

REQUESTING SERVICE: DIAGNOSTIC RADIOLOGY

SHIP TO: VAMC DETROIT  
V.A. Medical Center  
CHIEF ACQ. MGMT. 001R-A  
4646 JOHN R STREET  
60141 DETROIT , MI 48201

**Qty**

**Item Description**

1

**SOMATOM Force**

The all new SOMATOM Force contains two Vectron X-ray tubes with unprecedented tube current (2 x 1,300 mA) and generator power (2 x 120 kW). The StellarInfinity detector, including TrueSignal and Edge Technology provides increased in plane resolution (1,840 channels) and ~ 50% increased z-coverage, compared to SOMATOM Definition Flash. SOMATOM Force takes CT imaging where it has never gone before by routinely generating ultra-thin 0.5 mm slices e.g. for most accurate stenosis, plaque and stent analysis and for low-kV imaging without compromises, even in adults or obese patients at scan speeds up to 737 mm/s (opt.). Additionally, the all new measurement system sets the benchmark in low contrast detectability. An object size of 2 mm, at a contrast difference of 3 HU, with a CTDIvol (Ø 32 cm) of only 12.3 mGy (with Phantom CATPHan (20 cm)) can be detected.

The all new SOMATOM Force gantry, with its powerful hollow shaft motor achieves maximum rotation speeds of up to 0.25 seconds (opt.) resulting in 66 ms temporal resolution, enabling you to freeze motion independent of heart rate. It features the industry leading Turbo Flash mode, with a dynamic Field of View (FoV) of up to 50 cm, even in ultra-high pitch applications (up to 737 mm/s table speeds, Opt.).

Besides, it enables reduction in dose, while it improves overall image quality (both high- and low-contrast resolution) for all scans, resulting, e.g. in dose down to sub-mSv for cardiac imaging and below. In its third generation, Dual Energy with Selective Photon Shield II (~ 30% better energy separation, for more precise Dual Energy quantification), automatically provides a second contrast for the best possible diagnosis without any extra dose at a Dual Energy Field of View (FoV) of up to 35 cm at scan speeds up to 285 mm/s (opt.).

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**Cooling System Water/Air #split**

Water-to-air heat exchanger for the dissipation (to the air outside) of heat, generated in the gantry.

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**Trafo for cooling system water/air**

For adequate power consumption the chiller system may need an additional transformer: If the electrical connection to be used can not provide either 400V at 50Hz or 460V at 60Hz this transformer is needed.

1

**Service Switch**

Service switch to shut off the outdoor cooling unit for maintenance or in case of emergency

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**High Cap. Patient & Trauma Acc Kit**

The High capacity and Trauma accessory kit contains additional Patient restraint set with a

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	width of 400mm and additional table extensions for feet and head.
1	<b>High Cap. Patient &amp; Trauma Tab.Top</b> 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.
1	<b>Mat for MPT Standard Table Top</b> Replacement for the positioning mattress for Standard Multi Purpose Table Top
1	<b>Multi-purpose table</b> The Multi-Purpose table is especially designed for multi-disciplinary use, while still enabling ultra-fast spiral scanning (up to 737 mm/s with HeartView in Turbo Flash spiral). Its flexible design allows exchanging table tops for routine radiology, trauma or bariatric use.
1	<b>Mattress for Bariatric Table Top</b> This mat is used for scanning non-bariatric patients on the flat, bariatric table top. Placing this mat on the bariatric table top eliminates the need to exchange the table top when non-bariatric patients are scanned. This mat has a curved profile and enables comfortable positioning of non-bariatric patients.
1	<b>Table Side Rails</b> Side rails enable the quick and easy attachment of additional accessories such as an infusion bottle holder and i-control intervention module to the patient table.
1	<b>FAST IRS</b> Reconstruction computer for the preprocessing and reconstruction of the CT raw data. The reconstruction computer contains of a cluster of high-performance GPU boards performing the preprocessing and reconstruction of the CT data.
1	<b>Force Imaging</b> We combine our market leading applications to make this the most personalised scanner for our customers. Including SureView, Turbo Flash Spiral, Adaptive Dose Shield, CARE Dose 4D, CARE kV, CARE Child, CARE Profile, CARE Dashboard, CARE Bolus, Dose MAP, FAST Adjust
1	<b>Force Imaging - Advanced</b> The Imaging Advanced Package combines ADMIRE, X-CARE and CARE Contrast to bring imaging to the next level.
1	<b>High-speed 0.25 s rotation</b> High-speed 0.25 s rotation
1	<b>Force Reading</b> We combine our market leading applications to make reporting consistant, fast and simple for our customers. Includes VRT, Workstream 4D and Extended FoV.
1	<b>Force Reading - Advanced</b> We combine our advanced applications to make reporting of complex and atypical anatomical structures faster and simpler. Includes:  iMAR for anatomically driven metal artifact reduction, combining three successful approaches (beam hardening correction, normalized sinogram inpainting and frequency splitting). This reduces artifacts caused by metal implants.  FAST Spine, providing anatomically aligned preparation of spine recons with just a single click.  HD FoV, special reconstruction algorithms allow for visualization of objects using a FoV up to

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65 cm with an image quality suited for radiation therapy planning

UHR mode, with the wide large UHR-Comb, delivers Ultra High resolution in plane of up to 32lp/cm (0.16 mm) for high defined imaging of small structures such as inner ear or even the lung, joints or fractures of the bone. The UHR Collimation could be increased to 32 x 0.6 mm collimation.

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**Force Function**

We combine our market leading applications, Dual Energy, Cardiac and Dynamic Imaging, to make quantative scanning and cardiac analysis more accessible and simpler to use.

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**DirectDensity**

Software feature that enables user to obtain electron densities directly from the CT images, allowing patients to be scanned at any kV setting, and simplifying physics work for treatment planning\*.

It includes

- CARE kV, first automated, organ-sensitive voltage setting to improve image quality and contrast-to-noise-ratio
- CARE Child, dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and protocols

\*DirectDensity(tm) reconstruction is designed for use in Radiation Therapy Planning (RTP) only.

DirectDensity(tm) reconstruction is not intended to be used for diagnostic imaging

1

**FAST Integrated Workflow**

We combine our market leading applications to make positioning simple for our customers.

The world's first 3D camera integrated into a CT positioning workflow is available as an option and allows automatic patient positioning in the examination room.

The FAST 3D camera captures the patient's shape, position, and height in three dimensions. Using infrared measurement, it even recognizes body contours: for example, when people are wearing heavy clothes or blankets.

Specialized applications support accurate and reproducible positioning:

FAST Isocentering, at the push of a button, provides the correct isocenter position, enabling the right dose modulation and consistent images.

FAST Range supports scanning the correct body region in the topogram with no cut-off - by aligning the automatically identified anatomical position with the protocol.

FAST Direction helps safeguard the right scan direction of the topogram, which is crucial when moving the table with infused patients.

FAST Topo - enables faster scan speeds in topograms, which minimizes breath-hold artifacts. It also has the potential to decrease the topogram dose.

FAST Planning - assists scan and reconstruction planning, based on a topogram, to provide an easier, faster and standardized workflow in CT scanning.

FAST 3D Align - automatically corrects misalignment of anatomic structures, organs of the patient. It aligns those to fit it to the selected reconstruction plane for a highly automated reconstruction workflow. Additionally, it minimizes the black area in the image by automatically adjusting the recon field of view selection.

1

**Tunnel Light**

SOMATOM Force offers a tunnel mood light (LED) in different, preset, adjustable colors that

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	are synchronized with the gantry ring light. It makes the gantry bore appear wider thus making it easier for patients with claustrophobia to undergo their examination.
1	<b>Ring Light</b> SOMATOM Force offers a gantry ring mood light (LED) in different, preset, adjustable colors that are synchronized with the gantry tunnel light. They help create a relaxing atmosphere for your patients, making a SOMATOM Force examination even more exciting and memorable.
1	<b>Computer Desk</b> New CT desk to accommodate the control components and color monitor. Width: 1200 mm, Depth: 800 mm, Height: 720 mm.
1	<b>Computer Cabinet</b> 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	<b>Water Phantom</b> 300mm Water Phantom for Acceptance-Test according to IEC 61223-3-5
1	<b>Additional User Manual</b> Additional user manual for the above selected CT system.
1	<b>s.via CT bundle A (Identifier)</b> CT system bundled with syngo.via
1	<b>syngo.via Virtual XL-Software</b> <p>The syngo.via Virtual SW offers 2D, 3D, and 4D multi-modality routine reading capabilities and a variety of advanced applications. It is ideal for 5 to maximum 15 users. The availability of applications and workflows included in syngo.via virtual. SW is virtually unlimited, i.e. the number of opened cases is only constrained by virtualized VMware hardware resources.</p> <p>The syngo.via client runs on standard Windows computers in the network and integrates into radiologist's reading workplace (RIS; PACS) for efficient image reading based on a wide range of clinical applications (advanced visualization applications) for different clinical cases. Those applications are available as additional options for syngo.via.</p> <p>The optional advanced visualization applications/Engines follow the flexible concurrent user model (users working at the same time).The service support for syngo.via requires the provision of an administrator with dedicated tasks and a minimum broadband Internet connection bandwidth.</p> <p>Virtual Dedicated Graphics Acceleration (vDGA)  Following syngo.via applications require a NVIDIA GPU card as vDGA PCIpassthrough device in order to run the imaging algorithms:</p> <ul style="list-style-type: none"> <li>- syngo.CT Colonography</li> <li>- syngo.CT Liver Analysis</li> <li>- syngo.MI Neuro Hybrid 3D</li> <li>- syngo.MR Neuro 3D Engine</li> <li>- syngo.MR Neuro fMRI</li> <li>- syngo.MR Tractography</li> </ul>

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1	<p><b>syngo.via Media for Virtual XL</b></p> <p>The syngo.via Media for Virtual XL contains a syngo.via Virtualized VMware container including Microsoft Windows Server 2012 R2 including license and all other prerequisites for the installation.</p>
1	<p><b>syngo.CT Acute Care Engine #1</b></p> <p>The CT Acute Care Engine provides disease-oriented workflows which allow for lifesaving diagnostics when every second counts. The workflows consist of dedicated 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>Software Modules:</p> <ul style="list-style-type: none"> <li>- syngo.CT CaScoring for quick risk assessment and coronary age calculation</li> <li>- syngo.CT Coronary Analysis for quantification of coronary stenosis / arteries</li> <li>- syngo.CT Cardiac Function for left ventricular functional assessment</li> <li>- syngo.CT Vascular Analysis for assessment / quantification of general vascular pathologies, such as stenosis and AAA.</li> <li>- syngo.CT Neuro DSA for bone-free visualization of cerebral vessels</li> <li>- syngo.CT Neuro Perfusion for dynamic 4D quantification of stroke</li> </ul> <p>Additional integrated Dual Energy (DE) functionality: (For scanners with DE capabilities only. To enable the DE functionality at least one user license of the respective DE application has to be purchased)</p> <ul style="list-style-type: none"> <li>- syngo.CT Vascular Analysis - DE Direct Angio (with Bone Removal &amp; Hard Plaque Removal)</li> <li>- DE integration of syngo.CT DE Heart PBV</li> </ul>
1	<p><b>syngo.CT Acute Care Engine Pro #1</b></p> <p>The CT Acute Care Engine Pro provides Right Ventricular Assessment for cardiac impairment affecting the right ventricle. . Advanced evaluation tools for myocardial perfusion add an incremental value for a safer evaluation of the hemodynamic relevance of coronary stenosis. The automated segmentation, anatomical labeling and display of the main vessels speed up the reading process for faster diagnosis.</p> <p>Additional Software Modules:</p> <ul style="list-style-type: none"> <li>- syngo.CT Cardiac Function - Enhancement for analysis of ischemia from early or late enhanced images, and from dynamic myocardial perfusion data</li> <li>- syngo.CT Cardiac Function - Right Ventricle for right ventricular functional assessment</li> <li>- syngo.CT Vascular Analysis - Autotracer for automatic identification and anatomical labeling of main vessels</li> <li>- syngo.CT Dynamic Angio for the assessment of time-resolved CT images</li> <li>- syngo.CT Rapid Stent Planning for automatic completion of manufacturer-specific graft order forms</li> </ul>
1	<p><b>syngo.CT Oncology Engine #1</b></p> <p>The CT Oncology Engine is an oncology solution for diagnosis, staging, and follow-up assessment and monitoring. It provides a high level of automation and quantification with unique processing functionality for CT Oncology and CT Colonography.</p> <p>The CT Oncology Engine permits access for the following software modules:</p> <ul style="list-style-type: none"> <li>- syngo.CT Segmentation for automated segmentation and evaluation of lesions in lung, liver, lymph nodes and other organs</li> <li>- syngo.PET&amp;CT Cross-Timepoint Evaluation for automatic calculation of tumor growth rates, tumor burden, and tumor volume doubling time. Dual time point comparison in report, synchronized visualization and navigation of up to 4 time points</li> <li>- syngo.CT Colonography for non-invasive, diagnostic evaluation of lesions in the colon</li> </ul>

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Additional integrated Dual Energy (DE) functionality - only available for SOMATOM Force, Definition Flash, Edge, and AS Dual Energy image datasets:

- DE support of syngo.CT DE Virtual Unenhanced which offers the generation of an unenhanced liver or kidney image without additional scans by utilizing an enhanced Dual Energy image and subtracting the contrast agent from it.

(To enable the DE functionality at least one license of syngo.CT DE Virtual Unenhanced has to be purchased)

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**syngo.CT Oncology Engine Pro #1**

The CT Oncology Engine Pro includes syngo.CT Lung CAD (Computer Aided Detection) for detection of solitary pulmonary nodules and syngo.CT Colonography PEV (Polyp Enhanced Viewing) for automated detection of colon polyps.. These tools significantly improve the user's confidence in detecting potential lesions and therefore make the CT Oncology Engine Pro a second reader tool. Lung CAD results are presented in syngo.via or - powered by Rapid Results Technology - directly in the PACS.

syngo.CT Colonography - Advanced, consisting of the Polyp Lens, Stool Removal functionality, and Virtual Dissection, adds an additional diagnostic dimension in tumor detection and assessment.

syngo.PET&CT Onco Multi-Timepoint enables simultaneous visualization of up to 8 time points with specific layouts enabling synchronous scrolling and navigation through all datasets.

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**syngo.CT DE Advanced Package #1**

The syngo.CT Dual Energy Advanced Package includes all Dual Energy Applications that are available for syngo.via.

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**syngo.via General Engine XL**

The syngo.via General Engine provides functionalities for highly efficient reading and reporting of routine to advanced cases.

The syngo.via General Engine comprises the following software modules:

ALPHA technology speeds up the workflow by automating and standardizing reconstructions and improves consistency in image presentation.

syngo.via Advanced Reporting enables efficient and structured management and communication of syngo.via results plus easy creation and administration of report templates.

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**syngo.via Cinematic VRT XL**

The syngo.via Cinematic VRT provides outstanding photorealistic material for education, publication, and communication.

With the syngo.via Cinematic VRT in syngo.via, the clinical cases look like images from an anatomy textbook. Communication with referrers and patients is clear and convincing. It only takes one click to create jaw-dropping, easy-to-understand, clinical images.

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**syngo.via Project Identifier**

System identifier for syngo.via project

1

**PACS-Driven Implementation Pkg.**

This PACS-Driven Implementation Package includes installation and integration services for syngo.via in a radiologic workflow mainly supported by the PACS functionality.

This package includes professional services, such as:

- Installation of the syngo.via server software on the server hardware
- Installation of the syngo.via client software on one clinical workplace for one user
- Connection to up to 5 DICOM nodes
- Image call-up of syngo.via from the PACS' user interface
- Assistance in setting up image call-up of syngo.via from the PACS' user interface. This may require the purchase of software and services from the PACS vendor.
- Configuration of basic syngo.via workflows and rules

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- Integration of one syngo.via client workplace with one syngo MultiModality Workplace.

- Installation of WebViewer integrated license (syngo.via SW version VA30 or higher, country restrictions might apply).

- Installation of the syngo.via WebViewer client application on one Mobile Device or Web Client system if requested by the customer. Ensure that the customer's Web Clients / Mobile Devices fulfill the minimum requirements according to the syngo.via WebViewer Data Sheet. Verification of the syngo.via WebViewer basic functionality

- If applicable: Integration into the Local Area Network of the customer and to Siemens Remote Service over the internet connection plus basic installation service for the syngo.via HW system at the customer's site.

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**syngo.via local Impl. (Identifier)**

Identifier for professional services completely provided by locally organized resources.

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**Virtual Initial Consultation, syngo.via**

This virtual initial consultation session, up to 4 hrs in duration, is designed to define the clinical customization of syngo.via specific to radiology workflow. Through direct communication with a clinical education specialist, this session will identify and configure site-specific workflow and imaging storage and retrieval parameters. This educational offering must be conducted no more than 4 weeks before the scheduled system turnover event. This consultation session will be scheduled during standard business hours, Monday through Friday. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

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**syngo.via for Clinical Admin (NO TL)**

Clinical Admin. The objective of this course is to give the participants the necessary theoretical knowledge and practical experience to routinely operate the syngo.via system, and to become acquainted with the settings and configuration of the system. Lectures and interactive practical exercises will familiarize the participants with the functionality of syngo.via and the clinical case specific applications. \*Travel and lodging are not included. This educational offering must be completed by the later of (12) months from purchase or install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

3

**Add'l training 32hrs, syngo.via**

Up to (32) hours of on-site clinical applications training on syngo.via navigation and modality specific clinical workflows, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4)users. The training offering must be completed (12) months from the later of turnover date or offering purchase date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

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**Classroom ClinicAdmin Training 5 day**

The objective of this course is to give the participants the necessary theoretical knowledge and practical experience to routinely operate the syngo.via system, and to become acquainted with the settings and configuration of the system.

Lectures and interactive practical exercises will familiarize the participants with the functionality of syngo.via and the clinical case specific applications.

This class includes lunch, economy airfare, and lodging for (1) imaging professional. All arrangements must be arranged through Siemens designated travel agency This educational offering must be completed by the later of (12) months from purchase or install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1

**Initial onsite training 24 hrs syngo.via**

Up to (24) hours of on-site clinical applications training on syngo.via basic navigation and modality specific clinical workflows, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4)users. Training will focus on the use of syngo.via in clinical routine and customization of systems based on workflow needs. This educational offering must be completed (12) months from turnover date. If training is not completed within the applicable time period, Siemens obligation to provide the training will

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1	<p><b>Follow up training 16 hrs, syngo.via</b></p> <p>Up to (16) hours of follow-up on-site clinical applications training on syngo.via navigation and modality specific clinical workflows, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4)users. Training will focus on the optimization of syngo.via in clinical routine and customization of systems based on clinical workflow needs. Advanced clinical applications will be covered for users previously attending initial applications training. This educational offering must be completed (12) months from turnover date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.</p>
1	<p><b>CT Project Management</b></p> <p>A Siemens Project Manager (PM) will be the single point of contact for the implementation of your Siemen's 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.</p>
1	<p><b>CT Standard Rigging and Installation</b></p> <p>This quotation includes standard rigging and installation of your CT new system.</p> <p>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.)</p> <p>It remains the responsibility of the Customer to prepare the room in accordance with the SIEMENS planning documents.</p> <p>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.</p> <p>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.</p>
1	<p><b>Initial onsite training 32 hrs</b></p> <p>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.</p>
1	<p><b>Initial onsite training 32 hrs GovOffset</b></p>
1	<p><b>Additional onsite training 32 hours</b></p> <p>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.</p>
3	<p><b>Additional onsite training 32 hours</b></p> <p>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.</p>
1	<p><b>Govt. Training Class (T&amp;L not included)</b></p> <p>Tuition for (1) government attendee to attend a Classroom Course of choice at one of the</p>



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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.

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**CT Hands-On Wrkshp at Customer Facility**

This (4) hour customized workshop will take place onsite at the customer's facility and will be facilitated by Siemens Clinical Education Specialists. Through the use of didactic and/or hands-on training attendees will be able to increase their knowledge and skills to help improve their clinical practice. Workshop must be scheduled consecutively (Monday - Friday) during standard business hours. This educational offering must be completed (12) months from date of purchase order. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

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**AddL 4 HR Hands-On Wkshp at Cust Facil**

This additional (4) hour customized workshop for customers, to be delivered consecutively with the initial workshop purchase, will take place onsite at the customer's facility or designated facility and will be facilitated by Siemens Clinical Education Specialists. Through the use of didactic and/or hands-on training attendees will be able to increase their knowledge and skills to help improve their clinical practice. Workshop must be scheduled consecutively (Monday - Friday) during standard business hours. This educational offering must be completed by the later of (12) months from purchase or install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1

**CT Physics Onsite Workshop**

This workshop offering provides 2 (up to 2 hours each) onsite physics modules to be delivered in a workshop setting for up to 8 attendees, and is designed for the clinical medical physicist and/or technologist. This workshop will take place onsite at the customer's facility and will be facilitated by a Siemens Clinical Education Specialist and a Siemens Physicist. 2 module topics (up to 2 hours each) can be chosen for this initial 4 hour workshop. Prior to scheduling the workshop, a Siemens Clinical Education Specialist will call and provide you with all of the details and the value each module, discuss your facility's needs and help guide you to choose the most appropriate modules to be delivered. There are both basic and advanced modules you can choose from depending on the needs of your facility. Basic module topics are: Acquisition and Reconstruction, ACR Accreditation, Dual Energy Imaging, Image Quality, and Dose Reduction XR-29.

More advanced topics include: Siemens Quality Assurance, Dose Monitoring, High Pitch Scanning and Cardiac Scanning. All modules are up to 2 hours and additional modules (up to 2 hours) can also be purchased and must be delivered concurrently with the initial 2 modules (up to 2 hours each) purchase.

Workshop must be scheduled consecutively (Monday - Friday) during standard business hours. This educational offering must be completed the later of (12) months from install end or purchase date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1

**Definition Trng Plan for Clin Engr**

This Definition Series Training Plan includes tuition for (1) clinical engineering professional to attend a syngo Basics Class and a Definition Series System Class at a Siemens Training Center. The promotional value of the clinical engineering training is being provided in conjunction with a minimum four year service agreement which may be a full service or shared service agreement. The Definition Series Training Plan is designed to provide the fundamental education necessary to service Siemens Definition series scanners. Tuition includes: a 5 day syngo basics training class which provides the platform training for all Siemens products and a Definition Series System Class which provides 13 days of detailed instruction on system operation, repair and maintenance procedures, hands on labs and troubleshooting exercises. The customer clinical engineer must provide proof of previous certification on a competitive CT system prior to beginning this Definition Series Training Plan. If customer is not certified on competitive CT product, customer will receive a 25% discount on the associated CT Basics course which is prerequisite to the Definition Series Training Plan. The Definition Series Training Plan offering must be scheduled within (12) months from equipment install end date.

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**CT syngo Security Suite Virt eclass 5Hrs**

Tuition for up to (4) professionals to participate in a Siemens instructor led virtual class. The

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	objectives of this virtual class are to introduce the user interface and configuration options of the syngo Security Package. The training is best suited for the IT 6 and/or PACS administrator. The virtual setting allows the participant to benefit from a 5 hour online virtual training session without the need to travel to a Siemens training center. 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	<b>teamplay Welcome &amp; Registration Package</b> teamplay is a cloud-based network that brings together your imaging modality users, the systems' dose and utilization data, and the users' expertise to help you improve the delivery of care to your patients. Basic features are provided free of charge. Premium features (benchmarking, non-Siemens devices) are provided on a trial basis for three months at no charge, and may be used thereafter on a subscription fee basis. To register: <a href="http://teamplay.siemens.com/#/institutionRegistration/1">http://teamplay.siemens.com/#/institutionRegistration/1</a>
1	<b>Riedel Chiller Start-up by SBT</b>
1	<b>Surge Protective Device (SPD)</b>
1	<b>Medrad ISI900 interface,w/install</b>
1	<b>Medrad P3T 2.0 Bundle</b> P3T 2.0 Bundle containing all PT3 Modules for the Certegra Workstation. Includes Medrad's P3T Cardiac, Abdomen and PA
1	<b>Low Contrast CT Phantom &amp; Holder</b>
1	<b>Standard UPS for Force</b> The standard partial system uninterruptible power system (UPS) is built directly into the power distribution cabinet (PDC) and supports the critical circuits for table and gantry electronics, console computer, image reconstruction system, and the internal Ethernet switch (to ensure connectivity). This enables safe removal of patient if outage occurs during scanning.  The UPS allows for a safe shutdown of the CT scanner in the event of power interruption. The UPS provides 5-7 minutes of power, during which the user is prompted and guided through the process to perform a safe shutdown of the system. This safe shutdown ensures that no data is lost.
1	<b>Access Protection</b> Scan Protocols are password protected allowing only authorized staff members to access and permanently change protocols
1	<b>Adaptive Dose Shield</b> Adaptive Dose Shield for spiral acquisition to eliminate pre- and post-spiral over-radiation.
1	<b>CARE Analytics</b> Stand-alone tool, for installation in any PC in the hospital network, allowing evaluation of DICOM dose Structured Reports (DICOM SR)
1	<b>CARE Dashboard</b> 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
1	<b>CARE Dose4D</b> 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	<b>CARE Dose Configurator</b> CARE Dose Configurator: Enhancement of Siemens' renowned real-time dose modulation

Qty	Item Description
1	<p>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.</p> <p><b>CARE kV</b></p> <p>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%.</p>
1	<p><b>Neuro BestContrast</b></p> <p>The Neuro BestContrast algorithm can provide enhanced tissue contrast, resulting in improved contrast between gray and white matter without increasing image noise. This post processing step is rapid and can be easily incorporated into clinical workflow where it can be used with other dose reduction approaches such as iterative reconstruction.</p>
1	<p><b>CARE Profile</b></p> <p>CARE Profile: Visualization of the dose distribution along the topogram prior to the scan</p>
1	<p><b>DICOM SR Dose Reports</b></p> <p>DICOM structured file allows for the extraction of dose values (CTDIvol, DLP)</p>
1	<p><b>DoseLogs</b></p> <p>Whenever a dose limit exceeds the established reference dose levels (Dose Notification and Dose Alert) a report is automatically created on the system, enhancing your ability to track radiation dose.</p>
1	<p><b>Dose Alert</b></p> <p>Dose Alert: Dose Alert automatically adds CTDIvol and DLP values depending on z-position (scan axis). The Dose Alert window appears, if either of these cumulative values exceeds a user-defined threshold.</p>
1	<p><b>Dose Notification</b></p> <p>Dose Notification: Dose Notification 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.</p>
1	<p><b>FAST Adjust</b></p> <p>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.</p>
1	<p><b>FAST Scan Assistant</b></p> <p>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.</p>
1	<p><b>NEMA_XR-29 Standard</b></p> <p>This system is in compliance with NEMA XR-29 Standard Attributes on CT Equipment Related to Dose Optimization and Management, also known as Smart Dose.</p>
1	<p><b>SureView</b></p> <p>Provides exceptional image quality at any pitch setting, enabling you to scan faster because you can scan at any pitch without degrading image quality</p>
1	<p><b>UFC Detector</b></p> <p>Ultra Fast Ceramics (UFC) technology is a unique type of scintillation technology material that quickly and efficiently transforms radiation from the X-ray tube into light signals. Its superb overall quantum efficiency and unique short afterglow enable time-critical X-ray detection at low doses and extremely fast data collection.</p>
1	<p><b>CT Essentials OPTION 1</b></p> <p>This educational offering covers modality service essential training tuition for 1 clinical engineering professional on the CT imaging systems. The training curriculum depends on and</p>

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is limited to the system purchased and may include multiple courses. Option 1 includes Virtual Classroom training, hands-on, and web-based training. This offering includes a 15% discount. Travel and lodging are not included. This educational offering must be completed by the later of (12) months from purchase or install end date; if training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund. This forfeiture does not apply to Federal government agencies.

**Syngo Security Package Definition Offset**

**syngo Security Package #AWP**

Security package for general regulatory security rules

**SOMATOM Force System Complimentary Biomed Training**

This educational offering includes system training tuition for 1 clinical engineering professional on the SOMATOM Force system and the syngo multimodality workstation as applicable. The training curriculum depends on and is limited to the system purchased and may include multiple courses including classroom training in USA or an international site, and/or virtual and web-based training. Additional modality basics training may be required as a prerequisite to these courses and must be purchased separately. This system training includes a 15% discount. Travel and lodging are not included. This educational offering must be completed by the later of (12) months from purchase or install end date; if training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund. This forfeiture does not apply to Federal government agencies.

**VIA Govt Trng in PACS Imp**

Per agreement, credit for initial training in Basic Implementation 14412663

Trade-in of an Aristos, Project 2018-3420, De-install 12/2019,  
Offset Somatom Force Complimentary Biomed Training (  
Offset Part 14440662 Additional User Manual (  
Offset Part CT\_ADD\_32 One Additional Onsite Training 32 hours (  
Virtual Initial Consultation, syngo.via offset:  
Initial onsite training 24 hrs syngo.via offset: (  
Additional Rigging CT:

# Detailed Technical Specifications

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## Description

The SOMATOM Force is Siemens' state-of-the-art high-end Dual Source CT that provides the possibility to scan with Turbo Flash speed to be two steps ahead in

- a) Clinical Excellence - At the top of our Dual Source CT portfolio, SOMATOM Force enables new levels of image quality, clinical outcomes, and ultimately precision medicine. Examine patients without beta-blockers, with no need for them to hold their breath, while providing the ability to reduce contrast agent dosage. Make clearly quantified therapy evaluations with dose-neutral Dual Energy.
- b) Workflow Performance - Automated technologies support safe, standardized, and highly efficient workflows – allowing for appropriate dose and reproducible precision from the smallest to the tallest patients.
- c) Expert Leadership - Thinking beyond today, you're connected to the future with an ever-growing expert community, exclusive access to highest quality CT data in the market today and the tools to advanced your research and clinical practice.

SOMATOM Force - the scanner that is able to scan:

- adults and obese patients at very low kV settings in order to save radiation\*\*
- allows you routinely performing exams at 70-90 kV, even in adults. This may potentially reduce the amount of contrast media needed. The SOMATOM Force scanner provides the ability to reduce contrast agent dosage, which can improve patient safety
- for low dose early detection (e.g. in Lung and Colon)\*
- with comparable air-to-soft tissue contrast (e.g. lung and colon) at significantly lower dose, compared to Definition Flash)
- to scan soft tissue and the brain at new and higher low-contrast resolution
- with the Turbo Flash mode up to a FoV of 50 cm, dependent on the pitch (min. FoV 35 cm), making it suitable for trauma and ED imaging, also in obese patients
- all organs for dynamic perfusion imaging (whole organ coverage) (opt.)
- 4D dynamic imaging at reduced doses, compared to Definition Flash (opt.)
- 4D dynamic imaging at higher temporal resolution and longer ranges (opt.)
- the whole heart in 4D dynamic myocardial stress perfusion (quantitative) (opt.)
- in Dual Energy without dose penalty at a very high precision for iodine quantification (opt.)
- in Dual Energy at a fast acquisition speed of up to 285 mm/s, at a larger FoV (35 cm) making it suitable for ED/trauma imaging. (opt.)
- the heart in Dual Energy mode with a temporal resolution down to 66 ms (opt.)
- the heart routinely below 1 mSv, and selected patients even at 0.1 mSv (opt.)
- patients without the need for breath hold or holding still
- pediatric patients without controlled breathing
- thorax/heart/abdomen in about 0.2 s at a dose of <3 mSv

## Description

- to scan the heart even in the systolic phase with Turbo Flash mode (opt.)
  - to scan the body and the heart at an higher high-contrast resolution (standard: 22 lp/cm @ 0% MTF in x/y plane (0.24 mm) and 16.7 lp/cm in z-direction (0.30 mm))
  - to scan the lung at a slice width of down to 0.4 mm (opt.)
- \*The SOMATOM Force *may achieve the same Contrast-to-Noise level (in terms of image pixel noise) in the image at reduced dose.***
- \*\* *"With the low kV / high mA capabilities of the VECTRON tube, SOMATOM Force allows scanning with a very high tube current of up to 1300 mA at 70, 80 and 90 kV, such that a high tube output even for these low kV settings can be achieved. Along with SOMATOM Force's unique Turbo Flash Mode, this scan configuration is also available for conventional spiral or sequential scanning."***

- at 66 ms temp. resolution for all heart rates (even atrial fibrillation) (opt.)
  - obese patients up to 307 kg (opt.) with 78 cm bore and 2 x 120kW
  - at up to 60% lower dose with iterative recon (SAFIRE)\* at an unprecedented recon speed
- \* 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 SOMATOM Force is founded on the two fully-integrated Siemens' Stellar Infinity detector systems, with two revolutionary Vectron X-ray sources, the Turbo Flash Spiral scanning up to 737 mm/s, the diagonal z-Sharp technology, Dual Energy with Selective Photon Shield II and a range of proven CARE solutions from X-CARE to the Adaptive Dose Shield.

Using Siemens' diagonal z-Sharp technology the SOMATOM Force can provide the fastest sub-millimeter volume coverage at industry's highest spatial resolution. The high rotation time of 0.25 seconds delivers excellent temporal resolution up to 66 ms independent from the heart rate.

The SOMATOM Force 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. Your patients will be off the table faster than ever before - with positive feelings about their scan experience. Turbo Flash is also the solution for scanning your most difficult patients (i.e. obese and trauma patients, restless children, patients who cannot hold their breath for long), thus causing no time-consuming interruptions in your daily practice.

And now Siemens is once again redefining speed: the new SOMATOM Force, with the new FAST CARE technology platform, allows you to maximize clinical outcomes - meaning you will have the best possible clinical results, but with significantly fewer resources bound to the CT system. The ultimate goal is to provide you with more time for patients and diagnosis - in effect, patient-centric productivity. The complete examination - from scan preparation, scanning, reconstruction, and data assessment - is streamlined, leading to a fast and reliable diagnosis with less patient burden. Ultimately, the combination of highest image quality and highest patient-centric productivity is the lever to maximizing your clinical outcomes.

Maybe even more important - and impressive - is the significant reduction in dose which allows e.g. for sub-mSv scanning in case of cardiac imaging. Furthermore, the third generation of dual source systems also enables the user to acquire Dual Energy data and benefit from Dual Energy post processing without compromising image quality or dose. Due to the introduction of the new Selective Photon Shield II, with an even further improved energy separation for more precise DE quantification, each scan on the SOMATOM Force can now become a precise Dual Energy scan. At the same time, X-CARE protects individual organs and the most radiation-sensitive body regions - for example, female breasts - by accurately and efficiently minimizing exposure while preserving image quality.

With the new SOMATOM Force with FAST CARE, Siemens introduces several innovative Combined Applications to Reduce Exposure (CARE). CARE kV, for instance, is the industry's first tool that 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 150 kV for bariatric imaging but now, if

## Description

necessary, also down to 70 kV for new safety and image quality standards, not only in pediatric imaging, but thanks to Vectron tube, The SOMATOM Force may also allow obese low kV imaging. Add SAFIRE\*, our raw-data-based iterative reconstruction and define low dose for all body regions to take best care of your patients' well-being.

\* 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 SOMATOM Force System Overview

- SOMATOM Force Gantry

The SOMATOM Force gantry is founded on two fully-integrated Stellar Infinity Detector systems, with two revolutionary Vectron X-ray sources, the Turbo Flash Spiral scanning up to 737 mm/s, the diagonal z-Sharp technology, Dual Energy with Selective Photon Shield II and a range of proven CARE solutions from the Adaptive Dose Shield to X-CARE.

The 78 cm large bore, the 200 cm scan range - with patient weight up to 307 kg (676 lbs) (opt.) - and the 200 kW generator power, it can scan most acute patients independent of size or condition, helping to save precious time from scan to diagnosis.

It's Ultrafast rotation time of 0.25 sec. (optional) leads to acquired (not reconstructed) 66 ms temporal resolution to freeze any cardiac motion even in high and irregular heart rates.

The optional Dual Source Turbo Flash Spiral mode acquisition of 2 x 192 x 0.6 mm allows for increased scan speed up to 737 mm/s e.g. for pediatric head or chest CT scans or routine sub-mSv heart examinations in patients with stable/low heart rate and a weight of up to 90kg.

- Vectron tubes with diagonal z-Sharp Technology

The two Vectron sources provide cooling through an water-chilled e-catcher, closely mounted to the rotating anode, for direct cooling of the anode  
Utilizing the Turbo Flash Spiral scanning technology in combination with Siemens' own diagonal z-Sharp Technology it routinely enables the industry's highest isotropic, scan field position and pitch independent spatial resolution. This allows a highly beneficial combination of exceptional image detail and unmatched sub-millimeter volume coverage of 737 mm/sec enabling whole body examinations within sub-seconds and seconds, even without the need for breath hold - adapting to challenging patients such as poly-trauma and incautious or uncooperative patients, leading to an improvement in image quality (e.g. minimized motion artifacts) and patient comfort (e.g. no breath hold,).

In addition, the Vectron Tubes are equipped with the Adaptive Dose Shields world's first dynamic tube collimation that protects the patient from clinically irrelevant radiation in every spiral scan.

- Stellar Infinity detector

The revolutionary Stellar detector, is designed to minimize electronic noise using Siemens' innovative TrueSignal technology. It thus significantly improves the signal-to-noise-ratio (SNR). In combination with Siemens' proprietary UFC scintillator the SOMATOM Force acquires 2 x 192 slices per rotation at outstanding dose efficiency.

Herein the new Stellar Infinity detector hardware minimizes electronic noise and cross-talk, through its TrueSignal technology.

By further applying Edge Technology the spatial resolution can now be increased to an unprecedented 0.30 mm (16.7 lp/cm) in daily clinical routine, which makes it finally suitable for clinical practice as the signal-to-noise ratio is adequate without an additional increase in dose.

In combination with UHR (optional), it delivers a slice width of unprecedented 0.4 mm allowing visualizing extremely small anatomical structures with exceptional quality, for example the complex inner-ear bones,.

- Power Generator

The generator power of up to 2 x 120 kW delivers sufficient resources for every clinical challenge and

## Description

thus helps to acquire exceptional image quality and save precious time from scan to diagnosis.

- Patient table

The patient table with a scan range of up to 200 cm and a load capacity of up to 307 kg / 676 lbs. (optional) in combination with the 78 cm gantry diameter of the SOMATOM Force virtually adapts to any patient independent of size or condition thus helping to avoid patient exclusions.

- FAST CARE

With Siemens' unique FAST CARE platform, the SOMATOM Force 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 overall clinical outcome by creating reproducible results, making diagnosis more reliable and reducing patient burden through streamlined examinations. For example FAST Spine automatically labels all vertebrae and discs after the data acquisition and prepares typical reconstruction ranges rapidly in spine examinations.

- **The World's First FAST Integrated Workflow** (opt.)

We combine our market leading applications to make positioning simple for our customers.

The FAST 3D camera captures the patient's shape, position, and height in three dimensions.

Using infrared measurement, it even recognizes body contours: for example, when people are wearing masking clothes or blankets.

The 3D camera is equipped with an infrared light source and sensor as well as an RGB camera. It is positioned above the patient table and in front of the gantry.

A live image of the patient is displayed on the Touch Panel and a planning image can be taken and displayed.

Algorithms use the measured data to calculate:

- The body regions in z-direction
- The patient's direction – "head-first versus feet-first" as well as "prone versus supine"
- The table height and patient thickness

Specialized applications support accurate and reproducible positioning:

- **FAST Isocentering**, at the push of a button, provides the correct isocenter position, enabling the right dose modulation and consistent images.
- **FAST Range** supports scanning the correct body region in the topogram with no cut-off – by aligning the automatically identified anatomical position with the protocol.
- **FAST Direction** helps safeguard the right scan direction of the topogram, which is crucial when moving the table with infused patients.

The 3D camera system consists of several components.

- Ceiling flange: The ceiling flange covers the fixation to the concrete or suspended ceiling.
- Ceiling extension: The length of the ceiling extension is variable to allow an installation of the 3D camera at different room heights.
- Camera Interface Computer (CIC): The computer is connected to the 3D camera and the syngo Acquisition Workplace.
- 3D camera: The camera is used to get the data of the patient structure in three dimensions.

FAST Topo - enables faster scan speeds in topograms, which minimizes breath-hold artifacts. It also has the potential to decrease the topogram dose.

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.

FAST 3D Align - automatically corrects misalignment of anatomic structures and organs of the patient. It



## Description

aligns those to fit it to the selected reconstruction plane for a highly automated reconstruction workflow. Additionally it minimizes the black area in the image by automatically adjusting the recon field of view.

FAST 3D Align works in combination with Workstream 4D.

### - Low Dose with CARE

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 Force 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.

### Clinical Applications

The SOMATOM Force introduces the third generation of Siemens Dual Source Dual Energy imaging, proven by more than 1.500 installations worldwide and a wide range of clinical publications. With the all-new Selective Photon Shield II and a larger field of view (500 mm FoV visual, 350 mm full Dual Energy FoV), it offers up to 30% increased energy separation.

SOMATOM Force now allows DE scanning with 80 kV/150 kV, 90 kV/150 kV and 100/150 kV with Sn (tin) filtration. Thus is adjusted even for larger patients, all the while the additional diagnostic information of Dual Energy is available without additional dose

### Adaptive 4D Spiral

With its unique Adaptive 4D Spiral plus scan mode (optional) the SOMATOM Force overcomes the coverage limitations in dynamic CT imaging when using a static detector and allows for up to 80 cm coverage in dynamic CT imaging. It even enables for 4D CT DSA evaluation.

### 3D Interventional Suite

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

### Neuro BestContrast

Neuro head image quality is significantly improved with Neuro BestContrast, by optimizing grey/white matter differentiation without increase in radiation dose.

### HeartView

With the HeartView CT option the SOMATOM Force achieves the industry's lowest heart rate independent temporal resolution of 66 ms. It allows to reliably scan all heart rates - even highest and irregular heart rates (atrial fibrillation), e.g. in acute chest pain evaluation, in coronary visualization, dynamic myocardial stress perfusion imaging and in functional analysis of the heart.

### Heart Perfusion

The optional Heart Perfusion mode, for quantitative, dynamic myocardial stress perfusion imaging, is a sequence shuttle mode to dynamically cover up to approximately twice the detector width for myocardial perfusion studies of up to 105 mm, with sufficient temporal resolution of 66 ms even for high heart rates. This it provides sufficient temporal resolution even for high heart rates.

## SOMATOM Force

System specification in detail

### 1. System Gantry and Detector:

Aperture: 78 cm; power supplied via low-voltage slip ring.

Patient Table: Standard table (200 cm) or Multi-purpose table (opt.) are available. The standard table consists of:

- Motor-driven table height adjustment from min. 49 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

## Description

- Control elements on both sides on the front and rear panel of the gantry
- Table height can be controlled alternatively by means of foot switch (2 each on both sides of the patient table)
- Max. table load: 227 kg/500 lbs (optional 307kg/676lbs)
- Table feed speed: 2-800 mm/s
- Distance between gantry front and table base 40 cm, e.g. for convenient positioning of a mobile C-arm between gantry and table or for convenient access during CT-intervention.
- Positioning aids: Positioning mattress, mattress protector, head-arm support (inclusive cushion), 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
- 4 pairs of optional Foot Pedals, available for high capacity table, conveniently allow table lifting and lowering from various positions
- Optional Multi-purpose table: Additional exchangeable table tops for High-capacity patient and trauma table top; RTP table top
- In the case of emergency stop or power failure, the tabletop can also be moved manually in horizontal direction

Scanning system: Adaptive Array Detector (AAD) systems based on UFC with 88,320 elements for measurement system A and 61,440 for system B. 2 x 192 detector electronic channels (DAS) utilized for up to 2 x 192 slices/rotation acquisition, and 1,840 for measurement system A and 1,280 for system B, 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 Adaptive Signal Boost improves image quality by amplifying individual pixels based on an analysis of the surrounding image data. It reduces streaks and noise and maintains the correct HU values for large patients.

Spiral acquisition modes: 192 x 0.6 mm, 64 x 0.6 mm, 40 x 0.6 mm, 32 x 0.6 mm, 20 x 0.6 mm, 10 x 0.6 mm, 32 x 1.2 mm, 16 x 0.3 mm\*, 8 x 0.3 mm\*, 16 x 0.6 mm\*, 8 x 0.6 mm\*.

Sequence acquisition modes 64 x 0.6 mm, 32 x 0.6 mm, 32 x 1.2 mm, 12 x 1.2 mm, 1 x 5 mm, 1 x 10 mm, 8 x 0.3 mm\*, 8 x 0.6 mm\* (\* optional).

The scan field diameter is 50 cm.

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

### 2. Tube Assembly:

Source: The two Vectron sources provide cooling through an water-chilled e-catcher, closely mounted to the rotating anode, that significantly reduces extrafocal radiation, for reliable performance when operating two x-ray sources at an ultrafast rotation time of 0.25 sec.

- 2 x Vectron high performance X-ray source
- Tube current range: Single source 20-1.300 mA
- Dual Source 40-2600 mA
- e-Catcher, catching extra-focal electrons off the anode, thus directly cooling the anode through its internal water cooling. - Focal spot size according to IEC 60336: 0.4 x 0.5mm/8°, 0.6 x 0.7 mm/8° and 0.8 x 1.1 mm/8°.
- Computer controlled monitoring of anode temperature
- Multifan principle with new diagonal flying focal spot (diagonal z-Sharp technology)
- 2 x Adaptive Dose Shields with ultrafast blade positioning and movement enabled through SiDaNet (Siemens Data Net Bus technology)

### 3. Diagonal z-Sharp Technology:

## Description

The unique Vectron X-ray source with diagonal z-Sharp technology utilizes an electron beam that is accurately and rapidly deflected, creating two precise focal spots alternating multiple thousand 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' Stellar Infinity Detector hardware and the highly integrated 2 x 192-slice detector electronics enable a virtually simultaneous readout of two projections for each detector element - 2 x 2 x 96 slices for every viewing angle - resulting in a full 2 x 192-slice acquisition. Diagonal z-Sharp technology, utilizing the Vectron X-ray sources and the Stellar Infinity detector hardware, provides scan speed independent visualization of 0.33 mm isotropic voxels and a corresponding elimination of spiral artifacts in the daily clinical routine at any position within the scan field.

- 2 x 192-slice acquisition with diagonal z-Sharp technology
- routine 0.5 mm slice with 0.3 mm cross-plane resolution
- 0.4 mm slice with extra-large UHR comb (32 x 0.6 Collimation) (opt.) and a spatial resolution of 32 lp/cm (0.16 mm)
- Industry's highest isotropic and scan field position independent spatial resolution of 0.33 mm voxel size
- Visualization of the smallest anatomical structures with exceptional image quality in complex inner-ear bones, lungs or small sized vessels such as the intracranial, mesenteric and coronary system. Based on that accurate stenosis measurements or stent planning with outstanding precision are enabled.

### 4. High Power X-ray Generator:

2 microprocessor-controlled, low-noise high-frequency generators with integrated, automatic self-testing system for continuous monitoring of operation. Settings: High-voltage range 70, 80, 90, 100, 110, 120, 140 and 150 kV; power max. 2 x 120 kW (depends on clinic network) - for no compromises in obese imaging - adjustable in fine steps. The kV are automatically pre-selected through CARE kV in finest 10 kV steps based on patient body habitus and examination type for lowest possible dose at constant signal to noise ratio (image quality). The generator can maintain very high tube current (up to 2 x 1.300 mA) even during low-kV imaging thus allowing to benefit from radiation dose or contrast media concentration reduction - from pediatric to adult patients. ***"Early clinical experience based on imaging of the left ventricle and aortic root (TAVI studies) demonstrate that a reduction of contrast media administration may be possible using SOMATOM Force's Turbo Flash Mode and its low kV / High mA capabilities."***

### 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 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, External USB 2.0 devices for data storage are supported

### 6. CT Image Computer System:

Reconstruction computer for the preprocessing and reconstruction of the CT raw data. The reconstruction computer contains of a cluster of high-performance processors performing the preprocessing and reconstruction of the CT data

External USB 2.0 disks for quick and easy raw data storage are supported

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

## Description

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. 10,000 pre definable examination protocols

### 7. Cooling System:

Gantry is cooled with a water/water cooling system. An optional split cooling (water/air) is available to reduce reconstruction efforts and costs.

System operating temperature: 18-28°C, 20 - 75 % rel. air humidity (not condensing).

### 8. 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 work list via network. DICOM work list: Software module for accepting lists of patient data and exam requirements from a Radiology Information Systems (RIS) via DICOM Get Work list functionality. The program enables very efficient working and enables 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 Force is delivered with a large number of predefined examination protocols (e.g. for pediatric applications), 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: coronary, 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.

WorkStream4D with Asynchronous Recon (also possible with Dual Energy Data: FAST DE (opt.):

*syngo* WorkStream 4D, now also for Dual Energy Data (Called FAST DE) is the standardized workflow guide for confident patient management. Up to 8 pre definable axial, coronal, sagittal and oblique MPR and MIP up to sub mm recon jobs possible. The Asynchronous Recon allows for multiple image reconstructions and reformats, parallel to scanning. With this feature, up to eight reconstruction 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. WorkStream4D eliminates manual

## Description

reconstruction steps and reduces the data volume up to a factor of 10, since virtually all diagnostic information is captured in 3D slices.

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

- 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.

### 9. Examination and Evaluation Functions:

Topogram: scanning perspectives: a.p., p.a., lat.; length of scan field: 128 - 2000 mm; width of scan field: 512 mm, 2.0 - 21 s. The topogram can be switched off manually when the desired examination length is reached.

Scan field size: 50 cm. Rotation times (360°): 0.25 s (opt.), 0.285, 0.33, 0.5, 1.0 s.

Slice thickness in sequence: 0.4 (UHR\*), , 0.5, 0.6, 0.75, 1.0, 1.2, 1.5, 2.0, 2.4, 3.0, 4.0, 4.8, 5.0, 6.0, 7.0, 7.2, 8.0, 10.0, 14.4, 15.0, 20.0 mm (\* optional).

The Dynamic Multiscan allows continuous sequence scanning without table movement for fast dynamic contrast studies with maximum slice thickness of 57.6 mm. Scan times (full scan) 0.25 (opt.), 0.285, 0.33, 0.5, 1.0 s.

Slice thickness in spiral: 0.4 (UHR\*), 0.5, 0.6, 0.75, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 10.0 mm (\* optional) real-time image display.

Real-time image display for immediate image preview when every second counts. 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 possible. Max. scan time 100 seconds with full low-contrast resolution. Volume length ~ 197 cm with full low-contrast resolution (max. 200 cm scan range possible using multiple automatic ranges). Selection of the pitch factor between 0.35 and 3.2 depending on scan mode. Selection of up to 33 free definable scan ranges per protocol and individual anatomic sections can be successively combined and then scanned automatically. In addition individual anatomic sections can be successively combined and then scanned automatically. Storage of up to 10,000 examination protocols. Rotation times/cycle (360°): 0.25 s (opt.), 0.285, 0.33, 0.5, 1.0 s.

Dynamic Multiscan spiral examination without table feed: Continuous multirotational data acquisition in one slice position with up to 100 scans in uninterrupted, continuous sequence without table feed. Scan cycle time: 0.75 - 60 seconds with quantitative evaluation and graphical display of time-density curves.

Adaptive 4D Spiral (optional): Continuous multirotational data acquisition with continuous smooth bi-directional table movement for quantitative evaluation and graphical display of time-density curves over entire organs. It facilitates volume perfusion studies in head (Stroke) and body applications (e.g. liver, kidneys, etc.) for a perfusion

## Description

range of up to 22 cm. Moreover it allows dynamic studies up to a scan range of 80 cm, e.g. after aortic stent graft operation or for dynamic vascular (filling) studies of the peripheral vessels.

The intelligent algorithm Neuro BestContrast improves 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.

Image reconstruction and storage: Image reconstruction in full resolution (512 x 512 matrix) takes place during the examination, with full cone beam reconstruction, diagonal 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.

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 full cone beam reconstruction and diagonal 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.

### 10. 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, Work list, Storage Commitment, MPPS (Modality Performed Procedure Step).

### 11. Integrated CARE Solutions:

UFC based Stellar Infinity Detector: Dose reduction compared to conventional CT detectors. High efficiency for low mAs requirements enable best possible image quality with low patient dose at increased resolution and ~50% increased z-coverage, in comparison to Definition Flash

The new and ultra-fast Adaptive Dose Shield, powered by SiDaNet (Siemens Data Network Bus): world's first dynamic tube collimation that protects the patient from clinically irrelevant radiation in every spiral scan and newly also in Perfusion scans, such as the Adaptive 4D Spiral for significant additional dose reductions. Both tubes are equipped with an Adaptive Dose Shield, that is controlled and positioned through SiDaNet, and X-CARE, allow to reduce direct peripheral exposure in Spiral CT for the most dose-sensitive body regions while preserving constant

## Description

high image quality e.g. the breast during a chest CT exam or the eye lenses during neuro CT exams. Adaptive Dose Shield becomes now also available for 4D dynamic imaging through ultrafast blade drives and the fast control of SiDaNet bus communication.

X-CARE: Partial scanning to reduce direct X-ray exposure for the most dose-sensitive body regions, e.g. the breasts, thyroid gland or eye lens.

Turbo Flash Spiral scanning: Ultra-fast spiral scanning in Dual Source mode with up to 737 mm/s, allows for additional dose saving especially in ECG-triggered scans\*, e.g., cardiac or chest scanning (\* optional)

CARE Dose4D uses at first an automated adjustment of the dose level depending on patient size based on the attenuation values obtained from the standard (singular) topogram along the patient z axis. In addition CARE Dose4D uses a real-time adaptation of the tube current during the scan based on the actual attenuation of the X-ray beam measured around the patient. It delivers significant x-ray dose reduction for all body regions scanned compared with standard sequence or spiral scanning;

The projections are evaluated per second to optimize the mA level instantaneously. In combination with the extreme adjustment speed of the tube current, CARE Dose4D enables consistent high quality images in every anatomical position. Thinner axial slices and/or longer scan ranges become possible because of reduced tube loading; It also enables ultra-low dose examinations for pediatric patients.

CARE Filter: Specially designed X-ray exposure bow-tie filter installed at the tube collimator. Dose reduction with optimized image quality. Additional protocol dependent bow-tie filtration e.g. cardiac and pediatric body protocols.

### CARE kV

Industries first automated, exam-specific voltage setting to optimize contrast-to-noise-ratio and significantly reduce dose.

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.

## 12. IT Security:

The scanner comes with IT security features including:

- Whitelisting based on e.g. Microsoft Device Guard
- Secure Configuration and Hardening

In order to keep the system safe regular deliveries of Service Packs are deployed, typically via SRS. Also, Service Packs will be deployed in case of a security incident, typically via SRS.

Deployment of Service Packs will be discontinued when a new software version becomes available.

For more information please contact your local sales representative

## 13. Siemens Remote Service:

Siemens Remote Service (SRS) enables 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 can be ordered for all service agreement customers:

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.

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

## Description

measures.

### 14. The Welcome Package

The package contains a welcome letter, three current versions of the customer magazine SOMATOM Sessions, three Siemens Mouse Pads, pens and an e-Learning CD

The computer keyboard, insulated hose pipe for the water cooling and electrical cable set are part of the basic configuration and will be delivered with every system. Your local Siemens Project Manager will contact you for the details of the needed configurations.

System operating temperature (outside the building): -30°C to 50 degree C, 0-100% rel. humidity (not condensing), Ideal for high distance installation (scan room).

Cooling system contains two units (indoor + outdoor unit):

1. water/water exchanger close to the scan room and
2. an additional remote water/air exchanger

The indoor unit of the cooling system may be up to 30m away from the gantry with a height difference of not more than +10m. Additional hoses for 10m and 20m distance are available to extend the distance between the CT gantry and the indoor unit to 50m.

If the distance between the cooling-system and the gantry is longer than 50m an optional additional pump unit is needed.

Standard distance between water/water unit and remote water/air exchanger is 40m with a height difference of not more than +20m. For longer distance between water/water unit and remote water/air exchanger the tube diameter must expand or an optional additional pump is needed.

The Multi-Purpose patient table supports up to 200 cm scan range. Motor-driven table height adjustment from min. 55 cm to max. 94,5 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: 1-800 mm/s; distance between gantry front and table base 35 cm.

The included Physiological Measurement Module allows connecting a 3 channel ECG cable (included) for ECG controlled cardiac acquisition. Also includes a wide range of positioning aids, including a tiltable head holder.

Innovating for the Patient, as every patient is different they need their own distinct parameters. With the SOMATOM Force we combine our market leading applications to make this the most distinct scanner for our customers.

Including:

SureView - Siemens unique pitch independent dose solution

Turbo Flash Spiral - Fast spiral scanning mode with up to 737 mm/s, reducing motion artifacts.

Adaptive Dose Shield - world's first dynamic tube collimation that protects the patient from clinically irrelevant radiation in every spiral scan.

CARE Dose 4D - uses at first an automated adjustment of the dose level depending on patient size based on the attenuation values obtained from the standard (singular) topogram along the patient z axis. In addition, CARE Dose4D uses a real-time adaptation of the tube current during the scan based on the actual attenuation of the X-ray beam measured around the patient. It delivers significant x-ray dose reduction for all body regions scanned compared with standard sequence or spiral scanning; Projections are evaluated to optimize the mA level instantaneously. In combination with the extreme adjustment speed of the tube current, CARE Dose4D enables consistent high quality images in every anatomical position. Thinner axial slices and/or longer scan ranges become possible because of reduced tube loading; it also enables ultra-low dose examinations for pediatric patients.

CARE kV – The first automated, organ-sensitive voltage setting tool to improve image quality and contrast-to-



## Description

noise-ratio while optimizing and potentially reducing dose.

CARE Child - Dedicated pediatric CT imaging, including 70 kV scan modes and specific CARE Dose4D curves and Pediatric Protocols - Special examination protocols with 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 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 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.

Dose MAP - Siemens unique solution to support dose monitoring, protocol management and benchmarking

FAST Adjust - assists the user to handle system settings in a fast and easy way by automatically solving conflicts within user defined limits by a 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.

The Imaging Advanced Package combines:

**ADMIRE** - (Advanced Modeled Iterative REconstruction) offers significant dose reduction and image quality improvement, as well as an everyday suitability. Superb details, delineation and sharp organ borders and positive impact on image quality. Dose and Image Quality benefits also in thick slice reconstructions, which facilitates a PACS-ready workflow. Reader-ready reconstructions deliver the desired image impression on the fly.

\*In clinical practice, the use of ADMIRE 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.

**CARE Contrast** supports the consistent application of contrast media protocols on the scanner. Saving and linking contrast protocols to scan protocols is available in the Examination card or as part of the scan protocol manager.

### **X-CARE**

Partial scanning to reduce direct X-ray exposure for the most dose-sensitive body regions, e.g. the breasts, thyroid gland or eye lens.

Innovating for the Radiologist, as every patient is different, Radiologists also vary, and they have their own distinct reconstruction and imaging requirements. With the SOMATOM Force we combine our market leading applications to make reporting consistent, fast and simple for our customers

Includes:

**VRT** - Volume Rendering Technique standard on the 3D card.

**Workstream 4D** - the standardized workflow guide for confident patient management. Up to 8 pre definable axial, coronal, sagittal and oblique MPR and MIP recon jobs possible. The Asynchronous Recon allows for multiple image reconstructions and reformats, parallel to scanning. With this feature, up to eight reconstruction 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. WorkStream4D eliminates manual reconstruction steps and reduces the data volume up to a factor of 10, since virtually all diagnostic information is captured in 3D slices.

**Extended FoV** - allows you to capture more information in just one exam, saving valuable time with emergency patients. Up to 78 cm field of view.

## Description

We combine our advanced applications to make reporting of complex and atypical anatomical structures faster and simpler.

This item includes:

### **iMAR #AWP**

The iMAR metal artifact reduction algorithm combines three successful approaches (beam hardening correction, normalized sinogram inpainting and frequency splitting). This reduces artifacts caused by metal implants such as coils, metal screws and plates, dental fillings or implants. iMAR is compatible with extended FoV, the extended CT scale as well as the latest dose reduction features.

The iMAR metal artifact reduction algorithm combines three successful approaches to reduce metal artifacts: beam hardening correction (in sinogram regions of less severe metal attenuation), normalized sinogram inpainting (in sinogram regions of high metal attenuation), and frequency splitting (to mix back in noise texture and sharp details that are potentially lost during inpainting).

The correction process is then iteratively refined by repeating the normalized sinogram inpainting and the mixing steps thanks to the Adaptive Sinogram Mixing.

Along with the new algorithm comes a simple user interface for iMAR enabling easy reconstruction of clinical images with reduced metal artifacts. Besides the typical reconstruction parameters it only requires the user to select the desired protocol from a drop down menu which contains the following type of implants: dental fillings, neuro coil, thoracic coil, hip implants, extremity implants, pacemakers, spine implants and shoulder implants.

### **FAST Spine #AWP**

Accurate and anatomically aligned preparation of spine recons with just a single click.

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.

### **HD FOV Pro #AWP**

Software program with special reconstruction algorithms that allow for visualization of objects using a FoV up to 65 cm with an image quality suited for radiation therapy planning.

For radiation therapy settings or radiology environments providing radiation therapy planning (RTP), it is important to visualize areas outside of the regular 50 cm CT scan field with sufficient accuracy to precisely plan the radiation treatment. For this reason, special reconstruction algorithms have been created to allow for visualization of objects/for soft tissue using a FoV up to 65 cm with an image quality suited for RTP (e.g. contour recognition for dose calculation). The image quality for the area outside the standard 65 cm scan field does not meet the image quality specifications shown in the technical data sheet (non-diagnostic image quality). Image artifacts may be common in the area outside the 65 cm HD FoV, depending on the anatomy scanned.

### **UHR with extra wide comb**

The UHR mode, with the wide extra wide UHR-Comb, delivers Ultra High resolution in plane of up to 32lp/cm (0.16 mm) for high defined imaging of small structures such as inner ear or even the lung, joints or fractures of the bone. The UHR Collimation could be increased to 32 x 0.6 mm collimation.

Innovating for the Therapy, as every patient is different and they have their own treatment requirements and responses. With SOMATOM Force, we combine our market leading applications, Dual Energy, Cardiac and Dynamic Imaging, to make quantitative scanning and analysis more accessible and simpler to use.

Including:

The syngo Dual Energy Scan with Tin Filter option allows the use of both SOMATOM Force X-ray sources simultaneously at different energies, while the Tin Filter reduces dose and at the same time increases energy separation by blocking unnecessary parts of the energy spectrum. syngo Dual Energy offers the possibility to

## Description

acquire two spiral data sets simultaneously from a single scan running the tubes at 80/Sn150 kV, 90/Sn150 kV and 100/Sn150 kV (for obese Dual Energy imaging). The results are two data sets with diverse information.

FAST DE Results - enables a straight forward Dual Energy workflow. You can select dedicated Dual Energy applications at the AWP and they will be sent directly to the PACS without any interaction needed. FAST DE Results is as easy as selecting a recon job and will enhance your daily workflow significantly.

FAST DE (DE WS4D) - is a 4D workflow for the Dual Energy data with direct generation of axial, sagittal, coronal, or double-oblique images from standard Dual Energy scanning protocols. The Advantage: the reduction or elimination of time consuming, error prone, manual reconstruction steps and a reduction of data volume up to a factor of 10, since virtually all diagnostic information is captured in 3D slices.

Heart View – Heart View enables ECG controlled data acquisition and image reconstruction.  
The package comprises:

HeartView CT option on the syngo Acquisition Workplace console for the ECG-controlled acquisition and reconstruction of artifact free images of the heart.

The option supports adaptive prospective ECG-triggered sequence scanning and adaptive retrospective ECG-gated spiral scanning to obtain CT images of the heart in defined phases of the cardiac cycle at a minimum rotation time of 0.25 s (optional). With prospective ECG-triggered sequence scanning, quick scans are triggered by ECG signals. Retrospective gating is based on a continuous spiral scan with simultaneous ECG recording. The cardio spiral reconstruction allows volume imaging in selectable phases of the cardiac cycle.

With retrospective ECG-gated spiral scans the ECG signal can be edited for improved image quality in the case of severe arrhythmia. A dedicated "Preview" tool enables the planning of the volume reconstruction during an optimal cardiac phase on the basis of axial single slices. With ECG-pulsed control of the tube current a dose reduction can be achieved with retrospective ECG-gated spiral scans. The special scan protocols "Cardio-Care" and "Cardio-Sharp" offer a special filter technique for cardiac examinations for improved sharpness and a lower dose. ECG-gated, prospectively triggered high-pitch Turbo Flash Spiral for scanning at highest volume coverage can be used for:

- For high speed whole body examinations with up to 737 mm/s scan speed
- For fast thorax scans visualizing the aorta and the coronaries in one scan at very low contrast dose (e.g. for TAVI/TAVR planning)
- Fast whole-body scanning of patients who cannot lie calm for longer time, e.g. geriatric and pediatric patients (latter even w/o the need of sedation)
- For coronary CTA scanning of the heart in a quarter beat with a Dual Source acquisition mode at a temporal resolution of 66 ms, acquired within a single diastolic phase (monophasic) allowing for lowest possible doses down to <1 mSv

With split-second thorax imaging of heart, chest, or both, for ultra-low dose triple-rule-out examinations with a temporal resolution of 66 ms

ECG-controlled imaging techniques are the basis for both the quantification of calcified plaques in the coronary arteries (calcium scoring) and 3D reconstructions of the heart and coronary arteries in contrast media studies (CT angiography of the heart). Retrospective ECG gating also allows functional imaging of the heart. Moreover, these techniques suppress pulsation or motion artifacts in the lung and in vessels close to the heart (e.g. ascending aorta). The ECG signal is supplied by an ECG device integrated in the gantry.

Cardiac Best Phase Plus - is a dedicated software which automatically calculates and detects the optimal phase for motion-less coronary visualization. The phase is defined as either end-systole, end-diastole or both time points and is automatically reconstructed.

Also includes the DirectViewing™ tool, used for real time navigation through full volumes of up to 24 heart phases by using an integrated fast 3D volume viewer, available both on the Examination and Recon subtask card. Furthermore it provides VRT visualization of the coronaries with heart isolation in up to 20 phases within 15 seconds. DirectViewing™ completes the workflow of Cardio BestPhase™ by giving you the flexibility to individually visualize phases for all coronary arteries.

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## Description

Ca Scoring #AWP scanning - for quick calcium scoring based risk assessment and coronary age calculation (for single user at Acquisition Workplace)

FAST Phase - is an intuitive solution fully integrated in the cardiac workflow for helping to quickly set up complex and usually time-consuming cardiac procedures reliably and repeatedly. By measuring of heart rate and rhythm the system automatically choses the most appropriate phase of the heart cycle to scan and later to reconstruct based on fully configurable and customizable look up tables. This reduces complexity and helps to standardize cardiac acquisitions by making them more robust and less user-dependent.

The Dynamic Myocardial Perfusion Package contains the scanner and software features necessary to perform dynamic myocardial perfusion evaluations. It includes:

Heart Perfusion Scanning: A dynamic scan mode to visualize ventricular myocardial perfusion for identification of perfusion defects.

syngo Volume Perfusion CT Body for the quantitative 3D evaluation of dynamic CT data of organs and lesions by providing images of blood flow, blood volume, and permeability from one set of dynamic CT images.

syngo Volume Perfusion CT Body – Myocardium for the display and analysis of dynamic CT data of the heart.

Adaptive 4D Spiral applies a continuously repeated bi-directional table movement, moving the patient smoothly in and out of the gantry over the desired scan range. In stroke assessment, it provides the information not just for a limited section of the disease, but for the whole brain. It assures a reliable assessment of the type and extent of cerebral perfusion disturbances. In addition, it facilitates perfusion studies over entire organs in both the head and body. Enabling you to assess the entire extent of disease and visualize the function of potential metastasis. Finally, it enables the visualization and evaluation of complex intracranial vascular structures in separate phases. Arterial and venous phases are captured in a single scan, but can then also be evaluated separately. So you're able to not only delineate aneurysms and other vascular diseases, but also to exclude occlusions of the aortic vessels and assess venous thrombosis.

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We combine our market leading applications to make positioning simple for our customers.

The FAST 3D camera captures the patient's shape, position, and height in three dimensions. Using infrared measurement, it even recognizes body contours: for example, when people are wearing masking clothes or blankets.

The 3D camera is equipped with an infrared light source and sensor as well as an RGB camera. It is positioned above the patient table and in front of the gantry.

A live image of the patient is displayed on the Touch Panel and a planning image can be taken and displayed.

Algorithms use the measured data to calculate:

- The body regions in z-direction
- The patient's direction – "head-first versus feet-first" as well as "prone versus supine"
- The table height and patient thickness

Specialized applications support accurate and reproducible positioning:

- **FAST Isocentering**, at the push of a button, provides the correct isocenter position, enabling the right dose modulation and consistent images.
- **FAST Range** supports scanning the correct body region in the topogram with no cut-off – by aligning the automatically identified anatomical position with the protocol.
- **FAST Direction** helps safeguard the right scan direction of the topogram, which is crucial when moving the table with infused patients.

The 3D camera system consists of several components.

- Ceiling flange: The ceiling flange covers the fixation to the concrete or suspended ceiling.
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## Description

- Ceiling extension: The length of the ceiling extension is variable to allow an installation of the 3D camera at different room heights.
- Camera Interface Computer (CIC): The computer is connected to the 3D camera and the syngo Acquisition Workplace.
- 3D camera: The camera is used to get the data of the patient structure in three dimensions.

FAST Topo - enables faster scan speeds in topograms, which minimizes breath-hold artifacts. It also has the potential to decrease the topogram dose.

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.

FAST 3D Align - automatically corrects misalignment of anatomic structures and organs of the patient. It aligns those to fit it to the selected reconstruction plane for a highly automated reconstruction workflow. Additionally it minimizes the black area in the image by automatically adjusting the recon field of view.

FAST 3D Align works in combination with Workstream 4D.

### Brief description

*syngo.via* provides one graphical user interface to prepare and read images from various modalities.

Supported images types are:

- Computed Tomography Images
- Magnetic Resonance Images
- PET Images
- Computed Radiography Images
- Digital X-Ray Images
- X-Ray Angiographic Images
- X-Ray Radio-Fluoroscopic Images
- Ultrasound 2D Images
- Secondary Capture Images
- Encapsulated PDFs

### General reading functions, such as:

- Browser functionality for patient and data access
- Loading and displaying images
- Scrolling through images (e.g. movie mode, fast mouse scrolling, synchronized scrolling)
- Mirror, rotate, invert, windowing, pan/zoom, annotations, distance and angle measurement, pixel lens, ROI / VOI evaluation
- Findings navigator - create, collect and navigate findings
- Correlated cursor
- Series synchronization for pan/zoom, windowing, LUT, scrolling
- Locked navigation of different modality types (e.g. MR / CT)
- User-defined context menu
- Multiple layouts for 2D, 3D, 4D diagnosis
- Snapshot images as secondary capture

### Integrated 3D tools, such as:

- All reformats immediately available: VRT, MIP thin/thick, MPR thin / thick, interactive slice thickness change
- VRT Punch

## Description

- VRT Gallery
- Clip plane and clip box
- Bone removal for fast segmentation and removal of bony structures
- Fusion and registration
- Parallel, curved & radial ranges
- 2D & 3D reference lines, 3D reference point
- Region growing and quantification for interactive segmentation of anatomical structures

### Anatomic intelligence:

- Automatic spine labeling
- Automatic rib labeling for CT thorax scans
- Automatic landmark registration for accurate anatomical alignment of multiple timepoint cases

### Applications for dedicated clinical areas

Beside general 2D/3D/4D capabilities, the following advanced functionalities for dedicated clinical areas are part of *syngo.via*.

These applications are medical products in their own right and necessary country-specific approvals might not yet be available (e.g. 510k, CE Mark).

#### CT Cardiac

Review Marker, Heart Isolation, Movie (Beating Heart), Manual Coronary Tracking, Cardiac Planes, Curved & Cross-Section MPR, Integrated Reporting

#### CT Vascular

Bone Removal, Table Removal, Review Marker, MPR, Thin MIP Ranges, Curved & Cross Sectional MPR, Integrated Reporting

#### PET&CT Oncology

10 CT image series per time point, RECIST/WHO measurement, Basic PET evaluation, Image fusion, Registration, Time point comparison (two time points) 3D overview image, Local registration, Export CSV

#### *syngo*.CT Dual Energy

*syngo*.CT Dual Energy offers a viewer that displays a fused image for initial diagnosis. It includes Optimum Contrast to calculate automatically contrast-optimized images, the possibility to calculate monoenergetic images for a range of 40 - 190 keV as well as *syngo*.CT DE Rho/Z to display electron density and effective atomic number maps. The additional, optional Dual Energy applications utilize *syngo* Dual Energy's two data sets even further: the material-specific difference in attenuation enables an easy classification of the elementary chemical composition of the scanned tissue.

The Rapid Results Technology offers the ability to select the required Dual Energy results in the scan-protocol. After auto-transfer of the image data to the connected *syngo.via* system, all predefined results are calculated automatically. On top of that, an immediate distribution of the results to the connected reading environment can be triggered.

*syngo*.CT Dual Energy works with Dual Energy images from SOMATOM Definition, Definition Flash, SOMATOM Drive & SOMATOM Force and with single source Dual Energy images from SOMATOM Definition Edge, SOMATOM Definition AS family, SOMATOM Perspective, and SOMATOM Scope (Power configuration).

#### MR Reading

- Automatic data loading:  
All data of the current study is automatically loaded in a 2\*2 stack layout - including 3D and 4D data.
- Follow-up support:  
Follow-up layout for comparison between two timepoints.
- Rescan handling:  
Repeated scans are collected in one stack that provides an overview layout to select the best rescan for reading.
- Workflow customization and creation:  
MR Reading allows the user to generate new, customized workflows.  
MR Reading report template included.

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## Description

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### Workflow Automation

- Triggered by PACS or modality:  
Disease-specific workflow mapping can also be done based on image information (modality and/or study description)
- Triggered by RIS:  
*syngo.via* requests the DICOM Modality Worklist (DMWL) from the connected RIS to enable automatic disease-specific workflow mapping and prefetching of examinations from PACS for follow-up reading.

### Disease-specific reporting:

- Disease-specific reports can be derived from different clinical applications (structured reporting).
- Findings collected in the Findings Navigator can be transferred to disease-specific reporting application and can then be stored as DICOM Structured Reports.
- The reports created with *syngo.via* are stored as encapsulated PDF DICOM objects. Additionally the report can be saved in the file system as a PDF file. The stored PDF report can be viewed and printed by the clinical user.

### Further functionality, such as:

- *syngo* Expert-i support for *syngo* MMWP integration
- *syngo.plaza* Integration
- Query/retrieve from DICOM nodes
- Export images and creating patient media
- Filming (DICOM print) or postscript printing functionality

### Prerequisites for all service related issues:

- Availability of a customer administrator that performs dedicated administration and support tasks (e.g. 1st line support, data security, backup,...).
- Minimum permanent broadband internet connection bandwidth for uncompromised service support are 2000 kBit/s downstream and 512 kBit/s upstream. Otherwise, certain support services may not be provided and the agreed remote response time cannot be guaranteed.

#### Specification of minimum broadband internet connection in detail:

- Downstream: 2000 kBit/s for Software update, IT- and Application support (Siemens Remote Service - SRS)
- Upstream: 512 kBit/s for Application support (SRS)
- Upstream: 256 kBit/s for Software update and IT support (SRS)

### Scope of delivery:

- DVDs with *syngo.via* software – VB20  
(software license for *syngo.via* Software)

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### Brief description

The *syngo.via* VB20 application servers can run on VMWare vSphere 6.0 and later. No other hypervisor products are being supported.

### Customer-supplied VMWare Host

In a virtualized deployment there are no fixed hardware specifications. Instead, the customer-supplied hardware for each server should reach at least the level of the model configuration as laid out below.

### VMWare requirements

*syngo.via* can be installed in the following hypervisor environments:

VMware vSphere ESXi 6.0

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## Description

**syngo.via runs on the following guest operating system:**

- Microsoft Windows Server 2012 R2

### Physical hardware requirements

Requirements for physical hardware are strongly dependent on usage patterns, such as number of concurrent users and application mix.

### Scope of Delivery:

- syngo.via Virtualized VMware container
- Microsoft Windows Server 2012 R2 (including license)
- Installation manual

Technical details are subject to change without notice!

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

### Software Modules

- **syngo.CT CaScoring** is a workflow step that quantifies coronary calcifications (mass, volume, Agatston equivalent) and calculates the patient's 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,

- **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.

- 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 enables 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
- **Robust segmentation** of the coronary vessels despite high-grade stenoses
- Comprehensive 3D visualization of the **coronary tree**, including layered display of cardiac and coronary anatomy with individual VRT-presets and Cinematic VRT\*.
- Anatomy Visualizer for 3D layered visualization of multiple anatomical structures
- Automated centerline definition with less editing for **challenging evaluations** on long and/or partially occluded vessels
- Extend centerlines in CPR view
- **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 enables 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



## Description

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 with individual VRT-presets and Cinematic VRT\*.
- Automated centerline definition with less editing for **challenging evaluations** on long and/or partially occluded vessels
- Extend centerlines in CPR view
- **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.

- The local cardiac function is automatically displayed in AHA-conform 17 segment **2D polar maps**
- Automatic Aortic Valve and Mitral Valve plane display
- 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 feature the new **Rapid Results Technology**: You can 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 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

\* Only available, if the applicable license has been purchased:

The **syngo.via Cinematic VRT** provides photorealistic 3D views of CT datasets through highly sophisticated photon simulations. Multiple advanced image processing features like automatic volume rendering technique (VRT) range generation, mask handling, clip plane functionality and others are provided. Together with various view options this enables the user to highlight anatomical details of clinically relevant structures in superior image quality, which holds the potential to be beneficial for patient communication, education, preoperative planning, preparation and diagnosis support.

- Enabling a direct communication between scanner and PACS, utilizing your *syngo.via* workstation
- **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.

- **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

## Description

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, **syngo.CT Neuro Perfusion, available both as guided or automated (Auto Stroke) workflow, visualizes blood perfusion in the brain** and parameter mismatch in acute ischemic stroke. **In combination with Rapid Results technology, it allows automated results creation and archiving.**  
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.

### Additional integrated Dual Energy (DE) functionality:

(For scanners with DE capabilities only. To enable the DE functionality at least one user license of the respective DE application has to be purchased, i.e. *syngo.CT DE Direct Angio* and/or *syngo.CT DE Heart PBV*)

- **syngo.CT Vascular Analysis - DE Direct Angio** allows for easy and precise bone-free, whole-body visualization while preserving critically small vessels such as an accessory right upper-pole renal artery. It also removes hard plaque from major vessels (e.g. for aorta, iliac, and femoral arteries) for true lumen assessment.
  - The automated pre-processing allows for a fast and efficient use of Dual Energy data.
  - Seamless integration of Dual Energy processing into *syngo.CT Vascular Analysis*
  - The result (bone mask) can be switched on or off at any time.
  - Furthermore, the data can also be viewed over the "Series Navigator" that allows a floating window mode for better comparison.
- **DE integration of syngo.CT DE Heart Perfused Blood Volume (PBV)** automatically visualizes the contrast agent concentration or perfused blood volume of Dual Energy CT data of the myocardium for the assessment of myocardial viability or the visualization of infarct location and size within your *syngo.via* reading workflow.

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

### Additional Software Modules

- **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
- Dedicated workflow step for the analysis of dynamic quantitative perfusion
  - Offering 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

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

\*\* Requires *syngo.CT Myocardial perfusion*

## Description

## Description

- **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.

- **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 while making possible a full vascular assessment.

- **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**.

The **CT Oncology Engine** permits access for one user for the following software modules:

**syngo.CT Segmentation** provides advanced features for easy and fast CT oncology reading. It supports the automated segmentation and evaluation of lesions in lung, liver, lymph nodes and other organs. Additional quantifications like Choi criteria and Advanced HU Statistics provide enhanced clinical insights in assessment of potential cancerous lesions.

In detail the application provides:

- Follow up of multiple time-points
- Simultaneous two time point visualization and comparison
- 3D evaluation of lesions measurements
- Automated single click segmentation of lung and liver lesions, lymph nodes, and general lesions
- Easy adaptation of segmentations
- Auto-measurements and display of RECIST 1.0 or 1.1, WHO and volume data
- Calculation and display of Choi criteria (Mean HU and Std. Dev. HU combined with unidimensional measurements)
- Advanced HU Statistics and display of hypodense areas of lesions as potential indicator of therapy response
- PET visualization and basic evaluation CT, PET, and MR data. In case additional image data from MRI or PET are available images can be evaluated in the oncology reading environment. Images will be automatically registered and synchronized with the CT data sets.

**syngo.PET&CT Cross-Timepoint Evaluation** enables physicians to quantify changes in tumor activity and size between time points, typically during evaluation of therapeutic response (e.g. pre- and post-therapy) to assess disease status and treatment efficacy, by comparing quantitative analysis of volume, RECIST, WHO, minimum, average and maximum functional uptake.

## Description

In detail the application provides:

## Description

- Calculation of tumor growth rate, tumor burden, and tumor volume doubling time between different time points
- Trending VRT – color-coded visualization of RECIST size changes (baseline to current) at a glance
- Trending graph - visually trend lesion measurements (e.g. RECIST / volume) over time
- Follow up of multiple time points
- Simultaneous four time point visualization, comparison and synchronous navigation including anatomical, functional and fused data

**syngo.CT Colonography** combines the advantages of 2D and 3D reading strategies. Flexible screen layouts and dual monitor support permit instant switching between the 3D endoscopic view and the corresponding 2D images. Even more, the reading physician can choose to perform a synchronized flight in both prone and supine positions. The registered navigation offers both endoscopic views in a side-by-side display on up to two monitors for an easier differentiation of potential lesions. The Findings Navigator automatically collects and stores all the potential lesions when marked.

In detail the application provides:

- Non-invasive, virtual colonography based on low-dose, high-resolution CT scans
- Synchronized real-time display and analysis of two scans (prone and supine) on up to two monitors
- Support of dual monitor setup
- Synchronized update of endoscopic, axial and global views
- Real-time virtual endoscopic viewing in premium image quality, using high performance rendering techniques
- Fully automated flight path finding
- Automated tagging of the small bowel for removal from examination
- Solid or barium enema-type display of entire colon for easy overview of path
- Overview segment containing flight path and marked pathologic findings
- Semi-automated polyp measurement in 3D endoscopic view
- Visualization of stool tagging
- A panoramic endoscopic view of the colon allows the user to visualize the colon in both directions, enabling visualization of the area behind folds while flying in one direction.
- The Findings Navigator collects, stores, and exports findings of potential lesions.
- Findings can be reviewed from the Findings Navigator and reported easily according to C-RADS standard.

All results are stored in *syngo.via*'s findings navigator.

**Additional integrated Dual Energy (DE) functionality** - only available for SOMATOM Force, Definition Flash, Edge, and AS Dual Energy image datasets:

- **DE support of syngo.CT DE Virtual Unenhanced**  
Dual Energy opens the door to a new world of characterization, visualizing the chemical composition of material. Utilizing the *syngo* Dual Energy option, the CT Scan provides diverse information. *syngo.CT DE Virtual Unenhanced* uses this information to subtract the contrast medium out of enhanced CT images, thus avoiding the non-enhanced examination. The resulting image helps to characterize liver and kidney lesions, enabling a faster and more reliable diagnosis.  
(To enable the DE functionality at least one license of *syngo.CT DE Virtual Unenhanced* has to be purchased)

The **CT Oncology Engine Pro** provides the following software modules:

**syngo.CT Lung CAD** is a computer-aided detection tool designed to assist radiologists in the detection of solitary pulmonary nodules during review of CT examinations of the chest. Results are automatically processed

## Description

immediately after the dataset is sent to *syngo.via* and are ready for reading as soon as the patient case is loaded. The software is an adjunctive tool to alert the radiologist to regions of interest (ROI) that may have been initially overlooked. *syngo.CT Lung CAD* is intended to be used as a second reader tool after the initial read has been completed. All *syngo.CT Lung CAD* findings are presented directly in the Mini-Toolbar, located in the image segment, which facilitates reviewing and reporting of CAD-marked potentially suspicious lesions.

## Description

Alternatively to reviewing Lung CAD results in *syngo.via*, Rapid Results Technology sends preprocessed Lung CAD results to the PACS, thus eliminating manual steps and providing advanced visualization results – ready for reading directly in the PACS.

***syngo.CT Colonography - PEV*** is a fully automated computer assisted second reading tool for automated detection of colon polyps. The software is an adjunctive tool to alert the radiologist to regions of interest (ROI) that may have been initially overlooked. Results are automatically processed immediately after the dataset is sent to *syngo.via* and are ready for reading as soon as the patient case is loaded. All PEV results are presented in the Findings Navigator, where relevant findings can be reviewed and reported easily according to C-RADS standard.

***syngo.CT Colonography - Advanced*** is an option to *syngo.CT Colonography* consisting of the Polyp Lens, the Stool Removal functionality, and Virtual Dissection.

The Polyp Lens provides advanced visualization by color coding the CT values behind the surface of tagged fecal residue in the virtual endoscopic display. This allows the user to distinguish potential polyps from residual stool, lipoma and other structures.

The Stool Removal functionality enables the user to remove residual stool from the visualization in the 2D MPRs and the 3D endoluminal view. The user can quickly toggle between Stool Removal and regular display to assess potential polyps which might be hidden in residual stool cavities.

Virtual Dissection provides an advanced visualization which unfolds the colon so that the mucosal surface is displayed in one plane. For visualization of the colon in its entire length the user can scroll the organ from one end to the other.

*syngo.PET&CT Onco Multi-Timepoint* enables simultaneous visualization of up to 8 time points with specific layouts enabling synchronous scrolling and navigation through all datasets. Especially in cases with many prior examinations combined with multi-modality acquisitions, e.g. PET/CT, this functionality assists in visually keeping track of the complete patient history.

Based on a Dual Energy scan the *syngo.CT Dual Energy Advanced Package* offers the following applications:

- *syngo.CT DE Gout* facilitates a reliable diagnosis of gout by visualizing deposited uric acid crystals in peripheral extremities and automatically color-coding these crystals.
- *syngo.CT DE Direct Angio* offers a highly automated and reproducible vessel segmentation and bone removal even in complicated anatomical regions based on a single scan.
- *syngo.CT DE Virtual Unenhanced* helps to characterize lesions by offering an enhanced and an virtual unenhanced image based on a single scan.
- *syngo.CT DE Calculi Characterization* visualizes and characterizes kidney stones.
- *syngo.CT DE Heart PBV* visualizes the iodine concentration in the myocardium to reveal perfusional defects.
- *syngo.CT DE Brain Hemorrhage* allows to differentiate hemorrhages which are visible in the virtual non-contrast image from iodine uptaking lesions
- *syngo.CT DE Lung Analysis* allows for the color-coding of vessels that are affected by, e.g. pulmonary emboli and therefore show a significantly lower perfusion than non-affected vessels. It also enables a fast evaluation of perfusional defects in the lung parenchyma without an additional non-contrast scan.
- *syngo.CT DE Bone Marrow* allows for the segmentation and visualization (color-coding) of the bone marrow based on a material decomposition into bone marrow and calcium.
- *syngo.CT DE Monoenergetic Plus* allows users to display monoenergetic images for a range of 40-190 keV. For enhanced iodine contrast and metal artifact reduction.
- *syngo.CT DE Harplaque Display* distinguishes calcified plaques from iodine contrast media with color-coding.

The *syngo.via* General Engine provides functionalities for highly efficient reading and reporting of routine to advanced cases and comprises the software modules ALPHA technology and *syngo.via* Advanced Reporting.

## Description

**The ALPHA technology** speeds up the workflow by automating and standardizing reconstructions and improves consistency in image presentation. Anatomical Range Presets powered by ALPHA technology automatically initialize ranges and projections with respect to the underlying anatomy. Practically eliminating the need for manual interaction, this feature supports consistent results, efficient procedures, and diagnostic confidence.

**The syngo.via Advanced Reporting** is a set of features for merging 3D reading with flexible reporting. It enables efficient and structured management and communication of syngo.via results. Findings from different workflows can be combined in a single document. Print layouts can be flexibly selected. Formatted content and images can

## Description

be easily copied from the syngo.via Report as RTF into a diagnostic report or can be sent easily as a pdf-document\* with an HL7 message to an information system (e.g. RIS/HIS). And the syngo.via Report can be distributed to PACS as DICOM SC image. In addition, syngo.via Advanced Reporting provides tools for easy creation and administration of report templates. So you can easily edit and create sections and picklists and quickly create your own report templates or customize default templates for your institution.

Irrespective of modality or clinical field, syngo.via General Engine offers many benefits:

- Faster case preparation as manual interaction usually not needed
- Consistent result quality across users and patients
- Flexible combination of diagnostic results to provide the full picture in one document
- Easily report incidental findings in a structured way
- Having the full diagnostic picture is basis for appropriated treatment selection and patient satisfaction

\* Prerequisite for embedded pdf in HL7 message:

- Licenses for HL7 Patient Information Reconciliation (PIR) AND Report Export for syngo.via
- Implementation respectively: PACS/RIS-Driven Implementation Package, PIR Configuration and Report Export Configuration

syngo.via Cinematic Rendering provides photorealistic 3D views of CT and MR datasets through highly sophisticated photon simulations, such as ambient occlusion, shadows, scattering, and high dynamic range that achieve high resolution views of anatomical details within seconds.

Multiple advanced image processing features like automatic volume rendering technique (VRT) range generation, mask handling, clip plane functionality and others are provided.

Together with various view options this enables the user to highlight anatomical details of clinically relevant structures in superior image quality.

syngo.via Cinematic VRT redefines image renderings for patient communication, education, and publication purposes.

syngo.via Cinematic VRT is available for the following workflows:  
MM Reading, CT Cardiac, CT Cardiac Planning, CT Vascular.

syngo.via Cinematic VRT is not intended for diagnostic reading.

The PACS-Driven Implementation Package includes the following tasks:

- Basic hardware installation and network integration
- Activation of Siemens Remote Services connections
- Import of all syngo.via server license files
- Basic clinical configuration and integration of up to 5 DICOM nodes in syngo.via, such as one modality, one PACS, not more than two syngo MultiModality Workplaces, one printer, or one RIS/ DMWL-source including the request of a DICOM Modality Worklist sent to syngo.via for a networked Siemens scanner. All nodes need to be validated for connection with syngo.via.
- Installation of a software upgrade and a syngo.via client on one formerly installed syngo MMWP, already configured in syngo.via as a DICOM node;

## Description

- Configuration DICOM access to *syngo.via* in *syngo* MMWP;  
Integration of the basic *syngo* MMWP access into one *syngo.via* client workplace by installation and configuration of the software Expert-i on the *syngo.via* client.
- Assistance in setting up frontend integration of *syngo.via* with one PACS workplace (for image call-up directly out of the PACS application user interface). This may require the purchase of software and services from the PACS vendor.
- Integration of *syngo.via* into the IT infrastructure using an existing Active Directory, consultation of the customer's IT administrator for routing/ports.
- Configuration of basic workflow rules: autodelete, archiving, autorouting in *syngo.via*
- Installation of the WebViewer integrated license (applicable only for *syngo.via* SW version VA30 or higher and only in countries where released)

## Description

- Acceptance Test in cooperation with the customer

Context of the implementation tasks:

- The DICOM conformance of the DICOM nodes is prerequisite for connection to *syngo.via*.
- The DICOM nodes to be connected to *syngo.via* must be configured and tested by the customer, for e.g. configuration of the remote DICOM node *syngo.via*, routing rules, procedures. If necessary, the customer orders these services from the DICOM node's vendor.
- The DMWL-source must be able to provide the DMWL to *syngo.via* identical to the DMWL provided to the modalities.
- The configuration of the customer's Local Area Network is performed by the customer.
- Provision of a minimum broadband Internet connection bandwidth with 2000 kBit/s downstream and 256 kBit/s upstream for Siemens Remote Services (SRS) by the customer. If the customer does not provide SRS connectivity, then additional professional services for implementation without SRS support are offered. For service support after implementation the following minimum specification has to be provided: Downstream 2000 kBit/s (for Software update, IT- and Application support); Upstream 512 kBit/s (for Application support); Upstream 256 kBit/s (for Software update and IT support).
- The customer provides information, such as: IP addresses of the server for its network integration and the DICOM nodes identifiers.
- The customer provides the required power supply and the installation location for the server hardware.
- Presence and support of the customer's administrators (clinical and IT administrator) is required during implementation. In preparation for implementation support the customer's administrators have completed the *syngo.via* web-based trainings, which are part of the scope of delivery.
- A list of applications and systems with validated connectivity to *syngo.via* can be requested from your Siemens Sales Representative.
- If a DICOM node or another system has not been validated yet for connection to *syngo.via* by Siemens, then the customer will give his acceptance though there could be a narrowed functionality of the connection.
- Installation of *syngo.via* client software on additional workplaces, or configuration of additional DICOM nodes, or the distribution of the frontend integration to additional PACS workplaces are performed by the customer's administrator or can be ordered from Siemens separately as an option.
- The image call-up implementation and configuration will be upgraded by the customer with future software versions of the calling application (RIS, PACS).

Project coordination is performed by Siemens. Please see the *syngo.via* Data Sheet for system requirements and detailed description of implementation tasks.

If applicable, the hardware installation service includes the following tasks:

- Unwrapping. Consolidation of all packaging material and notification to the customer that the materials are ready for removal.
- Mechanical and electrical connections at site of operation
- Mechanical installation in a common rack (e.g. HP, Fujitsu, IBM, Rittal) not older than three years and connection to a console.
- Connection to the power supply, to Uninterruptable Power Supply (if applicable)

## Description

- Startup of operating system; check status of patches, drivers, service packs and hot fixes, etc.
- Connection and network configuration of the server and the remote service board to the LAN
- Configuration of remote service board (network settings, users configuration) if supported by server
- Test monitor setup and Handover of the readily installed system to the customer.

For the installation the customer provides, as described in the product Data Sheet:

- Access to the location and space for server operation
- Electrical power
- LAN access and LAN configuration
- Configuration of the broadband internet access for Siemens Remote Services
- IT Administrator's coordination and support for the mechanical and IT installation.
- Server and monitor(s) are at the site of operation. The customer's monitors are accompanied by appropriate

## Description

cables.

- The connection of one or two monitors to the Workstation HW (including the Workstation HW Extended) does not include monitor calibration.
- For Workstation HW (including the Workstation HW Extended), depending on the local regulations, the monitor installation described here may allow viewing only.

If applicable, the import of a predefined container is to be done by the customer administrator for the setup of a virtualized system.

### Note:

Certain constraints apply regarding the supported OS versions for the syngo.via clients and the supported versions of MMWPs. For details please check the datasheet of the respective syngo.via version.

## Brief description

### Target Group

This course is mainly designed for clinical administrators, technologists and physicians who act as departmental key user for the syngo.via system.

### Prerequisites

It is assumed that attendees have an understanding of the clinical workflow.

### Content:

System introduction  
Data handling  
Reading 2D /3D  
Configuration and settings  
Clinical applications  
Workflow consulting and adaptation  
Overview on modality applications and workflows

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

Software license enabling system to support Enhanced User and System management, including:

- User authentication to prohibit unauthorized access
- Privileges to define user/role based functionality
- Restricts access to functions and data through privileges and permissions



Description
<ul style="list-style-type: none"><li>- Logs relevant data security information in audit trail</li></ul>