the X-ray spectrum by lowering the required tube voltage and allowing for additional filtration.

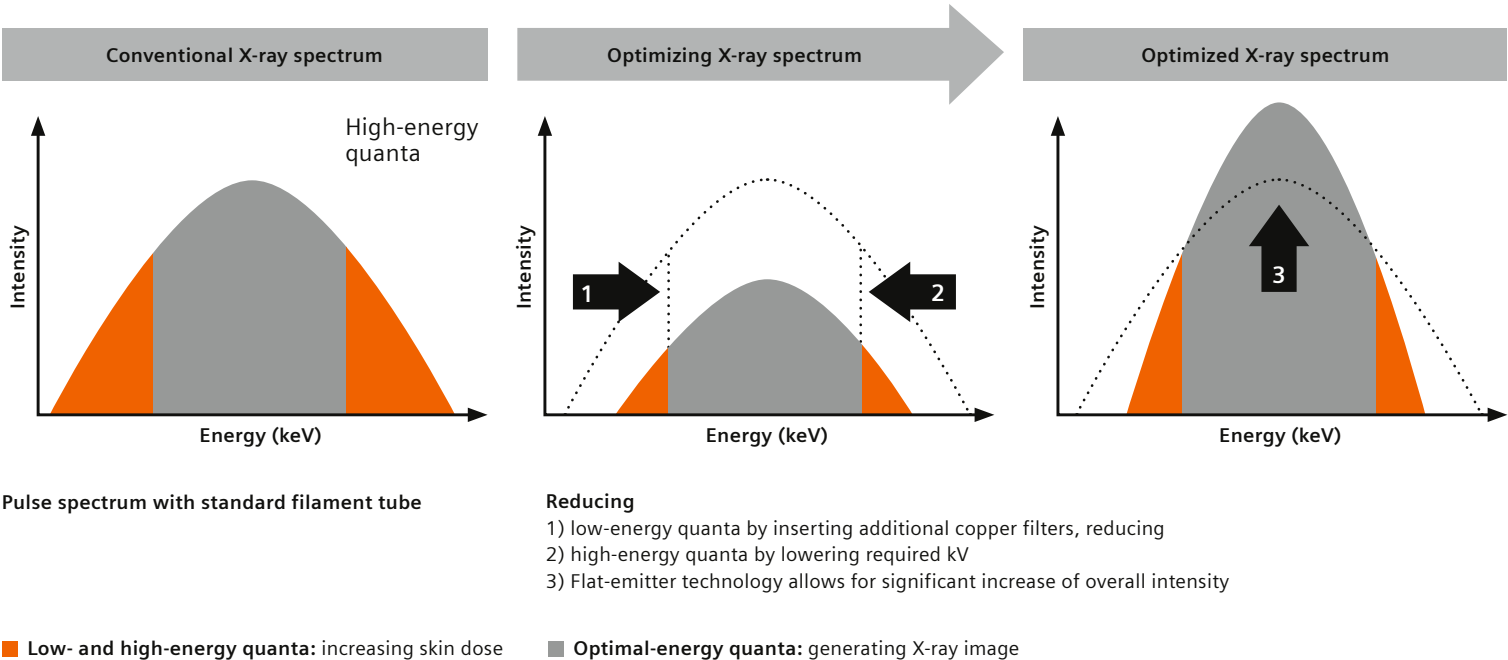
Together with small focal spots, this generates equal image quality with up to 60% less dose*.

The GIGALIX X-ray tube in the Artis Q.zen product line scores a double win: enhanced image quality at a significantly lower dose for both patients and staff.

- Flat emitter technology for high-contrast resolution even at steep angulations
- Small square focal spots for excellent spatial resolution to see more details
- CLEARpulse for sharp images and low dose

*Compared to previous X-ray tube technology. Data on file.

Up to **70%** better visibility of small vessels*
Up to **43%** shorter pulses for better images and optimized dose*





When vision becomes reality

Experience the future of interventional imaging and learn more about Artis Q.zen system configurations and options.

Artis Q.zen

Ceiling-mounted system

The Artis Q.zen ceiling-mounted system offers high positioning flexibility for the C-arm at any angle.

The C-arm can be conveniently positioned at the patient's left, right or head and any angle in between. This enables optimum patient access. The longitudinal ceiling travel offers maximum coverage from head to toe as well as easy parking away from the table.

For increased imaging accuracy, InFocus maintains the projection angle during stand rotation, IsoTilt the projection angle during table tilting, and StraightView upright images for all positions of the C-arm and table.

In addition, the system provides the uncompromised image quality of syngo DynaCT in the lateral position.

- High positioning flexibility of the C-arm at any angle
- Easy parking away from the table
- Maximum patient coverage from head to toe
- High 3D image quality including in lateral acquisition

Artis Q.zen

Biplane system

The Artis Q.zen biplane system offers high positioning flexibility and excellent patient access for biplane imaging.

The Artis Q.zen biplane system combines high performance and positioning flexibility. It supports two isocentric imaging positions enabled by the floor rotation point with motorized swivel from the head end to left side. This allows optimum access to the patient's head as well as extensive coverage from head to toe in biplane imaging mode.

In single-plane mode, the table and stand rotation allows access even to the patient's left side. A special orthogonal position with rotated table enables easy access to the patient's head for complex procedures under anesthesia. For increased imaging accuracy, IsoTilt maintains the projection angle during table tilting and Artis StraightView upright images for all C-arm and table positions.

- Two isocentric imaging positions enabling access to the patient's head for anesthesia in biplane mode
- Synchronized movements of both planes
- Extensive coverage from head to toe

Artis Q.zen

Floor-mounted system

The Artis Q.zen floor-mounted system offers high positioning flexibility on a very small footprint.

The C-arm features a floor rotation point with motorized swivel – from the head-end position to a left-side position. This ensures optimum access to the patient's head as well as extensive coverage from head to toe.

Flexible positioning of the C-arm relative to the table is possible, e.g., allowing access to the patient's left side for pacemaker implantations. A special orthogonal position with rotated table enables easy access to the patient's head and sides for hybrid procedures.

Artis StraightView maintains upright images for all C-arm and table positions.

The compact and slimline C-arm design has a small footprint requiring an examination room size of only 25 m².

- High positioning flexibility on a very small footprint
- Excellent access to the patient's head for complex procedures under anesthesia
- Extensive coverage from head to toe

Technical specifications

Installation

- Artis Q.zen is available in floor-mounted, ceiling-mounted, and biplane models

zen30HDR detector with 16-bit technology

- Crystalline silicon flat detector with 39 cm diagonal entrance plane
- High-resolution crystalline silicon matrix with 160 µm pixel size and 16-bit digitization depth
- 75 fps readout for 3D and syngo acquisitions for short scan times

X-ray tube

- Second-generation flat-emitter tube GIGALIX with a high maximum current of 1000 mA at 100 kV
- Small and square-shaped focal spots 0.4 and 0.7 for clear visualization of small devices and vessels
- Increased contrast during fluoroscopy, especially for examinations on obese patients

Operating modes

- Digital pulsed fluoroscopy at 0.5, 1, 2, 3, 4, 7.5, 10, 15, 30 p/s; acquisition at 7.5, 10, 15, and 30 fps
- Acquisition, display, and storage in original matrix
- 12-bit overlay fade, online superimposing of active fluoro and reference images

Technologies

- CARE+CLEAR for dose reduction and image quality
- PURE® for a smoother workflow and better system performance

Display

- 19" Monochrome Flat Display
- 55" Artis Large Display

Tables

Choose the table that works best for you. Our selection of free-floating tables have easily exchangeable tabletops, so they can be conveniently adapted to the different needs of clinical procedures within minutes.

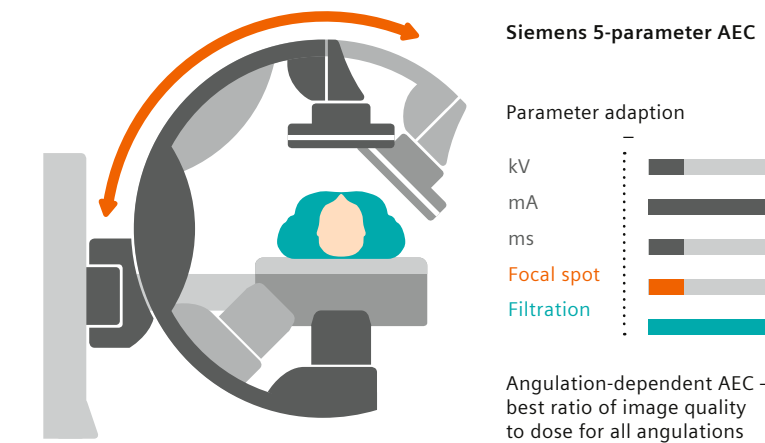
- Standard table: Free-floating tabletop with customizable tableside control module and rotation up to 120°.
- Tilting table: Additional tilting capability, which is useful for increasing patient blood pressure.
- Integrated Artis OR table: Designed for easy patient access, total body coverage, motorized in all directions and it provides tilt and cradle functionality.

Intelligent dose optimization

Five that make a difference

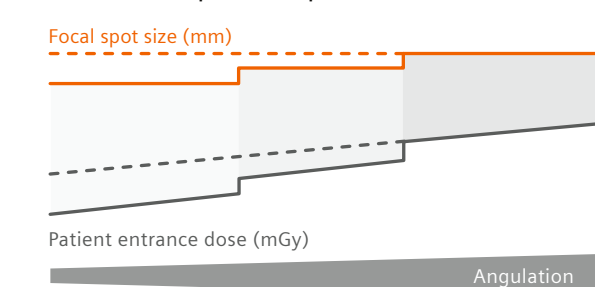
Effective dose reduction is important in every intervention. But only with the Artis system families do both your team and your patients benefit from X-ray regulation featuring five independent, self-adjusting, and angulation-driven parameters (Automatic Exposure Control, or AEC).

Compared to systems with only three manually adjustable parameters, for instance, AEC significantly helps increase image quality while reducing entrance air kerma. For small attenuations, the five-parameter AEC even enables you to increase dose efficiency by up to 43% for fluoroscopy and up to 128%¹ for acquisition – which is especially beneficial for pediatrics.



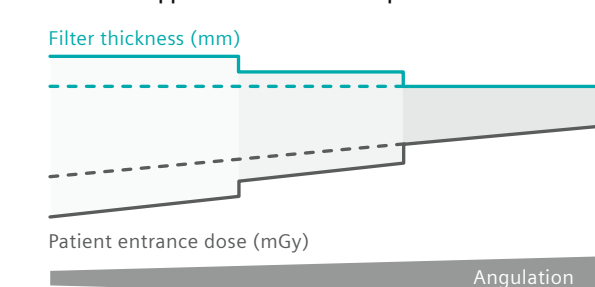
M Dehairs, H Bosmans, W Desmet, and N W Marshall; 2017 Evaluation of automatic dose rate control for flat panel imaging using a spatial frequency domain figure of merit, Phys. Med. Biol. 62

Effect of focal spot size on patient entrance dose



Comparison of focal spot adjustment (orange arrow) with a fixed focal spot (orange dashed arrow) and the corresponding effects on dose (gray arrow and gray dashed arrow).

Effect of copper filter thickness on patient entrance dose



Comparison of CAREfilter (petrol arrow) with fixed prefiltration (petrol dashed arrow) and the corresponding effects on dose (gray arrow and gray dashed arrow).

CARE – Combined Applications to Reduce Exposure

Almost 20 years of Siemens Healthineers innovations to reduce, monitor, and report dose in angiography. The CARE package helps reduce radiation for the operator and patient and is inclusive with all Artis Q.zen systems.

Dose saving

CAREvision provides variable fluoroscopy frame rates; pulse frequencies can be adapted to clinical needs.

CAREfilter is a specially designed copper prefiltration system that automatically adjusts the filter to the patient's anatomy.

CAREprofile allows radiation-free collimator and semitransparent filter adjustment using the last image hold (LIH) position as a reference.

CAREposition enables radiation-free object positioning, i.e., allows the table or C-arm position to pan without using fluoroscopy.

Low-Dose Acquisition a dedicated acquisition protocol, helps to achieve dose reductions.

Dose monitoring

CAREguard allows three threshold values to be defined for the accumulated skin dose and signals when a skin dose level is exceeded.

CAREwatch displays the dose area product and dose rate at the interventional reference point on the live display in the examination and control rooms.

CAREmonitor shows in real time the accumulated peak skin dose according to the current projection in the form of a fill indicator on the live monitor.

Dose reporting

CAREreport is a DICOM-structured radiation report containing all patient demographic, procedure, and dose information.

CARE Analytics is a stand-alone tool for installation on any PC in the hospital network, allowing evaluation of DICOM dose structured reports.

We think beyond technical hardware improvements. Introduced in 1994, our ever growing CARE portfolio continues to reduce radiation dose for patients and clinical staff while maintaining high image quality for diagnostic confidence.

Artis Large Display and Artis Cockpit

Get the big picture.

With the Artis Large Display, 9, 18, or 24 video signals can be connected to the screen. The screen layout can be changed from the tableside. With its built-in backup concept, additional back-up monitors are no longer necessary. Also, a special algorithm ensures sharp display of ECG signals in zoomed formats, which is especially important to precisely visualize intracardiac ECG signals.

- Scalable from 9 to 24 inputs
- Tableside control
- Special ECG signal optimization algorithm

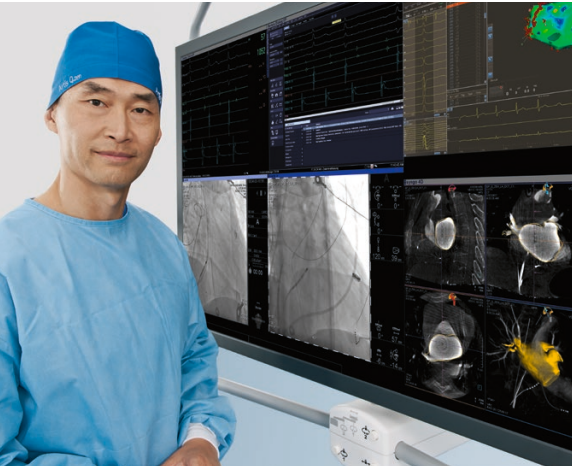
It's time to clean up the control room.

Stop running from one system to the next – let the Artis Cockpit consolidate all your information in one workplace. The 30-inch medical-grade monitor offers 4-megapixel resolution and high brightness for excellent image display. Up to 9 inputs can be simultaneously displayed and controlled, with a choice of four different layouts.

The position of the system inputs on the screen can be easily rearranged using the unique drag & drop functionality.

Artis Cockpit offers one single workplace that can be equipped with one or two keyboards and monitors. With so much more efficiency in the control room, you can focus on your procedure and your patient.

- Control up to 9 systems from one workplace and clean up your control room
- Configure the Cockpit to your needs with one or two keyboards and monitors



Additional products and services

Tailor your system: Choose from the following options to customize your Artis Q.zen system.

Accessory solutions

Choosing a new imaging system may inspire other equipment upgrades or additions at your workplace. Our accessory solutions portfolio offers a broad range of complementary products, such as radiation protection clothing/equipment, uninterrupted power supply solutions, contrast media injectors, and positioning aids. We will gladly tailor a package to your individual needs.

Sensis Vibe –

A scalable solution for hemodynamics and EP
Sensis Vibe is an integrated recording and information system that serves as your central point of data handling.

Since you need only one system for both hemodynamics and EP, you need less space. Sensis Vibe also grows with your EP lab because it lets you easily add a further ICEG board to expand your clinical capabilities in EP with up to 96 bipolar ICEG channels.

Sensis Vibe's integrative design reaches beyond the angio system to other important EP equipment: ablators, stimulators and mapping systems. Again, Sensis strives to be the central data collection node for these systems.

Sensis Vibe can be extended to a combined system for hemodynamic and electrophysiology acquisition featuring:

- One-stop patient registration and comprehensive reporting
- Seamless amplifier integration
- Excellent signal quality even during ablation





Why Siemens Healthineers

At Siemens Healthineers, our mission is to enable healthcare providers to increase value by empowering them on their journey towards expanding precision medicine, transforming care delivery, and improving patient experience, all enabled by digitalizing healthcare.

An estimated five million patients worldwide everyday benefit from our innovative technologies and services in the areas of diagnostic and therapeutic imaging, laboratory diagnostics and molecular medicine as well as digital health and enterprise services.

We're a leading medical technology company with over 120 years of experience and 18,500 patents globally. With over 50,000 employees in more than 70 countries, we'll continue to innovate and shape the future of healthcare.



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