



# Putting patients first

Philips Xcelera – excellent connectivity, excellent care through effective cardiology image management, analysis, and reporting

**PHILIPS**

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# 1. Putting patients first

Philips Healthcare strategy is to help provide better care for patients while improving workflow and having a positive impact on the financial operation of a hospital.

A robust multimodality and multivendor cardiology image management, analysis, and reporting solution, Xcelera provides patient-centric access to cardiology data and examinations. The system is highly configurable, scalable, and customizable. Optional plug-ins provide support of ultrasound, cardiovascular X-ray, nuclear medicine, computed tomography, magnetic resonance, and electrophysiology studies. In addition, chest X-rays can be displayed in order to assess the positioning of central venous access lines. Optional interface software enables the viewing of electrocardiograms, from select ECG management systems, at the Xcelera workspace. Xcelera performs the necessary functions for exam storage, allows for study review, and offers various optional analysis and quantification packages and clinical reporting tools.

## Designed around you

Xcelera features a **customizable, patient-centric user interface** that allows studies from multiple modalities to be organized and viewed according to the user's personal preferences. The Xcelera Main Window allows users to sort by patient name, study type, physician, date, and medical record number. To **facilitate diverse workflows** at multi-site, multi-department facilities, users can filter studies by institution, department, and modality level. The intuitive interface combined with the range of options allow institutions to create an efficient, customized system that provides information and images when and where they are needed to enhance patient care.

## Xcelera enhances efficiency and patient care by helping you:

- **Save time and simplify workflow** – Review studies, images, and reports from multiple departments at a single workspace
- **Get through your worklist fast** – Correlate information from multiple sources at one workspace supporting confidence in clinical decision making
- **Access simultaneous information** – View the function and morphology of the heart at the same time



One patient-centric  
workspace



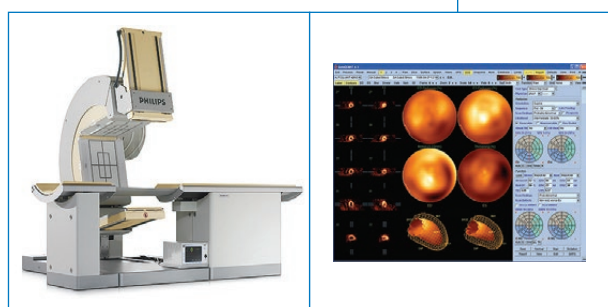
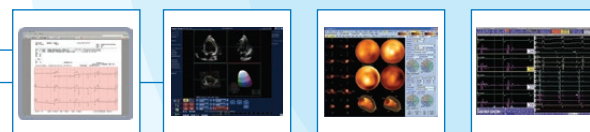
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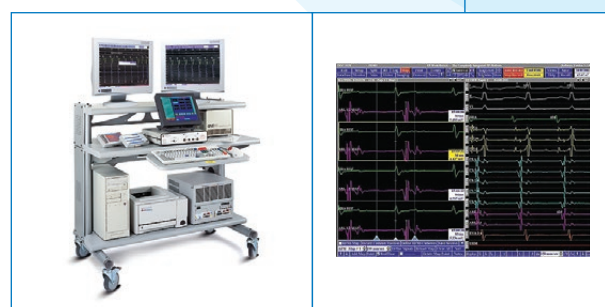
Multimodality viewing  
and reporting<sup>1</sup>



Cardiovascular ultrasound



Nuclear cardiology



Electrophysiology

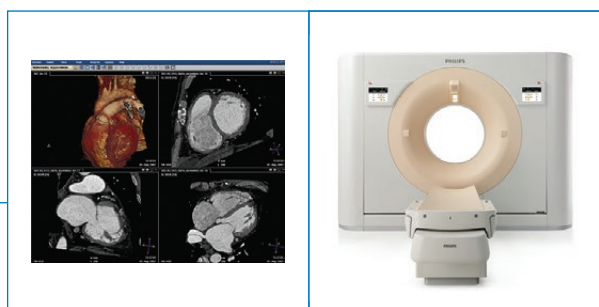
By bringing together patient information and tasks, Xcelera provides you with the power to manage and improve your workflow.



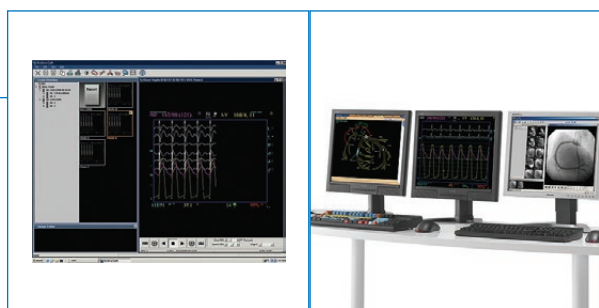
## Advanced clinical applications



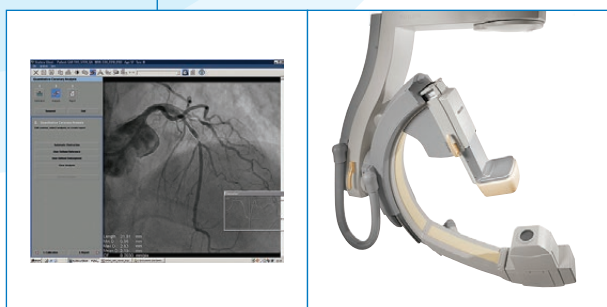
Cardiac MR



Cardiac CT



Physiomonitoring



Cardiovascular X-ray

<sup>1</sup> Exam review available for ECG, Ultrasound, Nuclear Medicine, ICE, IVUS, MR, CT, Chest X-ray, Cath, and EP recording signals and mapping. Reporting and advanced clinical applications options are available for Ultrasound, Nuclear Medicine, Cath, and EP recording signals.

Note: Cath reporting and hemodynamic monitoring delivered via Philips Xper Information Management.



## 2. Scalable solution extends clinical reach

Xcelera's expandable nature allows it to accommodate institutions, large and small.

### Tele-Cardiology: work where, when, and how you want

The need for a standardized workflow is emerging as cardiologist demands for availability of patient data at any point and time grow. Tele-Cardiology options in Xcelera significantly expand the scope of reviewing and sharing cardiology information. Images and reports can be accessed long distance through a secure connection. Hospitals can share information with affiliated clinics and other sites in a larger enterprise or even allow cardiologists to access relevant studies from remote locations, such as their homes. No matter the destination, Xcelera delivers full-fidelity to the user's computer system with consistent functionality to view images, perform quantification, and create reports.

Tele-Cardiology **benefits the cardiologist on the move** and improves clinical support for satellite clinics. With Xcelera's tele-cardiology solution, users can:

- Push batches of exams to a remote location prior to review and analysis
- Send studies to a shared drive at a location to be conveniently accessed by other clinicians at that location
- Pull exams on demand for convenient access, allowing for remote review, quantification, and reporting while away from the cardiology department
- Copy exams to a laptop or external drive to be reviewed later

### Results on-demand

Xcelera Cardiology Enterprise Viewer (CEV)<sup>1</sup> provides dedicated functionality to distribute exam results, including images and finalized clinical reports, across a healthcare enterprise. Whether users need to share information with a referring physician, another cardiologist, or have results available for reference purposes, Xcelera CEV is a true thin client application and **access to images and reports is as close as an Internet connection**. Xcelera's results on-demand

option facilitates the review of reference images and finalized reports from the ICU, the exam room, the office, and even a home computer when an internet connection is available.

### Enterprise interfacing saves time

Patient-context interfacing of Xcelera with an electronic medical records system or other clinical application provides patient-centric access to exams for **improved workflow and enhanced delivery of patient care**.

Via this option, the clinical system acts as a host application for Xcelera.

### IntelliBridge Enterprise helps you enhance workflow

Xcelera can be combined with IntelliBridge Enterprise to provide two-way communication to help you enhance workflow. Adding IntelliBridge Enterprise<sup>2</sup> facilitates data transfer from other hospital systems into the Xcelera workflow. Xcelera can receive and utilize data from multiple Hospital Information Systems (HIS) and Cardiovascular Information Systems (CVIS) and send results to multiple HIS and CVIS systems.

IntelliBridge Enterprise supports:

- Inbound ADT messages to provide important demographic data to Xcelera to reduce input errors and help improve workflow
- Inbound orders to facilitate DICOM Modality Worklists
- DICOM Modality Worklist to provide pre-populated patient information at the modality
- DICOM Modality Performed Procedure Step to send key procedure data to the receiving system
- Unformatted echo results to allow discrete procedure information to be sent to a central system
- Formatted Results to provide the export of clinical reports to an external CVIS or clinical repository via HL7
- Exported clinical reports to have a consistent appearance to those displayed in Xcelera

<sup>1</sup> For a detailed description see Xcelera Cardiology Enterprise Viewer functional description

<sup>2</sup> Optional

### Xcelera supports Enterprise Master Patient Index

Enterprise Master Patient Index (eMPI) allows for a single view of patient records and relevant cardiovascular studies from multiple institutions in **one virtual patient folder**. This functionality alleviates the inefficiencies and delay in care that can result if a patient has previously visited several different hospitals in the enterprise for treatment, with a different medical record number assigned at each facility. With Xcelera, users have a true, patient-oriented perspective that **saves the clinician's time** by preventing patients who have had an exam at one site from having to unnecessarily repeat the procedure at another.

### Security and patient privacy

Xcelera is designed to provide both enhanced connectivity and enhanced data security, allowing users to connect seamlessly and securely within the healthcare enterprise environment. A single Xcelera system serving a distributed healthcare organization incorporates security features that restrict or grant access to users on an individual basis. Varying access levels can be assigned based on criteria the system administrators deem most suitable. In this way, users **maintain data security** while allowing authorized personnel to view or edit information managed by Xcelera as needed.

Security options include the ability to control user access to data at the institutional and enterprise levels:

- Users can only access studies for the patients belonging to their institution with the exception of “Emergency Access,” which allows access to study data for a particular patient at a different institution
- All studies across all institutions in a healthcare enterprise can only be viewed by those granted access
- Users can be restricted from accessing studies that are not finalized
- Activity is recorded in an audit log

### Business tools

In addition to streamlining workflow in the cardiology department, advanced investigation of stored discrete data can be performed on Xcelera's database views with the use of standard data analysis tools. Xcelera provides the tools necessary to aid compliance with HIPAA regulations.

### Study Management Tool

Xcelera facilitates improved management of image studies across the range of supported modalities. There are often occasions, planned or otherwise, where there is a need to split or merge studies.

#### Split studies

There are situations when a procedure performed at an acquisition modality is not closed before a new patient is placed on the table and the next procedure is started. The result is that the acquired images for the second patient are appended to those from the first patient and are stored to Xcelera under the identifiers (MRN, Study Instance UID) of the prior performed procedure.

The Study Management Tool enables an authorized user to correct this situation by offering the option to split studies and move the incorrectly appended data to the correct study and associate it with an order.

#### Merge studies

In an emergency where a procedure is started before an order is placed the acquisition modality will store the images to Xcelera introducing a need to later reconcile the images with an order.

It may be the case that an order for a study does not arrive at the acquisition modality, simply because the modality does not support the DICOM Modality Worklist feature

The Study Management Tool enables an authorized user to correct this situation by offering the option to merge studies into an order

### Value-added services

Philips offers an extensive range of services to help implement, integrate, and configure the Xcelera solution, including project management, application training, report customization, and workflow consulting.

### 3. Xcelera solutions for cardiovascular ultrasound

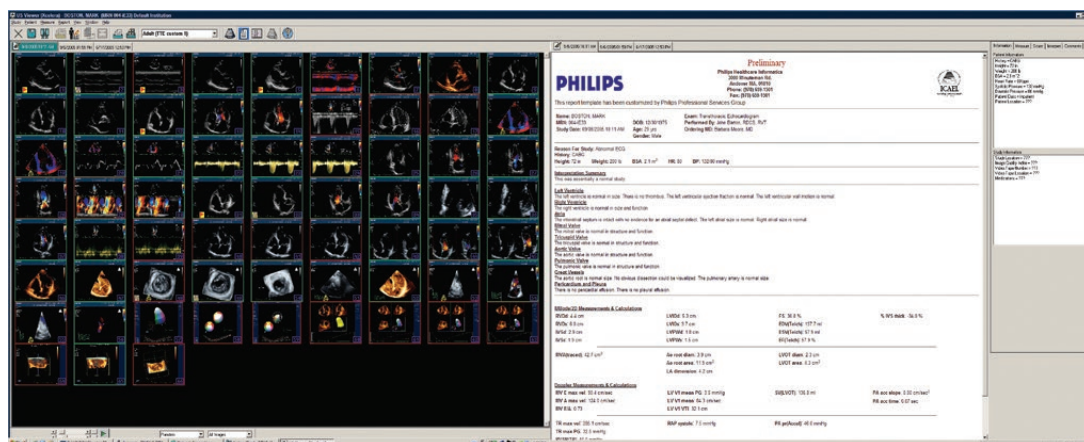
Designed to streamline workflow, Xcelera's cardiovascular ultrasound module provides a comprehensive, patient-centric approach to image and information management, and offers efficiencies designed specifically for clinical users.

#### Ultrasound workflow

The Xcelera **flexible workspace** for the review of ultrasound studies offers several viewing options to suit individual preferences and needs for review, quantification, and reporting. Xcelera speeds and simplifies reporting in a number of ways. Information about procedures can be automatically populated into pre-defined or customized statements, according to institutional needs or requirements. Philips Software Customer Services team can build custom reporting profiles and reports to support a facility's clinical workflow.

- Single-display or dual-display configurations are available
- Users can choose to show or hide toolbars
- Interfacing of the TomTec product, transparent to the end user
- Dual-display configuration offers side-by-side display of:
  - Main window/ultrasound images
  - Ultrasound images/QLAB<sup>1</sup>
  - Ultrasound images/report
  - Ultrasound studies/images
  - **Compare** current/previous studies

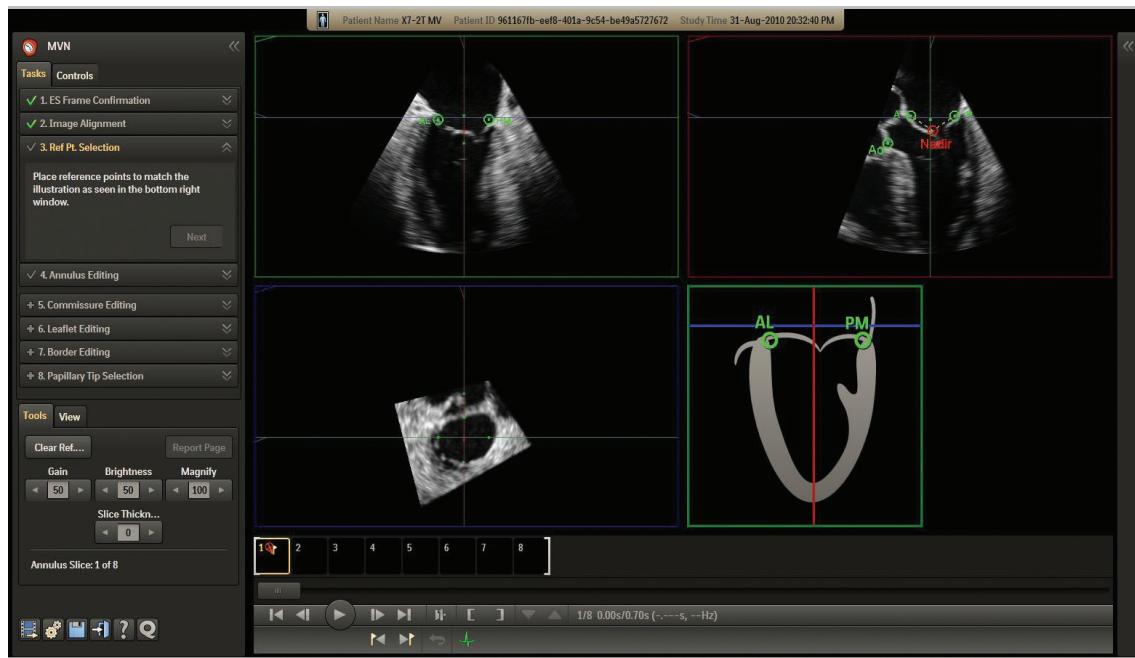
- **Customizable report profiles<sup>2</sup>** and templates to meet departmental and accreditation needs
- Customizable finding codes appear in drop-down menus enabling easy reporting<sup>1</sup>
- Information from previous finalized reports can be carried over
- Report macros **quickly add clinical content** to start the report
- Measurements made on the ultrasound system and advanced quantification packages populate the report
- Secondary capture from advanced quantification packages can be added to reports
- Images can be included in reports
- Images can be flagged or captioned for easy communication
- Ability to convert the HTML version of an echo report to a DICOM-encapsulated PDF for archiving to DICOM archive
- Spell check is available for all manual text entry



<sup>1</sup> Optional

<sup>2</sup> Software Services' engagement may be required





### Measurement tools enhance the quality of reporting

Measurements from Philips ultrasound systems are linked to images they were performed on so users can **efficiently verify the measurement data** quickly and delete or re-perform measurements if needed, enhancing the quality of reporting. With Xcelera's tools for measurement management, users can create, edit, and delete measurements and calculations. They can re-label existing measurements and calculations with the lab's standard naming convention, and even insert the lab's **normal value ranges** as part of a measurement's display label. Additionally, with Xcelera's **measurement mapping tool**, users can map measurements from nearly any vendor's ultrasound systems that meet the DICOM SR standard structure<sup>1</sup> to measurements in the Xcelera database. The database is automatically updated and the results can be displayed on the clinical report.<sup>2</sup>

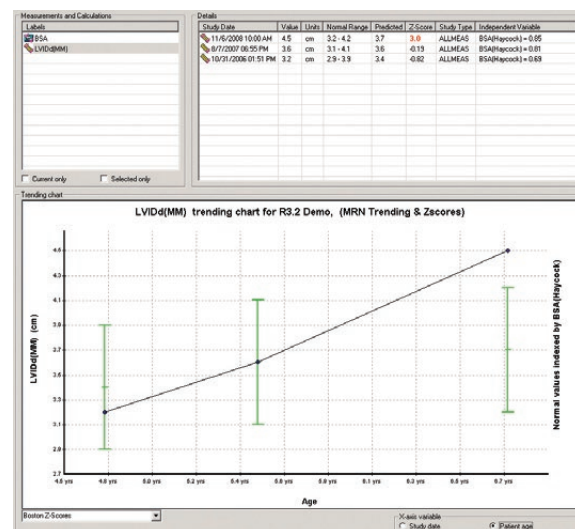
<sup>1</sup> For the following: TID 5200 – Adult Echo cardiology Procedure Report, TID 5100 – Vascular Ultrasound Report, TID 995300 – Philips Pediatric Ultrasound Report, TID 5220 – Pediatric, Fetal and Congenital Cardiac Ultrasound Report

<sup>2</sup> Professional Services may be required

<sup>3</sup> Professional Services may be required for some aspects

Xcelera also can display a **trending graph** of all cardiac measurements and calculations. This supports the clinician in evaluating and treating disease, or assessing disease progression over time.

- All measurements from an ultrasound system that meet the DICOM standard structure can be mapped to the corresponding measurement in the Xcelera database
- Measurements and calculations are configurable
- **Custom measurements and calculations** can be added to the work area and report
- Measurements can be re-labeled
- Users can easily add the lab's normal range values
- Graphical representation of the trending of measurements over time<sup>3</sup> does not include vascular measurements



### Advanced quantification

Xcelera offers access to various optional clinical application tools for advanced quantification of cardiovascular ultrasound. For Philips ultrasound systems, users may choose advanced 2D and 3D ultrasound quantification powered by QLAB 10.0, or the vendor-neutral 2D and 3D/4D clinical application packages provided by TomTec's Image-Arena 4.6 for mixed-vendor echo labs.

Xcelera accepts and stores image clips, measurements,<sup>1</sup> and calculations from both QLAB 10.0 and TomTec Image-Arena 4.6. Measurements performed within the applications can be transferred to the Xcelera database and can be made available in the work area and on the clinical report.

### Advanced quantification using QLAB

QLAB 10.0 quantification software assists with analysis of image data acquired on Philips ultrasound systems. It provides automated and semi-automated methods for quantifying ultrasound data, compatible with exams from Philips Voyager, iE33 xMATRIX, iE33, iU22 xMATRIX, iU22, CX50, HD15, Sparq, ClearVue, and HD11 cardiovascular ultrasound systems. QLAB 10.0 features both 2D and 3D advanced visualization and quantification.

Options include:

- Automated Cardiac Motion Quantification (aCMQ)
- Automated 2D Quantification (a2DQ)
- Intima Media Thickness (IMT) Quantification
- Region of Interest (ROI) Quantification
- Strain Quantification (SQ)
- Cardiac Motion Quantification (CMQ Stress)
- Mitral Valve Navigator (MVN)
- Advanced 3D Quantification (3DQA)

### 2D quantification

The 2D quantification option allows fast and reproducible analysis of left ventricular volumes and ejection fractions using automated and semi-automated border detection of cardiac chambers and vessel cavities.

### Automated Cardiac Motion/Quantification (aCMQ)

aCMQ provides many robust and objective tools for assessment of left ventricle global function and regional wall motion, deformation and timing, using the latest 2D speckle tracking technology from Philips. aCMQ automatically draws a region of interest based on the selected anatomical view (user can edit the ROI if desired), providing an angle-independent analysis of regional myocardial-tissue velocity, displacement, strain, and strain rate, using Philips latest generation of speckle-tracking technology. aCMQ generates measurements of the global and regional functions and reports them in a table, a 17-segment bull's eye, and a variety of waveform displays. It additionally computes LV Ejection Fraction (EF), End Systolic Volume (ESV), and End Diastolic Volume (EDV). aCMQ also includes the following workflow-driven tools:

- Automated border detection and Color Kinesis (CK) analysis of 2D echo images, with the ability to edit or manually draw the ROI if necessary.
- Auto Tissue Motion Annular Displacement (TMAD) provides global cardiac quantification based on angle-independent tracking of the cardiac valve's annular motion throughout the cardiac cycle.
- The User Defined workflow allows traces of one or more chords within the cardiac images and computes corresponding direct tissue speed, displacement, and strain values, identified by a color code of up to 17 colors.

### Intima Media Thickness (IMT) quantification

IMT provides automated measurements of intima media thickness in carotids and other superficial vessels. It decreases the laborious process of manually positioning cursors, reducing the time needed to complete an IMT study.

### Region of Interest (ROI) quantification

ROI increases the consistency and reliability of acoustic measurements while reducing the effort required to successfully carry out ROI analysis for contrast imaging, tissue analysis, and color Doppler.

<sup>1</sup> Does not include ROI plug-in

### Strain Quantification (SQ)

SQ provides data for evaluation of regional myocardial function, assessment of synchronicity, and guidance during biventricular pacing procedures. The user-selectable waveform display makes SQ curves easy to read.

- Measures the myocardial velocity TDI data set
- Derives the displacement, strain and strain rate along user-defined M-Lines
- Includes ability to overlay the opening and closing of aortic and mitral valves on SQ curves to evaluate left ventricle mechanical events

### Cardiac Motion/Mechanics Quantification Stress (CMQ Stress)

Designed to help objectify Stress Echo review, CMQ-Stress completes the CMQ plug-in.

CMQ Stress plug-in offers unique combination of Philips 2D PureWave images, the latest 2D speckle tracking and user interface specifically designed for stress echo exams.

The CMQ Stress User Interface auto adapts to the Stress acquisition protocol facilitating navigation and workflow. It creates a comprehensive summary page that reports LV 17 segments bulls-eye plots from each stress stage side by side.

### Mitral Valve Navigator (MVN)

The Mitral Valve Navigator updates the MVQ app with improved task guidance and automation for greater efficiency and ease of use. MVN provides workflow-driven tools for performing semi-automated shape analysis on the mitral valve, using fewer clicks than earlier versions.

MVN performs automated identification of the end-systole phase (Auto ES), and allows the user to confirm or override the Auto ES selection. An illustration displayed in the 3D Volume view guides the user through the process of aligning the MPR views and placing reference points. MVN then computes the mitral valve model view, which replaces the guidance illustration in the 3D Volume view. The mitral valve visualizations include the leaflets and annulus. The identification of the regional and localized

wall motion abnormalities that affect the papillary-muscle placement provides information about mitral insufficiency and regurgitation. MVN provides more than 30 measurements for clinical decision support.

### 3D Quantification (3DQ)

3DQ provides easy access to Live 3D, 3D Zoom, Full Volume, and 3D Color data sets from the iE33 xMATRIX, iE33, iU22 xMATRIX, iU22, and SONOS 7500 Live 3D systems. It offers viewing, cropping, slicing, and quantification such as distance measurements, area, biplane LV Volume, Ejection Fraction (EF), and LV Mass calculations.

3DQ also provides Multi-Planar Reconstruction (MPR) views for unlimited anatomical planes from 3D volume and new 3D iSlice generation.

### Advanced 3D Quantification (3DQA)

3DQA provides display and manipulation of dynamic three dimensional rendering and LV volumes from the SONOS 7500 Live 3D, iE33 xMATRIX, and iE33 systems.

- Displays 3D full volume renderings in grayscale or advanced colorization
- Provides unlimited anatomical planes from 3D volumes with Multi-Planar Reconstruction views
- Delivers access to iSlice, a flexible short and long axis slicing tool that facilitates LV function visualization and assessment, and which is now compatible with Philips Live 3D datasets including color data
- Measures endocardial volumes, stroke volume (SV), and true 3D ejection fraction (EF) using a semi-automated border detection in 3D space
- Computes global and regional LV volumes based on the ACC's 17 segment model
- Displays global LV volume waveform and provides selective display of 17 regional volume waveforms
- Assesses timing for each 17 minimal regional volumes and determines a 3D synchronicity index for all volume segments or a user-selectable group of volume segments
- Delivers a comprehensive report with summary of synchronicity indexes, regional timing, and radial excursion parametric images in bull's eye representation

## Advanced Quantification – using TomTec Image-Arena 4.6

TomTec Image-Arena clinical applications are compatible with datasets from ultrasound systems from most major vendors. Xcelera supports interfacing with 2D and 3D/4D clinical application packages from TomTec Image-Arena.

Options include:

- 4D Left Ventricular Analysis
- 4D Right Ventricular (4D RV-Function)
- 4D Mitral Valve (4D MV-Assessment)
- 4D Cardio-View
- M'Ath 3.0 basic
- M'Ath 3.0 Pro
- 2D CPA (Strain WM)
- 2D Cardiac Measurements
- Echo-Com 2D Stress Echo Review

### 4D Left Ventricular Analysis

4D LV-Analysis delivers global and regional quantification of volume, function, and dyssynchrony of the left ventricle based on dynamic 3D ultrasound data.

- Semi-automatic, contour-finding algorithm and 3D Speckle Tracking for a reproducible function analysis of the left ventricle
- Anatomical surface model including the left ventricular outflow tract (LVOT)
- Quantification of volumes – EDV (end diastolic volume), ESV (end systolic volume), and EF (ejection fraction) – without geometric assumptions
- Calculation and graphical display of global and regional volume curves throughout the entire cardiac cycle
- Advanced analysis capabilities including regional strain and displacement
- Exporting of AVI/BMP graphics files, screenshots, measurements, and coordinates of parameter curves

### 4D Right Ventricular (4D RV-Function)

Based on a complex 3D surface model, 4D RV-Function quantifies the volume and function of the right ventricle using dynamic 3D ultrasound data.

- Automatic calculation of three MPR views (4 Chamber, Sagittal, Coronal) in the end diastolic and end systolic phase
- Semi-automatic contour-finding algorithm for reproducible function analysis of the right ventricle

- Quantification of volumes (EDV, ESV, SV (systolic volume) and EF) without geometric assumptions
- Calculation and graphical display of global volume curves throughout the entire cardiac cycle
- Exporting of AVI/BMP, screenshots, measurements, and coordinates of the volume curve, and coordinates of the RV model (Beutel)

### 4D Left Ventricular (4D LV Function)

4D LV-Function 3.0 is intended to retrieve, analyze, and store digital ultrasound images for computerized dynamic 3-dimensional image analysis. Applications within 4D LV-Function 3.0 read certain digital 3D/4D image file formats for reprocessing to a proprietary 3D/4D image file format for analysis. It is intended as a digital 4D ultrasound image processing tool for cardiology.

### 4D Mitral Valve (4D MV-Assessment)

- 4D MV-Assessment provides visualization, function analysis, and quantification of the mitral valve using dynamic 3D ultrasound data. Based on a fast and easy workflow for the semi-automatic segmentation of anatomical structures, 4D MV-Assessment calculates a model of the mitral valve and the coaptation line. Automatically calculated parameters permit the quantification of pre- and post-operative valve function as well as a morphological comparison.
- Simple dynamic 3D visualization of valve function, morphology, and pathologies
  - Fast and easy workflow
  - Display of the segmented mitral annulus, the mitral valve leaflets, and the coaptation line of the mitral valve in 3D/4D data
  - Automatic calculation of annular, coaptation, and leaflet dimensions
  - Display of the jet source for color data
  - Standardized manual 2-dimensional measurements in MPRs (distance, area, circumference, curve, and angle)
  - Bookmark storage of MPR and 3D views
  - Export of automatic measurements
  - Export of still images and loops (BMP/AVI)

#### 4D Cardio-View

4D Cardio-View is a review, navigation, and quantification package for dynamic 3D ultrasound data that includes core measurement functions in 2D and 3D display. With the unique navigation tool D↑art, 3D views of any structure can be created quickly and easily with just two mouse clicks. Complex cardiac morphologies can be visualized completely in a 3D view.

- Real-time 4D rendering of black/white and color data
- D↑art navigation tool with “auto cropping”: simple selection of 3D display by positioning an arrow in the MPR view
- MPR navigation with reference images (LOI: lines of intersection)
- 3D landmark system to help with navigation and orientation in complex structures
- Color-coded 3D display for optimal depth display
- Bookmark storage of MPR and 3D views by simple drag & drop
- 3D measurement of cardiac structures: volume, mass
- 3D measurement of pathologies: shape, position, size
- 2D measurement for clinical routines: angle, area, length
- Volume calculation of each cardiac structure (atrium or ventricle) and integration of the 3D model (Beutel) into the 3D reconstruction
- Exporting of AVI/BMP, screenshots, and measurements

#### M'Ath 3.0 basic

M'Ath 3.0 basic provides semi-automatic measurement of Intima Media Thickness (IMT) in vessels based on 2D ultrasound images and sequences.

- Semi-automatic measurement of IMT and vessel diameter
- Quality index for evaluation of ultrasound image quality
- Assignment of measurement results to anatomical structures
- Storage of measurement values and digital screenshots

#### M'Ath 3.0 Pro

M'Ath 3.0 Pro enables measurement of atherosclerotic processes at different stages based on 2D ultrasound images and sequences.

- Semi-automatic measurement of IMT, vessel diameter, plaque thickness, stenosis degree, and distensibility to provide a fast and precise analysis of the state of the vessels
- Quality index for evaluation of ultrasound image quality
- Graphical display of diameter change over time
- Assignment of measurement results to anatomical structures
- Storage of measurement values and digital screenshots

#### 2D CPA (Strain Wall Motion)

2D Cardiac Performance Analysis assists in analysis of the myocardial function of the heart. The analysis is based on standard 2D ultrasound sequences and is performed using innovative Speckle Tracking algorithms for recording endocardial and epicardial movements. 2D Cardiac Performance Analysis offers different display options and provides automatic time-to-peak analysis of all available components and parameters.

- Angle-independent analysis of endocardium and epicardium
- Angle-independent analysis of speed, movement, and strain
- Analysis of all components: radial, longitudinal, and circumferential
- Variety of display modes, including contour, curve diagram, parametric display, and speed vectors
- Automatic time-to-peak analysis of all components
- Calculation of fractional area change and ejection fraction
- Selection of individual contour points for analysis of local events
- System-independent ultrasound analysis
- Reporting in Image-Arena using the American Society of Echocardiography 16-segment model (Xcelera echo reporting module required)
- Exporting of images, AVIs, and analysis data
- Analysis performed is automatically stored



## 2D Cardiac Measurements

M-mode, 2D, and Doppler measurements performed using the ultrasound device are automatically incorporated, and subsequent measurements can be added easily at any time. The “first measure, then assign” function simplifies and accelerates the measurement process.

- All standard echo 2D, M-mode, and Doppler measurements are available
- Two approaches are possible: “first measure, then assign” or “select measurement, then measure”
- Up to five values are available for each measurement
- Individual selection of the final reading in the worksheet (average, last, largest, smallest)
- Measurements can be edited manually in the worksheet
- Undo function makes it easy to edit a measurement
- Non-calibrated image data can be manually calibrated

## Echo-Com 2D Stress Echo Review

Echo-Com provides all functions required for the rapid, convenient analysis of stress echo examinations. All stress logs are displayed in a clear format. The segmental assessment of wall motion uses intuitive graphics which are displayed automatically for the corresponding loops.

- Display of different sectional planes for one stress level
- Display of different stress levels in one sectional plane
- Select mode for selecting special image sequences
- Correction function for errors during acquisition
- Wall motion scoring with color-coded segmental wall motion analysis
- ASE 16-segment or ASE 17-segment wall motion scoring model
- Different scoring models (4 to 7 evaluation levels)

## Z-scores for pediatric cardiology

Xcelera provides options for pediatric cardiologists who require the use of Z-scores for reporting measurement data. Measurements that have Z-score values require the input of the patient’s height, weight, and/or age. The resulting calculation can be **embedded into the clinical report**, with any deviations highlighted.

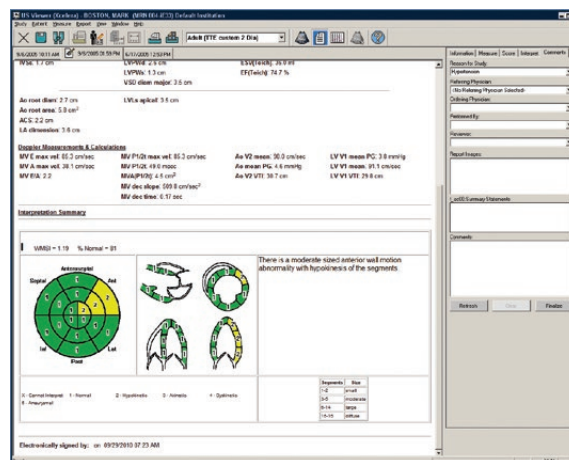
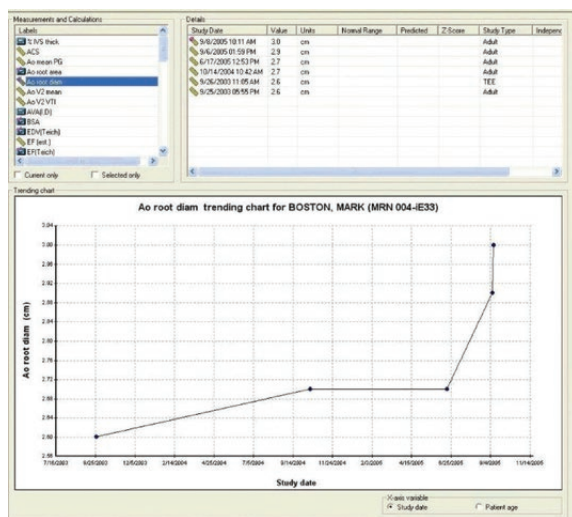
- Pediatric Z-scores are based on normative datasets from the following leading institutions and can be ordered separately or combined together:
  - Boston Children’s Hospital (subset of dataset)
  - Children’s Hospital of Michigan / Children’s National Medical Center collaborative dataset
- Trending chart includes an overlay of the normal range bar on each measurement that satisfies the requirements for Z-scores

## Non-invasive vascular ultrasound

Xcelera also provides viewing, quantification, and reporting for vascular ultrasound. Philips Software Customer Services is available to help build custom reporting profiles and reports for any vessel.

- Provides carotid reporting profiles
- **Carotid SmartChart** allows entering of user-defined, percent of stenosis statements based on measurement/calculation values
- Stenosis values are automatically populated in the clinical report when using the appropriate carotid report template

RIGHT										LEFT									
Other	Plaque	Stenosis	PSV (cm/sec)	EDV (cm³)	Dist ICA	Mid ICA	Prox ICA	Dist CCA	Mid CCA	Prox CCA	Vertebral A	Stenosis	Plaque	Other					
		16-49% stenosis	53.2	18.6															
			53.2	18.1															
			55.6	21.5															
		Heterogeneous, irreg.	17.7	13.8															
		patient occluded																	
		patient not visualized																	
			72.7	16.9															
			98.3	20.4															



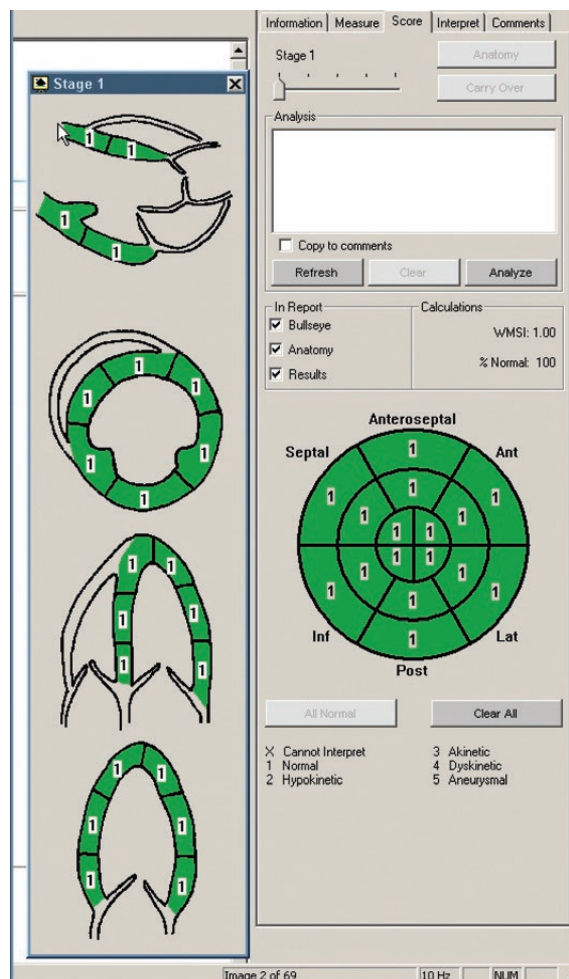
### Wall motion scoring

Clinical statements relating to wall motion scoring are **automatically generated** based on selections made by clinicians on the 16-segment wall scoring diagram. The algorithm that translates wall motion scores to clinical statements will:

- Determine the current wall segments with abnormal scores
- Combine these segments into sets, which are anatomically contiguous
- Automatically generate a graphical representation of the result in bull's eye and anatomical form
- Automatically generate related report statements

### Support for intracardiac echo (ICE) and intravascular ultrasound (IVUS)

Xcelera stores intracardiac echo (ICE) and intravascular ultrasound (IVUS) studies and supports review of these study types using the Xcelera cath viewer software.



## 4. Xcelera solutions for the cardiac catheterization laboratory

From procedure to review to archive, users can rely on Xcelera's outstanding performance. Built for speed, the system does not slow users down. It provides access to images with speed – up to 60 frames per second – and interfaces with all Philips cath labs as well as other major vendors.

### Review in the cath lab

For **immediate review** of acquired images, often during a procedure, Philips provides the option to access previous images via the Allura tableside module

- Places control of the system in the hands of the clinical staff at the patient's side
- **Facilitates Xcelera image display** and review on the cath lab's suspension monitors, which provides the display and review of relevant cardiovascular information
- Includes ECG reports, ultrasound, CT, MR, nuclear cardiology, and electrophysiology data



### Interoperability with hemodynamic monitoring and cath lab workflow solutions

The Philips Cath Lab Experience offers a **bi-directional interface** between Xcelera and Xper Information Management system.<sup>1</sup> It delivers the ability to combine the hemodynamic monitoring and reporting capabilities of Xper Information Management system with the multi-modality image management, viewing, analysis, and distribution capabilities of Xcelera.

The interface allows clinicians to launch the Xcelera cath viewer from within the Xper Information Management application to review cine runs pertaining to the case file created on Xper. The interface allows for selected

still-frame images in Xcelera to be copied into clinical reports created with the Xper Information Management system report generation tool.

### Support for biplane X-ray angiography

The Xcelera cath viewer software supports studies acquired with a biplane cardiovascular X-ray system. Users can easily toggle between synchronized biplane and monoplan viewing within the application.

### Export of single and multi-frames

Xcelera supports:

- Export of single frames in Bitmap and JPEG formats
- Export of multi-frames in AVI format
- The ability to add annotation and point-of-reference indicators to still frames
- The ability to customize multi-frame export by frame and compression level

### Cath lab quantification

Clinical applications optionally available on Xcelera include:

- Left Ventricular Analysis (LVA)
- Quantitative Coronary Analysis (QCA)
- Quantitative Vascular Analysis (QVA)

Powered by CAAS 2000, these packages are similar to the advanced quantification and analysis packages used on the Philips Allura Xper FD X-ray systems, which provide measurement **results that are consistent** on both Philips systems, at virtually any location where users choose to perform their analysis.

<sup>1</sup> Purchased separately

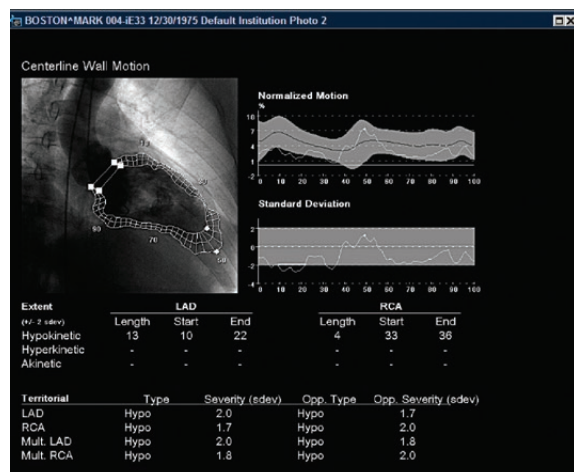
These clinical applications enhance ease-of-use and aid diagnostic confidence. In addition, all quantification steps are straightforward and easy to use. The quantification packages support both 1024x1024 images produced by flat detector X-ray systems, and 512x512 and 1024x1024 image intensifier-acquired studies.

### Left Ventricular Analysis (LVA)

The LVA package allows **objective and reproducible assessment** of left ventricular ejection fractions and volumes, and left ventricular wall movements.

- Automated delineation of the outline of the left ventricle (single plane, standard right anterior oblique projection)
- Manual delineation by the operator
- Cardiac output calculations from patient height and weight

Calibration facilities are also included in those cases where absolute volume measurements are required.

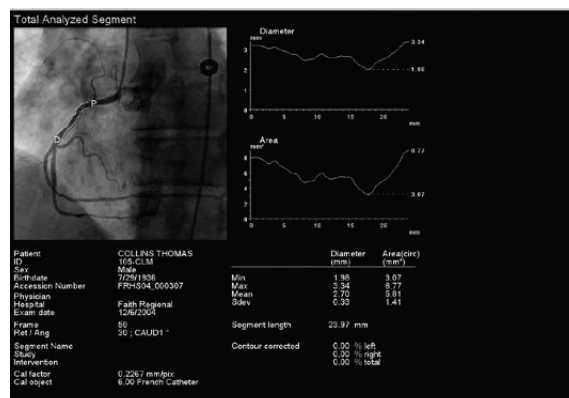


### Quantitative Coronary Analysis (QCA)

The QCA package allows objective and reproducible assessment of the severity of coronary narrowing with a single mouse click, using sophisticated methods for computerized measurement of digital images.

- **Aids the physician** in making decisions about additional treatment and in determining the appropriate course for post-interventional rehabilitation
- Provides automated arterial contour detection, and computer-defined reference

- Displays results based on geometrical and densitometrical analysis, in graphical or tabular formats
- Quantifies hemodynamic parameters and Stenotic Flow Reserve



### Quantitative Vascular Analysis (QVA)

QVA provides quantification analysis for vascular diagnosis and intervention. For 1024x1024 images, the QVA package provides quantitative analysis of peripheral vessels, including the aorta, iliac, renal, femoral, and carotid arteries, with automatic contour detection for vessels up to 50mm.

- **Fast and easy analysis**
- Virtually instant presentation of results
- Automatic obstruction analysis and a user-reference method for obstructions near a bifurcation
- Sub-segment analysis

The results for this package, as well as the QCA and LVA results, can be saved as DICOM Secondary Capture images and added to the clinical report created using the Xper Information Management system report generation tool.

### Vascular post-processing option

With optional software plug-ins, vascular post-processing results can be added to the exam. The software supports single and biplane applications. Functionality includes:

- Image subtraction
- New mask selection
- Average mask
- Pixel shift
- Landmarking

## 5. Xcelera solutions for nuclear cardiology

Nuclear cardiology analysis and reporting is a key strength of the Xcelera portfolio of cardiovascular information solutions. Xcelera's patient-centric design speeds workflow and helps to enhance patient care, all from a single cardiovascular workspace.

### AutoQUANT provides quick access, reproducible results

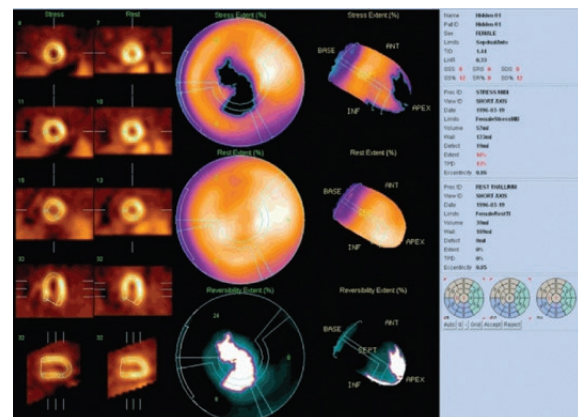
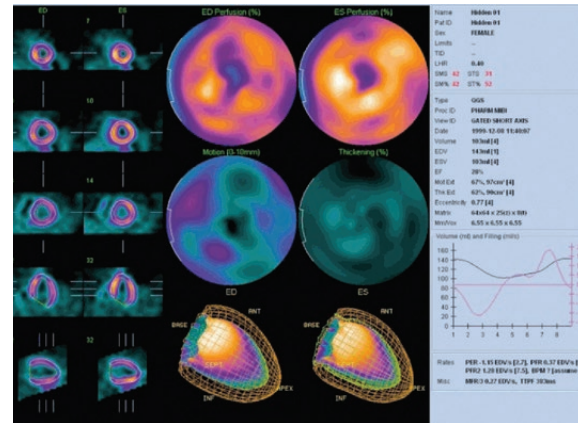
The Philips-exclusive AutoQUANT is a comprehensive cardiac review and quantification suite of applications that allows the physician quick access to many data files. This software package facilitates an **efficient workflow** for study interpretation with exclusive integration of perfusion (Quantitative Perfusion SPECT), function (Quantitative Gated SPECT), and reporting. Use of AutoQUANT facilitates efficient and comprehensive interpretation of nuclear medicine studies, and offers consistent reproducible results.

### Quantitative Gated SPECT

Quantitative Gated SPECT allows for the **automatic segmentation, quantification, and analysis** of gated and non-gated short axis myocardial perfusion SPECT. The image data can be viewed in a variety of modes, from selected slices in a 2D view to a rendered 3D surface of the myocardium with function maps (perfusion, motion, thickening, and regional ejection fraction).

- Left Ventricular Ejection Fraction (LVEF) and ventricular volumes
- Wall motion and wall thickening normal limits
- 3D wall motion and thickening maps
- Diastolic function measurement
- Published validation<sup>1</sup> 17 segment scoring

<sup>1</sup> Reference Articles: Published Validations G. Germano, P.B. Kavanagh, D.S. Berman, "An automatic approach to the analysis, quantification and review of perfusion and function from myocardial perfusion SPECT images", International Journal of Cardiac Imaging, 1997; 13(4):337–346. S.D. Van Kriekinge, D.S. Berman, G. Germano, "Automatic quantification of left ventricular ejection fraction from gated blood pool SPECT", Journal of Nuclear Cardiology, 1999;6(5):498–506



### Quantitative Perfusion SPECT

Quantitative Perfusion SPECT provides automatic segmentation, quantification, and analysis of static (ungated) short axis myocardial perfusion SPECT.

- Normal files (MIBI-MIBI, dual isotope, user-definable)
- 2D and 3D polar maps
- Mass of defect, percent of myocardium
- 17 segment scoring



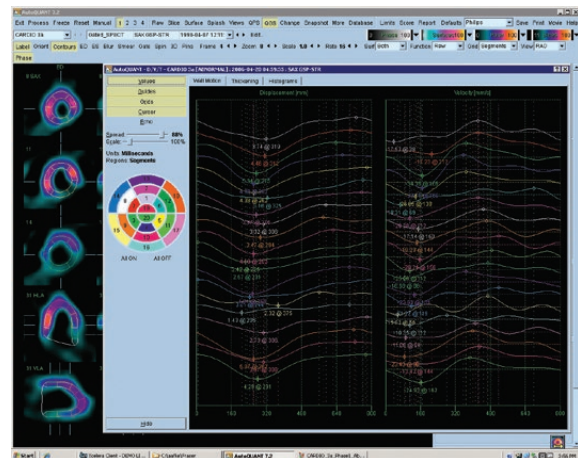
### Quantitative Blood Pool SPECT

Quantitative Blood Pool SPECT provides automatic segmentation and quantification of gated short axis blood pool (red blood cells), and SPECT.

- 3D dynamic wall motion and parametric surfaces
- Automated LV and RV endocardial contouring
- Automatic determination of LVEF and Right Ventricular Ejection Fraction (RVEF)
- End Diastolic Volume, End Systolic Volume, and stroke volume
- LV and RV wall motion polar maps
- 3D blood pool isosurfaces

Reporting functionality is provided by either the integrated Automated Report Generator (ARG) or Xcelera reporting<sup>1</sup>.

AutoQUANT works hand-in-hand with the Philips JETStream Workspace and Extended Brilliance Workstation-Nuclear Medicine. Nuclear cardiology examinations are acquired with a Philips SPECT camera, such as the CardioMD or BrightView. The images can be processed at the JETStream Workspace or the Extended Brilliance Workstation-Nuclear Medicine and subsequently viewed and post-processed using AutoQUANT with Xcelera. The Nuclear Medicine report can be exported to a third party information management system such as HIS, CVIS, or EMR.

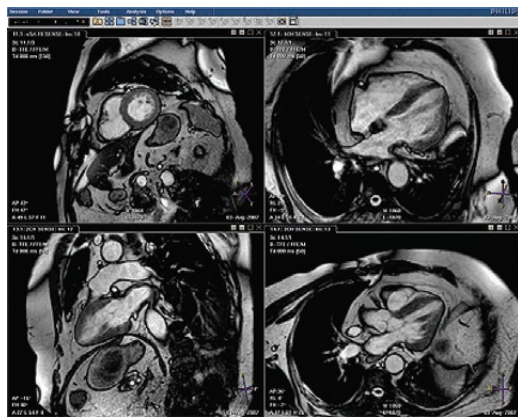


<sup>1</sup> Requires Professional Services

## 6. Xcelera solutions for CT and MR

The Xcelera MR/CT Viewer, powered by ViewForum, offers an enhanced viewing environment for CT and MR studies.

- Ability to **review stacks of images easily and quickly**
- Perform basic measurements and annotations
- Export to AVI files
- Use intelligent Display Protocols dedicated to MR viewing
- Store new series, movies and images as secondary captures and DICOM images
- View original volume series in all planes with MPR and MIP
- Flag key images and **save presentation states**
- Link multiple images of multiple acquisitions increasing the diagnostic view



## 7. Xcelera solutions for heart rhythm care

Xcelera performs the necessary functions for exam storage and review, as well as offering analysis and quantification packages, clinical reporting, and archiving features as optional functionality.

### Helping to meet your electrophysiology needs

Philips partners with prominent clinicians and healthcare institutes to **enhance electrophysiology workflow**, and works with industry-leading companies that share our commitment to clinical excellence. By integrating best-in-class solutions, Philips is in a unique position to help the various stakeholders in heart rhythm care. We have a strong alliance with St. Jude Medical, a global leader of electrophysiology recording systems and manufacturer of the EP-WorkMate Recording System, which interfaces with Xcelera.

### EP recording data in Xcelera

The EP-WorkMate Recording System receives, digitizes, and stores intra-cardiac and surface electrocardiograms, along with corresponding ablation, and navigation and imaging data. The same software that is used on the EP-WorkMate Recording System application can be installed on any Xcelera workspace throughout the healthcare enterprise.

- Via Xcelera, **review and analyze the saved EP recording signals** and procedure data, along with the previously created reports, using virtually all of the same viewing and scrolling controls that are found on the EP-WorkMate Recording System
- General viewing controls include the Holter, Imaging, Log, and split screen windows. The current protocols for a selected CathMap and Event annotations can also be displayed

### A single access point and data management

Accessing EP recording data from Xcelera offers a number of advantages for the heart rhythm care process.

- Allows review of EP recording signals alongside other relevant data without having to switch back and forth between equipment
- **Simplifies data assessment and supports decision-making** during complex procedures

- Provides centralized data storage for the EP-WorkMate Recording System information
- Replaces optical media disks, which can be lost and take time to retrieve from storage
- Allows review of EP recording signals and reports from an office or wherever an Xcelera workspace is located
- Provides access to respective cardiovascular X-ray images and other relevant patient data – like ECGs, ultrasound (including intracardiac echo), CT, MR, nuclear cardiology, and EP mapping data – from a single cardiology workspace
- Allows performing measurements on EP recording signals. These include the standard caliper measurements, as well as the baseline measurement
- Allows changed parameters in the stored electrocardiograms, including
  - Position
  - Amplitude
  - Clipping
  - High and low pass
  - Color
  - Analysis
  - Insert and remove a signal and change the channel-input points while reviewing the selected channel

### Access to procedural information

Xcelera is also an **entry-point to information** about the procedure itself. All events are logged and information about the medication, type of catheters and equipment can be accessed.



### Centralized data storage medium

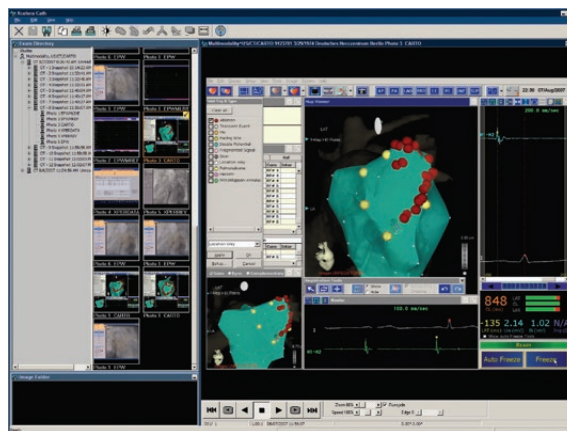
Xcelera provides a central storage medium for EP recording signals and reports from the EP-WorkMate Recording System. Finalized EP reports are sent to Xcelera and stored in the database so that they can be reviewed at any Xcelera workspace on the network.

### Connection with Biosense Webster's Carto XP

The CartoMerge Image Integration Software Module allows users to **combine the Carto XP electrophysiology mapping data** with pre-acquired 3D CT or MR images. This provides images with a high spatial resolution leading to enhanced anatomical visualization of the heart. Via DICOM Query/Retrieve, CartoMerge can pull 3D CT or MR datasets from the Xcelera platform. At the end of the procedure, the exam results can be stored as DICOM Secondary Capture images in Xcelera, where they can be accessed for review.

### Support for EP Cockpit

Philips EP Cockpit concept interfaces the entire electrophysiology lab environment. It includes EP Snapshot, which captures all relevant EP data at display in either the control area or exam room. These captures are sent as DICOM files to Xcelera and available for review using the Xcelera cath viewer software.



## 8. Reliability and interoperability

Xcelera utilizes industry-leading platform applications: Windows Server 2008 R2, SQL 2008 R2 for the database application and Windows 7 (32- and 64-bit) Ultimate and Enterprise for the clients<sup>1</sup>.

### DICOM interoperability

Xcelera's DICOM interoperability contributes to its efficiency and ease-of-use.

- Easily share third-party DICOM archives, such as a radiology PACS, for mass storage to leverage existing investments in IT infrastructure
- Take advantage of expanded DICOM capabilities, such as DICOM Query/Retrieve, manual DICOM export, DICOM Structured Reporting, and DICOM-based archive connectivity
- **Leverage existing IT solutions** and take advantage of expanded DICOM capabilities so that users can easily utilize third-party DICOM compliant systems and archives

### Excellent platform for expansion

Xcelera is an excellent platform in which to invest. In fact, nearly every Philips cardiology informatics product introduced since 1996 has a defined upgrade path to the latest advanced Xcelera functionality, retaining all historical data, including images, reports, and templates. Xcelera provides a **platform for further expansion**, allowing users to review, quantify and report on a variety of cardiac modalities all from the same workspace.

Xcelera is certified as VMware Ready, which means it can run within a virtual IT environment within the enterprise. Virtualization reduces the amount of hardware that needs to be configured and maintained, and can provide increased operating efficiencies. In case of hardware configurations or platform operating system changes, Xcelera remains compatible.



To keep the Xcelera solution as up-to-date as possible, **stay current** with the latest release and boost the value of the investment throughout its lifecycle, Philips offers the Philips Technology Update (PTU) program and the Software Release Continuity program (SRC). PTU and SRC provide the latest Xcelera software releases and provide predictable costs for budgeting.

### Xcelera proactive remote monitoring service

The Xcelera Proactive Remote Monitoring Service checks system status every second of every day, and alerts service personnel to potential trouble before a system failure or data loss occurs. It helps you react faster, **reduce operational disruptions and downtime**, lower maintenance costs, and decrease help desk calls.<sup>2</sup>

<sup>1</sup> Windows Server 2008 and SQL2008 may be required for some configurations

<sup>2</sup> Full-time internet access is required for the proactive remote monitoring to function. Please refer to page 6 for more information.



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