REQUESTING SERVICE: SURGERY
143-RECEIVING
V.A. Medical Center
1970 ROANOKE BLVD
SALEM, VA 24153
PO: 658-B60004

Qty	Item Description
1	**Artis zeego vascular surgery**

Artis zeego for vascular surgery now features PURE(r).

PURE adds smooth interaction to Siemens' smart technologies. It is designed to boost productivity and enhance outcomes for certain clinical applications while increasing image quality and reducing dose.

The multi-axis system offers a flexible working height and unmatched positioning flexibility thanks to the flexible isocenter. The design of the Artis zeego allows imaging even for open surgical procedures without significantly interrupting the laminar air flow from the ceiling. The c-arm adapts to the angulation of the table tops and moves along tables to support a procedure dependent patient positioning.

High-resolution, dynamic flat detector as40 for fully digital imaging chain, with integrated, removable grid and the MEGALIX Cat Plus 3-focus high-performance X-ray tube.

Digital acquisition technology and digital subtraction angiography with up to 7.5 f/s in 1k/12 bit matrix are available.

The complete CARE+CLEAR package offers optimal image quality at the lowest reasonable dose.

Live and reference images are displayed on two 19" flat screens in the exam room. In the control room live images are displayed on a third screen.

| 1 | **Table OR version** |

Floor-mounted swivelling patient table with telescopic foot, floating and tiltable tabletop (in two axes); motor-driven stepping for digital peripheral angiography, and power-assisted table control module.

Includes carbon fiber tabletop in wide, straight design with special foam mattress (4 cm thick) and 4-pedal wired footswitch.

Note: It is mandatory to provide UPS back up with this table in order to comply with IEC 60601-2-43 CL. 201.15.101. Reason: In the event of power failure a neutral table position suitable for CPR must be reachable within 15 seconds. Please include a suitable UPS from Siemens as required or make sure any existing / planned UPS provision for your installation site will satisfy the requirement

| 1 | **PERISTEPPING / PERIVISION** |

Motorized stepping for real-time bolus chasing.

Gantry stepping with zeego and ceiling mounted systems, table stepping with floor mounted and biplane systems.

Qty	Item Description
	Peripheral digital angiography with stepping and online subtraction display.
1	**Laser crosshairs**
	Laser crosshairs integrated in the cover of the flat detector and tableside operation for easier, quicker and dose-saving positioning of the patient.
1	**DYNAVISION DSA/DR**
	Native or subtracted digital rotational angiography with angle triggering.
1	**4P wireless footswitch inst. of cbl**
	Wireless footswitch connection
	Note: Wireless replaces the wired connection.
1	**syngo EVAR-3D Guidance Engine as40**
	A workstation for reconstruction, post-processing and handling of 3D information including specific applications for endovascular treatment of aortic aneurysms. The package includes the following functionalities: 3D high-contrast and CT-like soft-tissue imaging (syngo DynaCT), 3D roadmap for dynamic overlay of planning data and 3D volumes on live fluoroscopy, Fusion functionality for integration of pre-interventional 3D datasets also from other modalities into the Angio-room, Marking of points or lines on the 3D geometry or MPRs and overlay of these markings on live fluoroscopy, in-room control for table-side operation of advanced applications, Expert-i functionality for remote operation of the XWP. Only for PURE systems, the package also includes: 3D Wizard for expert step-by-step guidance in 3D acquisition, Parallel patient processing capabilities, Fusion of pre-interventional 3D datasets based on 2 projections (2D/3D Fusion), Marking of points or lines on the 3D geometry or MPRs and overlay of these markings on live fluoroscopy.
1	**syngo DynaCT 360**
	syngo DynaCT 360° Large Volume in conjunction with an Artis zeego system allows the acquisition of a large 3D volume for the DynaCT reconstruction in only six seconds. This results in better image quality, less motion artifacts and the possibility of saving contrast medium.
1	**syngo Dyna3D HighSpeed**
	In conjunction with Artis zeego, as the fastest 3D protocol on the market syngo Dyna3D HighSpeed enables acquisitions to be generated in less than 3 seconds. As a result, moving organs such as the lungs can be displayed with a lot fewer artifacts.
1	**syngo NeedleGuidance**
	A software module for planning and control of needle procedures.
	The application enables the planning of one or multiple needle paths based on intraoperative syngo DynaCT images, or a preoperative 3D volume of a CT, PET/CT or MR system, in combination with Fusion functionality. Optimal progression views for easy control during needle insertion are calculated and suggested by the system and the planned needle path is overlaid on the live 2D image for easy guidance. Interventions such as vertebroplasties, kyphoplasties, pedicle screwing, biopsies, drainages and ablations can be performed on the angiography system with greater confidence.
1	**syngo Angio Package**
	Software package consisting of DSA Angio Viewer as well as High-Speed Review for real-time display of native and subtracted angiography images.
1	**syngo iFlow**
	syngo iFlow allows the visualization and analysis of the flow and perfusion in the examined organs This information is based on the time-to-peak calculations from a routine DSA acquisition. The calculations can be shown as a color-map of the whole organ. It is also possible to analyze the flow and perfusion of regions of interest (ROIs) defined by the user and this information can be displayed with graphics, which might further help in understanding the flow dynamics of these ROIs.
1	**DICOM Attribute Converter**
	Individual solution via software-/XML-files, to solve compatibility problems.

Qty	Item Description

1   **OEM recording system interface**
Cable connection to an OEM measurement system.

Holder for the ECG interface when using an OEM measurement system in the examination room.

Recording, storage, and display of an ECG lead. Displayed together with the image information on a single monitor.

1   **Vascular analysis**
Vessel analysis with determination of degree of stenosis, distance measurement and calibration.

1   **Fluoro Loop**
Storage and review of dynamic fluoroscopic sequences (Fluoro Loop). This saves an additional acquisition and reduces dose. The maximum storable fluoroscopic time depends on the selected pulse rate, e.g. 34 s at 30 p/s, 68 s at 15 p/s.

1   **Automap**
Automatic stand positioning depending on the selected reference image and automatic reference image selection depending on the stand positioning.

1   **DICOM RIS-Modality Worklist**
Import of patient/examination data from an external RIS/HIS patient management system with DICOM MWL (Modality Worklist).

1   **DICOM MPPS**
Feedback of examination status via DICOM MPPS (Modality Performed Procedure Step) to an external RIS/HIS patient management system.
Data such as the dose-area product can be transferred to the RIS.

1   **DICOM Print**
Provision of DICOM Print service for connection to a laser camera or a network printer (postscript-capable).

1   **Lower body radiation protection**
This radiation shield protects the user from scattered radiation when standing at the table side. It can be attached to the accessory rails either on the right or on the left side of the patient positioning table.
It provides the user an additional accessory rail.
It includes a basic unit
(71.5 cm x 75 cm/ 28.2" x 29.5" (l x w); 7.7 kg/ 16.98 lb),
one lower body radiation protection pivot swivel element
(77 cm x 48 cm/ 30.3" x 18.9" (l x w); 3.8 kg/ 8.4 lb)
and three clip-on units
(57 cm/ 22.4" x 33 cm/ 12.99" (l x h), 2.2 kg/ 4.85 lb;
27 cm/ 10.6" x 33cm/12.99", 0.9 kg/ 1.98 lb and
27 cm/ 10.6" x 25cm/9.8", 1 kg/ 2.2 lb)
with a lead of 0.5 mm/ 0.02" Pb.
The maximum weight of the accessory rails is 40 kg (88.2 lb).

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **1st Large Display w/o holder**
Preparation for a primary large color flat screen display installed on a third-party display holder for the examination room.

Note:
For safety reasons, third-party display holders in combination with Large Display must meet

Qty	Item Description
	the following criteria:

To prevent injuring the patient when positioning the display holder above the table, it has to be possible to manually move the third-party display holder vertically with a force of up to 85 N.

In the event that the angiography system comes into contact with the third-party display holder, it must be possible to push away the holder in a horizontal direction with a force less than 50 N. Otherwise, there is a risk of crush injury to persons or material damage.

Please note that components supplied by Siemens (displays, cables) can be installed on an existing third-party display holder only by the manufacturer of that holder.

Note: If a Large Display is selected, the Artis basic configuration includes a connection kit for the large display instead of the displays for the examination room.

The type of large display can be chosen with a separate position.

1   **Large Display video controller 18**

Large Display Video Controller 18 is the middle of three different video controller sizes. A maximum of 18 video signals can be connected and displayed simultaneously on the Large Display.

The Large Display video controller 18 receives various internal and external video signals for presentation to scale on the Large Display.

Up to 18 external and internal video sources can be connected (max. 14 DVI-D and 4 analog (VGA) channels).

1   **2nd Large Display w/o holder**

Preparation for secondary large color flat screen display including cables, to be installed on a third-party display holder for the examination room.

Note:

For safety reasons, third-party display holders in combination with Large Display must meet the following criteria:

To prevent injuring the patient when positioning the display holder above the table, it has to be possible to manually move the third-party display holder vertically with a force of up to 85 N.

In the event that the angiography system comes into contact with the third-party display holder, it must be possible to push away the holder in a horizontal direction with a force less than 50 N. Otherwise, there is a risk of crush injury to persons or material damage.

Please note that components supplied by Siemens (displays, cables) can be installed on an existing third-party display holder only by the manufacturer of the holder.

Note: If a Large Display is selected, the Artis basic configuration includes a connection kit for the large display instead of the displays for the examination room.

1   **Sec. operation in the control room**

Interface for connecting the additional system control from the control room.

Rail profile for hanging control modules (e.g. the table module) in the control room.

Safety button for switching off all system functions from the control room.

1   **Secondary Hand Switch Ctrl (C Room)**

Additional hand switch for radiation release and additional control functions.

1   **Injector conn. in the control room**

Interface for controlling the contrast medium injector in the control room.

Qty	Item Description

Injectors can be offered by Siemens Healthcare Accessory Solutions

1   **Head-end holder**

This mounting frame is used to hold Siemens standard accessories such as shoulder supports and handgrips with support.

It includes a holder with accessory rails (17 cm x 1 cm x 2.5 cm/ 6.7'' x 0.4'' x 0.98''/ l x w x h) on both sides

Weigth: 1.75kg/ 3.9 lb

Maximum Weigth: 40 kg/ 88.2 lb

It can only be mounted on the narrow tabletop.

1   **Infusion bottle holder**

This infusion bottle holder can be mounted at the accessory rail of the patient table. It holds up to 4 infusion bottles.

It includes an infusion bottle holder made of stainless steel with 4 retaining rings.

Length: 84 - 138 cm (21.6'' - 54.3'')

Weight: 1.3kg (2.87 lb)

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **Intercom - Comfort**

Intercom system for communication between examination room and control room.

It includes

- a microphone with a control box for the control room

- a microphone with an adaptive acoustic filter for background noise suppression for the examination room

- a footswitch for conversation selection for the examination room

The microphone of the examination room is installed on the ceiling.

1   **Arm rest**

Arm support used for the arm approach. Length: 1 m (39.4''). Slides underneath the patient mattress and is held in position by the patient's weight.

Made of radiolucent carbon fiber material which is easy to clean. It includes two additional support pads of two different hights (4 and 7 cm).

Length pad: 60 cm/ 23.62''

Width: 9 to 20 cm/ 3.54'' to 7.87''

Maximum weight: 5 kg. (11.02 lb)

Weight (with pads): 2.1 kg/ 4.63 lb.

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **Arm holder (pair)**

The patient's arms can be comfortably placed along the body using these two arm holders. They slide underneath the patient mattress and is held in position by the patient's weight.

It includes two pairs of arm holders of different length (540/690 mm - 21.2''/27.2'') and height (85/115 mm - 3.35''/4.53''), suitable both for thick and thin patient mattresses.

Weight small arm holder: each 0.65 kg/ 1.43lb

Weight large arm holder: each 0.95 kg/ 2.09 lb.

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **OR arm rest (w/support)**

The item is used for stable arm positioning in the OR area.

It is height-adjustable and moves together with the table.

It includes one OR arm rest.

The maximum weight per side is 20 kg (44.1 lb).

Length: 84 cm/ 33".

Width: 37 cm/ 14.6"

Qty	Item Description

Weight: 15.5 kg/ 34.2 lb.

Height adjustment: 72 to 112 cm; 28.3" to 44.1"

Swivel range: ± 45 degrees

Depending on the tabletop used and the type of examination one of the two accessory rail modules

(Acc.rail module, narrow tabletop or Acc.rail module, wide tabletop) must be available.

1   **Tabletop extension**

Provides additional arm support for large / obese patients. Slides underneath the patient mattress and is held in place by the patient's weight. Patient arms can be fixed with Velcro straps.

The kit includes a board made of radiolucent carbon fiber material, four arm pads (two pairs with two different heights) made of washable plastic foam material and Velcro straps of two different lengths.

The maximum weight per side is 20 kg (44.09 lb).

Length: 45 cm/ 17.7''

Width: 85 cm/ 33.5"

Weight: 2.3 kg/ 5.07 lb

Dimension thick cushion: 10 cm x 34,5 cm x 7 cm/ 3.9'' x 13.58'' x 2.76'' (l x w x h)

Weight thick cushion: 0.25 kg/ 0.55 lb

Dimension thin cushion: 10 cm x 34,5 cm x 4 cm/ 3.9'' x 13.58'' x 1.57'' (l x w x h)

Weight thin cushion: 0.15 kg/ 0.33 lb.

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **Body strap set**

Can be used to secure patient to the patient table and to compress patient anatomy. It consists of two belts with Velcro straps (l x w: 185 cm x 10 cm/ 72.8'' x 3.94'').

Product may not be used in conjunction with a TRUMPF or MAQUET surgery table.

1   **VA kit Artis zee systems**

Second set of system documentation (operator manual, etc.)

1   **Bendable anesthesia screen**

This flexible anesthesia screen holder serves as a holder for sterile drape (anesthesia screen) placed between the head and abdomen of the patient.

It includes one anesthetic arm and brackets for mounting it onto the accessory rails.

Weight: 1 kg/ 2.21 lb, With holders: 1.75 kg/ 3.86 lb.

Length: 143 cm/ 56.4''.

It requires the presence of accessory rail modules to which it will be mounted.

1   **Head module**

This is an attachable module with accessory rails for mounting control modules at the head-end of the tabletop.

It includes a carbon fiber module (lxw: 62 cm/ 24.4'' x 39.5 cm/ 15.6'') with accessory rails attached to the right (31 cm/ 12.2''),

left (31 cm/ 12.2'') and head-end (45 cm/17.7'') slides over the outer edges of the tabletop.

Weight: 5.8 kg/ 12.8lb

Maximum weight: 40 kg/ 88.19 lb

Only for use with wide tabletops.

It may not be used in conjunction with head-end lower body radiation shield.

1   **Acc. rail module, wide tabletop**

This is an attachable module with accessory rails for placing the control modules near the patient's abdomen.

It includes a carbon fiber module with accessory rails (45 cm /17.7'') attached to the right and left slides over the outer edges of the patient positioning tabletop.

Length: 48 cm (18.9 '')

Width (without accessory rails): 47.5 cm (18.7'') 55 cm/ 21.65"

Qty	Item Description

Width (with accessory rails): 54.5 cm (21.5'') 62 cm/ 24.4"
Length: 62 cm (24.4'')
Weight: 5.9 kg (13 lb)
Maximum weight: 40 kg (88.19 lb).

Only for use with wide tabletops.

1 **Initial onsite training 32 hrs**

Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist. Uptime Clinical Education phone support is provided during the warranty period for specified posted hours. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1 **Follow-up training 32 hrs**

Up to (32) hours of follow-up on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. 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.

1 **Follow-up training 12 hrs**

Up to (12) hours of follow-up on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. 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.

1 **Additional onsite training 32 hours**

Up to (32) hours of on-site clinical education training, scheduled consecutively (Monday - Friday) during standard business hours for a maximum of (4) imaging professionals. Training will cover agenda items on the ASRT approved checklist if applicable. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1 **GOVT Training Class (T & L not included)**

Tuition for (1) government attendee to attend a classroom course of choice at one of the Siemens training centers. This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

1 **Mark 7 Arterion, Table Mount Injector**

The Arterion Mark 7 Table contrast medium injector allows for the remote installation of the system power supply and installation of the injector head onto a table bracket.

The injector system includes:
Power supply and injector head with corresponding cabling
An adjustable height table bracket for the injector head
A desk mounted user control console with large touch screen

Functions
Pressure limitation:
for 150 ml syringes 689 to 8273 kPa, corresponds to 100 to 1200 psi. .

Flow rates for 150 ml syringes:
0.1 to 45 ml/s in increments of 0.1 ml/s

Qty	Item Description
	0.1 to 59.9 ml/min in increments of 0.1 ml/min
	rise/fall: 0 to 9.9 s in increments of 0.1 seconds

Release delay for injection or radiation:
0 to 99.9 s in increments of 0.1 s.

Adjustable volume for 150 ml syringes:
1 ml to the max. syringe capacity in increments of 1 ml.

Fill rate:
Variable syringe filling speed 1-20ml/s.

Injection protocols:
Up to 40 injection protocols possible.

Parameters currently displayed on the touch screen display and on the head display:
Injection speed
Injection volume
Remaining volume
Injection duration
Applied pressure

Contrast medium heating:
Nominal 35°C (95°F)+-5°C (9°F)

Injection data memory
Up to 50 injection data items stored

Included in the scope of delivery
Injector standard configuration 150 ml
SIEMENS interface cable
Operator Manual
Service manual

1	**Pedestal for Injector**
1	**Eaton Powerware 9390 160 kVA UPS**

Includes UPS, battery, maintenance bypass panel, and one year on-site parts and labor coverage (24x7) by Eaton Powerware. Complete system backup without interruption. One UPS per lab.

Not approved for sites requiring OSHPD certification. Please contact XPAS Inside Sales for configuration of an OSHPD certified configuration.

1	**Standard Rigging zeego**
1	**Offset Initial Training 32 hrs**

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

This educational offering must be completed by the later of (12) months from purchase of training or if applicable, completion of installation. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

Additional Rigging/Out of Scope Inbound long push and off hours

Detailed Technical Specifications

Description

System description:

The Artis zeego – A PURE® system with single plane is an easy-to-use X-ray angiography system for digital acquisitions and is designed to meet the requirements of state-of-the-art angiography and interventional procedures, with a focus on vascular surgery.

Floor-mounted robotic assisted C-arm:

- New, compact, multiaxial C-arm system with adjustable isocenter height for the highest possible level of examination comfort, with flexible park positions for optimal patient access.
- Stand can travel in RAO/LAO, Cran/Caud, x-, y-, and z-axes
- 5 programmed working positions and additional 50 user-defined working positions as well as 3 direct positions can be stored and recalled from table side.
- Intelligent, computer-aided collision monitoring ICP (Intelligent Collision Protection).
- Stand rotation ±90° minimum
- Double oblique projections:
    - LAO/RAO ±200° (maximum angulations vary depending on working position)
    - cranial +45° up -65° caudal (maximum angulations vary depending on working position).
- Variable C-arm positioning speeds up to 25°/s.
- Variable longitudinal speed up to 15 cm/s, maximum 27 cm/s (option Perivision required)
- Variable focus-to-detector distance between 90 cm and 120 cm
- Isocenter/floor distance adjustable between 105.4 cm and 147 cm
- Focus-isocenter distance 78.5 cm
- Rotational angiography (used to generate 3D datasets, optional) can be performed at head end, left side and right side for pre-calibrated starting positions

Application-specific accessories

- Infusion bottle holder
- Unilateral armrest: Carbon fiber armrest for cardiology and arm angiography to slide underneath the positioning mattress.
- Arm holder (1 pair): Two arm holders for comfortable lateral arm positioning along the patient's body.

Note: This accessory set is only delivered in combination with the OR version Siemens table.

Operating modes

Fluoroscopy

- Digital pulsed fluoroscopy with pulse frequencies of 7.5 p/s, 10 p/s, 15 p/s, and 30 p/s in 1k/12 bit matrix. Pulse rates of 0.5 - 4 p/s are also possible with CAREvision.
- Overlay fade: On-line overlay of the reference image onto the active fluoroscopy. This improves efficiency and safety during interventional procedures because additional information which is clinically necessary can be displayed directly in the live fluoroscopy image.

Digital acquisition technology
Digital acquisition technology with frame rates of 0.5 to 7.5 f/s in 1k/12 bit matrix and digital real-time filtration.

Description

Single image and serial acquisitions with time-controlled and manually variable frame rate.
The 1k image matrix with a bit depth of 12 bits allows an excellent image contrast by using 4,096 shades of grey. Thus, the image quality meets highest expectations in angiography and fulfills all prerequisites for precise diagnostics and safe interventions.

Digital Subtraction Angiography:
Digital Subtraction Angiography with frame rates of 0.5 to 7.5 f/s, including pixel shift, remask, roadmap, peak opacification for iodine contrast (MaxOpac), and CO_2 contrast (MinOpac); adding of the anatomical background (landmark) from 0 to 100%.
Includes the "Advanced Roadmap" additional function which offers the following clinical benefits:
- DSA image can be selected as a mask for Roadmap
- Zoom can be changed during Roadmap
- Catheter and vascular contrast can be changed separately

Unexpected patient movements in DSA acquisitions can be corrected easily with Auto Pixelshift. This saves time for the user and improves image quality.

CLEARmap
Special 2D Roadmap operating mode creating a vessel map from a DSA-scene using Maximum Opacification technique. As an additional operating mode, you can also decide to pick one frame out of a DSA run (i.e. for venous access in Roadmap).
This provides improved image quality compared to conventional Roadmap, and reduces x-ray dose and contrast media.

CLEARmatch
Automatic/Online pixel shift processing for most accurate subtracted image display during Roadmap and DSA based on real time movement detection and compensation.
Six degrees of freedom – vertical, horizontal, rotational, zoom and shearing movement (left and right) - allowing highest possible efficacy. In order to show the most recent information in raw format, the pixel shift operation is applied to the mask image. This optimized way of pixel shifting ensures a perfect match of Roadmap image and native fluoro image, being shown at the Assist monitor.

CARE package

ALARA principle
Siemens follows the ALARA principle: "As Low as Reasonably Achievable"; the CARE package (Combined Applications to Reduce Exposure) was developed based on this research and development principle to protect the examiner and the patient.

Dose saving
- CAREfilter: Intelligent control software that minimizes X-ray dose. During fluoroscopy and acquisition, special copper prefilters are automatically inserted into the X-ray beam depending on current X-ray transparency, which is calculated continuously. This is necessary to ensure that the optimal prefilter value is always active. This automation makes work easier for the user because the optimal filter setting need not be adjusted manually for each case.
  The adaptive Cu prefiltration has five steps (0.1, 0.2, 0.3, 0.6, 0.9 mm) and is used to lower the reference air kerma and improve radiation quality by reducing the low-energy X-ray radiation.
- CAREvision with as20 detector: Pulsed fluoroscopy with additional, reduced pulse rates of 0.5, 1, 2, 3, 4, 6 p/s. Adaptation of pulse rate to the current application requirements for significant reduction of radiation exposure, especially during interventional procedures.
- CAREvision with as40 / as30 detector: Pulsed fluoroscopy with additional, reduced pulse rates of 0.5, 1, 2, 3, 4 p/s. Adaptation of pulse rate to the current application requirements for significant reduction of radiation exposure, especially during interventional procedures.
- CAREprofile: Radiation-free positioning of the primary and semi-transparent diaphragms by means of graphic display in the LIH (Last Image Hold). Collimator shutters and semi-transparent filters can be adjusted as a graphical overlay on the last-image-hold without any need for fluoroscopy or radiation.
- CAREposition: Radiation-free object repositioning by means of graphic display of the X-ray center beam and image edges in the LIH image. With CAREposition it is possible to reposition the object under visual control

Description

without radiation.
- In case of table movements the current position of the central beam and the image edges are superimposed on the LIH image as orientation points.
- Low dose acquisition: enables dose savings of up to 67 % during the examination. The Low Dose Acquisition protocol can be released with a separate pedal on the footswitch.

Dose monitoring
- CAREwatch: Display of the measured dose-area product and the calculated patient reference air kerma on the flat-screen display. Electronics unit with DIAMENTOR measurement chamber integrated in the collimator housing for dose acquisition.
Configurable screens on the data display and imaging system monitor:
During fluoroscopy: Reference air kerma rate.
During fluoroscopy interval: Accumulated reference air kerma or dose-area product, or percentage of the reference air kerma limit (total from fluoroscopy and acquisition).
- CAREguard: Monitoring the reference air kerma. If the accumulated reference air kerma exceeds one of the three configurable limits, a warning appears on the live display and tableside on the touchscreen control. This allows ideal monitoring of the accumulated reference air kerma during the examination.
- CAREmonitor: Special model-based monitoring of the measured skin entry dose, taking into account the geometric conditions of the system (actual device angulation, table position, patient weight, patient size). It then continually displays whether the skin entry dose applied to a specific region of the patient's body exceeds a specific configurable upper limit. CAREmonitor continually calculates and displays the actual accumulated skin entry dose as a portion of this upper limit. This helps the user to detect a potential patient hazard at an early stage. The patient is therefore better protected against the damaging effects of radiation.

Dose documentation
- CAREreport: Dose information as part of the DICOM Structured Report. After each examination, the information is available in DICOM format and can be sent to a DICOM archive together with the image data, for example. Saving dose information in DICOM format also enables flexible analysis and further processing via a DICOM-capable analysis software/database.
- CARE Analytics: Standalone PC program for analyzing doses in angiography, CT, and radiological examinations. The data can be exported to statistics programs such as Microsoft Office Excel and SPSS for further analysis. CARE Analytics is available for download from the Siemens Intranet.

CLEAR package
The CLEAR package enables optimized image quality through real-time processing of the image data without increasing the radiation dose.
- CLEARcontrol: The new histogram analysis provides a more homogeneous image impression by harmonizing over- and underexposed areas of the image. This is done fully automatically, thus eliminating any further manual user corrections through windowing.
- CLEARview: Dose-dependent filtering of the image data efficiently suppresses image noise, enabling clear, sharp images, even for low-dose acquisitions.
- CLEARvessel: Every pixel is analyzed in real time, and vessel edges are shown in high contrast without adding noise to the image.
- CLEARmotion: Fine moving structures, such as small vessels and guidewires, are detected in the image and motion artifacts are suppressed efficiently. The visibility of small moving vessels and guidewires is improved significantly during fluoroscopy.

In addition there is Dynamic Density Optimization (DDO) for on-line harmonization of native series and single images.

Image generation

X-ray generator
Microprocessor-controlled high-frequency X-ray generator with automatic dose rate control.
- Power output: 100 kW at 100 kV (IEC 60601-2-7 and IEC 60601-2-54), nominal power max. 80 kW (100 kV, 800 mA, 0.1 s) with MEGALIX Cat plus tube and the newest flat emitter technology.
- SID tracking: Automatic tube current adaptation to focus-to-detector distance.
- CAREmatic: Automatic X-ray control system for fully automatic calculation and optimization of exposure data based on fluoroscopic data.
- Patient transparency monitoring.

Description

- Tube load monitoring with indication in the live display.

The optimal X-ray parameters depend on the transparency of the patient at the current angulation, measured during fluoroscopy. These parameters are continuously calculated and updated. Test shots are no longer required. This ensures superior image quality and minimum radiation exposure for user and patient with every exposure release.

Tube assembly MEGALIX Cat Plus 125/20/40/80
3-focus high-performance X-ray tube with flat emitter technology, metal center tube in lubricated spiral groove bearing technology for permanent, noise-free rotation.

- Maximum tube voltage 125 kV
- Focus: 0.3/0.6 x 0.6*/1.0 (17/38/80 kW)
- Anode angle 12°
- Maximum anode heat storage capacity: 3,375,000 HU
- Maximum tube current for fluoroscopy: 250 mA

* Flat emitter focus for improved image quality

High tube power provides brilliant image quality even with heavier patients. In addition there is no need for X-ray pauses even during lengthy cases. The X-ray tube is completely silent, which is an additional benefit for patient and user.

Flat detector as40
The digital high-resolution dynamic flat detector with integrated removable grid is especially designed to fulfill the requirements of angiographic and interventional applications.

The as40 flat detector offers additional operating functions directly on the detector housing, such as angulation, FD rotation (cranial/caudal, RAO/LAO), and change of the focus-detector distance.

154 µm pixel arrays provide highest spatial resolution (3.25 LP/mm) and excellent contrast. Fluoroscopy as well as image acquisition are always done in 14-bit gray scale resolution, allowing excellent detail visibility. Acquisition frame rates of up to 30 f/s are possible.

Usable input formats:
- Overview mode: 30 cm x 38 cm
- Zoom 1: 30 cm x 30 cm; diagonal 42 cm
- Zoom 2: 22 cm x 22 cm, diagonal 32 cm
- Zoom 3: 16 cm x 16 cm; diagonal 22 cm
- Zoom 4: 11 cm x 11 cm, diagonal 16 cm
- Zoom 5: 8 cm x 8 cm; diagonal 11 cm

The very compact design with integrated collision protection provides a maximum C-arm angulation range for excellent patient access.

The flat detector is mounted on a motorized rotating turntable at the C-arm. It can be rotated by 90°, so that it can be adjusted to landscape format or portrait format. Any angle in between can be adjusted. Motorized adjustment of the detector-patient distance.

Digital data transfer from the detector to the imaging system is done via a high-speed Gigalink fiber-optic cable.

Removable grid:
The grid can easily be removed, saving the user time in examinations not requiring a grid. For example in pediatrics, where dose saving is especially important.

Angio collimator
Compact multileaf collimator with rectangular blade, wedge-shaped finger filters for DSA and cardiological

Description

applications and graduated filter.

- Independent rotation and shift of filter blades
- Automatic synchronous rotation of detector and collimator unit to compensate image rotation at the different examination positions of the support stand.
- Rotation also possible via table side control enabling upright images of objects or body parts not aligned with the table e.g. arms.
- Manual rotation of the detector and collimator unit using the control right on the detector housing.
- Five-step adaptive Cu pre-filtration (CAREfilter) to reduce the equivalent skin dose and improve radiation quality through dose saving for the soft radiation parts. Filter steps: 0.1; 0.2; 0.3; 0.6; 0.9 mm Cu.
- Electronics unit with DIAMENTOR dose chamber integrated in the collimator housing, for acquisition of the dose-area product and the calculated patient entry air Kerma at the patient entrance reference point (CAREwatch).

StraightView
The flat detector and the multileaf collimator are installed on a motorized rotating turntable on the C-arm. They automatically line up with the table swivel, thus ensuring upright images of objects which are in line with the table. The flat detector and multileaf collimator can also be rotated together at any angle relative to the table, enabling upright presentation and collimation of objects which are not in line with the table.

Image processing

- Image display as positive and negative, windowing, contrast and brightness control, electronic display shutter, image shift (roaming), vertical and horizontal image inversion, magnifying glass, and zoom functions
- Storing of single images as reference images for acquisition and fluoroscopy
- Quantification: angle and length measurements, automatic and manual calibration
- Text functions: user-definable image annotation, free annotation or by means of text components, comments line for the image, R/L display
- Fast and direct access to all series, single images, reference images, and photo file images via MULTIMAP. Access possible both in the examination and in the control room for displaying or post-processing images

Imaging system

Dual architecture
In order to provide highest level system availability, the imaging system consists of two independent computer systems that manage central tasks such as real-time image processing during fluoroscopy or acquisition as well as post-processing and networking functionality separately from one another. This ensures the best possible system performance and availability.

Image storage capacity
25,000 images in 1k/12 bit image matrix. This can be optionally extended to 50,000 / 100,000 images.

Image export and networking

DVD/CD burner
DVD drive for automatic digital image storage in the background on DVD-/CD-ROM for off-line data exchange in DICOM format.

Networking
- Network interface (1000 BaseT) with the following integrated DICOM services:
- DICOM Send: Sending of images into the DICOM network: The DICOM Send function enables fully automatic transfer of generated image data to a DICOM archive and/or a DICOM workstation. The user can perform his examinations without interruption, while the system is fully automatically transferring the images to the archive scene by scene. This is a background process, and thus does not interfere with the ongoing fluoroscopy or acquisition.
- DICOM Storage Commitment (StC): Feedback from the image archive. The DICOM StC function automatically gives feedback on whether the generated image data were successfully transferred. This provides the necessary certainty to the user before deleting the acquired images locally in the imaging

Description

system.

- DICOM-Query/Retrieve: Retrieval of archived images from a digital archive or from a workstation: Already archived image data from a previous examination can be fully retrieved and is then available for review and processing. The user can request CT or MR system images from the archive and display the image in the examination room. There is no need for a separate workstation.
- DICOM Structured Report: All the quantification results obtained on the system as well as all dose information on the individual radiation releases can be saved in DICOM SR (enhanced SR) format and transferred to a DICOM network.

Note concerning DICOM interface(s)
The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).
Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.
A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient. With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

Display and display suspension

Displays in the exam room
Live and assist displays are flat-screen displays in monochrome TFT technology with high luminance and extended viewing angle.

- Screen size: 19" (48 cm)
- Resolution: 1,280 x 1,024 (pixels)
- Excellent brightness for the entire service life: 400 cd/m² at a contrast ratio of 600:1
- Flicker-free and distortion-free image display
- Ambient light sensor for optimum adaptation of the image display to the room brightness

Reference images are shown on the assist display.
Data for device and table position, dose, and system messages are displayed in the examination and control room on both the live and the assist display.

Displays in the control room
19" high-contrast monochrome display for live image display in the control room is included as a desktop version with a black frame.

Display suspension
Ceiling-mounted, swiveling, rotating, and height-adjustable display suspension system with longitudinal travel. It features two 19" high-contrast monochrome displays for live and reference image display in the examination room. The double-articulated arm of the display suspension system provides greater flexibility and a larger display positioning range.

Operation

syngo
The intuitive syngo operating elements allow for managing the whole process from preparation of the patient to image post processing in a safe, reliable, and time efficient way.

Footswitch
A 4-pedal wired footswitch to release fluoroscopy, and exposure, as well as a configurable additional function is included as standard.

In the examination room
For an ideal workflow, full operation capabilities for the system can be accessed directly at the patient table (Siemens table). These include complete system operation through modular control elements for controlling C-arm movements, the patient table, and the multileaf collimator.

Description

syngo-based touchscreen with multi-functional joystick for operation of the imaging system, including post-processing and quantification as well as selection of the organ programs. The touchscreen is specifically configurable to individual clinical requirements.

This means that the user can operate the system on their own without having to leave the examination room if this is deemed necessary by the situation.

In the control room
Standard Siemens syngo control via country-specific keyboard and mouse for all imaging system functions such as image post-processing, storing, and configuring of organ programs.

Customer Care – the customer care solution from Siemens Healthcare
From the moment you purchase your Siemens system you will benefit from many services that are offered by "Customer Care"*. These include:

- Initial application training
- Interactive e-learning for various applications
- Free customer magazines
- Arrangements for clinical training via a global network
- Free trial licenses

You will find information on our e-learning program and further details on general "Customer Care" services on the Internet.

* The availability of "Customer Care" services may be restricted for some systems.

User Training
Siemens recognizes the significant investment you are making in purchasing a new imaging system and are determined that you are able to realize the full capability of this new system. Siemens clinical applications training ensures you have every opportunity to fully utilize your new system.

Content of user training: Handover Training and Follow-up Training

- Introduction to the functions, options, and handling of the Angiography system
- Instruction on the use of the Angiography system together with modern, highly-developed applications

Delivery & duration of the user training varies and may be country specific so for additional information please contact your local Siemens representative.

Floor-mounted patient table designed for angiographic examinations and interventions:

- Direct patient access from all sides, both through the swiveling table and large tabletop cantilever.
- ±15° head up/head down positioning.
- ±15° lateral tilting range.
- Iso-tilt functionality for maintaining the projection during table tilt along the patient axis.
- Motorized, power-dependent table movement in longitudinal direction when the table is tilted (power-assisted control).
- Electromechanical release of table swivel at the touch of a table button.
- Telescopic foot with motor-driven height adjustment.
- Max. patient weight 200 kg. It is possible to attach accessories of up to 40 kg.

Tabletop made of carbon fiber in wide, straight design for universal use, is straight up to the head area. The special foam mattress (including cover) is tailored specifically to the tabletop for maximum positioning comfort. The visco-elastic comfort mattress for the wide and straight tabletop reacts to temperature and has the special property of adapting to the individual body shape under the influence of body weight and heat.

There is a wired 4-pedal footswitch to trigger fluoro, acquisition, and the table brake, as well as a configurable additional function.

Description

Excellent image quality from the abdomen to the feet is due to the fact that adjustable parameters such as acquisition frame rate, measuring fields, position of collimator blades and semitransparent filters are stored specifically for each table position. That way the different X-ray transparencies for abdomen, legs and feet can be compensated and a consistent image quality with best possible contrast is achieved.
Just one single injection of contrast media protects the health of the patient and gives the physician an instant, subtracted image display of the peripheral blood vessels.

PERISTEPPING:
Peripheral digital stepping angiography with only a single contrast medium injection under visual control of the bolus flow.
Gantry stepping with zeego and ceiling mounted systems, table stepping with floor mounted and biplane systems.

- Position-dependent variable frame rates.
- Fully automatic exposure control.
- Automatic storage of the collimator setting for each step.

PERIVISION:
Peripheral digital stepping angiography with online subtraction display in an examination procedure with only one single contrast medium injection under visual control of the bolus flow.

- Only one single automatically acquired mask image for each individual position.
- Position-dependent variable frame rates.
- Fully automatic exposure control.
Automatic storage of the collimator setting for each step

Angle-triggered digital rotation angiography enables dynamic image display with 3D effect. Dynamic subtraction with optimum alignment of masking and filling, and automatic pixel shift in the entire scene.

- Rotation speed is 60°/s (Artis zeego and Artis ceiling) and 45°/s (Artis floor and Artis biplane).
- Acquisitions with frame rates in 1k matrix from 0.5 to 7.5, 10, 15, 30 f/s (standard) and 60 f/s with reduced spatial resolution can be selected,
- Angle triggering allows a reduction in dose through a reduced acquisition frame rate while at the same time achieving better image quality.

Includes DYNAVISION DR for native rotation angiography and DYNAVISION DSA for subtracted rotation angiography. Reconstruction at the *syngo* X Workplace is not possible with this operating mode.

Note: For biplane systems rotation angiography is available in plane A only.

Contents:
The syngo X Workplace is a dedicated workstation for image postprocessing. Its functionality can be extended with additional software functions to suit specific user or clinical needs in angiography, surgery, and cardiology. The use of the licensed software is limited exclusively to the specific *syngo* X Workplace included with this configuration.

***syngo* X Workplace PC**
The high-performance workstation is equipped with an Open GL accelerator board to support 3D applications. To exchange medical images on DICOM-compatible CD-Rs and DVDs, the system is equipped with a CD/DVD burner.

syngo X Workplace can be connected to an existing network via 1000/100/10 Mbit Ethernet.

Examination room: 19" color flat display or Artis Large Display connection kit
Examination room: 19" color flat display or Artis Large Display connection kit
With this configuration, if an Artis Large Display is ordered - the configuration includes a connection kit for the Artis Large Display. If an Artis Large Display was not ordered - a display is delivered additionally for the examination room...

Control room: 19" color flat display or Artis Cockpit connection kit
In this configuration, there is also one display for the control room or one connection kit for an Artis Cockpit.

The Siemens 19" LCD color display features very high contrast even under very bright ambient light conditions. The Gamma curve was precisely adapted to the CIE/DICOM recommendation and is thus especially suited for gray scale display.

Description

LCD color display
- 19" (48 cm) screen size
- Resolution: 1,280 x 1,024 (pixels)
- Excellent brightness for the entire service life: 137 cd/m² at a contrast ratio of 300:1.
- Flicker-free and distortion-free image display
- Anti-glare screen

The controlled background lighting provides stable lighting throughout the entire product life cycle.

syngo X Workplace Basic User Software
The *syngo* X Workplace software features an intuitive and thus easy to learn user interface developed from prototypes tested in close cooperation with users.

Standard functions such as filming or image review, and optional clinical application software, are performed in individual processes on dedicated task cards. A number of functions and input parameters, as well as the language used, can be selected according to individual requirements.

Package includes the following software licenses
Basic software with CD and dongle for the following functions:
- Patient Browser
- Filming
- Viewer
- System services

Patient Browser:
- Patient management.
- DICOM communication with Send, Receive, Query/Retrieve, Print.
- Reading and importing image data from CDs/DVDs.
- Module for writing DICOM CDs/DVDs for data exchange. Writing is in background mode.

Filming:
A virtual filmsheet shows a 1:1 display of the film sheets to be printed. This permits an effective preview of the filming job and the windowing of images, as well as providing a large number of evaluation functions.

Viewer:
The Viewer supports interactive 2D review, evaluation, and documentation functions. Multiple studies from the same patient can be displayed side-by-side for comparison.
- Image display: 1.024^2 screen matrix, configurable with up to 64 image segments.
- CINE display: Automatic or interactive dynamic presentation technique for the visualization of time and volume series.
- Synchronized viewing of multiple series.
- Measurement and annotation: Text annotation; distance, angle, circle, ROI and pixel lens, depending on information available from the acquisition system.

System services:
Microsoft Office Word, Excel, PowerPoint plus Outlook are supported (not provided!).
- Any user-selectable file, such as cardiac or angiographic acquisitions, DSA or 3D AVI video sequences, can be burned to CD, or exported to USB stick, to prepare quality presentations and demos of pathologies.
- Network module: For connection to a local Ethernet (Gigabit or 100 Mbit) for communication with networked archives, printers, diagnostic and therapy workstations, and teleradiology routers.

Scope of functions
- Network stations can be configured.
- Unlimited selection of stations.

Description

<u>3D image generation</u>

3D rotational angiography

In 3D rotational angiography, a sequence of 2D projection images is acquired by a C-arm performing a fast rotation around the isocenter in which the patient is positioned.
Image data are transferred automatically to a *syngo* X Workplace for time-optimized 3D image data reconstruction.

- All parameters required for the 3D reconstruction are included in the organ program. This enables optimized image quality and easy handling, as well as the fastest possible 3D reconstruction.
- Rotation speed is up to 88°/s (Artis zeego with *syngo* Dyna3D HighSpeed), 60°/s (Artis ceiling), and 45°/s (Artis floor and Artis biplane).
- Angle triggering allows a reduction in dose through a reduced acquisition frame rate while at the same time achieving better image quality. In addition, it allows for accurate subtracted rotational scans.

3D reconstruction and visualization of a volume are performed in real time in volume rendering technique, MPR, and MIP. 3D Rotational angiography is used in particular as support in interventional radiology and neuroradiology in the angiography laboratory. Based on dedicated acceleration hardware the primary reconstruction results are available in full diagnostic quality in the examination room within 19 seconds for high contrast images and less than 42 seconds for soft tissue DynaCT images. Subsequent secondary reconstructions are available even faster.

Note: For biplane systems rotation angiography is available in plane A only.

***syngo* DynaCT**
syngo DynaCT is especially suited to support radiologists and neuro-radiologists during interventional procedures in the angiography suite with both endovascular and non-endovascular procedures. *syngo* DynaCT provides enhanced decision making during oncology procedures such as chemoembolization and RF-ablations. In neuroradiology, *syngo* DynaCT allows the visualization of bleeds, the ventricular system of the brain and microstent placement.

With syngo DynaCT it is possible to visualize a soft tissue difference of 10 HU (Hounsfield Units) of an object 5 mm in size, or 5 HU for an object 10 mm in size, in a Thick-MPR display (measured with a CATPHAN 16 CT phantom with the CTP 515 module). Homogeneous image quality is achieved across the entire image. As a result, critical regions such as the base of the skull can be displayed with a lot fewer artifacts.

DynaCT also offers:
- a new reconstruction algorithm optimized for fan beam geometry
- a 20sDR-H 109 kV DynaCT acquisition reducing beam hardening artifacts and therefore improving e.g. detection of bleedings in DynaCTs with intravenous injection of contrast material
- faster 3D acquisition in 4x4 Binning mode

In conjunction with Artis zeego, *syngo* Dyna3D HighSpeed – being the fastest 3D protocol on the market – enables acquisitions to be generated in less than 3 seconds. As a result, moving organs such as the lungs can be displayed with a lot fewer artifacts. In addition, ~30% of contrast material can be saved which is important esp. in procedures requiring injection of a high volume of iodine (e.g. for enhancement of the aorta).

<u>3D Image Manipulation</u>

The 3D XWP comes with applications that facilitate interactive volume rendering, accelerated by a high-end graphics card. It offers support for large data records of up to 1,600 images (512 x 512 matrix).

In angiography, surgery, and cardiology, the three-dimensional information is used for diagnosis, planning of therapy and documentation.
Diagnosis and treatment can be performed in one session. This offers a significant advantage thanks to the fully-integrated workflow, for example the
- Transfer of the projection angle (that has been adjusted by the user in the XWP 3D volume) to the C-arm stand.
- Realtime synchronization between reconstructed volume and C arm position (Volume following the C arm

Description

position)
- Indication whether the angulation can be achieved at the C-arm without collision with the patient or table.
- Interventional volume measurement.

Features:
- Reconstruction protocols for visualization of vessels, bones, clips and coils.
- The result of the reconstruction can be native or subtracted.
- Modification of reconstruction area to allow zoom via reconstruction.
- Visualization with shading and light source for an improved three-dimensional impression.
- Interventional volume measurement.
- Link between C arm geometry and reconstructed volume: driving the C arm to exact projection position according to the view of the reconstructed volume and/or setting the volume to follow realtime C arm positions.

Image data:
- Viewing of volume data from AX, CT, MR, and PET modalities.
- Loading of two volume data sets simultaneously.
- Multiple Layouts: single (1on1), double (2 on1) and quadruple (4on1) for MPR display.
- Two displays are supported for simultaneous display of two volumes side-by-side.

Image display modes:
- VRT, Color VRT, MIP, MinIP, and MPR rendering.
- Thin slice renderings for VRT, MIP, and MinIP.
- Variable light source.
- Shading effects.

Volume editing:
- Cut planes.
- Editing of clip planes and control volumes.
- ROI punching.

Presets:
- Series-specific bookmarks, to store and retrieve volume visualization parameters.
- Global presets for series-unspecific application of volume visualization parameters.

Output:
- Radial ranges, including macro range definitions.
- 2D and 3D measurements, measurement grid, distance measurement and annotations.
- AVI format export with selectable compression format and compression ratio.
- TIFF, PNG, BMP, JPEG image export.
- Send to film sheet.
- Sending of parallel ranges results to PACS.

3D accessories
Includes the accessories required for 3D setup and calibration:
- Plexiglas calibration phantoms
- Line phantom for image quality control
- Form filter
- 3D data link

Dual volume visualization
Enables the differentiation between two high-contrast 3D objects that have virtually the same contrast density by choosing different visualization presets for the two simultaneously loaded volumes. This enables clear differentiation between e.g. contrast-filled vessels, bones, stents, clips or coils.
Furthermore, it allows the display of one low-contrast and one high-contrast volume in one view, often realized as

Description

embedded MPR where the high-contrast volume is visualized in VRT and the soft-tissue information is shown as MPR slice. This can be used e.g. for visualization of the anatomical structure of tumors in combination with the feeding vessels.

3D roadmap
The operator can overlay any 3D volume or planning data, or excerpts of it, onto the live fluoro image. Via a Fade in – Fade out with the joystick the degree of visibility of the overlaid information can be determined at any time This tool offers the physician real-time three dimensional guidance for more confidence. It avoids repeated injection of contrast material during fluoroscopy by overlaying a 3D vessel tree instead. The 3D roadmap is automatically updated in real-time according to any table, C-arm, zoom and SID changes. Even changes due to patient movement can be manually updated.
The 3D volume can be overlaid on regular fluoro as well as on subtracted fluoro (Roadmap) or acquisition series. The overlay appears on the display of the syngo X Workplace so the 3D Roadmap information is available in parallel with the regular 2D images of the live display of the acquisition system.

Fusion functionality
A fused CT, MR or PET image can be overlaid with live fluoroscopy in combination with 3D roadmap functionality providing information during interventional procedures that are available neither in 2D X-ray nor in 3D rotational angiography.
The package includes 3D/3D Fusion, which allows to spatially align two 3D volumes from the same or different modality in such way that the anatomical structures overlay each other. Any *syngo* DynaCT or *syngo* Dyna3D image can be fused with datasets from e.g., CT, MR or PET.

For PURE systems only: this package contains also the following functionalities:
The package includes in addition 2D/3D Fusion, which allows to spatially align any pre-acquired 3D volume of the patient with two 2D X-ray projections. This eases the workflow during the procedures and reduces the X-ray dose because no additional 3D acquisition is required.

Toolbox
Toolbox is a generic application to interactively mark structures of interest in a 3D volume, e.g. a *syngo* DynaCT image, using points and lines. Analogously to *syngo* 3D Roadmap, these markings are projected onto the live 2D X-ray illustrating the position of the 3D anatomical structure within the live X-ray.
Included functionalities:

- Automatic extraction and overlay of anatomical outlines of the 3D volume on live 2D image.
- Overlay of any lines and dots drawn on the VRT or MPRs on live 2D image.

This functionality provides an easy link between information that may only be visible in the 3D volume (VRT or MPRs) and the fluoroscopy or roadmap images.

Common functions

Inroom control functionality
Allows for remote control of the *syngo* X-Workplace from the examination room via touchscreen and joystick mounted table-side or on a trolley.
For this, a set of functions is offered inroom for e.g. 3D image assessment and manipulation, 3D navigation, multimodality image integration, or for actively following the steps of a pre-defined workflow.

syngo Expert-i
syngo Expert-i enables the physician to interact with the syngo X Workplace from virtually anywhere.
When clinical questions arise at the syngo X Workplace, a second user with a Windows PC can quickly and efficiently access the syngo X Workplace via the network. He or she can assume full control of every application on the syngo X Workplace and can see all screen content that is displayed for the local user on the main monitor. This allows the parties involved to discuss clinical questions via phone and quickly reach solutions on a joint basis.

DICOM
Industrial standard for the transmission of information between DICOM-compatible units from different manufacturers. The scope of functions is described in detail in the DICOM Conformance Statement and in the standard version includes the Transmission/ Reception, Query/ Retrieve and Basic Print functions.

Note concerning DICOM interface(s)

Description

For diagnostic purposes, only hardcopy cameras/laser printers explicitly approved for this system may be used.

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For applications in the abdomen or thorax, the larger field of view (FOV 35 cm x 25 cm, 13.8" x 9.8") allows complete visualization of tumors, their feeding vessels and the surrounding tissue, e.g. in chemoembolizations.
The larger FOV also optimally supports vascular treatments in the abdomen such as the placement of stent prostheses.
The short acquisition time makes it easier for patients, especially those that are critically ill, to hold their breath during the acquisition.

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syngo Needle Guidance workflow provides a guided intuitive 3 step approach, for consistent needle positioning results:

Step 1:
Definition and check of the needle path on a DynaCT or an external CT or MR or PET-CT dataset.

Step 2:
Check of automatically proposed progression views that will be used for monitoring the needle procedure.

Step 3:
Alignment and progression of the needle under fluoro control while the planned needle path is overlaid on the live image of the acquisition system. Easy switch between the defined progression views to control the real needle position and direction in all three dimensions.

Subsequently, a control scan can be performed and automatically fused with the planning volume using fusion functionality. syngo DynaCT, CT, PET or MR images are accepted for the image fusion.

The *syngo* Angio Viewer enables dynamic review of DSA scenes (in native or subtracted display) and their postprocessing at the *syngo* Workplace, with functions such as:
- Remasking.
- Pixelshift.
- Anatomic background.
- Opacification etc.
- Review of DYNAVISION and PERIVISION scenes

Cable connection to the OEM measurement system for ECG triggering. Necessary requirement for ECG-triggered Dyna CT card and for ECG triggered fluoroscopy.

Measuring program integrated in the imaging system for objective, precise and reproducible evaluation of vessels.
- Automated contour detection.
- Determination of degree of stenosis.
- Automatic and manual reference diameter determination.
- Automatic and manual calibration methods.
- Distance and angle measurement.

The Vessel analysis allows precise quantification under sterile conditions, direct at table side with the touchscreen control. This speeds up the intervention and makes the procedure safer for the patient. The reports can be easily stored in the patient folder for documentation and to show the correct analysis of dilatations etc.

Description

Especially to be used for vessel sizes between 0.5 mm and 50 mm.

Automap optimizes the procedure workflow, especially during interventions. A selected reference image displaying the needed medical information (e.g. before dilatation) is used as the basis for moving the system to the correlated position automatically. The intervention can be continued immediately without manually repositioning the patient. On the other hand, the system is able to select a reference image for the current device position. In case of changes in device position, this enables the user to see the corresponding reference images quickly and safely.

Note concerning DICOM interface(s)
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Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.

A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient.
With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

Sent in MPPS:
- **Total dose-area product**
- **Number of exposures**
- **kV** per image (DICOM Exposure Dose Sequence)
- **ms** per image
- **mA** per image

Note concerning DICOM interface(s)
For diagnostic purposes, only hardcopy cameras/laser printers explicitly approved for this system may be used.

The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).

Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.

A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient.
With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

Printing Acquisitions using a Virtual Filmsheet
Selecting "Auto-Print" automatically forwards the images stored in the virtual filmsheet to the printer. This optimizes the workflow, eliminating the need for user interaction. In addition, a specific layout can be configured on the virtual filmsheet, which the user can review and edit on the monitor at any time. As a result, printing is only required after the layout has been optimized on the monitor, saving time and costs.

Note:
For diagnostic purposes, only hardcopy cameras/laser printers explicitly approved for this system may be used.

The description in the DICOM Conformance Statement downloadable from the Internet is exclusively binding for the functionality of the DICOM interface(s).

Functionalities across interfaces with/between partner systems require explicit validation, since the interpretation of the interface by the partner/target system is not part of the product's responsibility.

Description

A modification of the interface that might be required is not included in the offer; e.g. for the rare case that available configurations are not sufficient.
With regard to expenses for interface configurations that might be required, the agreements on maintenance/service of the product apply.

The lower body radiation protection can be attached to the accessory rails either on the right or on the left side of the patient positioning table.
It consists of the following shielding units:

- A basic unit shielding the area between accessory rails and the floor. It is flexible and can be adapted to the examiner's preferences.
- One LB radiation protection pivot swivel element that can move out of the way during collisions with the tube and still retain its protective function.
- Two clip-on units pointing upwards from the upper edge of the basic unit with a length of 57 cm and 27 cm.

The scattered radiation shielding units can be attached to the basic unit in an overlapping and fan-shaped way to allow closed, adapted scattered radiation protection even in the lower thorax area.
The maximum load of the accessory rails is 40 kg, the weight of the attached scattered radiation protection is 8 kg.

Preparation for the large display.

The large display area allows for both large display and the free positioning of examination-relevant video signals. The fully integrated tableside control allows for selection from among twelve layout variants.

For the diagnostic color display in TFT technology, with high luminance and extended viewing angle, the gamma curve has been adapted particularly for gray scale display according to the CIE / DICOM recommendation.

Video signals such as live, assist and reference images, *syngo* X Workplace, Sensis/recording systems, PACS, HIS/RIS, ultrasound, ECG, external video, endoscope, mapping systems, system and table position, system messages and dose information can be individually positioned and displayed on the Large Display, if connected.

The extended Roadmap function is included, if DSA is available:

- Native live fluoro image during fluoroscopy; otherwise Last Image Hold.
- Native live fluoro image during roadmap / subtracted fluoroscopy; otherwise Last Image Hold.
- Native live acquisition during DSA acquisition; otherwise native max-fill image.

If the dual reference function is available, parallel static reference images are displayed on both reference monitors

Technical specification for the 60" display:

- Display size (W x H)   60 ", 133 cm x 74.8 cm
- Screen size   60 " 153 cm
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth $16.7 \cdot 10^6$ colors.
- excellent brightness over the lifetime: 300 cd/m² at a contrast ratio of 4000:1.
- Flicker-free and distortion-free image display.

Technical specification for the 55" display:

- Display size (W x H) 55 ", 121 cm x 68 cm .
- Screen size   55 ", 139 cm
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth $1.07 \cdot 10^9$ colors.
- excellent brightness over the lifetime: 350 cd/m² at a contrast ratio of 1450:1.
- Flicker-free and distortion-free image display.

Technical specification for the 56" display:

- Display size (W x H) at 56", 124.4 cm x 70 cm

Description

- Screen size at 56" (142.2 cm)
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth 16.7 10^6 colors.
- excellent brightness over the lifetime: 300 cd/m² at a contrast ratio of 800:1.
- Flicker-free and distortion-free image display.

Bypass concept
In case of error, such as controller failure, the Large Display switches automatically to bypass mode and emergency fluoroscopy is displayed on the Large Display.

Backup concept
The Large Display has a backup concept to ensure against power supply failure (2 separate power supplies for the left and right sides of the Large Display).

Note: *The type of large display can be chosen with a separate position.*

The Large Display video controller 18 receives various internal and external video signals for presentation to scale on the Large Display.
Up to 18 external and internal video sources can be connected (max. 14 DVI-D and 4 analog (VGA) channels).

Important images for diagnostic purposes can be displayed to scale in their original size on the Large Display. Less important, non-diagnostic information can be displayed at a reduced size by the interpolation algorithm for image information integrated in the video controller.

An enlarged or reduced display can be selected individually via the display configurations at the fully integrated tableside control. The video controller then takes over interpolation and adaptation of image size.

In waveform images with high resolution, such as for electrophysiological recording systems, the curves are displayed free of artifacts because of a special interpolation algorithm.

Preparation for large color flat display

The large display area allows for both large display and the free positioning of examination-relevant video signals. The fully integrated tableside control allows for selection from among twelve layout variants.

For the diagnostic color display in TFT technology, with high luminance and extended viewing angle, the gamma curve has been adapted particularly for gray scale display according to the
CIE / DICOM recommendation.

Video signals such as live, assist and reference images, *syngo* X Workplace, Sensis/recording systems, PACS, HIS/RIS, ultrasound, ECG, external video, endoscope, mapping systems, system and table position, system messages and dose information can be individually positioned and displayed on the Large Display, if connected.

The extended Roadmap function is included, if DSA is available:
- Native live fluoro image during fluoroscopy; otherwise Last Image Hold.
- Native live fluoro image during roadmap / subtracted fluoroscopy; otherwise Last Image Hold.
- Native live acquisition during DSA acquisition; otherwise native max-fill image.

If the dual reference function is available, parallel static reference images are displayed on both reference monitors

Technical specification for the 60" display:
- Display size (W x H) at 60", 133 cm x 74.8 cm
- Screen size 60", 153 cm
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth 16.7 10^6 colors.
- excellent brightness for the entire service life: 300 cd/m² at a contrast ratio of 4000:1.
- Flicker-free and distortion-free image display.

Description

Technical specification for the 55" display:
- Display size (W x H) 55 ", 121 cm x 68 cm .
- Screen size   55 ", 139 cm
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth 1.07 10^9 colors.
- excellent brightness over the lifetime: 350 cd/m² at a contrast ratio of 1450:1.
- Flicker-free and distortion-free image display.

Technical specification for the 56" display:
- Display size (W x H) 56", 124.4 cm x 70 cm
- Screen size 56" (142.2 cm)
- Resolution: 3840 x 2160 (pixels); 8 megapixels at 4 x HD.
- Color depth 16.7 10^6 colors.
- excellent brightness over the lifetime: 300 cd/m² at a contrast
  ratio of 800:1.
- Flicker-free and distortion-free image display.

Bypass concept
In case of error, such as controller failure, the Large Display switches automatically to bypass mode and emergency fluoroscopy is displayed on the Large Display.

Backup concept
The Large Display has a backup concept to ensure against power supply failure (2 separate power supplies for the left and right sides of the Large Display).

Rail profile (short table attachment) for table operation
- Weight: 1.4 kg
- Rail length: 12 cm
- Width: 20 cm
- Height: 14.5 cm

Rail profile (long table attachment) for device operation (with or without table operation)
- Weight: 2.8 kg
- Rail length: 25 cm
- Width: 20 cm
- Height: 14.5 cm

The infusion bottle holder serves for attaching a maximum of 4 infusion bottles directly at the accessory rail of the patient positioning table.
- No obstruction due to additional stands in the room.
- Safe administration of infusions even with the table moving or tilting.

Ordering information that can be deleted from the final version of the offer follows:
Not in conjunction with the Surgery carbon tabletop.
Already included in the basic configuration.
Can also be ordered as an option.

Communication / Intercom system for communication between examination room and control room, with additional footswitch for conversation selection in the examination room.
Microphone and control box on the console in the control room.
With adaptive acoustic filter for background noise suppression in the examination room.
Microphone in the examination room installed on the ceiling.

Description

Not in conjunction with the multi-section Surgery metal / carbon tabletop or the multi-section Surgery metal / carbon tabletop RoW.

For Artis tabletops, the two arm holders help to laterally position the arms comfortably along the patient's body. They are slid laterally underneath the mattress, level with arms, and fixed by the patient's body weight.
The patient's arms can be immobilized with commercially available securing straps (not included). Two pairs of arm holders of different length and height (matching the mattress height) are supplied, that are suitable both for thick and thin mattresses.

An arm holder weighs 8 kg.

Stable positioning of the arm on the armrest is provided through height-adjustable supports and an integrated flexible rubber buffer at the holding block of the armrest. When the patient positioning table is height-adjusted, the armrest will move together with the table due to the rubber buffer in connection with the accessory rail of the accessory rail module. This provides controlled, uninterrupted arm surgery.

Additional surgical accessories, e.g. clips, can be attached to the lateral accessory rails included on the armrest and on the included rail extension at the front end.

Maximum load capacity: 20 kg.
Length and width: 84 cm x 37 cm.
Height adjustment 40 cm: between 72 cm and 112 cm.
Swivel range: ± 45 degrees.

Depending on the tabletop used and the type of examination, the head module or one of the two accessory rail modules must be available.
Delivered as an option only, not included in the basic configuration

The lateral table extension is used especially in angiography and general radiology for big and obese patients as an additional armrest. It is slid underneath the positioning mattress and fixed by the patient's weight.

The lateral table extension consists of radiolucent carbon fiber material, which avoids disturbing edges and shadows in the image. Arm pads made of washable plastic foam material are available on both sides. The patients's arms are immobilized by Velcro straps.
Max. load per side 20 kg.

Description

Ordering information that can be deleted from the final version of the offer follows:
Not in conjunction with the Surgery table
Delivered as an option only, not included in the basic configuration.

Ordering information that can be deleted from the final version of the offer follows:
Not in conjunction with the multi-section Surgery metal / carbon tabletop or the multi-section Surgery metal / carbon tabletop RoW.

Delivered as an option only, not included in the basic configuration.

The flexible, curved anesthesia screen holder serves as a holder for sterile cloths (anesthesia screen) between head and abdominal area of the patient. With its two brackets it is attached to the accessory rails of the accessory rail or head module, which slides over the outer edges of the tabletop.
Weight: 1 kg.

Ordering information that can be deleted from the final version of the offer follows:
Depending on the tabletop used and the type of examination, the head module or one of the two accessory rail modules must be available.
Delivered as an option only, not included in the basic configuration.

The insert with accessory rails attached to the right, left, and head end slides over the outer edges of the patient positioning tabletop.
It is locked in place through two screws on either side. The part to be inserted underneath the tabletop consists of radiolucent carbon fiber material, which avoids disturbing edges in the image.
Max. load capacity of the accessory rails: 40 kg.
Length of the accessory rails: 45 cm.

Ordering information that can be deleted from the final version of the offer follows:
For wide tabletops.
Delivered as an option only, not included in the basic configuration.
Not in conjunction with the Surgery table.

The insert with accessory rails attached to the right and left slides over the outer edges of the patient positioning tabletop.
It is locked in place through two screws on either side. The part to be inserted underneath the tabletop consists of radiolucent carbon fiber material, which avoids disturbing edges in the image.
Max. load capacity of the accessory rails: 40 kg.
Length of the accessory rails: 45 cm.

Ordering information that can be deleted from the final version of the offer follows:
For wide tabletops.
Delivered as an option only, not included in the basic configuration.
Not in conjunction with the Surgery table.

Complete system backup without interruption. One UPS per lab.

The Artis system will be supplied by the UPS with full power to all functions in case of power failure. The operation is not restricted to emergency fluoroscopy.

Operation:

- In case of power failure, the complete Artis system is backed up without interruption to the system or any imaging functionality.

Description

- Full system operation including fluoroscopy and acquisition are possible without interruption. There will be no interruption even in the case of a power failure in the middle of an acquisition.
- No interruption to workflow
- No re-boots required.
- Additional advantage of an on-line power conditioner for complete system.
- Includes UPS, battery, maintenance bypass panel, and one year on-site parts and labor coverage (24x7) by Eaton Powerware.

Battery power is supplied for a 10 minute backup at continuous full power. This should allow the lab to continue operation for at least 45 to 90 minutes in normal operation.

Not approved for sites requiring OSHPD certification. Please contact XPAS Inside Sales for configuration of an OSHPD certified configuration.