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.

However, today's steadily growing patient volumes, a rapid rise in the number of images generated, and increasingly complex image reviews continue straining CT departments to their limits. What's more, departments are facing these challenges as they attempt to battle industry-wide staff shortages and burnout[i,ii] as well as immense cost pressures[iii].

In response to these conditions, GE Healthcare is proud to offer cutting-edge digital and artificial intelligence (AI) solutions as well as innovative CT systems to help meet healthcare system's most pressing needs today and in the future – all for the benefit of healthcare systems, clinicians and patients around the world.

Leveraging AI to Encourage 'Effortless Workflow'
As the pace of change in healthcare continues to increase, health plan leaders cite driving operational efficiency as one of the top challenges they face today[iv].

Studying radiology departments' entire workflows and identifying opportunities to simplify and streamline processes, GE Healthcare developed and launched **Effortless Workflow** on its Revolution Ascend system to utilize AI technologies and automate nearly every step in existing workflows – from pre-scan to post-scan – by automatically:

- Positioning patients with 94% auto centering accuracy within +/- 2 cm[v];
- Suggesting protocols with 90% accuracy[vi];
- Automating and expediting workflows with a 66% reduction in clicks[vii]; and
- Saving 56% of time for scan settings and 21% for the entire exam[viii].

This year, Effortless Workflow has become available on Revolution Apex platform and the company is proud to introduce four additional post-scan automated and AI-based applications to eliminate manual tasks for fast and consistent image post-processing as well as facilitate results sharing with interpreting physicians. Collectively, these new solutions are designed to enhance imaging consistency, efficiency, and improve reading experience:

- **Spine Auto Views**[ix] is designed to utilize a Deep Learning algorithm to immediately generate anatomically orientated, labeled spine images and presents them to the interpreting clinician ready to read;
- **Head Auto Views**[x] brings a state-of-the-art algorithm that automatically aligns head CT images;
- **Spectral Auto Views**[xi] is engineered to automatically processes images with specific spectral information, directly from the spectral dataset to Picture Archiving and Communication Systems (PACS); and
- **FastStroke with StrokeSENS**[xii] leverages automatic and AI algorithms for immediate processing of ischemic stroke cases and emailing results.

Keeping Up to Date with the Latest Technologies

Twenty years ago, new CT technologies were introduced every four-to-five years; but today, we see new solutions introduced annually – largely due to the pace of innovation today. Because of these advancements, CT technology is becoming obsolete more quickly than ever before – resulting in 44 percent of facilities expressing challenges during their attempts to keep systems up to date[xiii].

In response to these conditions, GE Healthcare introduced its **Revolution Apex platform**[xiv] – an industry first[xv] CT platform with built-in scalability for onsite CT detector upgrades from 40 mm to 80 mm or 160 mm in detector coverage – all without replacing the gantry[xvi]. Offering uncompromised clinical capabilities, the new Revolution Apex platform helps radiology departments stay ahead of the technology curve with a modular design that offers a seamless path to continuous hardware and software scalability and upgradability that can extend the lives of CT systems into the future[xvi].

The includes a new, modular CT system design that enables hardware scalability so radiology departments and healthcare facilities can add service lines to accommodate evolving patient needs[xvi]. Revolution Apex platform's Gemstone Clarity Detector is the foundation of this approach – enabling users to advance their service line from a 40 mm detector and 0.28 second rotation speed up to a 160 mm detector and 0.23 second per rotation – the world's fastest gantry speed[xvi,xvii]. This advanced rotation speed, combined with 19.5 millisecond effective temporal resolution, can freeze cardiac motion[xvii]. Additionally, the platform is built to enable seamless upgradeability.

The platform also offers Effortless Workflow to automate much of the pre- to post-scan workflow – helping to reduce clicks, save time, and achieve exceptional efficiency and consistency in imaging.

These capabilities enable healthcare facilities to keep up with the latest technology while helping to minimize technology obsolescence and optimizing clinical capabilities now and in the future[xvi]. They also help streamline fleet management, allowing facilities to minimize overall operating costs and address budget constraints.

Pushing CT Beyond Anatomy

At #RSNA22, GE Healthcare also is proud to unveil **Revolution Frontier Gen 3**, the latest addition to the GE Revolution family of intelligent CT scanners. Built to push the boundaries of what healthcare systems can expect from their CT, the new system includes a streamlined spectral imaging experience and a robust toolkit of imaging modes to enable a whole new level of everyday CT capability.

In addition to operational efficiency, one of the biggest challenges in CT today is that conventional systems often lack the fine detail and tissue composition needed to clearly characterize a disease. This puts clinicians in the position of having to order additional follow-up tests to complete a diagnosis – further straining healthcare system resources. With this in mind, GE Healthcare designed Revolution Frontier Gen 3 to deliver both high sensitivity and specificity with **Gemstone Spectral Imaging (GSI)**.

GSI is a dual energy application that generates material separation and 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.

This experience is further enhanced with **GSI Pro**, which enables seamless integration with AW applications and significantly reduces reconstruction times – effortlessly processing gigabytes of data at a time. Beyond that, GSI Pro also incorporates the latest in iterative reconstruction technology, **ASiR-V**[xviii], to enable dose neutrality, lower image noise and improved low-contrast detectability for patients of any size.

These improvements to spectral imaging technology make the clinical benefits of GSI routinely accessible and gives clinicians the freedom to explore the benefits of up to a 50 percent improvement in beam-hardening artifacts – namely metal artifacts – and non-contrast-like images that subtract detected iodine.

Revolution Frontier Gen 3 can also produce high quality CT images across a wide range of clinical applications at the lowest possible radiation dose with **TrueFidelity**. Also, because the solution runs on a cutting-edge reconstruction server, it has the power to achieve fast reconstruction for routine CT use, even in acute care settings.

Finally, Revolution Frontier Gen 3 simplifies the entire patient setup process with an innovative auto centering technology to increase operational efficiency and improve the scan experience for technologists and patients, starting with related protocol recommendations. By comparing the exam description against a database of scan protocols, the system displays a short list of protocols to choose from. What used to take valuable time searching for the right protocol and then manually positioning the patient in the bore, can now be done with a quick selection and the simple click of a button.

Advancing Photon Counting CT with Deep Silicon Detectors
GE Healthcare is also working to advance the capabilities of CT with its unique approach to photon counting CT.

Last week, the company announced researchers at the University of Wisconsin–Madison, the first U.S. clinical evaluation site for GE Healthcare's novel silicon-based photon counting CT[xix], will begin human scanning using the device that is engineered with Deep Silicon detectors for photon counting CT with the goal of greatly enhancing imaging capabilities to help clinicians improve patient outcomes across oncology, cardiology, neurology, and other clinical CT applications.

The collaboration comes nearly one year after GE Healthcare announced its first clinical evaluation site at Karolinska Institute and MedTechLabs in Sweden. Since then, the company has made significant steps forward in enhancing the developing technology, building a new system prototype to include:

- A larger detector with the possible goal of enabling quicker scan times as well as expanding coverage;
- ECG-gated cardiac scan capabilities designed for coronary artery imaging; and
- Faster acquisition speed with the intent to reduce the likelihood of blurred images due to motion[xx].

Photon counting CT could potentially advance the capabilities of CT, including the visualization of minute details of organ structures, improved tissue characterization, more accurate material density measurement (or quantification) and lower radiation dose.

GE Healthcare is pursuing a unique approach to photon counting CT, which may enable higher spatial and spectral resolution at the same time, thanks to several advantages provided by Deep Silicon detectors, including: the detector's material purity, innovative geometric design, and true multi-bin technologies for high performance spectral imaging. As such, the research being done at UW–Madison will assist GE Healthcare in better understanding the heights of these unique capabilities.

+++

MEDIA CONTACT

Margaret Steinhafel
margaret.steinhafel@ge.com
M: +1-262-366-5375

---

[i] Gleeson, Cailey. "Healthcare staff shortages project for every state by 2026." *Becker's Hospital Review*. Published 29 September 2021. Accessed 24 November 2021. https://www.beckershospitalreview.com/workforce/healthcare-staff-shortages-projected-for-every-state-by-2026-4-report-findings.html

[ii] Levine, David. "U.S. Faces Crisis of Burned-Out Health Care Workers." *U.S. News & World Report*. Published 15 November 2021. Accessed 24 November 2021. https://www.usnews.com/news/health-news/articles/2021-11-15/us-faces-crisis-of-burned-out-health-care-workers

[iii] "New Report Highlights Financial Challenges Facing Hospitals That Are Jeopardizing Access to Care." American Hospital Association (AHA) Special Bulletin. Published 15 September 2022. Accessed November 2022. https://www.aha.org/special-bulletin/2022-09-15-new-report-highlights-financial-challenges-facing-hospitals-are

[iv] "HealthEdge Survey Highlights Growth Opportunities and Challenges for Health Plan Leaders." HealthEdge. 9 April 2022. https://www.healthedge.com/about-us/news-events/press-releases/healthedge-survey-highlights-growth-opportunities-and-challenges-for-health-plan-leaders

[v] Measured centering accuracy which was scanned 921 standard routine exams in head and body with Auto positioning in three institutions using a pilot product.

[vi] Results may vary depending on the circumstances, including but not limited to, exam type, clinical practice. This analysis was performed on 3175 exams representing 17 different exam descriptions, collected from 4 different medical evaluation site.

[vii] The required clicks are defined as clicks required to execute a scan from selecting a new patient til start scan. All associated clicks for and in clinical practice, number of the required clicks may vary depending on the circumstances, including but not limited to, the clinical task, exam type, clinical practice, and image reconstruction technique.

[viii] The data was based on comparison between GE's legacy products (16ch and 64ch scanner) and Revolution Ascend in the three institutions using a pilot product and selected routine head and body. The data set of this comparison was 838 exams for legacy products and 1387 exams for Revolution Ascend. The time saving value may not be effective for all institutions depending on the clinical practice. Definition of entire exam time is from "Open new patient" to "Last primary recon completed" for Revolution Ascend and "Close exam" for legacy products.

[ix] Spine Auto Views is 510(k) pending at FDA. Not available for sale in the US. Not available for sale in all countries

[x] Head Auto Views is not available for sale in all countries.

[xi] Spectral Auto Views is not available for sale in all countries. Spectral Bone Marrow is 510(k) pending at FDA. Not available for sale in the US.

[xii] StrokeSENS™ is legally manufactured by Circle Neurovascular Imaging, Inc. FastStroke with StrokeSENS is not available for sale in all countries.

[xiii] GE Healthcare data on file.

[xiv] GE Healthcare's Revolution Apex platform is FDA 510(k) cleared and not available for sale in all countries.

[xv] GE Healthcare data on file.

[xvi] Scalability and upgradability are subject to the availability and compatibility of new capabilities and products.

[xvii] 0.23sec and 19.5msec are 510k pending and not available for sales in all countries. 19.5msec effective temporal resolution is achieved by a 6x improvement of motion-blur reduction while maintaining high spatial resolution as demonstrated in cardiac phantom testing. The reduction in motion artifacts is comparable to a 0.039 equivalent gantry rotation speed with effective temporal resolution of 19.5 msec, as demonstrated in mechanical and mathematical phantom testing.

[xviii] In clinical practice, the use of ASiR-V may reduce CT patient dose depending on the clinical task, patient size, anatomical location and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.

[xix] Technology in development that represents ongoing research and development efforts. These technologies are not products and may never become products. Not for sale. Not cleared or approved by the U.S. FDA or any other global regulator for commercial availability. Not CE marked.

[xx] Compared to previous prototype version.