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P. O. # 612-B56021

TRADE-IN OF SYSTEM -- OPTION 1
MANUFACTURER: SIEMENS MEDICAL
MODEL: SOMATOM DEFINITION AS 64
SERIAL#: 64247
ACQ DATE: 2/1/09

Qty	Item Description
1	SOMATOM Definition Edge The SOMATOM Definition Edge is based on the revolutionary Stellar Detector, the first fully-integrated detector. Designed to minimize electronic noise using Siemens' innovative TrueSignal Technology, it significantly improves the signal-to-noise-ratio (SNR). This enables the unique Edge Technology. It allows the generation of ultra-thin slices of 0.5 mm facilitating a spatial resolution of 0.30 mm. This new level of spatial resolution in clinical routine that can visualize previously unseen details without an increase in dose, for example to allow more accurate stenosis and stent analysis. Additionally, the Stellar Detector with TrueSignal Technology is the perfect match for Siemens' comprehensive ultra-low-dose imaging portfolio. With its improved SNR, the Stellar Detector can handle low signals much more efficiently, thus delivering more diagnostic quality with less patient radiation. With the Stellar Detector, the SOMATOM Definition Edge Dual Energy finally becomes truly suitable for Single Source CT. The novel design of the Stellar Detector with TrueSignal Technology provides HiDynamics, an extended dynamic range that improves the image detail level especially at low kV datasets. With this and the first dose-optimized Single Source Dual Energy scan mode, the SOMATOM Definition Edge allows adding tissue characterization to morphology. With these unrivaled features, the SOMATOM Definition Edge enters new frontiers in medical imaging, making it the Reference in Single Source CT
1	ELEVATE R 40-/64-slice>Edge Config. Elevate from 40-/64-slice configuration system to the New SOMATOM Definition Edge.
1	FAST CARE Platform Siemens' unique FAST CARE platform is set to raise the standard of patient-centric productivity. Utilizing FAST - Fully Assisting Scanner Technologies - typically time-consuming and complex procedures during the scan process are extremely simplified and automated, not only improving workflow efficiency, but optimizing the clinical outcome by creating reproducible results, making diagnosis more reliable and reducing patient burden through streamlined examinations. Siemens' desire for as little radiation exposure as possible lies at the heart of the CARE - Combined Applications to Reduce Exposure - research and development philosophy offering a unique portfolio of dose saving features, many of them being introduced as industry's first.
1	CARE Child Dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and protocols
1	FAST Planning #AWP Direct, organ-based setting of scan and recon ranges for a faster and more standardized workflow

Qty	Item Description
1	<p>DoseMAP</p> <p>DoseMAP - Siemens CT Dose Management Program - creates transparency in dose values and makes it possible to assess the dose situation</p> <p>DoseMAP provides functionalities like CARE Analytics to report, document and analyze dose. It lets the user access dose values per case, per examination type, or per patient.</p> <p>DoseMAP may also help to protect our patients from over radiation - thanks to its alert function that warns the operator in case set dose thresholds are exceeded.</p> <p>Additionally, to protect the set dose levels, access to scan protocols can be restricted to prevent unauthorized changes to the scan parameters</p>
1	<p>FAST Spine #AWP</p> <p>Accurate and anatomically aligned preparation of spine recons with just a single click.</p>
1	<p>FAST Cardio Wizard</p> <p>On-screen step-by-step guide to cardiac scanning for higher reliability and reproducibility in cardiac CT.</p>
1	<p>X-CARE</p> <p>Partial scanning to reduce direct X-ray exposure for the most dose-sensitive body regions, e.g. the breasts, thyroid gland or eye lens</p>
1	<p>100 kW Power</p> <p>The 100 kW power allows the X-ray generator the use of maximum power of 100kW in fine adjustable steps.</p>
1	<p>SAFIRE #AWP</p> <p>The Sinogram Affirmed Iterative Reconstruction (SAFIRE) enhances spatial resolution, reduces image noise and increases sharpness by introducing multiple iteration steps in the reconstruction process. The resulting high image quality enables to reduce dose by up to 60%.</p>
1	<p>FAST Iterative Reconstruction</p> <p>FAST Iterative Reconstruction allows a fast reconstruction performance in clinical routine with Sinogram Affirmed Iterative Reconstruction (SAFIRE).</p>
1	<p>FAST IRS</p> <p>Reconstruction computer for the preprocessing and reconstruction of the CT raw data. The reconstruction computer contains of a cluster of 4 high-performance GPU boards performing the preprocessing and reconstruction of the CT data. The raw data memory is 3.8 Tbyte. The peak reconstruction performance is up to 60 frames/sec.</p>
1	<p>syngo DE Scan for Single Source#AWP</p> <p>The syngo Single Source Dual Energy Scan mode option offers the possibility to acquire two spiral data sets in sequence at different energies. The results are two data sets with diverse information. As all features to reduce patient radiation like dose modulation or iterative reconstruction can be applied, the syngo Single Source Dual Energy Scan mode resembles industry's only dose-optimized Dual Energy Scan mode for Single Source CT systems.</p>
1	<p>CT Acute Care Engine @via #1</p> <p>The CT Acute Care Engine provides disease oriented workflows which allow lifesaving diagnostics when every second counts. The workflows consist of dedicated scan modes & software modules. These cover the wide variety of challenging acute situations, from efficient acute chest pain management to abdominal imaging, fast trauma assessment as well as neurovascular and stroke imaging.</p> <p>Scan modes</p> <ul style="list-style-type: none"> - Extended FOV for obese patient imaging or better device positioning during CT interventions. - HeartView CT including: <ul style="list-style-type: none"> - ECG-Gated Spiral scanning for high and irregular heart rates - Adaptive Cardio Sequence for moderate heart rates - Fast 0.28 s rotation time for 142 ms temporal resolution (resp. 71 ms in bi-segment mode) to

Qty

Item Description

freeze motion.
- MinDose ECG Pulsing

Software modules

- syngo.CT CaScoring for quick risk assessment and coronary age calculation
- syngo.CT Coronary Analysis for quantification of coronary stenosis / arteries
- syngo.CT Cardiac Function for left ventricular functional assessment
- syngo.CT Vascular Analysis for assessment / quantification of general vascular pathologies, such as stenosis and AAA.
- syngo.CT Neuro DSA for bone-free visualization of cerebral vessels
- syngo.CT Neuro Perfusion for dynamic 4D quantification of stroke
- syngo Volume Perfusion CT Neuro for dynamic 4D quantification of stroke and brain tumors (single user on syngo Acquisition Workplace).

1

CT Acute Care Engine Pro @via #1

The CT Acute Care Engine Pro extends the dynamic range for stroke imaging beyond detector widths. It allows the assessment of even smallest bone details and provides Right Ventricular Assessment for cardiac impairment affecting the right ventricle. The automated segmentation, anatomical labeling and display of the main vessels speed up the reading process for faster diagnosis.

Additional Scanner Options:

- Adaptive 4D Spiral acquisition for whole organ perfusion
- z-UHR for ultra high isotropic resolution, e.g. in inner ear down to 0.24 mm
- Tilttable (adjustable) head holder for optimal positioning of stroke patients

Additional Software Modules:

- syngo.CT Cardiac Function - Enhancement for visualization of ischemia from early or late enhanced images
- syngo.CT Cardiac Function - Right Ventricle for right ventricular functional assessment
- syngo.CT Vascular Analysis - Autotracer for automatic identification and anatomical labeling of main vessels
- syngo.CT Dynamic Angio for the assessment of time-resolved CT images
- syngo.CT Rapid Stent Planning for automatic completion of manufacturer-specific graft order forms

1

Rear cover incl. gantry panels

Rear Cover including gantry control panels with control functionality from the backside.

1

Keyboard English

Keyboard in the above-mentioned language.

1

Cooling System Air

SOMATOM Definition Edge air cooling for the dissipation of heat generated in the gantry.

1

Cable loom 25 m

Cable loom used to connect the power distribution system (PDS) with the gantry.

1

Patient Table Definition Edge

Patient table to support up to 200cm scan range. Motor-driven table height adjustment from min. 48 cm to max. 92 cm, longitudinal movement of the tabletop 200 cm in increments of 0.5 mm, positioning accuracy +/- 0.25 mm from any direction. Horizontal scan range 200 cm. Table height can be controlled alternatively by means of foot switch (2 each on both sides of the patient table). In the case of emergency stop or power failure, the tabletop can also be moved manually in horizontal direction. Max. table load: 227 kg/500 lbs, Table feed speed: 2-200 mm/s, Distance between gantry front and table base 40 cm.

Positioning aids: Positioning mattress, mattress protector, head-arm support (inclusive cushion), and non-tiltable head holders with positioning cushion set, patient restraining system for head fixation, restraining-strap set with body fixation strap that can be directly connected to the patient table top, headrest, table extension with positioning mattress, knee-leg support.

Qty	Item Description
1	Physiological Monitoring Module The Physiological Monitoring Module allows to connect a 3 Channel ECG cable for ECG controlled cardiac acquisition.
1	ECG Cable IEC2 #D ECG cable, IEC2 (AHA/US color coding).
1	Tiltable Head Holder Tiltable Head Holder for the fixation of the patient's head. Tilt range between +30 till - 15 degree.
1	Head-Arm Rest Head-Arm Rest allows scanning regions of interest (i.e. head and thorax) without repositioning the patient while the arms are not affecting the scan.
1	Computer Desk, height adjust 110V The height adjustable table (710 mm to 1100 mm) supports optimal ergonomic working positions at the CT consoles. It allows users to switch between the dynamism of a standing desk and the comfort of a traditional desk.
1	Computer Cabinet New cabinet to accommodate the computer system and UPS. Matched to the design of the control console table. Width: 800 mm, Depth: 800 mm, Height: 720 mm
1	Additional User Manual Additional user manual for the above selected CT system.
1	CT Project Management A Siemens Project Manager (PM) will be the single point of contact for the implementation of your Siemens' equipment. The assigned PM will work with the customer's facilities management, architect or building contractor to assist you in ensuring that your site is ready for installation. Your PM will provide initial and final drawings and will coordinate the scheduling of the equipment, installation, and rigging, as well as the initiation of on-site clinical education.
1	CT Standard Rigging and Installation This quotation includes standard rigging and installation of your CT new system. Standard rigging into a room with reasonable access, as determined by Siemens Project Management, during standard working hours (Mon. - Fri./ 8 a.m. to 5 p.m.) It remains the responsibility of the Customer to prepare the room in accordance with the SIEMENS planning documents. Any special rigging requirements (Crane, stairs, etc.) and/or special site requirements (e.g. removal of existing systems, etc.) is an incremental cost and the responsibility of the Customer. All other "out of scope" charges (not covered by the standard rigging and installation) will be identified during the site assessment and remain the responsibility of the Customer.
1	Edge Elevate R 40 64 Bonus
1	Initial onsite training 32 hrs Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

Qty	Item Description
1	Initial onsite training 32 hrs GovOffset
1	Additional onsite training 32 hours Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist if applicable. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.
1	Govt. Training Class (T&L not included) Tuition for (1) government attendee to attend a Classroom Course of choice at one of the Siemens training centers. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.
1	Lung Imaging This SOMATOM Definition scanner offers two specific scan protocols to provide Lung Imaging at 1.3 mGy CTDI or greater and for use with post-processing applications
1	Stellant D Dual Ceiling w/Certegra WS New Stellant D Dual Ceiling mounted with Certegra Workstation NO Informatics. Short ceiling post - 580 mm. Other ceiling post lengths are available (different part numbers): 850 mm and 1000 mm. Includes Stellant D, Dual Head, ceiling mounted injector; Certegra workstation; installation and warranty through Medrad.
1	Low Contrast CT Phantom & Holder
1	CT Slicker Thermoseal seams and flaps deflect fluids, reducing contaminant penetration into the cushion and table. Contaminants are retained on the tabletop or shunted to the floor. Cleanup is faster, more thorough, and contaminant build-up is reduced. Built using heavy, clear, micro matte vinyl, and top grade hook and loop fastening strips (Velcro) to better fit the specified table. Custom vinyl resists tears and minimizes radiologic interference. Latex free. Set includes CT Skirts. Shipped with main cover, a catheter bag holder, and 3 restraining belts unless otherwise noted. Includes warranty from RADSCAN Medical.
1	Surge Protective Device (SPD)
1	Lung Imaging This SOMATOM Definition scanner offers two specific scan protocols to provide Lung Imaging at 1.3 mGy CTDI or greater and for use with post-processing applications
1	Access Protection Scan Protocols are password protected allowing only authorized staff members to access and permanently change protocols
1	Adaptive Dose Shield Adaptive Dose Shield for spiral acquisition to eliminate pre- and post-spiral over-radiation.
1	CARE Analytics Stand-alone tool, for installation in any PC in the hospital network, allowing evaluation of DICOM dose Structured Reports (DICOM SR)
1	CARE Dashboard Visualization of activated dose reduction features and technologies for each scan range of an examination to analyze and manage the dose to be applied in the scan

Qty	Item Description
1	CARE Dose4D CARE Dose4D delivers the highest possible image quality at the lowest possible dose for patients - maximum detail, minimum dose. Adaptive dose modulation for up to 60% dose reduction
1	CARE Dose Configurator CARE Dose Configurator: Enhancement of Siemens' renowned real-time dose modulation CARE Dose4D, introducing new reference curves for each body region and for each body habitus allowing to adjust the configuration even more precisely to the patient's anatomy.
1	CARE kV CARE kV: First automated, organ-sensitive voltage setting to improve image quality and contrast-to-noise-ratio while optimizing dose and potentially reducing it by up to 60%.
1	CARE Profile CARE Profile: Visualization of the dose distribution along the topogram prior to the scan
1	DICOM SR Dose Reports DICOM structured file allows for the extraction of dose values (CTDIvol, DLP)
1	DoseLogs Whenever a limit exceeds of the set up reference dose levels (Dose Notification and Dose Alert) automatically a report is created on the system
1	Dose Alert Dose Alert: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition automatically adds up CTDIvol and DLP depending on z-position (scan axis). The Dose Alert window appears, if either of these cumulative values exceeds a user-defined threshold.
1	Dose Notification Dose Notification: As requested by the new release of the standard IEC 60601 3rd edition, the SOMATOM Definition AS provides the ability to set dose reference values (CTDIvol, DLP) for each scan range. If these reference values are exceeded the Dose Notification window informs the user.
1	FAST Adjust FAST Adjust: assists the user to handle system settings in a fast and easy way by automatically solving of conflicts within user defined limits by one single click on the FAST Adjust button. The limits for scan time and tube current per scan are defined via the Scan Protocol Assistant. FAST Adjust offers an undo functionality to return to previously set values.
1	FAST Scan Assistant FAST Scan Assistant: An intuitive user interface for solving conflicts by changing the scan time, resp. the pitch and/or the maximum tube current manually.

One complimentary biomedical tuition is included with the purchase of this system. This training must be completed before the end of the warranty period.

Offset Part 14428168 Additional User Manual

Offset Part CT_ADD_32 One Additional Onsite Training 32 hours

Lodging for Complimentary Biomed Training for one engineer for 22 nights at
Airfare for Complimentary Biomed Training for one engineer from SMF - RDU at

x

OPTIONS

Qty	Item Description
1	<p>Multi-purpose table Definition Edge</p> <p>Patient table to support up to 200 cm scan range. Motor-driven table height adjustment from min. 55 cm to max. 92 cm, longitudinal movement of the tabletop 200 cm in increments of 0.5 mm, positioning accuracy (horizontal) is +/- 0.5 mm. The accuracy of the repositioning (horizontal) is specified as +/- 0.25 mm. Table height can be controlled alternatively by means of foot switch (2 each on both sides of the patient table). In the case of emergency stop or power failure, the tabletop can also be moved manually in horizontal direction. Max. table load: 227 kg/500 lbs (with bariatric table top up to 307 kg/676 lbs); table feed speed: 1-200 mm/s; distance between gantry front and table base 40 cm.</p> <p>Positioning aids: Positioning mattress, mattress protector, head-arm support (inclusive cushion), and non-tiltable head holders with positioning cushion set, patient restraining system for head fixation, restraining-strap set with body fixation strap that can be directly connected to the patient table top, headrest, table extension with positioning mattress, knee-leg support.</p>
1	<p>High Cap. Patient & Trauma Tab.Top</p> <p>The high capacity and trauma table top offers the capability to support up to 307 kg/676 lbs of patient weight. It allows easy positioning and transfer from and to the table, due to its flat surface. Special accessories and an extended table top width of 530 mm ensure a safe and comfortable positioning for obese patients.</p>
1	<p>High Cap. Patient & Trauma Acc Kit</p> <p>The High capacity and Trauma accessory kit contains additional Patient restraint set with a width of 400mm and additional table extensions for feet and head.</p>
1	<p>Table Side Rails</p> <p>Side rails enable the quick and easy attachment of additional accessories such as an infusion bottle holder and i-control intervention module to the standard patient table.</p>
1	<p>Adapt. 3D Intervent. Suite Wireless</p> <p>The complete solution for 2D and 3D non fluoroscopic and 2D fluoroscopic minimal invasive volume interventions.</p> <p>The Adaptive 3D Intervention Suite contains Adaptive 3D Intervention for 3D volume intervention.</p> <p>Intervention Pro for spiral and sequential non- fluoroscopic interventional procedures and complete organ coverage with maximal flexibility and with minimal single click effort</p> <p>i-Fluoro CT for CT allows for 2 dimensional interventional fluoroscopic procedures</p> <p>i-Control CT supports interventional procedures as independent remote unit</p> <p>Foot switch for radiation release (x-ray).</p>
1	<p>Dual 19" Monitor #D</p> <p>Siemens proprietary syngo software visualizes the examination workflow in</p>

Qty**Item Description**

individual process steps on so-called task cards, such as the patient registration, examination, viewing or 3D task card. The dual monitor feature enables the split of the syngo task cards on two monitors in two different ways. This option includes the syngo dual monitor software and a second high resolution, flicker-free, 19-inch (48 cm) color flat panel display for medical diagnostic applications. This display provides a resolution of 1280 x 1024 and has a wide viewing angle, features high contrast even under high ambient light conditions. Display light output stability is ensured by controlled backlight throughout the whole lifetime.

Possibility one: One monitor displays the viewing task card, for instance for the interactive review of image data. All other syngo task cards are displayed on the second monitor.

Possibility two: Both monitors display the 3D-Basic task card, enabling the viewing and manipulation of two different datasets on two monitors. It enables the comparison of two series from the same patient e.g. pre and post contrast or the comparison of two studies from the same patient e.g. pre and post surgery.

1

Ceiling Kit for Second Monitor

1

Ceiling Support Intervention

Ceiling support for the accommodation and safe installation of one or two flat screen monitors in the examination room.

1

19in Flat Screen Monitor

The 19" monitor option supports CT interventions and CT fluoroscopy with a display in the examination room.

Description

The SOMATOM Definition Edge is founded on Siemens' revolutionary Stellar Detector and the unique STRATON X-ray tube with Siemens' z-Sharp Technology. In combination with FAST CARE (Siemens' Fully Assisting Scanner Technologies and Combined Applications to Reduce Exposure) and CARE (Combined Applications to Reduce Exposure) solutions as well as Siemens exclusive CT Clinical Engines options, the SOMATOM Definition Edge offers unprecedented image quality and detail at reduced patient exposure, as well as increased diagnostic speed and confidence.

The STRATON source provides direct oil cooling of the anode, eliminating the need for heat storage capacity (0 MHU). The resulting small and compact design enables an unprecedented cooling rate of 7.3 MHU/min as well as reliable performance even when operating at a very high rotation time of 0.28 sec. In combination with the HeartView CT option temporal resolution of 142 ms of the SOMATOM Definition Edge allows to reliably scan even high heart rates, e.g. in acute chest pain evaluation, in coronary visualization, and in functional analysis of the heart.

The 0.5 mm slices from the innovative Edge Technology of the SOMATOM Definition Edge together with the unique z-Sharp Technology deliver a spatial resolution of up to 0.30 mm without an increase in dose allowing the visualization of previously unseen details in clinical routine, whether the to allow more accurate analysis of stenosis and stents or crucial small fractures in acute care. In addition, the z-UHR functionality enables industry's high isotropic and scan field position independent spatial resolution of up to 0.24 mm voxel size, visualizing the smallest anatomical structures, for example complex inner-ear bones. Neuro head image quality may be improved with Neuro BestContrast, by optimizing grey/white matter differentiation without increase in radiation dose.

The Ultra Fast Ceramics (UFC) of the Stellar Detector in the SOMATOM Definition Edge acquire 128 slices of measured image data per rotation. Using the Edge Technology, the SOMATOM Definition Edge can facilitate 256 slices with 0.5 mm thickness per rotation for high-resolution imaging or generate up to 384 slices, per rotation depending on the chosen examination mode.

In combination with its 78 cm large bore, 200 cm scan range, and the 100 kW (depending on local power conditions) generator power, it adapts to virtually any patient independent of size or condition, helping to save precious time from scan to diagnosis to treatment. When doing interventional CT for example, the easy patient access enables fast positioning of interventional instruments and thus provides a larger and more comfortable sterile environment. Or for emergency room examinations, the large bore of the the SOMATOM Definition Edge virtually eliminates the necessity to reposition and adjust life support equipment. Additionally, positioning and scanning of bariatric patients is significantly simplified while improving patients comfort.

With all this, the SOMATOM Definition Edge offers the unique combination of industry's highest image detail and industry's highest sub-millimeter volume coverage of 230 mm/sec enabling whole body examinations within a few seconds - adapting to challenging patients such as poly-trauma and unconscious or uncooperative patients, leading to an improvement in image quality and patient comfort.

Siemens has developed many significant products and protocols that follow the "As Low as Reasonably Achievable" (ALARA) principle to reduce radiation dose to the lowest possible level. This desire for as little radiation exposure as possible lies at the heart of our CARE – Combined Applications to Reduce Exposure - research and development philosophy. The SOMATOM Definition Edge consequently offers a unique portfolio of dose saving features; many of them being industry's first like the Adaptive Dose Shield, CARE kV or 70kV scan modes. Using Siemens' CARE solutions radiation dose can be significantly reduced compared to conventional CT systems.

With the introduction of Siemens' unique FAST CARE platform, the SOMATOM Definition Edge raises patient-centric productivity. Utilizing FAST – Fully Assisting Scanner Technologies -, typically time-consuming and complex procedures during the scan process are extremely simplified and automated, not only improving workflow efficiency, but optimizing the overall clinical outcome by creating reproducible results, making diagnosis more reliable and reducing patient burden through streamlined examinations.

With its unique Adaptive 4D Spiral Plus scan mode (optional) the SOMATOM Edge overcomes the coverage

Description

limitations in dynamic CT imaging when using a static detector and allows for up to 48 cm coverage in dynamic CT imaging.

In addition the SOMATOM Definition Edge optionally offers a the 3D minimal invasive suite, enabling 3D guided interventions with full control of the radiologist due to the all new wireless in-room control.

Also the SOMATOM Definition Edge offers a wide range of clinical applications options, which may help performing perform fast and confident diagnoses and comprehensive reporting in only a matter of minutes, reviewing results before the patient is off the table.

1. Gantry:

Aperture: 78 cm; power supplied via low-voltage slip ring. Scanning system: Stellar Detector with Siemens' proprietary Ultra Fast Ceramics (UFC) with 47,104 elements, 128 detector electronic channels (DAS) utilized for up to 128 slices/rotation acquisition, and 1,472 measuring channels per slice (The measuring system can contain replacement components).

In cases of very low signal at the detector (e.g. when scanning bariatric patients), the TrueSignal Technology minimizes electronic noise of detector thus increasing the signal-to-noise-ratio (SNR) and allowing to make much more efficient use of low signals.

Three laser light markers: Horizontal, sagittal, and vertical laser light that shows the isocenter position of the scan plane.

2. Tube Assembly:

Source: STRATON high performance X-ray source. Tube current range: Single source 20- up to 800 mA; Tube anode heat storage capacity 0 MHU. Cooling rate 7.3 MHU/min (5,400 kJ/min). Focal spot size according to IEC 60336: 0.7 x 0.7 mm/7°, 0.9 x 1.1 mm/7°. Computer controlled monitoring of anode temperature, Multifan principle with flying focal spot.

3. High Power X-ray Generator:

Microprocessor-controlled, low-noise high-frequency generator with integrated, automatic self-testing system for continuous monitoring of operation. Settings: High-voltage range 70, 80, 100, 120 and 140 kV; power max. 100 kW (depending on local power conditions), adjustable in fine steps.

4. z-Sharp Technology:

The unique STRATON X-ray source utilizes an electron beam that is accurately and rapidly deflected, creating two precise focal spots alternating 4,608 times per second. This doubles the X-ray projections reaching each detector element. The two overlapping projections result in an oversampling in z-direction. The resulting measurements interleave half a detector slice width, doubling the scan information without a corresponding increase in dose. Siemens' proprietary UFC (Ultra Fast Ceramic) of the Stellar Detector and the corresponding 128-slice detector electronics enable a virtually simultaneous readout of two projections for each detector element – resulting in a full 128-slice acquisition. z-Sharp Technology, utilizing the STRATON X-ray sources together with the Edge Technology of the Stellar Detector provide scan speed independent visualization of up to 0.30 mm spatial resolution and a corresponding elimination of spiral artifacts in the daily clinical routine at any position within the scan field.

5. Control and Evaluation Unit:

Control box: CT control with patient intercom, user-recordable patient instruction system, 30 automatic patient instruction (API) text pairs are available in nine languages.

syngo Acquisition Workplace: The *syngo* Acquisition Workplace provides an intelligent and reliable workflow for data acquisition, image reconstruction and routine post-processing at the CT scanner. Built on the unique *syngo* platform, the *syngo* Acquisition Workplace is intuitive and user friendly. Computer system: High-performance computer with 1x Xeon QC6700, 2.66GHz, NVIDIA Quadro FX1700 DVI graphics card for fast 3D post-processing. High resolution, flicker free, 19-inch (48 cm) color flat panel display for medical diagnostic applications combining the demanding requirements of medical imaging with the advantages of liquid crystal displays. This display provides a resolution of 1280 x 1024 and has a wide viewing angle, features high contrast even under high ambient light conditions. Display light output stability is enabled by controlled backlight throughout the whole lifetime. Keyboard and mouse, 8 Gbyte RAM, 146 Gbyte image storage for 260,000 uncompressed images, CD-R 700 MB for 1,100 images. DVD DICOM with 4.7 GB media for 8,400 images. External USB 2.0 devices for data storage are supported (recommended: Iomega 160 Gbyte External Hard Drive Hi-Speed USB 2.0; Maxtor One Touch 160 Gbyte External Hard Drive).

Description

6. Cooling System:

SOMATOM Definition Edge can be equipped with either air or water cooling adapting to your room requirements. This optimizes system availability independently of the ambient conditions and reduces expensive reconstruction costs. System operating temperature: 18-28°C, 18 - 75 % rel. humidity (not condensing).

7. *syngo* User Software:

syngo features an intuitive and thus easy-to-learn user interface developed from prototypes in close cooperation with users. *syngo* visualizes the examination in individual process steps on so-called task cards, such as patient registration or examination card. A large number of functions and input parameters as well as the language used can be selected according to individual requirements. Frequently repeated processes can be automated and saved.

Patient registration:

The system can accept patient data in different ways. These include entering the data via keyboard or transfer of a worklist via network. DICOM Worklist: Software module for accepting lists of patient data and exam requirements from a Radiology Information Systems (RIS) via DICOM Get Worklist functionality. The program enables very efficient working and consistent patient data. In emergency cases, fast registration is possible. Here the system automatically assigns an emergency number which can later be replaced by the actual patient number. The input profile can be designed individually.

Examination card:

The SOMATOM Definition Edge is delivered with a large number of predefined examination protocols, making examination planning a very fast and efficient procedure. Example: A three-phase examination of the liver available as independent protocol only needs to be adapted to the patient's individual situation. Each examination is represented pictorially as a so-called "chronicle", which views the individual phases of the examination separately. This has the advantage that the individual phases of the examination can be accessed quickly and selectively and changes to the protocol can be made easily in graphical mode via drag-and-drop using the mouse. With a so-called routine window, it is possible to adapt individual examination parameters, representing a submenu of the essential parameters and giving information at a glance about the parameterization of the examination.

Viewing card:

On the viewing card it is possible to move interactively with the mouse through the image volume of the ongoing examination. The images of different examinations can be displayed simultaneously for comparison. A large number of functions are available for evaluation, documentation and archiving.

Filming card:

A virtual film sheet shows a 1:1 display of the film sheets to be printed out, thus enabling an effective preview of filming jobs and rewindowing of the images, as well as providing a large number of evaluation functions. Layout changes are possible interactively with up to 64 images. The printout parameters for the autofilming process running in parallel to acquisition or reconstruction are also defined with the filming card. Freely selectable positioning of images onto film sheet, configurable image text.

3D card:

Secondary reconstruction calculation: Real-time MPR for real-time reformatting of secondary reconstructions. Slice orientation: coronal, sagittal, oblique and double-oblique. Secondary reconstructions can be determined from the topogram, other MPR views or from a 3D surface reconstruction. Reconstruction with selectable slice thickness.

CT Angio: Software for the reconstruction of angular projections from the images of a spiral data record for the display and diagnosis e.g. of aneurysms, plaques, stenoses, vascular anomalies or vascular origins. MIP: Maximum Intensity Projection, MinIP: Minimum Intensity Projection and Thin MIP available. Interfering or irrelevant parts of the image can be eliminated with the integrated volume editor. The angular projections are reconstructed around a definable axis, whereby the maximum CT values in this direction are selected for each angular projection. The resulting images can be viewed with the CINE function as a series of images with a 3D image effect.

3D Display: Software for the three-dimensional display of surfaces of a body region from a series of continuous slices, for display and analysis of complex anatomies, e.g. the visceral cranium, pelvis, hips, for the purpose of planning surgical interventions. The 3D objects can be tilted and rotated interactively on the monitor and can also be displayed in relation to multiplanar reconstruction (MPR).

Volume card: Volume scans of tissues and organs, based on a "region-growing" algorithm and interactive ROI definition.

DynEva card: Software for dynamic evaluation of the contrast enhancement in organs and types of tissues, enabling the reconstruction of

Description

- Time-density curves (up to 5 ROIs)
- Peak-enhancement images
- Time-to-peak images.

Video Capture and Editing Tool: Software contains integrated solution for imaging and visualization of 4D information, allowing the generation and editing of video files for improved diagnoses, recording and teaching. A wide range of multimedia formats is supported, e.g. AVI, Flash (SWF), GIF, QuickTime (MOV), streaming video.

Additional task cards available as an option.

8. Examination and Evaluation Functions:

Topogram: Scanning perspectives: a.p., p.a., lat.; length of scan field: 128 – 1574mm (optional up to 1974 mm), width of scan field: 512 mm, 1.5 - 16s (optional 20.22s). The topogram can be switched off manually when the desired examination length is reached.

Tomogram: Scan field size: 50 cm. Standard scan times: 0.28, 0.33, 0.5 and 1 seconds. Slice thickness in sequence: 0.6, 0.75, 1, 1.2, 1.5, 2.0, 2.4, 3, 3.6, 4.0, 4.8, 5, 6, 7, 7.2, 8, 9, 10, 12, 14.4, 15, 20 mm
Slice thickness in spiral: 0.4**, 0.5, 0.6, 0.75, 1.0, 1.5, 2, 3, 4, 5, 6, 7, 8, 10 mm Real-time image display.
Immediate image reconstruction and display without time delay simultaneously to data acquisition in 512 x 512 matrix size.

Spiral: Scanning technique for continuous volume scans with continuous table feed in multirotation mode. Max. scan time 80 seconds with full low-contrast resolution. Volume length 1.970 mm with full low-contrast resolution (max. 200 cm scan range possible using multiple automatic ranges). Selection of the pitch factor between 0.3 and 1.7 depending on scan mode. Selection of up to 33 separately parameterizable examination ranges in a patient protocol. In addition individual anatomic sections can be successively combined and then scanned automatically. Storage of up to 10,000 examination protocols. Rotation times/cycle: 0.28 sec, 0.33 sec, 0.5 sec and 1 sec.

Adaptive 4D Spiral (optional): Continuous multirotational data acquisition with continuous smooth bi-directional table movement. Quantitative evaluation and graphical display of time-density curves over entire organs.

The intelligent algorithm Neuro BestContrast may improve native head image quality especially grey/white matter differentiation. Images are decomposed into high and medium/low spatial frequencies. While relevant tissue information is contained in medium and low frequencies noise is dominated by high frequencies. Separate processing of medium and low frequency information improves the tissue contrast without amplifying image noise resulting in a better signal to noise ratio.

Dynamic: Program for functional dynamic examinations. Serial scanning technique in one slice position with variable scans cycle times.

Multiscan spiral examination without table feed: Continuous multirotational data acquisition in one slice position. Quantitative evaluation and graphical display of time-density curves.

WorkStream4D with Asynchronous Recon: 4D workflow with direct generation of axial, sagittal, coronal, or double-oblique images from standard scanning protocols. Elimination of manual reconstruction steps. Asynchronous Recon allows for multiple image reconstructions and reformats, parallel to scanning. With this feature, up to eight reconstructions job requests can be loaded into a scan protocol. Immediately upon completion of the scan acquisition, these reconstruction jobs are automatically executed in the background without delaying the start of next patient examination.

Image reconstruction and storage: Image reconstruction in full resolution (512 x 512 matrix) takes place during the examination with up to 40 images per second, with full cone beam reconstruction, z-Sharp Technology and full image quality. Reconstruction fields of 5 cm to 50 cm through raw data zoom with the possibility of freely selecting the image center either prospectively before each scan or retrospectively. Reconstructions of different slice thicknesses from a single raw data record, e.g. lung soft tissue and lung high-contrast with CombiScan, with simultaneous suppression of partial volume artifacts. Up to 8 reconstructions per scan range can be predefined with the examination protocol. Patient-related storage of the image and raw data.

Image display: 1024 x 1024 display matrix; screen splitting configurable up to 64 image segments; CT value scale from -1024 to +3071 HU. For very dense objects, the CT value scale can be extended from -10240 to +30710 HU (extended CT scale) e.g. for suppressing metal artifacts.

Image evaluation: Complete software-controlled image evaluation program for all diagnostic requirements.

Description

CINE Display: Dynamic display technique for the visualization of time or volume series. A series of up to 1024 images can be displayed at a frame rate of at least 30 f/s. Automatic or interactive mouse-operated control.

Multitasking functions: Simultaneous processing during operation of the scanner.

Real-time Display: Image reconstruction in pace with the examination in full image quality (512 x 512 matrix) with up to 40 images/second (with full cone beam reconstruction and z-Sharp Technology).

Metro Display: Simultaneous display, processing and evaluation of images from other patients while the current patient is being scanned.

Metro Documentation: Simultaneous documentation of images from any previously examined patient while the current patient is being scanned.

Metro Copy: Automatic transfer of image data to the *syngo* CT Workplace (optional) or a DICOM network node.

9. Network Module:

For the connection to a local Ethernet (10, 100 Mbit or 1-Gigabit) in order to communicate with networked printers, diagnostic and therapy workstations, RIS or HIS systems and teleradiology routers.

Scope of functions:

- Configurable network stations.
- Unlimited selection of stations.
- DICOM Standard (Digital Imaging and Communications in Medicine) for the transfer of information between DICOM-compatible units from different manufacturers. The scope of functions is described in detail in the DICOM Conformance Statement, and the standard version comprises the functions Send/Receive, Query/Retrieve and BasicPrint, Worklist, Storage Commitment, MPPS (Modality Performed Procedure Step).

10. Integrated CARE Solutions:

Stellar Detector: Due to TrueSignal Technology electronic noise can be minimized potentially resulting in dose reduction in low signal imaging (e.g. bariatrics.).

UFC Detector: High efficiency for low mAs requirements enable best possible image quality with low patient dose.

Adaptive Dose Shield: First dynamic tube collimation that protects the patient from clinically irrelevant radiation in every spiral scan.

CARE Filter: Specially designed X-ray exposure filter installed at the tube collimator. Up to 25% dose reduction with increased image quality.

Pediatric Protocols: Special examination protocols with 70 and 80 kV and a large range of adjustable mAs values for optimum adaptation of the radiation exposure to the age and weight of the child to be examined.

CARE Topo: Real-time topogram, Manual interruption possible once desired anatomy has been imaged.

CARE Bolus: Operating mode for CM-enhancement triggered data acquisition. The objective is optimum utilization of the contrast medium bolus in its "plateau" phase in the target organ. This option has been especially adapted to the increased speed and timing requirements resulting from the multirow capability and faster rotation. The CM enhancement is observed via monitoring scans in a user-defined ROI with a trigger threshold. As soon as the enhancement reaches its predefined threshold, the spiral scan is triggered as quickly as possible. License for software use on one modality.

11. Siemens Remote Service:

Siemens Remote Service (SRS) offers a wide range of medical equipment-related remote services resulting in increased system availability and efficiency. SRS employs sophisticated authentication and authorization procedures, state-of-the-art encryption technologies and logging routines together with strictly enforced organizational measures that provide optimal patient data security and access protection. The following SRS services are included for all service agreement customers and during warranty period:

Description

Remote Diagnosis & Repair: In case of an unforeseen system malfunction, Siemens competent experts may directly connect with the CT system in order to identify the problem quickly. Moreover the remote repair function enables Siemens to often correct software errors immediately. Should an engineer on site be required, Remote Diagnosis & Repair allows Siemens to identify defective parts efficiently and accelerate their delivery, thereby keeping repair times to a minimum.

Event Monitoring: Event Monitoring screens the performance of the system. If a parameter deviates from a predefined value, a status message is automatically sent to the Siemens UPTIME Service Center. Service Engineers may evaluate the status message at periodic intervals and may initiate appropriate action within the scope of the service agreement.

SOMATOM LifeNet: An information and service portal directly at the CT Scanner consoles, featuring up to date information on CT products, application guides, accessories and training schedules as well as download of the latest scan protocols and 90 day free trial licenses on available software applications.

Notes on software use: Use of the entire integrated software, including optional software programs, is restricted exclusively to the application with this system.

Note: This product is in compliance with IEC60601-1-2 and fulfills CISPR 11 Class A. Note: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Welcome Package

The Welcome Package contains a welcome letter, three current versions of the customer magazin SOMATOM Sessions, three Siemens Mouse Pads plus an e-Learning CD.

Siemens has always been at the forefront to deliver highest image quality and reduce radiation dose to the lowest possible level at the same time. But today, an additional barrier has to be mastered to maximize clinical outcome: overcome the growing restrictions and limitation of resources. With FAST CARE, Siemens opens a new chapter in CT, explicitly focusing on the optimization of patient-centric productivity in modern healthcare delivery. With FAST CARE, time-consuming and complex procedures such as scan or recon preparations are extremely simplified – ideally reduced to a single click. The scanning process gets more intuitive and the results become more reproducible.

The FAST CARE platform consists the following features:

FAST Scan Assistant: An intuitive user interface for solving conflicts by changing the scan time, resp. the pitch and/or the maximum tube current manually.

CARE kV: First automated, organ-sensitive voltage setting to improve image quality and contrast-to-noise-ratio while optimizing dose and potentially reducing it by up to 60%.

CARE Child: Dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and protocols

CARE Profile: Visualization of the dose distribution along the topogram prior to the scan

CARE Dashboard: Visualization of activated dose reduction features and technologies for each scan range of an examination to analyze and manage the dose to be applied in the scan

CARE Dose Configurator: Enhancement of Siemens' renowned real-time dose modulation CARE Dose4D, introducing new reference curves for each body region and for each body habitus allowing to adjust the configuration even more precisely to the patient's anatomy.

Dose Notification: As requested by the new release of the standard IEC 60601 3rd editions, the SOMATOM Definition Flash provides the ability to set dose reference values (CTDIvol, DLP) for each scan range. If these reference values are exceeded the Dose Notification window informs the user.

Dose Alert: As requested by the new release of the standard IEC 60601 3rd editions, the SOMATOM Definition Flash automatically adds up CTDIvol and DLP depending on z-position (scan axis). The Dose Alert window appears, if either of these cumulative values exceeds a user-defined threshold.

Description

With Siemens' unique STRATON tubes, the tube voltage can now be reduced to 70kV which helps to reduce radiation exposure to patients. With prior tube technology, the minimum tube voltage setting was 80 kV. The new tube voltage setting of 70 kV helps to further reduce the radiation dose to small pediatric or neonate patients.

CARE Child consists of:

- dedicated 70 kV scan modes
- new CARE Dose4D curves for children
- respective Children Protocol utilizing these features

FAST Planning assists the scan and reconstruction planning, based on a topogram, to provide an easier, faster and standardized workflow in CT scanning. FAST Planning features the selection of the anatomical region of interest from a list prospectively defined scan and reconstruction ranges, automatic detection of the scan region(s) of interest and proposal of corresponding scan range(s) in the topogram (in a narrow or wide lateral FoV), optimized FoV and automatic iso-center adaptation for Head scans.

DoseMAP is exists of the three parts.

These three parts in combination with each other deliver a complete and comprehensive dose management.

Report Dose: Create transparency and document dose values.

- DICOM SR Dose Reports: DICOM structured file allows for the extraction of dose values (CDTIvol, DLP)

- DoseLogs: Whenever a limit exceeds of the set up reference dose levels (Dose Notification and Dose Alert) automatically a report is created on the system.

The report can for example be used for audit purposes.

Analyze Dose: Assess the dose situation.

- CARE Analytics: makes it possible to set a query and retrieve DICOM SR Dose Reports. With CARE Analytics it is possible assess DICOM SR Dose Reports from different DICOM nodes and document dose data to get an insight in radiation dose per case or examination type, cumulative dose per patient or to start in-house dose reporting.

Exported and structured dose information makes it possible to monitor the dose over time and gives an insight in the radiation values per examination type. Based on that outcome, measures can eventually be defined to reduce dose.

- CARE Dashboard: Pre-examination dose check-up by showing an overview of all the used dose reduction features per scan.

- CARE Profile: Pre-examination dose check-up by displaying the dose distribution prior to the scan at every z-position.

Protect Dose: Manage access to protocols and potentially protect patients from over-radiation

- Access protection: by setting a password it is only possible to change and access the scan protocols in the Scan Protocol Assistant by authorized staff members only.

- Dose Notification and Dose Alert: Both functionalities may help to protect from over-radiation and warn the operator in case set dose thresholds are exceeded.

Dose Notification checks the dose values per chronicle entry.

Dose Alerts checks the accumulated dose per z-position.

FAST Spine provides various modes that automatically create anatomically orientated spine reconstructions based on a 3D volume. It provides an easier, faster and standardized workflow in CT scanning. FAST Spine features automatic segmentation of the spinal canal, automatic labeling of the vertebrae, anatomically oriented slices – (orthogonal to the spinal canal), coronal and sagittal reconstructions which refer to the curvature of the spinal column and more. All modes offer the possibility to adapt the results manually.

FAST Spine requires Workstream 4D.

Description

FAST Wizard Cardio is intuitive guidance software, fully integrated in the cardio workflow. It allows training the cardiac workflow and provides guidance and support during the examination. It is based on the latest cardio application training material and provides helpful tips to avoid common problems and pit-falls. It features step-by-step training on-screen for various cardiac examinations. Text and images are delivered in a default setting based on Siemens' latest application training, but are fully customizable by the user.

HeartView CT is highly recommended.

Dose reduction with CT has been limited by the currently used filtered back projection (FBP) reconstruction algorithm. When using this conventional reconstruction of acquired raw data into image data, a trade-off between spatial resolution and image noise has to be considered. Higher spatial resolution increases the ability to see the smallest detail; however, it is directly correlated with increased image noise in standard filtered back projection reconstructions as they are used in CT scanners today.

Iterative reconstruction approaches allow decoupling of spatial resolution and image noise. With the Sinogram Affirmed Iterative Reconstruction (SAFIRE), correction loops are introduced into the image generation process. These iteration loops utilize raw-data information to significantly improve image quality. Additionally, image noise is removed in the iterative corrections without degrading image sharpness. The noise texture of the images is comparable to standard well-established convolution kernels. The new technique results in a higher image quality with reduced noise and increased image sharpness that can be translated to dose savings of up to 60 %* for a wide range of clinical applications.

* 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.

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 corresponding attenuation modification of the materials scanned. In other words, X-ray absorption is energy dependent, e.g. scanning an object with 80 kV results in a different attenuation than with 140 kV. In addition, this attenuation depends also on the type of tissue scanned. Iodine, for instance, has its maximum attenuation at low energy, while its CT-value is only about half in high-energy scans. The attenuation of bones, on the other hand, changes much less when exposed to low-energy scans compared to high-energy examinations. *syngo* Single Source Dual Energy Scan Mode exploits this effect: Two spiral data sets acquired in sequence at different energies show different attenuation levels. In addition, the unique design of the Stellar Detector facilitates HiDynamics for an extended dynamic range. This increases the image detail level of low kV datasets, optimizing the image quality in Dual Energy examinations.

The **CT Acute Care Engine** permits access for one user for the following scan modes and software modules:

Scanner Modes:

- **z-Sharp** Technology ensures the high spatial resolution required for exceptional visualization of the complex coronary and vascular anatomy.
- Fast **rotation time of 0.28 s** per rotation delivers high temporal resolution and fast volume coverage. A constant high temporal resolution of 142 ms (resp. 71 ms in bi-segment mode) allows to freeze motion and to minimize the occurrence of motion artifacts (e.g. cardiac motion).
- **HeartView** provides Siemens' proprietary Cardio ECG-gated spiral (helical) acquisition and reconstruction techniques for optimal image quality.
- Fully integrated ECG device facilitates ECG gating and **Adaptive ECG pulsing** for maximized dose reduction.
- **Adaptive Cardio Sequence** is an intelligently triggered sequence, fast enough to freeze the heart and robustly visualize the coronary arteries even at high and arrhythmic heart rates (Arrhythmia Compensation). The integrated automatic **Arrhythmia Compensation** provides higher safety and image

Description

quality in cases of extra systoles. **FlexPadding** allows widening the acquisition window for even more robustness.

- **Adaptive Dose Shield** for spiral acquisition to eliminate pre- and post-spiral over-radiation.
- Intuitive **ECG editing** tool allows adapting for extra beats in arrhythmic situations ensuring optimal retrospective image reconstruction.
- **syngo BestPhase**, a software dedicated to automatically detect the optimal phase for motionless coronary visualization. The phase is defined in either end-systole, end-diastole or both time points and automatically reconstructed
- The 4% **MinDose** algorithm lets the user save even more dose for coronary CT angiography. A special algorithm decreases tube current during ECG-Pulsing down to 4% of the tube output, thus decreasing dose about, compared to conventional ECG scanning. Only in combination with **syngo.CT Cardiac Function** this data can be additionally used for full functional assessment over all cardiac phases.
- **DirectViewing** is a tool for real time navigation through full volumes of up to 24 heart phases by using an integrated, fast 3D volume viewer. DirectViewing completes the workflow of Cardio BestPhase by giving you the flexibility to individually visualize phases for all coronary arteries.
- **CARE Dose4D** delivers the highest possible image quality at the lowest possible dose for patients - maximized detail, minimized dose.
- **Extended FOV** allows the capture of more information in just one exam, saving valuable time with emergency patients.
- Fast and accurate visualization of complex neurological disorders of head, neck, and spine using dedicated X-ray filters, e.g. Posterior Fossa Optimization (PFO), image reconstruction, and beam hardening correction algorithms for artifact elimination.

Software Modules

- **syngo.CT CaScoring** is a workflow step that quantifies coronary calcifications (mass, volume, Agatston equivalent) and calculates the patients coronary age. During the evaluation, the patient's score is compared to the scores of a healthy reference group. Implemented large reference databases are:

- MESA, McClelland, Circulation, 2006 (USA, 6,110 patients)
Data support for different ethnic groups: Caucasian, Asian, Hispanic, etc.
- Hoff, Am J Cardiol, 2001 (USA, 35,246 patients)
- Rumberger, Mayo Clinic, Proc, 1999 (USA, 1,898 patients)
- HNR, Schmermund, Atheroscl., 2006 (Germany, 4,275 patients)
- Raggi, Circulation, 2000 (USA, 9,730 patients)

- **syngo.CT Coronary Analysis** provides a cardiac-specific set of automatic pre-processing steps and display functions for quick and reliable evaluation and quantification of angiography images of the coronary arteries. With these features, the case is ready for review when first opened, thus saving many manual workflow steps and bringing more efficiency into daily practice. The rule-out of coronary artery disease is possible in less than a minute.

- Automatic segmentation and labeling of the main coronary arteries (RCA, LAD, CX), major coronary branches and **saphenous vein grafts (SVG)**
- The **Single-Click Stenosis** function provides all relevant information for stenosis quantification and coronary stent planning: Stenosis diameter and area, curved length, minimum lumen identification, effective diameter etc.
- The **VesselSURF** tool guarantees ultra-fast, 3D vessel assessment in axial slices even without the existence of centerlines or in occluded vessels. As the vessel is being surfed the cross section and best longitudinal view are displayed in real time
- The **Image Sharpening** tool allows for a more thorough evaluation of calcified lesions or stents without the need for an additional reconstruction at the scanner thus saving up to 3 minutes
- **Robust segmentation** of the coronary vessels despite high-grade stenoses
- Comprehensive 3D visualization of the **coronary tree**, including layered display of cardiac and coronary

Description

anatomy with individual VRT-presets

- Anatomy Visualizer for 3D layered visualization of multiple anatomical structures
- Multi-click centerline definition for **challenging evaluations** on long or partially occluded vessels
- **Straightened MPR** view for complete vessel overview, easy stenosis identification, and quick measurements

- **syngo.CT Vascular Analysis** allows to automatically evaluate and quantify angiography images of the general vessels. It provides a vascular-specific set of auto-preprocessing steps and display functions. These functions make it possible that the case is immediately ready for review when opened, thus saving many manual workflow steps to bring more efficiency into daily practice.

- The **VesselSURF** tool guarantees ultra-fast 3D vessel assessment in axial slices even without center lines or in totally occluded vessels, while displaying longitudinal/perpendicular cross sections of the vessel in addition to the 2D images in real time
- Auto pre-processing steps, like auto bone and table removal, provide an **immediate vascular-only view**
- The 2-click center line creation allows for a **quick and robust vessel segmentation** and CPR display
- **Vessel analysis tools** provide all relevant information, e.g. stenosis diameter and area, curved length, profile curve, minimum lumen identification, etc.
- Measurement and reporting tools for therapy support, such as stent planning in case of AAA
- Bone & Vessel Isolation mode for selective highlighting of high-contrast structures, for example to bring out the bone in trauma cases involving fractures of the femur or hip, or for **single-click plaster cast removal**
- Anatomy Visualizer for 3D layered visualization of multiple anatomical structures
- Multi-click centerline definition for **challenging evaluations** on long or partially occluded vessels
- **Straightened MPR** view for complete vessel overview, easy stenosis identification, and quick measurements

- **syngo.CT Cardiac Function** is a workflow step that allows reading and diagnosing CT angiography images of the heart for the evaluation of left ventricular function. Automatic pre-processing of the data includes left ventricular volumetry and myocardial wall segmentation of the left ventricle in all cardiac phases without any interaction. Full Cardiac assessment is now possible in less than four minutes.

- The local cardiac function is automatically displayed in AHA-conform 17 segment **2D polar maps**
- The display of the **aortic valve plane** with a single click facilitates the quantitative assessment of the aortic annulus for pre-procedural TAVI planning. Automatic calculation of the C-arm angulation (LAO/RAO, CRAN/CAUD) helps to save contrast agent in the interventional procedure.
- The workflow **CT TAVI Planning** allows to combine the assessment of the aortic annulus with the evaluation of the peripheral vessels (CT Vascular) providing streamlined TAVI planning.
- Straightforward drawing of contours, e.g. in the case of congenital heart disease or severe cardiomyopathy
- Polar map visualizations include flexible scaling
- Comprehensive **movie functionality**
- Quick creation of short-axis movies at multiple locations for PACS viewing
- **Cardiac movie playback** including adjustment of movie speed to heart rate

The latter three applications now feature the new **Rapid Results Technology**: You can now automatically generate reproducible and standardized visualizations of the coronary and general vessels in various types and orientations. Be creative and design your own personal Protocols that suit your daily work best. Define your workflow once and let Rapid Results Technology produce the decision basis for coronary evaluations, stent and TAVI planning, as well as examinations of unclear ischemia. *syngo.via*'s client-server technology lets you share your Protocols with other colleagues. Save time for reading other cases by automatically creating just the right amount of information – standardized and reproducible.

- **Customize** your every-day procedures by defining and saving individual Protocols in the Protocol Configurator
- Re-use your **own configured protocols** for an automated generation of snapshots, radial and parallel ranges for MPR, MIP, and VRT images (incl. VRT presets) in every case
- Save time by **standardizing image creation**, including PACS series and filming
- Pause the Protocol execution at any time and adjust settings interactively
- Configure result names and properties including snapshot and range series
- Send your findings to report and printing
- Provide hints, tips, and recommendations both to bring standardization to clinical routine and in order to **educate fellow colleagues**
- Integration of **measurement tools** into a protocol, such as length and diameter measurements

- **syngo.CT Neuro DSA** and its guided workflow support the evaluation of complex intracranial vascular structures and delineation of aneurysms and other vascular diseases. CT DSA data are immediately pre-processed and ready for evaluation whenever and wherever needed. It automatically removes bones of the head and neck, subtracting low-dose non-contrast native head-CT scan and a contrast-enhanced CTA.

Description

- **syngo.CT Neuro Perfusion** allows for quantitative evaluation of dynamic CT data and enables a quick and reliable assessment of the type and extent of cerebral perfusion disturbances. It provides quantitative images of Cerebral Blood Flow (CBF), Cerebral Blood Volume (CBV), Time to Peak (TTP), Time to Start (TTS), Time to Drain (TTD), Mean Transit Time (MTT), Transit time to the center of the Impulse Response Function (TMax) and Flow Extraction Product (Permeability).

- One clinical application is to visualize blood flow, blood volume, and parameter mismatch in acute ischemic stroke. This can help to estimate the size of the core infarct as well as the extent of tissue at risk to infarct (penumbra) that is potentially salvageable with further therapy. These insights can support the clinician to better decide on optimal treatment.
- Another application is the visualization of blood brain barrier disturbances using permeability imaging. Modeling extra-vascular leakage of blood into the interstitial space (Flow Extraction Product) may improve the differential diagnosis of brain tumors and be helpful in therapy monitoring.

- **syngo Volume Perfusion CT Neuro** facilitates quantitative volume evaluation for differential diagnosis of ischemic stroke and, in emergency situations, supports simultaneous multi-slice processing over the width of the detector. It includes Brain Tumor Evaluation for quantitative 3D evaluation of brain tumors.

- **syngo Volume Perfusion CT Neuro - Stroke Evaluation**
 - Reliable assessment of the type and extent of cerebral perfusion disturbances. Simple and easy workflow with automatic reference vessel and automatic midline identification.
 - Auto-Stroke functionality for automated display of all perfusion parameters.
 - 3D analysis of all perfusion data.
 - Automated guided workflow with automatic quantification of Cerebral Blood Flow (CBF), Cerebral Blood Volume (CBV), Time To Peak (TTP), Mean Transit Time (MTT) and Permeability maps.
 - Integrated automated 3 dimensional assessments of infarcted tissue and tissue at risk.
 - Integrated automated motion correction enhances data evaluation with uncooperative patients.
 - 4D Noise Reduction significantly improves image quality with no increase in dose or, alternately, reduces dose without compromising image quality.
- **syngo Volume Perfusion CT Neuro - Brain Tumor Evaluation**
 - 3D Visualization and evaluation of vascular leakage
 - Dedicated 3D blood-brain-barrier imaging
 - Enhances the ability to grade tumors
 - Allows biopsy and therapy monitoring

The **CT Acute Care Engine Pro** permits access for one user for the following additional scan modes and software modules:

Additional Scanner Options:

- **Adaptive 4D Spiral Plus** for whole organ perfusion, e.g. liver or brain perfusion.
The unique Adaptive 4D Spiral Plus allows to move beyond fixed detector limitations to provide full coverage of any organ in 4D. It introduces up to 48 cm range for dynamic CTA imaging and 4D Noise Reduction to significantly improve image quality with no increase in dose or, alternately, to reduce dose up to without compromising image quality (4D Noise Reduction requires Volume Perfusion CT Neuro or Body).
- **z-UHR** delivers the exceptional spatial resolution for detailed imaging of complex musculoskeletal structures down to 0.24 mm detail
- **Tiltable (adjustable) head holder** for optimal positioning of stroke patients or to protect the patient's eyes.

Additional Software Modules

Description

- **syngo.CT Cardiac Function - Enhancement** is an extension of the CT Cardiac Function workflow step that allows visualizing hypodense and/or hyperdense myocardial areas within CT datasets acquired with Single or Dual Energy* CT.

- Dedicated button for **First Pass Enhancement**: Single-click identification of hypodense areas within the myocardium by color-coding
- Dedicated button for **Late Enhancement**: Color-overlay helps to visualize hyperdense areas with a single click
- Color overlay can be turned on/off at any time
- Visualization of the **full spectrum of myocardial perfusion analysis**: First pass enhancement (Single and Dual Energy*), dynamic quantitative perfusion**, late enhancement (Single and Dual Energy*)
- Overlay of myocardial perfusion information on MPRs
- AHA-conform **17 segment polar maps** for all types of perfusion data
- Straightforward localization of myocardial enhancement defects
- Visualization of all types of perfusion data with the **Hybrid View** facilitating the analysis of the correlation of a defect with the coronary arteries - for a quick assessment of the hemodynamic relevance of a stenosis

* Requires at least one user license of *syngo.CT DE Heart PBV*

** Requires *syngo VPCT Body - Myocardium*

- **syngo.CT Cardiac Function - Right Ventricle** is an option for the CT Cardiac Function workflow step that allows reading and diagnosing CT angiography images of the heart for the evaluation of right ventricular function, allowing full cardiac assessment in less than one minute.

- **syngo.CT Vascular Analysis - Autotracer** is an option for the CT Vascular Analysis workflow step that allows automatic vessel centerline extraction and anatomical labeling of the main vessels, even before the case is opened for review. When the case is opened, all major vessels are already segmented and anatomically labeled. The first vessel is prepared in CPR view and the cross-sectional cuts are displayed for immediate evaluation. It is prerequisite for fast and efficient rule-out of atherosclerosis or severe stenosis in less than a minute while making possible a full vascular assessment in less than four minutes.

- **syngo.CT Rapid Stent Planning** introduces the automatic completion of manufacturer-specific stent order forms. As of delivery, *syngo.CT Rapid Stent Planning* provides the three order forms Gore Excluder, Zenith Flex, and Medtronic Endurant in pdf-Format. On top of that, new site-specific order form templates may be generated to match the requirements of other vendors (requires Adobe Acrobat Professional).

- **syngo.CT Dynamic Angio** helps to evaluate time-resolved CT images reconstructed from dynamic CT data. It facilitates the visualization of the vessel enhancement over time and allows to create CT volumes of, e.g. arterial or venous phase.

- Automatic calculation of **Temporal Maximum Intensity Projection (tMIP)** and **Temporal Average volume (tAVG)** for enhanced vessel and soft tissue visualization
- **4D noise reduction** and a body region dependent **motion correction** for robust image evaluation
- For a phase specific evaluation, e.g. of the arterial phase, the **Twin Slider** allows to restrict the calculation of new CT volumes to any user-defined time range within the dynamic scan. The tMIP or tAVG phase volume is automatically refreshed if the position of the Twin Slider is changed.
- For an evaluation of local vessel or tissue enhancement, *syngo.CT Dynamic Angio* displays ROI-specific time attenuation curves, as well as curve and statistical parameters, e.g. **time to peak and peak enhancement**.

Lung Imaging

This SOMATOM Definition scanner offers two specific scan protocols to provide Lung Imaging at 1.3 mGy CTDI or greater and for use with post-processing applications

LungLowDose Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.3 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 128X0.6 mm off. Default settings of a reference kVp of 120

Description

Description

and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B70f, B31F and B70F for axial viewing.

LungCARE Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.3 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 128X0.6 mm off. Default settings of a reference kVp of 120 and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B80f, B31F and B60f to be automatically transferred and post-processed on a Siemens workstation.

Eaton Surge Protective Device (SPD) Panel, 250kA per phase rating, 277/480VAC Wye, Three Phase (4W+G), Surge Counter, Dimensions 12.05"H x 7.47"W x 6.69" D, Weight: 13.5 lbs, 10 Year Limited Warranty

Lung Imaging

This SOMATOM Definition scanner offers two specific scan protocols to provide Lung Imaging at 1.3 mGy CTDI or greater and for use with post-processing applications

LungLowDose Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.3 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 128X0.6 mm off. Default settings of a reference kVp of 120 and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B70f, B31F and B70F for axial viewing.

LungCARE Uses CARE Dose 4D in conjunction with CARE kV and adaptive dose shield to provide imaging of the lung with a default scanner protocol set at 1.3 mGy CTDI. This protocol provides images from .6 mm and are acquired using .6 mm collimation and a z-sharp mm of 128X0.6 mm off. Default settings of a reference kVp of 120 and quality Reference mAs of 20 with rotation speed of .50 are used to achieve this dose. This protocol is set using a Kernel of B80f, B31F and B60f to be automatically transferred and post-processed on a Siemens workstation.

The Adaptive 3D Intervention Suite contains

Adaptive 3D Intervention as a built-In 3D minimal non invasive solution for spiral and sequential CT guided interventional procedures. It allows for 3D volume intervention - near to real-time interventional CT Imaging with coronal/sagittal/oblique images. It also allows for switching scan modes on the fly during intervention. Additionally an interventional 3D toolbar is available supporting *syngo*® 3D tools, Path Planning, to navigate the needle cautiously during the intervention including:

- Auto Needle Detection
- Switch between patient oriented view and needle oriented view
- i-NeedleSharp to avoid needle artifacts during an sequential intervention. i-needle sharp can be switched on and off.(available on tiltable gantries)

Intervention Pro supports spiral and sequential non- fluoroscopic interventional procedures and complete organ coverage with maximal flexibility and with minimal single click effort.

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Description

fluoroscopic interventional procedures such as drainage, biopsies or pain therapy. It also allows for switching scan modes between sequential to spiral mode on the fly during CT intervention. It contains: 2D Basic interventions, i-Sequence mode, i-Spiral mode, customizable user layouts and interventional toolbars.

i-Fluoro CT

i-Fluoro CT allows for ultrafast 2-dimensional interventional fluoroscopic procedures. Fluoroscopic scans are acquired with low dose techniques and displayed in real time on, with up to 10 frames/s, an additional in-room monitor. It also allows for switching scan modes on the fly during intervention.

HandCARE™ for i-Fluoro reduces on-line radiation exposure to the user and the patient by switching the radiation off in the upper segment of the 360° tube-rotation. It switches off the x-ray exposure for a 100° angle between three user selectable positions (10:00, 12:00 and 2:00 o'clock). Thus providing a significant dose saving to the operator's hand and to the patient while keeping the image quality constant.

i-Control CT

The interventional control panel (i-Control) supports interventional procedures as independent remote unit. The i-Control can be attached to the side rails of the table*, or an i-Control trolley*. i-Control Wireless CT module supports interventional procedures as independent wireless remote unit.

Documentation: Images are stored in file system for easy filming and archiving.

Foot switch for radiation release (x-ray).

* Optional

The space-saving ceiling installation along with the large movement range of the support allow maximum operating convenience when positioning the monitor.

Consisting of:

Ceiling support with installation kit, voltage supply.

Scope of delivery and functions:

- High-resolution, flicker-free monitor with 48 cm (19 in) flat screen, 1280 x 1024 resolution, 75 frames/s for parallel viewing and visual checking during the examination. The max. depth of the monitor is only 111 mm. In addition, a ceiling support or a monitor cart is required for installing the flat screen monitor (optional).