# StarGuide

Precision imaging at the speed of tomorrow

gehealthcare.com

StarGuide

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# Showing the way in clinical discovery

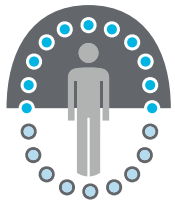
## The essential SPECT/CT for clinical innovation

Introducing StarGuide, our most advanced SPECT/CT designed to usher in a new age of discovery for research-focused clinicians. Utilizing the latest advancements in Cadmium Zinc Telluride (CZT) technology, StarGuide helps providers explore and expand the understanding of the patient condition, and help improve patient outcomes.

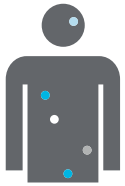
StarGuide™ is a valuable tool for physicians who seek pathways toward effective health care where none existed before. Its many technologies and productivity tools help physicians expand the horizons of nuclear medicine—while maintaining the ability to deliver efficient imaging solutions in demanding clinical environments.

## Avenues for clinical innovation

Explore new protocols by visualizing multiple tracers simultaneously



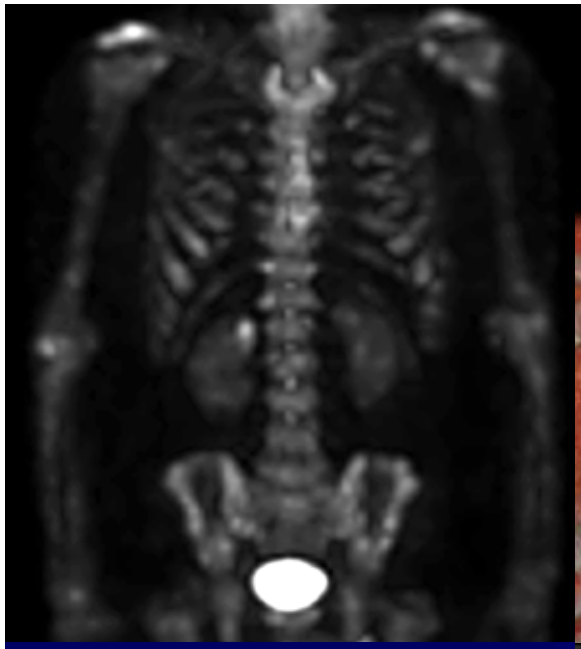
Search for new insights with 3D Dynamic Acquisition[1]

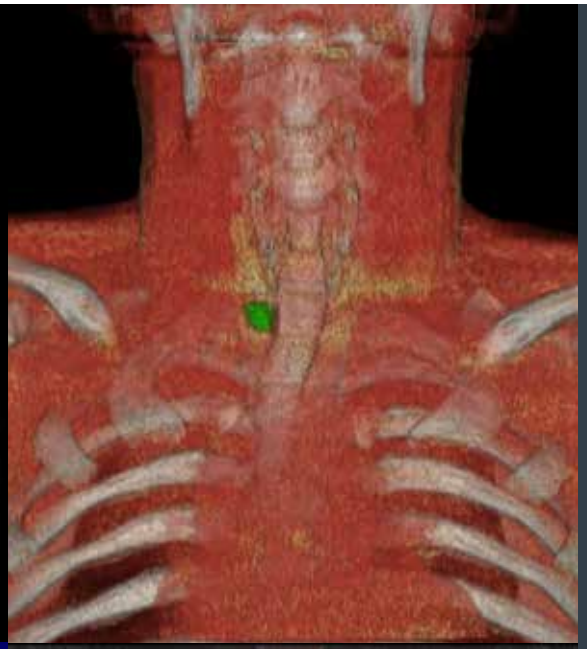


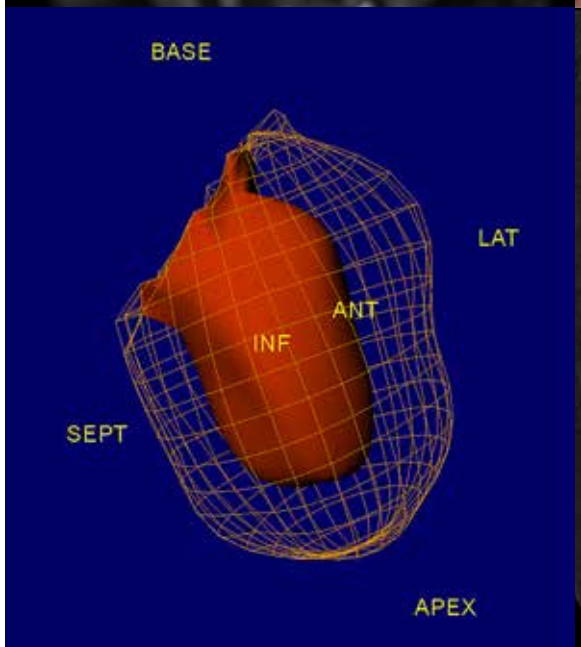
Research existing tracers to help expand their clinical applications

Support the development of new tracers

# Unlock the potential of Theranostics and highly personalized care







## StarGuide redefines what's possible

StarGuide provides accurate quantitation to help clinicians make personalized care decisions and treatment response assessments that are at the heart of Theranostics.

Each of StarGuide's 12 CZT Digital Focus Detectors supports a wide energy range capable of imaging the dual energy peaks of tracers used in Theranostics, such as the 113 keV and 208 keV emission peaks of $^{177}$Lu used to diagnose and evaluate treatment response for prostate cancer[2].

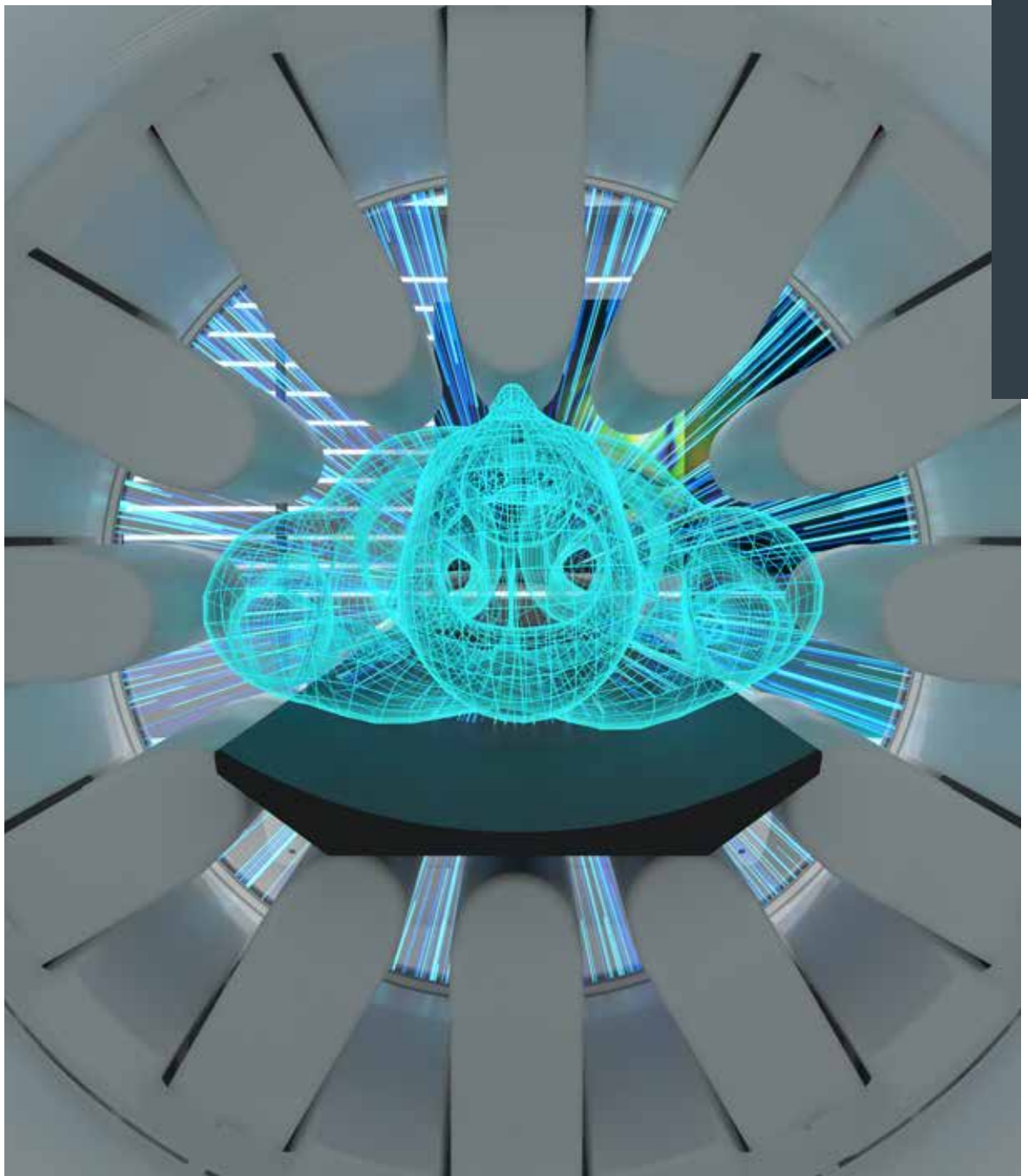
StarGuide is optimized for $^{177}$Lu imaging, enabled by its improved energy resolution, system sensitivity, and system planar resolution for $^{177}$Lu high and low energy peaks as compared to a NaI system[3]. This enables $^{177}$Lu imaging without the need for collimator exchange—typically needed in dual head cameras—simplifying day-to-day clinical workflow and patient scheduling.

## A trusted partner

GE Healthcare has been at the forefront of molecular imaging since we began development of the first commercially available SPECT/CT scanner in 1999. To maintain our leadership position for decades to come, we have established the CZT Center of Excellence in Rehovot, Israel, where we continuously develop advanced, proprietary CZT technology found exclusively in GE Healthcare's Nuclear Imaging products.

Leveraging GE Healthcare's Pharmaceutical Diagnostics (PDx) division, we are able to more comprehensively support the needs of our global customer base. We're proud to be the only medical equipment manufacturer with the ability to develop and supply highly specialized pharmaceuticals to clinical and research organizations throughout the world.

# Bringing clarity to the patient's condition



## Optical Scout: perform preliminary, optical scans in seconds

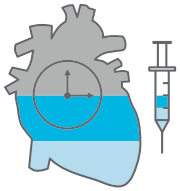
StarGuide's Optical Scout feature revolutionizes whole-body scanning and charts the path toward high-quality clinical images. Located within the 80 cm bore, Optical Scout quickly scans the patient to create a topographical map of the body quickly and accurately scanning contours to assure fast and safe transition from one imaging position to the next. After processing the contour data, StarGuide's detectors and table are automatically positioned in close patient proximity for each bed position before beginning the clinical scan.

## Take a closer look where needed

StarGuide's Digital Focus Detectors are designed to maximize the amount of information to help you gain true insight into the patient condition. After optimizing the detector and bed positions from the Optical Scout data, StarGuide's constellation of 12 slim Digital Focus Detectors orbit the body as closely as possible, and from all necessary angles, to scan the target area—and not the air surrounding the patient.

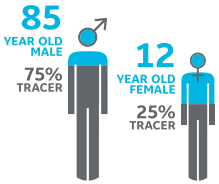
The CZT detector technology found in StarGuide features an intrinsic count rate greater than 700 kcnts/second with no detector saturation or resulting dead time, giving you the ability to extract more data during quantitative scans.

## The resolution to see more, learn more



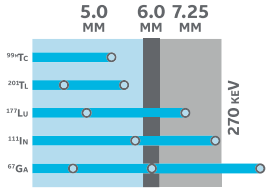
### Analyze flow in detail

StarGuide's ring of Digital Focus Detectors enables Dynamic SPECT acquisitions[1] with high temporal resolution as fast as five seconds. Fast temporal resolution is an important factor in imaging bolus injection and flow measurements.



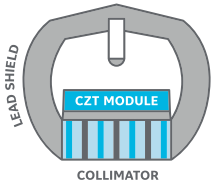

### Personalized patient exposure

StarGuide's CZT technology is pivotal to minimizing the patient's exposure to SPECT's radioactive processes because its higher system planar sensitivity and volume sensitivity is an important factor in NM imaging for enabling dose and time reduction[4].




### Image a wide energy range

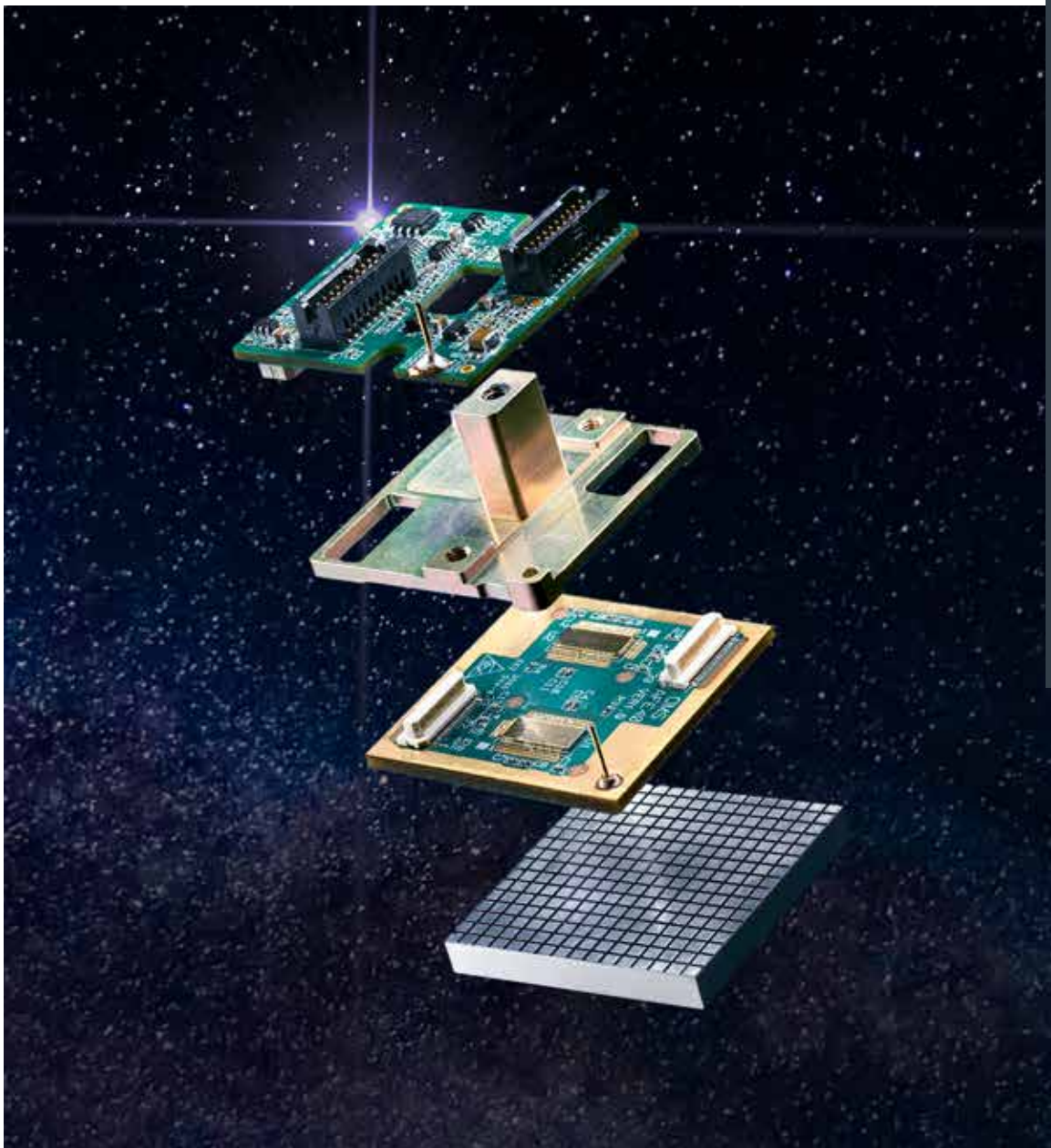
The ability to image both low and medium energy isotopes in a single scan with exceptional levels of spatial and energy resolution is what makes StarGuide a great tool for both clinical and research environments. The proprietary design of StarGuide's 7.25 mm thick CZT semiconductor crystals makes it possible to image a wide range of isotopes with energies up to 270 keV.




### Dual Channel collimation

StarGuide's unique Dual Channel collimator enables a balance between sensitivity and resolution across low and medium energy ranges. Its design combines shorter septa and tungsten construction to deliver a remarkable 8.0 mm NEMA detector planar resolution[5] and 4.5 mm Central SPECT resolution with scatter. The improved SPECT resolution enables sharp images for better visualization of fine anatomical details, which can help physicians to detect diseases at an earlier stage[6].

# Highly resolved nuclear imaging



## CZT: Tailor made for patient-friendly, high-resolution images

CZT has a number of properties that contribute to StarGuide's high-resolution imaging capabilities. One of its most impactful traits is its high SPECT Contrast-To-Noise (CNR) ratio and the effects it has across a wide spectrum of imaging performance.

StarGuide's imaging, including its advanced image processing methods, has higher CNR[7] compared to NaI systems, which is an important factor in lesion detectability.

Energy Resolution: StarGuide delivers a remarkable 5.9% energy resolution on $^{99m}$Tc scans and <5% energy resolution on $^{177}$Lu (208 keV peak) scans. This superb energy resolution enables differentiation between simultaneously acquired isotopes with smaller differences in peak energies.

Spatial Resolution: The CZT technology in StarGuide delivers outstanding 8.0 mm detector planar spatial resolution[5], enabling you to pinpoint the size, shape, and position of lesions with exceptional accuracy.

## Disease detection

StarGuide's improved SPECT resolution[6] enables sharp images for better visualization of fine anatomical details, which is important in helping enable physicians to detect diseases at an earlier stage. StarGuide, including its advanced image processing methods, provides higher Contrast-to-Noise Ratio (CNR)[7], an important factor in lesion detectability.

## Image processing

The StarGuide image processing engine is designed to help physicians advance from analog 2D scanning to digital 3D scanning in their pursuit of true insight into the patient condition.

The 12 Digital Focus Detectors scanning in 3D generate exponentially more data than 2D scans, significantly increasing the processing power of StarGuide's image processing engine to efficiently calculate the thousands of additional vectors, variable bed positions, and other factors. The result is a high-quality image.

Innovative physicians looking to navigate molecular imaging's unexplored regions will also appreciate that StarGuide's image processing engine offers highly customizable reconstruction capabilities in addition to a robust set of default protocols to steer their pursuits in any direction they choose.

## Focused imaging

Focused imaging gives you the ability to target a specific volume of interest (VOI) within the patient body and improves image quality within that VOI as the Digital Focus Detectors pass over that specific volume. StarGuide alters the detector sweep to spend more time focusing on the designated volume to produce high-quality, data-rich imagery with no increase in scan time.

## Dynamic imaging

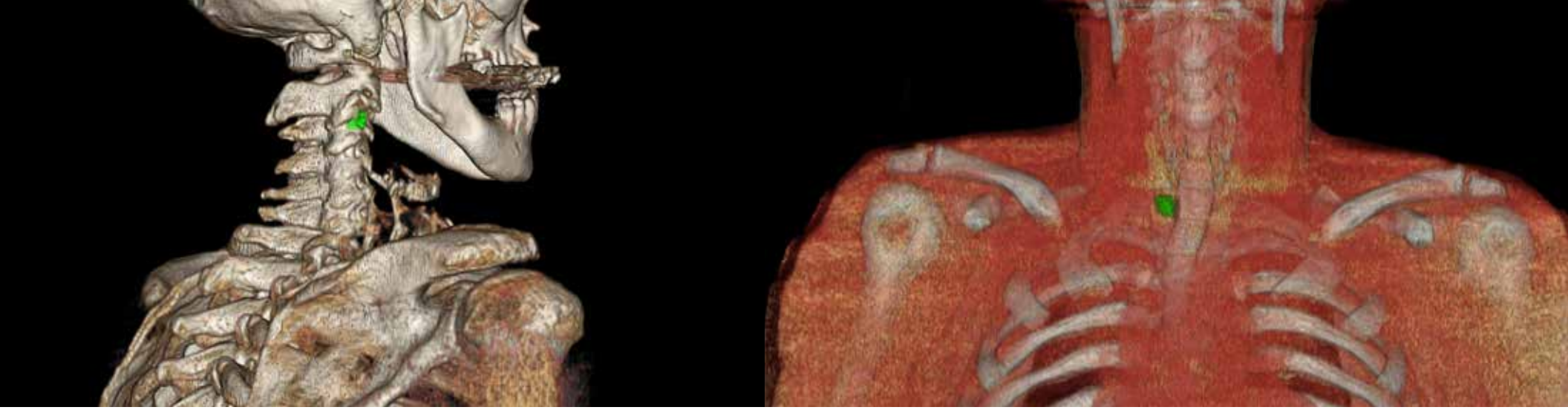
StarGuide's inherently high spatial resolution combined with Dynamic SPECT Acquisition's[1] potential ability to transition flow analysis from planar scans with 2D region-of-interest scans to SPECT scans with multi-segmented 3D volume-of-interest helps open the door to a number of avenues for research.

# Designed to maximize efficiencies

## Accomplish more in less time

StarGuide is changing SPECT/CT imaging by maximizing efficiencies and improving the patient experience. It starts by eliminating unpredictable whole-body 2D planar + regional SPECT protocols and replacing them with a fast, whole-body SPECT scan.

StarGuide requires fewer steps to predictably and reliably perform high-quality SPECT/CT scans thanks to Swift Plan workflow and our powerful reconstruction algorithms. This combination of operational efficiency and clinical performance enables you to quickly gain additional insights into the patient condition. It also means the patient time in the scanning room is minimized and you're better able to optimize the utilization of equipment and staff resources.



## Reliable high-quality image data

StarGuide's ability to generate high-quality SPECT/CT images starts with determining the precise body contour of the patient, then positioning the detectors to perform their scans as close to the body as possible. A quick scan by Optical Scout accurately captures the patient's contour data and sets the rest of the clinical scanning procedure into motion.

After processing the Optical Scout data, StarGuide's detectors and table automatically position themselves for fast, close-proximity, and contactless scanning of the patient—and not the air surrounding the patient. With patient safety of paramount importance, each detector also contains a pressure sensitive cover, stopping motion if it is triggered.

## Efficient performance for enhanced versatility

For all of StarGuide's ability to expand our understanding of nuclear medicine's potential through exploratory, research-focused work, you'll find StarGuide is designed to deliver efficient and high-quality patient care today. With StarGuide, you get a system that reliably and predictably handles the routine scanning procedures within the most demanding clinical environments, and still provides peace-of-mind for organizations that are cost-conscious.

## Efficiencies that raise the quality of care

Many of StarGuide's efficiencies, including Optical Scout, its predictable and repeatable scan times, and digital productivity tools also make it reliable enough to perform routine scanning procedures in demanding clinical environments, which will bring peace-of-mind to your institution's management team.

## Q.Clear: Full convergence reconstruction

The Q.Clear reconstruction algorithm represents a significant step forward for use in SPECT imaging, including in the assessment of treatment response in addition to the diagnosis and staging of disease. The advancement is made possible by suppressing noise to provide outstanding quantification accuracy without sacrificing StarGuide's ability to accurately determine lesion size and volume.

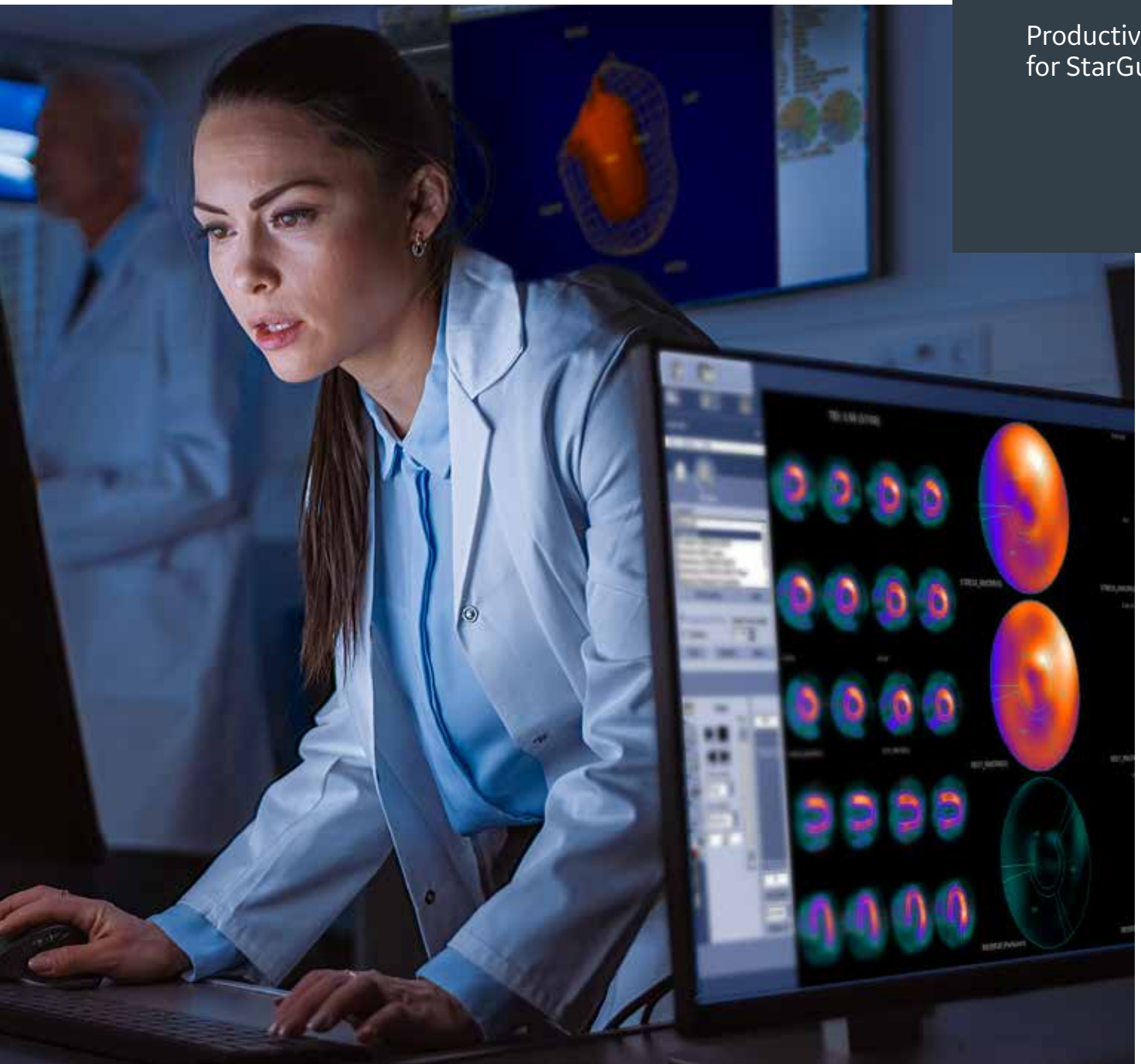
# Advanced technologies that help enhance both routine and pioneering clinical work

## SmartConsole

The all-digital productivity hub for hybrid imaging

SmartConsole is our latest network-capable image processing sub-system for Nuclear Medicine that enables you to automate SPECT/CT reconstruction, simplify complex hybrid imaging and quantitative protocols, and generate high-quality hybrid images so you can make informed decisions that lead to quantifiable results. SmartConsole is optimized to host our latest reconstruction algorithms and applications, plus it helps you seamlessly clarify and share patient data.

SmartConsole includes FAME post-processing, which integrates the CT anatomical bone information into the SPECT bone image processing. When used on StarGuide images, the lesion detectability is improved, which helps increase diagnostic confidence[8].



## Swift Plan

Productivity enhancement
for StarGuide

Swift Plan workflow is designed to simplify clinician interactions with a scanner as fast and sophisticated as StarGuide. By leveraging proven GE Healthcare innovations like its interactive table ruler and our advanced automation robotics, then combining them with new innovations like our intuitive bedside display and Optical Scout, Swift Plan quickly becomes an extremely capable and user-friendly productivity enhancer.

Swift Plan enables adaptive, consistent, and optimized camera setup and scanning which in turn allows for personalized camera setup and scanning, and minimizes patient time on the camera.

Swift Plan's simple workflow may help reduce the dependency on user expertise for the creation of quality images as well as the users' exposure to patient-injected radiation.

# The human element

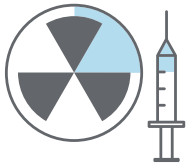
## Improving the patient experience

From its inception, StarGuide was designed with the goal of reducing the stress and anxiety of patients during an otherwise stressful juncture to their lives. StarGuide reflects our commitment to helping improve the patients' experience without compromising the quality of care they receive.

## A better patient experience by design

### Reliable scheduling

Replace planar exams with the predictable, repeatable scan times of 3D-only protocols which may minimize the need for additional views, reduce scheduling overruns and shorten patient wait times.



### Higher sensitivity[4]

Leverage StarGuide's higher system planar sensitivity and volume sensitivity, an important factor in NM imaging for enabling dose and time reduction.

### Fewer rescans

Optical Scout, Swift Plan, StarGuide's image processing engine, and Focused Imaging are important factors in helping reduce the need for inconvenient and anxiety-inducing rescans.

### Scanning comfort

StarGuide's Swift Plan minimizes the time the patient spends motionless on the camera, helping lower the stress for patients with certain anxieties.

### Rapid contouring

Optical Scout's contour scans help minimize the likelihood of detector contact while enabling close patient proximity.

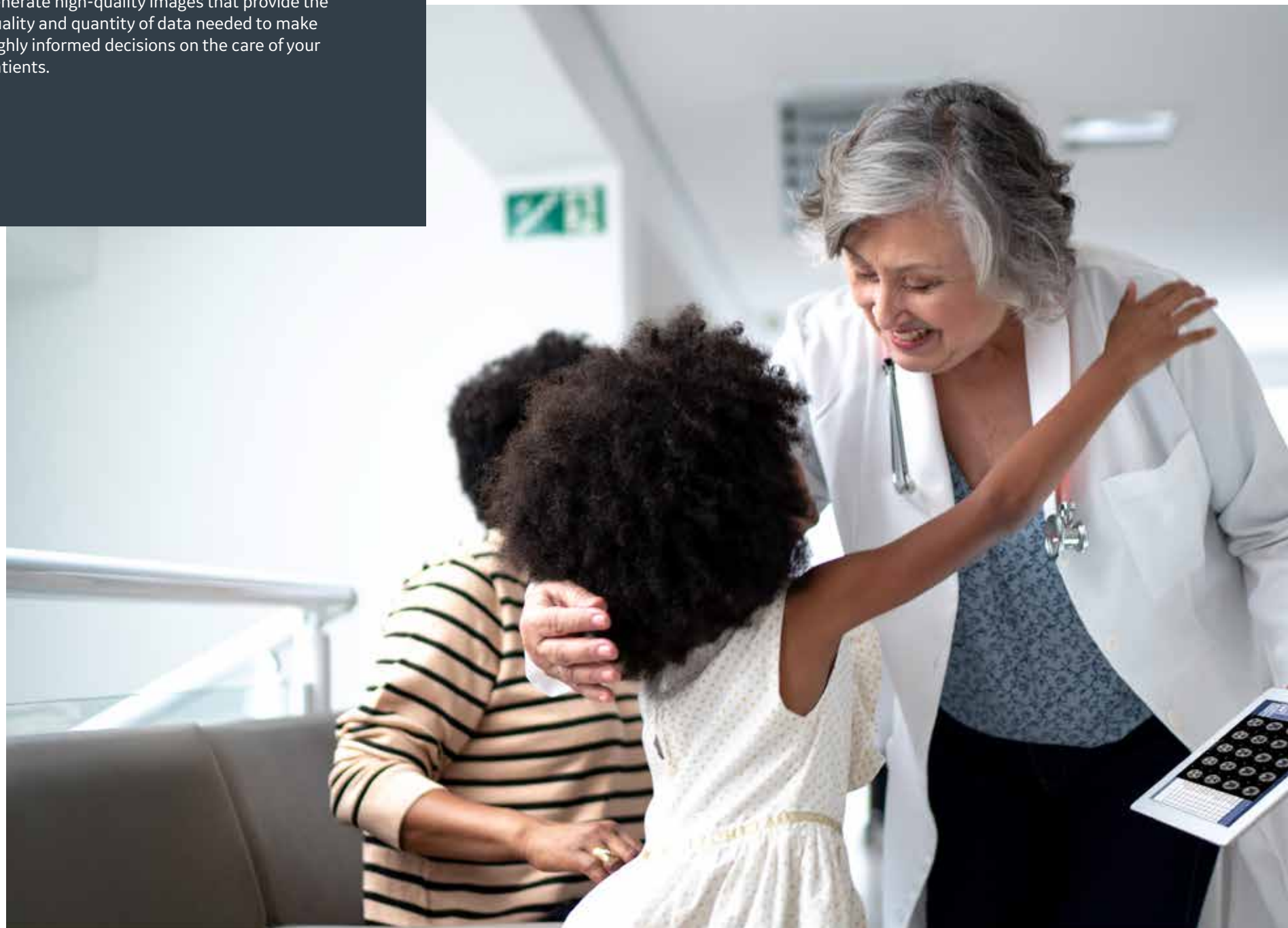
### Award winning design to help improve outcomes

Innovative design is nothing new to the engineers at GE Healthcare. When we first began the design for StarGuide, we put great emphasis on performance standards for SPECT/CT imaging with the goal of helping improve patient outcomes. We are gratified these efforts have resulted in StarGuide winning the prestigious 2021 Red Dot Award for product design.

reddot winner 2021

## Help improve patient outcomes

StarGuide helps providers to improve outcomes. In nuclear medicine, that means helping you generate high-quality images that provide the quality and quantity of data needed to make highly informed decisions on the care of your patients.



## Help enhance clinical care with StarGuide

### High-resolution images

Exceptional image quality and the enormous amount of high-resolution data that StarGuide generates with each scan give clinicians a clear image.

### Image diseases and infections in 3D

StarGuide's high image quality is the result of its powerful image processing engine and supporting algorithms developed to efficiently handle the enormous amount of data required to produce accurate 3D SPECT images of diseases and infections.

### Visualizing multiple tracers

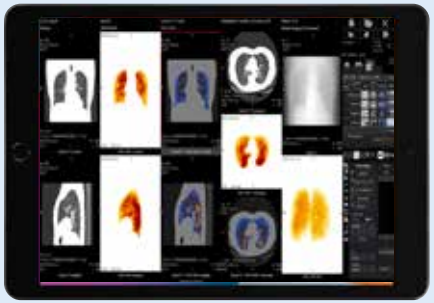
StarGuide's improved energy resolution enables you to effectively differentiate between simultaneously acquired isotopes with smaller differences in peak energies (e.g., $^{99m}$Tc and $^{123}$I)[9]. This gives you the ability to simultaneously visualize multiple tracers in a single scan, which otherwise would require two separate injections and imaging sessions that may involve multiple patient visits and, in relevant cases, multiple patient sedations.

Simultaneous scanning of multiple tracers provides inherent temporal registration between the images of the acquired isotopes, which helps increase the confidence in differential diagnosis.

# Explore other Nuclear Medicine products

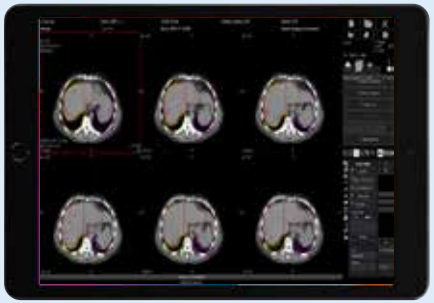
## Q.Volumetrix AI

Q.Volumetrix AI software enables advanced segmentation and quantitation capabilities for SPECT/CT and PET/CT data without impeding workflow for both baseline and longitudinal studies.



## Q.Lung AI

Q.Lung AI offers a deep learning-based SPECT/CT lung lobe segmentation application, fast and reproducible lung lobe segment analysis and a guided auto analysis of quantitative lobal and lung function. It also offers trachea segment masking for pulmonary embolism evaluation.



## Q.Liver

The Q.Liver application offers an enhanced workflow for assessing liver anatomy, an automatic method for liver segmentation and a single platform to facilitate dose calculation. It's a one-stop-shop for processing, quantifying and reviewing liver SPECT/CT as well as tools provided to the user to help calculate the therapeutic SIRT treatment doses using a user-defined formula.

FOOTNOTES:

1 Acquisition only. The acquired dynamic data is stored in a list file.

2 Radiopharmaceuticals may not be approved by ministers of health in all regions. $^{177}$Lu-PSMA is currently not an FDA approved tracer.

3 NM/CT 870 DR with MEGP collimator.

4 Compared to NM/CT 870 DR and NM/CT 870 CZT, StarGuide's planar sensitivity was measured for each of its 12 detectors and adapted from NEMA NU 1-2018. NM/CT 870 DR used LEHR/LEHRS collimators and NM/CT 870 CZT used the WEHR collimator for both planar and SPECT measurements.

5 Average of 12 detectors.

6 Compared to NM/CT 870 DR and NMCT 870 CZT. StarGuide SPECT reconstruction with scatter used the system's factory NEMA NU 1-2018 resolution protocol which uses the same method (BSREM with Clarity 3D) as its clinical bone protocol. NM/CT 870 DR and NM/CT 870 CZT SPECT reconstruction used Evolution for Bone (OSEM). NM/CT 870 DR used LEHR/LEHRS collimators and NM/CT 870 CZT used the WEHR collimator.

7 Compared to NM/CT 870 DR, as demonstrated in phantom testing using the NEMA IEC Body Phantom. StarGuide SPECT reconstruction was performed according to its clinical bone protocol (using BSREM with Clarity 3D). NM/CT 870 DR imaging was performed with LEHRS collimator and reconstructed using Evolution for Bone (OSEM).

8 As demonstrated in phantom testing using a model observer.

9 Compared to NM/CT 870 DR.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StarGuide

Building a world that works

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