

V.A. Medical Center
1601 SW ARCHER ROAD
GAINESVILLE, FL 32608-1135

TRADE-IN GE INNOVA

PO# 573-B35003

Line #	Description	Qty
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	Allura Xper FD20 C Rel. 8.1	1
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Allura Xper FD20 monoplane system is a state of art X-ray imaging system that can be customized to support a wide range of applications including peripheral, abdominal, cerebral, thoracic, cardiac and non-vascular interventional and diagnostic procedures.

If Philips makes a new generation of the system being quoted commercially available, then Customer may elect to change this order to a new similarly configured product. But, any such election must occur before the earlier of (a) two weeks before Philips begins to produce the system being quoted, (b) thirty (30) days from Philips notifying Customer that the new generation is commercially available, and (c) September 30th, 2014. If Customer elects such change, then Customer and Philips will modify the quote to account for the upgrade. For planning and budgetary purposes, Philips expects the cost of such upgrade or change to the next generation technology not to exceed:

The Allura Xper FD20 system uses an integrated single-host concept. The system is comprised of five functional building blocks: Geometry, X-ray Generation, User Interface, Image Detection, and Viewing. Each functional building block is explained in further detail.

GEOMETRY

The Allura Xper FD20 Stand

The Allura stand consists of a ceiling-mounted C-arm. The stand has the following capability:

- The L-arm can be rotated and can be moved in longitudinal direction allowing a three-sided patient approach and total body coverage.
- L-arm rotation around the patient table: +90, 0, -90 degrees.
- L-arm longitudinal movement: 300 cm
- This movement features auto-stops at the parking position, cardio/neuro position and lower peripheral position.

The Allura stand allows a very wide range of projections, including PA and AP imaging.

- In the head position (0 degrees position, L-arm parallel to patient table):
 - C-arm rotation range (degrees): 120 LAO to 185 RAO
 - C-arm angulation range (degrees): 90 CA to 90 CR
 - (Full angulation capability determined by patient position)
- In the side position (+90 / -90 degrees position, L-arm perpendicular to patient table):
 - C-arm rotation range (degrees): 90 LAO to 90 RAO
 - C-arm angulation range (degrees): 185 CA to 120 CR or 120 CA to 185 CR
 - (Full angulation capability determined by patient position)
- The stand provides fully motorized fast movements with variable and configurable maximum speed.

- Variable C-arm rotation speed, up to 25 degrees per second
- Variable C-arm angulation speed, up to 18 degrees per second
- L-arm rotation and longitudinal movement: motorized and manual
- C-arm depth is 90 cm
- The FD20 Dynamic Flat Detector features Xper Access which allows the flat detector to be positioned in either portrait or landscape imaging modes in 3 seconds.
- The variable source image distance between focus and Dynamic Flat Detector input screen is motorized from 86.5 to 123 cm.
- The stand features BodyGuard a capacitive sensing collision avoidance system for patient protection.

Patient support

The Xper Table

Patient support with flat carbon fiber tabletop

- Table top length of 319 cm, width 50 cm
- Metal-free overhang 125 cm
- Floating table-top movement of 120 cm longitudinal and 35 cm transversal range.
- Motorized height adjustment from 79 to 107 cm
- Maximum cantilever of 223 cm , for full patient coverage
- Maximum patient weight 250 kg with 25 kg of accessories plus 500 N for CPR in any longitudinal position of the table top
- Xper Geometry and Imaging Modules for exam room controls.
 - The operating modules can be attached to either side of the table.

Patient Support Accessories set

- One cerebral filter
- Three rail accessory clamps
- One IV stand
- One slow recovery foam mattress
- One Set of Arm Supports (FCV0248)
- One Set of Patient Straps (FCV0250)
- One Head Support (FCV0251)
- One Arm Support (FCV0258)
- One Table-mounted Radiation Shield
- One anti-fatigue mat with Philips logo

X-ray Generation

The Allura Xper FD20 comprises an integrated dedicated X-ray system, micro-processor controlled Velara CFD generator based on high frequency converter technique. The user interface control of this X-ray Generator is incorporated in the Xper module, Xper Desktop Viewing Console, and the Xper on-screen displays. The Velara CFD generator comprises:

- X-ray generator 100 kW
 - Voltage range is 40 - 125 kV
 - Maximum current 1250 mA at 80 kV
-

- Program selection
 - Pulsed X-ray for pulsed fluoroscopy; 3.75, 7.5, 15 and 30 frames/s
 - Pulsed X-ray for (subtracted) acquisition up to 6 frames/s for vascular applications
 - Minimum exposure time of 1 ms
 - Automatic kV and mA control for optimal image quality prior to run to save dose
 - An X-ray depth collimator with two semi-transparent wedged filters with manual and automatic positioning
 - SpectraBeam filtering of low energy radiation to optimize image quality and dose efficiency with MRC-GS 0407 X-ray tube.
 - Grid switching at dynamic pulsed fluoroscopy
 - Xper Beam Shaping, positioning of both shutters and wedges on the Last image Hold without the need for X-ray radiation

Fluoroscopy

- Three programmable fluoroscopy modes
 - Each mode can be set to different composition of dose rate, pulse speed, filter setting, and image processing (noise reduction, adaptive contour enhancement, and adaptive harmonization).
- Roadmap Pro
 - Roadmap Pro can be selected from the Xper imaging module and/or Xper module.
 - A vessel map is created and superimposed with (un)subtracted live fluoroscopy. Acquisition runs can be done during Roadmap without losing the vessel map. Roadmap Pro features Smart Settings in special clinical modes that are optimized to visualize special materials such as coils and glue. Live processing of the vessel map, the device map and the landmark map can be done on the Xper Module. Xres for vascular procedures is standard part of Roadmap Pro.
 - **Disclaimer:** AMC only corrects movement artifacts in two dimensions. Three dimensional movements such as swallowing or rotation of the head cannot be corrected.
 - In Roadmap Pro R2 "Automatic Motion Compensation" (AMC) is added to the roadmap functionality. During roadmap, small movements of the patient can lead to subtraction artifacts. These artifacts might conceal important clinical information. "Automatic Motion Compensation" compensates for rigid, uniform (skeletal/table) translations and is therefore very effective in interventional (neurology) applications where subtraction imaging is applied.

§ Disclaimer: AMC only corrects movement artifacts in 2 dimensions. 3 dimensional movements like swallowing or rotation of the head cannot be corrected.

- Xper Fluoro Storage, a grab function allows storage and archiving of both a fluoro image and the last 20 seconds of Fluoroscopy, called Xper Fluoro Storage. These fluoro images or fluoro runs can be archived as a regular exposure run.

X-ray tube

The Allura Xper FD20 has the Maximus ROTALIX Ceramic grid switch tube assembly MRC 200 GS 0407 integrated in the C-arc. This MRC tube has an anode heat storage capacity of 2.4 MHU and 0.4/0.7 mm. nominal focal spot values. The tube has a maximal loading of 30 and 67 kW.

Dynamic pulsed fluoroscopy uses grid switching technology to eliminate soft radiation and improve image quality. SpectraBeam allows for filtration of the x-ray beam with (a combination of) 0.2, 0.5 or 1 mm CU-equivalent filters.

Tube housing ROT-GS 1004 is for oil-cooling and has a build-in thermal safety switch. A rotor control unit is build-in for continuous rotation of the anode disk. The heat exchanger CU 3101 is for direct and continuous forced cooling with oil.

IMAGE DETECTION

The Allura Xper FD20 comprises the following image detection chain:

- A 30 cm by 40 cm FD20 Dynamic Flat Detector with eight imaging modes.
 - 30 x 38, 30 x 30, 26 x 26, 22 x 22, 19 x 19, 16 x 16, 13.5 x 13.5, and 11 x 11 cm
- The digital output of the FD20 flat detector is 2k*2.5k image matrix at 14 bits depth for the largest mode
- The flat detector subsystem features Xper Access, the detector can be rotated over 90 degrees, it moves from portrait to landscape back & forth
- DQE (Detective Quantum Efficiency) >73 %
- The pixel pitch: 154 x 154 microns

Viewing

The Allura Xper FD20 comprises the following components in order to display the clinical images in the control and examination room:

Displays

Examination Room

Two 18-inch monochrome LCD monitors designed for medical applications. The first display is used for viewing live images. The second display is the reference monitor.

- 18-inch monochrome TFT-LCD display with a 160 degree viewing angle.
- Native format 1280x1024 SXGA
- 10-bit gray-scale resolution with gray-scale correction

These monitors are not delivered when FlexVision XL, EP Cockpit or EP Cockpit XL is selected.

The monitor ceiling suspension in the exam room can be configured to accommodate 3, 4, 6 or 8 LCD monitors and includes motorized height adjustment. The height-adjust feature is dependent on the room ceiling height. When FlexVision XL, EP Cockpit or EP Cockpit XL is selected the monitor ceiling suspension is configured for one of those options.

- Of the two medical monochrome LCD monitors included in the MCS, one is used for viewing of live images and the other serves as the first reference display. Reference images or runs are controlled by infra-red remote-control Xper ViewPad.
- The On-Screen Display provides status information on stand rotation, angulation, display of system messages, X-ray tube load status, selected fluoroscopy mode, selected detector Field of View, and both the rate and accumulation of the dose area product and skin dose. For cardiac applications, the system also monitors and displays body zone specific Air Kerma data (10 zones).

Control Room

One 19-inch color LCD monitor used as a data monitor.

- 19-inch color TFT-LCD display
- Native format 1280x1024 SXGA

One 18-inch monochrome LCD monitor (Xper review monitor) designed for medical applications.

- 18-inch monochrome TFT-LCD display
- Native format 1280x1024 SXGA
- 10-bit gray-scale resolution with gray-scale correction

These control room monitors are not delivered when EP Cockpit or EP Cockpit XL is selected.

The Graphical User Interface on the monochrome monitor has the following features and functions:

- Step through file, run, or images
- File, and run overview
- Contrast, brightness, and edge enhancement settings
- Flagging of runs or images for transfer
- Applying text annotation in images
- Optional DICOM printing
- Executing Quantitative Analysis Packages if available
- Subtraction functionality
- Zoom/pan functionality
- Electronic shutters
- Video invert
- View trace, stacking of images
- Landmarking

Acquisition

The acquisition segment coordinates the parameters for automatic exposure control. The program is selected via the Xper module or Xper Desktop Console.

Exposure techniques:

- Serial imaging for DA and DSA with automatic exposure setting
- Single shot mode
- Acquisition frame rates: 0.5 to 6 images/s at 2048 x 2048, 12-bit matrix

The Allura Xper FD20 offers a storage capacity of:

- 50,000 images at matrix size of 1024 x 1024
- 12,500 images at matrix size of 2048 x 2048
- Maximum number of examinations is 999, with no limit to the maximum number of images per examination

USER INTERFACE

Xper is comprised of three elements: 1) Xper Settings, which customizes the system to each user preferred settings. 2) Xper User Interface 3) Xper Integration, which makes advanced integration functionality available such as DICOM Query / Retrieve, background archiving, and Xper Fluoro Storage.

The Xper User Interface uses User Interface modules in the Examination Room with On-Screen Display.

The On-Screen Display is positioned on the left side of the reference monitor. The following system information is displayed

- X-ray indicator and X-ray tube temperature condition
- Gantry position in rotation, angulation, and Source Image Distance
- Detector field size display
- General System messages
- Selected Frame speed
- Fluoroscopy mode
- Integrated fluoroscopy time
- Skin Dose and Dose Area Product
- Stopwatch

The Xper ViewPad contains the preprogrammed function settings. The system is provides with two Xper Viewpads. The following functions are provided:

- Run and image selection
- File and run cycle
- File overview
- Store to Reference image file
- Copy image to photo file
- Digital (fixed) zoom and panning
- Recall reference images
- Laser pointer, intended to point at regions of interest on the imaging monitors
 - LED indication of laser pointer on/off and battery low
- Subtraction on/off
- Remasking
- Landmarking

Remote Intercom

The separate intercom which is connected independently from the system that allows separate placement of the intercom at the preferred working position in the control room and examination room.

Table Side Modules

Two Xper Modules are provided for use. The first Xper Module is mounted tableside. The Second Xper Module (NCVA778) is located in the control room. These modules use a touch screen, which can be operated when draped with sterile covers. The Xper Module contains the following functionality:

- Acquisition settings
- Selection of Xper Setting allows the user to set frame rates and X-ray generation settings applicable for the type of the preferred intervention

- Image Processing

The Xper Geometry module can be positioned on all sides of the patient table, while keeping the button operation intuitive. The Xper Geometry module provides the following functionality:

- Tabletop float and table height position
- Source Image Distance selection
- Longitudinal movement of the Gantry along the ceiling
- Gantry rotation in an axis perpendicular to the ceiling
- Store and recall of two scratch gantry positions including SID
- Emergency stop button

The Xper Imaging module can also be positioned on three sides of the patient table, while keeping the button operation intuitive. The Xper Imaging module provides the following functionality:

- Fluoroscopy Flavor selection defined per Xper Setting
- Shutters and Wedge positioning
- Xper Fluoro Storage and Grab
- Selection of the Detector field size
- Shutter positioning
- Reset of the fluoroscopy buzzer

Pan Handle (NCVA081)

- The Pan Handle is an extension of the control facility for floating movements of the tabletop.

Control Room

The control room comprises a Xper Review Module, Xper Desktop Module, a keyboard, and a mouse. The Xper Review Module offers the basic functions for review. The Xper Review Module contains the following functionality:

- Power on/off
- Tagarno wheel to control the review of a patient file
- File and run cycle
- Contrast, Brightness, and Edge enhancement settings
- File, Run, Image stepping and run and file overview
- Delete run
- Image invert and digital zoom
- Reset fluoroscopy timer and enable/disable X-ray

System information is displayed on the bottom of the data monitor:

- Stopwatch and Time
- System guidance information
- Dose Area Product (DAP) and Skin Dose, and accumulative dose
- Frame speed settings, fluoroscopy mode, and accumulated fluoroscopy time
- Exposure and fluoroscopy settings as Voltage (kV), Current (mA) and pulse time (ms)

- Geometry information as rotation, angulation, and SID

Scheduling

The patients can be listed and selected per date, physician, and intervention type. Previous DICOM patient studies can be uploaded with the DICOM Query Retrieve function in the Allura system.

Patient management protocols are flexible and allow for multiple studies to be selected under one patient identification number. This means that new studies can be appended to an earlier patient file. Furthermore, each study can contain multiple examinations to allow for split administrative purposes. Each examination contains multiple files, like acquisition file, reference file, and QA results file.

Preparation

The preparation page provides the information of the room and patient preparation of each individual physician. The preparation page is customizable per Xper Setting and allows each physician to provide his own room protocols. This preparation page makes hard copies of the protocol instructions redundant.

Acquisition

The acquisition page contains information on the current selected patient.

Review

The review page allows for reviewing of patients:

- Previous examination cases
- Review of other DICOM XA or DICOM SC studies

Radiation Dose Structured Report

Collection of dose relevant parameters and settings and export to a DICOM database (e.g. PACS, RIS), according IEC60601-2-43, 2nd Edition.

The reported data can be used for, for example:

- Quality improvement: evaluating trends in X-ray dose performance per facility, system and operator.
- RDSR enables analysis of average dose levels & variance for routinely performed exams and procedures.
- Typical system usage can be extracted from the data.

Archive

Continuous Autopush (NCVA090)

Continuous Autopush is an archive accelerator, which ensures that background archiving continues with minimal disruptions.

Clinical studies can be archived to a CD or a PACS. The archive process can be completely automated and customized with Xper Settings. Parameters like multiple destinations, archive formats can be selected to the individual needs and wishes for programming under the Xper Settings,

The Xper DICOM Image Interface enables the export of clinical images to PACS. The export formats are based on DICOM 3.0 protocols. The system exports clinical studies in Cardiac DICOM XA Multi-Frame or DICOM Secondary Capture formats.

- The export format is configurable in 512x512, 1024x1024 2048 x 2048 (unprocessed) matrix.
- The examination can be sent to multiple destinations for archiving and reviewing purposes.
- The Xper DICOM Image Interface provides DICOM Storage and DICOM Storage Commitment Services.
- The DICOM Query/Retrieve function allows older DICOM XA MF and DICOM SC studies to be uploaded in the system. Furthermore, additional information can be appended to a study, while keeping the patient identification the same.

Remote Service

Access to the system from a Remote location is possible via network or modem connection. Remote access to a system can shorten the time needed for e.g. changing system settings or problem diagnosis.

Clinical Education Program for the Allura Xper System

Essentials OffSite Education: Philips will provide up to two (2) Cardiovascular Technologists, Registered Technologists Registered Nurses, or other system operator as selected by customer, with in-depth didactic, tutorial, and hands-on training covering basic functionality and work-flow of the cardiovascular imaging system. In order to provide trainees with the ability to apply all fundamental functioning on their system, and to achieve maximum effectiveness, this class should be attended no earlier than two weeks prior to system installation. This twenty-eight (28) hour class is located in Cleveland, Ohio, and is scheduled based on your equipment configuration and availability. Due to program updates, the number of class hours is subject to change without notice. Customer will be notified of current, total class hours at the time of registration. This class is a prerequisite to your equipment handover OnSite Education. CEU credits may be available for each participant that meets the guidelines provided by Philips. Please refer to guidelines for more information. **Travel and lodging are not included, but may be purchased through Philips. It is highly recommended that 989801292102 (CV Full Travel Pkg OffSite) is purchased with all OffSite courses**

Handover OnSite Education: Philips Education Specialists will provide twenty-eight (28) hours of education for up to four (4) students, selected by customer, including technologists from night/weekend shifts if necessary. Students should attend all 28 hours, and must include the two OffSite education attendees. CEU credits may be available for each participant that meets the guidelines provided by Philips. Please refer to guidelines for more information. Note: Site must be patient-ready. Philips personnel are not responsible for actual patient contact or operation of equipment during education sessions except to demonstrate proper equipment operation. **It is highly recommended for systems that are fully loaded or for customers with a large number of staff members to also purchase 989801292099 (CV Add OnSite Clin Educ 24h).**

The above education entitlements expire one (1) year from equipment delivery date. Ref# 106107318-091207

Set of black and white copies of all documents, comprising (if applicable):

- User manuals
- Service manuals
- System manuals
- Test results

3 Bracket for Rad. Shield (ER) 1

Accessory bracket for mounting a radiation shield

4 FlexVision 1
XL,XperHD,Snapshot

FlexVision XL is an integrated viewing solution designed to give you full control over your viewing environment.

The FlexVision XL provides the ability to:

- Display 2 to 8 screens simultaneously from up to 16 sources (incl. third party systems) on the Philips 56-inch color LCD in the Exam Room.
- Resize and/or enlarge information at any stage during the case.
- Select and customize viewing lay-outs of the Philips 56-inch color LCD via the Xper table-side module

XperHD on FlexVision XL brings High Definition viewing for clinical images. Native resolution of FD20 can be displayed. Excellent sharp and crisp clinical images can be displayed at full size without digital zoom.

Xper HD brings:

- High Definition imaging
 - Sharp images at full size without zoom
- High Definition display at native resolution
 - Up to 2k*2k image display fully integrated
- High Definition for the ultimate detail
 - Enhanced small vessel visualization
- Overview connected equipment (incl. third party systems) from a single location.

The FlexVision XL consists of:

- OmniSwitch
 - OmniSwitch allows the user to direct and switch the video output of all connected medical equipment to specific sub windows of the Philips 56-inch color LCD in the Exam Room.
 - OmniSwitch is a 16 channel video-switch operated from the Xper tableside module. 16 channels are available for a mix of up to 7 internal and up to 9 external inputs.
 - OmniSwitch supports a wide variety of display formats (up to 1600x1200).
 - External inputs are connected to OmniSwitch via Wall Connection box(es).
- Medical grade, high resolution color LCD in the Exam Room
 - This display supports the image quality requirements for monochrome X-ray images as well as color images and replaces all displays normally delivered with an Allura Xper FD system for the Exam Room.
 - Main characteristics are:
 - 56 inch, 8 Megapixel color LCD
 - Native resolution: 3840x2160
 - Brightness: Max: 450 Cd/m2 (typical) stabilized: 350 Cd/m2
 - Contrast ratio: 1200:1 (typical)

- Wide viewing angle (approx. 176 degrees)
- Constant brightness stabilization control
- Lookup tables for gray-scale, color and DICOM transfer function
- Full protective screen
- Ingress Protection: IP-21
- Large color LCD control (Xper Module)
 - Resize and/or enlarge information at any stage during the case via the Xper tableside module in the Exam or Control Room
 - Select viewing lay-outs via the Xper table-side module in the Exam Room
 - Create new layouts by matching inputs to desired locations on preset templates. Monitor Ceiling Suspension
 - Monitor ceiling suspension for use in the Exam Room carries the 56 inch color LCD, providing highly flexible viewing capabilities. The monitor ceiling suspension is height-adjustable and moveable along ceiling rails. It can be positioned on either side of the table.
- Isolated Wall Connection Boxes
 - Up to 8 Isolated Wall Connection Boxes can be connected to FlexVision XL.
 - Through Isolated Wall Connection Boxes, 3rd party equipment can be connected to the FlexVision Omniswitch.
- Snapshot
 - The snapshot function allows the user to store/save a screen-capture of any image on the 56" display as a DICOM Secondary Capture image to a connected PACS. The snapshot-all function allows the user to store/save a screen-capture for each displayed image in the Exam Room / Control Room as separate DICOM Secondary Capture images.

Allura 3D-RA assists physicians in decision making for treatment strategy in endovascular procedures, neuro or vascular surgery or even radiotherapy.

Allura 3D-RA reduces the number of DSA acquisitions and fluoroscopy time needed to perform an examination. This means less X-Ray dose for the patient and the medical staff and a reduced quantity of dye, leading to reduced procedure costs.

Allura 3D-RA provides a unique assessment after treatment due to the use of non-subtracted images that allows to show devices stents, coils, clips and provide the optimal stand projection for endovascular treatment.

Allura 3D-RA provides a wide range of communication facilities to export 3D images.

1 Image Acquisition

Image acquisition is performed with the Rotational Angiography feature of the Allura Xper FD series with the flexibility to position the C-arm in either head or side position.

C-arm in Head position: the Rotational Angiography run is performed over a scan range of 240 degrees with a rotation speed up to 55 degrees/sec.

C-arm in Side position: the Rotational Angiography run is performed over a scan range of 180 degrees with a rotation speed up to 30 degrees/sec.

2 3D Vessel Reconstruction

The rotational run is automatically transferred and displayed as a 3D vessel model: with the Real-Time digital link (option) 120 images are reconstructed into a 3 dimensional model within seconds. Additional reconstructions, using the Reconstructive Zooming Technique, can be performed as well.

3 Workflow:

Allura 3D-RA in combination with the Allura Xper FD series will provide an optimal workflow via the following workflow enhancers:

Complete automated 3D-RA process from 3D acquisition to 3D Viewing: no user interaction needed.

3D at Xper Module (option); With the Xper module the physician has all required 3D functionality at tableside. At the touch screen module functionality like rotating, panning, zooming, AVA, virtual stenting, 3D-APC and 3D Follow C-arc can be performed. With the mouse tablet all other functions can be performed so that there is no need for the Physician to leave the examination room.

3D Automatic Position Control (3D-APC); When the optimal working position has been chosen via the Allura 3D-RA interventional tool, the C-arc will automatically steer to this position.

3D Follow C-arc; When the position of the C-arc (not using any X-ray) is changed, the 3D volume will automatically follow the position of the C-arc. This means the position of the C-arc (and therefore the 2D projection) and the 3D volume are always aligned. As last seen; when the user leaves the patient in the model and later selects that patient again, the Allura 3D-RA interventional tool will return to the image last used by the user.

Mouse over: When moving the mouse cursor over a button the mouse over text will show up to explain the function of that specific button.

4 Calibration

Allura 3D-RA calibrations are performed by Philips Healthcare Customer Support. Allura 3D-RA calibration data are stable over at least 6 months time.

5 Viewing

A Real Time user interface is available with 3D-RA, providing 3D object viewing in any space direction. A graphical display of (C-arm) stand position including angulation/rotation for any projection.

Philips' CRM (Contrast Resolution Management) Technology for a considerable increase in contrast resolution in all volumes.

Various Image Rendering possibilities: Volume/Surface Rendering, MIP, Endoscopy, SUM (pseudo x-ray image) Gradient rendering; the possibility to display the vessel structure transparently.

Cut-plane function to get a precise insight of the shape of the pathology

Orthoviewer providing a multi-planar visualization of objects using the different Image Rendering possibilities.

MPR (Multi-Planar Reformatting): enables visualization of the volume in all three standard projections (coronal, sagittal and axial) Especially useful for optimal viewing of spine procedures (e.g. Vertebroplasty)

SpineView: special acquisition protocol for optimal viewing of the spine, especially osteoporotic vertebrae

CalciView: allows visualization of Hyper dense plaque in 3D, separately or in relation to the lumen. 5 different distance measurements calculated in the same volume, including "Quick measurement" feature

Volume calculation

Automated Vessel Analysis (AVA), provides information on vessel segment diameter, area and length with only three mouse-clicks. Endoscopic and cross sectional views are available.

Computer Assisted Aneurysm Analysis (CAAA), providing information on Aneurysms, like volume, neck size etc..

Catheter tip shape simulation, providing information on how to shape the catheter tip.

Virtual stenting; Ability to simulate a stent placement in a selected vessel segment for proper stent sizing. All relevant data of the simulated stent are displayed

Annotation: text can be added to a volume to capture comments.

Interpolative Zoom

Reconstructive Zooming Technique, 2 additional user defined reconstructions focused on the Volume Of Interest (VOI) using different cube size and voxel resolution.

Subtraction of reconstructed volumes, allowing to visualize vessels without embolization devices (stents, coils, clips,...) to assess the outcomes of treatment

Automatic Voxelshift: compensates for movement when rendering subtracted or superimposed

volumes
 Set the grey values WW/WL
 Store/Recall of user defined projections.

6 Archiving

Transfer to:

Optional Hard Copy unit (DICOM Print)

Any optional DICOM compatible device (e.g. PACS/ViewForum/Xcelera), supported are DICOM XA, DICOM SC, DICOM CT and DICOM 3D

Any PC in a standard PC compatible format (JPEG,AVI)

One or multiple DVD's, CD-ROM(s) for easy archiving

Store a subset of exportable objects (snapshots and AVI Movies) to a USB removable memory device.

Clinical Education Specialists will provide sixteen (16) hours of tailored CV 3DRA OnSite Education for up to four (4) students, selected by customer, including technologists from night/weekend shifts if necessary. CEUs are not available in all cases. Please read Guidelines for more information, which will be provided to you during the scheduling process. Education Hours: Mon – Fri 8:00am to 5:00pm, except Monday and Friday are half-days to allow for trainer's travel. Note: Philips personnel are not responsible for actual patient contact or operation of equipment during education sessions except to demonstrate proper equipment operation. Education expires one (1) year from equipment delivery date (or purchase date if not sold with equipment).

6

Set of 2 additional 21in. LCDs

1

Two 21inch additional displays are located on top of the monitor ceiling suspension frame which carry the 56 inch large screen color LCD display.

These 2 additional LCD's can be used to display additional video sources or used as display back up for Hemo and Xray Live images. These LCD's have a fixed content.

Main characteristics of back-up displays are:

- 21.3 inch, 2 Megapixel color LCD display
- Max. resolution: 1600x1200
- Brightness: 450 Cd/m2
- Contrast ratio : 550:1
- Wide viewing angle (approx. 170 degrees)
- Constant brightness stabilization control
- Independently selectable brightness settings for monochrome and color images
- Independently selectable lookup table for gray-scale, color and DICOM transfer function

FCV0587, "XPer Live/Ref Slaving" required when displaying X-Ray Live as back-up.

7

Monoplane LCD support for control room

1

Display support to increase display height and create storage volume to put away keyboard, mouse and cabling

8

Xper Live/Ref Slaving

3

Xper Live/Ref Slaving

The Xper Live/Ref Slaving will enable the option to slave the Live or Ref video source from the Allura Xper. The total amount of

Xper Live/Ref Slaving that can be selected is max 4.

Xper Live/Ref Slaving is possible:

- In Control Room icw FCV0011(B/W monitor in Control Room)
- In Philips MCS (additional monitor excluded from this option)
- icw FCV0519 1 or 2 MCS from Skytron/Steris

9

MultiSwitch.

1

MultiSwitch/Xper Window Switch

MultiSwitch is an option that provides the ability to share the Xper workspot in the Control Room with other applications that are loaded on separate PC modalities.

The MultiSwitch option allows switching of the (colour LCD) data monitor, keyboard and mouse, normally connected to the Allura Xper system, to a separate PC modality.

Thus saving significant space in the control room as only one monitor and keyboard is used for multiple applications.

Applications that are loaded on this PC modality, will run independantly of the Allura Xper system, operated from the Xper workspot in the control room. Obvious example PC applications from PMS are Xcelera, Xcelera CLM, 3D RA, StentBoost, Viewforum.

In addition to the Allura Xper system, up to three separate PC modalities can be connected to MultiSwitch. If these PC modalities are also connected to an Ethernet Network, the ethernet connection will also be switched by MultiSwitch.

The requirements of the PC modality that is connected to MultiSwitch, and the applicable applications are:

- maximum resolution for the colour LCD display: 1280*1024 VGA
- PS/2 keyboard- and mouse interface
- complies with UL60950 regulations and EMC level A

The maximum power supply requirement for three PC modalities (incl accessories) in total should not exceed 1400 Watts@230 VAC.

The MultiSwitch option comprises:

- KVM Switch box (4 inputs, 1 output)
- Ethernet switch (3 inputs, one output)
- 5 ea cable sets for keyboard, mouse and VGA
- 3 ea power cables for the PC modalities and one power cable for the ethernet switch
- 4 ea ethernet cables

The Xper Window Switch is an option that provides the ability to integrate networked functionality in the Control Room of the Allura Xper Flat Detector system. The Xper window switch provides the possibility to switch to CIS/RIS applications that are available on the network and are basically data-only oriented.

Xper Window Switch to any RIS/CIS

The Control Room workspot can be switched to the hospitals' Cardiology/Radiology Information System. Only the user-interface devices Data Monitor, Keyboard, and mouse are switched via standard available solutions: "X-window", and "HTML browser" to become a standard UI for the RIS/CIS system.

This option is a software key which enables the specific Xper switch functionality for only the applications, which are available on site.

Compatible with:

- . Allura Xper FD10 R.3
- . Allura Xper FD10/10 R.2

10

RIS / CIS DICOM interface

1

This package allows communication of the Allura Xper system with a local information system (CIS or RIS). The interface uses the DICOM Worklist Management (DICOM WLM) and Modality Performed Procedure Step (DICOM MPPS) standards.

If a hospital has an Allura Xper system and an information system it can receive patient and examination request information from the information system and report examination results in order to:

- Eliminate the need for retyping patient information on the Allura Xper
- Prevent errors in typing patient names and registration numbers (ensuring consistency with IS information to prevent problems in archive clusters or to search for a name in case of later retrieval)
- Inform the IS about the acquired images and radiation dose

Upon request from the Allura Xper system the complete worklist with all relevant patient and examination data is returned from the IS to the Allura Xper system. For each patient the following information will be shown on the Allura Xper after it has been retrieved from the IS:

Patient Identification:

- Patient name
- Patient ID
- Birth date
- Sex

Examination/Request Information:

- Accession number
- Scheduled procedure step start time
- Scheduled performing physician's name

It is possible at all times to enter patient demographics information manually within the Allura Xper system in case of an emergency or in case the local Information System connection is down.

On request of the clinical user the Allura Xper will report the following information about the selected patient to the IS:

Patient Identification:

- Patient name
 - Patient ID
-

- Birth date
- Sex

Examination/Request Information:

- Accession number
- Performed procedure step status start/end date and time
- Performing physician's name
- Referenced image sequence

Radiation dose:

- Total time of fluoroscopy
- Accumulated fluoroscopy dose
- Accumulated exposure dose
- Total dose
- Total number of exposures
- Total number of frames

Further detailed information can be found in the Allura Xper DICOM Conformance Statement.

The interface requires an EasyLink (hardware and software) if the IS is not compliant with DICOM Work List Management and Modality Performed Procedure Step.

11	Lab Reporting	1	Lab Reporting allows the user to generate and print simple reports in modality stand-alone situations. The user is able to incorporate free text and clinical images. The reporting functionality is suited for local printing and email. Part of the report is generated automatically from administrative data (e.g. patient/exam data hospital name) and required data (e.g. run-log dose information and event-log).
12	Dicom Print compose	1	Dicom Print provides the possibility to interface to any DICOM Printer. This is an automated printing protocol. The option provides Print Manual Overrides, Print Job submission, and Print Job management.
13	Table APC	1	<p>The Automatic Position Controller (APC) for the table provides two modes of operation:</p> <ul style="list-style-type: none"> • Auto positioning. The tabletop position and table height will be adjusted automatically to the pre-defined default point of interest. This to save time and x-ray dose at the start of an exam or for setting up the system for rotation scans. • Store/recall of a position of the table top. This includes the height-, longitudinal- and lateral position of the table top.
14	FD Rotational Angio	1	<p>Rotational angiography provides real-time 3D impressions of complex vasculature and coronary artery tree. It acquires multiple projections with just one contrast injection via a fast rotational scan of the region of interest.</p> <p>Rotational Angiography can be used during screening procedures to quickly determine the optimal projection for the study as the angle (rotation/angulation) of the projection is indicated on each image.</p>

Compared with traditional angiography, Rotational Angiography can save considerable time, dose and contrast, while providing image detail required for diagnostic and therapeutic decisions.

A rotational scan is possible both with the Allura Xper systems in the side position (ceiling mounted systems) and in the head position, providing the flexibility to perform procedures virtually from head to toe.

C-arm in side position:

- Max. rotation Speed: 30 degrees/s
- Max. rotation Angle: 180 degrees

C-arm in head position:

- Max. rotation Speed: 55 degrees/s
- Max. rotation Angle: 305 degrees

Max. Frame speeds are given by the framespeed specifications of the system configuration.

The speed and range of rotation are the highest available (see table). The very high speed allows using less contrast, whereas the very wide rotation range provides a complete evaluation of the anatomy.

A contrast run can be followed up with a mask run, to allow image/run subtraction.

The stand is designed for a very high mechanical stability. It offers precise positioning and high reproducibility, assuring you of high quality images and excellent subtraction studies.

Operation of Rotational Angiography is extremely easy. The procedure is selected, set up and executed virtually in a matter of seconds, supporting the highest patient throughput.

A set of dedicated acquisition programs is available on the Xper Module and can be selected at the touch of a button. The rotation end- and start-positions are easily selected. The procedure is controlled from the exposure hand- or footswitch.

15

Subtracted Bolus Chase

1

For visualization of vessel structures when the blood flow is difficult to estimate, in particular in the lower peripherals.

Bolus Chase solves the problem of cumbersome step movements, the mismatch between blood flow and selected program, and lack of real-time image information.

During digital acquisition in non-subtracted mode with uninterrupted real-time image display, the contrast bolus is followed (chased) interactively by a motorized table scan movement using a hand-hold speedcontroller to adapt the speed of the table scan to the contrast flow. The framespeed can be adapted as well.

The bolus run is followed with a mask run while using the same speedcurve and framespeed as generated during the bolus run. Viewing is possible in the subtracted and non-subtracted mode. If subtracted viewing is not required, the mask run can be skipped.

Subtracted Bolus Chase gives fast, accurate results for increased patient throughput and improved patient management. Automated exposure control and precise speed control assure a high quality images and excellent subtraction studies.

Comprising:

- automatic exposure control
- tabletop motordrive and hand-held speed controller (tableside)
- technique selection using Xper module, available both tableside and in control room (Xper FD20, FD20/10)

16 CO2 View Trace Software 1

Software package which enables tracing (stacking) of images acquired with CO2 injections. This function can be used during postprocessing next to view trace of images acquired with iodine injection.

17 Storage extension 1

Storage extension

Storage extension provides an increased storage capacity for

Allura Xper FD20 systems the storage is increased from:

- 50.000 to 100.000 images at 1024x1024 matrix
- 12.500 to 25.000 images at 2048x2048 matrix

Allura Centron system the storage is increased from:

- 50.000 to 100.000 images at 1024x1024 matrix

Power requirements:
refer to system configuration

18 extension to 30Fr/sec (mono) 1

Frame Rate Extension increases the system acquisition speed for cardiac applications that require high speed imaging. The frame rate extension increases the acquisition speed to 15fps and 30fps with a 1024x1024 matrix.

19 60Fr/sec extension (mono) 1

Extension to 60 frames per second

Frame rate extension to increase the system acquisition speed up to 60 frames per second for cardio-vascular studies requiring high speed imaging allowing, for example, high speed pediatric applications.

The up to 60 frames per second acquisition speed is achieved with 512x512 matrix.

20 FULL AUTO CAL 1

The AutoCal option is a software package to be used in conjunction with quantitative analysis software packages. It provides an auto calibration procedure for an object to be analyzed that is placed in the iso-center. When the object to be analyzed (e.g. Left Ventricle Vessel Segment) is placed in the iso-center AutoCal avoids the need to:

- acquire an additional image series containing a sphere or grid for calibration purposes
- calibrate manually on a calibration object (e.g. catheter) displayed in the image or image series to be analyzed

21 **Vascular Quant.Sw pkg(Xper)** 1

Functions:

- vessel diameter / stenotic index
- automated vessel analysis
- calibration routines

In addition the package allows manual measurements of line lengths (absolute and ratio's) and angulations. Multiple measurements in one image are possible.

Compatible with:

- Allura Xper FD10 Rel 3 and FD10/10 Rel 2 onwards
- Allura Xper FD20 Rel 2 and FD20/10 Rel 2 onwards
- Allura CV20 R1 onwards

22 **ViewForum for CV with LCD** 1

ViewForum combined with the Allura Xper System provides a parallel working environment to increase patient throughput and procedure efficiency. It allows for parallel viewing and processing of previously acquired images. These images can be from the current or previous patient. The ViewForum enables a multi-modality work environment for physicians and staff in preparation and review of CT, MR, US and X-Ray studies. The viewforum includes a 19" LCD color monitor for the control room.

The ViewForum standard functionality includes:

- visual shutters, stack and tile viewing, cine, movie-export, sequence generation of volumes and projections, linking annotations and measurements
- Print Protocols and Editor.
- Full DICOM communications (Incl. Query and Retrieve, import and export).
- CD and DVD Writing (DVD+RW), a DICOM viewer will be burnt with all CD's and DVD's
- Support for DICOM Standard Grey-scale for best image quality.

The ViewForum includes the X-ray vascular package. The X-ray Vascular Analysis package enables advanced, off-line vascular processing. All processing settings of the acquisition system remain available and can be manipulated to obtain optimal results for reporting or further detailed analysis.

The package includes:

- Remasking
 - Subtraction (incl. run subtraction)
 - Manual Pixel Shift
 - Split Screen (horizontal or vertical split)
 - AutoWarp Pixel Shift("rubber band" transformations)
 - Landmarking or Viewtrace (for CO2 and Iodine)
 - Automated Vascular Analysis (AVA) for stenosis measurements
-

- Multi Planar Reconstruction (MPR):
 - Rendering of arbitrary slices through the data volume lets you optimally visualize anatomy in any cut plane direction and also in curved planes.
- Maximum and minimum Intensity Projection (MIP):

- Visualization of the highest intensity along the line of sight, typically used for vascular visualizations.
- 3D Volume Rendering (VR) with:
 - State of the art shaded volume rendering technique for CT and MR datasets
 - This feature also re-renders 3D RA and Xper CT image sets
 - Linked to MPR/MIP and original images for enhanced diagnostic confidence (reference views with triangulation)
- Task guided advanced segmentation toolset. The tools also include a tissue management function allowing the user to compose visualizations with different segmentations to clearly emphasize anatomical structures.
- Task guided movie generation and capture tools, one Protocollized and one freestyle version.
 - The Protocollized tool lets you define spin, bounce, roll and set the range of movie as well as the number of images. This is a tool of choice for strait forward movies for MPR, MIP or 3D renders. Save the results as original or secondary capture (protocol movie) or as AVI (for PowerPoint).
 - The freestyle movie tool has another purpose; it facilitates the specific visualization of pathology. It allows the user to set a number of key images in any position, render type and zoom modus. From these key images it automatically generates an “interpolating” movie allowing the viewer to follow pathology. Store your results in a PowerPoint compatible AVI.

Content:

- Extended graphical card with 768 MB memory.
- ViewForum Volume Vision software

25 Cath Arm Support 1

For brachial catheterisation and digital imaging technique
The support is made of X-ray transparent material with exception of the fixing clamp and pivots.

26 Pulse Cath Arm Support 1

Facilitates catheterization through the pulse and provides room for placing catheterization instruments. It is a flat radio translucent board and is placed under the patient while a part projects at either the left or right side of the tabletop to support the arm.

Size: 100 x 85 cm

Material: carbon-fibre reinforced material

27 Ratchet compressor 1

Accessory with quick-set lever stop.

Includes:

- 3 Cotton compression belts 23 cm wide
- Ratchet-winding mechanism on one side for symmetrical compression

28 Peripheral X-ray Filter 1

Set of flexible x-ray filters to provide an uniform density in angiographic examinations of the lower peripheral area.

Comprising:

- one central filter, at the top edge provided with sizing markers at every 5 cm, length : 1 m
- two side filters, length: 1 m

29

Pivot for table base.

1

For angiographic- and interventional procedures of the upper peripherals.

Provides improved table access for patient transfer.

Allows pivoting of the table base around its vertical axes.

Pivot range from -90 degrees to + 180 degrees (or -180 to +90 degrees) with locked positions on 0, -13/+13 (facilitating arm-angiography) and -90/+90 and 180 degrees.

Comprising:

- pivot device with graduated scale to be mounted on the universal floor plate of the table.

Compatible with Xper Table

30

Xper Table Tilt

1

This innovating SyncraTilt enhances the accuracy and efficiency of gravity-oriented procedures. It is available as an option for the Xper table in Allura Xper series systems.

SyncraTilt is ideal for interventional, myelography, phlebography and head down procedures because it provides more precise imaging of contrast medium, blood, or objects in the body.

With SyncraTilt, the isocentre is automatically located at the isocentre of rotation and angulation of the stand. If the longitudinal position of the stand changes, the tilt isocentre is changed to match with the new stand position. As a result, the region of interest is always centred

As the table tilts, the X-ray beam automatically coordinates to the movement.

The table floats even when tilted, and the region of interest can be followed by panning the tabletop.

When combined with the Bolus Chase option, SyncraTilt enables phlebography to be performed with a head-up tilted patient.

The option provides:

- maximum tilt range:
- 17 degrees (head down) to +17 degrees (head up).
- tilt speed: 2 degrees/sec
- automatic safeguarding system with manual override
- panning range in tilted plane: equal to the standard
- tabletop specifications (longitudinal 120cm, lateral 35cm)
- easy to use controls

Comprising:

- Tilt drive with user controls`

Compatible with:

. Xper table in Allura Xper FD series Rel 3 onwards (monoplane versions) and Rel 2 onwards (biplane versions)

- . Bolus Chase
- . Pivot for table base
- . swivel for table base

31 Cradle extension 1

This extension provides the possibility to cradle the table top.

This allows optimal positioning of the patient for f.i. more invasive (surgical) or guided puncture procedures.

Functionality:

- . isocentric cradle with maximum cradle range: -15 degrees to +15 degrees for the full tilt range
- cradle speed: 3 degrees/sec
- . automatic safeguarding system with manual override
- . easy to use controls

32 Table top brake kit for the Xper 1
Table

The table top brake kit prevents the table top from floating in case of a power off situation.

A friction brake is applied to stop the longitudinal and lateral movement of the table top.

33 Patient straps 1

Straps for patient fixation.

Set of 5 straps:

- 3 long straps
- 2 short straps

34 Dripstand 1

Drip stand for hanging fluid bags

35 Arm support 1

Arm support for brachial and radial artery access and arm angiography. The support is made of X-ray transparent material and includes a mattress pad for increased patient comfort.

36 Neuro Wedge 1

The neuro wedge is used to obtain optimal iso center position of the head during neuro-radiology examinations.

37 Add.op-rail with cable ext.kit 1

The content of the additional OP-Rail kit is:

- [A] One additional OP-Rail (mechanical)
- [B] Cable Extension for OP-Rail
 - One Extension cable for Geo Module
 - One Extension cable for Imaging Module
 - One connection box (wherein the extension cables are coupled with the UI-Module cables.

[A]

- An extension for the table op-rail (30cm).
- The additional op-rail can be mounted at the both sides of the tabletop part where no op-rails are mounted.

- The additional op-rail is compatible with AD5 and XperTable (cardio and neuro) patient-tabletops.
- The op-rail has the same profile /dimensions as the current standard op-rail
- The maximum load (downwards) on the additional op-Rail is 100 N (F=100N)
 - (this is limited by the tabletop of the Patient Table)
- The maximum mechanical moment on the additional op-Rail is 40Nm downwards and 20Nm upwards
 - (this is limited by the tabletop of the Patient Table)

[B]

- The cable extension consists out of two cables with a length of 1.3 m; one for the Geo and one for the Imaging module, and an interface box were the coupling to the
- Geo and Imaging module cables can be made.

38 **CABLE CARRIER CS** **1**

Additional carrier for suspension of cable hose from X-ray tube assembly or TV monitor.

39 **Interventional Tools Hardware** **1**

The interventional tools hardware is the computer that enables the 3D interventional tools, it allows to import and view DICOM compatible data from other imaging modalities The interventional Hardware comprises at least a Harddisk containing operating system and application software.

40 **Real time image link** **1**

Real Time digital image link to an off-line Allura Interventional Hardware station. This applies on the applications 3D-RA, StentBoost and 3D-CA on the Interventional Hardware. This dedicated digital link sends raw or processed image data (depending on the application) real time during monoplane exposures to the connected Interventional Hardware station, to allow instant results of the applicable reconstruction after the exposure run.

In biplane systems, this digital link is available for the frontal channel only.

41 **3D RA Control for Xper Module** **1**

Table Side Module functionality for Allura Xper FD20 used with Integris 3D-RA Release 4.2.

For further improvement of interventional procedures efficiency the following workflow enhancers are made available in the examination room: With the Xper touchscreen module the physician has all 3D functionality needed at tableside. Functionality like rotating panning zooming AVA Virtual stenting 3 and 3D Follow C-arc can be performed. No need for the Physician to leave the examination room. 3D Automatic Position Control (3D-APC); when the optimal working position has been chosen via the Integris 3D-RA interventional tool the C-arc will automatically steer to this position. 3D Follow C-arc: When the position of the C-arc (not using any X-ray) is changed the 3D volume will automatically follow the position of the C-arc. This means the position of the C-arc (and therefore the 2D projection) and the 3D volume are always aligned.

42 **3D Roadmap** **1**

3D Roadmap extends the capabilities of the integrated 3D product by providing a sustainable 3D roadmap to support interventional procedures. The 3D Roadmap option matches the real-time 2D fluoroscopy images with the 3D-RA reconstruction of the vessel tree. It provides a 3D real time insight of the advancement of the guide wire, catheter and coils through complex vessel structures. 3D roadmap has automatic motion compensation for the neuro runs. When the automatic motion compensation function is active, this functionality will constantly correct the motion artifacts which can be present in the 3D Roadmap image.

Image Acquisition

The 3D Roadmap is based on the visualization of the vessel tree out of 3D-RA. The 3D Roadmap is activated with one button touch at tableside (Xper Module). Select the 3D Roadmap function on the touch screen module, activate fluoroscopy and the 3D Roadmap is activated. The "live" 2D fluoroscopy image is overlaid with the 3D volume of the vessel tree and is automatically displayed on the 3D roadmap monitor in both the examination and control room.

Intuitive, fully controlled from tableside:

The bidirectional link between the X-ray system and the 3D Roadmap allows the user to select the optimal stand position for the procedure in two ways. 3D Automatic Position Control allows the gantry to automatically move to the best interventional projection as shown on the 3D Roadmap monitor. 3D Follow C-arc allows the 3D Roadmap to remain in sync with the 2D projection, automatically adjusting viewpoint as the gantry is repositioned.

- Landmarking to adjust the intensity of the anatomical reference surrounding the vessels;
- 3D blending to fade in/out the 3D view;
- WW/WL settings to control the contrast/brightness;
- Store and review runs for reporting and archive purposes;
- Store snapshots and movies.

3D Roadmaps can be sent to:

Any optional DICOM compatible device (e.g. PACS/ViewForum/Xcelera), supported are DICOM XA, DICOM SC, DICOM CT and DICOM 3D

Any PC in a standard PC compatible format (JPEG, AVI)

And stored/archived on

A PACS systems as DICOM Secondary Capture images or movies

USB removable memory device

One or multiple DVD's, CD-ROM(s) for easy archiving

Hard copy via the (DICOM Print) protocol

43

MR/CT Roadmap

1

MR/CT Roadmap extends the capabilities of the integrated 3D product by providing a sustainable 3D roadmap based on previous acquired CT or MR scans to support interventional procedures. The MR/CT Roadmap option matches the real-time 2D fluoroscopy images with the 3D volume of CT or MR.

The CT or MR data can visualize in either 3D (e.g. vascular structure) or with 2D slice in the same orientation as the 2D fluoro image. It provides a 3D real time insight of the advancement of the guide wire, catheter and coils through complex vessel and anatomical structures.

Image Acquisition

A previously acquired CT or MR scan can be imported into the system and matched with a low dose 3D-RA or XperCT scan. The MR/CT Roadmap is activated with one button touch at tableside (Xper Module). Select the MR/CT Roadmap function on the touch screen module, activate fluoroscopy and the MR/CT Roadmap is activated. The "live" 2D fluoroscopy image is overlaid with the MR/CT volume presented in 2D or 3D and is automatically displayed on the roadmap monitor in both the examination and control room.

Intuitive, fully controlled from tableside:

The bidirectional link between the X-ray system and the MR/CT Roadmap allows the user to select the optimal stand position for the procedure in two ways. 3D Automatic Position Control allows the gantry to automatically move to the best interventional projection as shown on the MR/CT Roadmap monitor. 3D Follow C-arc allows the MR/CT Roadmap to remain in sync with the 2D projection, automatically adjusting viewpoint as the gantry is repositioned.

- Easy 2 step registration of the MR/ CT volumes
- Landmarking to adjust the intensity of the anatomical reference surrounding the vessels and tissue
- 2D and 3D blending to fade in/out the 2D or 3D view;
- WW/WL settings to control the contrast/brightness;
- Store and review runs for reporting and archive purposes;
- Store snapshots and movies.

MR/CT Roadmaps can be sent to:

- Any optional DICOM compatible device (e.g. PACS/ViewForum/Xcelera), supported are DICOM XA, DICOM SC, DICOM CT and DICOM 3D.
- Any PC in a standard PC compatible format (JPEG,AVI).

And stored/archieved on

- A PACS systems as DICOM Secondary Capture images or movies.
- USB removable memory device.
- One or multiple DVD's, CD-ROM(s) for easy archiving.
- Hard copy via the (DICOM Print) protocol.

44

DoseAware Bundle

1

DoseAware is a unique solution providing staff working in an X-Ray environment with direct, real time dose feedback, enabling them to optimize their behaviour and reduce exposure to scattered dose. The DoseAware bundle comprises:

- 1 BaseStation Package
- 10 PDMs
- DoseManager
- 2 PDM racks.

Base Station Package

The Base Station is the heart of the DoseAware system. It offers Online View, which displays real time dose rate and immediate dose data for any Personal Dose Meter (PDM) in range. The Walk-Up View enables easy access to personal dose history and PDM settings.

The Base Station has a touch screen interface and wireless communication with the PDM. The PDM dose information is stored within the Base Station and can be retrieved by the DoseAware Dose Manager software via a standard network interface to complete the DoseAware system with archiving and reporting functions.

The Base Station package includes also:

- a cradle and the DoseView software package that can be installed on a local PC (not included), which has Windows XP or Vista as operating system.
- Mounting material for the Base Station, facilitating mounting on a wall or on a Philips Monitor Ceiling Suspension or a Philips mobile C-arm system.

10 Personal Dose Meters

The Personal Dose Meter (PDM) is a small and easy to wear active X-ray dose meter intended to measure and store received X-ray dose of staff, present in an X-ray room during radiation. The PDM has build-in radio-frequency wireless communication (868.3 Mhz for Europe version, 915 Mhz for USA version) to connect to the DoseAware Base Station for real time dose-rate indication and has a long battery life for maintenance-free usage. In addition it can be personalized to increase interest and awareness. The PDM not only records warning level profiles every second

for a total of 3600 sec (cyclic overwritten), but also stores accumulated dose data every hour for maximum 5 years. A clip and a lanyard holder are included to facilitate easy wearing.

The PDM can be configured via the cradle, DoseView, and Dose Manager Software.

Dose Manager Package

The Dose Manager is a software program that serves as archive and reporting facility for all dose data of the DoseAware system. It allows tracking of multiple PDM's at a location.

Core functionality is:

- Store and manage dose history for multiple PDM's
- Collect all dose history from connected Base Stations via the network
- Browse dose history of PDM's as graph or table
- Export dose data for personal analysis with other software tools, like Windows Excel
- Create and print reports of dose history

45

Personal Dose Meter(10 pieces) 1

This package includes ten equal pieces of Personal Dose Meters.

The Personal Dose Meter (PDM) is a small and easy to wear active Xray dose meter intended to measure and store received Xray dose of staff, present in an Xray room during radiation. The PDM has build-in wireless communication to connect to the DoseAware Base Station for real time dose-rate indication and has a long battery life for maintenance-free usage. In addition it can be personalized to increase interest and awareness. The PDM not only records warning level profiles every second for a total of 3600 sec (cyclic overwritten), but also stores accumulated dose data every hour for maximum 5 years.

A clip and a lanyard holder are included to facilitate easy wearing.

The PDM can be configured via the cradle and DoseView (and the optional Dose Manager) software for the following attributes:

- Full name (max 40 bytes)
- Display user name (max 16 bytes)
- User group from list
- PDM ID (max 16 characters)
- Position on body
- Date & time = Real Time Clock, synchronized with local time, and being the clock master for the DoseAware system. With each connection PDM => Base Station => Dose Manager the timing is synchronized automatically.
- Date of PDM assignment to a person
- Dose history reset
- Sleep mode On/Off

- Annual dose limit

The PDM has following specifications:

- Operational unit: HP10
- Dose range: 1 μ Sv – 10 Sv
- Dose resolution: 1 μ Sv
- Dose uncertainty: 5% or 1 μ Sv
- Dose rate range: 10 μ Sv/hr – 50 mSv/hr
(3 nSv/s – 15 μ Sv/s)
- Response time: < 4 s, 40 μ Sv/hr – 100 μ Sv/hr; < 1 s above 100 μ Sv/hr
- Energy dependency X-, γ -rays: N40-N160 (33keV – 118 keV)
- Average battery life: 3 – 5 years, depending on daily use
- Weight: 30 gr
- Dimensions: 45 x 45 x 10 mm (w x h x d)
- Personalization: 8 inlays with colour
- Communication radio: Center frequency 868.3 Mhz for Europe version
915 Mhz for USA version

46

CV Full Travel Pkg OffSite

2

Includes one (1) participant's airfare from North American customer location to Cleveland, Ohio, with lodging, ground transportation, and meal expenses. Breakfast/dinner provided by the hotel, and lunch/breaks are catered by Philips. All other expenses will be the responsibility of the attendee. Details are provided during the scheduling process. Note: Cancellation/rescheduling policy strictly enforced.

Education expires one (1) year from equipment installation date (or purchase date if sold separately).

47

CV Add OnSite Clin Educ 28h

2

Clinical Education Specialists will provide twenty-eight (28) hours of CV OnSite Education for up to four (4) students, selected by customer, including technologists from night/weekend shifts if necessary. CEU credits may be available for each participant that meets the guidelines provided by Philips. Please refer to guidelines for more information. Note: Philips personnel are not responsible for actual patient contact or operation of equipment during education sessions except to demonstrate proper equipment operation. Education expires one (1) year from the earlier of equipment delivery date or purchase date.

48

Vasc Interventional Tools OffSite 20h

1

A Philips Clinical Instructor will provide 20 hours (2.5 days) of in-depth didactic, tutorial and hands on training covering the Vascular Interventional Tools used in conjunction with the FD system. This course is designed to provide basic functionality, workflow and application knowledge necessary to fully utilize the Vascular Interventional Tools programs. Due to software release levels, the software used for training may slightly differ from software used at the trainee's facility. This course is highly recommended and will compliment your standard On-site training for Vascular Interventional Tools.

This 20 hour course is located in Cleveland, Ohio at the Cleveland Training Center. Due to program updates, the number of class hours is subject to change without notice. The customer will be notified of current total class hours at time of registration. CEU credits may be awarded if the participant meets the ASRT guidelines. **Travel and lodging are not included, but may be purchased through Philips. It is highly recommended that 989801292445 (CV Partial Week Travel Pkg Offsite) is purchased.**

- | | | |
|----|---|----|
| 49 | CV 16h to 20h Travel Pkg
OffSite | 1 |
| | <p>Includes one (1) participant's airfare from North American customer location to Cleveland, Ohio, with lodging, ground transportation, and meal expenses. Breakfast/dinner provided by the hotel, and lunch/breaks are catered by Philips. All other expenses will be the responsibility of the attendee. Details are provided during the scheduling process. Note: Cancellation/rescheduling policy strictly enforced.</p> <p>Education expires one (1) year from equipment installation date (or purchase date if sold separately).</p> | |
| 50 | DoseAssure Program | 1 |
| | <p>CV Intervention RadSafe Quality Verification Program:</p> <p>This intensive 4 day program provides site specific, clinically relevant information and processes to verify the IQ performance of the x-ray system(s) in use. The program increases user understanding of the X-ray exposure dose levels to patients, the accuracy of radiation dose displays, the effective use of x-ray imaging techniques, an understanding of radiation dangers, the proper utilization of safe radiation practices and certification of acceptable x-ray system performance.</p> <p>Each session includes an up-to-date Radiation Safety presentation targeted to the unique requirements of the interventional specialist and the associated staff. The Radiation Safety presentation includes defining different x-ray dose types and implications to patients/staff, explains and quantifies three primary dose types, illustrates the industry standard NEMA XR21 dose measurement protocol, details personnel dose monitoring techniques and maximum permissible dose limits, describes conditions known to cause x-ray injury to patients, makes clear proven techniques to reduce x-ray dose to patients/staff, lists the components/functions of the Philips DoseWise system, explains the function of Dose Area Product and Air Kerma displays and integrates x-ray dose monitoring and safety to clinical practices. Education entitlement expires one (1) year from installation date (or purchase date if sold separately).</p> | |
| 51 | Airfare to Cleveland for
Biomed Training | 3 |
| | <p>Includes one (1) participant's airfare from North American customer location to the Cleveland Training Center (CTC) in Cleveland, Ohio. All other expenses will be the responsibility of the attendee. Details are provided during the scheduling process. Note: Cancellation/rescheduling policy strictly enforced. Expires one (1) year from the earlier of equipment delivery date or purchase date.</p> | |
| 52 | Food Transpt Lodging for
Cleveland Biomed Training | 23 |
| | <p>Includes one (1) day of modest lodging, ground transportation, and meal expenses in Cleveland, Ohio for one (1) attendee. All other expenses will be the responsibility of the attendee. Details are provided during the scheduling process. Note: Cancellation/rescheduling policy strictly enforced. Although this part is only for one day, it is sold in multiple quantities to account for entire length of course. Expires one (1) year from the earlier of equipment delivery date or purchase date.</p> | |
| 53 | XD3970ALLURAFD7.6PART1C
TC9 | 1 |

Course Number: XD3970

System Codes: 722010, 722011, 722012, 722013

Course Title: Allura Xper Rel 7.6 Part 1

Course Length: 9 days (exclude Saturday, Sunday, and Philips holiday)

Delivery Method(s): Instructor-Led

Modality: iXR

Location: PHC, SLC, CTC

Target Audience: Service Engineers.

DESCRIPTION:

Part 1 trains the Customer Support engineer to a technical level which will enable him/her to perform Planned Maintenance (PM) and basic Corrective Maintenance (CM) on Allura Xper systems, according to the Customer Support philosophy. He / She will also be able to assist during a system installation.

Part 1 can be followed up by part 2, intended for dedicated Cardio Vascular modality Engineers.

Part 2 focuses on setting to work (configuration) and extended Corrective Maintenance.

The following Allura Xper systems are covered:

FD10 release 7.6

FD10/10 release 7.6

FD20 release 7.6

FD20/10 release 7.6

FD20/20 release 7.6

PREREQUISITES:

CS9020 BASIC NETWORKING

XC3002 X-RAY SYSTEMS BASIC PART 2

COURSE OBJECTIVES:

The engineer will learn how to:

- Operate the system, as far as required to perform service tasks.
- Make use of the service documentation.
- Make use of basic functionality of the service tools.
- Perform Planned Maintenance:
 - Safety checks
 - Performance checks
 - Adjustments(Not included: Mechanical checks)
- Create a backup of the system.
- Perform a restore of the system.
- Perform basic CM with help of the service documentation and service tools.
 - Faultfinding using the System Manual Corrective Maintenance.
 - Focus on replacement of parts with a high exchange rate.
 - Retrieve the log file from the system to escalate a problem.
- Customize positions for Automatic Position Control in the EPX-database.

MAJOR TOPICS:

Introduction Allura Xper systems

Operating

Service documentation

Service tools

Planned Maintenance

Corrective Maintenance

System Architecture

X-ray generation

Geometry

Operator controls

Power supply

Imaging

System control
Radiation safety
Image quality
Customization
Software

* PHILIPS PROPRIETARY MATERIALS SUCH AS DIAGNOSTIC SOFTWARE AND SERVICE DOCUMENTATION ARE NOT INCLUDED IN THE TRAINING AND WILL NOT BE AVAILABLE FOR USE OUTSIDE OF THE TRAINING ENVIRONMENT. THE TRAINEE MUST RETURN ALL PROPRIETARY MATERIALS RECEIVED DURING THE TRAINING AT THE END OF THE TRAINING. CUSTOMER ACKNOWLEDGES AND AGREES THAT NEITHER CUSTOMER NOR TRAINEE WILL RECEIVE A LICENSE TO SUCH PROPRIETARY MATERIALS AND THAT THE TRAINEE MAY NOT BE ABLE TO FULLY UTILIZE THE TRAINING WITHOUT THE USE OF SUCH PROPRIETARY MATERIALS. (CERTAIN LICENSES MAY BE OBTAINED THROUGH PURCHASE OF AN ALLIANCE CO; OP AGREEMENT.) Course dates and location to be finalized by Philips. Philips shall attempt to accommodate Customer requested dates and training location. The price quoted includes course tuition. Travel and living expenses are not included, but may be purchased separately through Philips.

IMPORTANT Notes Regarding Admission to Philips Customer Engineer Training Courses:

1. Trainee must meet all prerequisites
2. Course expires one (1) year from equipment installation date (or purchase date if sold separately)
3. Customer must sign Philips Nondisclosure statement
4. Trainee must sign Philips Nondisclosure statement
5. Customer must sign Philips terms and conditions of training

54

XD3972 Interventional ToolsR8 1
CTC3

Course Number: XD3972

System Codes: 722010, 722011, 722012, 722013

Course Title: Interventional Tools R8

Course Length: 3 days (excludes Saturdays, Sundays, and Philips holidays)

Delivery Method(s): Instructor-Led

Modality: iXR

Location: PHC, SLC, CTC

Target Audience: Service Engineers.

DESCRIPTION:

This course is a follow up on the Allura Xper Part 2 course and is intended for dedicated Cardio Vascular modality Engineers.

This course trains the Customer Support engineer to a technical level which will enable him/her to perform complete Installation, Planned Maintenance and Corrective Maintenance on Interventional Tools.

The following Interventional Tools are covered:

3DRA rel.x / 3D Road mapping
Stent Boost rel x / Stent Boost subtract
3DCA
CT True View
XperCT / Xper Guide
Multi Modality Matching

PREREQUISITES:

XD3967 or XD3971 or XD3875 or XD3879

COURSE OBJECTIVES:

For Interventional Tools, the engineer will learn how to:

- Perform a complete installation, including setting to work
- Make use of the service documentation.
- Operate Interventional Tools as far as required to perform service tasks
- Perform Planned Maintenance.
- Perform Corrective Maintenance; with help of the service documentation and service tools.
 - Distinguish technical problems from incorrect operating.
 - Faultfinding using the System Manual Corrective Maintenance.
 - FRU replacement.

MAJOR TOPICS:

- Operating
- Installation aspects
- Service tools
- Corrective Maintenance
- System Architecture
- User Interface
- System control
- Interoperability
- Customization
- Software

* PHILIPS PROPRIETARY MATERIALS SUCH AS DIAGNOSTIC SOFTWARE AND SERVICE DOCUMENTATION ARE NOT INCLUDED IN THE TRAINING AND WILL NOT BE AVAILABLE FOR USE OUTSIDE OF THE TRAINING ENVIRONMENT. THE TRAINEE MUST RETURN ALL PROPRIETARY MATERIALS RECEIVED DURING THE TRAINING AT THE END OF THE TRAINING. CUSTOMER ACKNOWLEDGES AND AGREES THAT NEITHER CUSTOMER NOR TRAINEE WILL RECEIVE A LICENSE TO SUCH PROPRIETARY MATERIALS AND THAT THE TRAINEE MAY NOT BE ABLE TO FULLY UTILIZE THE TRAINING WITHOUT THE USE OF SUCH PROPRIETARY MATERIALS. (CERTAIN LICENSES MAY BE OBTAINED THROUGH PURCHASE OF SUPPORT OR ASSIST AGREEMENT.) Course dates and location to be finalized by Philips. Philips shall attempt to accommodate Customer requested dates and training location. The price quoted includes course tuition. Travel and living expenses are not included, but may be purchased separately through Philips.

IMPORTANT Notes Regarding Admission to Philips Customer Engineer Training Courses:

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55	Blue Anti-Fatigue Floor Mat w/ Logo	1
	Blue Anti-Fatigue Floor Mat w/ Logo	
56	40x50CM Rad Shield w/ Ext Arm-Ceiling Mnt	1
57	PIVOTING TABLE-MOUNTED RADIATION SHIELD	1

Table-mounted radiation shield for additional protection of physician and staff against scatter radiation. The shield consists of two protective parts: a lower shield and an upper shield. The shield is specially designed for use with the AD5 patient table.

The table mounted radiation shield provides the following features:

- Mounting to either the right or left table accessory rails;
- Pivoting into the required working position;
- Pivoting into the parking underneath the tabletop facilitating patient preparation;
- The upper shield can be positioned upright providing optimal protection or can be folded down for free access to the patient.

The table mounted radiation shield includes:

- Lower shield measuring 70 cm high 80 cm wide 0.5 mm Pb equivalence;
- Upper shield measuring 40 cm high 50 cm wide 0.5 mm Pb equivalence;
- Mounting clamp;

Docking device for wall mounting.

58 Cable Spooler 1

59 M LED 3MC Light 1

MAVIG M3 MC LED - Multi Color / power Supply Included
Includes Portegra2 Ext Spring Arm 75/90cm

60 Medrad Xper Cable Rack Mnt 1

61 Medrad Provis Rack Mount 1

The MARK V ProVis rack mount version is a contrast medium power injector which is dedicated for system integration.

The injector is accomplished with microprocessor control of the flow rate the volume and the pressure. A dual turret syringe system is applied suitable for 2x150 ml disposable syringes.

- flow rate can be set in ml/sec. ml/min. and ml/hour.
- display of achieved rate volume pressure and time.
- constant update and display of total injected contrast per patient
- injection programs can be stored and retrieved.

Comprising:

- electronic unit for rack mounting with power cable (3 m)
- injector head with controls heater system and cable (4.6 m)
- two disposable 150 ml syringes with pressure jackets and dual turret.
- control panel with cable (15 m)
- hand switch with coiled cable
- system interface cable 24 m with D connector
- rack mount installation kit

WSXGA 1440x900 16:10 (8:5)
WSXGA+ 1680x1050 16:10 (8:5)
WUXGA 1920x1200 16:10 (8:5)
2K 2048x1080 19:10
TV1080I/P 1920x1080 16:9
TV 480I 720x480 4:3
TV 480P 704x480 4:3

68	Universal Power Supply	1
	25 KVA Universal Power Supply (UPS)	

69	Room Moves	1
	Remove GE Innova from existing room	

OPTIONS

Line #	Description	Qty
1	Volcano Joystick Option Kit A compact joystick that comes with a clamp to be mounted on the patient bedrails. Some physicians prefer to control the IVUS system via a joystick, and this option provides this functionality. Can be operated under the sterile drape.	1
2	Volcano Print Kit A compact color thermal printer that is used to print IVUS images for physician reference, the patient file, or to provide to the patient. Connects directly to the CPU in the control room via USB.	1
3	Volcano Video Switch Opt kit In cases of established labs that have limited monitors on the boom, an optional 4-port video switch permits for toggling of multiple video inputs to one monitor. If the lab already has a video switch with an open port, this option would not be required.	1
4	Volcano Witt ECG Cable Kit The VH IVUS functionality from Volcano requires an input signal from the labs ECG signal. This custom connector ensures connectivity for the ECG signal from a specific ECG system. NOTE: Every s5i installation will require an ECG connection. Note the labs ECG system when ordering.	1
5	Volcano IVUS s5i The base components required to operate a Volcano IVUS s5i system, including: the system CPU; a control console for the control room; a bedside touchpad controller; a patient interface module (PIM); an isolation transformer through which power is supplied to the CPU; a USB extension kit which transmits data and power between the CPU and patient bedside-mounted peripherals; a 19" LCD monitor for the control room. The core bundle also includes installation of components, excluding pulling cables, which will be done by Philips. Cables required to operate the Volcano IVUS s5i system. The kit includes a patient interface module (PIM) cable, a shielded CAT5 Ethernet cable, an ECG cable, and a grounding cable. These cables need to be laid in the dedicated pipe connecting the patient table area to the control room. All cables in this kit are 30 meters in length. Patient interface module (Pimmett) for FFR wires and all hardware required for the Fractional Flow Reserve Fractional Flow Reserve for IVUS system. FFR measures pressure changes in the vessel to assess lesion significance. System is compatible with Volcano's PrimeWire™ product. Includes FFR PIM and FFR cable.	1
6	Rotational IVUS Upgrade Kit Rotational Option: Adds rotational IVUS functionality to the IVUS system. System is compatible with Volcano's Revolution™ catheters.	1
7	ZeroGravity Floor Unit ZeroGravity Radiation Protection System Floor Unit <ul style="list-style-type: none"> • Moveable base • 77" boom arm • One 1.0 mm Pb body shield • One 0.5 mm Pb face shield 	1

OPTIONS

Line #	Description	Qty
	<ul style="list-style-type: none"> • Anti-reflective coating on center (3) panels of head and face shield • Three nylon mesh vests: customer's choice of sizes: S, M, L, XL, 2XL, 3XL, • One box of 20 sterile, disposable covers 	

Includes one day post delivery in-service/training

The ZeroGravity Radiation Protection System, developed by CFI medical Solutions, is a cutting edge radiation protection device that is superior to conventional lead aprons and their equivalents. Designed to protect caregivers from radiation exposure, the ZeroGravity system is unique in that it doesn't weigh down the user like traditional protection technology. Absolutely no weight is placed on the body of the interventionalist as the ZeroGravity system operates very smoothly along an X, Y, Z axis, requiring little effort. The device is designed with the end user in mind and creates a safe working environment for the patient and the caregiver. Heavy lead aprons lead to progressive back pain and can eventually cause irreversible damage to the spine. ZeroGravity protects you from discomfort so you can continue to give comfort to your patients.

Reduced Orthopedic Risks

- Customizable, lightweight Airware Vest makes engaging and disengaging effortless
- Interventionalist bears no weight, reducing long term orthopedic risks
- Sturdy frame provides total support of apron
- Reduces strain to practitioner health by wearing heavy lead alternatives

Increased Radiation Protection

- 1.0mm lead equivalency protects the user from the thyroid to shin
- Twice the protection compared to standard lead aprons
- Provides 0.5mm protection where previously there was none available
- Front and side protection from direct and scatter radiation

Ease of Use

- User freely engages and disengages without assistance and without breaking sterility
- Intuitive draping procedure can be done in seconds by a single individual Magnetic Airware Vest fits comfortably beneath the sterile gown
- Contact between the device and the body is minimal, giving an open, ventilated feeling
- The system does not impede activity or motion involved during case work; full mobility is maintained

AMB Cove Standard Design Service

The Ambient Experience solution begins with recommendations to optimize the clinical area in terms of workflow and storage, including opportunities to minimize clutter for a more soothing environment. These recommendations are incorporated into the standard equipment Site Plans.

The Ambient Experience Design Consultation includes room layout, design, and finish recommendations.

Standard Design does not include on site design services.

Customer Responsibilities Include:

- Provide detailed floor plans and sections of the specified areas (in CAD and PDF format).
- Provide access to hospital resources to discuss the specific workflow of the specified areas.
- Provide access to the identified space during normal business hours for the implementation of the Ambient Experience technology elements.
- All construction, electrical and infrastructure required by the Ambient Experience Solution and implementation. Such as (but not limited to): curved walls, electrical and low voltage cabling, conduit and trays for AE cabling, expanded control room glass, millwork for storage and work desks, mounting support brackets for projectors, and all necessary task or work lighting.
- Provide a single point of contact to work with in planning and implementing the services described.
- Work with Philips to accomplish their task, in an agreed upon timeframe, in order to facilitate the project.
- Any and all expenses related to required Union or Contracted Labor for construction or implementation of the Ambient Experience technology and/or design elements specified for this project.
- Provide a Programming document with accurate and complete information of all functional requirements and expectations for the project. This information includes: objectives, constraints, special equipment needs, adjacent space relationships and other site requirements.
- Identify architect of record for project. The Philips Ambient Experience Team and Customer architectural team will collaborate closely on this project.
- The architect of record will be responsible for all final architectural and construction drawings and validation that these drawings meet all applicable regulations and code requirements.
- Participation by Customer, and their architects and engineers, in design presentations.