

NEWS BRIEF

GE Healthcare pioneers cutting-edge CT solutions in pursuit of clinical and operational excellence

For nearly 50 years, computed tomography (CT) has proven to be a vital imaging tool used by clinicians to detect cancer, heart conditions, and other diseases large and small. CT's clinical use and diagnostic power have rapidly increased with the introduction of volumetric imaging, faster rotation speed, iterative and AI-based image reconstruction, dual energy, as well as dose reduction technologies. Last year, the United States reported an all-time high in CT procedure volume with an estimated 91.4 million scans¹.

Now, through GE's dedication to CT innovation, **photon counting CT (PCCT)** technology has the potential to define the new standard of performance for premium CT systems for many years to come². PCCT has the promise to further expand the clinical capabilities of traditional CT, including the visualization of minute details of organ structures, improved tissue characterization, more accurate material density measurement (or quantification) and lower radiation dose.

Investing in Next Generation CT Technology

Recently, [GE Healthcare announced its acquisition of Prismatic Sensors AB](#), a Swedish start-up specializing in photon counting detectors, signifying the company's continued investment in PCCT technology. This technology has the potential to significantly increase clinical performance for oncology, cardiology, neurology, and many other clinical CT applications.

GE researchers began studying PCCT in 1993 and introduced the world's first PCCT prototype using cadmium-based detectors in 2006. The company has been an industry leader in this technology for Nuclear Medicine for a decade, providing excellent results to clinicians and patients. Now, using Deep Silicon detectors, GE has identified a better solution for photon counting CT to accommodate the much higher count-rate demands of CT imaging, thereby providing much more information to clinicians.

"Clinicians rely on the information they receive from medical images – like those we receive from a CT – to help them correctly diagnose patients, monitor cases, and make treatment decisions," explains Staffan Holmin, MD, Professor in Clinical Neuroimaging, Karolinska Institutet and Senior Consultant at Karolinska University Hospital in Sweden. "What's so exciting about photon counting CT technology is that it enables higher spatial resolution and contrast. This can help us to image small blood vessels, vascular pathologies, and to see malignant changes at an earlier stage when treatment can be more effective. The potential for substantially reduced radiation is also important, particularly for pediatric patients. Photon counting will likely become the new standard for all clinical applications where CT is used today."

Prismatic Sensors has overcome many challenges working with silicon and patented a novel way to position the silicon sensors "edge on" so the detector is deep enough to absorb very high energy photons and fast enough to count and quantify the energies of hundreds of millions of CT photons per

¹ 2019 CT Market Outlook Report by IMV Medical Information Division.

² Technology in development. Not for sale. Not cleared or approved by the U.S. FDA or any other global regulator for commercial availability.

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second. The company was founded in 2012 as a spin-off from KTH Royal Institute of Technology in Stockholm, Sweden.

GE Healthcare expects to close the Prismatic Sensors acquisition by January 2021, after holding a minority position in the company since 2017. GE Healthcare and Prismatic Sensors will work together to deliver a clinical system in the near future². Terms of the transaction are not disclosed.

Introducing Unique Solutions to Improve Patient Outcomes

GE Healthcare is no stranger to introducing breakthrough CT technology. A little more than a year after receiving [industry-first clearance of its Deep Learning Image Reconstruction engine to create TrueFidelity CT Images](#), GE Healthcare is excited to unveil another industry-first: **TrueFidelity for GSI**³.

Gemstone Spectral Imaging (GSI) is a novel dual energy application that generates material density data that can be used for the separation of materials and derivation of monochromatic spectral images using a projection-based reconstruction algorithm. In turn, this process can help provide additional anatomical and functional information to clinicians to expedite and assist in an accurate CT diagnosis.

Now, utilizing a Deep Neural Network, the Deep Learning Image Reconstruction engine is trained to effectively differentiate and suppress noise in GSI projection data and produce dual energy TrueFidelity images with reduced image noise⁴, preferred noise texture⁵, enhanced contrast-noise-ratio⁶, and low-contrast-detectability⁷. Running on a reconstruction server, the Deep Learning Image Reconstruction engine can natively generate all GSI image types (monochromatic, material selective and virtual unenhanced images) to support routine and fast workflows, even in acute care settings.

Also, in direct response to the COVID-19 pandemic, GE Healthcare introduced its **CT in a Box**⁸ solution, an all-in-one portable CT solution available to pop up scan centers and hospitals to enable fast CT deployment using safe distancing measures and helping to minimize contact with potential COVID-19 cases. With more than 100 installed throughout the world⁸, GE Healthcare's CT in a Box solution is helping to provide accelerated access to CT imaging in situations requiring increased CT scans⁹.

Improving Clinical Efficiency with CT Applications

Furthermore, GE Healthcare has made several updates to its comprehensive portfolio of CT applications. Powered by Edison, these applications help improve clinical efficiency and patient outcomes.

³ TrueFidelity for GSI is 510k pending at FDA, not available sale in all regions.

⁴ Demonstrated in testing using the uniform section of the Catphan®600 with the CTP579 oval body annulus comparing pixel standard deviation in images reconstructed from the same raw data, at 0.625mm with DLIR-H and ASiR-V50%

⁵ As demonstrated in a clinical evaluation consisting of 40 cases and 5 physicians, where each case was reconstructed with both DLIRfor GSI and ASiR-V and evaluated by 3of the physicians. In 88% of the reads, DLIR for GSI's noise texture was rated better than ASiR-V's.

⁶ Demonstrated in testing using images of the CT ACR 464 Phantom (Gammex) and its 25 mm low contrast cylinderreconstructed from the same raw data with DLIR-L, DILR-M, and DLIR-H and ASiR-V 50%.

⁷ Evaluated using the body MITA CT IQ Low Contrast Phantom (CCT189, the Phantom Laboratory) with the CTP579 oval body annulus and a model observer with images reconstructed from the same raw data with DLIR-H and ASiR-V 50%.

⁸ Available in select countries. Not available in all regions.

⁹ Rodgers, A et al. "The World Health Report 2002 Reducing Risks, Promoting Healthy Life." *World Health Report*, World Health Organization, 2002, https://www.who.int/whr/2002/en/whr02_en.pdf?ua=1.

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Thoracic VCAR: Chest and lung scans made up 20 percent of all CT scans globally¹⁰ and are often used to help assess conditions like pneumonia, and viral respiratory infections showing imaging patterns including Ground Glass Opacity, which could be present in COVID-19 patients¹¹. Now, GE Healthcare's Thoracic VCAR application has been updated to allow users to instantly make quantitative measurements of the lungs to help doctors quickly and accurately diagnose lung disease and clearly communicate key information to referring physicians and patients alike.

FastStroke: For the more than 15 million individuals¹² who suffer a stroke every year, time is of the essence in the diagnosis and management of acute ischemic stroke. Every minute in which a large vessel ischemic stroke is untreated, the average patient loses 1.9 million neurons, 13.8 billion synapses, and 12 km (7 miles) of axonal fibers¹³. Fortunately, the FDA recently 510(k) cleared GE Healthcare's FastStroke, which can be used to help expedite CT stroke workups by automatically loading and processing CT studies and communicating with the stroke team via emails – providing a comprehensive workflow solution with exceptional flexibility and simplicity.

For more information on GE Healthcare and this cutting-edge CT technology, visit the company's virtual [RSNA booth](#) or gehealthcare.com.

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¹⁰ IMV 2019 CT Market Outlook Report.

¹¹ Forum of International Respiratory Societies. The Global Impact of Respiratory Disease – Second Edition. Sheffield, European Respiratory Society, 2017.

¹² Rodgers, A et al. "The World Health Report 2002 Reducing Risks, Promoting Healthy Life." *World Health Report*, World Health Organization, 2002, https://www.who.int/whr/2002/en/whr02_en.pdf?ua=1.

¹³ Saver JL. Time Is Brain—Quantified, *Stroke*. 2006; 37:263–266