

SIEMENS



Now
With new
Stellar Detector

www.siemens.com/healthcare

Flash Speed. Lowest Dose.

SOMATOM Definition Flash

Answers for life.

SOMATOM Definition Flash

SOMATOM Definition Flash



Siemens CT Vision



Today's reality

Better healthcare for all patients is a key priority for the entire medical industry. But the realities of clinical practice often make this simple-to-understand goal quite difficult to realize: staying within budgets, reducing hospital stays, speeding up time to diagnosis, and dealing with personnel issues, while maintaining high clinical standards and throughput. At the same time, patients demand better and faster results.

Our approach

In order to meet our share of responsibility in addressing these challenges, Siemens, from the earliest stages of research, product development, and design, relies

upon the advice and recommendations of external medical experts to determine our focus—and this focus has been on the needs and demands of our end users. Over the years, this focus has been fine-tuned in four key areas:

- To lead technological and medical advancement.
- To maximize workflow efficiency.
- To make state-of-the-art CT affordable.
- To set the standard in customer care.

Our vision

As a customer-oriented healthcare provider, Siemens CT creates innovations that lift clinical practice to the next level of excellence and enable wide access to

better patient care. We believe that even the farthest technical horizons are temporary and can be surpassed with consistent dedication to improved healthcare. This visionary approach, backed up by the, by far, largest R&D budgets in the healthcare industry, has made Siemens the undisputed innovation leader in CT over the past 35 years. And our ambitious global team continues to set the trend in an always changing environment, providing Answers for Life.

Leading patient care

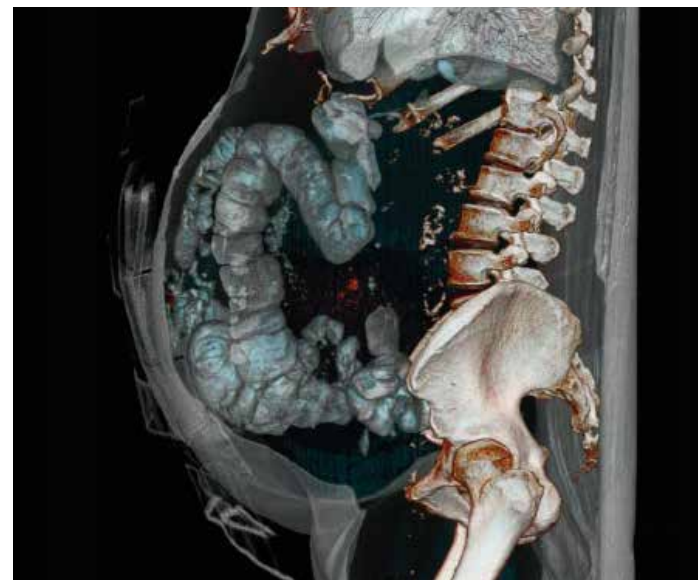
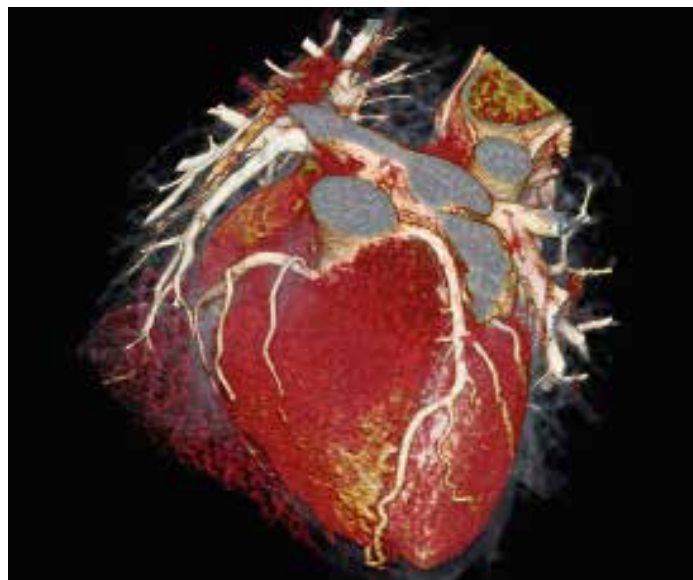
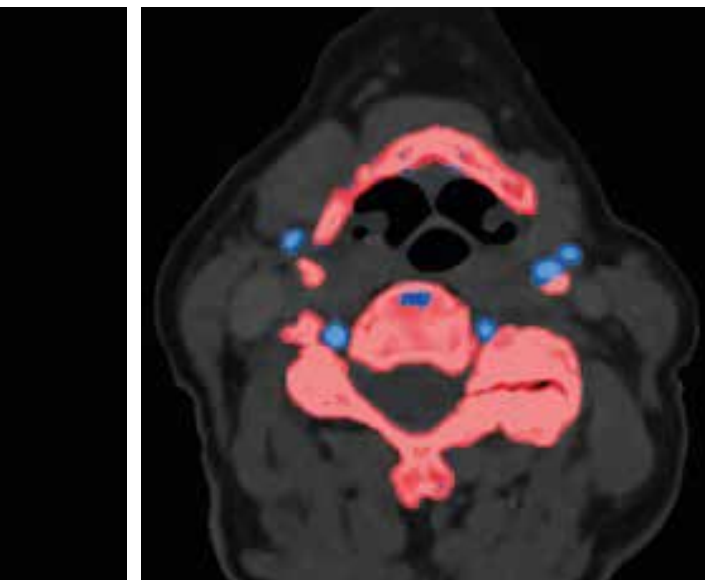
Today, more than 900 institutions worldwide have already taken this opportunity to improve patient healthcare and push their clinical boundaries to a higher level utilizing Dual Source CT.

Pushing the boundaries again

In 2008, Siemens introduced the gold standard in CT technology, still unrivaled today: the SOMATOM® Definition Flash. And now, again, Siemens sets the standards in CT with the revolutionary Stellar Detector with TrueSignal Technology. Developed with the clear goal of providing the latest state-of-the-art CT technology, the new detector offers uncompromised diagnostic outcome with the highest image quality, acquired outcomes at impressively low patient radiation. With the SOMATOM Definition Flash in combination with the Stellar Detector, Siemens again pushes the boundaries of patient care.

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Flash speed. SOMATOM Definition Flash Lowest dose.

Flash speed

The SOMATOM® Definition Flash opens a door to new levels of patient friendliness with the speed to cover the entire thorax in less than a second—if necessary even without a breath hold. A whole-body scan requires only five seconds, while for perfusion or dynamic vascular imaging long-range scans become routine and pediatric scans become sub-second procedures only minimally impaired by motion.

The revolutionary new Stellar Detector—the first fully-integrated detector that minimizes electronic noise—taking CT

imaging where it has never gone before. By generating ultra-thin slices, it delivers the highest spatial resolution and an outstanding level of sharpness in CT that visualizes even the finest image details.

Our FAST CARE platform, enriched by the FAST Dual Energy 3D WorkStream™, allows you to achieve clinical results with significantly fewer resources. The ultimate goal is to provide you with more time for patients and diagnosis—in effect, patient-centric productivity.

The Fully Assisting Scanner Technologies (FAST) simplify typically time-consuming procedures so that the scan process is more automated and results become more

reproducible. Integrating the capabilities of syngo®.via leads to a fast and reliable diagnosis with less patient burden.

Lowest dose

Maybe even more important—and impressive—is the significant reduction in dose, which allows, for example, for sub-mSv scanning in daily cardiac imaging. Furthermore, the second generation

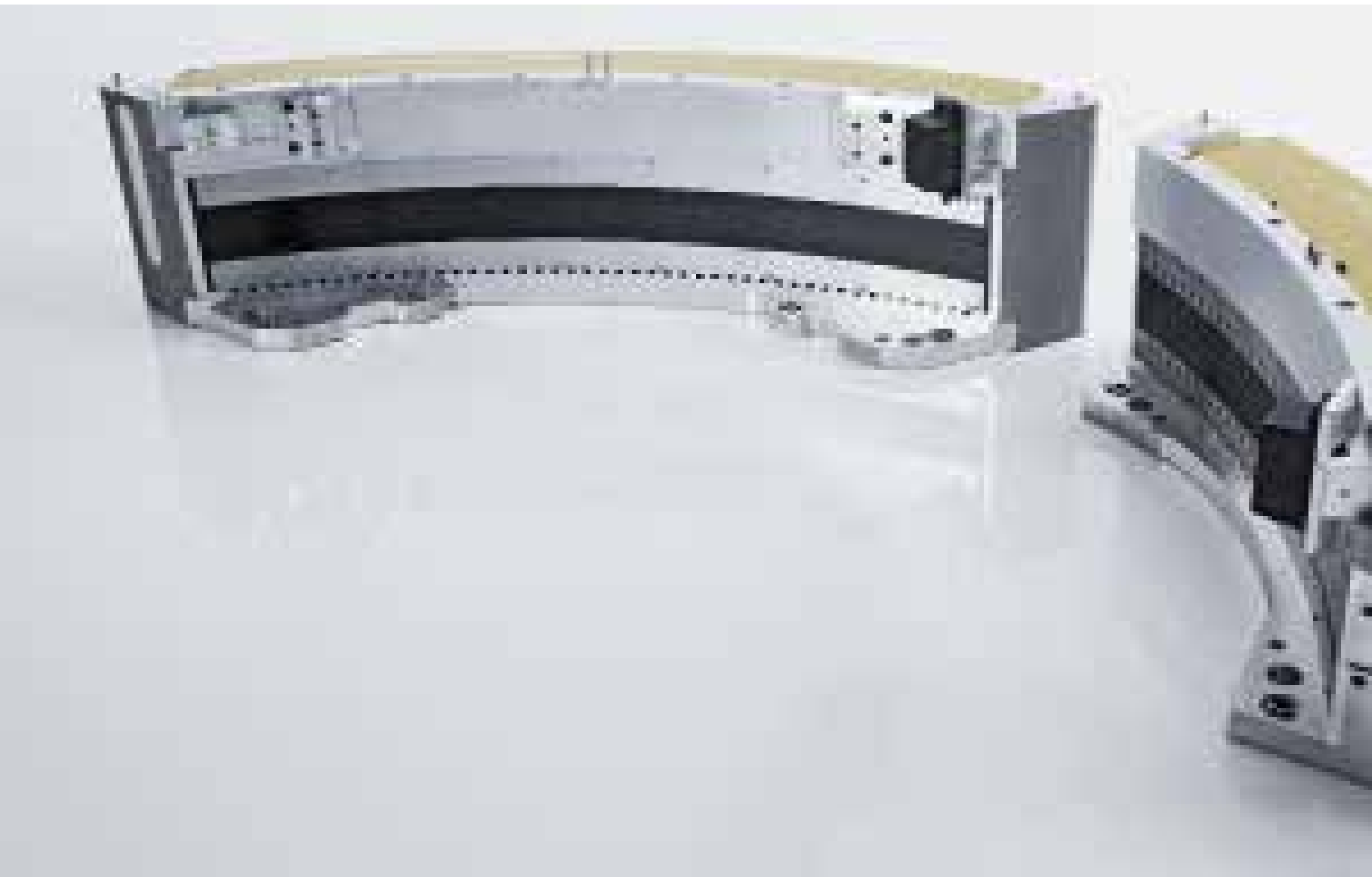


of dual source systems enables the user to routinely acquire Dual Energy information at excellent image quality without a dose penalty for your patient. Further, Virtual Noncontrast Dual Energy CT proves to substantially save radiation dose. At the same time, X-CARE protects individual organs and the most radiation-sensitive body regions—for example, female breasts and the eyes—by accurately and efficiently minimizing exposure while preserving image quality. Finally, the revolutionary Stellar Detector, with its significantly reduced electronic noise level, is designed for ultra-low signal imaging in, for example, in obese and pediatric patients. HiDynamics

provides an extended dynamic bandwidth for an increased detail level especially in low-kV and Dual Energy imaging. So the Stellar Detector eliminates the contradiction of outstanding image quality with minimal dose.

With FAST CARE, Siemens introduces several innovative CARE (Combined Applications to Reduce Exposure). For instance, CARE kV automatically solves the complex equation for optimal image quality at lowest possible dose for each individual CT exam while considering tube voltage, tube current, and contrast changes at different voltages and attenuation. This allows you to benefit

from the industry's widest tube voltage range—not only 140 kV for bariatric imaging, but now, if necessary, also down to 70 kV for new image quality standards in pediatric imaging. Add SAFIRE, and define low dose for all body regions to take best care of your patients' well-being.





Stellar Detector Technology

The overall goal in Computed Tomography is to achieve high-quality images, with a high spatial resolution, but at the lowest possible dose. When pushing spatial resolution further with conventional detector technologies the resulting increase in noise is clinically unacceptable. Decreasing noise again would mean increasing dose which contradicts the overall goal. Therefore, further improvement of spatial resolution was limited—until now.

The Stellar Detector

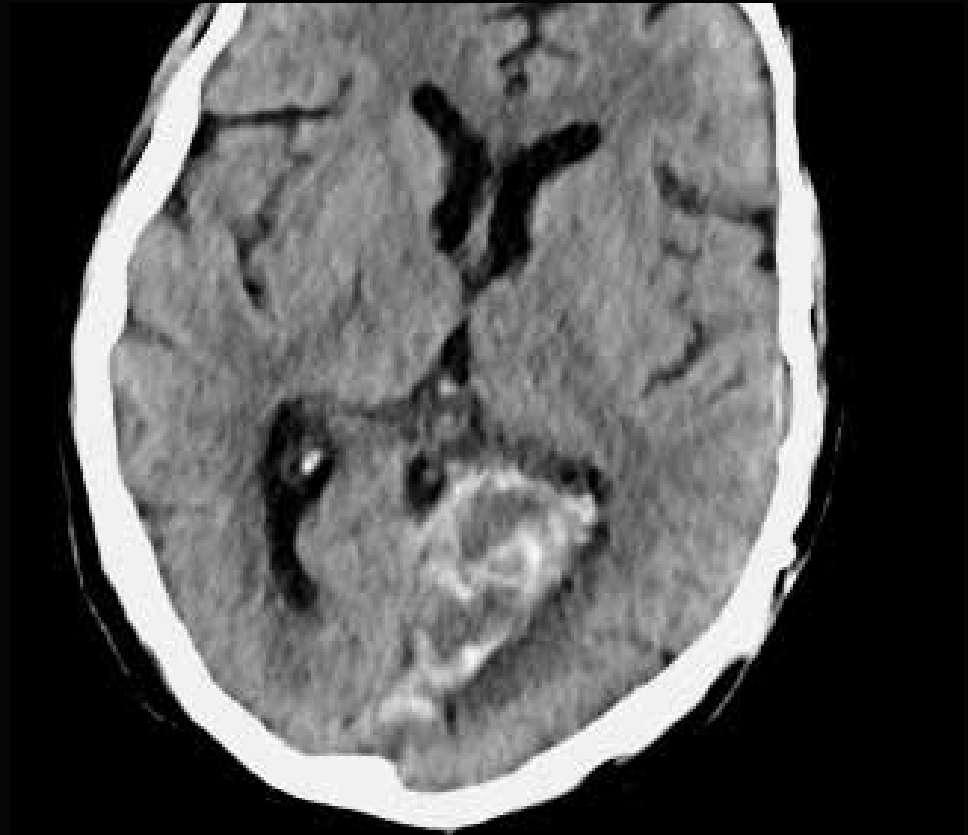
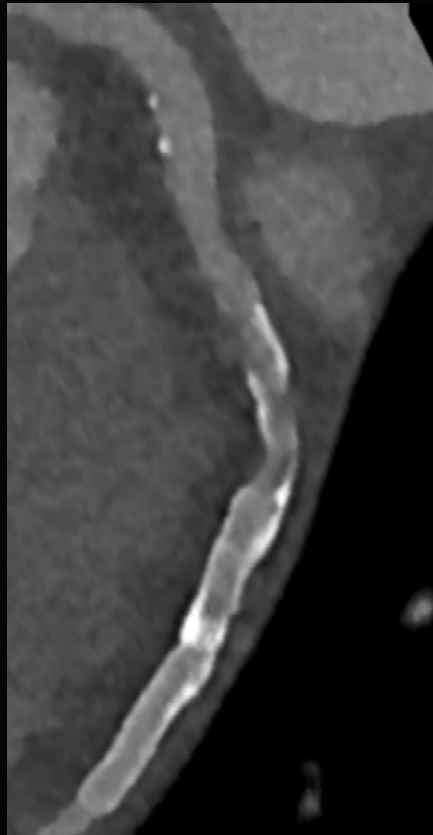
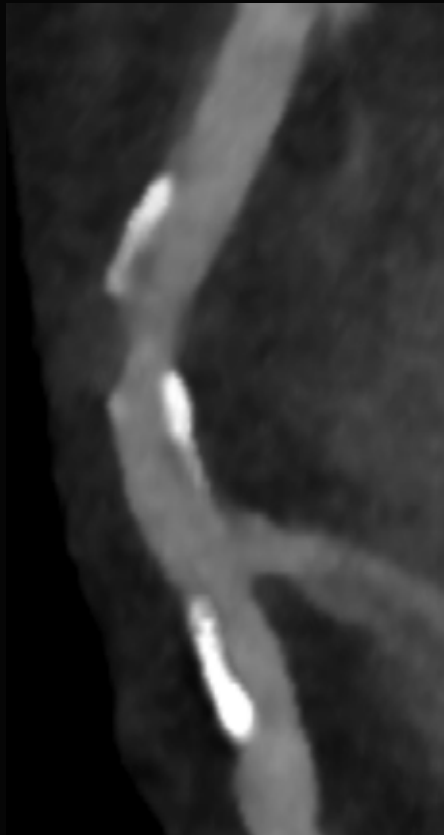
The Stellar Detector introduces the next generation in detector technology, Siemens' revolutionary TrueSignal Technology, the successor to gas and solid-state technology. Siemens has, for the first time, been able to miniaturize the electronic components on the detector, permitting their full integration directly with the photodiode. TrueSignal Technology drastically reduces the electronic noise and therefore increases the signal-to-noise ratio.

Edge Technology

By further applying Edge Technology, the routine spatial cross-plane resolution can now be increased to an unprecedented 0.30 mm, which makes it finally suitable for clinical practice as the signal-to-noise ratio is adequate without an additional increase in dose. Thus, the Stellar Detectors enable the visualization of very fine image details which are crucial, for example, for more accurate calcified plaque and stent analysis.

Stellar Detector Technology

Clinical Examples

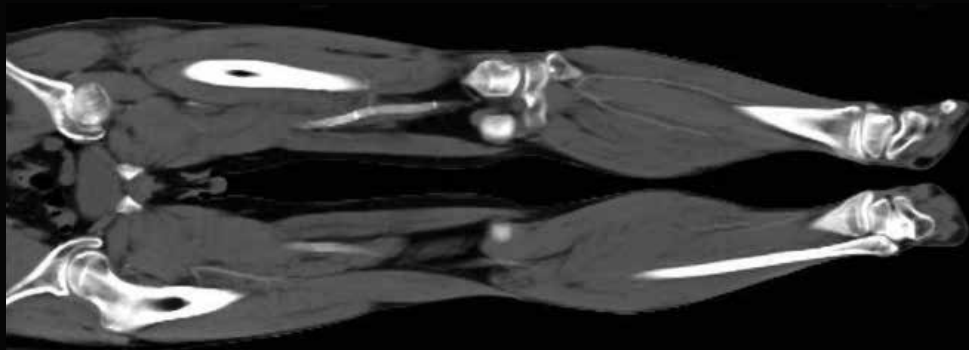


High-resolution imaging, with significantly reduced blurring, at a temporal resolution of 75 ms, for sounder calcified lesion evaluation and exclusion of in-stent restenosis.

Excellent gray-white matter differentiation, especially at the basal ganglia and the cortex cerebri, for increased diagnostic certainty while X-CARE protects the eyes.

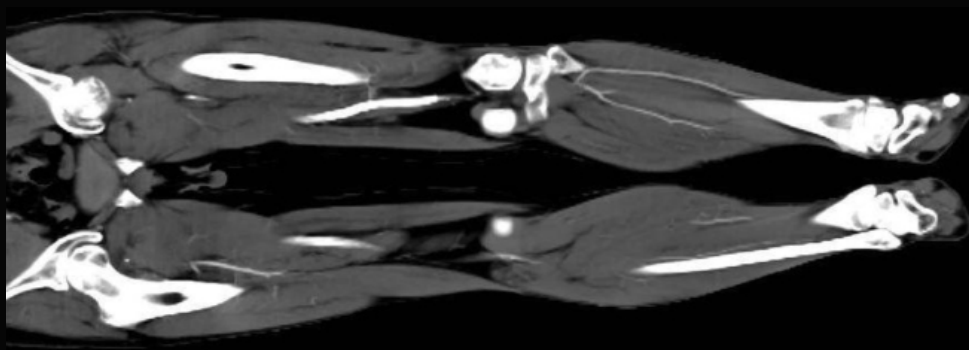
Stellar Detector A

140 kV



Stellar Detector B

Excellent 80 kV series



HiDynamics, Stellar Detector's extended dynamic range, provides higher image detail level, especially for low-signal and low-energy scans, e.g., as with the 80 kV Dual Energy series.



Stellar Detector Technology also significantly increases detail level and sharpness in low dose/low signal imaging, such as in obese or pediatric patients.





Split-Second Scanning

How often has your daily practice been interrupted or delayed by fragile, sick, traumatic, or pediatric patients who either cannot hold their breath, cannot hold still, or simply require sedation? Finding a solution to these hindrances is what has motivated us to design the world's fastest CT, by utilizing Dual Source for Flash-like scan speeds of up to 458 mm/s. With Flash Spiral scanning, holding breath and motion lose their significance, making the SOMATOM Definition Flash the optimal patient-friendly CT.

Utilizing the uniqueness of the new Stellar Detector—to generate ultra-thin slices, thus delivering exceptional spatial resolution even in routine CT imaging—you can visualize extremely fine details, for example, for very accurate calcified plaque and stent analysis.

Additionally the FAST CARE cutting-edge technology raises the standard of your patient-centric productivity, e.g., through FAST Cardio Wizard, which breaks down the restrictions of previous CT scanning in cardiology. Today, split-second scanning is proving its value in daily clinical practice. Chest CT without breath hold, pediatric exams without sedation, and trauma scans of an entire body in less than five seconds have been made possible by the Flash's speed. With the help of the FAST Spine feature, making the preparation of complex vertebrae and disc reconstructions a matter of one click, we take trauma imaging and neurological CT examinations to the next efficiency level for earlier and more accurately targeted treatment.

Introduction

Split-Second Scanning

Body imaging in adult and pediatric patients

Scanning an entire thorax in only 0.6 seconds for motion-artifact-free¹ studies that revolutionize triple-rule-out protocols. The scan speed is fast enough to image the thorax without breath hold and also produces clear imaging of the coronary arteries, thus routinely enabling sub-second triple-rule-out with less than 5 mSv dose.

Bringing this scan speed to pediatric imaging makes sedation a thing of the past. Now Flash Spiral scans are consistently fast enough to produce sharp pediatric images without sedation. This shortens prep time, eliminates repeating scans due to motion, and reduces risk as well as anxiety.

Fastest emergency CT

For several years now, CT has been the ideal modality for trauma cases. However, in the most severe cases the time required to produce useful images often placed the patient at risk. With Flash speed, scan time is no longer an issue. The SOMATOM

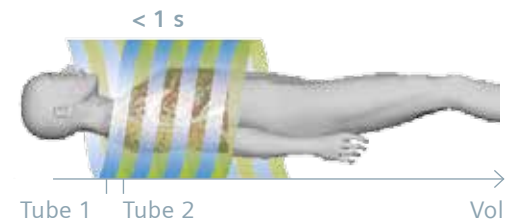
Definition Flash with FAST CARE now offers Siemens' unique FAST (Fully Assisting Scanner Technologies) platform to support you in finding and applying the ideal settings for every individual examination to aide in diagnosis.

Cardiac imaging in a quarter of a heartbeat

The system's unique split-second scanning capability allows scanning the heart in only 250 ms, a quarter of a heartbeat. Together with its highest temporal resolution of 75 ms, available in all cardiac scan modes, it minimizes any cardiac motion, irrespective of the heart rate.

Edge Technology

With the full electronic integration of the Stellar Detector elements, cross-talk between neighboring detector channels is significantly reduced. This significantly reduces slice blurring, resulting in a more precise slice profile. This enables delivering a cross-plane spatial resolution of up to 0.30 mm in routine CT imaging.



Sub-second thorax scan for triple-rule-out and a dose below 5 mSv.



Sub-second pediatric scan without the need for sedation or anesthesia.



Whole-body imaging in less than 4 seconds without motion artifacts.

Source

¹: Barns E. et al, High-pitch DSCT offers speedy images. 2009 Nov 30. Available from: <http://www.auntminnie.com>.



Automated scan and recon planning

Based on the respective organ, the chosen examination type, and, at the end, also expected images, in-depth knowledge of the appropriate system settings is normally required. Imagine the time the system can save you by automatically planning the subsequent reconstruction fields in a whole-body trauma. The SOMATOM Definition Flash with FAST and *syngo.via* now automatically assist you in solving this challenge, making possible even shorter time to diagnosis and more interaction with patients.

All heart rates, all patients

Not only does the selection of the appropriate scan mode for imaging every cardiac patient demand expertise, but also the preparation for image evaluation is anything but trivial.

FAST Cardio Wizard helps you achieve high-quality clinical outcomes in every situation.

Ready for review in one click

FAST Spine, another prominent feature of the FAST technology, enhances rapid trauma and neuro imaging, saving up to 30 minutes with a single click compared to conventional manual workflows. Again easing, accelerating, and standardizing the workflow in CT scanning.

syngo.via-based diagnosis

Let us look at only one example of more than 17 functions that *syngo.via*, the outstanding multimodality imaging platform, performs: a triple-rule-out assessment in less than four minutes and automatically (at no click), coronal and sagittal images for your referring physicians located anywhere in your clinical network. The reading physician can immediately start with the evaluation of the case without wasting efforts in case preparation.

Your Benefits

- ▶ Flash Spiral scanning—no breath hold required
- ▶ Sharp coronaries at all heart rates—even without beta-blockers
- ▶ Whole body trauma scan < 4 s
- ▶ 0.30-mm cross-plane resolution for accurate calcified plaque and in-stent restenosis analysis
- ▶ Accurate spine recons with just a single click

Flash Spiral works

Even the most advanced single source CTs are limited in their scan speed by the maximum table feed that can be used and still allow the acquisition of contiguous data. The SOMATOM Definition Flash breaks through this barrier primarily by simultaneously integrating data from a second source during the scan. The combination of Dual Source technology with the fastest available hardware components, including a gantry that rotates at 0.28 seconds, a patient table that can handle immense table feeds, and ultra-fast data transmission technology, makes possible the fastest scan mode in CT history. The result is an unprecedented scan speed of up to 458 mm/s, fast enough to scan an entire adult patient in less than four seconds.

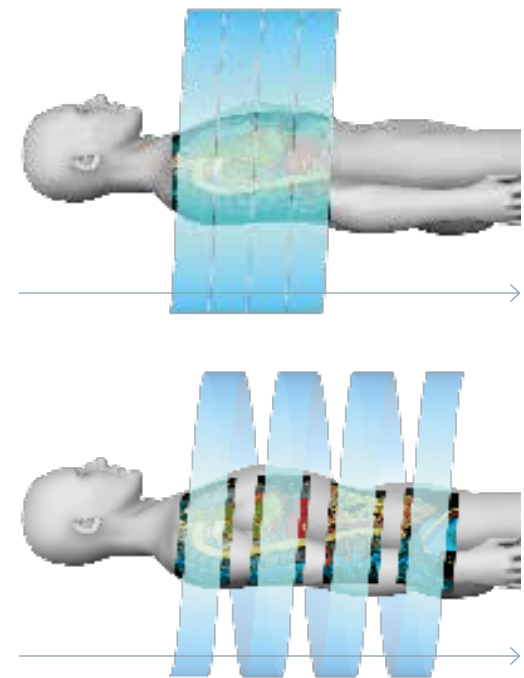
Increased patient friendliness

Patients who cannot hold their breath or suffer from shortness of breath, are restless or impatient, or who are uncooperative, obese, or young children, are no longer a problem. As a result of its unprecedented scan speed, the Flash Spiral

mode even stops motion entirely, preventing image artifacts that might obscure image quality and affect your sound diagnosis.¹ The SOMATOM Definition Flash allows fast and accurate ED imaging.

Revolutionizing the triple-rule-out

In cases of acute chest pain, scanning with the SOMATOM Definition Flash significantly saves time because it is now possible to assess pulmonary arteries, coronary arteries, and the aorta in a single split-second scan. Thanks to the SOMATOM Definition Flash's split-second scanning capabilities physicians obtain "motion-artifact-free and accurate visualization" in these challenging examinations "at a very low radiation exposure."² Mean scan times are 0.7 seconds while a radiation dose of only 4.1 mSv or less is applied. Researchers find that the Flash Spiral technology "has the potential to revolutionize triple-rule-out protocols."¹



Single-source CT requires slower table feeds to prevent gaps in the acquired volume (bottom).

Sources

¹: Barns E. et al, High-pitch DSCT offers speedy images; www.AuntMinnie.com, 2009, Nov 30.

²: Press release, Andrew Stewart, Radiology Manager, St George's Hospital, UK, http://www.medical.siemens.com/webapp/wcs/stores/servlet/PressReleaseView~q_catalogId~e_18~a_catTree~e_100011,13839~a_langId~e_18~a_pageId~e_129422~a_storeId~e_10001.htm, published online, 2010, Jan 1.

Barrier-free pediatric imaging

Bringing this scan speed to imaging children, the most delicate patient group, opens new possibilities by eliminating the need for sedation or anesthesia. Researchers state that mean examination times of only 0.49 seconds provide high image quality, making sedation or controlled ventilation unnecessary, while maintaining low radiation dose values.¹

Being independent of this time-consuming and potentially dangerous procedure can save you up to 90 minutes of preparation time and involves fewer personnel.

Sources

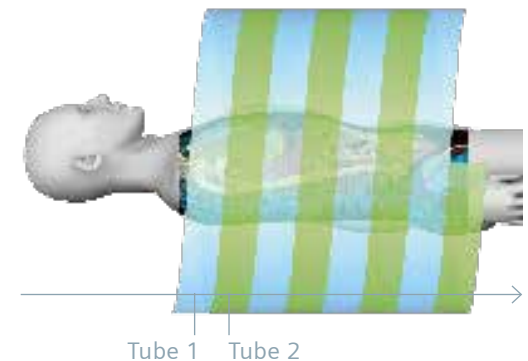
¹: Lell MM. et al, Invest Radiol. 2010 Sept 17. [Epub ahead of print].

²: Malviya S. et al, British Journal of Anesthesia. 2000;84(6):743-748.

Avoiding repetition of scans

Another and widely underestimated risk factor is eliminated as well by the Flash Spiral technology: the unnecessary repetition of scans in young children due to failed sedation, which unfortunately is the case in 29% of conventional examinations, as shown in a large trial.²

The statements by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.



Dual Source CT combines the data from two Stellar Detectors for faster table feeds above a pitch of more than three for revolutionary triple-rule-out scanning and barrier-free pediatric imaging without sedation.

How it works

Edge Technology

General principle in CT

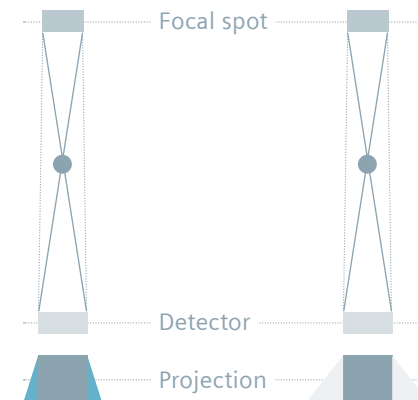
Thinner slices deliver more image detail, but also less light quanta per voxel, i.e., higher image noise. This lowers the signal-to-noise ratio (SNR) and leads to slice blurring. Conventional CT compensates by increasing dose. Clinical experience following the ALARA (As Low As Reasonably Achievable) principle has shown that a 0.6-mm collimator width is the optimum combination of slice thickness and dose. So further reduction of slice thickness was limited. Until now.

The Stellar Detector

The Stellar Detector introduces the next generation in detector technology, succeeding gas and solid-state technology. Siemens has made it possible to miniaturize the electronic components on the detector elements, enabling their integration directly at the photodiode. So, for the first time, the electronics of the detector elements are fully integrated in the photodiode. This full electronic integration is Siemens' revolutionary TrueSignal Technology.

Edge Technology

Electronic noise and cross-talk are significantly reduced thanks to full electronic integration with the photodiode. Without cross-talk from electromagnetic induction, intrinsic slice blurring between neighboring detector channels can be avoided and individual slice profiles are much more precise. Siemens' Edge Technology creates a precise model of the focal spot and detector, generating a slice thickness of 0.5 mm. Thanks to reduced electronic noise, the 0.5-mm slice has a sufficient signal contribution to be used in clinical routine. Thanks to the unmatched temporal resolution of 75 ms, together with the Edge Technology, you can robustly visualize even the finest details, for example, for accurate calcified plaque and in-stent-restenosis analysis.



Edge Technology

Significantly reduced cross-talk from Stellar Detectors create a precise model of the focal spot. The result is a slice thickness of 0.5 mm.

Conventional Technology

Slice blurring resulting from electromagnetically induced cross-talk in conventional detectors.

How it works

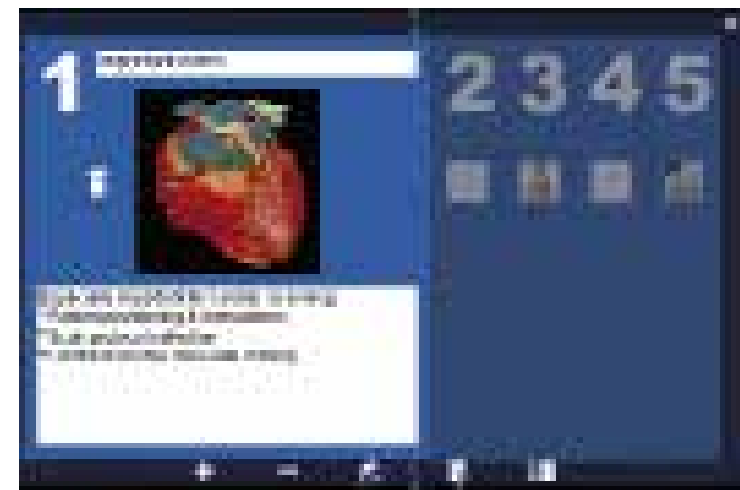
FAST Cardio Wizard

All heart rates, all patients

The SOMATOM Definition Flash is the fastest cardiac scanner in the industry, offering a true single-segment temporal resolution of 75 ms. Its Flash Spiral acquires the entire heart in around 250 ms—within a single heartbeat. It alternatively enables robust diagnostic outcomes, even in the presence of high heart rates and arrhythmia. This permits imaging the heart without the clinical, workflow, and financial aspects of utilizing beta-blockers when using the Flash cardio sequence. The realities of healthcare today often do not permit interruptions in workflow or longer patient preparation times. All this makes the Flash Cardio Sequence an outstandingly versatile low dose mode for cardiac imaging

But cardiac CT examinations are also among the most sophisticated and demanding procedures in CT, requiring careful preparation and a high degree of expertise. All the more, it is important that the user feels sure that he or she has done everything correctly in order to achieve the best clinical outcome possible and to avoid any unnecessary radiation of the patient. Additionally, it allows you to define your individual institutional-guided cardiac workflow for standardization.

Therefore, the new SOMATOM Definition Flash offers the FAST Cardio Wizard, explaining to the operator on a step-by-step basis what needs to be done to achieve an optimal cardiac scan, either in real-time when preparing a scan or for training purposes.



The modifiable text in the guided workflow allows you to define your standards and quality goals that users have to follow in order to achieve an optimal cardiac scan.

Additional benefits with *syngo.via*

Make lifesaving decisions, when every second counts

Acute care imaging often requires multiple clinical disciplines such as radiologists, cardiologists, neurologists, and trauma surgeons to review images to develop a structured and prioritized treatment plan. *syngo.via*'s unique information sharing makes it easy to involve all required disciplines into the therapeutic decision-making process.

The client/server architecture allows you to access the data independently with up to five users for fast parallel reading. It allows clinicians to review the same images on their individual workplaces to discuss decisions remotely.

The Acute Care Engine helps you in more demanding cases by automatically adding incremental information for your diagnosis and supports you with a powerful set of intelligent tools.

For example, it enables you to conduct a thorough analysis of the major blood



vessels of the body with their curved multi-planar reformations (MPR) and appropriate display layouts the moment you open the case. Additionally, it automatically provides you with coronal and sagittal reconstructions of the patient's data that can be displayed in the entire clinical network such as the ICU, the PACS workplace, the OR, or when you discuss the patient's diagnosis in your office.

Dual-monitor layout for instant emergency reading process. This is the first view directly after loading the patient.

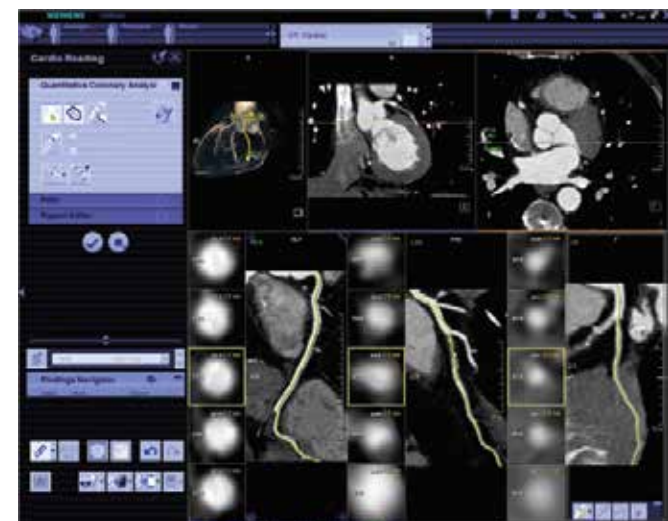
Rule out coronary heart disease in under a minute

The moment you open a cardiac case, the Automated Case Preparation has already preprocessed the images and displays them in your appropriate layout with the adequate evaluation tools. This means that you can immediately start evaluating the coronary vessels, the functional parameters, and the prepared calcium score.

The comprehensive layout for display of multiple CPRs permits the review of the coronary tree at the blink of an eye. All your findings and key images are collected in the Findings Navigator on-the-fly as you read the case. Your result: rule-out and reporting of coronary artery disease in less than a minute.

The syngo.CT Cardiac Function—as part of the CT Cardiovascular Engine—allows you to read and diagnose CT angiography images of the left side of the heart for the evaluation of ischemia or cardiomyopathy.

Additionally, the application can evaluate the late or early myocardial enhancement of single energetic CT data, which is displayed as a color overlay. The CardioVascular Engine's Pro level provides right ventricular volumetric analysis, which may have prognostic value for congestive heart failure, chronic pulmonary disease, and pulmonary emboli.



Single-click stenosis aneurysm measurement. Three reference lines are already predefined.

Split-second scanning

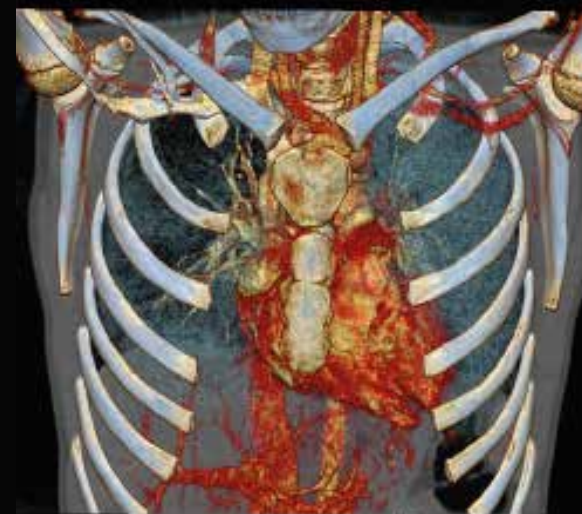
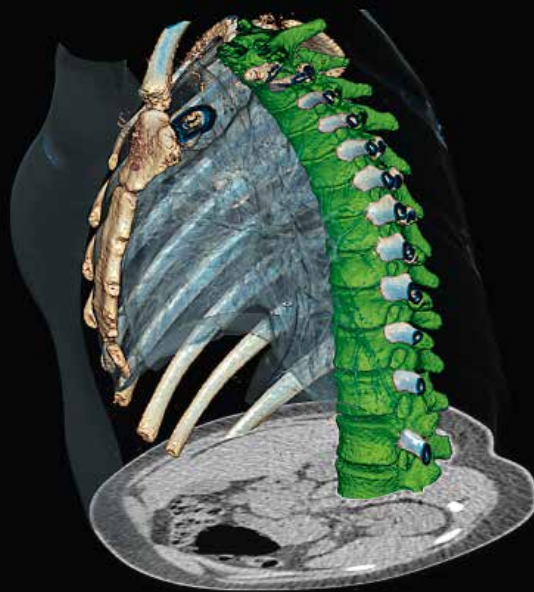
Clinical Results



Motion-free emergency room trauma Flash Spiral scans of an entire body in less than four seconds with dose usually under 5 mSv.



Split-second scanning of the human heart with Flash Spiral in only 250 ms for sharp coronary arteries thanks to unmatched 75 ms temporal resolution.



Organ-based setting of scan and recon ranges with FAST Planning for a fast and more standardized workflow at the scanner. FAST Spine allows the preparation of anatomically aligned spine recons with just a single click.

Restless children or patients who cannot hold their breath no longer cause time-consuming interruptions.





Defining Low dose CT

Applying the lowest radiation dose while achieving high-quality images, with a high spatial resolution, is of great importance in CT. This desire lies at the heart of our CARE (Combined Applications to Reduce Exposure) research and development philosophy. Consequently, with Siemens' continuing effort to achieve highest dose protection, the new SOMATOM Definition Flash now combines all features to reduce radiation as low as possible: next to its already outstanding dose protection portfolio from the initial product generation, it now adds a wide range of new and improved dose reduction features.

CARE kV, for instance, is the industry's first tool for automatically considering tube voltage, tube current, and contrast changes at different voltages and attenuation in each examination. This allows you to benefit from the industry's widest tube voltage range—not only 140 kV for bariatric imaging but now, if necessary, also down to 70 kV.

Finally the significantly reduced noise level of the Stellar Detector together with SAFIRE—our raw-data-based iterative reconstruction—is perfect for ultra low dose imaging, eliminating the contradiction of outstanding image quality with minimal dose. So you can get more diagnostic quality with less patient radiation.

Introduction

Defining Low Dose CT

Sub-mSv heart – the ultimate CARE feature

Discussions regarding dose in cardiac scanning have changed because dose values down to under 1 mSv are so frequent that sub-mSv heart can be considered routine for Siemens SOMATOM Definition Flash owners. Such low routine values have opened realistic discussions about the use of Flash Spiral for early detection of coronary artery disease.

Optimizing tube current and voltage

As early as 1994, Siemens introduced the first versions of CARE Dose4D™ to actively modulate the applied power for scans depending on the patient's anatomy. With FAST CARE, the configuration options have now been made more flexible and can be perfectly adjusted for every patient so that you can achieve lowest possible dose at optimal image quality in every examination.

CARE kV – solving a complex equation

But CT scanning is not only about adapting mAs values: the right kV settings play an equal, if not more important, role. Siemens' unique CARE kV now addresses this consideration, and supports the user in exploiting the remaining dose-saving capabilities in kV adaptation.

Stellar Detectors' True Signal Technology

The full electronic integration of the Stellar Detector elements, where no more electronic components are mounted on the elements, significantly reduces electronic noise so that the signal-to-noise ratio is increased accordingly. It allows a much better utilization especially of low signals at the detector. Applying Edge Technology, the cross-plane resolution can now routinely be increased to an unprecedented 0.30 mm, which makes it finally suitable for clinical practice as the signal-to-noise ratio is adequate without an additional increase in dose.



< 1 mSv

Flash Spiral allows for ultra-fast spiral acquisition at 75 ms temporal resolution with scan speed of up to 458 mm/s for maximum dose efficiency in your daily clinical practice.



Taking care of children

The Flash Spiral scan has proven to be a robust method for scanning children and infants with reduced impact from motion while providing high image quality at lowest possible dose.¹

With CARE Child, offering the new 70 kV STRATON tube together with a set of dedicated pediatric scan protocols, the new SOMATOM Definition Flash offers a unique solution to provide even healthier scanning for your youngest patients. With CARE kV, you now benefit from the industry's widest tube voltage range—down to 70 kV.

Source: 1: Lell MM. et al, Invest Radiol. 2010 Sept 17. [Epub ahead of print].

*In clinical practice, the use of SAFIRE 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. The following test method was used to determine a 54% to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution, and high-contrast resolution were assessed in a Gammex 438 phantom. Low dose data reconstructed with SAFIRE showed the same image quality compared to full-dose data based on this test. Data on file.

Preventing unnecessary radiation

SOMATOM Definition Flash minimizes unnecessary pre- and post-spiral over-radiation with its two Adaptive Dose Shields offering dose reductions up to 25%. It also protects dose-sensitive body regions, such as the female breast, eyeballs, the thyroid glands, or the gonads, through X-CARE with possible dose reductions up to 40% while preserving the image quality.

Iterative reconstruction

SAFIRE, the first raw-data-based iterative reconstruction, that is a unique approach allowing for up to 54%–60%* additional dose savings.

Your Benefits

- ▶ Routine sub-mSv cardiac CT opens the door to early detection
- ▶ Lowest dose in all organs
- ▶ 0.3-mm routine spatial resolution at no additional dose
- ▶ Adaptive Dose Shields minimize unnecessary overradiation
- ▶ Protect radiation-sensitive organs
- ▶ Dose reductions in a wide range of protocols with iterative reconstruction

How it works

Sub-mSv Heart

Dose down to below 1 mSv

With the SOMATOM Definition Flash, discussions regarding high dose versus low dose cardiac scanning will change, because, even under unfavorable conditions, the patient exposure with the SOMATOM Definition Flash is less than what is required for diagnostic cardiac cath (average patient is about 2.5 R per minute). Many clinical trials demonstrate that high-dose cardiac CT can be avoided with Siemens equipment.^{1, 2, 3} With Flash Spiral, dose values down to under 1 mSv—especially important for the most dose-sensitive patients—are so frequent they can be considered routine.

Such low values can open realistic discussions about the use of CTA for early detection of coronary artery disease, taking advantage of its ability to scan the entire heart in only 250 ms—a quarter of a heartbeat. And, for less favorable conditions, such as high heart rate or arrhythmia, the Flash Cardio Sequence with its automated arrhythmia compensation still allows dose below diagnostic cath. Its unique dual pulsing even calculates the heart's ejection fraction.

Low dose cardiac for all heart rates

When fully flexible X-ray pulsing meets 75 ms of temporal resolution, the result is the Flash Cardio Sequence, a highly versatile low dose cardio scan mode on the market.

The intelligently triggered sequence shuts off radiation in the systolic phase when not required and dynamically reacts to irregularities during the ECG trace. The real-time ECG monitoring reacts instantly and stops the scan until the heart rate becomes stable again. This arrhythmia compensation method allows for high-dose savings and an increased robustness of the scan.

For the first time, a step-and-shoot mode is robust and fast enough to freeze the heart and visualize the coronary arteries even at high heart rates, thus allowing even low dose cardiac CT without the need for beta-blockers.



Single source cardiac spiral scanning requires overlapping data acquisition, resulting in relatively high patient exposure (top).



Flash Spiral with Dual Source CT allows for ultra-fast spiral acquisition for maximum dose efficiency in your daily clinical practice (bottom).

Sources

- ¹ Leschka S. et al, Eur Radiol. 2009 Dec; 19(12): 2896–903.
- ² Lell M. et al, Eur Radiol. 2009 Nov; 19(11): 2576–83.
- ³ Achenbach S. et al, Eur Heart J. 2010 Feb; 31(3): 340–6.
- ⁴ <http://hps.org/publicinformation/ate/q825.html>

How it works

CARE kV and CARE Child

Real-time dose modulation

CARE Dose4D aims to regulate the mAs so that image quality is uniform across the whole scan range. CARE Dose Configurator provides the user the ability to select reference curves for each body region and for each body habitus individually. With the new SOMATOM Definition Flash with FAST CARE, the configuration options have now been made even more flexible for perfect adjustment for every patient.

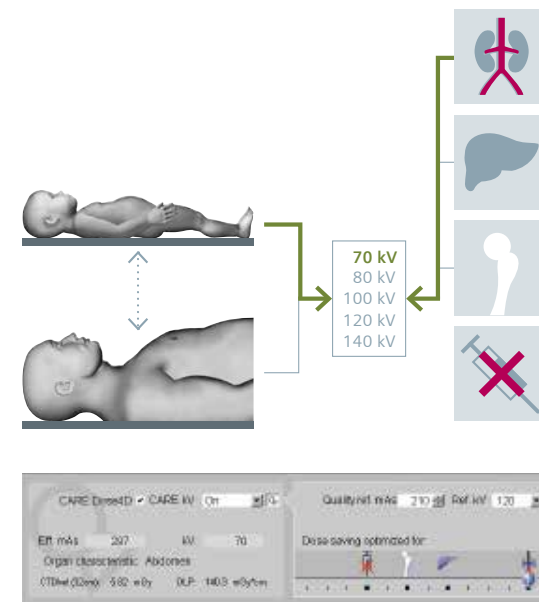
Solving a complex equation

The dose saving and image quality potential of the right kV settings play an equal, if not more important, role to achieve optimal clinical outcomes. But changing kV values always comes along with the need to adapt all other values according to the respective patient and the proposed examination. Unfortunately, up until now this had to be done manually. These dependencies are described in a complex physical equation, so that often the full potential for dose reduction remained untapped with 120 kV being used in almost every adult patient.

CARE kV, an extension of CARE Dose4D, can now automatically suggest kV and effective mAs to optimize the contrast-to-noise-ratio (CNR) of the image while limiting the applied dose. The system's proposal is based on the attenuation as measured in the topogram and the user-defined acquisition type (non-contrast, bone, soft tissue, vascular). The system also identifies bariatric patients and consequently sets the parameters to make full use of the system's reserves. CARE kV is, of course, fully customizable, meaning that the user can choose the degree of system assistance between none, semi, and full.

Taking care of children

With the new, improved STRATON tube, the voltage range is extended from 80 down to 70 kV where it sets new standards in low dose pediatric imaging with CARE Child. The new 70 kV scan mode further reduces the dose to small pediatric or neonate patients. Overall, with these features, an additional dose reduction of up to 60% is possible and easy to achieve in clinical practice.



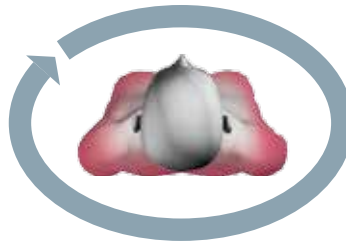
Example: For a vessel examination of a small patient, CARE kV proposes scanning with 70 kV and sets the other values for optimal image quality at lowest dose accordingly.

X-CARE it works

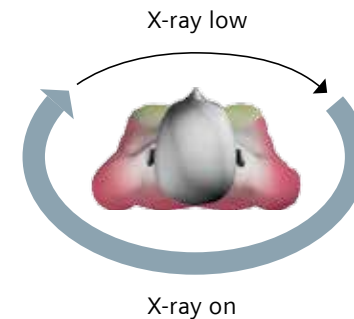
Additional dose reduction of up to 40%

Siemens has recognized the importance of dose-sensitive scanning, especially for female patients, but also when directly radiating the eye lens or the thyroid gland. A simple but effective approach to lower dose for the most dose-sensitive body regions is partial CT scanning that has been integrated into dedicated protocols of the SOMATOM Definition Flash. It protects these areas from direct X-ray exposure by nearly switching the X-ray tube off for a certain range of projections, while automatically adjusting tube currents for the remaining projections to prevent deteriorating image quality.

The result with X-CARE is reduced sensitive-area exposure up to 40% without loss of image quality.



Conventional scanning applies radiation permanently during the full rotation, thus resulting in direct exposure of radiation-sensitive organs, for example for the breasts.



X-CARE nearly switches the tube current off within a certain range of projections, minimizing direct exposure for highly dose-sensitive body regions.

SAFIRE it works

Iterative Reconstruction

SAFIRE—Sinogram Affirmed Iterative Reconstruction—for the first time allows the full dose-saving potential of the iterative reconstruction in clinical practice. Now, raw-data information (which is visualized in the so-called sinogram) is actually being utilized in the image improvement process.

After the initial reconstruction using the weighted filtered back projection (WFBP), the first iterative reconstruction loop is performed. The CT images are retransferred to raw data that models all relevant geometrical properties of the CT scanner. This step reproduces CT raw data like a real scanner does. By comparing this synthetic raw data with the acquired data, differences are identified. A further iteration loop compares the images

with homologous reference data. This procedure can be regarded as validating (or affirming) the current images.

An updated image is reconstructed, using the detected deviation information. In each iteration, a dynamic raw-data-based noise model is applied that allows for reduction of image noise without noticeable loss of sharpness. This optimization process makes even better use of the diagnostic information contained in the raw data. Using multiple iterations, geometrical imperfections of the WFBP are corrected in addition to incrementally reducing image noise.

With this, SAFIRE allows for a radiation dose reduction of 54% to 60%* or improved image quality in regards to contrast, sharpness, and noise.

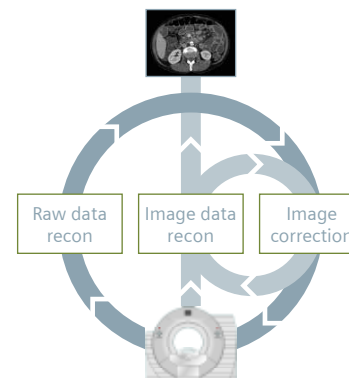
*In clinical practice, the use of SAFIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. The following test method was used to determine a 54% to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution, and high-contrast resolution were assessed in a Gammex 438 phantom. Low dose data reconstructed with SAFIRE showed the same image quality compared to full-dose data based on this test. Data on file.

Standard Filtered Back Projection



- + Ultra-fast reconstruction without iterations
- + Well-established image impression
- Limited dose reduction

SAFIRE



- + More powerful dose reduction than image-based methods
- + Well-established image impression
- + Exceptional image quality
- + Fast reconstruction in image and raw-data space and improved workflow with variable settings

Additional benefits with *syngo.via*

CT Acute Care Engine

Make lifesaving decisions, when every second counts...

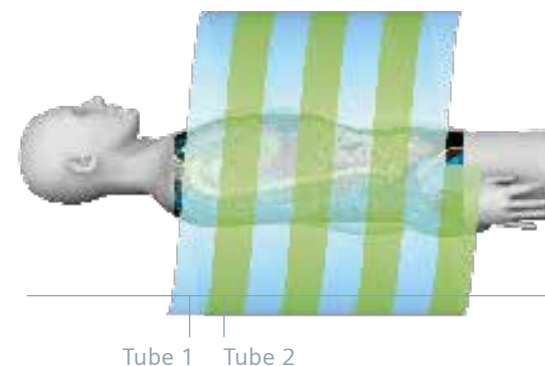
CT is the modality of choice when it comes to diagnostic imaging in acute care situations, whether it is for a triple-rule-out of acute chest pain, for stroke assessment, polytrauma, or for acute abdominal pain. The CT Acute Care Engine provides clinical functionality that delivers decisive results for all of these challenging indications. *syngo.via*'s workflow is another remarkable feature, as the Direct Image Transfer, Study Split for parallel assessment with up to five parallel readers, together with Automated Case Preparation, make the CT Acute Care Engine the zero-delay diagnostic tool. Above all, speed and dependability add confidence for critical decisions made against the clock.

The CT Acute Care Engine provides comprehensive image-processing functionality for triple-rule-out of acute chest pain caused by coronary heart disease, aortic dissection, or pulmonary

embolism. *syngo.CT* Coronary Analysis, as a part of the CT Acute Care Engine, evaluates the coronary status and quantifies stenoses in less than one minute through Single Click Stenosis measurement. *syngo.CT*'s Cardiac Function is also able to evaluate whether the myocardial function has already been affected by an infarction, while *syngo.CT* Vascular Analysis with VesselSURF is the perfect tool to assess the extent of an aortic dissection, or to evaluate a pulmonary embolism.

Flash Spiral scanning of the entire thorax below 4 mSv

The prospectively triggered Flash Spiral scan perfectly meets the need for patients who present with acute chest pain to exclude coronary artery disease, pulmonary embolism, and aortic dissection. The average dose for this high speed examination is 1.6 mSv for patients who can be scanned with 100 kV protocols and 3.2 mSv for patients who can be scanned with 120 kV protocols.

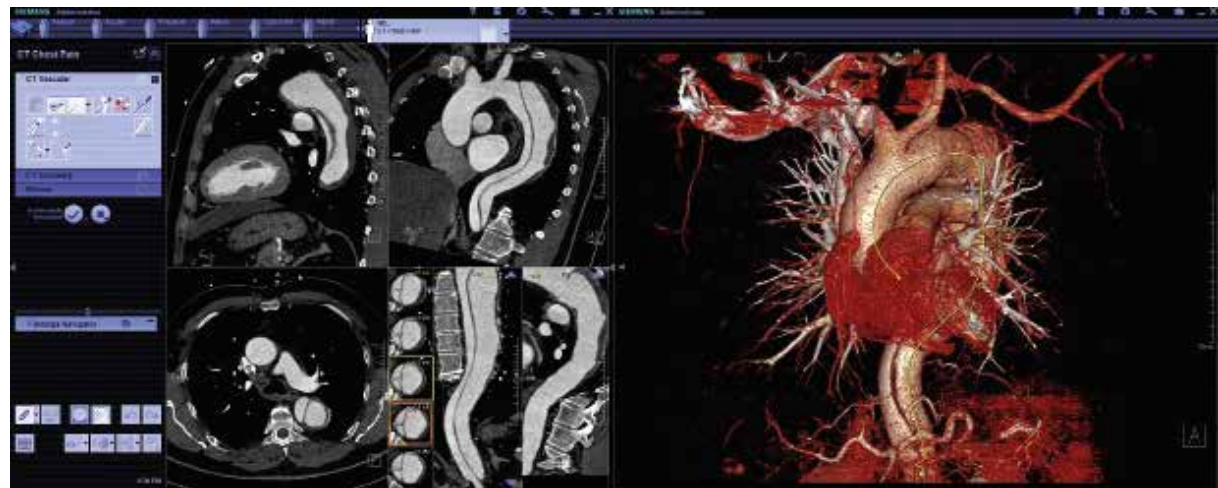


Dual Source CT combines the data from two Stellar Detectors for faster table feeds above a pitch of three.



The prospectively triggered high-pitch Flash Spiral scan mode for triple-rule-out allows motion-artifact-free and accurate visualization of the entire thoracic vessels, including the aorta, pulmonary, and coronary arteries at dose levels, before unseen, of below 4 mSv.

syngo.via automatically displays the acquired data in the appropriate layout and has preprocessed it according to the triple-rule-out specific (disease-oriented) workflow for a quick rule-out in less than four minutes.



Triple-rule-out of coronary artery disease, aortic dissection, or pulmonary embolism in less than four minutes.

Defining low dose CT

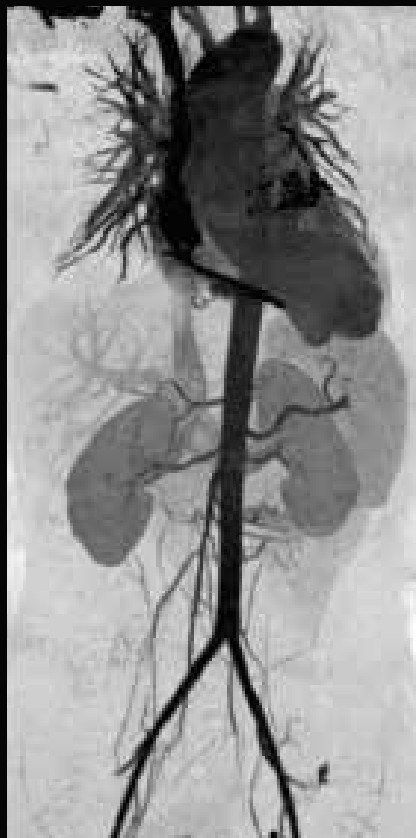
Clinical Results



CARE Child with 70 kV scan modes for a new image quality in pediatric imaging.



Dose values down to under 1 mSv are so frequent that sub-mSv heart can be considered routine for SOMATOM Definition Flash users.



Thoracoabdominal aorta examination, including the coronary arteries, with dose below 5 mSv, automatically preprocessed in *syngo.via*, showing aortic insufficiency.

1.9 mSv low dose Flash Spiral scan together with iterative reconstruction of a newborn after perinatal complications.





Dual Source DE for All Patients

It has always been a CT goal to collect as much information as possible in order to differentiate tissues. With Dual Energy scanning, the SOMATOM Definition Flash opens the door to a new world of characterization, visualizing the chemical composition of material. The idea of Dual Energy is not new to the CT community. Approaches, including two subsequent scans at different tube voltages or two subsequent scans at the same position, fail to seamlessly align the imaged anatomy and to capture the same phase of contrast enhancement. On the other hand, rapid kV-switching suffers the dose-penalty from fixed, high mA.

To date, Dual Source remains the only modality that enables the usage of Dual Energy in daily practice at a dose comparable to a conventional 120 kV scan and with optimum spectra separation for highest value DE information. Utilizing Stellar Detector's unique extended dynamic range – HiDynamics – you receive higher image detail, especially for low-signal and low-energy scans, e.g., as with the 80 kV Dual Energy series.

Together with the applications Optimum Contrast and Monoenergetic imaging, which is used by more than 900 installed Dual Source CTs installed, Dual Energy with Dual Source CT adds the decisive diagnostic confidence for sustainable and sound treatment decisions—it is the advantage that proves itself over and over in daily practice.

Introduction

Dual Source DE for All Patients

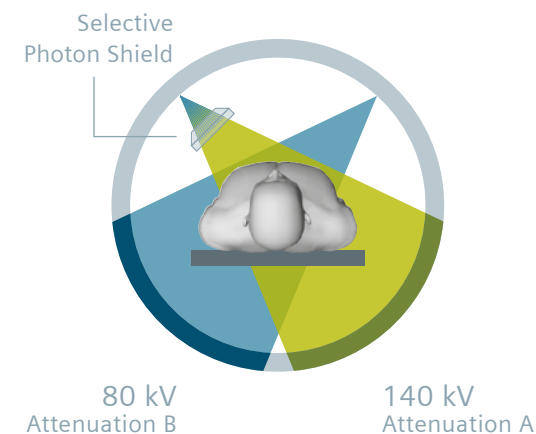
Dual Source Dual Energy: setting the standards

Dual Source Dual Energy (DE) CT acquisition provides an expanded set of diagnostic capabilities and alters CT imaging in significant ways. Clinicians in 900 international institutions, working with SOMATOM Definition and Definition Flash, are setting the technological and clinical benchmark in Dual Energy imaging.

Most important and most obvious with the Dual Source approach: the two Stellar Detector units can operate at different tube potentials during the synchronous CT acquisition. This avoids spectral contamination or waste of applied dose occurring during kV-switching time intervals. Furthermore, the Dual Source approach allows the introduction of X-ray filters such as the Selective Photon Shield for even further spectral separation.

Dose-neutral every day: Dual Energy imaging

An additional benefit is the fact that all renowned dose-saving techniques, such as CARE Dose4D, Adaptive Dose Shield, and X-CARE, can be applied to effectively achieve dose-neutral Dual Energy imaging for everyday usage without a dose penalty compared to a conventional 120 kV scan.^{1, 2, 3} Moreover, with Dual Source Dual Energy you can now get motion-free diagnostic images with a temporal resolution of down to 75 ms in Cardiac Dual Energy imaging.



Always a dose-neutral second contrast.

Sources

¹ Schenzle JC. et al, Radiol. 2010 Jun; 45(6): 347–53.

² Graser A. et al, Invest Radiol. 2010 Jul; 45(7): 399–405.

³ Thomas C. et al, Invest Radiol. 2010 Jul; 45(7): 393–8.



Dual Energy for all patients

Dual Source DE offers significant patient benefit improving diagnostic outcomes through improved lesion detection, removal of bone and plaque, improved visualization of metal prostheses, chemical analysis of normal and pathologic tissue, and iodine mapping. It may grant the decisive diagnostic information for a safe, sound, and sustainable diagnosis and treatment planning in any of the patients entrusted to you.

Stellar Detector with HiDynamics

With the full electronic integration of the Stellar Detector elements, the dynamic bandwidth is significantly extended. This increases the image detail level especially for low-contrast objects close to high-contrast objects. This is of significant relevance in low-kV scans, e.g., in the 80 kV dataset of Dual Energy scans.

Already clinical routine

More than 145 peer-reviewed publications for our DE applications, together with Optimum contrast and Monoenergetic imaging, provide evidence and identify the improvements in clinical outcome as a result of their implementation. Nine hundred thousand successful DE examinations have already helped to detect pulmonary embolisms in lung vessels, to improve metal-implant visualization, to directly remove bone and plaque in angiographies, to characterize renal calculi, or to allow for enhanced lesion conspicuity through Optimum Contrast, or simply to speed up workflow through Virtual Non-Contrast Imaging.

Your Benefits

- ▶ Always second contrast at no dose penalty
- ▶ Wide range of applications
- ▶ HiDynamics for low-kV images rich in detail
- ▶ Optimum Contrast in every image
- ▶ Improved visualization of metal prostheses
- ▶ 75 ms high temporal resolution DE freezing any cardiac motion
- ▶ *syngo.via* automatic virtual non-contrast bone and hard plaque removal

How it works

Dual Source Dual Energy

The X-ray tube's kilo voltage (kV) determines the average energy level of the X-ray beam. Changing the kV setting results in an alteration of photon energy and a changed attenuation of the materials scanned. For instance, scanning an object with 80 kV results in a different attenuation than with 140 kV. In addition, this attenuation depends on the type of tissue scanned. While the CT value for iodine is highest at the low-energy scans, it can be less than half in the high-energy scans. The attenuation of bones, on the other hand, changes much less when exposed to low-energy scans compared to high-energy voltage examinations.

The material-specific difference in attenuation enables an easy classification of the elementary chemical composition of the scanned tissue. In addition, a fused image is provided for initial diagnosis.

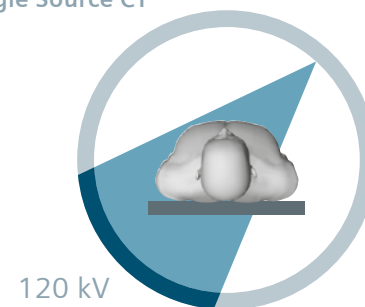
Benefits of Dual Source scanning

Using the two z-Sharp STRATON tubes, Dual Source data acquisition allows for at least 1,152 projections per rotation and spectrum. This provides homogeneous image quality over the entire FOV. In spiral mode, the same slice is acquired within the same time interval for both spectra, so the reconstructed images show no time offset. The fast gantry rotation of 0.28 seconds, with only 0.24 ms sampling time, minimizes motion artifacts, while all renowned dose-saving techniques can be applied, such as CARE Dose4D, Adaptive Dose Shield, and X-CARE. In addition, iterative reconstruction techniques can be applied with SAFIRE.

Monoenergetic imaging

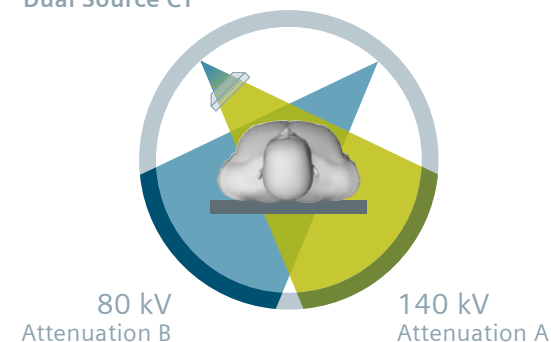
Using the SOMATOM Definition Flash also allows obtaining monoenergetic CT images. These are similar to images acquired with a synchrotron X-ray beam of single photon energy. The equivalent photon energy between 40 keV and 190 keV (151 steps) can be used to provide best lesion contrast or metal artifact reduction.

Single Source CT



Single source CT only provides one energy level for morphology imaging.

Dual Source CT



Two X-ray sources set to different kV levels simultaneously acquire two data sets at different attenuation levels.

How it works

Selective Photon Shield

Eliminating unnecessary radiation

An important factor in making dose neutrality viable is the development of the Selective Photon Shield that blocks unnecessary photons of the X-ray energy spectrum. The result is a much better separation of the 80 kV and 140 kV images, as the second Stellar Detector is 25% larger than previous.

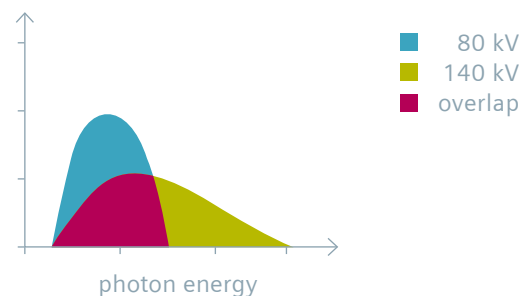
In effect, the Selective Photon Shield assures dose neutrality for single-dose Dual Energy by avoiding unnecessary exposure. Thus, it makes Dual Energy as dose efficient as conventional 120 kV scans. So all the diagnostic advantages of Dual Energy imaging are now available with the same dose as a single energy scan.

Better dose efficiency

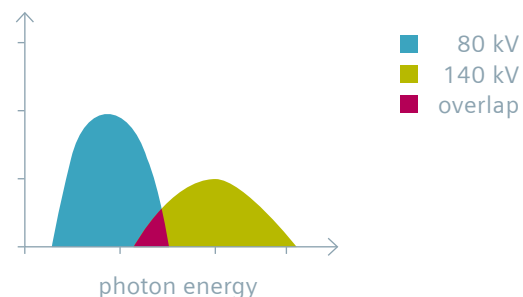
While Dual Source technology has already overcome this limitation, the Selective Photon Shield further increases dose efficiency by filtering out unnecessary photons of the high-energy X-ray tube. The remaining photon spectrum is therefore better focused and more clearly separated from the photons emitted by the low-energy tube. The result is a much better separation of the 80/140 kV images, increasing bone-iodine differentiation by up to 80% while reducing overall dose. Therefore, the high-quality 80/140 kV mode is ideal for the head and extremities, especially CT angiographies.

The spectral separation through the Selective Photon Shield on the other hand, opens the possibility to use 100/140 kV imaging with still 30% better bone-iodine contrast and more power reserves for cardio, abdomen, pelvis, and larger patients in general, making Dual Energy a clinical application for all your patients.

Without Selective Photon Shield
number of quanta



With Selective Photon Shield
number of quanta



The Selective Photon Shield increases energy separation and reduces unnecessary dose by blocking low-energy photons out of the high-energy X-ray tube's spectrum. This results in optimal information quality and dose neutrality compared to a conventional 120 kV scan.

How it works

Optimum Contrast

Maximizing anatomic information

Dual Energy can be used to enhance the iodine signal. It is well-known that the iodine signal is potentiated at low tube energies (80 and 100 kV), yet lower tube energies are not employed in general CT scanning because of increased noise. This is what builds the foundation of Dual Energy Optimum Contrast.

Optimum Contrast

The images obtained at 80 and 140 kV automatically exploit the spectral behavior of certain materials or tissues in *syngo.via*. Additionally, average images can be calculated to provide a "normal" CT image, because the 140 kV images lack contrast, while the 80 kV images are naturally more noisy.

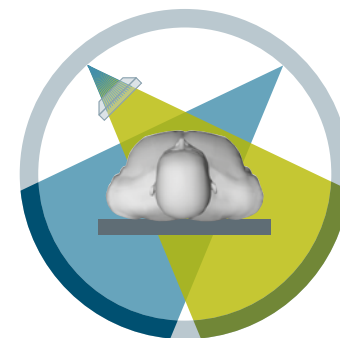
By adding more of the contrast information from the 80 kV images in areas of iodine enhancement, and more of the detail from

the 140 kV images in non-enhanced areas, an optimized image can be automatically calculated. It is especially helpful in enhancing conspicuity of lesions for a safe, sound, and sustainable therapy planning that may improve outcome, cost effectiveness, and patient comfort.

syngo.via enhanced DE imaging

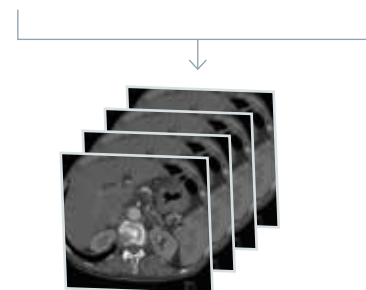
syngo.via not only provides you with the result images, for instance of Optimum Contrast, in all standard views such as coronal, sagittal, and axial. It also automatically removes bone and hard plaque in the major vessels for a easier assessment of the true lumen.

With *syngo.via* clients, your results, such as Dual Energy Brain Hemorrhage images, can be instantaneously displayed in the OR or the angio suite.



80 kV scan
Focus: iodine,
high contrast

140 kV scan
Focus: soft tissue
and low image noise



Best of both worlds to maximize anatomic information: less noise and more contrast than standard CT images.

How it works

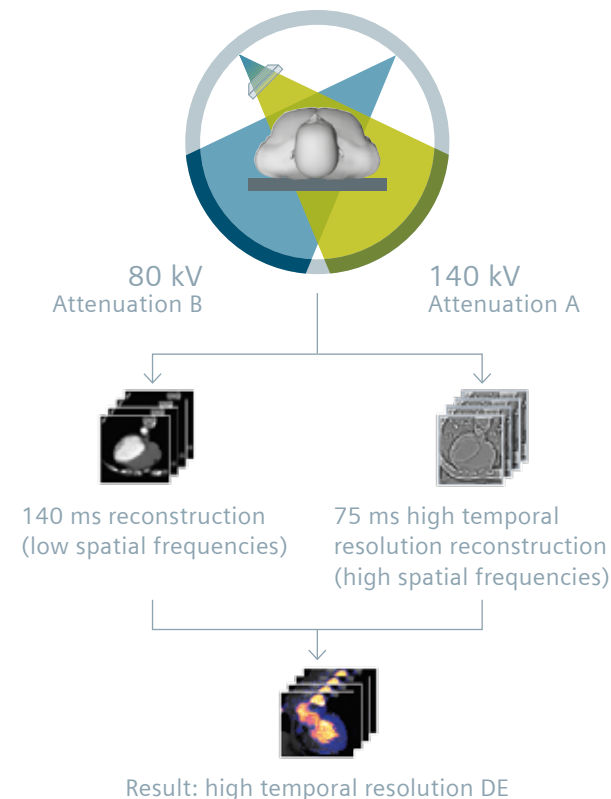
High Temporal Resolution DE

Dual Energy Flash Cardio

Another CT first: the SOMATOM Definition Flash allows scanning of the entire heart, and then evaluating the coronaries with a full temporal resolution of 75 ms as well as, in a second reconstruction, visualizing perfusion defects in the myocardium, thus combining the maximum speed of Dual Source CT with Dual Energy imaging in a single scan. This has been made possible with our latest reconstruction technology, which allows achieving Dual Source temporal resolution from image components acquired at different energy levels. The result is the ability to obtain diagnostic Dual Energy CT images without the use of beta-blockers.

Dual Energy Heart Perfused Blood Volume

With its high temporal resolution, Dual Source CT has greatly improved coronary CT angiography, because it is less sensitive to high heart rates or arrhythmia than other types of scanners. With Dual Energy CT, it is now possible to highlight iodine content to visualize organ perfusion. Prospectively triggered sequence or retrospectively gated spiral acquisition modes are available for first pass or late enhancement Dual Energy myocardial perfusion studies. The corresponding syngo Dual Energy Heart PBV software color-codes myocardial perfusion, so that both coronary artery morphology and myocardial perfusion can be assessed in a single CT scan.



High 75 ms temporal resolution Dual Energy freezes even cardiac motion and allows color-coded perfused myocardial blood pool evaluation, for example, for patients suspected of having an acute myocardial infarction.

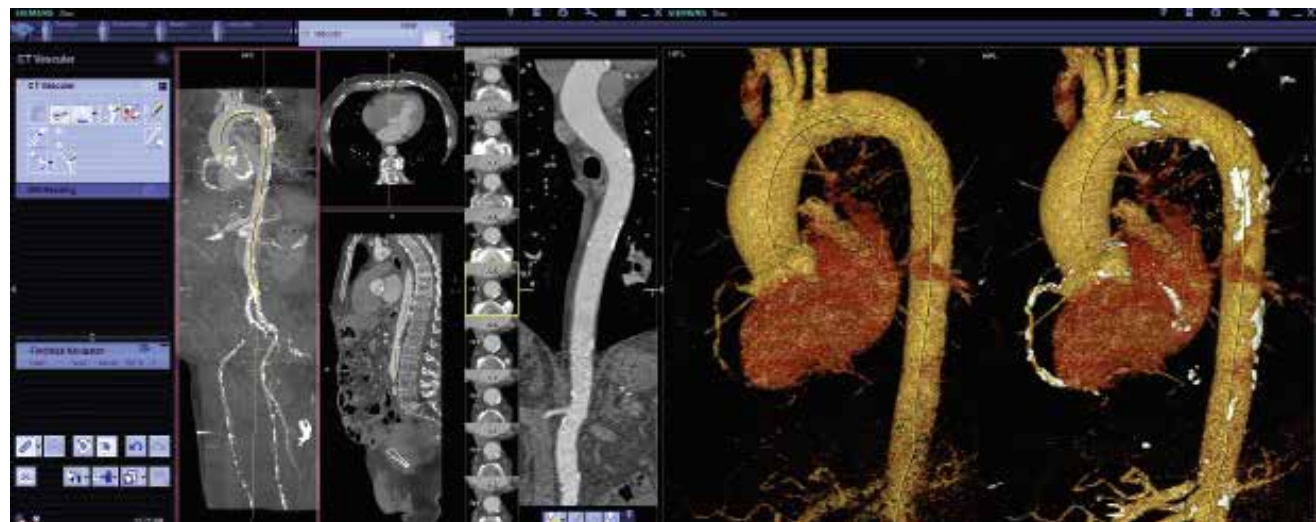
Additional benefits with *syngo.via*

Speed in routine—power in challenging cases

The new CT Cardiovascular Engine offers excellent functionality for the automatic anatomical evaluation, quantification, and functional assessment of CT angiography images of the heart or the peripheral vessels, while allowing manual interaction for challenging cases at any time.

Before you open a case, the Automated Case Preparation has already pre-processed the images, including the Dual Energy direct bone and hard plaque removal and displays them in your appropriate layout together with the adequate evaluation tools.

You can immediately start evaluating the major blood vessels of the body with their curved multi-planar reformations (MPR) and appropriate display layouts. Additionally, it automatically provides you with coronal and sagittal reconstructions of the patient's data that can be displayed in the entire clinical network such as the ICU, the PACS workplace, or when you discuss the patient's diagnosis in your office.



syngo.via showing a severely calcified thoracic aorta in which Dual Energy direct bone and hard plaque removal was automatically applied in the background—before you opened the case. A single click on your patient in your private Worklist opens the case the way it is displayed here.



From scan to diagnosis in under ten minutes

CT Neuro imaging is very often a matter of life-and-death therapeutic decision-making. From infarctions caused by stroke and extensive bleeding, to subarachnoid hemorrhage and a ruptured aneurysm—seeing them clearly is essential because of the huge difference it makes in determining treatment.

The new CT Neuro Engine provides tools and workflows that help deliver a complete and accurate status of the vascular structures and the brain tissue for these patients—from scanning to diagnosis in less than ten minutes including Dual Energy data into the disease-oriented workflow for seamless integration into your clinical practice.

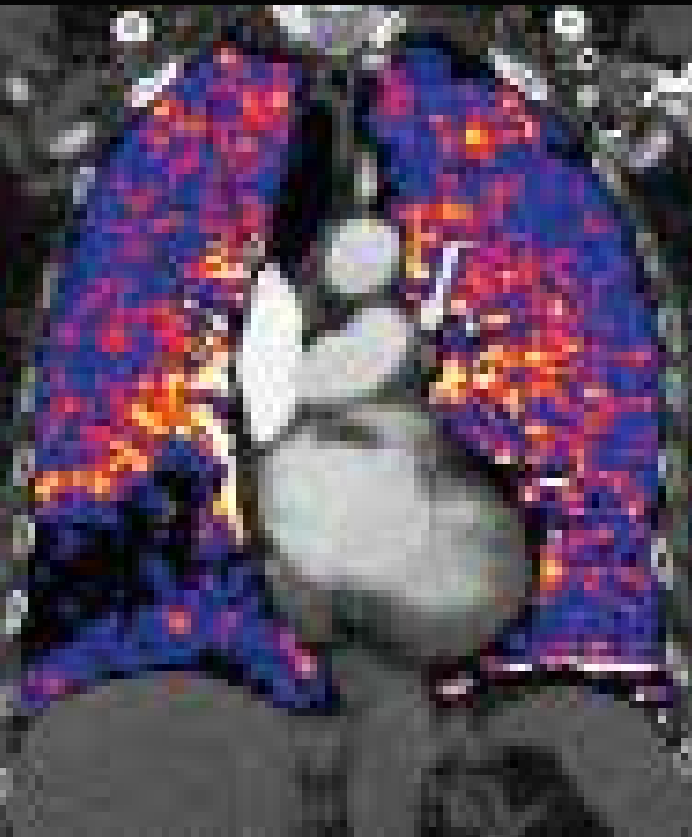
Using data delivered by the Adaptive 4D Spiral, perfusion assessment of the brain can easily be integrated in the assessment. The CT Neuro Engine also helps identify fractures after an accident and, for instance, uncovers the potential stenosis when looking at the vascularity of the neck.

If a Dual Energy examination, such as a Dual Energy Brain Hemorrhage calculation was made, the data is automatically displayed together with all your other preprocessed data. So Dual Energy data, seamlessly integrated in *syngo.via*, may give you the decisive diagnostic information for making sound, safe, and sustainable treatment decisions in any patient.

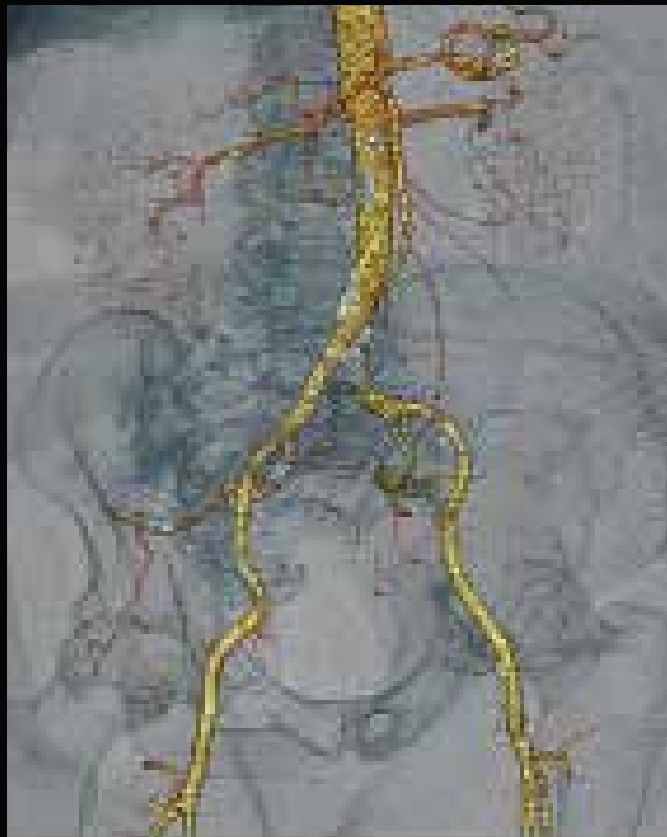


Clinical Results

Dual Source DE for all patients



Dose-neutral Dual Energy shows a lung perfusion defect in the right lower segment—unveiling the effect of pulmonary emboli.

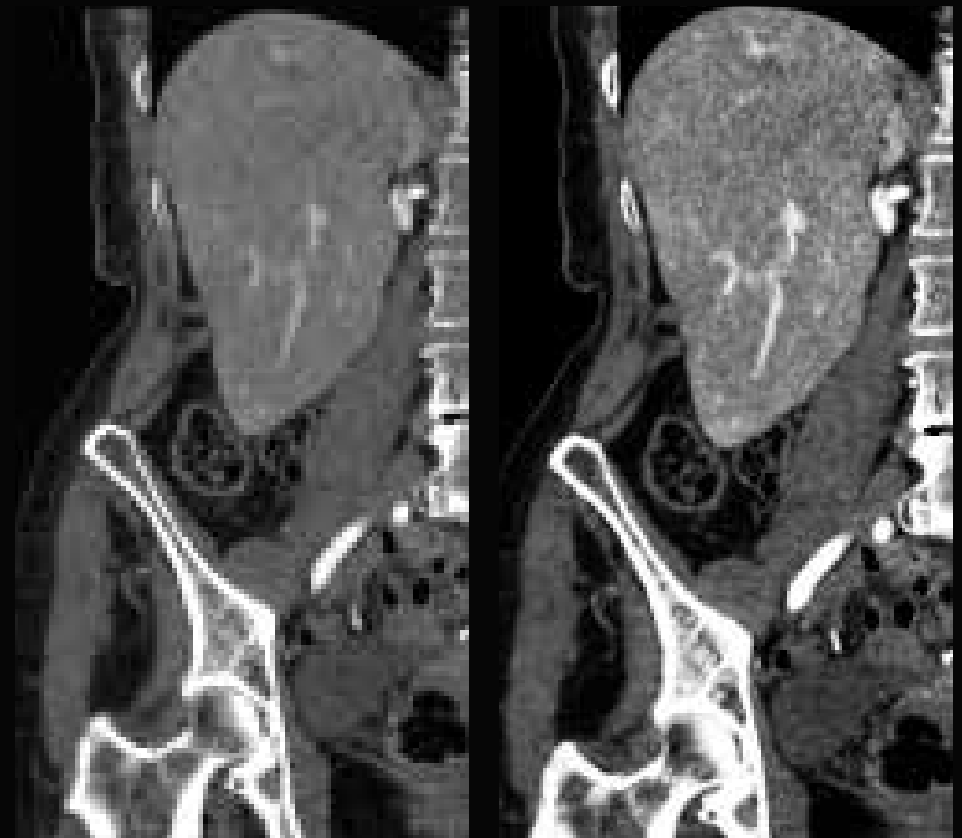


Dual Energy direct hard plaque and bone removal for immediate true lumen assessment. Automatically preprocessed in *syngo.via* with coronal, sagittal, and axial reformats for sound treatment decisions.





Monoenergetic imaging, provides improved visualization of the metal screws relative to the surrounding bone tissue.



Dual Energy Optimum Contrast (right) combines the advantages of low- and high-kV CT scans for enhanced lesion conspicuity in iodine-enhanced CT images.

UPTIME Services

A partner at your side

With Siemens, systems and services go hand-in-hand. High system availability, diagnostic confidence, and optimized workflow are crucial for the success of your CT.

To meet your performance expectations, we systematically focus on being proactive. That's why we developed our proactive service solutions that help you increase system availability, reliability, and workflow efficiency. We also support you with different types of training and provide support for existing applications and functionalities, even remotely.

A smart investment and seamless support

As a proactive service provider, Siemens UPTIME Services focuses on real-time remote monitoring and preventive maintenance of medical hardware and software. That's how we solve problems before they even occur, thus enabling increased system availability, optimized performance, and workflow efficiency.

Through our innovative service portfolio, we will keep you on track:

- Siemens Performance Plans
- Siemens Guardian Program™
- Siemens Virus Protection
- Siemens Utilization Management

Siemens Performance Plans – tailored to meet your specific needs

Service and maintenance are highly important to prevent unscheduled downtime and thus to improve your workflow. Siemens Performance Plans are designed to help you run your operations smoothly—with predictable costs, lower risks, and higher efficiency. Modules can be combined together with your Performance Plan Pro, Plus or Top and an individual solution with substantial benefits for you can be achieved. Our Siemens Virus Protection, for example, offers top-level defense in safeguarding your CT against viruses, providing exclusive and reliable support in getting your system back online again fast.

Education – broaden your knowledge and expertise

Know-how is your key to success. With our extensive portfolio of education and training programs, you can deepen your knowledge and clinical expertise.

Depending on the training type you select, you can benefit most from the wide range of choices in our portfolio:

- Individual on-site training
- Classroom training
- Web-based training
- Fellowships
- Remote assistance

Training that matches your needs

We offer routine application training and beyond to answer your clinical questions. For example, stroke imaging with the latest applications and much more. We show you how to maximize the benefits that can be achieved with our advanced technology, helping you to optimize your workflows so you can offer an even higher quality of care for your patients and faster and more efficient throughput for your clinic.



SOMATOM Definition Flash

Configuration Overview

SOMATOM Definition Flash with FAST CARE and Stellar Detector

- All routine and advanced applications for clinical practice
- Industry's fastest Flash Spiral scanning
- Dual Energy CT without dose penalty from the vendor who introduced Dual Energy imaging in CT*
- Full CARE functionality like CARE kV and CARE Child, including the redesigned 70 kV STRATON tube
- High-performance image reconstruction system with WorkStream4D, even for Dual Energy data
- Industry's highest—heart rate independent—temporal resolution* of 75 ms for all heart rates in cardiovascular imaging—even without the need for beta-blockers

- State-of-the-art cardiovascular imaging
- Industry's widest range of kV steps and strongest generator power
- High-speed whole-body coverage at highest spatial resolution
- Pediatric and bariatric CT imaging with no patient exclusion
- Chest and pediatric CT without breath hold*
- Two Adaptive Dose Shields blocking clinically irrelevant dose in spiral scans
- Two detector scatter collimators enhance low-contrast imaging, e.g., in neuro and abdominal imaging

Access to:

- SAFIRE—the first raw-data-based iterative reconstruction
- Full FAST functionality like FAST Planning and FAST Spine to raise patient-centric productivity
- 3D-guided interventional CT
- Ultra-long-range dynamic imaging (up to 48 cm) for whole-organ coverage
- Scanner-injector coupling including injector protocol management
- Latest syngo.via Engines with automated preprocessing tools aid in rapid, sound, and sustainable diagnosis
- Dynamic myocardial stress perfusion imaging

For more details on FAST CARE benefits for your patients, please visit www.siemens.com/fastcare

Rotation time	0.28 s*
Detector	2 x Stellar Detector
Number of slices	2 x 128
Detector Collimator	2 x 1D scatter collimator
Generator	200 kW (2 x 100 kW)
kV steps	70, 80, 100, 120, 140 kV
Isotropic resolution	0.33 mm
Cross-plane resolution	0.30 mm
Temporal resolution	75 ms*, heart-rate independent
Max. scan speed	458 mm/s* with Flash Spiral
Table load	up to 307 kg / 676 lbs*
Gantry opening	78 cm

*Optional



SOMATOM Definition Flash



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syngo.via can be used as a stand-alone device or together with a variety of *syngo.via*-based software options, which are medical devices in their own rights.

Usage of *syngo.via* for an emergency case requires customer to provide respective emergency measures in case of non-availability of system or network.

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