Biograph Trion PET/CT

Future-forward by design

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SIEMENS Healthineers

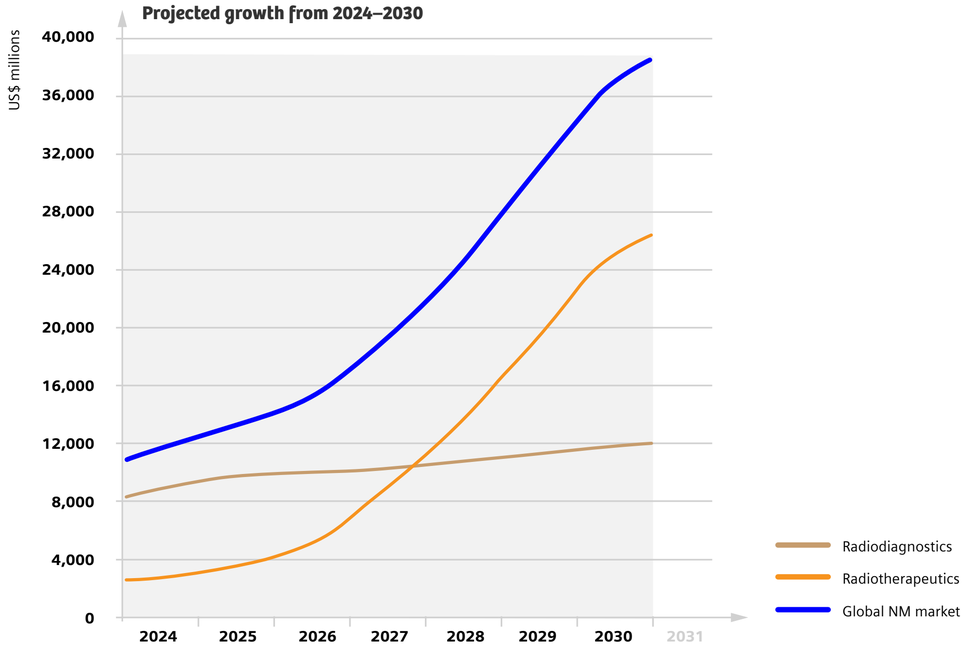
Opportunities for high-performance PET/CT

While oncology indications continue to account for the majority of PET/CT scans, cardiology and neurology imaging are on the rise. Theranostics and therapies for Alzheimer's disease along with new PET radiopharmaceutials are further fueling the demand for molecular imaging.

To stay successful in this dynamic landscape, it is crucial to be well prepared for the future with a scalable PET/CT system that can exceed the average scanner lifecycle and allow healthcare providers to expand patient access to more imaging services—now, and for the next generation.

Significant growth in PET/CT radiotracers[1]

Radiodiagnostics and radiotherapeutics evolution, 2024–2030



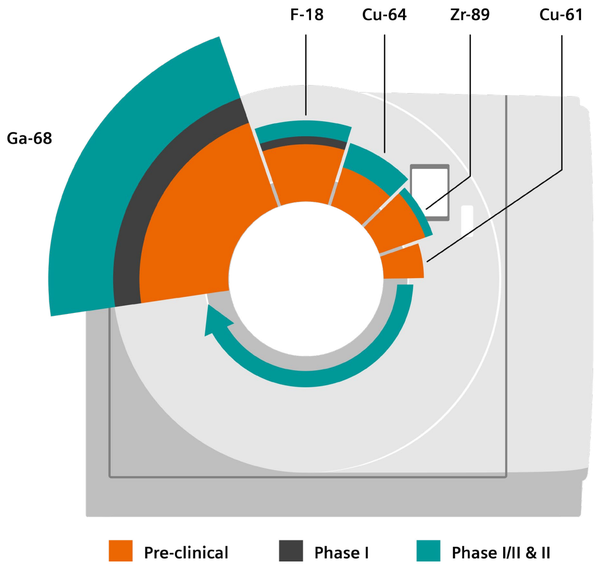
Growing clinical demand[2]

Oncology
+6.5%

Cardiology
+1.7%

Neurology
+50%

Novel radiotracers in theranostics[3]



- Fast imaging and low dose across all isotopes
- Consistent quality with ultra-fast time of flight (TOF)[4]
- Reproducible results for every patient with FlowMotion™ AI

Step into the future

Launch your future forward with a PET/CT that puts you confidently ahead of the curve and easily adapts to evolving clinical possibilities: Biograph Trinion™[5] with myExam Companion™.

Biograph Trinion PET/CT fully integrates best-in-class hardware and software[6] to create one high-performance platform. A brand-new imaging experience puts patients more at ease, while users gain efficiency from a modern design and AI-supported workflow. Always the right fit, Biograph Trinion provides a sustainable investment from today onward—delivering reduced costs through its compact footprint, automated energy-saving features, and on-site scalability.

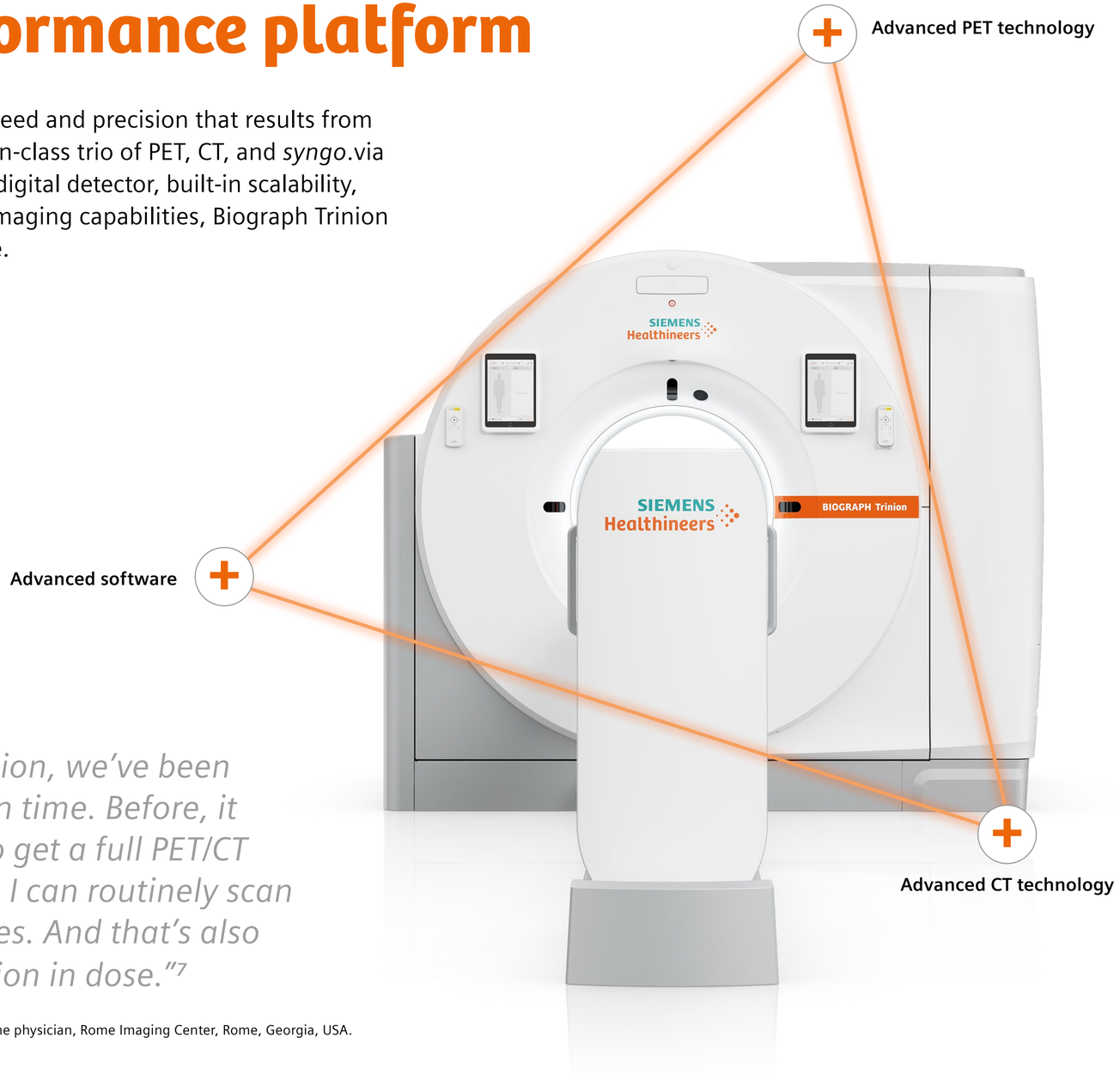
The future of PET is yours with the unmatched accessibility and performance of Biograph Trinion.

Biograph Trinion—your next-generation PET/CT

- One, high-performance platform
- New imaging experience
- Always the right fit

One, high-performance platform

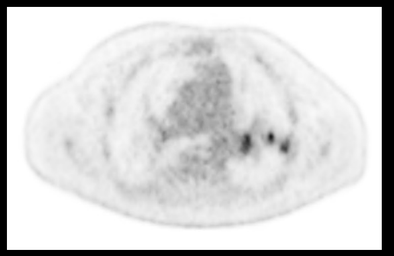
Progress your PET/CT imaging with the speed and precision that results from one platform that fully integrates a best-in-class trio of PET, CT, and *syngo*.via software[6]. With its innovative LSO-based digital detector, built-in scalability, next-level CT, and integrated intelligent imaging capabilities, Biograph Trinion helps you step confidently into the future.



"With Biograph Trinion, we've been able to reduce scan time. Before, it took 20 minutes to get a full PET/CT on a patient. Now, I can routinely scan in under 10 minutes. And that's also with a 50% reduction in dose."[7]

Russell L Roberts, Jr., MD, Nuclear medicine physician, Rome Imaging Center, Rome, Georgia, USA.

PET

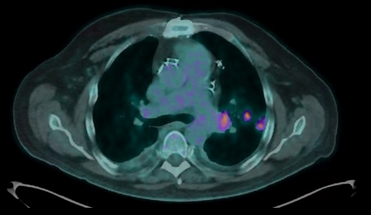


Make confident diagnostic decisions backed by improved small lesion detectability and effective sensitivity.

CT

Offer patients the latest in diagnostic image quality, speed, and dose reduction with next-level CT.

PET/CT



Have intelligent imaging tools and advanced reading solutions for molecular imaging and CT at your fingertips.

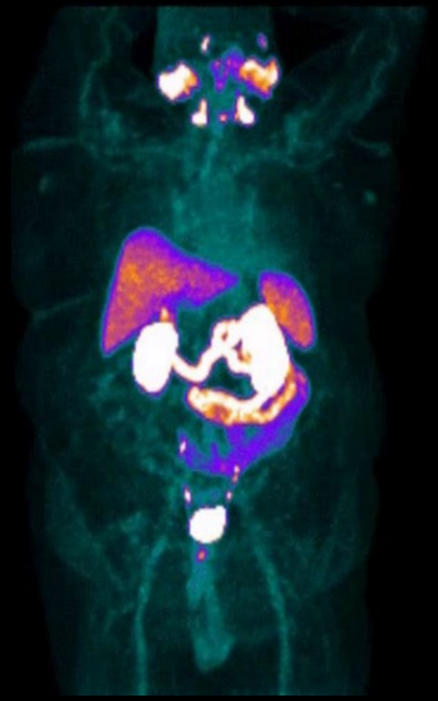
Clinical impact

With its ultra-fast TOF[4], Biograph Trinion PET/CT allows you to adjust scan time and use any radiotracer. FlowMotion AI, combined with OncoFreeze™ AI[8] gives you high-quality, motion-free images without the need for external gating devices. The result? A complete imaging solution for oncology, neurology, cardiology, theranostics, and more.

"Everyone in my group of 21 radiologists has been blown away. I am finding tiny lesions that are two millimeters to four millimeters at least three or four times a week that normally we would have not seen."[7]

Russell L Roberts, Jr., MD, Nuclear medicine physician, Rome Imaging Center, Rome, Georgia, USA.

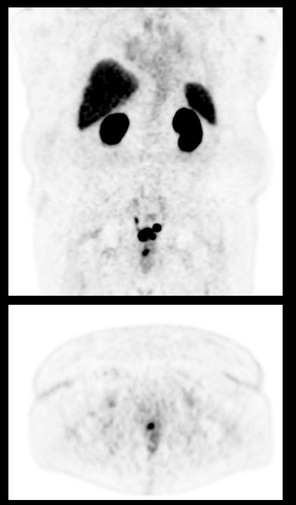
Ultra-fast TOF[4] enables deep lesion detectability



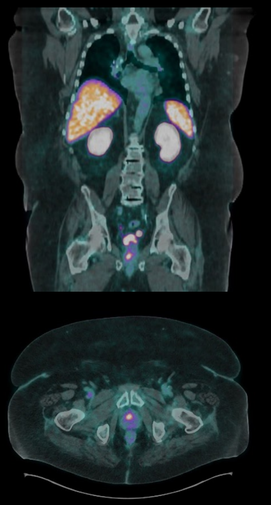
High **50.3 BMI** patient

Low noise and sharp contrast

^{18}F PSMA PET/CT



PET



PET/CT

New imaging experience

Go beyond with an unprecedented PET/CT imaging experience. Biograph Trinion helps you keep the well-being of your patients and staff in focus while benefiting from a highly efficient department workflow.

Increase patient well-being

Biograph Trinion PET/CT is designed to provide a streamlined, personalized scanning experience, offering features that work with you and help put your patients at ease by creating a relaxing, more comfortable atmosphere.

"I had one patient who used to take anxiety medication before his exams but felt he did not need to after seeing the Biograph Trinion. He had high praise for it, and said the moodlights were comforting for him, and it was an enjoyable experience."[7]

Melissa L Bishop, LPN, Nurse, Rome Imaging Center, Rome, Georgia, USA.

Patient moodlight

Patients can choose from seven colors to create a more calming environment.

Patient monitoring camera

Help give your patients peace of mind by closely observing and communicating with them as needed throughout the scanning process.

Scan&GO flexible workflow

Gain more freedom to move about the room while staying focused on your patient by accessing the procedure on the tablet or via the wireless remote control.

Flared bore

Help reduce claustrophobia and enhance comfort with a flared tunnel design.

IV pole and paper roll holder[10]

Create a clean environment for your patients with the integrated paper roll holder and IV pole.

Patient table

Keep patients comfortable with a fast, cantilevered bed that supports up to 600 lb (272 kg).

Auto unload

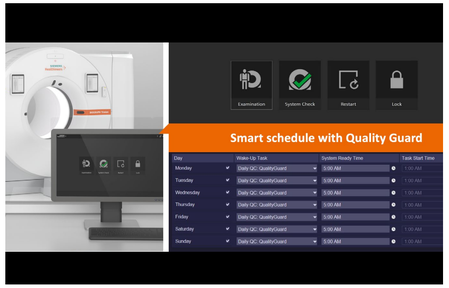
Shorten the time patients spend on the table and help minimize radiation exposure with one-click unload.

Focus on user experience

PET/CT imaging can be complex. With its AI-based features and myExam Companion intelligent imaging solutions, Biograph Trinion works for you by automating workflow steps—for consistent, fast results and a more fulfilling user experience.

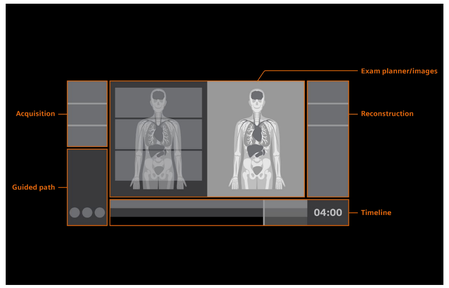
"Changing parameters is very easy for me, and I think that everyone has really caught on quickly."[7]

Betty Harrell, R.T.(R)(N)(ARRT), Chief nuclear medicine technologist, Rome Imaging Center, Rome, Georgia, USA.



Automated quality control (QC)

Increase productivity. Smart schedule allows you to set up time for the system to be scan-ready and QualityGuard™[10] automatically performs daily QC.



Integrated simplified user interface (UI)

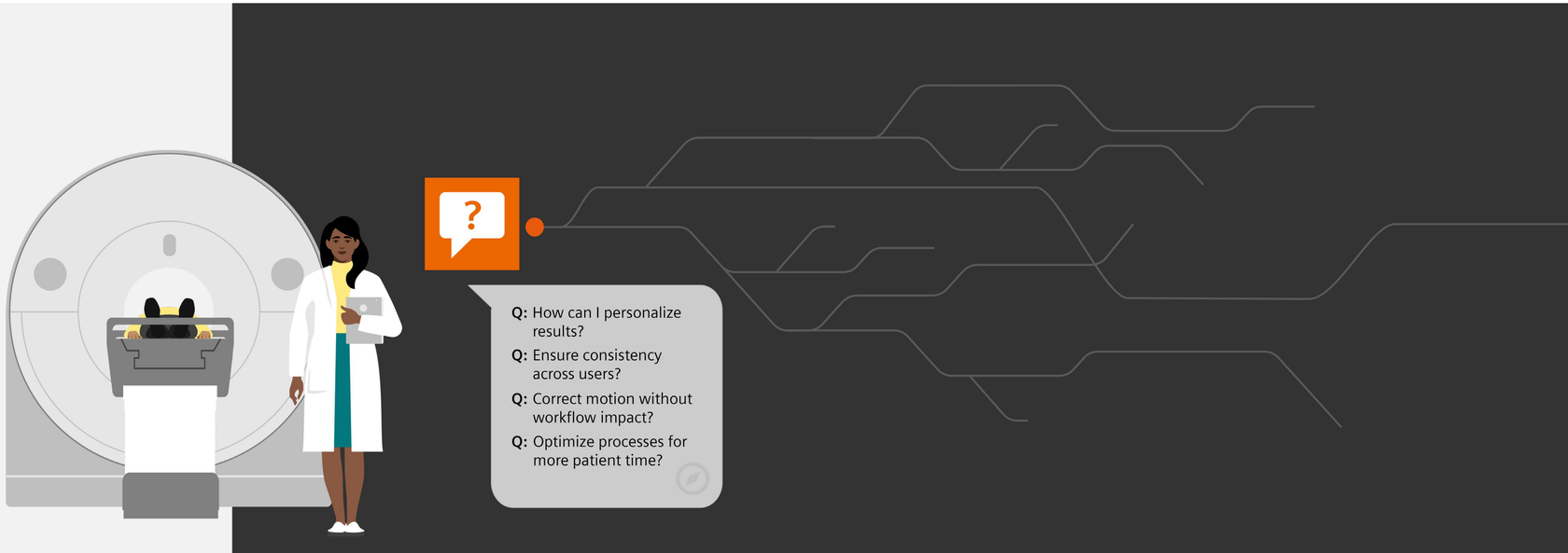
Focus on relevant tasks. The intuitive UI simplifies system operation by providing guidance and automating steps, supporting consistent and reproducible results no matter who is performing the scan.

Modern, clutter-free environment

Enjoy a clean workspace. With Biograph Trinion, the computers are integrated inside the gantry. This means more space for you in the control room, no computers under your desk, and less heat generation due to an efficient, air-cooled design.

Intelligent imaging with myExam Companion

myExam Companion intuitively guides users of all experience levels through any procedure—helping them efficiently achieve reproducible results and unlock the full potential of Biograph Trinion PET/CT.



Always the right fit

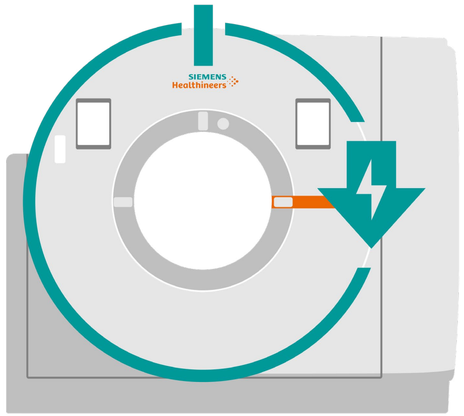
Be ready from day one and give your future a jump-start with a system that meets growing clinical demands with ease. Biograph Trinion PET/CT is a sustainable investment that moves you ahead for years to come.

An innovative system design

Optimize your space. Biograph Trinion offers a compact footprint, built-in computers, and power-efficient, air-cooled design. The system can be installed in most existing rooms with minimal renovation costs. And you can easily configure it to newly designed spaces.

Reduced downtime and power consumption

Save time and resources. Biograph Trinion automatically powers off overnight for significant energy savings. You can schedule the system to turn on and perform a daily quality check—so it is ready to scan when you are. And remote monitoring ensures your system is serviced when it is convenient.



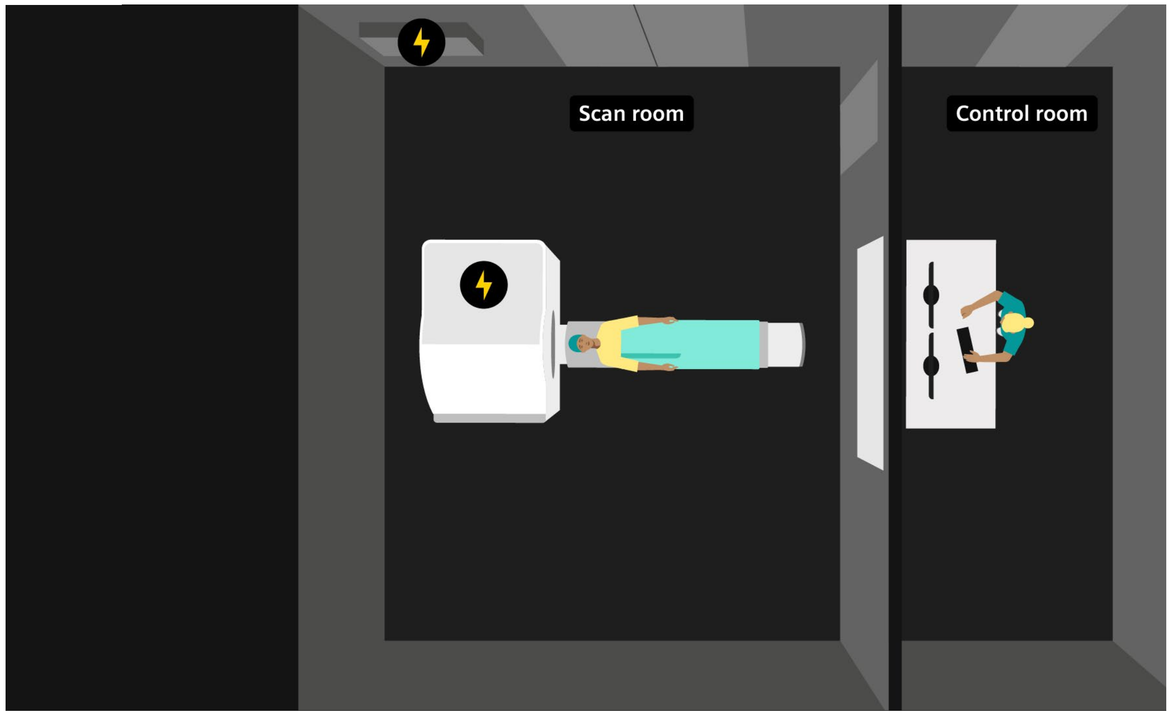
Auto-off feature:
Turn your system off overnight without affecting worklow

< 15 MWh per year energy consumption

Save at least 46% in power consumption[11]

Flexible room design

Be ready for changing needs. Because the power generator is integrated into the gantry, there is no need for a technical room.



With Biograph Trinion, you can convert that space into additional uptake rooms, an office, an expanded scan room, or more. Imagine the possibilities!

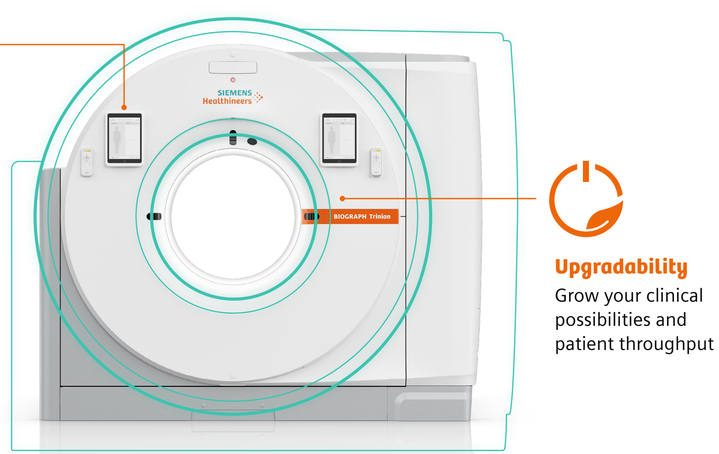
Scalable performance

Keep pace with changing demands. Whether you need to scale your PET, CT, or clinical capabilities, you can easily adapt Biograph Trinion at any time and within your existing space. Always the right fit, the PET/CT scanner is a sustainable investment that moves you ahead from today onward.

"I think this system is a platform that will carry you into the future. If you want to expand performance, you can add axial field of view and extend it very cost-effectively."

Gregory Gray, Project manager, PET/CT, Siemens Healthineers Molecular Imaging, Knoxville, Tennessee, USA.

A sustainable investment



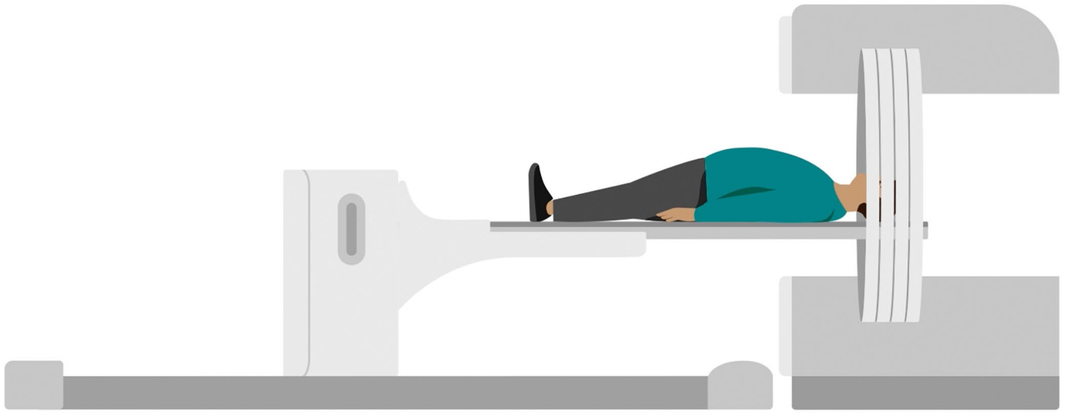
Operation
Increase efficiency with Smart powersave mode, fast scans, and lower dose

Installation
Install and upgrade within your existing space

Upgradability
Grow your clinical possibilities and patient throughput

Scale the axial field of view—in the same room

Easily scale your PET axial field of view on-site to quickly boost your system's performance and continue expanding patient access to new imaging opportunities.



Ready when you are. Biograph Trinion is upgradable on-site, allowing you to expand your PET/CT capabilities without having to invest in a completely new system.

The future-forward design of Biograph Trinion

"This is a near future-proof machine. It's scalable for whatever you're going to need. It allows you to image all radiotracers and image them very well. And the patients are on and off the table in a much more comfortable setting."[7]

Russell L Roberts, Jr., MD, Nuclear medicine physician, Rome Imaging Center, Rome, Georgia, USA.

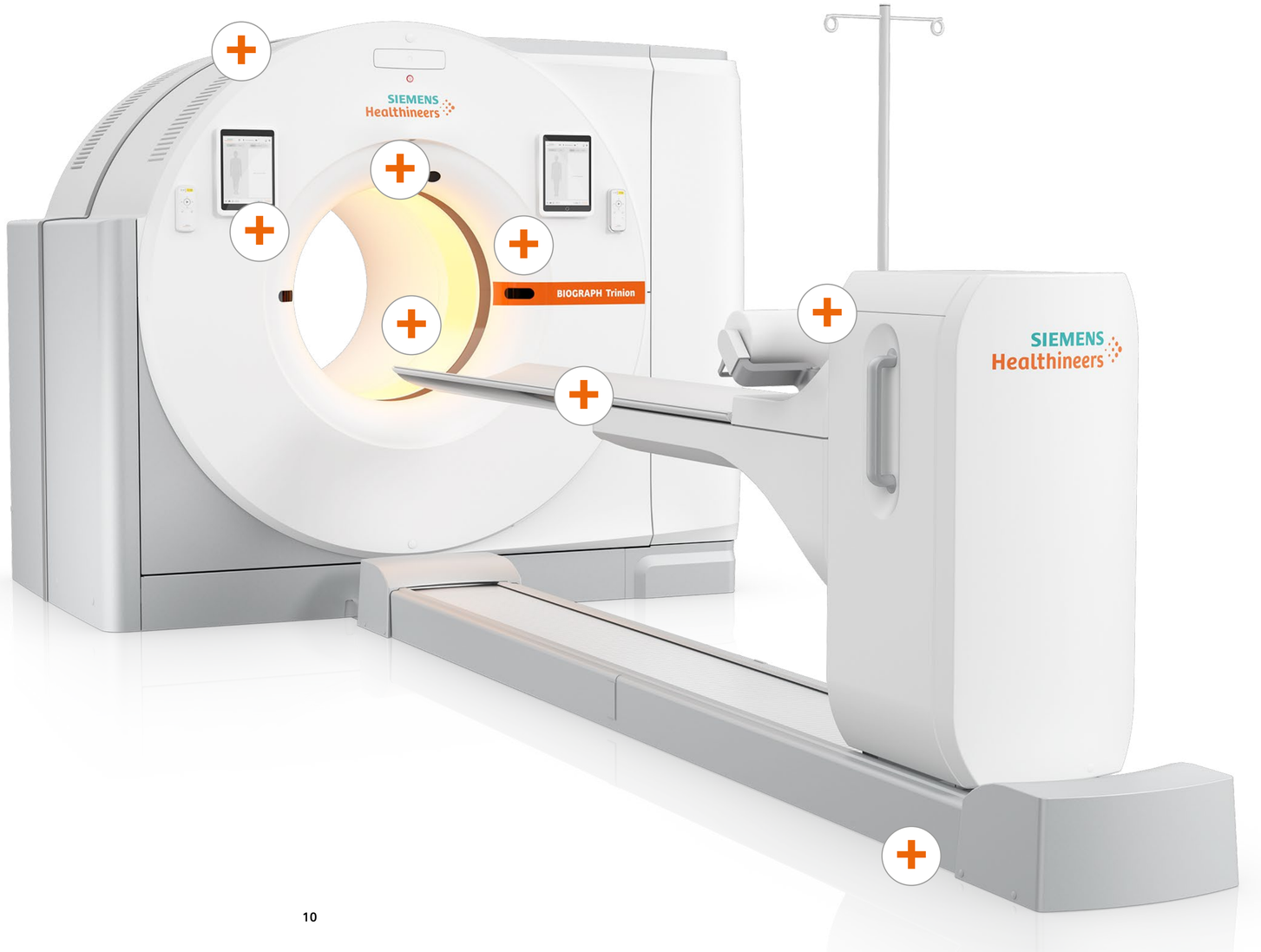
Fully integrated hardware and software, a brand-new imaging experience for patients and users, and future-forward scalability—Biograph Trinion is a powerful platform that meets your next-generation PET/CT imaging needs.

Technical specifications—PET

Crystal size	4 x 4 x 20 mm
Ultra-fast TOF performance[4]	239 ps
Scalable axial field of view	18 cm, 24 cm[12]
Effective sensitivity[13]	up to 128 cps/kBq[14]
Effective peak NEC rate[13]	up to 1,270 kcps ≤ 25 kBq/cc[14]
Air-cooled design	
LSO-based digital detectors	

Technical specifications—CT

CT slices	64/128
Rotation times	up to 0.33 s[10]
Tube current	up to 825 mA
Maximum power	75 kW (187 kW with SAFIRE)
Athlon™ X-ray tube	
Tin Filter	
Stellar detector	



Biograph Trinion PET/CT

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The information in this document contains general technical descriptions of specifications and options as well as standard and optional features, which may not always be present in individual cases.

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[1] MEDraysintell. Clinical Radiopharmaceuticals Report & Directory – Edition 2023. September 2023:92)

[2] IMV Science & Medicine Group. PET Imaging Market Summary Report presentation. February 2024:28)

[3] Based on internal analysis. Data on file.

[4] Ultra-fast time of flight (TOF) is defined as less than 275 picoseconds (ps). Data on file.

[5] Biograph Trinion PET/CT is not commercially available in all countries. Future availability cannot be guaranteed.

[6] Data on file.

[7] The statements by Siemens Healthineers customers described herein are based on results that were achieved in the customer’s unique setting. Because there is no “typical” hospital or laboratory and many variables exist (eg, hospital size, sample mix, case mix, level of IT, and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

[8] OncoFreeze AI is not commercially available in all countries. Future availability cannot be guaranteed.

[9] iMAR is designed to yield images with a reduced level of metal artifacts compared to conventional reconstruction if the underlying CT data is distorted by metal being present in the scanned object. The exact amount of metal artifact reduction and the corresponding improvement in image quality achievable depends on numerous factors, including composition and size of the metal part within the object, patient size, anatomical location, and clinical practice. It is recommended to perform iMAR reconstruction in addition to conventional reconstruction.

[10] Optional.

[11] Compared to other air-cooled Biograph™ PET/CT systems.

[12] Scalable axial field of views beyond 18 cm and 24 cm are not yet commercially available.

[13] With time of flight.

[14] Data calculated with 35-cm phantom.

All clinical images in this brochure are courtesy of Rome Imaging Center, Rome, Georgia, USA.

Siemens Healthineers Headquarters
Siemens Healthineers AG
Siemensstr. 3
91301 Forchheim, Germany
Phone: +49 9191 180
siemens-healthineers.com

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

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

Biograph Vision PET/CT

Precision-driven performance

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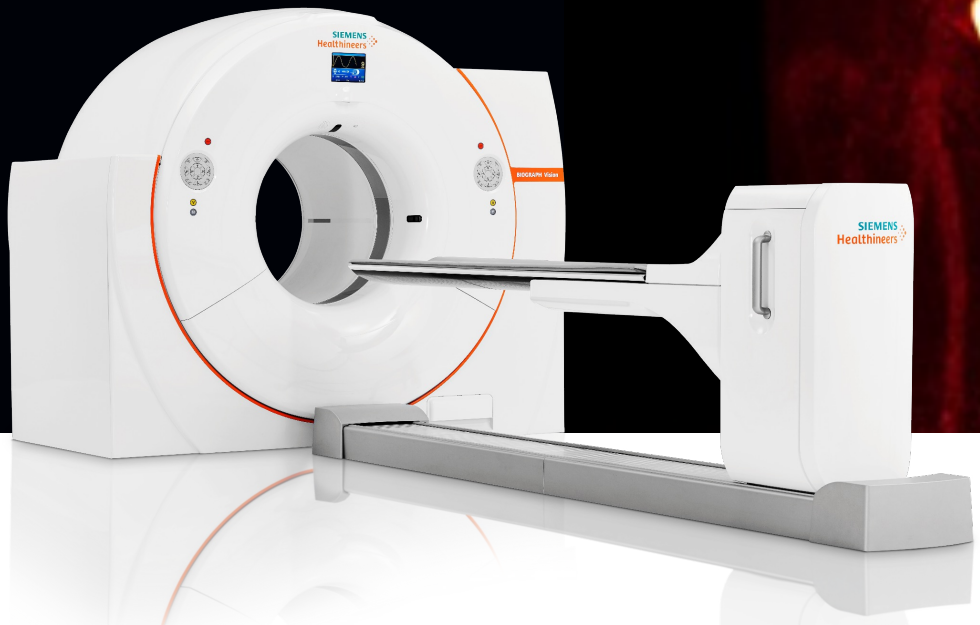
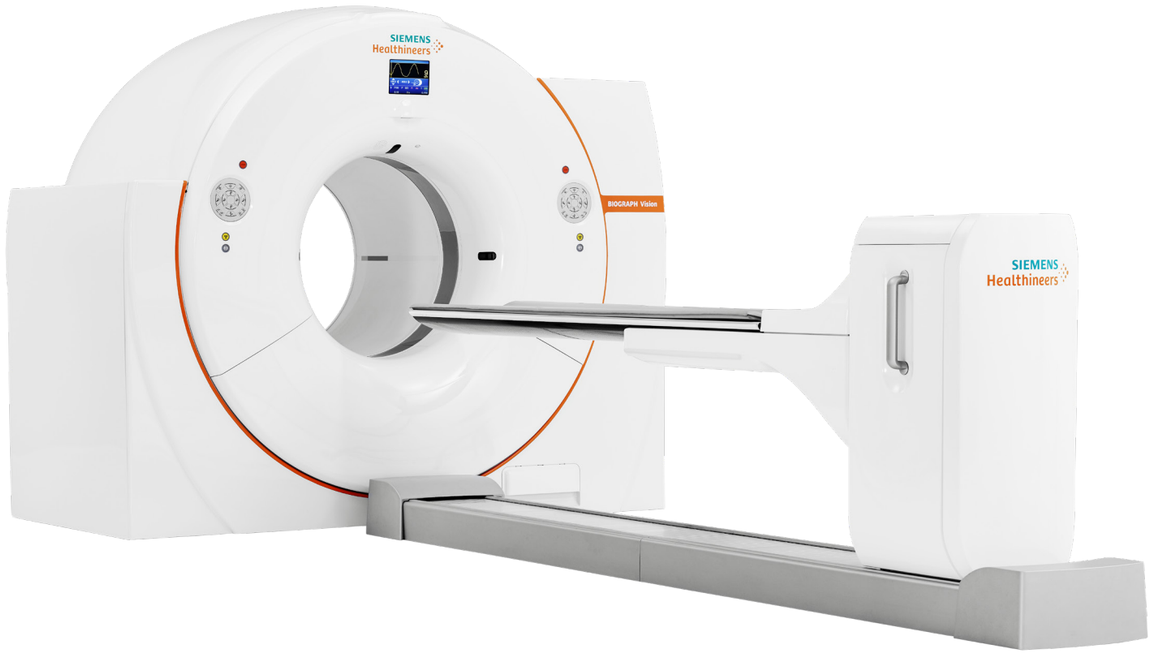


SIEMENS Healthineers

Leverage advancing technology for improved outcomes

PET/CT continues to improve the practice of medicine.

As healthcare shifts toward personalized diagnosis and treatment, healthcare innovators continue to drive technological advancement to positively affect clinical outcomes. PET/CT has vastly improved the practice of medicine, and each technological step can do more than just incrementally continue its momentum.



Technological advancements create opportunity and with the right implementation can deliver benefits to patients and healthcare systems.

Redefine PET/CT imaging with the precision-driven performance of Biograph Vision™. With industry-leading technical specifications, Biograph Vision delivers next-level image quality that transforms accurate decision-making. State-of-the-art detectability opens new clinical and research avenues while expanding your range of radiotracers at optimum doses. Now users can scan faster, reduce dosages, and enhance patient comfort.

Redefined technical precision

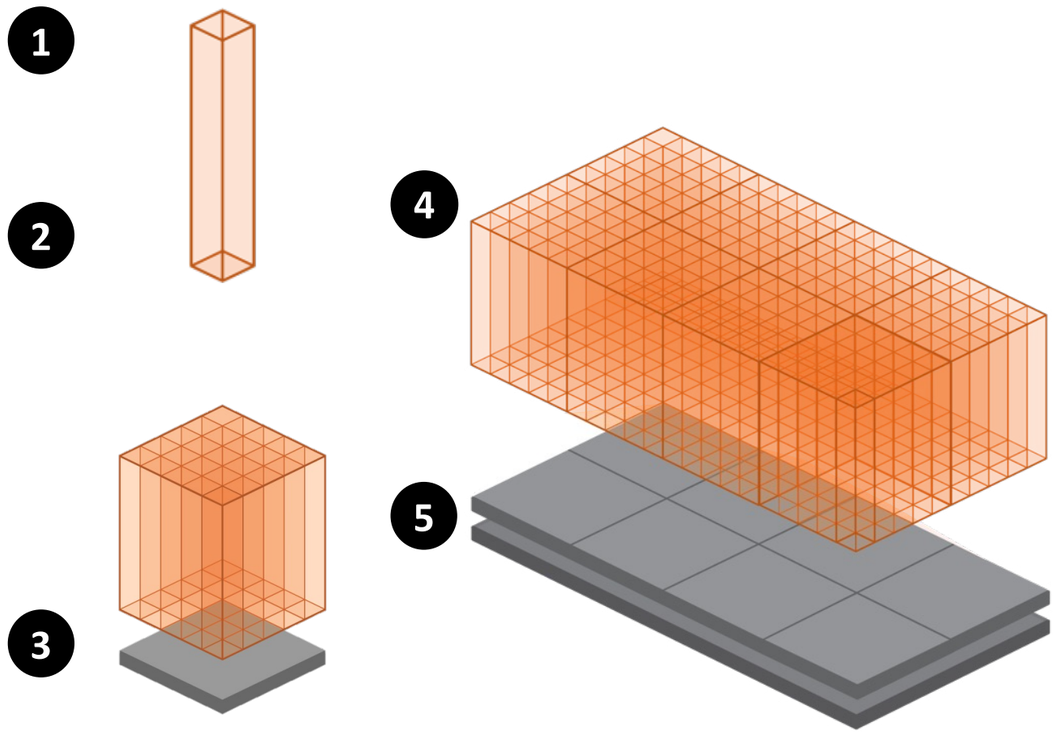
Unlocked imaging versatility

Empowered operational performance

Biograph Vision empowers you to redefine PET/CT imaging with precision-driven performance.

Redefined technical precision

Biograph Vision's groundbreaking technological performance redefines the limits of imaging. Featuring 3.2 x 3.2-mm lutetium oxyorthosilicate (LSO) crystals that are 100% covered by SiPMs[1], Biograph Vision's Optiso Ultra Dynamic Range (UDR) detector technology delivers high 48-mm^3 volumetric resolution[1] and industry-leading 214-picosecond (ps) time-of-flight (TOF) performance[2]. Biograph Vision leverages the full potential of SiPM technology to reveal the bigger picture for more accurate and confident decision-making.



Optiso UDR

The detector is the most important component of a PET/CT system. It defines the quality of the incoming data. The developers at Siemens Healthineers re-envisioned conventional digital detector design to improve spatial and temporal resolution, leveraging the full potential of SiPM and going beyond simply replacing a single component.

1 **A fast, efficient scintillator, LSO** is grown and cut in-house through a vertically integrated manufacturing process to ensure the highest quality.

2 **3.2 x 3.2 x 20-mm crystal elements** are individually selected and deliver high 48-mm^3 isotropic spatial resolution; higher spatial resolution may result in improved lesion detectability.

3 **100% coverage[1] of the crystal area** with SiPM sensors results in a timing resolution of 214 picoseconds[1], providing 3.9 times higher effective sensitivity[2] for faster scans and lower dose.

4 **A small block size delivers > 1789 kilo counts per second[1] effective peak NECR** for improved clinical performance.

5 **High-flow direct-cooling of the detector electronics assembly** allows the detector temperature to remain stable at room temperature for outstanding performance and serviceability, as well as improved patient comfort.

Redefined technical precision

Spatial resolution: Small crystals, big impact

Improving spatial resolution with smaller crystal sizes is one of the most effective ways to deal with partial volume effect (PVE). With 3.2 x 3.2-mm crystals, Biograph Vision delivers high spatial resolution to reduce the impact of PVE. This helps you quantify more accurately and more confidently understand disease progression.

4-mm crystal

Biograph Vision

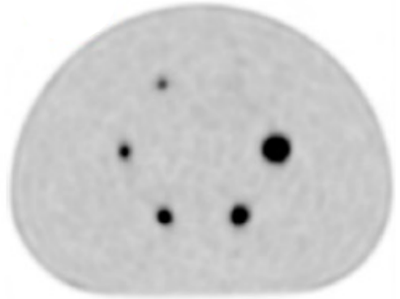
High-resolution torso phantom
Sphere size (mm): 5.0, 7.9, 9.9, 12.4, 15.4, 19.8
6:1 contrast-to-background

Temporal resolution: Exceptional TOF

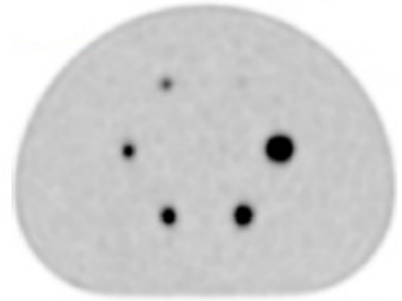
Faster temporal resolution allows for smaller segments of response, which increase the accuracy of locating the annihilation event. TOF performance depends on collecting light from all photons in the scintillation.

Biograph Vision is designed so SiPMs cover the entire LSO array area, allowing all light from the scintillation to be detected. This leads to 100% coverage and enables fast temporal resolution.[1]

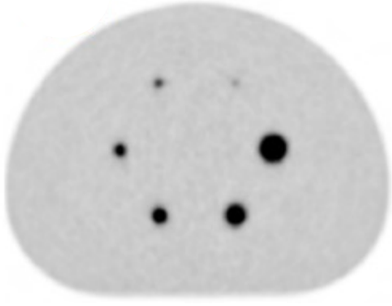
Images A and B acquired on Biograph™ mCT. Image C acquired on Biograph Vision.



A | No TOF



B | 540-ps TOF



C | 214-ps TOF

Advanced PET/CT imaging in one platform

Biograph Vision is designed to help you set the standard in PET/CT. Diagnose, treat, monitor, and research disease more confidently with strong foundational technology and artificial intelligence (AI)-enabled capabilities, as well as enhanced image quality and optimized workflows.

Experience precision PET/CT imaging[3]

ultraHD•PET
Improve image signal-to-noise by utilizing TOF combined with the resolution recovery of HD•PET. This option can be used to enhance image quality and/or reduce patient acquisition time.

FlowMotion™ AI
Create standardized imaging workflows for fast, reproducible, and personalized results, with disease-based protocols that intelligently adjust to the patient's anatomy.

Multiparametric PET AI
Expand the available parameters and acquisition flexibility, facilitate more reproducible images, and enable absolute quantification.

Biograph Vision with AIDAN, our intelligent imaging platform, lets you 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.

Biograph Vision PET/CT scanners can help you deliver the best clinical services for your patients.

OncoFreeze™ AI
Locate and correct anatomy impacted by respiratory motion and increase clinical confidence without additional setup or patient interaction.

QualityGuard™
Save technologist time by eliminating the need for an external source for daily and weekly PET quality control using intrinsic radioactive properties of LSO to calibrate automatically.

FAST CARE CT technologies
Optimize dose, image quality, and streamline workflow. Innovations such as CARE Dose4D™, CARE kV, SAFIRE, iMAR, Tin Filter, and more.

Unlocked imaging versatility

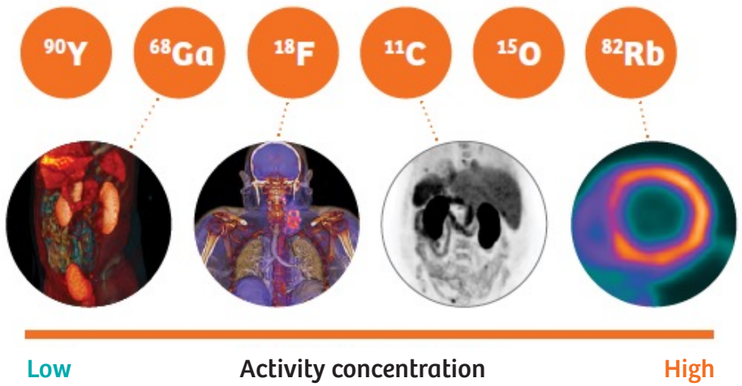
Unlock more clinical and research capabilities with Biograph Vision's state-of-the-art detectability. Biograph Vision provides high image resolution and sensitivity for more precise quantification that can positively impact health outcomes. Ultra Dynamic Range (UDR) provides outstanding performance for a wide spectrum of count rates, enabling a broader variety of radiotracers at optimal doses.

What is UDR?

A truly flexible PET/CT system can adapt to the requirements of a wide variety of radioisotopes. As the availability of different tracers grows and PET/CT gets more involved in theranostics, systems should optimally work in a large range of radioactivity, from very low to very high.

Optiso UDR detectors use multiple technologies to provide optimal performance in a wide range of count rates. Fast TOF and high effective sensitivity provide excellent performance in low- and medium-activity ranges such as ^{90}Y, ^{18}F, and ^{68}Ga applications.

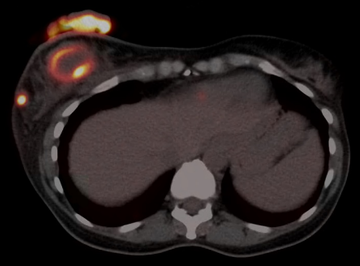
A small block detector with low dead time makes it suitable to operate in the high-activity concentrations found in studies with very short-lived tracers, such as ^{82}Rb and ^{15}O.

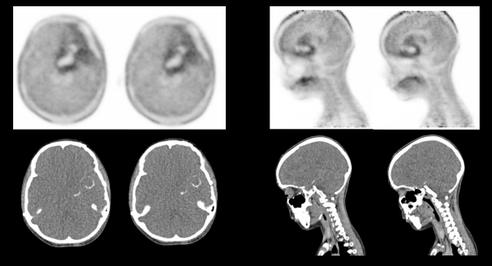


Unlocked imaging versatility

Oncology

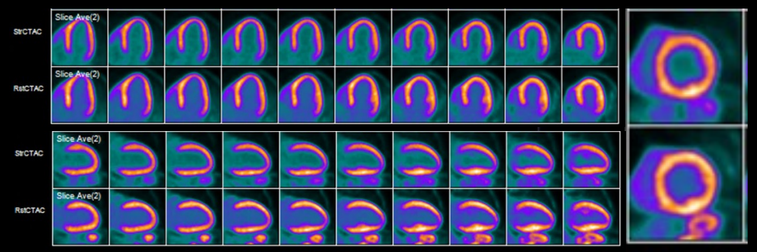
Biograph Vision's fast 214-ps TOF, combined with 3.2-mm crystal elements that deliver a 440 x 440 acquisition matrix, makes it easier to see small lesions that can significantly improve lesion-detection performance for oncologic PET/CT imaging. Biograph Vision's superb image quality provides exceptional results for a wide range of radiopharmaceuticals and imaging needs, including whole-body dynamic imaging, RT planning, and much more.

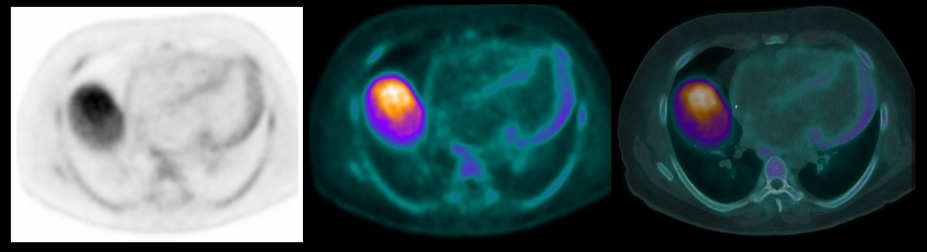




Cardiology

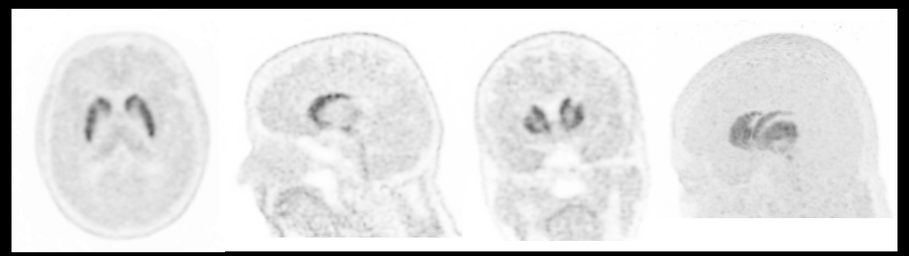
Biograph Vision's Optiso UDR detector provides excellent performance in applications that require dealing with high activity concentrations, such as myocardial bloodflow (MBF) with ^{82}Rb. Demonstrating high image quality with sharp definition of ventricular margins with low noise. 3.2-mm crystal elements support high-resolution PET imaging for sarcoid, which can often appear ill-defined on PET/CT imaging.





Neurology

Biograph Vision small crystal size and fast TOF with high-resolution 880 x 880 matrix reconstruction deliver high contrast with sharp definition of brain structures that may improve visual and quantitative assessment.

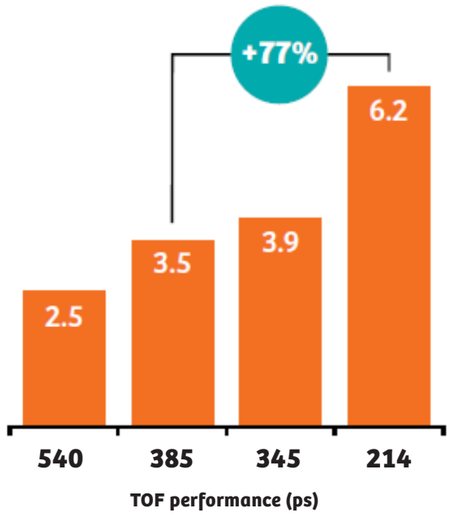


Data courtesy: see final page.

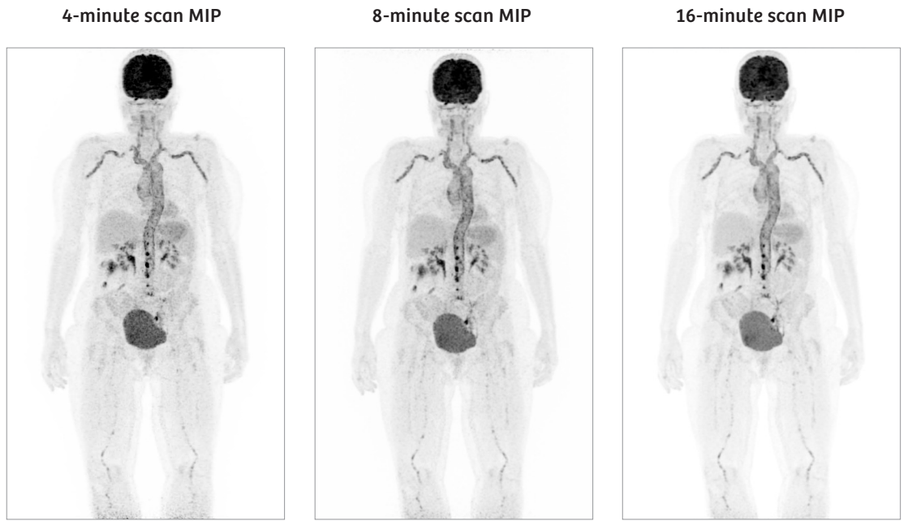
Empowered operational performance

Biograph Vision empowers users to reduce scan time and injected dose to boost productivity, avoid unnecessary exposure, and increase patient comfort with the market's highest effective sensitivity[2] at 100 cps/kBq. Enhance patient and user experience with intelligent imaging capabilities that drive greater throughput while providing more consistent and accurate results. No matter the user, the patient, or the procedure, Biograph Vision delivers exceptional outcomes.

TOF sensitivity gain[5]



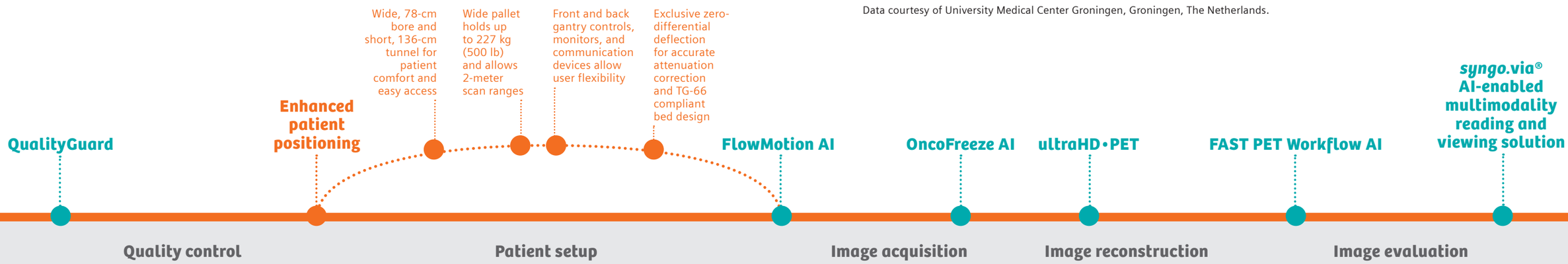
High-quality, low-dose whole-body exams in under 5 minutes



Biograph Vision requires significantly less injected tracer dose compared to current state-of-the-art technology[2] without compromising image quality or scan speed. This reduces patient exposure.

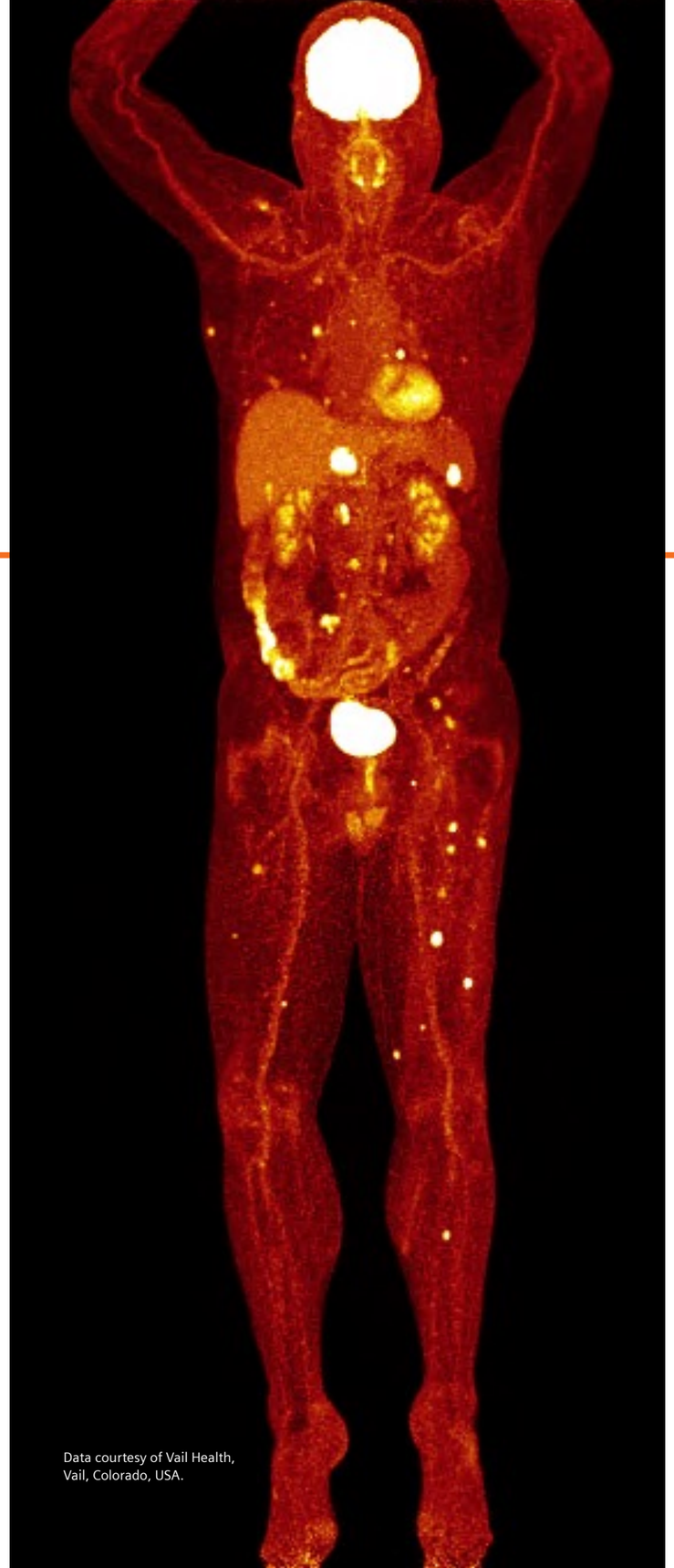
Data courtesy of University Medical Center Groningen, Groningen, The Netherlands.

Streamlined workflow with intelligent imaging



“There is a potential in better discriminating lesions from physiological background activity. And maybe upstaging your patients from, let’s say, uncertain up to the presence of a disease.”

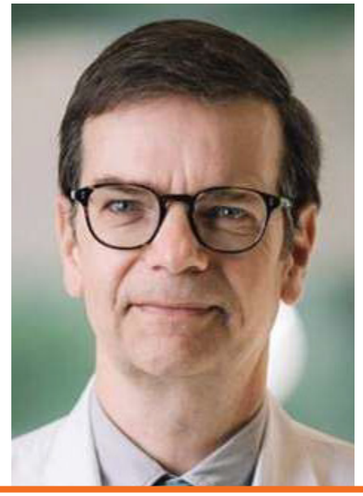
Walter Noordzij, PhD, MD
University Medical Center Groningen
Groningen, The Netherlands



Data courtesy of Vail Health,
Vail, Colorado, USA.

“... because of the high sensitivity of the system, we can achieve good image quality and low noise, even if injecting

Silvano Gnesin, PhD
Radiophysicist, Nuclear Medicine Department
Lausanne, Switzerland



“We can reduce the injected activity by about one-third at least. This was also not at the cost of the acquisition time. The acquisition time could be also reduced, so we were really pleased to be able to work on those two variables and to make better images, faster, with less activity.”

John Prior, MD, PhD
Head of Department, Nuclear Medicine
Lausanne, Switzerland

“... by improving the spatial resolution... you also have less partial volume effect, so you get sharper images and more accurate quantification.”

Prof. Ronald Boellard, PhD
University Medical Center Groningen
Groningen, The Netherlands

Biograph Vision

Set the standard in PET/CT with precision-driven performance

Data courtesy of Indiana University Methodist Hospital, Indiana, USA.

Clinical image featured on cover: data courtesy of Vail Health, Vail, Colorado, USA.

[1] Based on internal measurements available at time of publication. Data on file.

[2] Compared to current state-of-the-art technologies. Data on file.

[3] Optional.

[4] Worldwide data on file.

[5] Gain is calculated for a 20-cm cylindrical phantom.

Clinical images featured in order top left to bottom right on page 12 and 13:

Data courtesy of Mainline Health, Philadelphia, Pennsylvania, USA.

Data courtesy of Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland.

Data courtesy of Osaka City University, Japan.

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

The statements by Siemens Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Because there is no "typical" hospital or laboratory and many variables exist (eg, hospital size, samples mix, case mix, level of IT, and/or automation adoption) there can be no guarantee that other customers will achieve the same results.

Biograph Vision is not commercially available in all countries. Its future availability cannot be guaranteed. Please contact your local Siemens Healthineers organization for further details.

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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