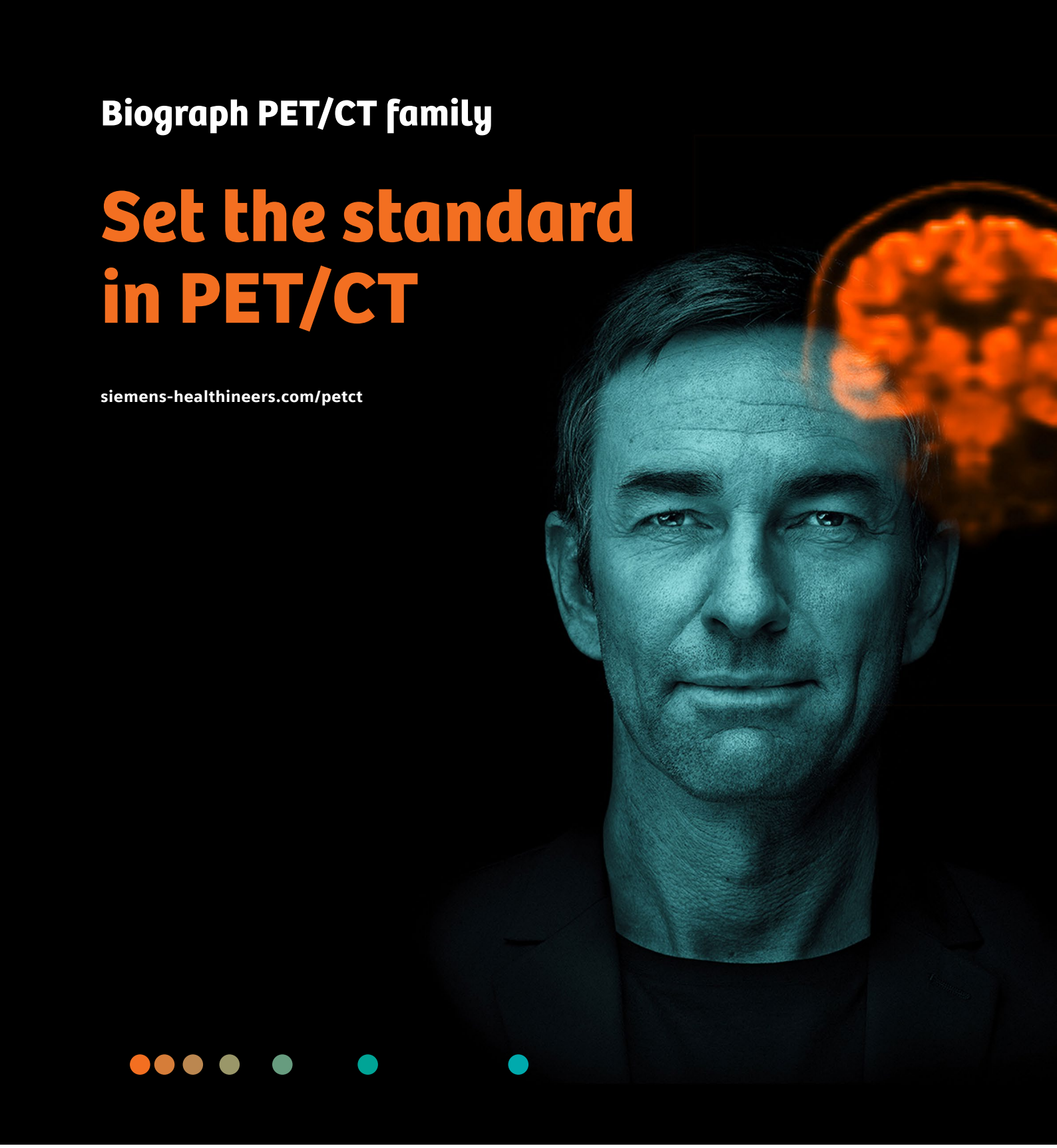
Biograph PET/CT family

Set the standard in PET/CT

siemens-healthineers.com/petct



SIEMENS Healthineers

A range of options. A world of care.

The demand for PET/CT imaging is growing. Diagnostic and therapeutic radiopharmaceuticals are expanding, leading to increased requests for PET/CT imaging in oncology, neurology, cardiology, therapy planning, and other specialty applications. Additionally, the need for a personalized patient experience and efficient workflow make having the right equipment essential. Our Biograph™ PET/CT family of scanners offers a range of options to help you deliver.

Biograph PET/CT systems give you:

- Optimal technology
- AI-enhanced performance
- Exceptional image quality
- Outstanding efficiency
- Limitless clinical potential

Biograph PET/CT systems are designed to help you diagnose, treat, monitor, and research disease more confidently. With strong foundational technology, digital detectors, and artificial intelligence (AI)-enabled capabilities, as well as enhanced image quality and optimized workflows, Biograph PET/CT scanners help you provide the best clinical services for your patients.

+20

new PET tracers could reach the market before 2027[1]

Under Development

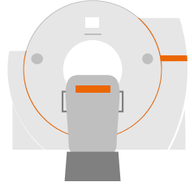
2x

increased radiopharmaceutical diversity[2]

PET/CT imaging grows by

7%

each year[3]



The Biograph family of PET/CT scanners

Biograph Horizon

Ready for more

Expand your options with advances and efficiencies. Capitalize on premium performance at an attractive level of investment. Offer a high level of care with increased flexibility and intelligent imaging.

Biograph mCT

Clearly going beyond

Accelerate your potential and go beyond the standard level of imaging. Improve steps across the entire patient journey with enhanced clinical efficiencies and move the patient and user experience to a new level of care with intelligent imaging.

Biograph Vision™

Precision-driven performance

Redefine PET/CT imaging with precision-driven performance that transforms accurate decision-making. Open new clinical and research avenues with state-of-the-art detectability. Empower users to scan faster, reduce dose, and enhance patient comfort intelligently.

Biograph Vision Quadra™

Bigger perspective. Better answers.

Deepen the dimension of your investigations, explore new research questions, and identify the best clinical approach with the perspective of a large axial PET field of view (FOV), taking the potential of PET/CT even further.

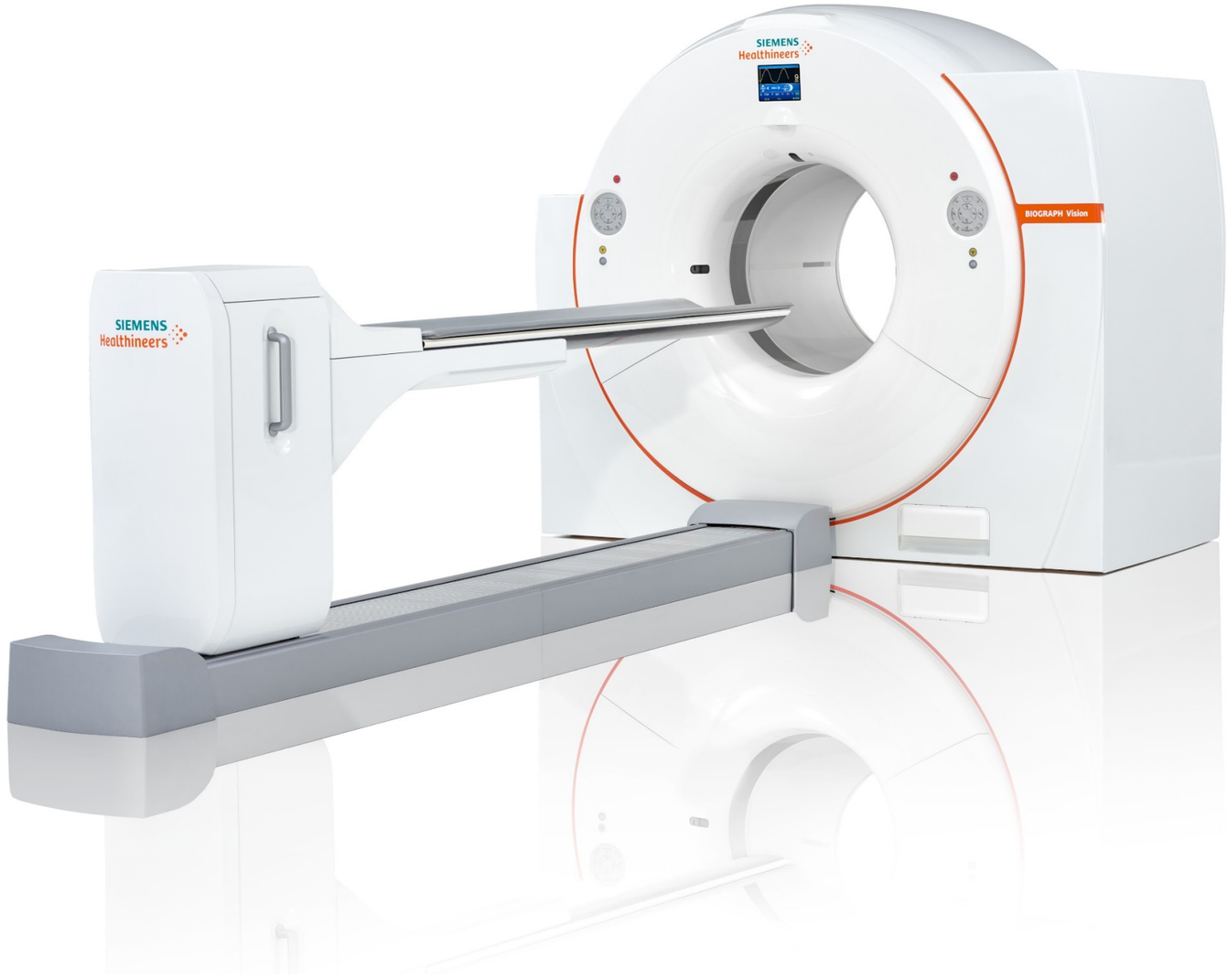
AIDAN:
Intelligent imaging platform for Biograph PET/CT scanners

AIDAN is our intelligent imaging platform for Biograph that supports the demanding processing power of AI-based solutions. Combined with the Biograph family of smart PET/CT scanners, AIDAN accelerates operational efficiency and creates an elevated patient workflow that enables precise diagnoses and helps transform care delivery. For molecular imaging professionals, AIDAN uses powerful AI to generate real impact.

Set the standard in PET/CT

The value of PET/CT is in the details —more precise information leads to greater potential for an earlier diagnosis and a more definitive treatment strategy, helping to improve patient outcomes.

Our entire product portfolio is built on technology that adds up to more. AIDAN, our intelligent imaging platform, unlocks a host of advanced solutions to expand your clinical capabilities and deliver excellent lesion detectability, quantification accuracy, and operational efficiency—letting you bring a high standard of care to more patients.



PET detector expertise

Maximize performance with lutetium oxyorthosilicate (LSO) crystals that we grow and individually select and detectors that are designed and built in-house.

True dual-modality

Benefit from the full diagnostic potential of a hybrid scanner that integrates the best performance of both PET and CT into a single, compact system.

Smart scanner design

Accommodate a wide range of patients with smart technologies, an open gantry design, and well-integrated features at the scanner for ease of use.

AIDAN: an intelligent imaging platform

Leverage an elevated patient workflow that generates more precise diagnoses with a world of AI-enhanced features.

Unique features

Get the full potential out of your PET/CT with unique features across the entire portfolio.

Answering your needs with optimized technology

With a state-of-the-art technology foundation, Biograph PET/CT scanners deliver outstanding performance, accuracy, and perspective. We control the entire manufacturing process—from growing our own LSO crystals in-house and producing proprietary detectors to managing production and assembly. Our unique approach minimizes tradeoffs, optimizes quality, and builds on decades of expertise.

+2,300
installations worldwide[2]

+97%
system uptime[2]

We grow
our own crystals

We hand select
each crystal

We build
our own detectors

We integrate
our own CT scanners

We assemble
and test on-site

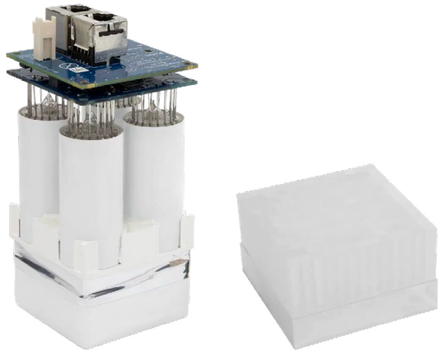
We develop
cutting-edge software

Data courtesy of University of Tennessee Medical Center, Knoxville, Tennessee, USA.

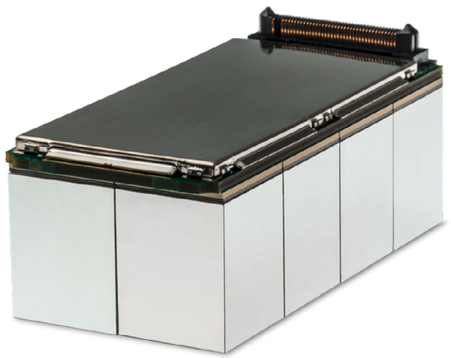
Advancing detector technology

Over the past 50 years, we have continuously improved our detector design. In addition to integrating the highest-quality LSO crystals, our detectors are designed for maximum precision. Each individual pixel's performance is calculated and matched within the detector for optimal results.

Biograph PET/CT scanners deliver exceptional high isotropic spatial resolution for improved small lesion detectability. The detector electronic assembly (DEA) is engineered to eliminate gaps between the sensor in all directions while enabling easy serviceability. Each detector's performance is optimized within the configuration of the PET ring.



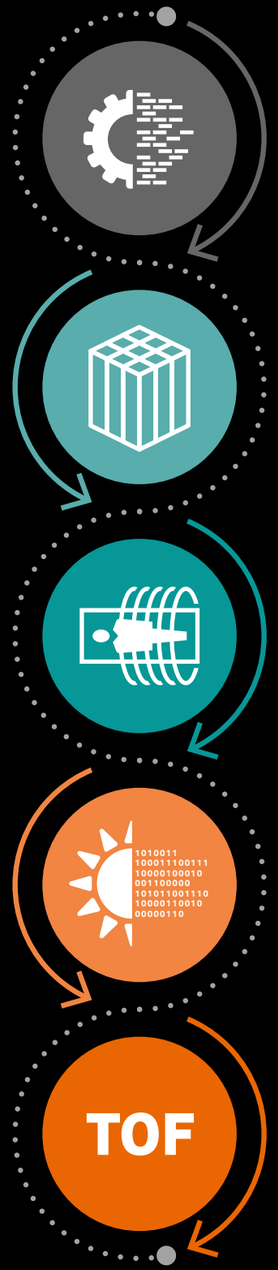
Optiso HD detector



Optiso UDR detector

Optimized designs that progress PET/CT

Transitioned from bismuth germinate (BGO) to LSO crystal material for **faster scintillation and higher light output**



Reduced crystal element size for **increased precision and lesion detectability**

Tightly packed crystal elements in unique block designs to optimize light output for even **greater timing performance and energy resolution**

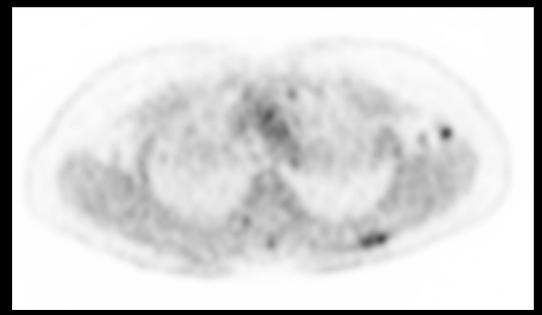
Integrated photomultiplier tube (PMT), avalanche photodiode (APD), and silicon photomultiplier (SiPM) photosensors for different specialty demands and enhanced performance

Improved image contrast and clinical flexibility with **true time-of-flight (TOF) performance**

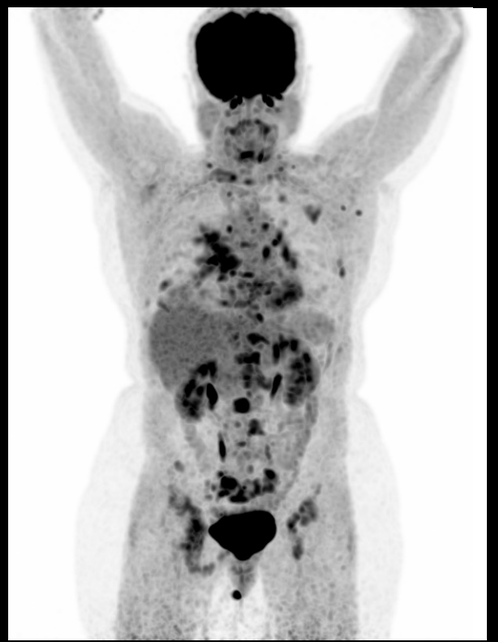
A focus on crystals

Every crystal used in our Biograph PET/CT scanners is grown and hand-selected in-house by Siemens Healthineers. We do this because it allows us to control LSO purity, which directly impacts performance. By specifying crystal dimensions, we strengthen the detector's ability to capture photons accurately; and we can extract the highest possible performance from each detector. Optimized crystal elements enhance signal-to-noise ratio and quantitative accuracy to maximize lesion detectability.

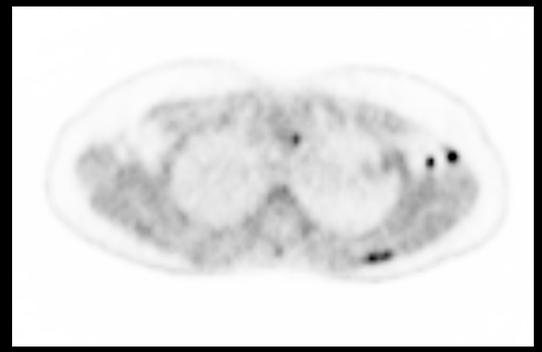
Reducing crystal size has an impact



Crystal size A



Crystal size B is 20% smaller than crystal size A

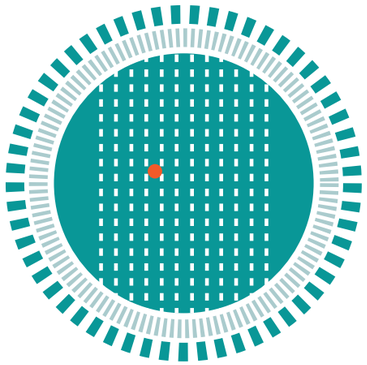


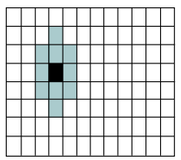
Crystal size B

Data courtesy on file.

Advancing image quality

TOF

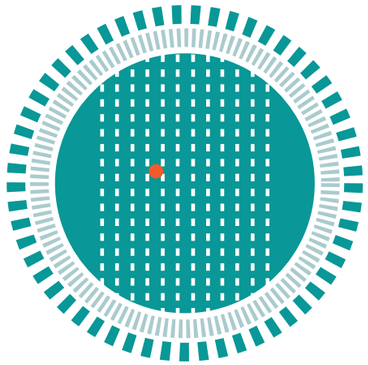


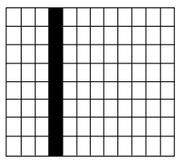


Segments of response ("time bins")

Accurately locates the annihilation along the line-of-response (LOR)

HD•PET

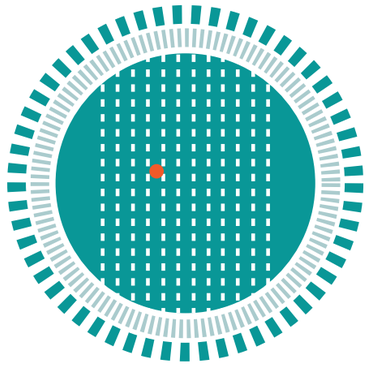


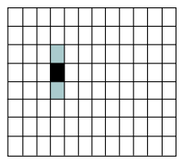


Segments of response ("time bins")

Effectively positions the LOR in its actual geometric location

ultraHD•PET





Segments of response ("time bins")

ultraHD•PET reduces blurring of the signal from all axes

Time of flight (TOF)

All Biograph PET/CT scanners are TOF-capable to enable lower doses and faster scan times. By measuring the difference between the detection of each coincidence photon, they can better determine the event location along the LOR. True TOF effectively boosts the clinical performance of PET scans, better localizing each event and reducing noise within the reconstructed image.

Faster TOF resolution
= Higher TOF gain

HD•PET

HD•PET incorporates millions of accurately measured point spread functions (PSF) in the reconstruction algorithms. Using measured PSFs, HD•PET effectively positions the LORs in their actual geometric location, which dramatically reduces blurring and distortion in the final image—increasing sharpness.

Visually sharper clinical images

ultraHD•PET

ultraHD•PET improves signal-to-noise, contrast, and image resolution for sharper clinical images and the ability to precisely visualize even the tiniest lesions. ultraHD•PET provides enhanced resolution over measured FOV. The combined power of HD•PET and TOF enhances image quality and reduces acquisition time.

2x improvement
in signal-to-noise ratio

Improving your performance with AI

Biograph PET/CT scanners with AIDAN offer access to AI-enabled features that increase the performance of your imaging platform. Our Anatomical Landmarking and Parsing of Human Anatomy (ALPHA) deep machine learning algorithm provides visual detection of anatomical structures based on thousands of expert-annotated images and several algorithm modules working together. By using landmarks and reference regions to learn anatomical location, ALPHA recognizes features in a way similar to how human visual recognition works.

AIDAN brings together two key technologies

ALPHA and the SMART patient handling system (PHS)

As the demands on molecular imaging increase, opportunities for streamlined workflows and more sophisticated studies make AI even more important. AIDAN is our intelligent imaging platform for Biograph PET/CT. With AIDAN, you can leverage the demanding processing power of AI-based solutions to perform PET/CT exams with more efficiency—optimizing clinical operations and the patient experience with just a click of a button.

ALPHA is at the heart of the AIDAN platform, which includes four key features that enable Biograph PET/CT scanners' intelligent imaging experience:

FlowMotion™ AI
offers disease-based protocols that intelligently adjust to the patient's anatomy and combine with continuous bed motion for standardized imaging workflows—providing fast, reproducible, and personalized results.

OncoFreeze™ AI
locates and corrects anatomy impacted by respiratory motion and increases clinical confidence without additional setup or patient interaction.

FAST PET Workflow AI
boosts technologist efficiency by reducing image processing time and data file size and by creating PACS-ready ranges and automatic data exports.

Multiparametric PET AI
expands the available parameters and acquisition flexibility, facilitates more reproducible images, and enables absolute quantification.

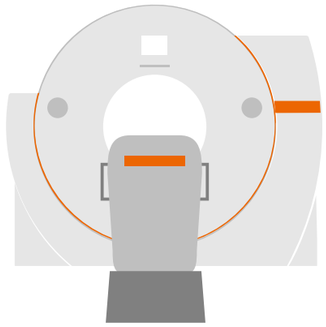
Deepen clinical perspectives

Improve patient and user experience

Optimize department workflow

Enhancing your efficiency and patient experience

Biograph PET/CT scanners are designed with the needs of your patients and users in mind. From software advances to bore designs, Biograph PET/CT builds on real-world imaging insights to better meet your needs and enable more focused and productive time with patients.



System preparation

Daily quality control (QC) can expose technologists to radiation. Biograph PET/CT scanners offer QualityGuard™, an automatic daily QC protocol that runs during scanner off hours.

- QualityGuard eliminates the use of radioactive calibration source for daily QC
- Technologists no longer need to lift a 12-kg phantom
- Approximately 120 hours in technologist time can be saved per year

Patient preparation

The open design and front and back access to controls give users the freedom to work efficiently and streamlines patient preparation steps. Additionally, the short tunnel design opens up access for greater comfort.

- Wide bore (up to 78-cm wide) and short tunnel offer a more open scanning experience
- Large bore allows for better positioning of radiation therapy planning (RTP) devices, such as breast boards

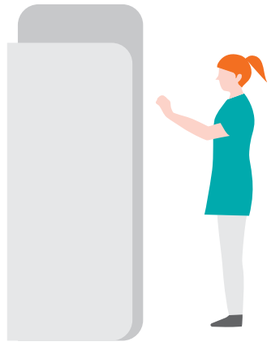


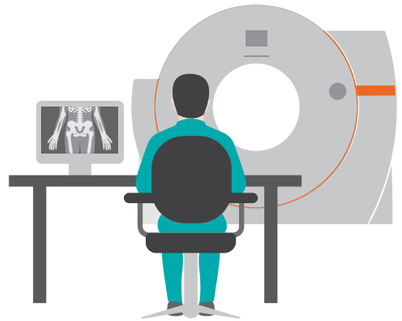
Image acquisition

The SMART PHS built into every Biograph PET/CT scanner is designed specifically for PET/CT imaging. The unique cantilever design enables the pedestal and table to move as one unit. All Biograph PET/CT scanners support up to 227 kg (500 lb) without differential deflection between PET and CT acquisitions for more precise images. The magnetically driven mechanism enables continuous bed motion.[6]

- Scalable axial PET FOV supports a wide range of clinical needs
- Each system's axial PET FOV is configurable for choice in count rate performance
- Addresses site-specific workflow needs

Image reconstruction

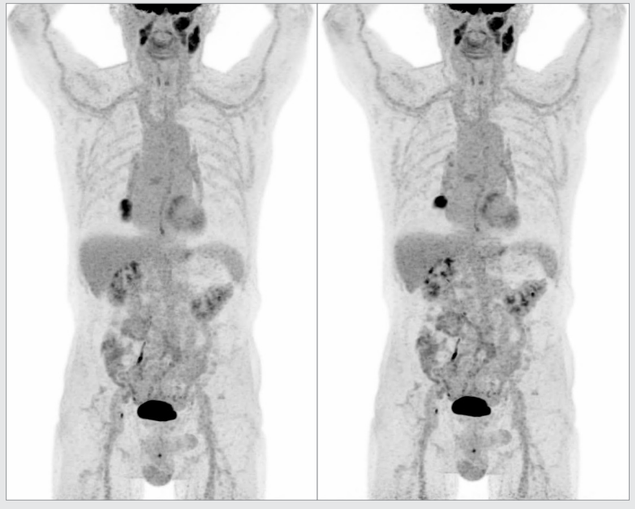
Image reconstruction starts simultaneously with the image acquisition. Advanced hardware provides images ready for review just a few seconds after the end of the acquisition of each specific zone. Users do not have to wait until the end of the entire scan to react and restart due to patient movement.



Maximizing your clinical potential

Oncology

Biograph PET/CT offers fast TOF combined with small crystal elements, delivering an acquisition matrix that makes it easier to see small lesions and can significantly improve lesion detectability for oncologic PET/CT imaging. Biograph PET/CT produces outstanding image quality for a wide range of radiopharmaceuticals and imaging needs, including whole-body dynamic imaging, theranostics, and much more.



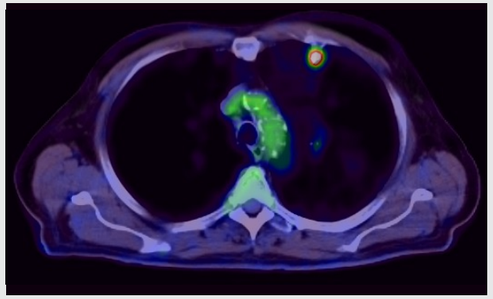
Static **OncoFreeze AI**

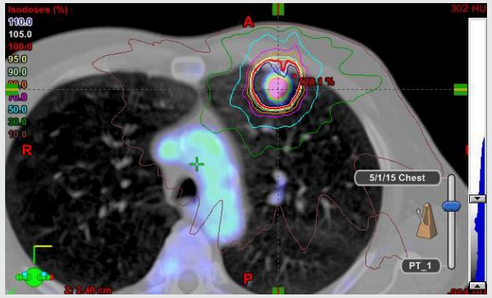
OncoFreeze AI provides sharp visualization of small lung nodules using deviceless respiratory motion management. The results show a right hilar lung carcinoma imaged with sharper visualization, as compared to non-gated imaging, due to the elimination of respiratory-motion-induced blurring. Using FlowMotion AI, the motion correction with OncoFreeze AI was integrated in a single scan.

Data courtesy of Aarhus University, Aarhus, Denmark.

Click for more

Biograph PET/CT offers advanced imaging capabilities that can elevate and expand your offerings. Designed with specific features to meet the clinical demands of oncology, radiation therapy, neurology, and cardiology, Biograph PET/CT delivers imaging versatility that expands what you can do.





Data courtesy of University of Tennessee Medical Center, Knoxville, Tennessee, USA.

Biograph mCT with FlowMotion enables targeted respiratory gating for improved stereotatic body radiation therapy (SBRT) planning in a patient with lung cancer, and the 78-cm bore size facilitated patient positioning with dedicated radiation therapy positioning devices.

ultraHD•PET with high lesion contrast allows target planning for SBRT for delivering high radiation doses in just a few fractions for enhanced local control and lower toxicity. Incorporation of respiratory gating into FlowMotion acquisition enables definition of lesion motion for appropriate target definition.

Radiation therapy

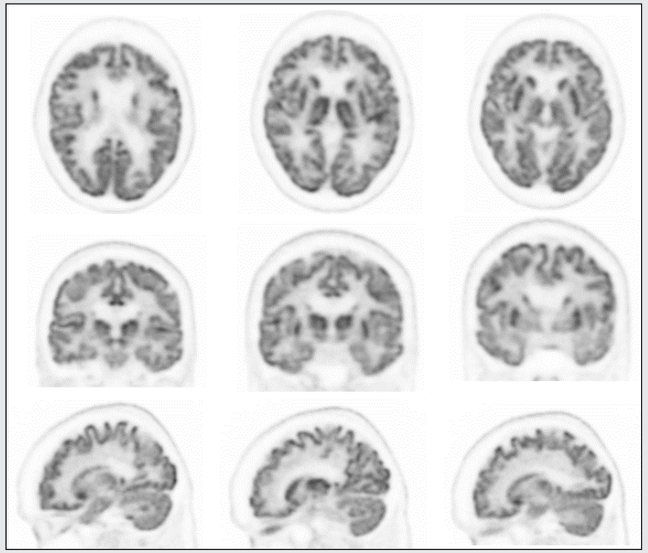
Biograph PET/CT provides exceptional imaging quality for a variety of radiation therapy needs, allowing for greater lesion detectability, more accurate planning, and improved clinical results.

Click for more

Maximizing your clinical potential

Biograph Vision neurology study shows normal uptake in the brain with excellent delineation of functioning cortex and sharp contrast between cortex and white matter. Additionally, there is sharp basal ganglial edge definition, especially the sharp margins and distinct separation of the head of caudate nucleus and putamen.

This study leverages ultraHD•PET technology and the small LSO isotropic crystal elements with a native 440 x 440 matrix.



Data courtesy of University Medical Center Groningen, Groningen, The Netherlands.

Neurology

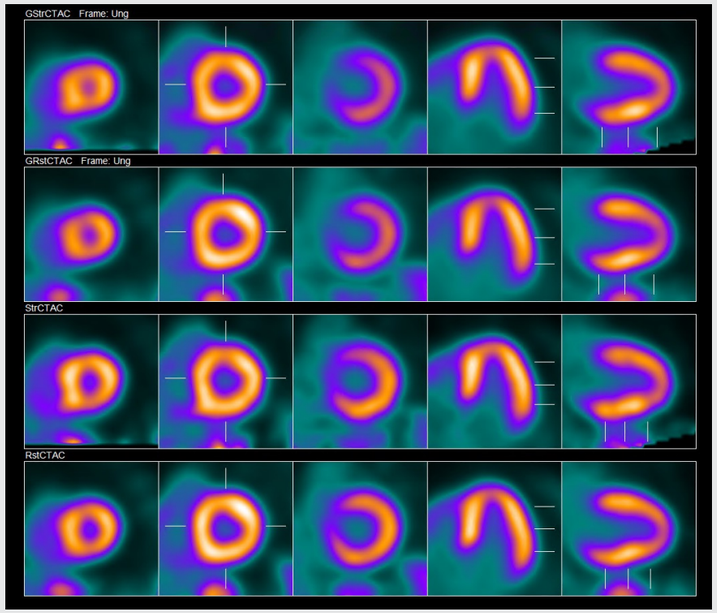
Biograph PET/CT's small crystal size plus fast TOF with high-resolution matrix delivers high contrast with sharp definition of brain structures, which may improve visual and quantitative assessment.

Data courtesy of Osaka City University, Osaka, Japan.

Click for more

Cardiology

Biograph PET/CT's detectors provide excellent performance in applications that require dealing with high activity concentrations, such as myocardial bloodflow (MBF) with ^{82}Rb—demonstrating high image quality with sharp definition of ventricular margins with low noise.

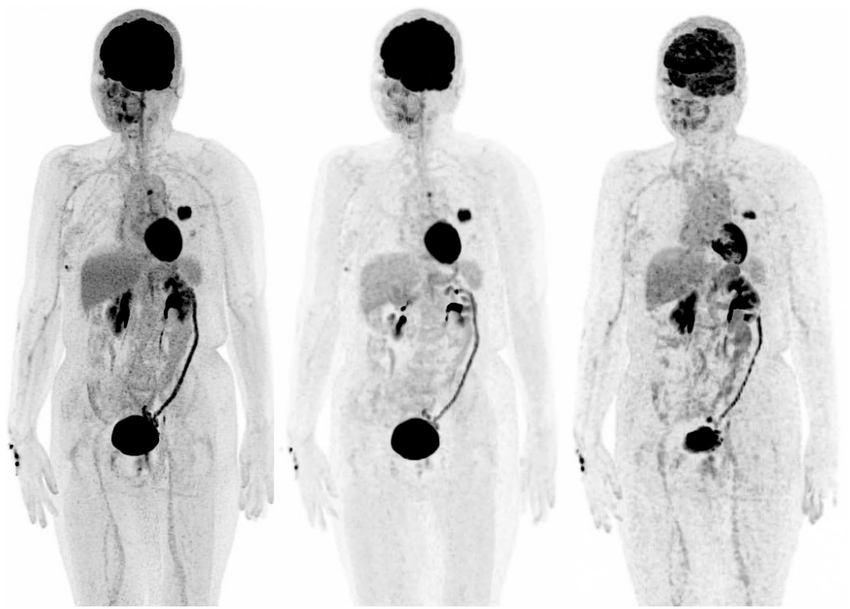


Biograph Horizon study shows how LSO crystals combined with optimized detector technology allow fast detection of scintillation events, resulting in excellent image resolution in ^{82}Rb cardiac imaging.

Data courtesy of Christiana Care Health Systems, Newark, Delaware, USA.

Click for more

Maximizing your research potential



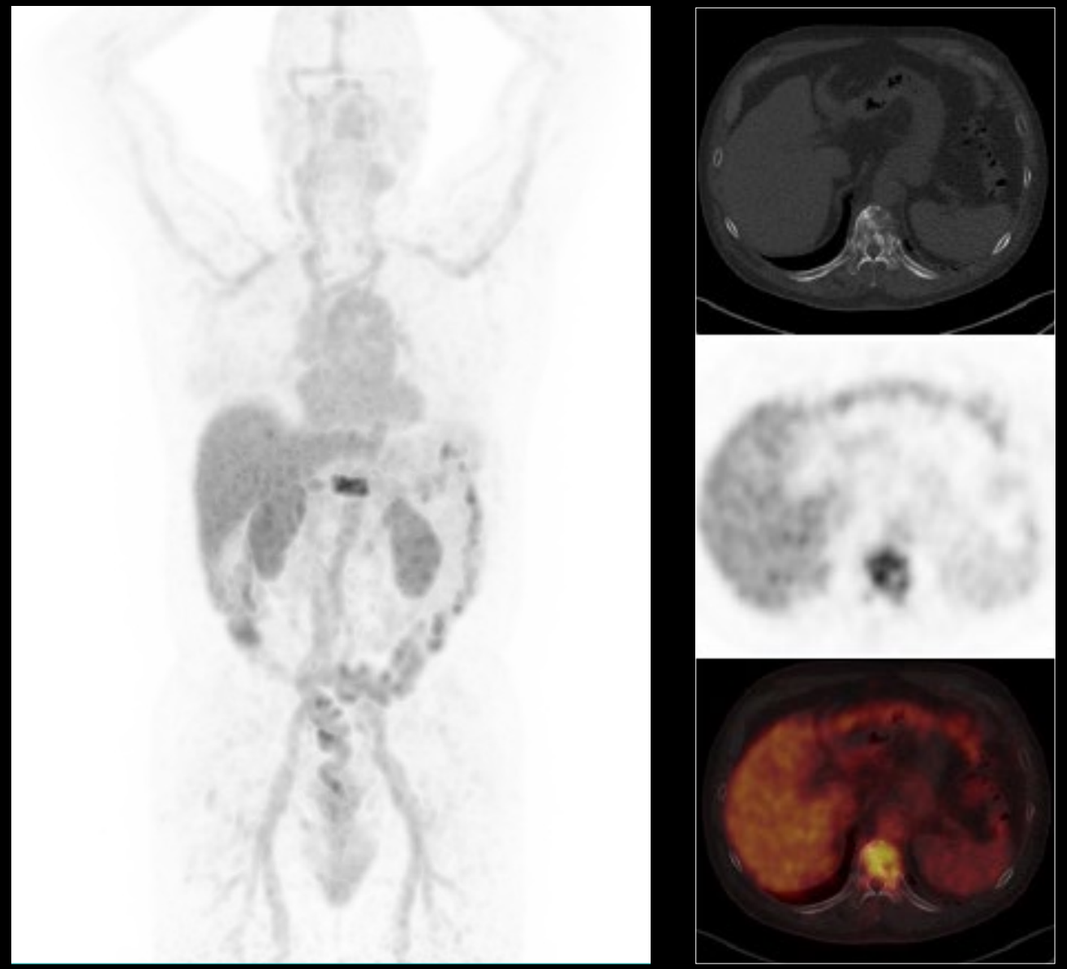
Summed frames 14-19 | Patlak slope (MR_{FDG}) Image | Patlak intercept (DV) image

	Summed SUV	MR_{FDG}	DV
Lung tumor	$SUV_{peak:}$ 10.5	$MR_{FDG\ (peak):}$ 19.72 µmol/min/100ml	$DV_{mean:}$ 238%
Mediastinal nodal met	$SUV_{peak:}$ 3.51	$MR_{FDG\ (peak):}$ 5.48 µmol/min/100ml	$DV_{mean:}$ 93.3%

Multiparametric PET imaging

Biograph PET/CT study demonstrates high SUV and MR_{FDG} values in the primary lung mass, which reflects hypermetabolism secondary to high cellular proliferation within an aggressive lung carcinoma. In contrast, the mediastinal metastasis shows lower SUV and MR_{FDG} values, reflecting lower cellularity. Additionally, the high distribution volume (DV) within the lung tumor reflects tumor vascularity and high interstitial fluid volume.

Data courtesy of Chulabhorn Hospital, Bangkok, Thailand.



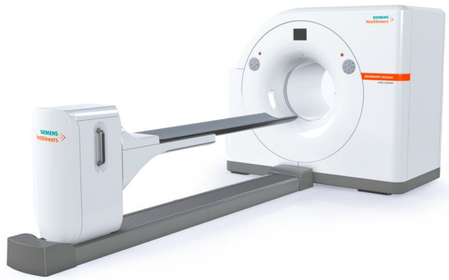
^{89}Zr Trastuzumab imaging

Biograph Vision ^{89}Zr-Trastuzumab breast cancer study demonstrates the power of optimized detector technology when scanning with unique radiopharmaceuticals.

Data courtesy of University Medical Center Groningen, Groningen, The Netherlands.

Keep up with growing demand and latest technologies

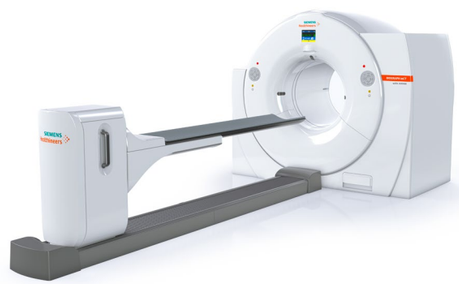
The Biograph PET/CT family of scanners offers the flexibility and scope to address all of your clinical needs and patient realities. With optimized technology and field upgradeability, every Biograph PET/CT system ensures you are ready for the scanning demands of today and tomorrow. Built-in AI and advanced image quality help improve outcomes, while key features boost scanning efficiency and enhance the patient experience. With Biograph PET/CT scanners, you have the functionality and performance to maximize your clinical potential.



Biograph Horizon

Ready for more

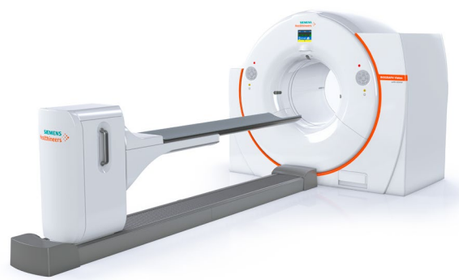
- Optiso HD: 4 x 4 x 20-mm PMT detector
- 16.4/22.1-cm axial PET FOV
- 70-cm bore size
- 227-kg (500-lb) PHS weight limit
- 16/32-slice CT
- True TOF-enabled
- UHD
- AIDAN
- Biograph Horizon RT edition



Biograph mCT

Clearly going beyond

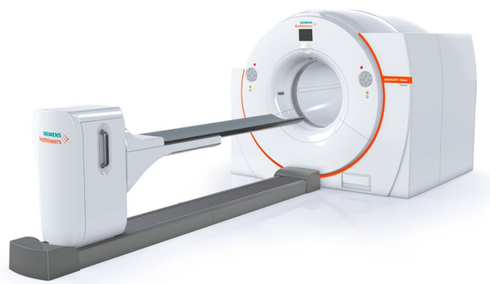
- Optiso HD: 4 x 4 x 20-mm PMT detector
- 16.4/22.1-cm axial PET FOV
- 78-cm bore size
- 227-kg (500-lb) PHS weight limit
- 40/64/128-slice CT
- True TOF-enabled
- UHD
- AIDAN
- Biograph mCT Sim edition



Biograph Vision

Precision-driven performance

- Optiso UDR: 3.2 x 3.2 x 20-mm SiPM detector
- 20/26-cm axial PET FOV
- 78-cm bore size
- 227-kg (500-lb) PHS weight limit
- 64/128-slice CT
- True TOF-enabled
- UHD
- AIDAN
- Biograph Vision RT Pro edition



Biograph Vision Quadra

Bigger perspective. Better answers.

- Optiso UDR: 3.2 x 3.2 x 20-mm SiPM detector
- 106-cm axial PET FOV
- 78-cm bore size
- 227-kg (500-lb) PHS weight limit
- 128-slice CT
- True TOF-enabled
- UHD
- AIDAN

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Clinical image featured on cover: data courtesy of Inselspital, Bern University Hospital, Bern, Switzerland.

[1] Since 2018. Data on file.
[2] Data on file.
[3] On average year over year since 2013. Data on file.
[4] Compared to current state-of-the-art PET/CT systems. Data on file.
[5] Based on competitive literature available at time of publication. Data on file.
[6] Based on typical patient height and weight limit of 227 kg (500 lb).

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Siemens Healthineers Headquarters
Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen, Germany
Phone: +49 9131 84-0
siemens-healthineers.com

Published by
Siemens Medical Solutions USA, Inc.
Molecular Imaging
2501 North Barrington Road
Hoffman Estates, IL 60192
USA
Phone: +1 847 304-7700
siemens-healthineers.com/mi

Legal Manufacturer
Siemens Medical Solutions USA, Inc.
Molecular Imaging
2501 North Barrington Road
Hoffman Estates, IL 60192
USA
Phone: +1 847 304-7700
siemens-healthineers.com/mi

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