

CT Scanning in a Flash



The SOMATOM® Definition Flash computed tomography (CT) scanner sets new standards in both image acquisition speed and radiation dose as the world's fastest CT with the lowest dose ever. Like no other scanner, it can image the entire thorax in less than one second and complete a cardiac scan in one-fourth the time of a single heartbeat, with a radiation dose of less than one millisievert. "Our goal was to build the most patient-friendly CT by significantly reducing dose through faster speed," says Sami Atiya, PhD, Chief Executive Officer of the CT Business Unit of Siemens Healthcare. "Lowest radiation dose is important to physicians and patients. It's important to us."

SOMATOM Definition Flash utilizes Dual Source technology that consists of two detectors and two X-ray sources. This configuration, coupled with a gantry rotation time of 0.28 seconds, enables a temporal resolution of just 75 milliseconds, makes dual energy scanning possible, and allows the use of 200 kilowatts. Now, Siemens scientists and engineers have discovered how to push acquisition speeds to new levels. SOMATOM Definition Flash can scan at a pitch of above three, while still

achieving gapless z-sampling, resulting in a table speed of more than 40 centimeters per second. That is because the two detectors create two complementary data spirals that, when put together, include all the information found in a single spiral acquired at a much lower table speed.

Together, these features enable lung scans in 0.6 seconds, taking the burden of breath-holding off the patients. Fast scan speeds also eliminate the additional dose penalty of electrocardiographically (ECG) gated thoracic studies, so radiologists can scan the thorax and 'get the heart for free.' Dedicated cardiac investigations can be completed in about 250 milliseconds. But more importantly: It also reduces dose to unprecedented levels down to below one millisievert. The new features also permit pediatric scans more quickly and safely than ever before. In addition, a shuttle mode makes it possible for trauma patients to be scanned to conduct dynamic time-resolved imaging over 40 centimeters, the longest range available today.

Besides the reduced radiation exposure that directly results from the high table speed, SOMATOM Definition Flash offers

several other dose-conscious features. In dual energy scans, a new photon shield prefilters high kilovoltage X-rays, both improving material separation and substantially reducing dose, making it perfect for routine clinical use. Adaptive Dose Shielding blocks X-rays that will not be used in image reconstruction. New organ-specific dose reduction eliminates direct exposure of radiation-sensitive organs, such as the breast, thyroid gland, or eye. And Siemens is looking to the future, developing iterative reconstruction techniques that promise to further reduce dose.

Willi Kalender, PhD, Director of the Institute of Medical Physics at the University of Erlangen-Nuremberg in Erlangen, Germany, says, "The new scanner is a true revolution. It picks up on the well established concept of Dual Source CT but improves it in several ways. We never before dared to scan with such a low dose and such a high speed."

www.siemens.com/SOMATOM-Sessions-Flash

Large Display for Artis zee Family

Following the release of the Artis zee® family for interventional imaging in radiology and cardiology in 2007, Siemens launched a new, full-color large display¹ for integration with the new portfolio at RSNA 2008. The Artis zee Large Display is a 56-inch monitor that allows users to replace up to eight single monitors on the system. It provides the integration of multiple modalities on one screen for greater flexibility and enables the user to configure the screen during the procedure. The operator can choose from different screen layouts directly at the tableside of the angiography system. This enables the operator to adapt the configuration to the individual workflow

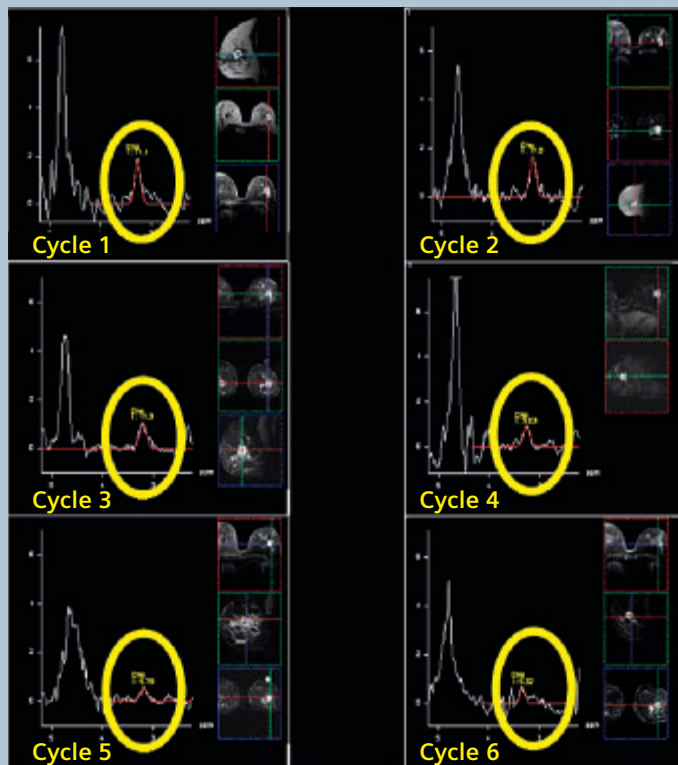
steps. Continuing the flexibility and versatility of the Artis zee systems, the product can be used for interventional radiology, interventional cardiology/ electrophysiology, and surgery, and is particularly valuable for interventional imaging in hybrid rooms as it tremendously reduces the number of monitors in the room. With its high resolution (4 x HD), the Large Display shows even the finest details. Up to 200 layout combinations and the possibility to connect at least 16 image sources and show up to ten windows simultaneously enhance imaging results and workflow in the interventional suite. Moreover, the reduction of additional displays and the option



to put other video signals on the Large Display – for instance, for monitoring other rooms, telemedicine, or endoscopy – make it a rewarding investment for the future.

¹ The information about this product is being provided for planning purposes. The product requires 510(k) review and is not commercially available in the U.S.

Comprehensive MR Oncology Solutions



syngo GRACE after every chemotherapy cycle of a patient with known breast cancer: The efficiency of therapy can be easily seen by the decreasing choline.

Within the field of oncology, magnetic resonance imaging (MRI) has proven to be one of the most effective imaging techniques. For asymptomatic and high-risk patients, MRI enables both early tumor detection and oncological staging without radiation. To support precise surgery planning, therapy monitoring, and follow-up, Siemens provides comprehensive MRI oncology solutions, going far beyond single applications and software features.

In Women's Health, the first quantitative MRI breast spectroscopy application *syngo*® GRACE is now also available for the 3 Tesla systems MAGNETOM® Verio and Trio. By checking relative choline concentration during therapy, the efficiency for monitoring treatment is more reliable. This may also reduce the number of unnecessary breast biopsies for the women concerned.

In the field of Men's Health, *syngo* Tissue 4D¹, the new task card for visualization of 3D dynamic measurements, is particularly valuable for prostate evaluation. Offering two evaluation workflows – standard curve evaluation or a pharmacokinetic model – *syngo* Tissue 4D supports an efficient oncology workflow and reliable follow-up studies.

Completed by *syngo* TimCT Oncology – the hardware and software solution for seamless whole-body imaging using Continuous Table move – these new applications and workflow tools expand the comprehensive Siemens solution for oncology diagnosis and staging.

¹ This application is pending 510(k) review and is not yet commercially available in the U.S.

What is your SPECT'S IQ?

Siemens demonstrated industry leadership once again with molecular imaging's most recent innovation in single photon emission computed tomography (SPECT) – IQ-SPECT¹. This new feature in SPECT enables a comprehensive cardiac evaluation including perfusion, attenuation correction, and calcium scoring in as little as five minutes² when traditional cardiac SPECT perfusion studies can average 15 to 20 minutes. Available for the Symbia® product line, IQ-SPECT allows organ-specific cardiac evaluations with enhanced image quality. For medical facilities, this innovation means being able to accommodate more patients in less time and meet a variety of patient needs.

IQ-SPECT's 'intelligence' is achieved through a combination of three technologies beginning with SMARTZOOM, a specially designed smart collimator that magnifies the heart while imaging the rest of the torso under traditional conditions. Second, the SMARTZOOM collimator works in a cardio-centric orbit to maximize the amount of cardiac information collected from the patient. Finally, unique IQ-SPECT reconstruction completes the innovation and is seamlessly integrated into the current Symbia workflows and automation features, giving physicians access to the most flexible and versatile system available today.

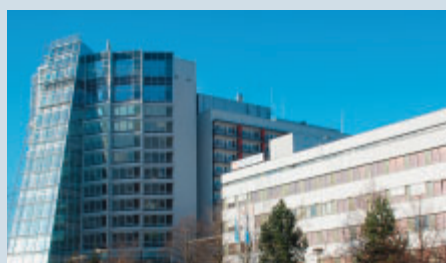
Calcium scoring with SPECT·CT, extracted from a quick low-dose spiral CT, has also become a critical element in the cardiac work-up to evaluate the extent of cardiac disease in patients. Adding the 30-second CT to the SPECT study cannot only illustrate any ischemia present in the patient, but also can assess the buildup of calcium in the coronary arteries. The addition



of IQ-SPECT to these important SPECT·CT studies may lead to new risk stratification algorithms and workups for patients with suspected coronary artery disease.

¹ Works in Progress. The information about the product is preliminary. The product is under development and is not commercially available in the U.S., and its future availability cannot be assured.

² New Product Feature based on preliminary internal data. Actual performance characteristics have not been established.



Klinikum Chemnitz is one of the first hospitals in Germany to link its teleradiology service with an electronic health record (EHR). The EHR makes demographic and administrative data of a teleradiology service available. Provided the patient agrees, images and results from diagnostics can be shared by different facilities. Thanks to a special security system, the data are only accessible to authorized users who

Electronic Health Record for Integrated Care

are involved in the patient's treatment. Siemens equipped the hospital with an overall technology system that includes Soarian® Integrated Care¹ (Soarian IC) for information exchange, as well as radiological image communication software. Soarian IC improves the flow of information across institutions and sectors without the need to exchange existing primary systems. As a result, the system supports the cooperation between the individual clinical facilities and simplifies the patient treatment. Together with 14 regional county hospitals as well as medical centers and several practicing physicians, Klinikum Chemnitz sets standards for integrated healthcare in

Germany. Especially regarding diagnoses in the fields of neurosurgery, traumatology, angiology, and radiology, the hospital supports regional hospitals and practices with its medical expert knowledge. For example, a patient who has been brought into a county hospital after an accident can be scanned with a computed tomography system. The image data is sent electronically to a responsible physician in Klinikum Chemnitz, who then diagnoses the patient and sends back the report.

¹ The information about this product is preliminary. The product is under development and is not commercially available in the U.S. or in Canada, and its future availability cannot be assured.

Neonatal Care

Siemens RAPIDLab® 1245/1265 blood gas analyzers have been enhanced to measure total bilirubin on neonatal whole-blood samples. The RAPIDLab systems determine the neonatal total bilirubin concentration in 60 seconds using multiple wavelength spectrophotometry. Bilirubin is the main bile pigment formed from the degradation of hemoglobin. An increased level of bilirubin in the blood (hyperbilirubinemia) causes jaundice,

the discoloration of body tissues. Neonatal jaundice is usually harmless, a consequence of immature liver function and the breakdown of fetal hemoglobin as it is replaced with adult hemoglobin. Severe neonatal jaundice may indicate a more serious condition, including erythroblastosis fetalis, that is most likely caused by blood incompatibilities between baby and mother. Extremely high levels of bilirubin in infants may cause bilirubin encephalopathy or kernicterus, a form of brain damage.

The Business Partner in MRI

“You can’t run a radiology practice without an MRI [magnetic resonance imaging] system,” says Franz Walter, MD. “Demand from referrers and patients for radiation-free imaging is growing steadily.” This is why the radiologist invested in a MAGNETOM® ESSENZA immediately after taking over the recently out-sourced radiology practice of the Evangelische Krankenhaus in Zweibrücken, Germany. With a low total cost of ownership, MAGNETOM ESSENZA is ideal for setting up and expanding MRI services. Zhen Jin, MD, agrees. The Director of the MRI Center at Hospital 306 in Beijing, China, looks back on 13 years of MRI service at her institute – and installed two additional systems last year: a 3 Tesla MAGNETOM Trio and a 1.5 Tesla MAGNETOM ESSENZA. The decision for the MAGNETOM ESSENZA was a natural one for both physicians: “It is the first system that is optimized for cost of ownership. Zero helium boil-off and a 50 percent lower electricity consumption compared to conventional systems are just two examples of its affordability,” says Walter. “We wanted a robust system for clinical use to allow more time for research on the MAGNETOM Trio,” Zhen Jin says as she explains the reason for buying two systems within such a short timeframe. MAGNETOM ESSENZA offers full diagnostic capabilities thanks to Tim® (Total imaging matrix). Tim provides flexibility through versatile coil combinations, accuracy through high signal strength and spatial resolution, and speed resulting from parallel imaging. It offers access to the applications needed for both an outpatient practice and a primary care hospital. Zhen Jin also appreciates the integrated IsoCenter Matrix coil of MAGNETOM ESSENZA. Thus, the region of interest is always at the center of the magnetic field, which makes coil repositioning and changing obsolete.

With 28 patients a day, she is also happy with the speed of the exams, as is Walter with 22 exams, which include outpatients as well as referrals from within the hospital. Walter mentions a Parkinson’s patient who was referred for an angio exam. First, he was skeptical about being able to achieve diagnostic image quality. Thanks to MAGNETOM ESSENZA’s fast sequences, movement artifacts were reduced and the images were good for diagnosis. “From any perspective, MAGNETOM ESSENZA is definitely up to date,” he says.



At Hospital 306 in Beijing, Dr. Zhen Jin is happy with MAGNETOM ESSENZA’s low cost of ownership.



Dr. Franz Walter of the radiology practice at Evangelische Krankenhaus Zweibrücken likes the system’s ease of use.

www.siemens.com/ESSENZA