

Healthcare Sector Imaging & IT Division

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Flash Speed. Lowest Dose.

New CT scanner from Siemens Healthcare sets the bar higher

With the Somatom Definition Flash, Siemens Healthcare is introducing a CT scanner that will set new standards regarding speed and dose reduction. The system requires only a fraction of the radiation dose that systems previously required to scan even the tiniest anatomical details faster than ever before. The Somatom Definition Flash is a new dual-source CT from Siemens, featuring two X-ray tubes that simultaneously revolve around the patient's body. The fastest scanning speed in CT (43 cm/s) and a temporal resolution of 75 ms, enable for example complete scans of the entire chest region in just 0.6 seconds. Thus, patients are no longer required to hold their breath during the exam the way they had in the past. At the same time, the Somatom Definition Flash operates at an extremely reduced radiation dose. For example, a spiral heart scan can be performed with less than 1 millisievert (mSv), whereas the average effective dose required for this purpose usually ranges from 8 mSv to 40 mSv. The new CT scanner will be available for sale in the first quarter of 2009.

Siemens will present its new Somatom Definition Flash CT scanner at the 94th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA) from November 30 to December 5 at McCormick Place (Booth #922, East Building, Hall D). This new generation of dual-source CT scanners, featuring two X-ray tubes and two detectors, will provide a genuine innovation boost to dual-source technology. The enormous speed of the Somatom Definition Flash offers decisive advantages, especially regarding examinations of moving structures, such as the thorax and the heart. The gantry (i.e., the X-ray detector system surrounding the bore) rotates about its own axis in just 0.28 s. It is this extraordinary rotational speed that enables a scan speed never before attained in CT (i.e., up to 43 cm per second) and temporal resolution of 75 milliseconds. The patient is moved through the CT tube more than twice as fast as with any conventional system. At the same time, scans acquired with the Somatom Definition Flash require a much lower radiation dose than conventional scans. While the average effective dose for a heart CT scanner

ranges from 8 mSv to 40 mSv, the new Siemens CT scanner gets by with less than 1 mSv. In comparison: The X-ray radiation that everyone is exposed to each year from natural sources amounts to 2 mSv to 5 mSv. The dose values of the new Siemens CT scanner, thus lie far below those of an intracardiac catheter examination, thus opening up possibilities for using CT scanners for routine cardiological examinations.

Dr. Sami Atiya, chief executive officer of Computed Tomography at Siemens Healthcare said: "The Somatom Definition Flash is not only the world's fastest CT scanner, but also the one with the lowest radiation exposure. Siemens has always given top priority to radiation dose reduction in the course of CT development. And we are proud that our company has once again set a new standard in this regard."

Thorax scan in the subsecond range: Breath holds no longer required

Due to the high scanning speed, it is now possible to acquire scans of the thorax, the heart or both at the same time in fractions of a second. For example, thorax examinations now only require a scan time of 0.6 seconds. As a result, patients no longer have to hold their breath during the scan. This offers considerable advantages, especially in cases involving the elderly, children, emergency, and ICU patients.

It is also possible to perform whole-body scans extremely fast: For example, a person with a height of 6 feet 6 inches can be scanned in less than 5 seconds. Until now, such whole-body examinations took more than 10 minutes to perform from patient preparation to diagnosis. With the Somatom Definition Flash, this process is completed in just a few minutes. This represents an advantage, especially for emergency medicine since, until now, physicians often had to forego this examination method due to time pressure. Furthermore, it is no longer necessary to sedate children prior to the examination, since they no longer have to remain still. The high scanning speed also makes it possible to cover large areas measuring up to 48 cm with 4D imaging (3D plus time). The areas scannable using conventional systems are limited to a maximum of 16 cm due to the detector size involved.

Flexible cardiac examinations with a minimum radiation dose

A scan of the entire heart can be performed in only 250 milliseconds, which is less than half a heart beat. In addition, it is possible for physicians to reliably display a heart with a fast pulse or an irregular heart beat without using beta blockers, thus simplifying the workflow and yielding clinical and financial advantages. Owing to its high scanning speed, the Somatom Definition Flash also features new possibilities for performing CT examinations of the heart in the sub-mSv range. This

represents a much lower radiation dose than is obtainable with conventional systems, which require doses ranging from 8 mSv to more than 40 mSv. For the first time ever, the heart can thus be examined at a radiation exposure level that is three times lower than the background radiation a person naturally absorbs in a year. The Somatom Definition Flash is the only CT scanner on the market that enables the use of noninvasive cardiological diagnostic techniques as routine applications at the lowest possible radiation exposure levels.

Double contrast in routine daily work

The second generation of Dual Energy imaging will introduce a new imaging quality. The contrast in CT scans will be increased without having to apply the higher radiation dose previously required. This is achieved via a new, selective photon shield which blocks unnecessary parts of the energy spectrum. It thereby provides improved separation of the two simultaneous scans with low and high photon energy, without causing a higher radiation exposure than would result from an individual, conventional CT examination with only one energy source. Thus, the Somatom Definition Flash can always provide a double contrast which, for the first time ever, can also be used to classify the chemical composition of tissues via a CT scan in routine daily work. Subsequently, it could also be used to reconstruct unenhanced CT images without contrast media not having to perform an additional examination.

Dose protection for radiation-sensitive organs

Another technical development for keeping the patient's radiation exposure as low as possible is the X-CARE application. For the first time ever, this application selectively reduces the radiation exposure of dose-sensitive anatomical regions, such as the female breast. This is done by switching the X-ray tube assemblies off during the rotation phase in which the anatomical regions concerned are most directly exposed to radiation. In this way, it is possible to reduce the radiation exposure of individual anatomical regions by up to 40 percent. Furthermore, an adaptive dose shield blocks irrelevant prepiral and postpiral radiation with dynamic diaphragms, thus ensuring that only a minimum and clinically essential radiation exposure occurs. This enables an additional 25 percent reduction of the dose required for routine examinations. The CARE Dose4D software, which analyzes the individual cross-sectional anatomy in real time and adapts the emitted X-ray dose accordingly, also helps to reduce radiation exposure.

Press pictures are available at

<http://www.siemens.com/med-pictures/Somatom-Definition-Flash>

Further background material can be found by visiting

www.siemens.com/somatom-definition-flash

The **Siemens Healthcare Sector** is one of the world's largest suppliers to the healthcare industry. The company is a renowned medical solutions provider with core competence and innovative strength in diagnostic and therapeutic technologies as well as in knowledge engineering, including information technology and system integration. With its laboratory diagnostics acquisitions, Siemens Healthcare is the first integrated healthcare company, bringing together imaging and lab diagnostics, therapy, and healthcare information technology solutions, supplemented by consulting and support services. Siemens Healthcare delivers solutions across the entire continuum of care – from prevention and early detection, to diagnosis, therapy and care. Additionally, Siemens Healthcare is the global market leader in innovative hearing instruments. The company employs more than 49,000 people worldwide and operates in 130 countries. In the fiscal year 2008 (Sept. 30), Siemens Healthcare reported sales of €11.17 billion, orders of €11.78 billion, and group profit of €1.23 billion. (Preliminary figures) Further information can be found by visiting <http://www.siemens.com/healthcare>.