IntelliSpace Cardiovascular 2.3

Cardiovascular Image and Information Management System
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# 1 Introduction

## 1.1 About IntelliSpace Cardiovascular

IntelliSpace Cardiovascular is a comprehensive cardiac image and information management solution designed to provide clinicians with convenient access to the detailed records of cardiac patients across their complete cardiovascular care continuum. The application also provides hospital administrators and department managers with detailed operational information, as well as productivity and outcomes reporting. Key components include a wide range of detailed clinical modules that capture data during diagnostic/therapeutic procedures and patient follow-up encounters. Interfaces to other systems and devices within the cardiology departments as well as across the enterprise system, such as HIS/EMR, are available.

The solution supports a remote deployment model.

## 1.2 About the Instructions for Use

This *Instructions for Use* is intended to assist users in the safe and effective use of the Philips software product described. The “user” is considered to be not only the body with authority over the software product but also those persons who use the software product.

This *Instructions for Use* does not describe the use of the IT equipment on which the Philips software product is installed. Refer to the documentation of the IT equipment concerned.

Before attempting to use this medical device software, you must read this *Instructions for Use* thoroughly, paying particular attention to all *WARNINGS*, *Cautions*, and *Notes* it contains. You must pay special attention to all the information given, and procedures described, in the chapter “Safety”. In addition you must pay special attention to On-screen Messages and Help information containing *WARNINGS*, *Cautions*, and *Notes* that may be related to the function being executed.

**WARNING**

*WARNINGS* are directions which if not followed could cause fatal or serious injury to a user, patient or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data.

**CAUTION**

Cautions are directions which if not followed could cause damage to the IT equipment on which the software product is installed and/or other equipment or goods, and/or cause environmental pollution.

**NOTE**

Notes are intended to highlight points of attention as an aid to users.
This *Instructions for Use* and the Help describe the most extensive configuration of the software product, with the maximum number of options. Not every function described may be available.

**WARNING**
The chapter “Safety” deals with safety aspects and should be read first, before operating this software product.

**NOTE**
The screen shots in the *Instructions for Use* can differ from the user interface screens on details.

### 1.3 Usage of the Product

This Philips software product is intended to be installed and used only in accordance with the safety procedures and instructions given in this Instructions for Use and for the purpose for which it was designed.

The purpose for which the software product is intended is given below. However, nothing stated in this Instructions for Use reduces users’ responsibilities for sound clinical judgment and best clinical procedure.

Installation and use of this medical device software is subject to the law in the jurisdiction in which it is being used. Users must **only** install and/or use the software product in such ways as do not conflict with applicable laws, or regulations which have the force of law.

Use of the software product for purposes other than those intended and expressly stated by the Manufacturer, as well as incorrect use, may relieve the Manufacturer (or his agent) from all or some responsibility for resultant non-compliance, damage or injury.

#### 1.3.1 Intended Use

Philips IntelliSpace Cardiovascular software product is an integrated multimodality image and information system designed to perform the necessary functions required for import, export, storage, archival, review, analysis, quantification, reporting and database management of digital medical images.

#### 1.3.2 Additional Information

IntelliSpace Cardiovascular is not to be used outside the clinical domain of cardiovascular.

IntelliSpace Cardiovascular is only to be used as a supporting device during open heart surgery and cardiac interventional procedures.

IntelliSpace Cardiovascular is to be used as storage and distribution medium for cardiac clinical data excluding lab results like blood analysis. Clinical data is defined as images, results from measurements, and clinical reports.
IntelliSpace Cardiovascular tools enable the clinical user to enter findings and other reporting elements. However, the user carries the responsibility for providing correct clinical content and language.

Patient diagnosis should not be based solely on results provided by a single data source to IntelliSpace Cardiovascular. Corroboration of clinical results from a variety of procedures should be utilized.

Procedures that supply clinical data for IntelliSpace Cardiovascular that do not require usage of radiation or contrast fluids are considered to result in less than moderate or no injury.

1.4 Indications for Use

Philips IntelliSpace Cardiovascular software product is an integrated multimodality image and information system designed to perform the necessary functions required for import, export, storage, archival, review, analysis, quantification, reporting and database management of digital cardiovascular images, waveforms and data related to cardiology.

Philips IntelliSpace Cardiovascular offers support for third party applications in order to enable the use of commercially available tools and specified applications for analysis, quantification and reporting. It allows multiple users fast access to, and exchange of specific and/or multiple cardiology exams.

Philips IntelliSpace Cardiovascular software runs on standard information technology hardware and software, utilizing the standard information technology operating systems and user interface. Communication and data exchange are done using standard protocols. Philips IntelliSpace Cardiovascular will also be made available for use on specified Cardiovascular Monitoring Systems, which use suitable hardware components.

The modular design allows configurability to tailor the image import, archive and communications solution to one’s particular budgetary and performance needs. The number of modalities and reporting and/or viewing sites can be configured per system.

1.5 Contraindications

None.
1.6 Limitations of Use

WARNING
IntelliSpace Cardiovascular must be operated in an environment where the minimum specified requirements for hardware and network performance are met.

WARNING
IntelliSpace Cardiovascular can display both lossless and lossy compressed images. Your ability to analyze images depends on the quality of the image data you intend to analyze. Lossy / irreversible compression affects the quality of the image. The user is responsible to ensure that the image has adequate quality for the review purpose.

WARNING
IntelliSpace Cardiovascular is not intended for diagnostic purposes on mobile devices.

1.7 Compatibility

The software product described in this Instructions for Use should not be used in combination with other software, equipment or components unless such other software, equipment or components are expressly recognized as compatible by Philips Healthcare. A list of such software, equipment and components is available on request from your local Philips Healthcare Representative, or the Manufacturer. Philips Healthcare is not responsible for running compatibility validation of non-supported third-party software.

Changes and/or additions to the software product should only be carried out by Philips Healthcare or by third parties expressly authorized by Philips Healthcare to do so. Such changes and/or additions must comply with all applicable laws and regulations which have the force of law within the jurisdictions concerned, and with best engineering practice.

Changes and/or additions to the software product that are carried out by persons without the appropriate training may lead to the Philips Healthcare warranty being voided.

Philips is not responsible for any malfunction of IntelliSpace Cardiovascular, if IntelliSpace Cardiovascular runs on hardware that is not according to hardware specification.

If not supplied by Philips with the IntelliSpace Cardiovascular medical device software, Philips is not responsible for any malfunction of the hardware used.
1.8 Compliance

This software product complies with relevant international and national standards and laws. Information on compliance will be supplied on request by your local Philips Healthcare Representative, or by the Manufacturer.

This software product must be installed on appropriate IT equipment that complies with relevant international and national laws and standards on EMC (Electro-Magnetic Compatibility) and Electrical Safety. Such laws and standards define both the permissible electromagnetic emission levels from equipment and its required immunity to electromagnetic interference from external sources.

1.9 Symbols Glossary

The following symbols may appear in the product documentation or on the labels attached to the product.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Symbol Name</th>
<th>Symbol Description</th>
<th>Standard Number &amp; Name</th>
<th>Symbol Reference Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Manufacturer" /></td>
<td>Manufacturer</td>
<td>Indicates the name and address of the manufacturer</td>
<td>ISO 15223-1:2012¹</td>
<td>5.1.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.12</td>
</tr>
<tr>
<td><img src="image" alt="EC REP" /></td>
<td>Authorized Representative in the European Economic Area (EEA).</td>
<td>Indicates the Authorized Representative, responsible for the device in the European Economic Area (EEA).</td>
<td>ISO 15223-1:2012¹</td>
<td>5.1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.13</td>
</tr>
<tr>
<td><img src="image" alt="Date of manufacture" /></td>
<td>Date of manufacture</td>
<td>Indicates the date when the device was manufactured.</td>
<td>ISO 15223-1:2012¹</td>
<td>5.1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.6</td>
</tr>
<tr>
<td><img src="image" alt="Batch code" /></td>
<td>Batch code</td>
<td>Indicates the full Software Release/Version number.</td>
<td>ISO 15223-1:2012¹</td>
<td>5.1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.4</td>
</tr>
<tr>
<td><img src="image" alt="Catalogue number" /></td>
<td>Catalogue number</td>
<td>Indicates the manufacturer's catalogue number so that the device can be identified.</td>
<td>ISO 15223-1:2012¹</td>
<td>5.1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.10</td>
</tr>
<tr>
<td><img src="image" alt="Consult instructions for use" /></td>
<td>Consult instructions for use</td>
<td>Indicates the need for the user to consult the instructions for use.</td>
<td>ISO 15223-1:2012¹</td>
<td>5.4.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN 980:2008²</td>
<td>5.18</td>
</tr>
</tbody>
</table>
1 Training Introduction

IntelliSpace Cardiovascular 2.3 Instructions for Use

Training

Users of this software product must have received adequate training on its safe and effective use before attempting to use the software product described in this Instructions for Use. Training requirements for this type of software product will vary from country to country. It is for users to make sure that they receive adequate training in accordance with local laws or regulations which have the force of law. If you require further information about training in the use of this software product, please contact your local Philips Healthcare representative, or the Manufacturer.

1.10 Training

Ce Marking of Conformity

Product meets the requirements of 93/42/EEC for Medical Devices distributed in the European Economic Area (EEA).


Annex XII

Prescription Device in USA

Caution: Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.

21 CFR 801.109(b)(1) Prescription Devices

Caution and/or Warning

WARNINGS are directions which if not followed could cause fatal or serious injury to a user, patient or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data.

Also:
This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Symbol Name</th>
<th>Symbol Description</th>
<th>Standard Number &amp; Name</th>
<th>Symbol Reference Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>![symbol]</td>
<td>Caution and/or Warning</td>
<td>WARNINGS are directions which if not followed could cause fatal or serious injury to a user, patient or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data. Also: This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.</td>
<td>ISO 15223-1:2012¹</td>
<td>5.4.4</td>
</tr>
<tr>
<td>![symbol]</td>
<td>Prescription Device in USA</td>
<td>Caution: Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.</td>
<td>21 CFR 801.109(b)(1) Prescription Devices</td>
<td></td>
</tr>
</tbody>
</table>

¹ ISO 15223-1:2012  Medical devices - Symbols to be used with medical devices labels, labeling, and information to be supplied -Part 1: General requirements

² EN 980:2008  Symbols for use in the labeling of medical devices
1.11 Power Supply

It is advised to use an uninterruptible power supply (UPS), for example, to continue to provide power to the IntelliSpace Cardiovascular system for a specified time after a power outage, and to allow automatic and controlled shutdown.

1.12 Workplace Design

To minimize the risk of computer-related disorders, ensure the workplace is properly designed and provides a good ergonomic working position (e.g., proper working height of chair and desk; screen setup). Observe good working practices; for example, take regular breaks and perform exercises. Alternate work periods at the computer with other kinds of work.

1.13 Other Instructions for Use

This Instructions for Use relates to the software product IntelliSpace Cardiovascular. However, if other software and/or equipment may be used with the software product, each will have its own Instructions for Use.

1.14 Errors in the Information supplied with the Product

If you suspect an error in the information supplied with the software product, for example, in this Instructions for Use, you should report the error to your local Philips Healthcare Representative or the Manufacturer, for analysis and, if applicable, for correction.

1.15 About Screen

To display the About Screen that displays labeling and product information, open the application, click on Help and from the menu, click on About.

1.16 Software Updates

Updates for this Philips software product can become available. Such updates are essential to keep the software product operating safely, effectively, and reliably.

1.17 Accuracy of Measurements

Effect of image quality

The accuracy of measurements depends on multiple factors that determine image quality:

- The accuracy of patient positioning and fixation
- Patient motion and organ motion
• The modality type and acquisition protocol, acquisition and reconstruction distortions
• Image resolution: both spatial and contrast resolution
• Other factors

Measuring

The ability to accurately place a measurement control point on an image displayed on a monitor is the major factor that determines the accuracy of measurements. In addition, the image viewing settings in IntelliSpace Cardiovascular influence measurement accuracy. Settings such as gray level, window width, zoom and others may affect how users perceive the dimensions of the anatomy displayed on the screen. These settings also influence the accuracy of positioning measurement control points with a mouse pointer.

The clinical user is responsible to judge the accuracy of the measurements based on the image quality and based on the accuracy of placing measurement control points.
2 Safety

2.1 Important Safety Directions

All Philips Healthcare products are designed to meet stringent safety standards. To safeguard human safety this software product requires proper installation, use and maintenance.

It is vital that you read, note, and where applicable strictly observe all DANGER notices and safety markings on the outside of the IT equipment on which this software product has been installed. To help ensure the safety of both patients and users, it is vital that you strictly follow all directions under the heading SAFETY and all WARNINGS and Cautions given throughout this Instructions for Use and/or displayed on the user interface.

You must also note the following information.

2.1.1 Safety Awareness:

WARNING

• Do not use this software product for any application until you have read, understood and know all the safety information, and safety procedures contained in this SAFETY chapter. Use of this software product without a proper awareness of how to use it safely could lead to fatal or serious injury, clinical mis-diagnosis, and/or loss/damage of patient-related data.

2.1.2 Adequate Training:

WARNING

• Do not use this software product for any application until you have received adequate and proper training in its safe and effective use. If you are unsure of your ability to use this software product safely and effectively DO NOT USE IT. Use without proper and adequate training could lead to fatal or serious personal injury, clinical misdiagnosis, and/or loss/damage of patient-related data.

For information about training, please refer to Training in the chapter “Introduction” of this Instructions for Use.
2.1.3 Usage & Compatibility

**WARNING**

- Do not use this software product for any purpose other than that for which it is intended.

Do not use this software product with any equipment or software other than that which Philips Healthcare recognizes as compatible. Use of this software product for unintended purposes, or with incompatible software and/or equipment, could lead to fatal or serious personal injury, clinical misdiagnosis, and/or loss/damage of patient-related data.

For information about intended use and compatibility, refer to the Intended Use and Compatibility sections in the chapter “Introduction” in this Instructions for Use.
2.1.4 Data Security

**WARNING**

2.2 Power Off

**WARNING**
Never switch the IT equipment off using the POWER ON/OFF switch while the software product is still running, as this may damage data integrity, which can lead to loss/damage of patient-related data. Always exit the software product before switching off the IT equipment.

2.3 Unsupported Software

**WARNING**
Do not install unsupported software on the IntelliSpace Cardiovascular system as this could interfere with diagnosis, and/or cause loss of or damage to patient-related data, and/or introduce computer viruses.

2.4 Deleting Data from Acquisition System

To prevent unwanted data loss, make sure that the data has been stored on the IntelliSpace Cardiovascular system before deleting it from the acquisition system.

2.5 Storage Overflow

When the storage space (on the archive or server) is full, additional acquisition data cannot be stored. Free space must then be created by the system administrator.

2.6 Context Sharing

**WARNING**
When sharing patient data between different applications, verify that the patient data sets are for the same person to avoid misdiagnosis.

The user is responsible for the correct use of clinical results in- or out-of-context of IntelliSpace Cardiovascular. When sharing patient data between different applications, the user is responsible to verify that the patient data sets are for the same person to avoid misdiagnosis.
When reviewing clinical images either prior diagnosis or post results discussion, it is proper clinical practice to verify the leading patient demographics as separately displayed within the viewer area. In case of any discrepancies in patient demographics, clinical users are considered to be well educated and trained to use the separately mentioned demographics in the viewing area as the principal source.

### 2.7 Data Access and Data Actioning

The integrity of data access and data actioning is based on the responsibility of the end user ensuring that they have authenticated the system with their personal access details.

The ability to perform many actions is handled by system privileges and rules which the system administrator is responsible for assigning.

### 2.8 Study Placement

IntelliSpace Cardiovascular indiscriminately stores cardiac clinical data as provided by the modalities or a user. Take care when performing Study Management functions.

**WARNING**

Before placing a study into a Patient Folder, verify that the MRN, Patient Name, Birth Date and Institution Code of the study are identical to those of the selected Patient Folder. Although the IntelliSpace Cardiovascular system allows placing of studies whose patient data does not match, this is not advised.

**CAUTION**

When a study that was placed in an incorrect Patient Folder, is moved to the correct Patient Folder, some or all patient identifiers will change.

### 2.9 Measurements

Some applications of IntelliSpace Cardiovascular allow you to perform measurements on images.

**WARNING**

Make sure that images are calibrated correctly. Only then accurate measurements are possible.

If the calibration guidelines are not followed, the analysis results may be inaccurate or unreliable.

**NOTE**

Measurements can be part of studies imported from QLAB, TomTec, or other systems using DICOM SR. These data are outside the scope of IntelliSpace Cardiovascular.
Disclaimer

The Z-Scores are provided on an “as is” basis without warranty of any kind, including without limitation, the warranty that it is free from defects. The calculations provided are not meant to be a substitute for professional advice and must be confirmed by qualified medical professionals before official interpretation. No use of the Z-Scores is authorized hereunder except under this disclaimer.

Sole use of measurement data to make a diagnosis is not recommended. The accuracy of each measurement and subsequent calculation is highly dependent on image quality. Besides the ultrasound system design, image quality depends on operator scanning technique, familiarity with system controls and, most importantly, patient echogenicity. These variables are independent of the ultrasound system, and therefore prevent specifying clinical accuracy for the measurements and calculations produced by the system.

DICOM SR Measurements

The IntelliSpace Cardiovascular Measurement Configuration Tool makes it possible to map DICOM SR measurements to existing IntelliSpace Cardiovascular measurements with the same measurement concepts.

WARNING

It is the responsibility of the clinical end-user to ensure that DICOM SR measurements are mapped to the correct IntelliSpace Cardiovascular measurements.
2.10 User Details

WARNING
In various places in the IntelliSpace Cardiovascular, the System Administrator can record contact details for users and staff members, such as email addresses or fax numbers. Users can also update their own details. These details may be used when the system generates automatic reports. For example, a report may be emailed to a user using their email address. It is important that this information is correct.

2.11 Cardiovascular Angiography Analysis System (CAAS) Related Safety Warnings

WARNINGS
- The analysis software has to be used by or under the supervision of a physician, or educated health care professional. The analysis data has to be interpreted by a competent health care professional to be used for diagnosis or for decision making on treatment of patients. (Generic).
- The contrast between background and calibration object must be good. When contrast between the calibrating object and the background is too low, the pixel size will be inaccurate for calibration (Cal).
- Use sufficient contrast medium to clearly delineate the object under investigation. When gray scale differences between the object and the background is too low, the detection may fail and derived measurements will be inaccurate. (QCA, QVA).
- The calibration and analysis must belong together in a meaningful way, such as both images must have the same projection.
- When you perform a vessel analysis, make sure that you select a vessel segment that is long enough to include sufficient proximal and distal reference diameter information; otherwise, the analysis algorithm will not work correctly. In addition, take the following into account:
  - When you use the Automatic Obstruction analysis method, you can adjust the proximal and/or distal reference markers, or the minimum luminal diameter marker (MLD), if needed.
  - Use the User Defined Reference method if you want to set the proximal and/or distal reference markers independent of the obstruction length markers. The other option is to adjust the minimum luminal diameter marker (MLD).
  - You could also use the User Defined Subsegment analysis method to limit the analysis information only to the subsegment that you define with the subsegment markers.
- The auto-calibration factor is valid only for objects under analysis within the isocenter.
- Select optimal projections with minimal overlap of the object to be analyzed with vessels, catheters or electrodes or other objects. (QCA, QVA).
- When Autopathline detection fails, use Manual pathline detection to detect a shorter part of the analysis segment. (QCA, QVA).
• Autopathline detection is not possible when the artery of interest is occluded totally. (QCA, QVA).
• For an LVA analysis, both ED and ES images have to be selected from an image run. Preview a run carefully to select the most optimally filled heart cycle. (LVA).
  – When selecting ED and ES phases of an image run, ensure that the ED and ES images belong to the same heart cycle.
  – In case of an extrasystole, it is not advised to analyze the heart cycle in which the extrasystole occurs. Note, that it is also not advised to analyze the heart cycle after an extrasystole. An extrasystole causes contraction of the LV that does not represent the normal contraction of the heart.
• Which regression formulas should be used depends on the used volume method. Ensure to select a correct regression formula, because it has great influence on the computed volume. (LVA).
• When indicating vessels, the pencil point must be well-placed (QCA, QVA). A pencil point should not be placed:
  – at a heavily curved vessel
  – in a vessel where the path is not clearly visible
  – near another vessel that is much wider
  – near a vessel that has foreshortening
  – near a bifurcation
  – at a place where it is not clear which vessel should be selected
• Correct acquisition angles must be used for the ventricle to avoid distortion in volumes and ejection.
2.12 Media

Studies and other data can be written to external media (CDs, DVDs and USB memory devices).

CAUTION

To preserve the integrity of data stored on a CD or DVD:

- Handle the disc only by the outer edges.
- Store the disc in the protective case.
- Do not leave the disc in direct sunlight.
- Do not leave the disc in a hot, humid environment.
- Do not attach any adhesive label to the disc. To write on the disc, use only a soft felt-tip CD/DVD marker pen intended for this purpose. Write only on the printed surface or on the clear inner region of the disc.
- If necessary, clean the disc with a soft, lint-free cloth. Always wipe from the center of the disc to the outside edge. Never wipe in a circular motion.
- Take into account that the life span of CDs and DVDs is limited.

WARNING

Take care that you write a label on the surface of the media (according the instruction above), immediately after you have written data to it. This to avoid that media get lost or become wrongly archived.

2.13 Allura Xper Module

Clinicians can access some basic review functions of IntelliSpace Cardiovascular through the Allura Xper FD table-side module in the Examination room (option). This enables them to display information from IntelliSpace Cardiovascular on the cath lab’s suspension monitors.

WARNING

When using the Allura Xper module:

Verify that the images being viewed are of the patient on the examination table. Make sure there is communication between the personnel in the Examination Room and the IntelliSpace Cardiovascular user in the Control Room.

2.14 Monitor Settings

WARNING

Hardware Characteristics, resolution settings, and viewing environment all affect the displayed image quality. It is the responsibility of the user to ensure that the displayed image quality is fit for purpose. Incorrect monitor setup can lead to misdiagnosis. Check the monitor performance regularly.
2.15 IntelliSpace Cardiovascular Configuration

DICOM Archive

CAUTION

If an IntelliSpace Cardiovascular system is configured to use a DICOM archive for storage, 3D data included within a DSR formatted study will be deleted during the conversion to DICOM format.

Loss of Study Data

WARNING

The following configuration in the IntelliSpace Cardiovascular Servicetool will eventually lead to loss of study data:

- Repository-only Storage Solutions
- Unselected Archive Data check-box for an import modality in one of the following sections of the IntelliSpace Cardiovascular Servicetool:
  - DICOM Import
  - DSR Import
  - Query Retrieve SCU
- When a repository-only solution is configured, or the Archive Data check-box is unselected, a user might configure a Time-To-Live per DICOM/DSR/Query Retrieve import node. This *maximum* Time-To-Live will be set per study and will result in the deletion of the study data when the Time-To-Live is reached. A study might be deleted earlier from the system if the high watermark of the repository is reached.
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3 Starting and Stopping IntelliSpace Cardiovascular

The instructions in this manual assume that you use a Windows operating system. However, IntelliSpace Cardiovascular can also be used with other operating systems (e.g., OS X operating system) and browsers (e.g., Safari browser, Google Chrome browser).

This means that keyboard combinations and other instructions that are used in this manual can be slightly different in the system that you are using. For instance, a common difference is the use of the Ctrl key in Windows and the Command key in OS X.

Please refer to the documentation of the systems and browsers that you are using if you are not using a Windows system.

NOTE
The configuration of user roles defines your ability to perform tasks in IntelliSpace Cardiovascular. For example, access to and the ability to work with the tools, modules, and viewing options, depend on the permissions set for your user role. Roles also determine the options that you can configure in IntelliSpace Cardiovascular. See your system administrator for more information.

3.1 Start IntelliSpace Cardiovascular

1 To start IntelliSpace Cardiovascular, double-click the desktop icon.

2 Select the language you require from the Language list.

3 When prompted, enter your user name and password to log on, or click OK to use Windows authentication.

This launches the Workspace.

3.2 Lock the Workstation

CAUTION
To prevent unauthorized access while you are away from the workstation (even for a short period of time):

1 Press Ctrl+Alt+Del to display the Windows Security dialog box.
2. Click **Lock this computer.**
Alternatively, use the keyboard shortcut: **Windows key+L.**

**CAUTION**
Take care when locking the workstation since, in an urgent situation, it can only be unlocked by a system administrator in your absence and could take needed extra time to do so. Therefore consider logging off instead.

### 3.3 Unlock the Workstation

1. Press **Ctrl+Alt+Del** to display the Unlock Computer dialog box.
2. Enter your password and click **OK.**

**NOTE**
You can only unlock a workstation that you have already logged on to.

### 3.4 Log Off of IntelliSpace Cardiovascular

- Click the Log off icon above the upper right corner of the tab.

### 3.5 Auto Log Off of IntelliSpace Cardiovascular

IntelliSpace Cardiovascular has automatic log-off functionality. Its behavior depends on how the application has been configured:

- IntelliSpace Cardiovascular automatically logs off after a defined period of time. Unsaved data is lost!
- IntelliSpace Cardiovascular does *not* automatically log off after a defined period of time because there is unsaved data.

If more than one browser tab is opened, and one of the browsers has unsaved data, IntelliSpace Cardiovascular will not automatically log off.

Depending on the permissions you have to configure the system, you can adjust the auto log off functionality under:

- System > My Settings
- System > System Settings

### 3.6 Exit IntelliSpace Cardiovascular

Do one of the following:

- Click the close icon at the top-right of the browser window.
- Press **Alt+F4.**
3.7 Shut Down the Workstation

**CAUTION**
Always use the Windows Shut Down function from the Start menu to terminate Windows. This ensures that the operating system shuts down correctly before the PC power is switched off.

1. Exit IntelliSpace Cardiovascular.
2. From the Windows Start menu, select Shut Down.
3. In the Shut Down Windows dialog box, select Shut Down.
4. Click OK. Wait until the shutdown procedure has completed and the PC has turned off (automatically).

**NOTE**
Your local system administrator may have configured additional options to the shut down dialog. If so, follow the local procedure to shut down the workstation.
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4 Workspace Overview

4.1 Consumption and Production Environments

Depending on the permissions set for your user role, you may have access to the Workspace in production environment or consumption environment.

Consumption Environment

The consumption environment is a web-only mode. IntelliSpace Cardiovascular will display “Web only” when it starts in web-only mode.

All applets may be used in this mode to perform various tasks. Examples of applets include Search, Worklists, Image Viewer, Document Viewer, and DICOM ECG Viewer.

Production Environment

If operating in the production environment, the IntelliSpace Cardiovascular will NOT display “Web only”. In addition, the production environment in IntelliSpace Cardiovascular lets you perform the following tasks, among others:

- document information with clinical applications
- perform diagnostic review of images
- generate clinical reports and patient letters
- generate studies

Note

The Echo module (web) operates with full-functionality in both the consumption environment and the production environment.

4.2 Workspace Layers

IntelliSpace Cardiovascular offers two Workspace layers which are available from the Home and Patient tabs.

- Home—User-centric Workspace
- Patient—Patient-centric Workspace

Each Workspace layer has a selection of applets that determine how relevant information is presented. The applets are available based on your personalized, role-based configuration and the environment in which you are working.

The Applet title bar shows which applets are available. In the User-centric Workspace, the Search Applet and Worklists Applet can be open.
4.2.1 Minimizing and Maximizing Applets

To maximize an applet so that it fills the whole of the applet area, do one of the following:

- Double-click the title bar of the applet.
- Click the maximize icon on the right side of the title bar.
- Click the pop-out icon on the right side of the title bar to create a floating window that can be sized or dragged to a second monitor.
- To restore the applet to its original size, click the minimize icon or click the title bar.

4.2.2 Switching Applets

Two applets can be displayed in the Workspace; this is determined by the configuration in use.

To switch one applet with another:

- Click the Swap icon on the right side of the title bar.
5 User-centric Workspace

The User-centric Workspace displays after you log on to IntelliSpace Cardiovascular. The default view shows the Home tab, which hosts the Search Applet and the Worklists Applet.

Both study management and patient management can be performed from the Search Applet and the Worklists Applet.

All Access is located at the top-left of the Workspace, under the Home tab. Click All Access to display ALL studies and Patient Folders, thus overruling any restrictions. Access to this information is only available if your user role allows such access.
5.1 Search Applet

The Search Applet can be used to search on Patient or Study, or to Query Retrieve DICOM data, if a Q/R DICOM node is available.

5.1.1 Patient Search

There are different parameters that you can use to perform a patient search. Currently you can search on Patient name, MRN or Date of Birth in the search box.

- **Patient name**—last name, first name
- **MRN**—numeric, text, or both.
- **Date of Birth**—stated format. Requires exact matches. For example: 01/01/1965.
The application grays out the filter on which a match has been made. For example, if you search on Johnson, the filter for “Last Name, First Name” becomes disabled so that you cannot use it. This will allow you to narrow the search with the filters that are available.

5.1.1.1 Wildcards
In the Search Applet, * (asterisk) and% (percent) can be used as wildcards. They execute the same action, for example, when looking for a patient named Johnson:

- *nson will return all patients with first name, middle name or last name (and MRN) including “nson”.
- Johns* will return patients with a first name, middle name, last name, or MRN starting with “Johns”.

To search for a patient:
1. Select the Patient tab and type the search text into the search box.
2. Click the Search button or press Enter to run the search.
3. Right-click on the patient name for the patient management options, or double-click a patient name to display the Patient tab for that patient.

5.1.1.2 Scrolling and Paging
You can set the grid interaction of the applets to Scrolling or Paging: (System > My Settings > General Settings). The default is scrolling.

If you set the grid interaction to Paging, the search results (for all searches) will display as individual pages. Depending on the size of your monitor and the amount of search results, there may be too many search results to fit in one Applet window. In that case, you can use the controls at the bottom of the window to move between pages.

However, it is also possible to use the Page Up or Page Down keys on your keyboard to move between pages.

You can use the arrow keys on your keyboard to move from one item to another item on a page.

NOTE
If the patient folder only contains an unplaced study, the name will not appear in the patient search.

5.1.1.3 Filtering Patient Results
Search results can be filtered at the top of columns that have a down arrow. Click the arrow and make your selection from the list of available criteria.
If you already know part of an item’s identifying information, you can put your cursor in the filter and type the information of the item. The application will display search results after you press the Enter key on your keyboard, or click in another field. Select the item when you see it.

If you filter on a free text field such as “Last Name, First Name”, pressing the Enter key on your keyboard initiates a query to the database.

IntelliSpace Cardiovascular sees the first name and middle name of a patient as a single entity that can be searched on. A comma is used to distinguish between last name and first name. For example, if you have a patient called Johnson, Nicholas William, and you search on “Ni”, the application will find “Johnson, Nicholas William”.

You can filter on more than one column. Each time you add or remove a filter, IntelliSpace Cardiovascular initiates a new search of the database for matching studies.

The application grays out the filter on which a match has been made. For example, if you search on Johnson, the filter for “Last Name, First Name” becomes disabled so that you cannot use it. This allows you to narrow the search with the enabled filters.

You can remove an individual filter if you click the X.

Click the X on the vertical scroll bar to remove all filters.

You may have to scroll horizontally to see all the columns. Always check that your results are not being filtered on a column you cannot see.
5.1.1.4 Multiple Selection on a Filter

You can enter more than one search criteria in a filter with a drop-down list to narrow your results.

1 Select the drop-down list and select the first criteria by which you want to filter.

IntelliSpace Cardiovascular leaves the drop-down list open so that you can make an additional selection.

2 Select a second criteria. Select more if needed.

Click outside of the drop-down list to close it. IntelliSpace Cardiovascular will query the database and displays the filtered information.
3 Click the X on the filter to remove the filter.

Alternative Filtering with Multi-Select Filters

You can type data directly into multi-select filters and press the Enter key to query the IntelliSpace Cardiovascular database.

You can also enter a plus sign (+) between data to query for more than one item. For example: You can enter CT + CR in the modality column and press the Enter key to retrieve items that contain CT and CR studies.
5.1.1.5 Customizing the Columns

To customize the columns on the Patient tab:

1. Click Modify and then Edit.

2. Click on the check boxes to select or de-select the desired Column Name. Use the scroll bar to see all column names available.

3. Click on the up or down symbols to move items up or down the list.

4. Click Save. IntelliSpace Cardiovascular will arrange the columns as you have defined them. You can revert any modification to the default configuration if you click the Reset button.

**NOTE**
The search can be saved system-wide.
5.1.2 Study Search

There are different parameters that you can use to perform a study search. Currently you can search on Patient name, MRN or Exam Date in the search box.

- **Patient name**—last name, first name
- **MRN**—numeric, text, or both
- **Exam Date**—stated format

The application grays out the filter on which a match has been made. For example, if you search on Johnson, the filter for “Last Name, First Name” becomes disabled so that you cannot use it. This will allow you to narrow the search with the filters that are available.

5.1.2.1 Wildcards

In the Search Applet, asterisk (*) and percent (%) can be used as wildcards. They execute the same action, for example, when looking for a patient named Johnson:

- *nson will return all patients with first name, middle name or last name (and MRN) including nson
- **Johns* will return patients with a first name, middle name, last name, (or MRN) starting with Johns

To search for a study:

1. Select the **Study** tab and type the search text into the search box.
2. Click the **Search** button or press **Enter** to run the search.
3. Right-click an item in the list to see the available study management options.
4. To display the Patient-centric Workspace for the patient, right click an item in the list and select **Open patient**.
5.1.2.2 Scrolling and Paging

You can set the grid interaction of the applets to **Scrolling** or **Paging**: (System > My Settings > General Settings).

If you set the grid interaction to **Paging**, the search results (for all searches) will display as individual pages. Depending on the size of your monitor and the amount of search results, there may be too many search results to fit in one Applet window. In that case, you can use the controls at the bottom of the window to move between pages.

However, it is also possible to use the Page Up or Page Down keys on your keyboard to move between pages.

You can use the arrow keys on your keyboard to move from one item to another item on a page.

5.1.2.3 Filtering Study Results

Search results can be filtered at the top of columns that have a down arrow. Click the arrow and make your selection from the list of available criteria.

If you already know part of an item's identifying information, you can put your cursor in the filter and type the identifying information of the item. The application will display search results after you press the Enter key on your keyboard, or click in another field. Select the item when you see it.

If you filter on a free text field such as “Last Name, First Name”, pressing enter initiates a query to the database.
IntelliSpace Cardiovascular sees the first name and middle name of a patient as a single entity that can be searched on. A comma is used to distinguish between last name and first name. For example, if you have a study called Johnson, Nicholas William, and you search on “Ni”, the application will find “Johnson, Nicholas William”.

You can filter on more than one column. Each time you add or remove a filter, IntelliSpace Cardiovascular initiates a new search of the database for matching studies.

The application grays out the filter on which a match has been made. For example, if you search on Johnson, the filter for “Last Name, First Name” becomes disabled so that you cannot use it. This allows you to narrow the search with the enabled filters.

You can remove an individual filter if you click the X.

Click the X on the vertical scroll bar to remove all filters.

You may have to scroll horizontally to see all the columns. Always check that your results are not being filtered on a column you cannot see.
5.1.2.4 Multiple Selection on a Filter

You can enter more than one search criteria in a filter with a drop-down list to narrow your results.

1. Select the drop-down list and select the first criteria by which you want to filter.
   
   IntelliSpace Cardiovascular leaves the drop-down list open so that you can make an additional selection.

2. Select a second criteria. Select more if needed.

   Click outside of the drop-down list to close it. IntelliSpace Cardiovascular will query the database and display the filtered information.
3 Click the X on the filter to remove the filter.

**Default Institution + For1**

**Alternative Data Entry into Multi-Select Filters**

You can type data directly into multi-select filters and press the Enter key to query the IntelliSpace Cardiovascular database.

You can also enter a plus sign (+) between data to query for more than one item. For example: You can enter CT + CR in the modality column and press the Enter key to retrieve items that contain CT and CR studies.
5.1.2.5 Customizing the Columns

To customize the columns on the Patient tab:

1. Click Modify and then Edit.

2. Click on the check boxes to select or de-select the desired Column Name. Use the scroll bar to see all column names available.

3. Click on the up or down symbols to move them up or down in the list.

4. Click Save. IntelliSpace Cardiovascular will arrange the columns as you have defined them. You can revert any modification to the default configuration if you click the Reset button.

NOTE

The search can be saved system-wide.
5.1.3 DICOM Q/R

DICOM Query/Retrieve allows you to query for studies which are stored on a modality or on another PACS system, and to retrieve and view the images on the Cardiology Timeline in the Patient tab. From there you can open a dedicated Workspace if the system is set up accordingly.

For example, you can search for CT or MR studies to view next to Cath studies and US studies in the Cardiology Timeline. From there, you can launch ViewForum to take a closer look at the CT or MR.

To perform a DICOM Q/R:

1. Select the DICOM Q/R tab.
2. Type search criteria in one or more of the following fields to perform the search on:
   - Patient name
   - MRN
   - Gender
   - Date Of Birth
   - Study Date
   - Accession Number
   - Modality
3. Click the Search button or press Enter to run the search. The results of the Search query appear in the middle part of the DICOM Q/R tab

**NOTE**
If it takes too long to query, you can abort the action by clicking Abort.

4. Double-click the desired patient name entry to start the retrieve. The retrieve starts and the progress is indicated in the lower part of the DICOM Q/R tab
5. Use the Search Applet or Worklists Applet to open the Patient in the patient tab to see the retrieved study on the Cardiology Timeline.

**NOTE**
The user may need to place the study first before seeing it in the Search Applet or Worklists Applet.

**NOTE**
If you prefer to search on the Patient Name, click on the pencil. This opens another window where you can enter the following:

- Title
- First Name
- Middle Name
- Last Name
• Honorific

5.1.4 Customize columns on the DICOM Q/R tab

To customize the columns on the DICOM Q/R tab:

1. Click **Modify**.

   ![Modify Columns](image)

   2. Click on the check boxes to select or de-select the desired **Column Name**. Use the scroll bar to see all column names available.

   3. Click on the up or down symbols to move them up or down in the list.

   ![Up and Down Symbols](image)

   4. Click **Save**.
5.1.5 Viewing a Patient List or Study List in the Search Applet

1. Open the application and use the Search Applet to perform a search on a patient list or a study list. The list will display a number of items after the search.

2. Select an item in the list of search results to display the Graphical Study List.

– If the search results list is a patient list, the graphical study list shows all the studies that are available. The application automatically selects the most recent study.

– If the search results list is a study list, the graphical study list shows all the studies that are available. The selected study has an orange border.

– You can double-click an icon in the Graphical Study List to open the default application. If there is no default application, IntelliSpace Cardiovascular will open the Patient-centric Workspace instead.

3. Select the Pictorials tab to view pictorials of the images that belong to the selected study in the Graphical Study List.

You can start the Patient-centric Workspace from the Pictorials tab.

– If the Image Viewer Applet is configured in the Patient-centric Workspace, then the viewer shows the selected series, loop, run or image.

– If the Document Viewer Applet is configured in the Patient-centric Workspace, then the applet shows the report that belongs to the selected series, loop, run or image.

4. Select the Study Info tab to display information about the study. Some items you can see are patient name and study date.
5 Click the **Edit Study** button to modify study details.

6 Select the **Patient Info** tab to display information about the patient. Some items you can see are patient name, address and phone number.

7 Click the **Edit Patient** button to modify patient details.

8 Right-click an item in the search results list for options to open or manage the item.
5.2 Worklists Applet

The **Worklists** Applet can be used to search on a Patient Worklist or a Study Worklist.

Based on the permission for each user role, the Worklists Applet also allows you to create, refresh, edit, copy, delete, and print worklists. (See “Creating a New Worklist” on page 58 for information on creating worklists.)
5.2.1 Viewing a Worklist in the Worklists Applet

1. Open the application and use the Worklists Applet to perform a search on a study worklist or patient worklist. The list will display a number of items after the search.

   Select an item in the list of search results to display the Graphical Study List.

   - If the search results list is a study worklist, the graphical study list shows all the studies that are available. The selected study has an orange border.
   - If the search results list is a patient worklist, the graphical study list shows all the studies that are available. The application automatically selects the most recent study.
   - You can double-click an icon in the Graphical Study List to open the default application. If there is no default application, IntelliSpace Cardiovascular will open the Patient-centric Workspace instead.

2. Select the Pictorials tab to view pictorials of the images that belong to the selected study in the Graphical Study List.

   You can start the Patient-centric Workspace from the Pictorials tab.

   - If the Image Viewer Applet is configured in the Patient-centric Workspace, then the viewer shows the selected series, loop, run or image.
– If the Document Viewer Applet is configured in the Patient-centric Workspace, then the applet shows the report that belongs to the selected series, loop, run or image.

3 Select the **Study Info** tab to display information about the study. Some items you can see are patient name and study date.

![Study Info tab](image)

4 Click the **Edit Study** button to modify study details.

5 Select the **Patient Info** tab to display information about the patient. Some items you can see are patient name, address and phone number.

![Patient Info tab](image)

6 Click the **Edit Patient** button to modify patient details.

7 Right-click an item in the worklist for options to open or manage the item.
5.2.1.1 Filtering Worklist Results

Search results can be filtered at the top of columns that have a down arrow. Click the arrow and make your selection from the list of available criteria.

If you already know part of an item’s identifying information, you can put your cursor in the filter and type the identifying information of the item. The application will narrow down the list as you enter characters. Select the item when you see it.

If you filter on a free text field such as “Last Name, First Name”, pressing enter initiates a query to the database.

You can add a plus sign (+) between filter criteria to include multiple items. For example, if you filter with Male + Female, IntelliSpace Cardiovascular will return all patients that are either male or female. Items that do not include gender are not included in the search results.

You can filter on more than one column. Each time you add or remove a filter, IntelliSpace Cardiovascular initiates a new search of the database for matching studies. In the case of worklist results, this means that IntelliSpace Cardiovascular can return more search results than the initial worklist query.

You can remove an individual filter if you click the X.

Click the X on the vertical scroll bar of the Applet to remove all filters. IntelliSpace Cardiovascular will display the search results based on the original search text used to perform the search.

You may have to scroll horizontally to see all the columns. Always check that your results are not being filtered on a column you cannot see.
5.2.1.2 Multiple Selection on a Filter

You can enter more than one search criteria in a filter with a drop-down list to narrow your results.

1. Select the drop-down list and select the first criteria by which you want to filter.

   IntelliSpace Cardiovascular leaves the drop-down list open so that you can make an additional selection.

   ![Dropdown List Example](image)

2. Select a second criteria. Select more if needed.

   ![Dropdown List Example](image)

   Click outside of the drop-down list to close it. IntelliSpace Cardiovascular will query the database and display the filtered information.
3 Click the X on the filter to remove the filter.

![Default Institution+Forl X](image)

Alternative Data Entry into Multi-Select Filters

You can type data directly into multi-select filters and press the Enter key to query the IntelliSpace Cardiovascular database.

You can also enter a plus sign (+) between data to query for more than one item. For example: You can enter CT + CR in the modality column and press the Enter key to retrieve items that contain CT and CR studies.
5.2.1.3 Too Many Records Found

Sometimes a database search can yield too many records to show in a list. In such a case, IntelliSpace Cardiovascular will display the following message in the user interface: Too many records were found.

By default, the application will show this message when there are more than 300 entries. Filters are automatically available so that you can narrow the search.
5.2.2 Creating a New Worklist

To create a new worklist:

1. Click the Modify drop-down button.
2. Click New.
3. Select Study or Patient.
4 In **Details**, type a **Worklist Name** and click the **Default** check box to make this the new default worklist.

5 In **Show Worklist Entries For**, select **Current User** or **System Wide**.

6 In **Filters**, make selections and click **Add**.

In some instances, you can select multiple filters. For example, the filter “Referring Physician” allows you to select more than one name if more than one name is in the system.

7 In **Column Selection**, click on the check boxes to select or de-select the desired **Column Name**. Use the scroll bar to see all column names available.

8 Click on the up or down symbols to move them up or down in the list.

9 Click **Save** or click **Cancel** to quit without saving the new worklist.

**Note**
IntelliSpace Cardiovascular automatically sorts and displays the names of worklists from 00 to ZZ, regardless of the order in which worklists have been created.

### 5.2.3 Editing a Worklist

To edit a Worklist:

1 From the **Modify** menu, select **Edit**.

2 In the **Edit Worklist** window, make changes to any of the **Details, Show Worklist Entries For, Filters, or Column Selection** sections.

3 Click **Save** or click **Cancel** to quit without saving the new worklist.

### 5.2.4 Copying a Worklist

To copy a Worklist:

1 From the **Modify** menu, select **Copy**.

2 In the **Copy Worklist** window, type a new **Worklist Name** and click the **Default** check box if this will be the new default worklist.

3 Click **Save** or click **Cancel** to quit without saving the new worklist.

### 5.2.5 Deleting a Worklist

To delete a Worklist:
1. From the **Modify** menu, select **Delete**.
2. When prompted, click **OK**, or click **Cancel** to quit without deleting the worklist.

![Delete Worklist]

### 5.2.6 Printing from the Worklist

To print a Worklist:

1. From the **Worklists** vertical pane, select the **Worklist** you want to print.
2. Click **Print**, the default printer’s print preview window displays automatically.
3. Click **Print**, or if applicable select another printer first, or click **Cancel** to exit without printing.
5.3 Study Management

The following functions can be executed from the Search Applet and Worklists Applet when you are in study context.

**NOTE**
Some functionality is available in the production environment only.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archive Study</td>
<td>sends a study to the configured archive</td>
</tr>
<tr>
<td>Copy Study</td>
<td>copies studies between different locations</td>
</tr>
<tr>
<td>Delete Study</td>
<td>deletes a study from IntelliSpace Cardiovascular</td>
</tr>
<tr>
<td>Echo Module (web)</td>
<td>opens the Echo Module</td>
</tr>
<tr>
<td>Edit Study Comments</td>
<td>edits or adds a short text visible in the Study Info tab of the Patient Folder and, if configured, in the worklist column Study Comment</td>
</tr>
<tr>
<td>Edit Study Details</td>
<td>allows you to edits study specific details</td>
</tr>
<tr>
<td>Manage Study</td>
<td>moves or deletes partial content of a study (e.g., individual runs/loops) that was placed in an incorrect study or patient to the correct study or patient</td>
</tr>
<tr>
<td>Merge Study</td>
<td>merges two echo studies that are in the same Patient Folder</td>
</tr>
<tr>
<td>Move Study</td>
<td>moves a complete study that was placed in an incorrect Patient Folder to the correct Patient Folder</td>
</tr>
<tr>
<td>Open Patient</td>
<td>opens the Patient-centric Workspace of the selected patient</td>
</tr>
<tr>
<td>Open Study</td>
<td>opens a study in the default viewer set by the system administrator for the selected study type</td>
</tr>
<tr>
<td>Open Study With</td>
<td>opens a study in a viewer selected by the user from the configured viewers (e.g., Cath Module, Echo Module, Xper IM, Medstreaming, etc.)</td>
</tr>
<tr>
<td>PDF Import Tool</td>
<td>imports a document in a patient study</td>
</tr>
<tr>
<td>Place Study</td>
<td>assigns a study not associated with a specific patient to a Patient Folder; the Patient Folder can be an existing folder or a new folder</td>
</tr>
<tr>
<td>Show Session Info</td>
<td>shows which user has opened a study, on which computer or with which application, as well as the date and time when the study opened. (Opening a study locks the study.) The Show Session Info functionality also offers the opportunity to end the session of the user who has a study opened. The option is disabled if a study is not opened (grayed out).</td>
</tr>
<tr>
<td>Show Study Properties</td>
<td>displays a read-only list of study properties, including properties configured to be hidden in the worklist</td>
</tr>
<tr>
<td>View Study Details</td>
<td>displays a read-only list of study specific detail</td>
</tr>
<tr>
<td>Write Study to Cache</td>
<td>sends the study to a remote location such as another hospital, clinic, office, or a home office</td>
</tr>
</tbody>
</table>

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Philips Healthcare
5.4 Patient Management

The following Patient Management menu functions are available.

NOTE
Some functionality is available in the production environment only.

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create empty study</td>
<td>allows a user the ability to create an empty study; this feature is often used for those customers that would like to create a report for a procedure, however there are no images; this workflow is restricted to US only</td>
</tr>
<tr>
<td>Create an Order [Sonos only]</td>
<td>allows the user to manually create an order for a NM or US procedure for Sonos only</td>
</tr>
<tr>
<td>Create new patient</td>
<td>allows the user to manually add a new patient to the IntelliSpace Cardiovascular database</td>
</tr>
<tr>
<td>Delete Patient</td>
<td>allows the user to delete the patient from system; if the user selects Delete Patient; this functionality is only available at a production system (dedicated workstation)</td>
</tr>
<tr>
<td>Edit Patient details</td>
<td>allows the user to edit the patient details; this functionality is only available at a production system</td>
</tr>
<tr>
<td>Emergency order [Sonos only]</td>
<td>allows the user to manually create an order for a NM or US procedure for Sonos only; this order will be flagged as an emergency</td>
</tr>
<tr>
<td>Link Patient</td>
<td>enables the user to Link a patient across an enterprise for those facilities that have different MRNs associated with each site</td>
</tr>
<tr>
<td>Open Patient</td>
<td>opens the Patient-centric Workspace for the selected patient</td>
</tr>
<tr>
<td>PDF Import Tool</td>
<td>allows the user to add an unsolicited (scanned) report to the Cardiology Timeline</td>
</tr>
<tr>
<td>Start EMR</td>
<td>starts the configured emergency medical record application</td>
</tr>
<tr>
<td>Unlink Patient</td>
<td>enables to Unlink patients that have been linked</td>
</tr>
<tr>
<td>View Patient details</td>
<td>allows the user to view the demographics of the patient</td>
</tr>
</tbody>
</table>

CAUTION
When Delete Patient is used, a warning displays: “All studies for this patient will be deleted.”
This page is left intentionally blank.
6 Patient-centric Workspace

When a patient or study opens while you are in the consumption environment, the Patient-centric Workspace opens to the Patient tab.

6.1 Patient Bar

The Patient Bar is located in the center of the top of the Workspace when a patient’s record is open. The bar displays a summary of that patient’s ID data and can be expanded by clicking anywhere on the bar to show additional patient demographic information.

Only if there are allergies or alerts associated with a patient will the warning symbol be displayed on the patient bar. To view the patient allergies and alerts, hover the mouse over the warning symbol and an information pane displays the allergies and alerts details.

The Patient Bar allows the user to:

- show the details by opening the patient details tab
- refresh the patient information
- edit Patient details by opening the edit patient details window
- start EMR in patient context
6.2 Cardiology Timeline

The Cardiology Timeline is displayed on the Patient tab. It allows you to view cardiology patient records that have been received into more detailed clinical records. You can change the time scale for viewing a patient's end-to-end history, apply smart filters to focus on the relevant information, and group selected procedures and studies of interest. You can access ECG reports, images, procedure reports and other information related to each study via actions in the Cardiology Timeline.

In addition, from the production environment you can launch directly into the respective clinical applications from within a patient-study context. Note that only the clinical applications provided by IntelliSpace Cardiovascular Clinical modules, Medstreaming, Xper IM, or applications like third-party PACS and EMR (via URLs) can be launched in this way.

Within the Cardiology Timeline there are two mini-timelines. The upper timeline allows easy navigation of the patient’s timeline and provides a quick view of certain trends with the patient and the tempo of that patient’s cardiovascular evolution.

The upper timeline uses a time scale represented as a row of dates. One study is represented by a small dot.

Immediately underneath is the real-time graphical timeline which has graphical icons, see “Graphical Timeline Thumbnails and Icons” on page 67 for more information.

6.2.1 Time Ranges

Pre-determined time periods allow you to view the Cardiology Timeline in Full History, Last 3 years, and Last year time frames. Select these options from the drop-down list:
- **Full History**: the Cardiology Timeline shows all procedures in the patient’s history, including scheduled procedures.
- **Last 3 years**: the patient history of the last 3 years is displayed in the upper timeline.
- **Last year**: the patient history of the last year is displayed in the upper timeline.

Use **Refresh** to update the timeline with any activity (e.g., received new studies, someone opened a procedure and the case locks, a report came in, an image came in).

### 6.2.2 Using the Slider Frame

When the patient tab is selected, the Cardiology Timeline shows (by default) as many studies as possible and centers the Slider Frame around them.

The Slider Frame defines your period of interest. It slides over the dots, which represent procedures, that are displayed on the time scale.

Use the Slider Frame as follows:

- Perform a horizontal scroll by dragging the Slider Frame left and right across the upper timeline panel.
- Resize the Slider Frame by dragging the left or right slider-handles to increase or decrease the period of interest.
- Hover over the Slider Frame to highlight it.
- Click anywhere on the time scale to move the center of the Slider Frame to that point in time.

Studies outside of the Slider Frame range are indicated by “studies out of screen.”

Studies with filters applied are indicated by “filter applied.”

Studies outside of the range which also have filters applied are indicated by “filter applied, studies out of screen.”
NOTE
When switching between Full History, Last 3 years, and Last year views, the Slider Frame is moved to the most recent study.

6.2.3 Navigating Through the Cardiology Timeline

Use the following step controls to navigate through the Cardiology Timeline:

The buttons are described in the table below:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On the timeline, go to the patient’s first or last procedure, depending on your timeline setting (ascending or descending).</td>
</tr>
<tr>
<td></td>
<td>On the timeline, go to the patient’s previous or next procedure, depending on your timeline setting (ascending or descending).</td>
</tr>
<tr>
<td></td>
<td>On the timeline, go to the patient’s next or previous procedure, depending on your timeline setting (ascending or descending).</td>
</tr>
<tr>
<td></td>
<td>On the timeline, go to the patient’s last or first procedure, depending on your timeline setting (ascending or descending).</td>
</tr>
</tbody>
</table>

6.2.4 Graphical Timeline Thumbnails and Icons

Immediately underneath is the real-time graphical timeline, which provides a greater understanding of the patient’s cardiovascular care continuum.

To collapse or expand the timeline, click the timeline title bar.

The timeline has thumbnails and icons that indicate the type of procedure and the status.

- LHC—study type abbreviation
- Report Available—bottom-left corner icon
- Image—bottom-middle icon
- Link—bottom-right corner icon
- Study Category (based off the study type, refer to Appendix C: Icon Functions)—center icon
- Lock icon—displays when a study is locked by another user; the user can unlock the study by ending the session from the search or worklist in the study management menu (right-click context menu)
The thumbnails identify, display, and provide access to different studies or clinical modules on the Cardiology Timeline. In the production environment and PDF Import Tool, you can launch the associated clinical module or associated images directly from the study icon.

To view additional study information, hover over a thumbnail. An information pane displays study details such as study date and time, Category type, study status, (e.g., scheduled, in progress, completed), location of the images (if available), Referred by, and patient name (in case a patient is linked).

6.2.5 Thumbnail Border Colors

- Yellow—indicates that the study is selected
- Red—indicates that the study does not have a date
- Gray—indicates relevant studies (which have not been selected)
- Black—indicates non-similar studies

6.2.6 Grouped Thumbnails

Thumbnails are grouped on the lower timeline so that more procedures can be shown. This is based on Study Category. For example, the image below shows Modality US, category type Echo, and study types Stress and Adult US.

To see more information about the study, hover over the thumbnail.

**WARNING**

An icon on the study represents that data is available. It does not indicate the amount of data available. For example, a study represented by one icon may have many images to view.
6.2.7 Filtering Studies

A small funnel-shaped icon to the right of the Cardiology Timeline can be used to filter the timeline studies. Studies can be filtered on modality and study type.

You can also apply additional filters by right-clicking on the thumbnail in the timeline and selecting available options such as **Hide this type**, **Show this type only**, or **Show all**.
6.3 Document Viewer Applet

To view any document, such as a report, click a study icon in the Cardiology Timeline. The report (preliminary or finalized) for that study will automatically load in the Document Viewer Applet. You can view any document that has been created by the system or sent to the system via HL7, DICOM embedded PDF, or manually imported using the PDF Import tool.

To compare two reports side by side, select a desired study including a report:

1. Press Ctrl and click on one or more of the icons on the timeline (including a study).
2. Do one of the following:
   - From the Documents tab, press Ctrl to select the desired reports from the list, or
   - Open two instances of the Document Viewer Applet; then select one report from the Documents tab for the first Document viewer and select the second report in the Documents tab for the second Document Viewer.

When the report is visible in the Document Viewer Applet, you can:

- maximize the applet for easier review
- select from available versions
- print the reports
6.4 Image Viewer Applet

**WARNING**
The Image Viewer Applet is designed so that you can perform diagnoses with ultrasound. It is *not* designed for performing diagnoses with any other modality.

To use the Image Viewer Applet, click a study icon in the Cardiology Timeline. The associated reference images for that study will automatically be loaded in the Image Viewer Applet.

The main functions of the Image Viewer Applet are:

- to view series, runs, loops, images
- to compare series, runs, loops, images
- to play series, runs, loops as a movie
- image interaction using the toolbar

The Image Viewer Applet supports a number of predefined viewing settings that influence the screen layout. These settings are called *viewing protocols*. Different viewing protocols are applied, for example, for biplane or stress echo runs.

It is not possible to define and save your own protocols within the Image Viewer Applet. You can change the screen layout, but these changes are lost when you leave the Image Viewer Applet.

**NOTE**
When selected, images have a yellow border.

**NOTE**
If more than one image is opened in the Image Viewer, subsequent selections of the loaded series, runs, loops, and images can be made in the pictorial index.

When viewing, you can:

- navigate through the images
- manipulate images by changing image settings such as gray level or zooming
- change the presentation of the Viewer
- add or remove images shown in the image window at the same time
- select a viewing protocol to apply special viewing conditions
  
  **NOTE:** The protocols that the application makes available are dependent on the modality in the study.

  - Classic Single-Select
  - 2 Up
  - 4 Up
  - 6 Up
  - 8 Up
After viewing, you can:

- export snapshots and secondary captures in JPEG
- print images to a local printer
- use Previous series 🔄 or Next series 🏅 to step through the pictorials in the pictorial index.
- select a pictorial in the pictorial index to open another image or run in an image window
- close the Viewer to make another selection in the worklist

### 6.4.1 General Layout

1. Applet title bar (see “Applet Title Bar” on page 73) allows you to:
   - change the Image Viewer Applet to a Document Viewer Applet or a DICOM ECG Viewer Applet
   - maximize applet
   - pop-out applet
   - restore/minimize applet
2. Study bar:
   - can be collapsed or expanded
• gives access to viewing protocols

3 Study info

4 Toolbar (see “Toolbar” on page 76). Gives access to a number of view settings and (temporary) image manipulations like zoom and changing BG and BN (WW/WL). These tools depend on the chosen modality

5 Pictorial index (see “Pictorial Index” on page 89). Contains pictorials of series/runs/loops/images belonging to different studies

6 Viewing protocols (see “Viewing Protocols” on page 92)

7 Movie navigation pane (section “Movie Navigation Pane” on page 100)

The toolbar, patient info, pictorial index, and movie navigation pane are always visible. The number of image windows depends on the applied viewing protocol.

The viewer depends on the modality and defines:

• the number of functions that are available to manipulate the image
• if the movie starts automatically, or not

6.4.2 Applet Title Bar

The applet title bar allows the user to:

• maximize applet
• pop out applet
• restore
• minimize applet
• change the Image Viewer Applet to a Document Viewer Applet or a DICOM ECG Viewer Applet

6.4.3 Change Screen Layout

Within an applied viewing protocol, the layout of the screen can be changed.

To rearrange the layout of the Viewer, do one of the following:

• minimize and maximize the Image Viewer Applet
• change the size of the pictorial index area
• pop out the Image Viewer Applet
• use the F11 function key to collapse the browser bar and maximize the IntelliSpace Cardiovascular application to full screen. (Press F11 again to expand the Internet browser bar.)

(See “Minimizing and Maximizing Applets” on page 33.)

To increase image viewing space;

• Click on the title bar of the applet
• Click the maximize icon on the right side of the title bar.
To *toggle* between a minimized and maximized Image Viewer Applet:

- Click the Maximize icon in the right upper corner of the title bar of the applet, to increase the size of the applet, or click on the title bar of the applet.
- Click the Restore icon in the right upper corner of the title bar of the applet to minimize the size of the applet, or click on the title bar of the applet.

### 6.4.4 Change the size of the pictorial index area

To change the size of the pictorial index area, click on the dividing line between the pictorial area and the Image Viewer and drag the line to the left or the right.

![Image Viewer Applet size adjustment](image)

### 6.4.5 Pop out the Image Viewer Applet

To pop out the Image Viewer Applet, do one of the following:

- Double-click on the applet title bar, or
- Click the pop-out icon on the right side of the title bar.

This creates a floating window that can be sized or dragged to a second monitor.

**NOTE**

When an applet has been popped out, a message displays: “Applet is popped out (close pop-out window to return)”

To restore the applet to the original size close the pop out by clicking on the “X”:

- in the browser
- in the patient bar

### 6.4.6 Changing applets

The user can change applets. The available applets in IntelliSpace Cardiovascular are:

- Image Viewer Applet
- Document Viewer Applet (see “Document Viewer Applet” on page 70)
- DICOM ECG Viewer Applet (see “DICOM ECG Viewer Applet” on page 106)
NOTE
The user can save the layout of an applet by selecting the **Save applet layout** setting under Home tab settings or Patient tab settings located at System > My Settings.
6.4.7 Toolbar

The toolbar contains a number of buttons to access some functions and is always visible. Selecting mouse manipulation tools like scroll, zoom, pan and WW/WL will be visible in all viewports. The button’s mouse cursor icon indicates the selected manipulation. Other tools like edge enhancement, invert gray level, windows presets, fit to..., rotate, flip and mirror can be used in multiple viewports by holding the Ctrl key while selecting the desired viewport.

NOTE
Buttons in the toolbar with a right arrow under them offer additional functions that pop up when you click the toolbar button.

NOTE
The availability of the function depends on the modality of the image.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scroll</td>
<td></td>
<td>Zoom</td>
</tr>
<tr>
<td></td>
<td>Pan</td>
<td></td>
<td>Edge enhancement</td>
</tr>
<tr>
<td></td>
<td>Gray level</td>
<td></td>
<td>Invert gray level</td>
</tr>
<tr>
<td></td>
<td>Window presets</td>
<td></td>
<td>Fit to view</td>
</tr>
<tr>
<td></td>
<td>Fit height</td>
<td></td>
<td>Fit width</td>
</tr>
<tr>
<td></td>
<td>Rotate clockwise</td>
<td></td>
<td>Rotate counter-clockwise</td>
</tr>
<tr>
<td></td>
<td>Mirror</td>
<td></td>
<td>Flip</td>
</tr>
<tr>
<td></td>
<td>Add or remove image row</td>
<td></td>
<td>Add or remove image column</td>
</tr>
<tr>
<td></td>
<td>Set tiling for up to 4x4 images</td>
<td></td>
<td>View a series of MR, CT, or NM studies in their default order or sort them by phase, slice, bin, or frame</td>
</tr>
<tr>
<td></td>
<td>Conceal demographic information</td>
<td></td>
<td>Display or hide image information</td>
</tr>
<tr>
<td></td>
<td>Display ECG curve</td>
<td></td>
<td>Save and add image to list of images to be saved</td>
</tr>
<tr>
<td></td>
<td>Clear list of saved images</td>
<td></td>
<td>Preview list of saved images</td>
</tr>
<tr>
<td></td>
<td>Save movie to MP4 format</td>
<td></td>
<td>Add image to print set</td>
</tr>
<tr>
<td></td>
<td>Remove all images from print set</td>
<td></td>
<td>Print preview</td>
</tr>
<tr>
<td></td>
<td>Set color map</td>
<td></td>
<td>Previous and next color map</td>
</tr>
</tbody>
</table>
### 6.4.7.1 Functions available for all modalities

The functions available on the toolbar for all modalities are:

- Scroll
- Zoom
- Pan
- Reset
- Zoom states (fit to...)
- Gray level
- Display/Hide Image information
- Print
- Save

### 6.4.7.2 Direct mouse manipulation

For easy manipulation of images, some main functions in the Viewer are assigned to mouse buttons by default.

**Default mouse manipulation settings**

The following table lists the default mouse manipulation functions.

<table>
<thead>
<tr>
<th>Mouse button (click and hold)</th>
<th>Pointer image changes to</th>
<th>Drag the mouse to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left</td>
<td></td>
<td>Scroll (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE: To use the left mouse button for other functions listed in this table, select the appropriate icon in the toolbar</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td>Gray level adjustment</td>
</tr>
<tr>
<td>Left + middle</td>
<td></td>
<td>Pan</td>
</tr>
<tr>
<td>Left + right</td>
<td></td>
<td>Edge enhancement</td>
</tr>
<tr>
<td>Middle + right</td>
<td></td>
<td>Zoom</td>
</tr>
</tbody>
</table>
While a movie cycles through images in a series/run/loop, you can move the mouse wheel forward or backward to start the next or previous series/run/loop. You press the mouse wheel to stop the series/run/loop. Press the mouse wheel again to start the series/run/loop.

**NOTE**
If the mouse manipulation does not work as described, check the configuration of your mouse driver.

**NOTE**
The mouse buttons must be configured correctly: left- and right-click for the standard buttons and middle-click for the scroll wheel.

**Change mouse manipulation for left mouse button**
The default setting for the left mouse button allows the user to scroll through images. It is possible to assign other functions to the left mouse button.

To assign another function to the left mouse button:
1. Click the toolbar.
2. On the toolbar, click one of the five buttons to assign to the left mouse button:
   - Scroll
   - Zoom
   - Pan
   - Edge enhancement
   - Gray level

**6.4.7.3 Scroll**
To scroll continuously, use the scroll function to go quickly to certain images within series/run/loop. Press the left mouse button and drag the mouse pointer up or down over the image to scroll backward and forward within the run.

Alternatively, use the scroll wheel of the mouse.

**NOTE**
The left mouse button is set to scroll images by default. It is possible to assign other settings to the left mouse button.

To scroll step-by-step, click one of the following buttons on the navigation pane to navigate through the images in a series/run/loop:

- **Previous image** to move one image back
- **Next image** to move one image forward
6.4.7.4 Zoom

To zoom in, press the right and middle mouse buttons and drag the mouse up. During this movement, the pointer looks like this:

To zoom out, press the right and middle mouse buttons and drag the mouse down. During this movement, the pointer looks like this:

Alternatively, to assign the zoom function to the left mouse button:

1. Select Zoom in the toolbar.
2. Click and drag the mouse up or down to zoom in or out.

6.4.7.5 Zoom states

Use zoom states to zoom the image according a predefined zoom state. On the toolbar, click one of the following:

- **Fit to View** to display the whole image in the view
- **Fit Height** to display the image in the available height of the Viewer
- **Fit Width** to display the image in the available width of the Viewer
- **Zoom 1:1** to display a one-to-one pixel ratio between the image as it was acquired and the image displayed on the screen. This option can be used only on images with square pixels.

6.4.7.6 Pan

Use the **Pan** function to move the image within a window. This is useful if the image is larger than the available viewing area. Press the left and middle mouse buttons and drag the image in the preferred direction. During this movement, the pointer looks like this:

Alternatively, to assign the pan function to the left mouse button, select the **Pan** button in the toolbar, and then click and drag the image in the preferred direction.

6.4.7.7 Gray Level

Use gray level to increase/decrease brightness or contrast.
To adjust brightness, click and drag the mouse pointer up or down over the image to increase or decrease brightness (decrease/increase Level for MR and CT images). During this movement, the pointer looks like this:

To adjust contrast, click the middle mouse button and drag the mouse pointer right or left over the image to increase/decrease contrast (decrease/increase Width for MR and CT images). During this movement, the pointer looks like this:

Alternatively, assign the gray level function to the left mouse button by selecting the **Gray level** button in the toolbar, and do one of the following:

- Click on and drag the mouse pointer up or down over the image to increase or decrease brightness.
- Click on and drag the mouse pointer right or left over the image to increase or decrease contrast.

**NOTE**
By default, the gray level adjustment applies to a complete run.

6.4.7.8 Reset
Reset returns a view to the last-applied presentation state.

To reset view to last presentation state, select **Reset All** from the toolbar.

Reset does not delete measurements or demographic information that has been concealed from images. It does, however, revert actions such as panning, zooming, windowing, color mapping and edge enhancement.

6.4.7.9 Perform unlabeled measurements

1. Select **Perform unlabeled measurement** from the toolbar.
2. Select the type of unlabeled measurement that you want to perform
3. See “Performing an Unlabeled Measurement” on page 152 for further instructions, if necessary.

The measured value is displayed in the Measurements panel. The panel can be moved and resized.

6.4.7.10 Perform labeled measurements

1. Select **Perform labeled measurement** from the toolbar.
2. Select the labeled measurement that you want to perform and make the measurement.
The measured value is displayed in the Measurements panel. The panel can be moved and resized.

6.4.7.11 Create annotation

1. Select Create Annotation from the toolbar.
2. Select the type of annotation that you want to make:
   - Text with arrow
   - Text only
   - Arrow only
3. Use your cursor to create and position the annotation.

6.4.7.12 Delete measurement

Do one of the following:

- Position the mouse pointer over one of the end points of the line, right-click and select Delete.
- Right-click on the measurement value in the Measurements table and select Delete, or press the Delete key.

To delete all measurements from the image, select Delete all in image. Select Delete all in loop to delete all measurements in a loop.

6.4.7.13 Display or hide image information

To toggle the image information on or off, click Image Information on the toolbar to turn the information on.

To turn the information off, click Image Information on the toolbar.

6.4.7.14 Show or hide measurements

You can display or hide measurements on an image.

- Click on the toolbar to show measurements on an image.
- Click on the toolbar to hide measurements on an image.

IntelliSpace Cardiovascular automatically displays any hidden measurements that have been made on an image at the moment that you start to make a new measurement on the image.

6.4.7.15 Print images

To print the displayed image or multiple images:

1. Select the thumbnail of the image to be printed.
2 Click the Print button ⬇️ in the toolbar.

3 In the pop-up toolbar, click Add to print list ⬆️ and do one of the following:
   • To add additional images to the print list, select each image and then click the Add to print list button to add it to the print list.
   • To add multiple images at the same time to the Print list, hold the Ctrl key and select the viewports to be added. Then click the Add to print list button to add the selected images to the print list.

4 Click Print in the toolbar.

5 In the pop-up toolbar, click Preview ⭑. The Preview window displays.

6 If applicable, click Print in the toolbar and turn on the image information button ⬇️ to display image information, or parts of the image that show patient demographic information.

**NOTE**
To prevent patient information from being made public, images are anonymized by default. Anonymization does not apply to information that is burnt in an image.

7 To print, click Print. The Print dialog box displays (standard Windows format).
8 In the Print dialog box, modify the print settings, if desired and, if your browser’s print options allow you to do this.
9 Select the desired printer and modify any other settings, if needed.
10 Click Print. The images are sent to the selected printer and the Viewer displays.
11 To remove all images from the print list, click Print in the toolbar, and then click Clear list ⬇️ in the pop-up toolbar.

Disclaimer:
IntelliSpace Cardiovascular supports Windows compatible printers for paper copies of images. You can use paper-copy images for reference, to share information with patients or for teaching purposes. Paper copies of images are not created for diagnostic purposes!

IntelliSpace Cardiovascular supports DICOM print compatible printers for film.

IntelliSpace Cardiovascular supports MS Windows compatible laser printers, but not for producing diagnostic quality output!

**6.4.7.16 Save Images**
You can export snapshots and secondary captures in JPG file format and movies in MP4 format.

To save a displayed image or multiple images:
1. Select the thumbnail of the image to be saved. You can also hold down the Control key and click with the mouse on additional thumbnails so select more than one image to save.

2. Click **Save** on the toolbar to save all selected images.

### 6.4.7.17 Save movies

You can export movies in MP4 format. To save a displayed movie as an MP4 file:

1. Select the thumbnail of the series/run/loop to be saved and click **Save** on the toolbar.

2. Click **Save movie** on the in the pop-up toolbar button. The **Save movie** pop up displays.

3. Enter a file name and click **Save**.

4. Use the web browser functionality to navigate to the saved series/run/loop.

**NOTE**

Refer to the instructions for use for your web browser to navigate to the saved images or movies.
6.4.8 Functions available depending on modalities

The following functions are available on the toolbar for certain modalities:

- Edge enhancement
- ECG curve on/off
- Rotate/Flip/Mirror
- Conceal demographics
- Invert gray level
- Tiling
- Window presets
- Colormap

6.4.8.1 Edge Enhancement

This option determines the amount of edge enhancement.

To assign the edge enhancement function to the left mouse button:

1. Click Edge enhancement on the toolbar.
2. Click and drag the cursor up or down over the image to increase or decrease edge enhancement.

6.4.8.2 ECG Curve On/Off

When a run contains an ECG curve, this curve can be displayed or hidden.

To toggle the ECG curve on or off, click ECG on the toolbar.

NOTE
The ECG setting applies to a complete run.

6.4.8.3 Rotate, Flip, Mirror

To rotate images in increments of 90 degrees clockwise or counter-clockwise:

1. Click Rotate Clockwise to rotate an image clockwise.
2. Click Rotate Counter-Clockwise to rotate an image counter-clockwise.

To flip images horizontally or vertically:

1. Click Mirror to mirror an image horizontally.
2. Click Flip to mirror (flip) an image vertically.
6.4.8.4 Conceal Demographics

Demographic information burnt into an image cannot be hidden with the Image Information function. However, such information can be concealed by placing a black rectangle on top of it.

To conceal demographic information:

1. Click Conceal Demographics. A cross-hair displays to draw a rectangle.
2. Click in the image or movie and drag the cursor to draw the rectangle. This rectangle can be deleted, repositioned, or resized.

You can add more than one black rectangle to hide items. You can delete black rectangles in different ways from a loop, run, series or image:

- Select a black rectangle and press the Delete button on the keyboard.
- Right-click a black rectangle and select Delete from the right mouse button menu.
- Right-click a black rectangle and select Delete all from the right mouse button menu.

IntelliSpace Cardiovascular displays the boundary of a concealed demographic in yellow when you hover over it with the mouse.

6.4.8.5 Invert Gray-Level

- Click Invert Gray Level.

**NOTE**

By default, the Invert gray level setting applies to a complete run.

6.4.8.6 Tiling

Some modalities allow the images of a run arranged in a grid.

Do one of the following:

- Click the Tile on the toolbar and select one of the available grids layouts from the list (1x1 up to 4x4).
- Click one of the following to change the layout of the grid:
– **Add row**: to increase the number of rows by one.
– **Add column**: to increase the number of columns by one.
– **Remove row**: to decrease the number of rows by one.
– **Remove column**: to decrease the number of columns by one.

**NOTE**
When rows or columns are added, images are arranged over the tiles from left to right, then from top to bottom.

6.4.8.7 **Window Presets**
A preset value of window width and window level can be applied to CT images.

In the toolbar, click **Window presets** to select one of the anatomy-related window presets from the list:

- Cardiac
- Posteria Fossa
- Brain
- Temporal Bone
- Cervical Spine
- Colon 1
- Thoracic Spine
- Lumbar Spine
- Lungs
- Mediastinum
- Abdomen
- Liver
- Kidneys
- Bone 1
- Bone 2

6.4.8.8 **Color Map**
A preset value of a color map can be applied to NM or PET images.

1. On the toolbar, click **Color Map**. A sub-menu displays.
2. Do one of the following:
   - Click **Select Color Map** and select one of the color maps from the list.
   - Original Gray Scale
- Rainbow 1
- Rainbow 2
- Rainbow 3
- Grayscale
- Inverted Grayscale
- Ice
- Cool
- Thermal
- Warm
- Hot Metal
- Ten Bands
- Smart
- Contour
- Cardiac
- SUV 1
- SUV 2
- SUV 3
- Fusion

- Click **Next Color Map** to select the next color map from the list.
- Click **Previous Color Map** to select the previous color map from the list.

### 6.4.8.9 Sorting Images

Sorting allows you to view a series of MR or NM images in the default order or sort them by phase, slice, bin or frame.

To sort images:

1. Select the appropriate images.
2. Click **Sorting** and then from the pop-up menu, select the appropriate sort option.
6.4.9 Image Compression

IntelliSpace Cardiovascular supports JPEG lossy and PNG lossless compression. Lossy compression:

- decreases the size of image files
- helps reduce the time required to send files over the network
- lets you store more image files to disk (because images are smaller)

To achieve this, a JPEG lossy-compression algorithm reduces the amount of data stored to represent an image. The algorithm uses a quality factor that trades image quality for compression.

The IntelliSpace Cardiovascular client displays a lossy data indicator when a lossy image is shown.

There are two cases in which the lossy data indicator displays:

1. If data was already JPEG lossy when it arrived (see the lossy data indicator tooltip):

   ![Lossy Data Indicator Tooltip](image)

   The lossy data indicator tooltip indicates that a 12:1 compression ratio was applied by another system.

2. If IntelliSpace Cardiovascular applies JPEG lossy compression to facilitate the frame rate performance of a movie (see the lossy data indicator tooltip).

   (The system does this only if the Allow Lossy Image check box is selected. See “Image
Viewer Settings” on page 186 for more details on the check box.):

The lossy data indicator tooltip indicates that a 6:1 compression ratio was applied by IntelliSpace Cardiovascular.

(See “Adaptive Streaming” on page 102 for more details on movie frame rates.)

Hover above the lossy data indicator icon , with your cursor to display the tooltip with details about the applied compression.

The user interface has a mechanism that lets you balance between performance and quality.

Format of ratios

Compression ratios display in the standard format of ratios: \( X:Y \).

For example, a lossy compression ratio of 12:1 indicates that 12 times less data of an image is received in comparison to the amount of data in the image before compression was applied. A ratio of 6:1 indicates that 6 times less data of an image is received, and so on.

Notes on lossy compression

- If IntelliSpace Cardiovascular applies lossy compression to uncompressed DICOM images, it applies the compression to a copy of the images: original DICOM images are left unmodified.
- IntelliSpace Cardiovascular does not compress data that has been previously compressed
- Lossy image compression reduces the quality of an image
- When the system applies lossy compression during a movie, and you stop the movie, the system displays the image of the movie in its uncompressed state.

Lossless compression

Lossless compression reduces the size of the data stored on disk to represent the image without losing information.
6.4.10 Pictorial Index

The pictorial index contains pictorials of the series/runs/loops/images that are available to be viewed in the image window(s).

The following applies to the pictorial index:

- The pictorial index can be resized horizontally.
- Pictorials of series/runs/loops/images that are opened in an image window have a yellow border, as shown in the figure below.
- When the mouse pointer is paused above a particular pictorial, its background turns gray. A pop-up shows information about the series/runs/loops/images represented by this pictorial:

![Pictorial Index Example]

- The pictorial may contain an icon to indicate a stack of images (multi-frame). An image (single frame) will not have this indicator.
- Viewing Protocols can be selected to select a viewing protocol.
- Pictorials of series/runs/loops/images that have been viewed have a green check mark.
- If you right-click on a pictorial, IntelliSpace Cardiovascular gives you the option to view the DICOM information associated with the image that the pictorial represents. You can double-click an entry and use the copy-paste functionality of your system to copy and paste the information.

To resize the pictorial index:

1. Place the mouse pointer on the edge between the pictorial index and image window until a double-headed arrow displays.
2. Drag the window to the desired size.
6.4.10.1 Resizing Pictorials

There are different ways to resize pictorials and thumbnails in the application.

- **Method 1**: Select the pictorial. Then press the Shift key and scroll the mouse wheel forward or backward. IntelliSpace Cardiovascular resizes the pictorial larger or smaller.

   ![Resizing Pictorials](image)

   **Note:**
   If you select the Ctrl key and scroll the mouse wheel, the entire web page resizes - not just the pictorials.

- **Method 2**: Click the magnifying glass icon to display a slider. Drag the slider to increase or decrease the size of the pictorials. You will find the magnifying glass in the graphical study list, Image Viewer Applet, Echo Module and the Cardiology Timeline.

   ![Magnifying Glass and Slider](image)

   **Note**
   Use the System menu to find and adjust the appropriate Save applet layout setting to save resized pictorials in the User-centric Workspace and the Patient-centric Workspace.
6.4.11 Viewing Protocols

A viewing protocol determines the presentation of images or reports in the viewing area. The following viewing protocols are available:

<table>
<thead>
<tr>
<th>Viewing protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classic</td>
<td>This is the default view. It shows one image in the Viewer.</td>
</tr>
<tr>
<td>Single-Select</td>
<td>This protocol shows two images side-by-side, initially starting from the first series/run/loop image. The Previous series button loads the previous two series/runs/loops/images in the Viewer. The Next series button loads the next two series/runs/loops/images in the Viewer.</td>
</tr>
<tr>
<td>2 Up</td>
<td>This protocol shows four images besides together, initially starting from the first series/run/loop/image. The Previous series button loads the previous two series/runs/loops/images in the Viewer. The Next series button loads the next two series/runs/loops/images in the Viewer.</td>
</tr>
<tr>
<td>6 Up, 8 Up, 9 Up</td>
<td>Higher-numbered protocols operate in the same way.</td>
</tr>
</tbody>
</table>

Three advanced viewing protocols are available. Each protocol opens more than one image window and links the contents of the windows:

- Stress Echo Stage
- Stress Echo View
- Biplane

6.4.11.1 Stress Echo Protocol

A stress echo is an echo examination to investigate the behavior of the heart. During several load levels of the heart (the ‘stages’), dynamic echo images are acquired.

In most cases, the echo study is made in four different stages:

- during rest (BASE)
- low load (LOW)
- high load (PEAK)
- during recovery (POST)

By default, four different heart echo views are made for each stage:

- Long Axis view (LAX)
- Short Axis view (SAX)
- 4 chamber view (AP4)
- 2 chamber view (AP2)

Result of stress echo protocol when a stress echo run is opened for viewing:

- The Stress Echo Stage selection strategy shows all available views (LAX, SAX, AP2, or AP4) in the study for each stage (BASE, LOW, PEAK, or POST). If available, additional runs taken at the same stage are shown, too.
- The **Stress Echo View** selection strategy shows all available stages (BASE, LOW, PEAK, or POST) in the study for each view (LAX, SAX, AP2, and AP4). If available, additional runs taken at the same view are shown too.
- The runs in the image windows start playing synchronously. By default, all runs are played at the acquisition frame rate and are synchronized on the first frame.
- The runs in the image are linked on scrolling and movie playing. This is indicated by the link sign 🙂 in the image windows.

### 6.4.11.2 Stress Echo View Protocol

No matter which methodology was used to acquire the stress echo images/series/loops, the Stress Echo View protocol shows the different stages (BASE, LOW, PEAK, or POST) of a certain view (LAX, SAX, AP2, and AP4) in a Quad View (2 X 2) display configuration. If an odd number of stages is acquired, the Stress Echo View protocol displays the stages in a Quad View (2 x 2) format, even if the rest of the display is empty (black), so that the loops are always displayed at the same size. The displayed stress echo loops showing the different acquired views of the same stages are synchronized to the beginning and end of systole.

To open a stress echo study with the Stress Echo View selection strategy:

1. Open a stress echo study with the Stress Echo View protocol:
   - The pictorials of the Stress echo study are ordered by view number.
   - The first acquired view is shown in all the acquired stages in a 4-up display in cine mode, synchronized to the beginning and end of the systole.
   - You can view the next view or views in the acquired stages by clicking on **next series** or view the previous stage by clicking on **previous series** and navigating through the whole acquired study.

If there are more loops from the same view in the same stage, for example three loops from ‘LAX’ in the stage “Base”, the loops of the ‘same view’ will be displayed by default in a “stacked” mode. This is indicated by the ‘stacked icon’.

![Stacked icon](image)
See “Sub-loops Beneath a Stacked Icon” on page 96 for more information about stacked icons.

**NOTE**
Manually added single loops, for example manually added Doppler images, are **not** automatically added in the display protocol, but can be manually selected from the pictorials.

**NOTE**
If there are more loops from the same view in the same stage, for example three times loops from ‘AP4’ in ‘Baseline’ stage and the loops of the ‘same view’ are already stacked and the study status is finalized, the stress Echo Viewing Protocol shows the same stacking as defined in the finalized study.

### 6.4.11.3 Stress Echo Stage Protocol

No matter which methodology was used to acquire the stress echo images/series/loops, the Stress Echo Stage protocol shows all different views (LAX, SAX, AP2, and AP4) of a certain stage (BASE, LOW, PEAK, POST) in a Quad View (2 X 2) display configuration. If an odd number of views are acquired, the Stress Echo Stage protocol displays the views in a Quad View (2 x 2) format, even if the number of different views within one stage is five. The loops are displayed at the same size. The displayed stress echo loops show the different acquired stages of the same views.

To open a stress echo study with the Stress Echo Stage selection strategy:

1. Open a stress echo study with the Stress Echo Stage protocol:
   - The pictorials of the Stress echo study are ordered by view number.
   - The first acquired stage is shown in all the acquired views in a 4-up display in cine mode. The order of the views is the same as in the acquisition protocol.
   - You can view the next stage(s) in the acquired stages by clicking **Next series** or the previous stage by clicking **Previous series** and navigating through the whole acquired study.
• If more than one loop of the same View (offset or poorly gated views) is available and not already stacked previously, the system shall automatically stack the Views and display the last acquired View on top of the stack. This is indicated by the stacked icon.

See “Sub-loops Beneath a Stacked Icon” on page 96 for more information about stacked icons.

NOTE
• Manually added single loops, for example manually added Doppler images, are not automatically added in the display protocol, but can be manually selected from the pictorials.
• If there are more loops from the same view in the same stage, for example three loops from ‘AP4’ in ‘Baseline’ stage and the loops of the same view are already stacked and the study status is finalized, the Stress Echo Stage protocol shows the same stacking as defined in the finalized study.

6.4.11.4 Biplane Protocol

During a biplane run, two X-ray channels (frontal and lateral) acquire images simultaneously. Channel A acquires images from the frontal view and channel B acquires images from the lateral view. The two channels have the same acquisition frame rate.

To open a biplane study with the biplane selection strategy:
1 Open a biplane study from the timeline.
2 Select the biplane protocol form the protocol selection.
   • The Biplane selection strategy shows the biplane run is shown in two image windows. The frontal run is shown in the left window and the lateral run in the right window.
   • The movie player starts automatically.
   • By default, both runs are played at the acquisition frame rate and are synchronized on the first frame.
• The runs in the image are linked on scrolling and movie playing. This is indicated by the link icon in the image windows.
• The movie control buttons in the navigation pane apply to both image windows.
• When you use Previous series and Next series, you can navigate to other biplane runs in the study.

6.4.11.5 Sub-loops Beneath a Stacked Icon
You can use the stacked icon to click and navigate through the different sub-loops of a view within a stage. Click on the Previous Loop arrow or Next Loop arrow to show the prior or adjacent sub-loop that is available.

A stacked icon has a sub-loop indicator to display the quantity of sub-loops. Click on the number on the stacked icon to see all the available sub-loops. In the viewport that opens, the item with a selected check box in the lower left is the preferred sub-loop (or image). The system shows this item by default. You can select the check box in the lower left corner of another sub-loop (or image) to specify it as the preferred item. When you exit this mode, you will see the sub-loop in the viewport by default until you select another sub-loop as the preferred item.

You can double-click on any of the other available sub-loops to load it in the protocol (this will not make it the preferred sub-loop).

Single-click on the header to increase the size of the viewport that contains the sub-loops. Single-click the header again to return the viewport to its original size.
6.4.11.6 Add a loop to the protocol temporarily

You can temporarily add a loop to a protocol:

1 Right-click on a viewport in a stress echo stage or stress echo view protocol. Then click on an item to select a temporary loop.

2 Double-click the selected pictorial, or click OK. IntelliSpace Cardiovascular will put the loop in the viewport of the protocol.

The loop will remain until you move to the next or previous image/series/loop, or if you navigate away.

There is no link between the temporary loop and the loops in the remaining viewports. This means that there is no synchronization between the temporary loop and the loops in the other viewports. The temporary loop will run at its acquisition speed (if applicable).
6.4.12 Compare Images

As long as compared content is from the same patient, everything can be compared - even runs from different modalities.

To compare series/runs/loops/images (of the same study):
1. Select the desired study on the timeline.
2. Select one pictorial of a series/run/loop, image or report in the pictorial index. The content opens in an image window.
3. Press and hold the Ctrl key.
4. Select the second pictorial in the pictorial index. The content opens in a separate image window.

NOTES
- As long as you keep the Ctrl key pressed, you can open more image windows by selecting pictorials. However, this functionality is not available when you view a stress echo study with the stress echo protocol.
- Pictorials of a selected study are indicated with an orange border in the pictorial index.
- If you want to control a movie with the navigation buttons, you must first select an image window. Biplane and stress echo groups are synchronized when they play. All other runs that are in separate image windows are not synchronized; they play independently. Alternatively, open two instances of the Image Viewer Applet; then select one Image for the first Image Viewer and select a second image for the second Image Viewer.
- Once the images have loaded, you can maximize the applet for easier viewing.

To remove images from a multiple selection in the image window:
1. Press and hold the Ctrl key.
2. Select the pictorial in the pictorial index of the image to be removed.

To compare series/runs/loops/images (of another study):
1. Select the desired study on the timeline.
2. Press and hold the Ctrl key.
3. Select the second study on the timeline.
4. Select one pictorial of a series/run/loop, image or report in the pictorial index. The content opens in an image window.
5. Navigate to the second study in the pictorial index.
6. Press and hold the Ctrl key.
7. Select the second pictorial in the pictorial index. The content opens in a separate image window.

NOTES
- As long as you keep the Ctrl key pressed, you can open more image windows by selecting pictorials. However, this functionality is not available when you view a stress echo study with the stress echo protocol.
• Pictorials of a selected study are indicated with an orange border in the pictorial index.
• If you want to control a movie with the navigation buttons, you must first select an image window. Biplane and stress echo groups are synchronized when they play. All other runs that are in separate image windows are not synchronized; they play independently. Alternatively, open two instances of the Image Viewer Applet; then select one image for the first Image Viewer and select a second image for the second Image Viewer.
• Once the images have loaded, you can maximize the applet for easier viewing.

**To remove images from a multiple selection in the image window:**

1. Press and hold the **Ctrl** key.
2. Select the pictorial in the pictorial index of the image to be removed.

**To add or remove images to an image window while having a viewing protocol selected**

1. Select a pictorial in the pictorial index.
2. Press and hold the **Ctrl** key. Select subsequent pictorials in the pictorial index. The images open in an image window.

**To remove images from a multiple selection in the image window:**

1. Press and hold the **Ctrl** key.
2. Select the pictorial in the pictorial index of the image to be removed.
6.4.13 Movie Navigation Pane

A number of images can be played as a movie. This can be a series/run/loop containing more than one image or a number of images in a series.

- Start playing the movie.
- If desired, adjust the frame rate of the movie.
- Pause playing the movie.

The movie navigation pane contains buttons to control movies and to navigate through series/runs/loops.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>◀</td>
<td>Previous image</td>
<td>◁</td>
<td>Next image</td>
</tr>
<tr>
<td>▶</td>
<td>Play movie</td>
<td>▶</td>
<td>Pause movie</td>
</tr>
<tr>
<td>Use slider</td>
<td>Decrease frame rate</td>
<td>Use slider</td>
<td>Increase frame rate</td>
</tr>
<tr>
<td>⏳</td>
<td>Adjust frame rate</td>
<td>⏳</td>
<td>Cycle study</td>
</tr>
<tr>
<td>◀</td>
<td>Previous series</td>
<td>◁</td>
<td>Next series</td>
</tr>
</tbody>
</table>

6.4.13.1 Play or Pause movie

To play a movie:

- Click the Play Movie ▶ button on the navigation pane.

To pause a movie:

- Click the Pause Movie ▶ button on the navigation pane.

The movie will continue from the paused frame when you click Play Movie again.

6.4.13.2 Restart Movie from the First Frame

To restart a movie, do one of the following:

1. Scroll back to the first frame.
2. Select the pictorial of the series in the pictorial index again.

NOTE

If you have more than one image window open, take care that you select the correct window first. To start multiple viewers at the same time, select the desired viewports by holding the Ctrl key and start the movie from the navigation pane.
6.4.13.3 Adjust Frame Rate

You can use the Adjust frame rate icon on the movie navigation pane to increase or decrease the frame rate at which a movie plays:

1. Hover your mouse over the icon while a movie plays.
2. Move the slider up or down to increase or decrease the frame rate of the movie. IntelliSpace Cardiovascular displays the adjusted frame rate at which the movie plays.
3. Double-click the horizontal line to reset the frame rate to the acquisition rate. The acquisition rate is the frame rate that was used when the movie was made.
6.4.13.4 Adaptive Streaming

If you adjust the frame rate of a movie to a large quantity of frames per second, the system can adapt the quantity of frames it plays so that the movie can play at the set frame rate. This means that you will not see all the individual frames of the movie as it plays.

If you click this icon ( ) at the top of the viewport, the system will display the following information:

- the number of frames displayed of the total number of frames that an image has
- the frames per second at which the movie runs

If IntelliSpace Cardiovascular uses adaptive streaming to achieve the set frame rate, the top of the viewport will give a numerical display of the percentage of frames that are used to play the movie.

Percentage of frames used to play the movie
If you **have NOT** configured adaptive streaming under the Settings menu, IntelliSpace Cardiovascular displays the ratio between the achieved frame rate and the set frame rate when a movie runs. The application displays this ratio at the top of the image:

Contrarily, if you **HAVE** configured adaptive streaming under the Settings menu, IntelliSpace Cardiovascular displays only the set frame rate when a movie is actually run. This is because IntelliSpace Cardiovascular will always achieve the set frame rate when this setting is enabled.
6.4.13.5 Playback parameters

You can temporarily influence the frame rate and the quality of the movie.

1. Click the Playback parameters icon (⚙️) on the movie navigation pane.
2. In the dialog, select or clear one or both of the following settings:
   – Allow Lossy Images
   – Allow Adaptive Streaming

IntelliSpace Cardiovascular adjusts the quality and/or speed of the movie.

**NOTE:** The adjustment you make here applies only to the current patient. The next patient that you open will use the default settings that have been adjusted on the Image Viewer tab under the Systems menu.
6.4.13.6 Cycle through All Series or Images

By default, a movie cycles through all images in a series/run/loop.

To Cycle Study:

- Click Cycle Study on the navigation pane to cycle through all series/runs/loops in a study. At the last image of the series/run/loop the movie continues with the first image of the next one.

6.4.13.7 Next/Previous Image in a Run/Loop

- Click Previous Image to move one image backward in a run/loop. Click Next Image to move one image forward through the images in a run/loop.

6.4.13.8 Next/Previous Series

- Click Previous Series to move one pictorial backward in a study. Click Next Series to move one pictorial forward through the images in a study.

6.4.14 Fetching Images

When a procedure is not available online (it may for example be on the archive or remote system) then instead of showing pictorials the Fetch button is displayed:

![Image Viewer Applet Patient-centric Workspace](image)

To fetch images:

- Click Fetch to retrieve the images. The pictorials of the elements are displayed once all images are retrieved.
6.5 DICOM ECG Viewer Applet

The DICOM ECG Viewer Applet allows viewing of DICOM ECGs.

NOTE
Please refer to the IntelliSpace Cardiovascular Online Help for detailed instructions about the DICOM ECG Viewer Applet.

6.5.1 Basic ECG Viewing

The default viewer shows all the waveforms available in the DICOM file, each having a tab specific to the waveform, for example, ORIGINAL or DERIVED.

IntelliSpace Cardiovascular displays the waveforms as exported by the modality, so unfiltered. For example, no AC filtering or high/low-pass filtering is applied to the displayed waveforms.

A user is able to pan the waveform (right-click and move) or zoom (click scroll wheel):

ECG selection is done the same way as in the document viewer. Open the side-panel and select a study (when selected in the timeline). The side-panel can also be pinned.
6.5.2 Reference Lines

The DICOM ECG viewer can show two reference lines. The reference lines can be activated via the context menu of the viewer. For each line, the DICOM values are presented in the panel, including the time between the reference lines.

The numbers can be switched between an average number or a Min-Max number. The Min-Max number contains the minimum DICOM value and the maximum DICOM value of the point in the ECG.
The viewer contains a calibration marker to indicate the grid size. Horizontal is the time in ms, the marker shows 1 ms. And vertical is the amplitude, the marker shows 1 mv:
6.6 PDF Import Tool

The PDF Import tool can be accessed from the Worklists Applet, the Search Applet, or from the Cardiology Timeline. There are two type of PDF Imports: patient or study.

6.6.1 Patient PDF Import

If you select a patient from the patient worklist or patient tab of the Search Applet, or from any open space within the Cardiology Timeline (right-click), you can create a new study containing the attached PDF document.

When all the mandatory fields (marked with an *) are provided (including a valid PDF document is selected) the Import button will be enabled.

During upload of large documents, a progress bar displays. When the upload is accepted and complete, the dialog window closes.

If an error occurs, Unable to import document will display.

6.6.2 Study PDF Import

You can import a study PDF document from the procedure search (Search Applet), procedure worklist, or from the icon in the Cardiology Timeline directly (right-click, then select PDF Import).

When all the mandatory fields (marked with an *) are provided (including a valid PDF document is selected) the Import button will be enabled.

During upload of large documents, a progress bar displays. When the upload is accepted and complete, the dialog window closes.

If an error occurs, Unable to import document will display.

6.6.3 PDF Import Tool and SONOS DSR Studies

IntelliSpace Cardiovascular will block the import of PDFs if the PDFs are SONOS DSR studies that have the study status “Ordered” or “In-Progress”. You are advised to proceed in one of ways below:

- Import the PDF after the acquisition and the receipt of images
  OR
- Use a separate study to import the PDF. You can do this in one of two ways:
  - Create an empty study first and then use the PDF import tool on that study
    OR
  - Use the PDF import tool via a patient record from the Search Applet, the Worklist Applet or from an item on the Cardiology Timeline. In all cases, you import from patient level and enter study details in the import dialog.
7 Echo Module

7.1 Overview of the Echo Module

The IntelliSpace Cardiovascular system provides integrated image/patient management and reporting for users in cardiovascular healthcare.

Use the Echo Module to perform the following tasks:

- View images and perform measurements and resulting calculations on them
- Enter diagnostic findings and comments
- Generate, view and print reports
7.1.1 Enter the Echo Module

There are different ways to enter the Echo Module:

- Right-click and select **Open Study With > Echo Module (web)** from an item in a study search list or a study worklist.
- Right-click an icon on the timeline and select **Echo Module (web)**.

IntelliSpace Cardiovascular brings you automatically into a pictorial view or into report mode, depending on the status of the study.
### 7.1.2 Pictorial View

IntelliSpace Cardiovascular automatically displays a Pictorial View if the study that you select has the status *Unread*. The Pictorial View has a number of options that help you work:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study List</td>
<td>Displays the studies available for viewing. Click the expand and collapse button to see more or fewer studies for the selected patient.</td>
</tr>
<tr>
<td>Pictorial Index of loops and still frames</td>
<td>Shows an overview of the available loops and still frames of studies for the selected patient.</td>
</tr>
<tr>
<td>Viewing Protocol Selector</td>
<td>Determines the presentation of images when you view them in the Echo Module. See “Viewing Protocols” on page 92 for details on how this functionality works.</td>
</tr>
<tr>
<td>Expand and Collapse buttons</td>
<td>Buttons that increase and decrease the size of sections in the interface. For example:</td>
</tr>
<tr>
<td>Echo module toolbar</td>
<td>Expands and collapses the Work Area.</td>
</tr>
<tr>
<td>Work Area</td>
<td>Lets you add data to a study.</td>
</tr>
</tbody>
</table>

![Pictorial Index of loops and still frames](image)  
![Study List](image)  
![Viewing Protocol Selector](image)  
![Echo module toolbar](image)  
![Work Area](image)
There are different ways to view images from the Pictorial View:

- Double-click a single pictorial to display the corresponding image.
- Select an image and click the Show Images icon.
- Press the Ctrl button, select images with your mouse and click the Show Images icon ( ) to view more than one image simultaneously.

The toolbar in the Pictorial View contains a number of buttons that give you access to some functions. See “Toolbar” on page 76 for an explanation of the functionality that is available via the buttons.

The Echo Module toolbar has standard icons with different functions:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Show pictorials" /></td>
<td>Show pictorials</td>
</tr>
<tr>
<td><img src="image" alt="Show images" /></td>
<td>Show images</td>
</tr>
<tr>
<td><img src="image" alt="Show report" /></td>
<td>Show report</td>
</tr>
<tr>
<td><img src="image" alt="Save report" /></td>
<td>Save report</td>
</tr>
</tbody>
</table>
7.1.2.1 Dribble mode

If the arrival of images or measurements are expected, IntelliSpace Cardiovascular displays one of three icons on the Echo Module toolbar, depending on whether images, measurements, or images and measurements enter the system.

<table>
<thead>
<tr>
<th>Button / ICON</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Load new acquisition objects</td>
<td>Indicates that the study has new images that have not been viewed.</td>
</tr>
<tr>
<td></td>
<td>Load new acquisition objects</td>
<td>Indicates that the study has new SR measurements that have not been viewed.</td>
</tr>
<tr>
<td></td>
<td>Load new acquisition objects</td>
<td>Indicates that the study has new images and SR data that has not been viewed.</td>
</tr>
</tbody>
</table>
7.1.2.2 Access and Compare Multiple Images in the Echo Module Pictorial View

If you select more than one study on the Study List, the application highlights the studies so that you can identify them. Study headers in the Pictorial Index distinguish between a “Reporting Study” and “Other Study”.

The Reporting Study is the study on which you are reporting.

**NOTE**
The Work Area always shows the information of the Reporting Study and never the Other Study!

The Work Area does not update if there is one or more other studies opened.

You can compare an image from the Reporting Study with an image from the Other Study:

1. Place the cursor on a pictorial in the Reporting Study. Press the Ctrl button on the keyboard and click with the mouse.
2 Place the cursor on a pictorial in the Other Study. Press the Ctrl button on the keyboard and double-click with the mouse.

   NOTE: You can press the Ctrl button, select images with your mouse and click the Show Images icon ( ) to compare several images simultaneously

3 IntelliSpace Cardiovascular displays the images so that you can compare them.

   NOTE: Steps 1 - 3 describe a scenario in which the default viewing protocol for the images is “Classic Single”. IntelliSpace Cardiovascular will produce a different result if other viewing protocols are used. For example, if an image uses a 2-up viewing protocol and another uses “Classic Single”, then the result will be three images on the screen.

4 Double-click an image to maximize its size. Double-click the image again to return to the original view.

5 Click the Show Pictorials icon ( ) to return to the Pictorial Index.

   If the study you want to view is offline, you can click the Fetch button to retrieve the study from the archive.

   A green check mark ( ) at the top of a pictorial indicates that you have already viewed the image in the current session.


7.1.3 Report Mode

You enter the Echo module in Report mode immediately if the study that you selected has a preliminary report or a final report. The echo reports for the selected patient are shown in an overview along with other documents received from outside the IntelliSpace Cardiovascular application.

As you enter measurements, findings, demographic information, and wall motion scoring, the application automatically adds the new or edited information to the report.

- Click 📐 to display thumbnails or selected image.
- Click ➔ or ← if you want to expand or collapse the image or report sections.
If you have the necessary rights, you can configure the appearance and content of the report by defining text fonts, field locations and the information that the report contains. See “Report Template Editor” on page 174 for details on how to create a template for your report.

7.1.3.1 Overview of reports

Report mode has an overview of reports. Click on the Documents expand-and-collapse bar to display or hide the overview.

The overview itself contains:

- documents created in the IntelliSpace Cardiovascular application
- documents that IntelliSpace Cardiovascular has received from outside the system

7.1.3.2 Compare Reports in the Echo Module

You can compare one or more reports in the echo module.

1. In the overview of reports, select and double-click the icon that represents current report.
2. Press the Ctrl button on your keyboard and single-click the icon that represents an additional report to open it.

   IntelliSpace Cardiovascular will display both reports side by side for comparison.

3. Repeat step 2 to view additional reports.
4. Press the Ctrl button on your keyboard and single-click an icon in the overview of reports to clear a report.

You can select the Versions drop-down list to view a previous version of a report.

Click the Print document icon ( ) to print a report.
7.1.4 Work Area

The Work Area lets you add data to a study. The Work Area has sheets to record data:

**NOTE**
You record data on the sheets for a particular reporting profile.

- Information: to record patient and study data.
- Measure: to record calculations and measurements related to the open study and the reporting profile currently selected.
- Score: to select and score segments in the bull’s-eye or the anatomic view, or in both.
- Interpret: to enter, review, and edit finding codes.
- Finalize Report: to add free-form text to appear in the Interpretation Summary section of the report. This sheet also lets you finalize the report.
When a study is a stress study, IntelliSpace Cardiovascular automatically displays an additional sheet called the Work Area Stress Sheet. You can use it to record data obtained during stress-related activities.

The Work Area Stress Sheet is hidden unless a study is a stress study.

### 7.2 Reporting Profile

A reporting profile defines the measurements, finding codes, and additional study-specific options that you can see in the user interface. It also determines the report template that the system will use for reporting.

Select the reporting profile that applies to the study type with which you are working when you begin to create a report.
7.3 Work Area Information Sheet

The Work Area Information sheet contains the Information section. The section contains the following fields:

- Height
- Weight
- BSA (body surface area)
- Heart Rate
- Systolic pressure (Blood Pressure)
- Diastolic pressure (mmHg)
- History
- Medications
- Reason for Study
- Image Quality Index
- Patient class
- Patient location
- Study location
- Referring Physician
- Ordering Physician
- Performed By
- Reviewer
- Video Tape Number
- Video Tape Location
- Additional study attributes that can be configured for your site.

Enter information and click Save.
7.4 Work Area Stress Sheet

IntelliSpace Cardiovascular displays the Work Area Stress Sheet if a study is a stress study. The sheet displays the:

- Stress Study Information section: shows stress information about the entire study
- Stage Information section: shows measurements taken during stages of the stress procedure

Information on the Work Area Stress Sheet is read-only. You enter, edit and remove data via the UltraSound Viewer.

7.4.1 Stress Study Information

The Stress Study Information section of the Work Area Stress Sheet contains the following information from the study:

<table>
<thead>
<tr>
<th>Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol Name</td>
<td>Identifies the stress protocol.</td>
</tr>
<tr>
<td>Maximum Predicted Heart Rate</td>
<td>220 minus the patient’s age. This value is calculated based on the patient’s date of birth.</td>
</tr>
<tr>
<td>Target Heart Rate</td>
<td>85% times the maximum predicted heart rate. This value is calculated based on the value of the maximum predicted heart rate.</td>
</tr>
<tr>
<td>Maximum Stress Heart Rate</td>
<td>Maximum heart rate entered in any stage using the Stage Information section.</td>
</tr>
<tr>
<td>Percent Maximum Predicted HR</td>
<td>Maximum stress heart rate versus the maximum predicted heart rate, expressed as a percentage. This value is calculated automatically.</td>
</tr>
<tr>
<td>Percent Target Heart Rate</td>
<td>Maximum stress heart rate versus target heart rate expressed as a percentage. This value is automatically calculated.</td>
</tr>
<tr>
<td>Total Stress Duration</td>
<td>Total of all entered duration-stage attributes minus the recovery time value, if any.</td>
</tr>
<tr>
<td>METS</td>
<td>Metabolic equivalents which is a simplified system for classifying physical activities.</td>
</tr>
<tr>
<td>Recovery Stage</td>
<td>Stage number of the stage in the Stage Information section that has Recovery field set to Yes. This value is calculated automatically.</td>
</tr>
<tr>
<td>Recovery Time</td>
<td>Duration of the Recovery Stage. This value is calculated automatically.</td>
</tr>
</tbody>
</table>

Information that has been overridden with manual values appears with the following icon: [ ].

7.4.2 Stage Information

The Stage Information section of the Work Area Stress Sheet has a slider that you can use to navigate through stages of the report.

Each stage contains the following fields:

- Stage Name
- Duration (minutes/seconds)
- Heart Rate (bpm)
• Systolic Pressure (mmHg)
• Diastolic Pressure (mmHg)
• Dose
• Comments
• Recovery

The current recovery stage and recovery time values are displayed as read-only data in the Study Information section. The recovery time equals the duration of the selected recovery stage, if it exists. Also, the Total Stress Duration value displayed in the Study Information section does not include the duration of the recovery stage, if one exists.

In the table that appears in a stress report, the recovery stage, if any, is indicated with a superscript R (R) next to the stage name.
7.5 Work Area Measure Sheet

The Measure sheet contains calculations and measurements related to the open study and the reporting profile currently selected. Depending on the type of measurement and its origin, the measurements are placed in one or more of the following sections:

- Calculations
- Labeled Measurements
- Unlabeled

See “Measurements” on page 146 for information on how to create, edit and remove measurements. This section also gives information about the specific measurements that IntelliSpace Cardiovascular supports.

7.5.1 Calculations

The Calculations section lists the available calculations for the current reporting profile. Click the drop-down arrow to display the component measurements of the calculation.

Component measurements that have not been performed are displayed without a value. If the appropriate configuration has been made, completed calculations will be displayed in the report.
7.5.1.1 Calculations Right-Click Menu

The following table lists and describes the menu options that can appear when you right-click a specific measurement in the expanded calculations list:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform</td>
<td>If measurement definitions without a value appear with the measurement, selecting Perform opens the Keyboard Entry window so that you can enter a value manually. If a measurement value is already displayed, selecting Perform changes the cursor to a crosshair so you can perform the selected measurement. This option is unavailable if the selected measurement cannot be performed on the displayed image, or if there is no image in the Image View area.</td>
</tr>
<tr>
<td>Keyboard Entry</td>
<td>Displays the Keyboard Entry window so you can manually enter a value without performing the actual measurement.</td>
</tr>
<tr>
<td>Show Image</td>
<td>Displays the image on which the measurement was performed. This option is unavailable if the measurement has no associated image.</td>
</tr>
</tbody>
</table>

7.5.2 Labeled Measurements

The Labeled Measurements section lists all labeled measurements. You can use the drop-down list to view All measurements or Performed measurements. IntelliSpace Cardiovascular displays only those measurements that are relevant for the study type.

If you open a study that does not yet have measurements, the application will use the All option by default. If a study does have measurements when you open it, IntelliSpace Cardiovascular uses Performed by default.

Measurements that appear with a value in this section may have been performed using IntelliSpace Cardiovascular, or may have automatically been transferred from elsewhere.
IntelliSpace Cardiovascular displays an icon to indicate the source of a measurement. The icon will indicate, for example, if the source of a measurement is a keyboard measurement, or if a measurement comes from a product that IntelliSpace Cardiovascular supports.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Source of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Q-Lab Icon" /></td>
<td>Q-Lab</td>
</tr>
<tr>
<td><img src="image" alt="TomTec Icon" /></td>
<td>TomTec application</td>
</tr>
<tr>
<td><img src="image" alt="Keyboard Entry Icon" /></td>
<td>Keyboard entry</td>
</tr>
</tbody>
</table>

You can double-click a performed labeled measurement in the list to view the image on which the measurement has been made. IntelliSpace Cardiovascular will display this icon ![Image Icon](image) if a measurement is not linked to an image.

Measurements with known values are used in appropriate calculations and are placed in the report if the application has been correctly configured.

7.5.2.1 Labeled Measurements Right-Click Menu

The following table lists and describes the menu options that can appear when you right-click a specific labeled measurement:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform</td>
<td>Changes the cursor to a crosshair so you can perform the selected measurement.</td>
</tr>
<tr>
<td>Keyboard entry</td>
<td>Displays the Keyboard Entry window so you can manually enter a value without performing the actual measurement.</td>
</tr>
<tr>
<td>Use in calculations</td>
<td>Specifies that the selected value is used to represent the measurement in all calculations and dependent calculations, and moves the value to the calculations field. It is the counterpart to the option Use Average. In addition, the Use in calculations option will include the selected value in the report instead of the average (if the application is configured this way).</td>
</tr>
<tr>
<td>Use Average</td>
<td>Specifies the average value of measurements that have the same label in a study. IntelliSpace Cardiovascular applies this option by default. Its counterpart option is Use in Calculations.</td>
</tr>
<tr>
<td>Go to image</td>
<td>Displays the image that has the measurement.</td>
</tr>
<tr>
<td>Delete</td>
<td>Removes the measurement.</td>
</tr>
</tbody>
</table>

7.5.3 Unlabeled Measurements

Unlabeled measurements are displayed in the Unlabeled Measurements section of the Work Area Measure sheet.
Unlabeled measurements are not included in calculations and do not appear in reports.

The following table lists unlabeled cardiac measurements that you can perform with IntelliSpace Cardiovascular.

<table>
<thead>
<tr>
<th>Unlabeled Cardiac Measurement</th>
<th>Use to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Length</td>
<td>Length (cm) measurement on 2D images.</td>
</tr>
<tr>
<td>2D Trace</td>
<td>Area (cm squared) and circumference (cm) measurements on 2D images.</td>
</tr>
<tr>
<td>2D Volume</td>
<td>Method of discs (MOD) volume (ml) measurement on 2D images.</td>
</tr>
<tr>
<td>Dop Slope</td>
<td>Slope (cm/s) and time seconds measurements on Doppler images.</td>
</tr>
<tr>
<td>Dop Trace</td>
<td>Mean velocity (cm/s), mean pressure gradient (mmHg), and velocity-time integral (cm) measurements on Doppler images.</td>
</tr>
<tr>
<td>Dop Vel</td>
<td>Peak velocity (cm/s) and peak pressure gradient (mmHg) measurements on Doppler images.</td>
</tr>
<tr>
<td>MMode Slope</td>
<td>Height (cm), time (seconds), and slope (cm/sec) measurements for MMode images.</td>
</tr>
<tr>
<td>Physio Time</td>
<td>Time (seconds) measurements in Physio regions.</td>
</tr>
</tbody>
</table>

You can double-click an unlabeled measurement in the list to view the image on which the measurement has been made.

**NOTE**

If you click on a measurement on the Measure tab in the Work Area, IntelliSpace Cardiovascular automatically displays any measurements that have been hidden with the feature to display or hide image information (See “Display or hide image information“ on page 81.).
7.6 Work Area Score Sheet

Use the Score sheet to select and score segments in the bull’s-eye or the anatomic view, or in both. As you score each segment, the score is represented on the wall segments diagram both by color and alphanumeric text.

The Score sheet includes the following:

**Stress Stage slider:** Move the slider to change the stage (1 through 12).

**Carry Over:** Carry Over sets all unscored segments to scores from the previous stage, if present. If you click Carry Over after some segments in the stage were scored, only the unscored segments receive scores from the preceding stage. The scored segments remain unchanged. If you advance more than one stage, Carry Over scores all intervening stages.

**Calculations section:** Shows the computed calculations from the scores. It displays the following:

- **WMSI** (Wall Motion Score Index) = (Sum of all scores) / (number of scored segments which are not ‘Cannot Interpret’)
- **% Normal** = 100 * (number of segments scored as Normal) / (number of scored segments which are not ‘Cannot Interpret’)

**NOTE**

WMSI and % Normal are not defined if there are no scored segments, or if the only scored segments are marked Cannot Interpret.

**Anatomy bar:** The anatomy bar displays an anatomic-views diagram for scoring the same segments that are shown in the bull's-eye. The anatomy bar also lets you associate predefined scores with the segments. Select an item in the legend and click in an anatomical diagram to score a segment. The scores in the bull's-eye diagram and in any visible anatomic views window are updated to the selected stage.

**In Report:** Selecting the check box displays the item on the report.

**Score legend:** Explains the numerical scores according to the site-selected wall scoring method. Hover over the legend with the cursor to display a tooltip that explains the numerical score. Selecting the scores lets you associate the scores on the segments.

**NOTE**

The selected wall motion scoring can be set to ‘ISCV’ or ‘ASE’. See your system administrator for details.

**Clear All:** Erases all scores in the current stage.

**Bull’s-eye diagram:** Lets you associate predefined scores with the segments. Select an item in the legend and click in the bull’s-eye to score a segment. If you change the score of a segment in the anatomical views diagram, IntelliSpace Cardiovascular immediately updates the score in the bull’s-eye for that segment (in that stage).

**Unscored:** Sets all unscored segments in the stage (or view) to the selected score.
**Analyze bar:** Contains information generated by wall motion score analysis. The Echo module will show the analysis as set by the US Viewer in read only format.

If you want to add or edit an analysis, you must go to the thick-client, ultrasound viewer to make the addition or edit. You must also use the ultrasound viewer if you want to add the analysis to comments.
7.7 Wall Motion Scoring Methods

IntelliSpace Cardiovascular supports different wall motion scoring methods: the standard ASE method and the IntelliSpace Cardiovascular (ISCV) method. See “Echo Module Settings” on page 187 for details on how to configure wall motion scoring methods.

7.7.1 IntelliSpace Cardiovascular (ISCV) and ASE Wall Motion Scoring Methods

The following table shows the score definitions for the IntelliSpace Cardiovascular and the ASE wall motion scoring methods:

<table>
<thead>
<tr>
<th>Score Value</th>
<th>IntelliSpace Cardiovascular Score Definition</th>
<th>ASE Score Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Cannot Interpret</td>
<td>Cannot Interpret</td>
</tr>
<tr>
<td>0</td>
<td>Hyperkinetic</td>
<td>--</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>Hypokinetic</td>
<td>Hypokinetic</td>
</tr>
<tr>
<td>(2)</td>
<td>Mildly Hypokinetic</td>
<td>Hypokinetic</td>
</tr>
<tr>
<td>3</td>
<td>Akinetic</td>
<td>Akinetic</td>
</tr>
<tr>
<td>4</td>
<td>Dyskinetic</td>
<td>Dyskinetic</td>
</tr>
<tr>
<td>5</td>
<td>Aneurysmal</td>
<td>Aneurysmal</td>
</tr>
<tr>
<td>6</td>
<td>Akinetic with scar</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>Dyskinetic with scar</td>
<td>--</td>
</tr>
</tbody>
</table>

The following table shows how IntelliSpace Cardiovascular re-maps values if you change the scoring method:

<table>
<thead>
<tr>
<th>Score Definition</th>
<th>IntelliSpace Cardiovascular to ASE Score Value</th>
<th>ASE to IntelliSpace Cardiovascular to Score Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannot Interpret</td>
<td>X to X</td>
<td>X to X</td>
</tr>
<tr>
<td>Hyperkinetic</td>
<td>0 to 1</td>
<td>--</td>
</tr>
<tr>
<td>Normal</td>
<td>1 to 1</td>
<td>1 to 1</td>
</tr>
<tr>
<td>Hypokinetic (ISCV and ASE)</td>
<td>2 to 2</td>
<td>2 to 2</td>
</tr>
<tr>
<td>Mildly Hypokinetic</td>
<td>(2) to 2</td>
<td>--</td>
</tr>
<tr>
<td>Akinetic</td>
<td>3 to 3</td>
<td>3 to 3</td>
</tr>
<tr>
<td>Dyskinetic</td>
<td>4 to 4</td>
<td>4 to 4</td>
</tr>
<tr>
<td>Aneurysmal</td>
<td>5 to 5</td>
<td>5 to 5</td>
</tr>
<tr>
<td>Akinetic with scar</td>
<td>6 to 3</td>
<td>--</td>
</tr>
<tr>
<td>Dyskinetic with scar</td>
<td>7 to 4</td>
<td>--</td>
</tr>
</tbody>
</table>
When an institution switches from one scoring method to another, the IntelliSpace Cardiovascular user interface displays a dialog that gives you the option to use the new scoring method or to continue to use the method that has been used in the past.

**NOTES**

- If you change a study that was stored with the previous scoring method, IntelliSpace Cardiovascular prompts you to change to the new scoring method.
- You can set the wall motion scoring method in IntelliSpace Cardiovascular differently than the wall motion scoring method in the US Viewer.
7.8 Performing Wall Motion Scoring

1. Open the study to display a report or images.
2. In the Work Area, click the **Score** tab to display the Score sheet.
3. To select a stress study stage to score, drag the **Stress Stage** slider to the appropriate location (Stage 1 through Stage 12).

![Stress Stage Slider]

4. Select a score from the score legend.

![Score Legend]

5. Select a segment in the bull’s-eye diagram. The diagram is annotated with the segment score using color and a corresponding number. (See the table for a definition of each score.)

![Bull’s-eye Diagram]
In addition to the bull’s-eye diagram, you can view and score segments by anatomy by clicking Anatomy. When you score segments in either graphic, the score is synchronized between both views.

6 Do any of the following to continue to score segments:
   – To change a score, select a score from the wall motion score legend and click in the segments whose score you want to change.
   – To set all unscored segments to the same score, select the score from the score legend and click Unscored ➔ ....
   – To set all unscored segments to normal, select Normal from the scoring legend and click Unscored ➔ Normal. The previously scored segments retain their scores.

7 To clear all scores, click Clear All. The Clear All option clears all scores for the selected Stress Stage.

8 To set segments in one stage to the same scores as in the previous stage, click Carry Over. If you click Carry Over after some segments in the stage are scored, only the unscored segments receive scores from the preceding stage. The scored segments remain unchanged. If you advance more than one stage, clicking Carry Over scores all intervening stages.

9 Click the In Report check box to specify which items, if any, you want to display in the report: Bull’s-eye, Anatomy, and Results.

10 Use the Stage slider to select another stage to score and go to step 3 to perform wall motion scoring on another stage.

NOTE: Use the IntelliSpace Cardiovascular Clinical Application Configuration Tool to configure whether or not the WMSI and % Normal should display in the report.
7.9 Work Area Interpret Sheet

Use the Work Area Interpret sheet to enter, review, and edit finding codes.

The Work Area Interpret Sheet has:

- a drop-down list to search for pre-defined finding codes
- section buttons to access finding groups for displaying and selecting finding codes
- finding groups fields into which you can enter pre-defined finding codes. A finding group field belongs to a particular finding group.

7.9.1 Finding Groups

The finding groups in the Interpret sheet vary depending upon your site configuration. The Work Area Interpret sheet can be divided into a number of sections. Each section is typically named for anatomical structures or segments. Each section contains one or more groups of findings. Click the associated tabs at the top of the sheet to access the finding group or groups from which to display and select finding codes.
7.9.2 Entering a Finding Code into a Report

1. Open a study and click the **Interpret** tab in the Work Area to display the Interpret sheet.

2. Click the appropriate **Section** button to display the finding groups fields associated with the Section. Sections are typically named for anatomical structures or segments.

3. Put your cursor in a finding group field.

4. From the list of findings that displays, click the finding code to insert it into the report. If the list is long, begin to type the identifying information of the finding code that you want. The application will filter the list as you enter characters.
5 Double-click a finding code if you want to insert it into the Comments section on the Finalize Report sheet. A plus sign (+) appears and indicates that the finding has been successfully inserted. Double-click the finding code again to remove the finding from the Comments section on the Finalize Report sheet.

6 Click the Close button (×) if you want to remove a finding code. You cannot delete a finding code from a finalized (read-only) study.

Notes
- The application lets you select a particular finding code only once.
- See “Pinning a Finding Group to Multi-Select Finding Codes” on page 136 for information on how to keep a list of findings open for multi-selection of finding codes.
- See “Finding Groups” on page 134 for detailed information on finding groups and finding group fields.
- See “About Finding Codes” on page 139 for information about finding codes.

7.9.2.1 Pinning a Finding Group to Multi-Select Finding Codes

Hover your cursor over a finding group field and click the Pin icon (🔒) if you want IntelliSpace Cardiovascular to keep the list of findings open when you select a finding code.

This is useful if you want to select more than one finding code from a particular finding group field. If you do not select the Pin icon, IntelliSpace Cardiovascular will close the list of findings each time you select a finding code for a particular finding group.

You click on the Pin icon (🔒), or anywhere else, to turn off the multi-select functionality.

The application does not keep a list of findings open when you close the study.
7.9.2.2 Entering Manual Text in a Finding Group Field

You can manually type text into a finding group field.

1. Put your cursor into a finding group field and select **Manual text entry** (indicated by the abbreviation MTE).
2. Enter your text.
3. Press the tab on your keyboard. IntelliSpace Cardiovascular inserts the text into the finding group field. Each finding group can have one manual text entry. Press the Enter key to add an additional line to manual text.

![Manual text entry in a finding group field](image)

7.9.2.3 Interpretation Text

You can hover over a pre-defined finding code or a manual text entry to display the text that the report will show. This text is called interpretation text.

You can double-click any finding code to insert its interpretation text into the Comments section on the Finalize Report sheet. Double-click the finding code again to remove the interpretation text from the Comments section.

If you remove a finding code from a finding group field, after interpretation text has been added to the Comments section, IntelliSpace Cardiovascular removes the interpretation text from the Comments section as well.

If you manually edit interpretation text in the Comments section, the application breaks the link to the original finding code. If you then delete the finding code from the Interpretation sheet, the application informs you that it could not find the interpretation text in the Comments area of the Interpretation sheet. Remove the text in the Comments section manually.
Finally, if you add a finding code to the Comments section of the Finalize Report sheet, and then edit the interpretation text, IntelliSpace Cardiovascular will not delete the interpretation text from the Comments area if you delete the finding code from the Interpret Sheet. Remove the text in Comments section manually.

7.9.2.4 Searching with a Partial Finding Code

1. If you already know a part of a finding code’s identifying information, you can put your cursor in the Search Finding Codes drop-down list and type the identifying information. The application will display a list of finding codes as you enter characters.

2. Select the appropriate finding code from the list of possibilities that the application displays. IntelliSpace Cardiovascular will automatically display the correct section from which it selected the finding code.

3. Repeat the process to select as many codes as needed.

7.9.3 Reordering Finding Codes

1. Open the study.
2. Click the Interpret tab to display the Interpret sheet.
3. Click the finding code in the finding group field and drag it to a new location within the same group.

The new order of finding codes is shown in the report.
7.9.4 About Finding Codes

IntelliSpace Cardiovascular supports the following types of extended formatting finding codes:

<table>
<thead>
<tr>
<th>Finding Code Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill in the Blank</td>
<td>Findings of this type have an underscore in the text of the finding code. When you select this type of code, you can complete the blank space with text.</td>
</tr>
<tr>
<td>Fixed finding codes</td>
<td>Finding codes of this type are standard finding codes that come with the system. You cannot edit them.</td>
</tr>
<tr>
<td>Multiple Choice</td>
<td>Findings of this type have an underscore (__) in the text of the finding code. When you select this type of code, a submenu appears displaying several predefined choices from which to choose.</td>
</tr>
<tr>
<td>Measurements</td>
<td>Findings of this type appear with the selected measurement or calculation name in brackets. The actual measurement value replaces the bracketed name in the group field and on the report. You can only select embedded measurement or calculation findings when the specified measurement or calculation has been performed.</td>
</tr>
</tbody>
</table>

NOTES
- The Clinical Application Configuration Tool is used to add finding codes to the IntelliSpace Cardiovascular application. Check with your system administrator or see the Clinical Configuration Manual for more information about using Clinical Application Configuration Tool to add, delete, or edit finding codes.
- The Profile Manager Tool is used to import complete clinical reporting profiles into your IntelliSpace Cardiovascular system. Check with your system administrator or see the Clinical Configuration Manual for more information about using the Profile Manager tool to add reporting profiles.

7.9.5 Carrying Over Findings and Comments from Other Studies

You can add findings and comments to a current study from prior, finalized studies. This lets you quickly pre-fill a report with findings so that you can focus on the clinical differences between a current study and a previous study.

1. Click the icon on the Echo Module toolbar. The icon displays only if there are studies whose findings you can carry over.
2. IntelliSpace Cardiovascular displays a study list of studies with finalized report findings.
3. From the list, click the study whose finding codes you want to carry over into the current report.
4. Click OK in the confirmation dialog to confirm that you want to clear the findings from the current study and replace them with the findings from the study in the study list.

If the reporting profile of the current study is different from the study in the study list, IntelliSpace Cardiovascular displays a message that warns you that it will not carry over findings that are not defined for the profile in the current study.
7.9.6 Copying Finding Codes to the Interpretation Summary in the Report

To copy finding codes to the Interpretation Summary section of the report:

1. Open the study.
2. In the Interpret sheet, double-click the finding code that you want to copy to the Interpretation Summary section of the report. A plus sign (+) will appear before each finding code you select.

   This also copies the finding code to the Comments section of the Finalize Report sheet where you can edit if necessary.

You can also right-click a finding to add it to the Interpret Summary section of the report. The context menu will also contain options to edit the finding code and delete it from the Interpretation Summary section of the report.

NOTES

- You can use the Comments section of the Finalize Report sheet to edit manually inputted finding codes that you copied to the Interpretation Summary of the report. If you manually edit the interpretation text in the Comments section, the application breaks the link to the original finding code. If measurements are then updated, IntelliSpace Cardiovascular will update the related finding codes, but the text in the comments section will not update.
- You can use the Comments section of the Finalize Report to enter free text into the Interpretation Summary Section of the report.
- Your system administrator can configure finding codes to automatically be copied to the Interpretation Summary Section of the report. Check with your system administrator for more information.

7.9.7 Deleting a Finding Code from a Finalized Report

You cannot delete a finding code from a finalized (read-only) study.

However, you can amend a finalized report and delete the finding code on the amended version.

1. Open the study and click the Interpret tab in the Work Area to open the Interpret sheet.
2. Right-click the finding code you want to delete and select Delete from the context menu. You can also click the X in the corner of the finding code.

   IntelliSpace Cardiovascular will remove the finding code from the finding groups field. IntelliSpace Cardiovascular will also delete the finding code from the Comments area on the Interpret Sheet if the finding code has been added to the Comments area from the Interpret Sheet.
7.9.8 Transferring Findings or Comments to a New Reporting Profile

If you change a study's reporting profile after you have already entered finding codes or comments, the system prompts you to carry over the changes to the new reporting profile.

To change the reporting profile:

1. Open the study, and select the new reporting profile from the Information sheet. If you had made changes or entered data in the Work Area Interpret sheet or in the Work Area Finalize Report sheet, a message prompts you to carry the findings and comments to the new reporting profile.

2. Do one of the following:
   - To carry over findings and comments, click Yes.
   - To delete all findings and comments, click No.
   - To cancel the operation, and not change the reporting profile, click Cancel.

7.9.9 Using a Report Macro

A report macro is a pre-defined set of findings that you can use in reports.

To use a report macro:

1. Open a study in the Echo Module, select a reporting profile and navigate to the Work Area Interpret Sheet.

2. Click the Macro (_macro) button on the Echo Module toolbar and select one of the Existing Macros from the list.

3. When an existing macro is selected, IntelliSpace Cardiovascular inserts the values of the macro into the finding fields.

The report macros that IntelliSpace Cardiovascular makes available are dependent on the reporting profile. If you change the reporting profile, you will only see macros that apply to the selected reporting profile.
7.10 Work Area Finalize Report Sheet

Use the Work Area Finalize Report sheet to view:

- images associated with the report
- summary statements of the overall analysis
- additional comments

**Study Status**: The Study Status field displays the state of the study in the workflow:

<table>
<thead>
<tr>
<th>Study State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordered</td>
<td>The study is ordered but has not yet occurred.</td>
</tr>
<tr>
<td>In Progress</td>
<td>A study has been ended and data is transmitting from a system to IntelliSpace Cardiovascular. When all images have arrived on the IntelliSpace Cardiovascular server, the status will change to Unread.</td>
</tr>
<tr>
<td>Unread</td>
<td>A placed / unplaced study has a status of Unread when it is complete and data transmission has been either completed by the DSR acquisition device, or started by a DICOM-configured acquisition device. Also, it has not yet been opened and changed within IntelliSpace Cardiovascular.</td>
</tr>
<tr>
<td>Preliminary</td>
<td>The study was opened, changed, and saved in IntelliSpace Cardiovascular.</td>
</tr>
<tr>
<td>Final</td>
<td>The study was opened, changed, and marked as Final by a physician or an IntelliSpace Cardiovascular user with appropriate privileges.</td>
</tr>
</tbody>
</table>

**Report Images**: The Report Images section lists the images that have been inserted into the report.

See “Adding a Still Image to a Report” on page 167 for details on how to add an image to a report.

**Summary Statements**: Summary statements consists of finding codes that show the main point of an analysis.

**Comments**: The Comments section is the area into which you enter text that you want in the report.

If you copy finding codes from the Interpret sheet, or analysis text from the Work Area Score sheet, the associated text automatically appears in the Comments section of the report.

7.10.1 Summary Statements

The Summary Statements field displays a collection of selected summary finding codes.

1. Click in the Summary Statements list area to display the list of summary codes.

   You can also insert your cursor into the Summary Statement field and begin typing the identifying information of a summary finding code. The application will display a list of values as you enter characters.

   Alternatively, select Manual Text Entry to create your own summary statement.
2 Select a code.

The text associated with the summary codes you select appears in the Interpretation Summary section of the report.

### 7.10.2 Finalizing a Report

After a study is reviewed and completed, follow this procedure to mark the report and study as Final. You can then send the report to the referring physician.

1 Open the study.
2 In the Work Area, click the **Finalize Report** tab.
3 Click **Finalize**. The Electronic Signature window opens.
4 Select your user name from the list. If you select a different user name, IntelliSpace Cardiovascular might require a password, depending on its configuration.
5 Do one of the following:
   - Select the **Automatically close study after finalize** check box to close the study when you click **OK**.
   - To close the Electronic Signature window and continue, click **OK**.
   - To return to the report without finalizing it, click **Cancel**.

The study is marked as Final and cannot be changed. Fields in the Work Area are read-only. However, you can amend the report, which creates a different version of the report and leaves the original unchanged.

### 7.10.3 Amending a Finalized Report

You cannot change a final report. You can only amend it. This leaves the original, final report intact and creates an amended version.

1 Open a finalized study you want to amend.
2 Click on the **Finalize Report** tab and select **Amend**. A Pencil icon will appear to signify that you are amending the report.
3 Edit the Information, Interpret, and Finalize Report sheets, as needed. Any changes you make are automatically entered into the amended report.
4 Click **Finalize**. The Electronic Signature window opens.
5 Select your user name from the list. If you select a different user name, IntelliSpace Cardiovascular might require a password, depending on its configuration.
6 Do one of the following:
   - Select the **Automatically close study after finalize** check box to close the study when you click **OK**.
   - To close the Electronic Signature window and continue, click **OK**.
   - To return to the report without finalizing it, click **Cancel**.
The study is marked as Final and cannot be changed. Fields in the Work Area are read-only. However, you can amend the report, which creates a different version of the report.

A finalized study can be amended only with the wall motion scoring method originally used to finalize the study.

You can amend only the latest version of a report.
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8 Measurements

8.1 Measurements - About Measurements

IntelliSpace Cardiovascular lets you perform labeled and unlabeled measurements on images. If any of the images in the display are loops, you must stop the motion before performing any measurements.

If the acquisition device supports DICOM SR or SONOS DSR, you may receive images on IntelliSpace Cardiovascular with labeled measurements as part of the study.

NOTE
When performing measurements in Selected Images mode the system does not let you extend the measurement beyond the measurable region.

8.2 Measurements Panel

IntelliSpace Cardiovascular puts measurements that you make in the Measurements panel. This is usually in the right upper corner of the image, unless you change the position for the current measurement session.
If you select a measurement in the Measurements panel or in an image, IntelliSpace Cardiovascular will highlight the measurement in the Measure Sheet if it the Measure Sheet is open.

A measurement that you select in the Measurements panel highlights to blue in the image. Likewise, a measurement that you select in an image highlights to blue in the Measurements panel.

Unselected measurements display in yellow in the Measurements panel.

Measurements that IntelliSpace Cardiovascular considers flawed are marked as “Invalid” in the Measurements panel. An example of an invalid measurement is a measurement that extends further than the region in which you are allowed to make measurements.

The top of the Measurements panel shows the number of displayed measurements versus the total amount of measurements made in the image. This information is shown as N/NN.

Click on the expand and collapse button in the Measurements panel to increase or decrease the size of the Measurements panel.

You can scroll in the Measurements panel to view measurements when there are more measurements than the panel can display because of its size.

Grab a side of the Measurements panel with the cursor and slide the mouse to increase or decrease the height or width of the panel. This is useful if the panel is small and is hiding measurements.
8.3 Performing Measurements on Images

You can perform measurements on still images only. If the image is in motion, press the mouse wheel or click ⏹️ to stop the motion. Use the mouse wheel to select the frame.

See “Performing a Labeled Measurement” on page 149 for specific information about how to perform a labeled measurement.

See “Performing an Unlabeled Measurement” on page 152 for specific information about how to perform an unlabeled measurement.

NOTES

• A set of measurements and calculations is available for each study type. Check with your system administrator for more information about modifying the sets.
• Check with your system administrator for information about using the Measurement Configuration Tool to modify content, labels, results, and the order in which measurements are displayed.
• You can press the Escape button on your keyboard to abort a measuring session.
8.4 Performing a Labeled Measurement

There are different methods to perform a labeled measurement.

- Performing a Labeled Measurement from an Image
- Performing a Labeled Measurement from the Toolbar
- Performing a Labeled Measurement from the Measure Sheet

8.4.1 Performing a Labeled Measurement from an Image

To perform a labeled measurement from an image:

1. Select the image or images you want to measure. If any of the images are in motion, click \( \text{stop} \) to stop the motion. If the image is a loop, use the Frame Select slider or keyboard arrow keys to choose the frame.

2. Right-click on an image and select Perform labeled measurement from the menu.

3. In the Labeled measurements dialog box, use the drop-down list to select the type of labeled measurement that you want to see in the list of available labeled measurements.

4. Type the name of the labeled measurement into the search box until the measurement displays in the list. Alternatively, scroll through the list until you find the measurement you
need and select it. Click the selection to confirm your choice.

5 Perform the labeled measurements as needed.

The values of completed measurements are added to the Labeled Measurements section of the Work Area Measure sheet, and are used in appropriate calculations.

**NOTES**
- The Labeled measurements list box automatically displays the mode (2D, Doppler, MMode, Physio) based on the image where you perform the right-mouse click. If multiple images that were acquired from different imaging modes are shown, the Labeled measurements list box displays the other image modes, as well as the option All. If necessary, click the Labeled measurements down arrow and select the appropriate mode for the image you are measuring.
- You can press the Escape button on your keyboard to abort a measuring session.

### 8.4.2 Performing a Labeled Measurement from the Toolbar

To perform a labeled measurement from the toolbar:

1. Select the image or images you want to measure. If any of the images are in motion, click ![stop](image) to stop the motion. If the image is a loop, use the Frame Select slider or keyboard arrow keys to choose the frame.

2. Select Perform Labeled measurement ![labeled](image) from the toolbar. Select the type of labeled measurement you would like to make and make the measurement accordingly.

### 8.4.3 Performing a Labeled Measurement from the Measure Sheet

You can perform a labeled measurement from the Measure sheet:
1 Select the image or images you want to measure. If any of the images are in motion, click \( \text{Play} \) to stop the motion. If the image is a loop, use the Frame Select slider or keyboard arrow keys to choose the frame.

2 Navigate to the Work Area Measure Sheet and open the list of Labeled measurements.

3 Right-click the labeled measurement you want and select **Perform**.

4 Perform the labeled measurements as needed.

**NOTES**
- If the image needs to be manually calibrated, a message appears prompting you to calibrate the image before making any measurements. The image does not need to be calibrated if the message does not appear. DICOM images do not require manual calibration.

5 Click \( \text{Save} \) to save your measurements.

**NOTES**
- Each measurement is denoted with a unique alphabetic letter from A - Z. After that, measurements are denoted by AA - AZ etc.
- Labeled measurements are automatically used in any calculations that use the measurement as a component measurement.
- Only labeled measurements appear in the report, as configured using the Measurement Configuration Tool. You can double-click a measurement in the labeled Measurements section of the Measure sheet to display the image on which a labeled measurement has been performed.
- An icon will indicate that measurement
8.5 Performing an Unlabeled Measurement

All performed, unlabeled measurements are listed in the **Unlabeled measurements** section of the Measure sheet. Unlabeled measurements are not included in calculations or in reports.

To perform an unlabeled measurement:

1. Display the image you want to measure. If the image is in motion, click \[ \] to stop the motion. If the image is a loop, use the movie control bar or the mouse wheel to choose the frame.

2. There are different methods to perform an unlabeled measurement. Choose one of the following:
   a. Select **Perform unlabeled measurement** \[ \] from the toolbar. Select the type of unlabeled measurement you would like to make.
   b. Right-click on the image. From the right mouse button menu, select **Perform unlabeled** and then the type of unlabeled measurement you would like to make.

   The mouse pointer changes to a crosshair.

3. Choose one of these methods to make the measurements with the cursor:
   **Method 1 (for line measurements)**
   a. Click on the image at the desired starting point of the measurement
   b. **Drag** the mouse pointer to the desired end point. Release the mouse button.

   **Method 2 (for volume measurements and trace measurements)**
   a. Click on the image at the desired starting point of the measurement.
   b. **Point** to the desired end point of the measurement and click again.
   c. Repeat the process if you must make additional data points.
   d. Double-click the final data point to complete the measurement.

   Hint: You can press the back button twice successively on your keyboard to remove the last data point that you made.

   The measured value is displayed in the Measurements panel. The panel can be moved, resized, expanded and collapsed.

4. Click \[ \] to save your measurements.

**Tips:**
- To delete all endpoints and cancel the measurement, press **Esc**.
- To display the image on which an unlabeled measurement was performed, double-click the measurement in the Unlabeled Measurements section.
8.6 Performing a 2D Length Measurement

To perform a 2D length measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click \( \square \) to stop the motion. Use the mouse wheel to select the frame.

2. To perform a labeled measurement:
   - Right-click on the image and select the measurement from the menu.

3. Do one of the following:
   - Click on the image at the desired starting point of the measurement. Then point to the desired end point of the measurement and click again.
   - Click on the image at the desired starting point of the measurement then drag the mouse pointer to the desired end point. Release the button.

The measurement value appears in the Measurements panel. This is usually in right corner of the image, unless you change the position for the current measurement session.

4. Click \( \square \) to save your measurements.
8.7 Performing a 2D Trace (Area) Measurement

To perform a 2D trace (area) measurement:

1. Select the image or images you want to measure.
2. To perform a labeled measurement:
   - Right-click on the image and select the 2D Measurement Mode from the menu.
3. Place the crosshair at the starting location on the image and click to mark the spot. As you move the crosshair, a line connects the crosshair to the anchored spot.
4. Move the free crosshair to the next place on the image and click. Continue moving the crosshair and clicking to trace the entire area. A blue circle marks each spot that you click.

   The area value is updated in the Measurements panel as you move the crosshair. The Measurements panel is usually in right corner of the image, unless you change the position for the current measurement session.

   You can press the back button twice successively on your keyboard to remove the last data point that you made. On Apple machines, press the Delete button to remove the last data point that you made.

5. To complete the area measurement, double-click. An alternative method to complete the measurement is to place the endpoint on top of the starting point and click once.
6. Click to save your measurements.
8.8 Performing a 2D Volume Measurement

To perform a cardiac 2D volume measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click \[ \text{frame} \] to stop the motion. If the image is a loop, use the mouse wheel to select the frame.

2. To perform a labeled measurement, do any of the following:
   - Right-click on the image and select the measurement from the menu.

3. Place the crosshair at the starting location on the image and click to mark the spot. As you move the crosshair, a line connects the crosshair to the anchored spot, and the measurement value appears in the Measurements panel.

   The Measurements panel is usually in right corner of the image, unless you change the position for the current measurement session.

4. Move the free crosshair to the next place on the image and click. Continue moving the crosshair and clicking to trace the entire area. A blue square marks each spot that you click. The volume value is updated in the right corner as you move the crosshair.

5. To complete the measurement, double-click. An alternative method to complete the measurement is to place the endpoint on top of the starting point and click once.

   The final measurement value appears in the right corner of the image and automatically populates the appropriate volume calculation(s).

6. Click \[ \text{save} \] to save your measurements.

Tip
To take advantage of the automatic long-axis feature for method-of-discs (MOD) volume calculations, position the starting point at one side of the MV annulus and the endpoint at the other side. Double-click the endpoint to automatically close the trace and to position the long axis from the center point on the auto-close line to the most distant point in the apex. You can adjust the long-axis point and line separately.
8.9 Performing an MMode Height Measurement

To perform an MMode height measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click to stop the motion. Use the mouse wheel to select the frame.
2. To perform a labeled measurement:
   – Right-click on the image and select the measurement from the menu.
3. Place the cursor at the starting location on the image and click to mark the spot. As you move the crosshair, a line connects the crosshair to the anchored spot, and the measurement value appears in the Measurements panel.
   
   The Measurements panel is usually in right corner of the image, unless you change the position for the current measurement session.
4. Move the free crosshair to the endpoint of this height measurement.
5. Click to anchor the second point of the height measurement.
6. Click to save your measurements.
8.10 Performing a Cardiac Doppler Trace Measurement

To perform a cardiac doppler trace measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click \[ \text{[stop]} \] to stop the motion. Use the mouse wheel to select the frame.

2. Place the crosshair where you want it on the image and click. The starting point automatically connects to the baseline. As you move the crosshair, a line connects the crosshair to the anchored spot and the measurement values appear in the right corner of the image.

3. Move the free crosshair to the next point in the flow envelope and click. The Mean Velocity (Mean Vel), the Velocity Time Integral (VTI), and the Mean Pressure Gradient (Mean PG) values are updated in the right corner as you move the crosshair. Continue moving the crosshair and clicking until you finish tracing the envelope.

4. Double-click to complete the Doppler trace measurement.

5. Click \[ \text{[save]} \] to save your measurements.
8.11 Performing a Dop Vel Measurement

To perform a dop vel measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click \( \text{pause symbol} \) to stop the motion. Use the mouse wheel to select the frame.

2. To perform a labeled measurement:
   - Right-click on the image and select the measurement from the menu.

3. Place the crosshair at the point on the Doppler spectral display and click to mark the point. A symbol appears on the image and the measurement value appears in the right corner of the image.

4. Click \( \text{save symbol} \) to save your measurements.
8.12 Performing a Physio Time Measurement

To perform a physio time measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click [ ] to stop the motion. Use the mouse wheel to select the frame.

2. To perform a labeled measurement:
   - Right click on the image and select the measurement from the menu.

3. Place the crosshair at the starting location on the image and click to mark the spot. A solid blue circle marks the anchored spot. As you move the crosshair, a line connects the crosshair to the anchored spot and the measurement value appears in the Measurements panel.

   The Measurements panel is usually in right corner of the image, unless you change the position for the current measurement session.

4. Move the free crosshair to the endpoint of this measurement.

5. Click to anchor the second point of this linear measurement.

6. Click [ ] to save your measurements.
8.13 Performing an MMode/2D Protocol Measurement

NOTE
Do not perform 2D measurements on 3D clips.

Prerequisite:
IntelliSpace Cardiovascular has been configured to perform MMode/2D protocol measurements. See “Echo Module Settings” on page 187 for the configuration steps.

NOTE
You can set the protocol measurement in IntelliSpace Cardiovascular differently than the protocol measurement in the US Viewer.

To perform an MMode/2D protocol measurement:

1. Select the image or images you want to measure. If any of the images are in motion, click \( \text{STOP} \) to stop the motion. Use the mouse wheel to select the frame.

2. Right-click on the image and select **Perform protocol**. IntelliSpace Cardiovascular opens a submenu.

3. Do either of the following:
   - Select **MMode/2D** to initiate the measurement sequence with the first measurement defined in the protocol settings. A crosshair appears on the image.
– Select a single measurement to initiate the sequence. A crosshair appears on the image. When you select a single measurement, IntelliSpace Cardiovascular will execute the entire protocol as defined in “Echo Module System” on page 194.

4 Perform the first measurement and continue until all measurements have been performed.

When you perform the protocol, IntelliSpace Cardiovascular adds the measurements to the Measurements panel successively.

**NOTE:** At any time, you can press the *Escape* button on your keyboard to pause the measurement. Right-click the image and select *Continue protocol* to resume the measurement.

5 If necessary (for example, in the case of a 2D loop), you can display a subsequent frame during a protocol with either of these methods:

– Press the Escape button on your keyboard to pause the measurement and use the mouse wheel to go to the desired frame.

– Press the Escape button on your keyboard to pause the measurement and use the Next image on the movie bar to go to the desired frame

In either case, right-click the image and select *Continue protocol* to resume the measurement.

6 Click ![save](image) to save your measurements.
8.14 Measurement Macro

A measurement macro is a defined set of measurements associated with one measurement. For example, if you select the Ao V2 Trace measurement macro, IntelliSpace Cardiovascular generates the following set of measurements:

- Ao V2 Max vel
- Ao V2 Max PG
- Ao V2 Mean vel
- Ao V2 Mean PG
- Ao V2 VTI

**NOTE**
If you have the appropriate rights, you can refer to the IntelliSpace Cardiovascular Measurement Configuration Tool to view the macro measurement and its contents.
8.15 Using a Specific Measurement in a Calculation

The default selected value to use in a calculation and report is the average value for cardiac-study types. If a measurement is performed more than once using IntelliSpace Cardiovascular, IntelliSpace Cardiovascular calculates and displays an average value along with the individual measurements in the Labeled Measurements section.

![Image](https://example.com/image1.png)

The average value of measurements 1 and 2

Measurements 1 and 2

However, you can also set IntelliSpace Cardiovascular so that a selected value is used to represent the measurement in all calculations and dependent calculations (right-click a measurement and select **Use in calculations**).

![Image](https://example.com/image2.png)

The representative value used in calculations, based on the selected value

The selected value

Right-click a measurement and select **Use in calculations**
8.16 Performing a Keyboard-Entry Measurement

A keyboard-entry measurement is a value that you enter directly from the keyboard without performing the measurement on the image.

You can use the keyboard to quickly enter known values for any measurement. In addition, there are certain measurements that you can only enter using the keyboard.

8.16.1 Entering and Editing Keyboard Values

To enter a keyboard value:

1. Select the image or images for which you want to enter a measurement value.
   - Right-click a measurement in the Calculations or the Labeled measurements section of the Measure sheet and select **Keyboard Entry**.
   - The Keyboard Entry window opens.

2. Enter a measurement value and click **OK**. The measurement appears in the Labeled Measurements section of the Measure sheet with the keyboard icon (keyboard icon). The keyboard measurement value is also copied to any dependent calculations in the Calculations section and to the report.

3. Click to save your measurements.

**NOTE**
Keyboard entered measurements are not linked to an image.

To edit a keyboard value:

1. Double-click the value of the keyboard measurement.
2. Modify the measurement in the edit box.
3. Click outside the edit box to confirm.
8.17 Readjusting Measurement Points

You can readjust measurement points on an image as needed. The measurement values update dynamically.

To readjust a measurement point:

1. Click directly on the measurement in the image. The measurement value and the graphic are displayed in blue.
2. Drag each endpoint to a new location as required. The measurement value is recomputed when you release the mouse button.

**NOTE**

When readjusting volume measurements, drag either of the long-axis endpoints to change its location. For method-of-disc (MOD) volumes, the disc chords are recomputed relative to the new long-axis location.
8.18 Deleting a Measurement

Deleting a measurement removes it from the Labeled or Unlabeled Measurements section of the Measure sheet, the image, any calculations using that measurement, and the report.

Deleting part of a trace measurement deletes all other measurements associated with that trace.

There are different ways to delete one or more measurements:

- Select a measurement on an image and press the Delete button on your keyboard.
- Right-click a measurement on an image and select Delete to remove the measurement.
- Right-click a measurement on an image and select Delete all in image to remove all measurements from an image. (This does not remove the black rectangle deployed by the graphics option.)
- Right-click a measurement on an image and select Delete all in loop to remove all measurements from a loop.
- From the Work Area Measure Sheet, right-click a labeled measurement and select Delete.
8.19 Navigating through Measurements on Images

There are different ways to navigate quickly to measurements displayed on images.

Method 1

a On the Measure sheet, right-click a measurement in the Labeled Measurements list or the Unlabeled measurements list

b Select *Go To Image* to navigate to an image.

IntelliSpace Cardiovascular will display the image regardless of the series that the image is in.

Method 2

– On the Measure sheet, double-click a measurement in the Labeled measurements list or the Unlabeled measurements list to navigate to an image.

IntelliSpace Cardiovascular will display the image regardless of the series that the image is in. The application will also highlight the measurement on the image.

NOTE
If you select a measurement in the Measure box or in an image, IntelliSpace Cardiovascular will highlight the measurement in the Measure Sheet if it the Measure Sheet is open.

See “Measurements Panel” on page 146 for additional methods to navigate through measurements on images.

8.20 Adding a Still Image to a Report

NOTE
Images displayed as part of the report are compressed and are not to be used for diagnostic purposes.
1 To add a still image to a report, open the study and select the image you want to add to the report. If the image is in motion, click, or press the mouse wheel to stop the motion. If the image is a loop, use the Frame Select slider or keyboard arrow keys to choose a specific frame.

2 Right-click the image and select **Put Image in Report**. The Add Image window is displayed.

3 Enter a caption in the Enter Image Caption field and click **OK**. IntelliSpace Cardiovascular **automatically** displays the Finalize Report sheet with a representative icon of the image in the Report Images section.

**NOTE**
If you used the Caption/Flag feature to add a caption to an image, the caption text already appears in the Enter Image Caption field. You can edit the text as needed.

The image caption is included in the report with the image and is listed in the Report Images section of the Work Area Finalize Report sheet.

**NOTE**
Image captions may be added to a finalized or read-only study.
9 Third-party Interfaces

9.1 EMR/HIS Context Launch

The IntelliSpace Cardiovascular EMR/HIS interface option makes it possible to launch directly into IntelliSpace Cardiovascular from certain electronic medical record (EMR) systems.

Launching into the IntelliSpace Cardiovascular Workspace can be done in the Patient-centric Workspace in patient context or procedure context, as well as directly into the imaging workflow environment in procedure context.

Implementation of the interface that starts IntelliSpace Cardiovascular from an EMR requires customization of the EMR/HIS system. Implementation and set-up information is available on request. Deploying IntelliSpace Cardiovascular as a component of an institution’s EMR solution provides clinical users with improved workflow and enhanced patient care delivery by accessing patient exams directly on IntelliSpace Cardiovascular from within the EMR/HIS application.

The corresponding IntelliSpace Cardiovascular review or reporting application will launch when the exam is selected in the EMR/HIS.

This feature enables the EMR/HIS to launch directly into IntelliSpace Cardiovascular in the following ways:

- directly into the Patient-centric Workspace in patient context
- from procedure centric view in procedure/patient context—images and reports would already be selected for a patient and be displayed in the Image Viewer Applet and Document Viewer Applet
- directly into the production environment
- directly into the Echo Module

See “Adjusting Settings in IntelliSpace Cardiovascular” on page 184 for instructions on how to configure IntelliSpace Cardiovascular so that you can gain access to electronic medical records.
9.2 WebAPI in IntelliSpace Cardiovascular

WebAPI functionality in IntelliSpace Cardiovascular lets you launch into third party applications at user, patient, study or series level. More specifically, the functionality lets you:

- start multiple URLs for each supported modality in IntelliSpace Cardiovascular
- launch into a third party application at Series level
- start third party applications directly from the system level menu

9.2.1 Multiple URLs per Modality

With the WebAPI you can associate multiple applications to a single modality. This is helpful if you want to access more than one application for a particular modality.

You can start an application from:

- a study search or study worklist item
- an icon on the Cardiology Timeline
- one or more pictorials in the pictorial index

9.2.2 Launch a Third-party Application on Series Level

You can use the IntelliSpace Cardiovascular WebAPI functionality to launch into a third-party application on Series level. This means that you do not have to launch an entire study, select a series and then select the application to launch it. Instead, you can right-click on the series and select the application that you want to launch.

This Web API application is opened with a right-mouse click on a pictorial.

9.2.3 Accessible from the System Level Menu

The WebAPI is also able to launch third-party applications directly from External Web Applications in the IntelliSpace Cardiovascular user interface. This can be configured to be user centric or not (depends on the third party). This means that you can be presented with the third-party log-in screen, or you can bypass this and launch directly into the application without your user name and password.
NOTES:
• A WebAPI application can be configured as a default application. This means that you can double-click an icon on the Cardiology Timeline, a pictorial in the pictorial index from a worklist item, or a search result to directly access a third-party application.
• If configured, the WebAPI functionality will let you automatically exit applications if you open a different patient or close the patient bar.
• You can launch into multiple third-party applications from the patient bar. This lets you access multiple EMR systems.
• Successful WebAPI functionality in IntelliSpace Cardiovascular is dependent on the ability of third-party applications to support the WebAPI functionality.

9.2.4 API for Third-Party Application Launch
The API (application programming interface) allows you to launch a third-party clinical application in procedure context. Once configured, the third-party application will be available as an application or viewer from the Cardiology Timeline, Search Applet, or Worklists Applet.

9.2.5 WebAPI for Third-Party Application Launch Using a URL
An available WebAPI allows you to launch a third-party clinical application based on the URL. It can be associated with the inbound interface source, modality, (e.g., CT, MR, XA, etc.), or both. To set up a document template:

1. From the System menu, select System Configuration.
2. From the System Configuration tab, click on Study Type to application mapping, and then click New Group or Edit.
3. In the Name text field, type a group name (required).
4. From the Modality drop-down list, select the desired modality.
5. Open the Study Types drop-down list and check one or more of the available study types.
6. In Application name, go through the following steps:
   • Click on the check boxes to select or de-select the desired Application name(s).
   • Click on the up or down symbols to move them up or down in the list.
   • Click OK or click Cancel to quit without saving the group.
7. Click Save and Close.
Once configured, the URL to the third-party clinical application is available in the Search Applet, Worklists Applet and Cardiology Timeline.

The WebAPI allows you to launch into a third-party EMR/EHR. To set this up:

1. From the System menu, select System Configuration.
2. From the System tab, click on EMR Settings.
3. See the section “EMR Settings” on page 191 for instructions on how to configure the settings so that IntelliSpace Cardiovascular can launch into a third-party EMR/EHR.

Once configured, the EMR launch is available from the expanded patient bar or from the patient worklist context menu (Start EMR).
10 Report Template Editor

The report template editor lets you create report templates that you can use to create patient reports during diagnosis and treatment.

A report template is assigned to a reporting profile so that you automatically have the type of information available that you need to make assessments while you work.

You open the report template editor from the System menu.

There are two sections on the homepage of the template editor when you open it:

- List panel
- Preview panel

The list panel displays one or more report templates that have been created. These templates can be:

- factory templates (pre-defined templates created for the IntelliSpace Cardiovascular system)
- templates that other users have created

The preview panel displays the report template that is selected in the list panel.
NOTE
You can use the Reporting Profile drop-down list to filter the list of available templates.

To open a template, select it and click the **Edit** button.

**NOTE**
Factory templates do not have an edit button because you cannot open them for editing. You can only copy factory templates, which you can then edit into a custom report template.

There are three areas on the editor page:
- Left panel area
- Formatting area
- Template preview area
10.1 **Left Panel Area**

The left panel area has a number of tabs:

<table>
<thead>
<tr>
<th>Tab</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elements</td>
<td>![Elements Icon]</td>
</tr>
<tr>
<td>Fields</td>
<td>![Fields Icon]</td>
</tr>
<tr>
<td>Section</td>
<td>![Section Icon]</td>
</tr>
<tr>
<td>Settings</td>
<td>![Settings Icon]</td>
</tr>
</tbody>
</table>

The tabs contain the sections and the fields that you drag into the template preview area.

### 10.1.1 The Elements Tab

The Elements tab contains building blocks for creating customized sections.

- The Sections building block lets you to create a custom Section.
- Subtitles and Tables can be added to a custom section.
- The Section Separator can be used to mark the beginning and ending of sections.
- The Logo building block lets you to add images to tables.
- The Line Spacing lets you insert additional empty lines between items to make a report more readable.

### 10.1.2 The Fields Tab

The Fields tab contains groups of fields that you can add to sections. An example of a particular group is Patient Fields, which contains individual fields such as Date of Birth and MRN.

### 10.1.3 The Sections Tab

The Sections tab contains blocks of general or specific information. For instance, it can contain general information such as Header, but also specific information such as particular measurements.

### 10.1.4 The Settings Tab

The Settings tab displays the reporting profiles that you can link to a template. You can select one or more reporting profiles. All factory templates have at least one reporting profile selected.
10.2 Formatting Area

The formatting area has controls for formatting text shown in the template. Formatting works on:

- Individual text
- Entire sections

10.3 Template Preview Area

The template preview area displays a sample of the report as you build it. It is a real-time preview of the contents for reorganizing and formatting the template.

10.4 Quick-Start to Create a Basic, Customized Patient Report

1. Navigate to the template editor via the System menu.
2. Find an existing template that is most similar to the type of patient report that you would like to create (see “View Report Templates” on page 177).
3. Copy the template (see “Create a Custom Report Template” on page 177).
4. Modify the template so that it becomes the type of patient report that you want to use (See “Edit Report Templates” on page 178).
5. Use the additional functionality of the template editor to create a more advanced, customized patient report.

10.5 View Report Templates

1. Navigate to the template editor via the System menu.
2. Click on the Reporting Profile drop-down list.
3. Select the type of template that you would like to see. Otherwise, select All to view the entire set of available templates.

10.6 Create a Custom Report Template

1. Navigate to the template editor via the System menu.
2. Click on the Reporting Profile drop-down list. Select the type of template that you want to define; e.g., Stress or Adult etc.
3. From the list that appears, select the template that you want to use for your custom-made template.
4. Click the Copy Template button.
5. Give the template a Name.
6 Give the template a **Description**.

7 Click **Next**.

IntelliSpace Cardiovascular loads the template in the template editor.

8 Click **Save** to store the report template. See “Edit Report Templates” on page 178 for information on how to edit the template.

### 10.7 Edit Report Templates

1 Navigate to the template editor via the System menu.

2 Select the template you want to modify and click **Edit**.

   **NOTE:** Factory templates do not have an edit button because the application does not let you edit them. You can only copy factory templates, which you can then edit into a custom report template.

3 To add report elements, click the **Sections** tab and drag items to the right side of the screen.

   - **Sections:** This area contains generic and reporting-profile specific sections, such as Header and Adult Echo.

   As you drag, the system displays a yellow dashed line to indicate the position of the section.

   If the report template already includes a section, you cannot add another section of the same type. For example, you cannot add two Institution sections to a report template.

   An item signified by a green check mark is already in the report template. If you hover over the item with your mouse, you can click the lighted magnifying glass to navigate to the item in the template preview area.

   Items without a green check mark are candidates for addition to the report template.

   **NOTE:** You can use the Line Spacing option on the Elements tab to insert additional empty lines between items to make a report more readable.

4 Click on the **Fields** tab and drag a field into your sections. Repeat the step to add additional fields. To display or hide a label, or a value of a field, right-click the label and choose options from the menu. See “Display, Hide and Edit Labels” on page 182 for additional information.

5 Select a section and use the Formatting Area to define the shape, size, color and general makeup of the section.

6 Click on the **Elements** tab and use the following options to create and format blank sections:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>Drag to add a blank section into the report template.</td>
</tr>
<tr>
<td>Subtitle</td>
<td>Drag to add a subtitle into a report template.</td>
</tr>
</tbody>
</table>
Format Text in Report Templates

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>Drag to add a table to the report template. Then specify the number of rows and columns and click <strong>OK</strong>. <strong>Important</strong>! Carefully read and apply any information displayed in the Tables Details dialog box!</td>
</tr>
<tr>
<td>Section Separator</td>
<td>Drag to add a line to clearly distinguish between sections.</td>
</tr>
<tr>
<td>Logo</td>
<td>Drag to add a logo to the report template.</td>
</tr>
<tr>
<td>Line Spacing</td>
<td>Drag and click the sign (+) or the minus sign (-) to increase or decrease the space between sections.</td>
</tr>
</tbody>
</table>

7 To delete a section, or a field within a section, hover over the section or field with the cursor and click [X]. Not all fields can be deleted.

8 To move a section, hover over the section with the cursor and drag the grab bar icon (::*). Not all sections can be moved.

9 Click **Save** [■] to store the report template. Click **Cancel** [☒] to undo the edits and return to the home page of the template editor.

10 Select the desired reporting profile from the drop-down list and click on the desired template entry. Click on the **Set as Default** button.

10.8 Format Text in Report Templates

1 Navigate to the template editor via the System menu.

2 Select the template you want to edit and click **Edit**.

3 To format text, margins, borders, and background colors, select a section or field heading and use the formatting options in the menu bar.

4 Click **Save** [■] to store the report template. Click **Cancel** [☒] to undo the edits and return to the home page of the template editor.

10.9 Add Measurements and Calculations to Report Templates

1 Select the template you want to edit and click **Edit**.

2 Click the **Sections** tab.

3 Select the reporting profile to expand it.

4 Select the measurements group or calculations group and drag it into the report template to add it.

5 To display or hide a label or a value, right-click the label and choose options from the menu. See “Display, Hide and Edit Labels” on page 182 for further help.
10.10 Create Tables in Report Templates

1. Navigate to the template editor via the System menu.
2. Select the template you want to edit and click **Edit**.
3. Click the **Elements** tab and drag a Table to the report template. 
   You must add a table to a section. A table cannot be outside of a section.
4. In the Table Details dialog box:
   a. Specify the number of Rows and Columns that you want in the table.
   b. Indicate if you want to hide rows or cells in the report when the rows or cells do not have values.
   
   **Important!** Carefully read and apply any information displayed in the Tables Details dialog box!
   c. Click **OK**.
5. To add **fields** to the table, click the **Fields** tab and drag fields into the table in the report template.
6. To add or remove columns or rows, right-click the table and choose options from the menu. You can also drag the borders of the table or a column to resize a table or column.
7. Click **Save** to store the report template. Click **Cancel** to undo the edits and return to the home page of the template editor.

10.11 Create a Report Template with Measurements of Different Study Types

IntelliSpace Cardiovascular lets you combine the measurements of different study types into one report.

**Prerequisite:** A template with a reporting profile has already been created.

1. Navigate to the template editor via the System menu.
2. Select the template you want to edit and click **Edit**. This must be a template with of a particular reporting profile already created.
3. Navigate to the **Settings** tab.
4. Select the supported reporting profiles whose data you want to include in a single report.
5. Click the **Set** button.
6. Click the **Sections** tab and expand the application whose information you want to include in the report template.
7. Grab the section that you want to include in the report template and drag it to the location where you want to see it in the Report View Area. Repeat the step to include additional sections.
8. Click **Save** to store the report template. Click **Cancel** to undo the edits and return to the home page of the template editor.
10.12 Add Logos to Report Templates

The template editor supports png, jpg and bmp image formats.

1. Navigate to the template editor via the System menu.
2. Select the template you want to edit and click Edit.
3. Navigate to the Sections tab.
5. Click on the logo area.
6. Select the image that you want to use as your logo and click on OK.
7. Repeat steps 4 and 5 to add an additional logo.
8. To increase or decrease the size of a logo, select the logo with the mouse and drag towards or away from the logo.
9. To remove a logo, select a logo and click the X.
10. Click Save to store the report template. Click Cancel to undo the edits and return to the home page of the template editor.

10.13 Delete Report Templates

1. Navigate to the template editor via the System menu.
2. Select the template from the list of templates.
3. Click Delete.

10.14 Search for Report Template Sections

You can search for report template sections. This can be useful, for example, if you have a template with a lot of information and do not want to manually scroll through it to locate a section.

If a section is present in a template, it is signified by a green check mark. Hover over the item with your mouse and click the lighted magnifying glass . IntelliSpace Cardiovascular brings you to the item in the template preview area.

Items without a green check mark are candidates for addition to the report template.
10.15 Display, Hide and Edit Labels

Right-click on any label to display, hide or edit the label in a section or table.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Label</td>
<td>Select and enter the new label that you want in the section or table. You can use this, for example, to give a label a more explicit meaning; e.g., change the label “Height” to “Patient Height”.</td>
</tr>
<tr>
<td>Display Label and Value</td>
<td>Select this option if you want to see a label and the value of the label. For example: Patient Height: 178 centimeters.</td>
</tr>
<tr>
<td>Display Label Only</td>
<td>Select this option if you want to see only the label. For example: Patient Height. You can use this option to customize a report so that a label is in a separate cell than its value in a table.</td>
</tr>
<tr>
<td>Display Value Only</td>
<td>Select this option if you want to see only the value of a label. For example: 178 centimeters. You can use this option to customize a report so that the value of a label is in a separate cell than the label.</td>
</tr>
<tr>
<td>Show Label Only When Value Exists</td>
<td>Select this option if you want IntelliSpace Cardiovascular to display the label only when a value exists for the label. For instance, if a patient’s height is not part of the medical record, IntelliSpace Cardiovascular will not show the label at all.</td>
</tr>
<tr>
<td>Always Show Label</td>
<td>Select this option if you want IntelliSpace Cardiovascular to display the label if there is a value for the label or not. For instance, if a patient’s height is not part of the medical record, IntelliSpace Cardiovascular will show the label anyway.</td>
</tr>
</tbody>
</table>

Note

IntelliSpace Cardiovascular does not let you hide labels in required sections of a report template, despite offering the option to hide a particular label.

For example: the section “Institution” is a required section in a report. Because it is a required section, "Institution" will always show all content. IntelliSpace Cardiovascular will, therefore, display a label when a cell has been tagged with "Show Label Only When Value Exists", even if the cell does NOT have a value.
This page is left intentionally blank.
11 Adjusting Settings in IntelliSpace Cardiovascular

You can use the System menu to adjust various settings in IntelliSpace Cardiovascular.

11.1 My Settings

Use My Settings to customize options in the application to your way of working.

The options are organized by category:

- General Settings
- Home tab
- Worklists
- Patient tab
- Image viewer
- Echo module

Buttons on the My Settings page

These buttons on the My Settings page also help you configure the application.

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset to System Settings</td>
<td>Click <strong>Reset to System Settings</strong> to revert all adjustments to the defaults created under System &gt; System Settings. (See “System Settings” on page 188 for an explanation about what system settings are and how they work.)</td>
</tr>
<tr>
<td>Undo</td>
<td>Click the <strong>Undo</strong> button to exit without saving any changes that have been made.</td>
</tr>
<tr>
<td>Save and Close</td>
<td>Click the <strong>Save and Close</strong> button and restart the application to permanently save any changes and to exit the page.</td>
</tr>
</tbody>
</table>
11.1.1 General Settings (restart needed)

- UI scheme—select dark or light
- Font size—select small, normal, or large. Note that not all text will be affected by adjusting the font size, such as text and numbers in procedure items in the timeline.
- Grid Interaction—select paging or scrolling to determined how you want to move through information that does not fit on one page in the Search Applet or Worklists Applet.
- Double-click on study starts patient centric view —click on the check box to open the Patient tab with a double-click on a study in a Study Worklist or Study Search. If the check box is not selected, double-click on a study in a Study Worklist or Study Search to open the clinical module (for example Cath, ECHO, or ViewForum, etc.) or a configured Web API application (modality based or external source).
- Application auto logoff timeout (Min)—defines the behavior of the auto log off functionality in IntelliSpace Cardiovascular:
  a. Click on the check box to activate the auto log off functionality.
  b. Specify a time in minutes for the system to wait during inactivity before the system will automatically log off.
  c. Select the log off behavior:

<table>
<thead>
<tr>
<th>Option</th>
<th>Expected result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always auto log off</td>
<td>IntelliSpace Cardiovascular automatically logs off after a defined period of inactivity. Unsaved data will be lost!</td>
</tr>
<tr>
<td>Never auto log off if there is unsaved data</td>
<td>IntelliSpace Cardiovascular will not automatically log off until you have saved or discarded unsaved changes.</td>
</tr>
</tbody>
</table>

11.1.2 Home Tab Settings

You can use the Home Tab Settings to adapt and preserve the layout of the Home tab.

- Save applet layout—select the check box to save changes made to the Home tab layout, such as applet configuration and resizing of pictorials in the applet.
- Set the default search tab—select patient, Study, or DICOM Q/R to be the default search tab in the Search Applet.

**NOTE**
Make sure the Home tab layout is configured to meet your needs BEFORE saving the layout. This can be done in the Home tab itself by swapping or maximizing certain applets.

11.1.3 Patient Tab Settings

You can use the Patient Tab Settings to configure or adapt the organization and operation of the Patient tab layout in the Patient-centric Workspace.

- Save applet layout—select the check box to save changes made to the Patient tab layout, such as applet configuration and resizing of pictorials in the applet
- Timeline closes on maximize applet —select the check box so that the application hides the timeline when an applet is maximized
• Timeline default ordering type—select *ascending* or *descending* as the default order for study date and time (performed)
• Timeline default period setting—select Full History, last 3 years, or last year from the drop-down list to set your preferred default time frames

**NOTE**
Make sure the Patient tab layout is configured to meet your needs BEFORE saving the layout. This can be done in the home tab itself by swapping or maximizing certain applets.

### 11.1.4 Image Viewer Settings

- Preserve Contrast / Brightness - XA - select the check box if you want IntelliSpace Cardiovascular to apply contrast and brightness adjustments to selected runs in an XA series when you alter the contrast or brightness in an image. Adjustments are not saved when you exit the image viewer.
- Preserve Contrast / Brightness - US - select the check box if you want IntelliSpace Cardiovascular to apply contrast and brightness adjustments to selected loops in a US series when you alter the contrast or brightness in an image. Adjustments are not saved when you exit the image viewer.
- Allow Lossy Images—select the check box so that IntelliSpace Cardiovascular compresses images that are originally uncompressed. Clear the check box to keep images in their original state.  
  **NOTE:** IntelliSpace Cardiovascular never re-compresses images. This means that it does not compress images that have arrived in JPEG lossy.
- Adaptive Streaming—select the check box to let IntelliSpace Cardiovascular skip frames when it runs multi-frame images. IntelliSpace Cardiovascular always applies adaptive streaming to linked movies: movies synchronized in stress mode.
- Use WebGL for still images (not for US)—WebGL is the abbreviation for Web Graphics Library. WebGL is used to increase the performance of image processing. The setting works only if your system has a graphics card that supports WebGL technology.

If you configure WebGL, the application will **not** apply it to ultrasound images or to any movie.

- Synchronization type—specify how IntelliSpace Cardiovascular synchronizes moving images:
  - Free run: Plays all loops at their acquired rate, continuously wrapping around from the last frame to the first, with no synchronization between loops.
  - Synchronize on both ends: Plays the first and last frames together for all loops. Intermediate frames play evenly distributed between the first and last frames.
  - Synchronize on start: Plays the first frames of all loops together and allows each loop to run at its acquired rate, and then waits at the last frame until all loops have reached their last frame. At that time, all loops wrap around to the beginning and restart. The total loop time is equal to the longest of the loop times of the displayed loops.
  - Preferred stress protocol: Define the stress protocol with which IntelliSpace Cardiovascular will operate when you open a stress study. If the image does **not** have both stage and view information, and the image is not biplane, IntelliSpace Cardiovascular selects the default viewing protocol which is classic single select.
• Edge enhancement—select a value between 0 and 4.

**NOTE**

The Image Viewer Applet shows XA images with a default edge enhancement setting of 2. You can change this default setting to your own preference. This value will be saved and applied per user per client and is sticky until the user changes it.

By default, edge enhancement is not applied to modalities other than XA. You can always change the edge enhancement by using the edge enhancement tool from the toolbar.

### 11.1.5 Echo Module Settings

- **Save applet layout:** Select the check box to save changes made to the Echo module layout.
- **Wall scoring method (restart needed):** Select the wall scoring method that you want to use to score myocardial segments: ASE or ISCV.
- **Default viewing protocols:** Select the default viewing protocol that you want to use with a particular reporting profile when you work in the Echo module.

If you use auto detect, then the Echo Module looks at the setting in the Image Viewer section for stress echo study types; otherwise, it will default to classic single select.

Based on the DICOM information in the image, the application determines if an image contains both stage and view information. If this is the case, IntelliSpace Cardiovascular applies Stress Viewing as defined in the settings for the Image Viewer Applet.
11.2 System Settings

Use System Settings to make adjustments that affect all users in a particular group or domain. Special rights are needed to make these adjustments.

The adjustments under System Settings are similar to the adjustments under My Settings. However, the System Settings page contains the following additional settings.

- Measurement System—select the unit of measurement that you want to use for height and weight in the report, Work Area and Order dialog. The units of measurement are U.S. or Metric.
- Date Format—select MM/DD/YYYY (US format), DD/MM/YYYY (Europe format) or YYYY/MM/DD (ISO format) from the drop-down list. The format you select here controls how IntelliSpace Cardiovascular shows dates for which IntelliSpace Cardiovascular is responsible.
- Page size- define the size of the paper (A4 or Letter Format) used for PDF and HTML reports that the system can print from the Echo module.

NOTE
The adjustments under System Settings take precedence over the adjustments made under My Settings. This means that an administrator can override the personal settings that a user has made under My Settings if the administrator makes an adjustment under System Settings. However, a user can then alter the system setting and make it a personal setting under the My Settings page.

Buttons on the System Settings page

These buttons on the System Settings page also help you configure the application.

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset to Factory Settings</td>
<td>Click Reset to Factory Settings to revert all of the settings of all the categories to the defaults created by Philips Healthcare before the system was set up.</td>
</tr>
<tr>
<td>Undo</td>
<td>Click the Undo button to exit without saving any changes that have been made.</td>
</tr>
<tr>
<td>Save and Close</td>
<td>Click the Save and Close button and restart the application to permanently save any changes and to exit the page.</td>
</tr>
</tbody>
</table>
11.3 System Configuration

Use System Configuration settings to integrate IntelliSpace Cardiovascular to various systems. The settings are organized by category:

- List of applications
- Modality-based URL Templates
- Study Type to application mapping
- EMR
- External source-based URL Templates
- List of third-party application URLs
- Epic Integration
- Echo module (system)

Buttons on the System Configuration Page

These buttons on the System Configuration page also help you configure the application.

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
</table>
| Reset to Factory Settings | Click Reset to Factory Settings to revert the system configuration settings to the defaults created by Philips Healthcare before the system was set up. IntelliSpace Cardiovascular will display the Reset to factory settings dialog box. Select one of the following:  
  - Reset the selected configuration category only  
    IntelliSpace Cardiovascular will revert the settings of the selected category to the manufacturer defaults.  
  - Reset all configuration items in the category list  
    IntelliSpace Cardiovascular will revert the settings of all the categories to the manufacturer defaults.  
  - Click OK to confirm your choice or Cancel to exit the dialog box. |
| Undo                 | Click the Undo button to exit without saving any changes that have been made. |
| Save                 | Click the Save button and restart the application to permanently save any changes and to exit the page. |
11.3.1 List of Applications

This shows the current list of applications available.

- New Application - add an application together with its Globally Unique ID.
- Delete - delete a selected application from the list.

11.3.2 Modality Based URL Templates

Configure a modality based URL template so that you can view and process one or more series or images with WebAPI based applications.

- Add - create a new template to start an application for a specified modality via a URL. The URL can contain parameters that the system fills with attribute values based on patient, study or series information.
  - Application ID - enter an identifier to uniquely identify the application for the selected Modality; e.g., CT Portal. The Application ID, together with the Modality setting, form a unique name.
  - Modality - select the modality for which you want to view images via the WebAPI based application.
  - Display name - enter the name that the system will display in the context menu when you want to start the WebAPI based application. You will see this name when you right click a study in a study worklist or study search list and select Open study with, right click a pictorial in the pictorial index and select Open with, or right-click an icon on the timeline and select Open study with.

Make sure that the Study Type to Application Mapping table contains a mapping for the modality for the URL template that you create; otherwise, the display name will not appear in the IntelliSpace Cardiovascular context menu.

- Image display template - enter the URL that will start the WebAPI based application. You can use the example in the user interface as the basis to enter the URL.
- Open message: Enter a message that you want IntelliSpace Cardiovascular to display when it opens a WebAPI based application.
- Close template - enter the URL command that will let you exit the WebAPI based application. IntelliSpace Cardiovascular will give this command if you open a different patient or close the patient bar.
- Log off template - enter the URL command that will log you out of the WebAPI based application when you log off of IntelliSpace Cardiovascular.
- Show close message - select the check box so that IntelliSpace Cardiovascular displays a message to inform you that it is about to exit the WebAPI based application.
- Silent launch - Select this check box so that IntelliSpace Cardiovascular automatically closes the browser tab it opened after IntelliSpace Cardiovascular starts the configured the WebAPI based application, if the WebAPI based application leaves an empty browser window (not all do).
- Browser tab name - Enter the name of the browser tab which will display the launched application. This will allow IntelliSpace Cardiovascular to re-use a particular tab when another instance of a specific WebAPI based application is started. This means that an
additional browser tab will not open and, therefore, reduces the number of open tabs in the browser.
- Date format - Select the date format that is needed to communicate with the application with which you want to integrate.

NOTE
You can manually change information in the filter box at the top of the Modality column to filter the list of Modality based URL Templates by modality.

- Edit - adjust a template.
- Delete - delete a template from the list of templates.

11.3.3 Study Type to Application Mapping

Assign modalities and study types to the applications that will display in the context menu in IntelliSpace Cardiovascular.

- New Group - Defines the name of the group in which you assign modalities and study types to applications that you want to display in the context menu.
- Modality - Select the modality for which you want to define applications that will display in the context menu.
- Study types - Select the study types for which the context menu will display options.
- Application Name - select the applications that will populate the context menu of a matching study. The application that you want to select must already be defined under List of applications.

You use the up and down symbols to move items up or down the list. The higher that an item is on the list, the higher it displays in the context menu.

NOTE: The option URL based applications is a place holder for modality based URLs that are defined under the section “Modality Based URL Templates” on page 190. If the option URL based applications is at the top of the list in the Application name pane, then the web applications defined under Modality based URL Templates will display at the top of the IntelliSpace Cardiovascular context menu. They will display in the order in which they were created.

- Edit - adjust the settings of a group.
- Delete - delete a group from the list of groups.

11.3.4 EMR Settings

Configure one or more EMR templates so that you can gain access to electronic medical records from IntelliSpace Cardiovascular.

- Add - create a new template to access an EMR system from IntelliSpace Cardiovascular.
  - Display Name - enter the name of the EMR system that IntelliSpace Cardiovascular will display in the patient worklist context menu or on the patient bar.
  - EMR Template - enter the URL that will start the EMR system. You can use the example in the user interface as the basis to enter the URL.
− Open message: Enter a message that you want IntelliSpace Cardiovascular to display when it opens a modality based URL template.
− Close template - enter the URL command that will let you exit the EMR system. IntelliSpace Cardiovascular will give this command if you open a different patient or close the patient bar.
− Log off template - enter the URL command that will log you out of the EMR system when you log off of IntelliSpace Cardiovascular.
− Show close message - select the check box if you want IntelliSpace Cardiovascular to display a message to inform you that it is about to exit the EMR system.
− Silent launch - Select this check box so that IntelliSpace Cardiovascular automatically closes the browser tab it opened after IntelliSpace Cardiovascular starts the configured the EMR template, if the EMR template leaves an empty browser window (not all do).
− Browser tab name - Enter the name of the browser tab which will display the launched application. This will allow IntelliSpace Cardiovascular to re-use a particular tab when another instance of a specific WebAPI based application is started. This means that an additional browser tab will not open and, therefore, reduces the number of open tabs in the browser.
− Date format - Select the date format that is needed to communicate with the EMR with which you want to integrate.

• Edit - adjust a template.
• Delete - delete a template from the list of templates.

11.3.5 External Source Based URL Templates

• Add - create a new template to start an external source based URL. The URL can contain parameters that the system fills with attribute values based on patient or study information.
  − Source name - enter the name of the external source as it is known on the network.
  − Display name - enter the name that the system will display in the context menu when you want to start the external source based URL. You will see this name either via a study worklist or the Cardiology Timeline.
  − Document template - enter the URL that points to the report that you want to view in the external source. This is used for ECG reports.
  − Image display template - enter the URL that will start the External Source based application. You can use the example in the user interface as the basis to enter the URL.
  − Open message: Enter a message that you want IntelliSpace Cardiovascular to display when it opens a modality based URL template.
  − Close template - enter the URL command that will let you exit the External Source based application. IntelliSpace Cardiovascular will give this command if you open a different patient or close the patient bar.
  − Log off template - enter the URL command that will log you out of the External Source based application when you log off of IntelliSpace Cardiovascular.
  − Show close message - select the check box if you want IntelliSpace Cardiovascular to display a message to inform you that it is about to exit the external source based URL.
– Silent launch - Select this check box so that IntelliSpace Cardiovascular automatically closes the browser tab it opened after IntelliSpace Cardiovascular starts the external source based URL template, if the template leaves an empty browser window (not all do).
– Browser tab name - Enter the name of the browser tab which will display the launched application. This will allow IntelliSpace Cardiovascular to re-use a particular tab when another instance of a specific WebAPI based application is started. This means that an additional browser tab will not open and, therefore, reduces the number of open tabs in the browser.
– Date format - Select the date format that is needed to communicate with the application with which you want to integrate.

NOTE:
Once a template has been defined, you can double-click on an external-source study worklist item or on an icon in the Cardiology Timeline to access the study on the external source.

- Edit - change the template.
- Delete - delete the URL template from the list of templates.

### 11.3.6 List of 3rd-party Application URLs

Configure third-party application URLs so that you can access third-party web-based applications.

- Add - create a new template to start a third-party web-based application via a URL.
  - Name - define a meaningful name for the third-party web-based application.
  - URL - enter the URL that points to the third-party web-based application.
  – Silent launch - Select this check box so that IntelliSpace Cardiovascular automatically closes the browser tab it opened after IntelliSpace Cardiovascular starts the third-party application URL, if the third-party application URL leaves an empty browser window (not all do).
- Edit - change the URL.
- Delete - delete the third-party web-based application URL from the list of URLs.

NOTE:
Once a template has been defined, you can start a third-party web-based application with the External Web Applications option under the System menu in the user interface. This option displays only when a third-party application URL has been configured.

### 11.3.7 Epic Integration

Complete this section to integrate IntelliSpace Cardiovascular with the Epic EMR.

- File location - type the UNC path to the Networked Shared Folder where the Epic client stores its control files.
• Client ID - this is a read-only field. It displays the hostname of the IntelliSpace Cardiovascular client.
• Control location - In the first field, type a useful description of the location where Epic will put the xml file that contains the patient and study data required by IntelliSpace Cardiovascular. The second field is a read-only field. Its content is a combination of the File location and Control location.
• Measurements location - In the first field, type a useful description of the location where IntelliSpace Cardiovascular will put the xml file that contains the measurements required by Epic. The second field is a read-only field. Its content is a combination of the File location and Measurements location.

11.3.8 Echo Module System

Configure the measurements that you want to include in the MMode/2D Protocol.

The MMode/2D protocol is a set of cardiac measurements performed on MMode frames and 2D images. The protocol consists of a sequence of measurements that are linked together.

• To configure the MMode/2D protocol, select the associated check box to enable a measurement.
• Clear a check box to disable a measurement. This means that you cannot use the measurement when you perform an MMode/2D protocol measurement. (See Performing an MMode/2D Protocol Measurement for an explanation of this measurement.)

Enabled protocol measurements are displayed in the Perform protocol submenu when you right click on an image.
11.4 External System Tools

The External System Tools menu contains the following items:

1 System Administration Manager—launches the System Administration Manager, from which you can set permissions and other administrative settings, if your profile settings allow.

2 Profile Manager—use to configure aspects of the ultrasound viewer to meet a lab's particular needs such as: Reason for study, report templates, preferences on wall-scoring and password requirements, and report profiles.

3 Clinical Application Configuration Tool—determines how the application (mainly Echo Module functions) operates on all workstations (for example: modifies or edits finding codes and report profiles, and adds patient and study attributes).

4 Measurements Configuration Tool—use to create and select measurements and calculations for use in the IntelliSpace Cardiovascular ultrasound viewer.

5 Profile Transport Tool—use to export reporting profiles from an IntelliSpace Cardiovascular system as a set of XML files.

6 Diagnostic Guidance Configuration Tool—use to create collections of rules (called RuleSets) to validate or augment the diagnostic content of an IntelliSpace Cardiovascular ultrasound study.

7 XperIM System Portal Manager—enables access to XperIM Patient Billing, Inventory and Scheduling.

Items 1 - 6 are further explained in the IntelliSpace Cardiovascular 2.3 Clinical Configuration Manual (English only).

11.5 Preferences

The Preferences menu contains the following items:

- **Edit Preferences**: Use this to edit the application preferences using the Viewer tab, Image Server tab, CD/DVD Recording tab, DICOM print tab, Export Anonymous tab, Security tab, and if applicable TSM tab and Remote Reporting tab.

- **Backup Preferences**: This saves the current system preference settings (of the logged-on user) in a file to a location you can select using the dialog box.

- **Restore Preferences**: Use this to locate and open the file that restores the preference settings.
11.6 Tools Menu

The following options are available from the Tools menu:

- **Open DICOM File**—opens a dialog box to let you navigate to the location of the DICOM file and open it
- **Browse**—use this to specify the default Browse search location that will be used when you browse for studies and copy studies to a desired location from there
- **DICOM Print**—prints the selected study on the film printer (hard-copy printer)
- **Show Queues**—displays the Retrieve Queue, Send Queue, Print Queue
- **HIS Worklist**—displays the studies on the HIS server.
- **Import from Cache**—used to allow studies to be imported for remote reporting. The study is imported (via VPN or portable media) into the local cache of the remote workstation.
12 IntelliSpace Cardiovascular Modules

12.1 IntelliSpace Cardiovascular Advanced Analytics

The IntelliSpace Cardiovascular Advanced Analytics tool allows you to run and create reports, including pre-loaded standard report templates for IntelliSpace Cardiovascular that can easily be customized to generate standard reports or ad hoc queries.

Open the Report server in Internet Explorer using the URL configured at the time of IntelliSpace Cardiovascular Advanced Analytics installation and configuration. The first time you access the tool, a small application will automatically be downloaded.

For full details, including the database schema, see the IntelliSpace Cardiovascular Advanced Analytics Guide.

12.2 Clinical Modules and Xper IM

IntelliSpace Cardiovascular Clinical modules and Xper IM can be launched from the Cardiology Timeline and the Worklists Applet. When you close any of these applications, you will be returned to wherever you were working in the Workspace when you launched the application.

IntelliSpace Cardiovascular Clinical modules include:

- Echo Module
- Cath Module
- Nuc Med Module
- CT Module and MR Module
- EPMed Module
- Image Management
- Diagnostic Guidance

12.2.1 Echo Module

The Echo Module is used to assess ultrasound images and generate a report. It includes, for example, the creation of measurements, calculations, diagnostic findings, trends and supports pediatric Z-scores.

12.2.2 Cath Module

The Cath Module is used to view, perform measurements and quantitative analysis on cardiac catheterization images. The viewer can also be used to view medical images from other imaging modalities.
12.2.3 Nuc Med Module

Within IntelliSpace Cardiovascular, AutoQUANT is the default viewer for Nuclear Medicine studies. AutoQUANT can be used to view images, make measurements, state findings, and create a report.

The IntelliSpace Cardiovascular NM Reporting application can be used to generate reports by entering diagnostic findings and comments.

12.2.4 CT Module and MR Module

Within IntelliSpace Cardiovascular, ViewForum is the default viewer for MR and CT studies.

This software performs viewing, image manipulation, communication, printing, and quantification of images.

12.2.5 Image Management

The image management module provides multi-modality import, copy, storage, archiving, and distribution of cardiac images. Flexible archive media options include DVD, MOD, digital tape, SAN and NAS. It can forward images to network nodes including web servers.

12.2.6 Diagnostic Guidance

IntelliSpace Cardiovascular Diagnostic Guidance is a tool that allows you to create rules that define relationships among distinct finding codes, measurements, and other items. The tool operates during echo reporting and warns users of conflicts, errors, omissions, or patterns that would otherwise go unreported or mistakenly reported. It also allows them to review their interpretations before finalizing reports.
13 Getting More Information

13.1 Information you need

More information about using the IntelliSpace Cardiovascular system is available from the following sources:

- Documentation
- Online Help
- Technical support

13.2 Documentation

Consult the following documentation for detailed information about using the IntelliSpace Cardiovascular.

- IntelliSpace Cardiovascular System Administration Guide—This manual describes activities that system administrators must complete to maintain the IntelliSpace Cardiovascular system, including the assignment of users and permissions to workgroups.
  IMPORTANT: This guide is only available to system administrators (not all users).
- IntelliSpace Cardiovascular Advanced Analytics User Guide—This manual describes how to run the tools that generate reports for data analysis.

All mentioned documentation is available with the IntelliSpace Cardiovascular Software.

13.3 Online Help

Select the type of Help that you want from the Help menu. The Help contains instructions for logging on and starting the application, and full instructions for using the application.

Click About to display the About box, which displays labeling and product information.
13.4 Technical Support

Should you encounter difficulty using the IntelliSpace Cardiovascular, refer to the “Workspace Overview” chapter for basic information about the system and follow the guidelines below to locate the relevant source for information and assistance.

- **Configuration Settings**—Configuration includes the assignment of user permissions and the content of various lists used in the applications. For questions in these areas, consult a hospital IntelliSpace Cardiovascular system administrator or refer to the IntelliSpace Cardiovascular System Administration Guide.

- **Technical Issues**—These issues include backup schedules, network connectivity, and workstation operation. Start by contacting a hospital IntelliSpace Cardiovascular system administrator or refer to the IntelliSpace Cardiovascular System Administration Guide.

If you cannot resolve your problem, contact the Philips technical support group serving your area. To obtain contact information for this group, ask your local Philips Healthcare representative.

When contacting Philips technical support, please have the following information available:

- **Caller name**, **customer organization name**, and **location**.
- **Site number**, if applicable.
- **Detailed description of the problem**, including any history of troubleshooting efforts completed before or after the problem first occurred.
14 Glossary

A
Analysis Applications: reporting profiles.
Analysis Application filter: contains a set of reporting profiles.
Anatomic Views Diagram: a diagram related to wall motion scoring that displays the wall segments based on the four views (Long Axis, Short Axis, Apical 4 chamber, and Apical 2 chamber).

B
Bull’s-eye Diagram: a diagram on the Score sheet that contains all of the segments in one graphic.

D
Digital Storage and Retrieval (DSR): a proprietary image file format used to store and retrieve ultrasound images.

F
Finding code: a predefined diagnostic code based on the assessment and diagnosis of a study.

K
Keyboard Entry Measurement: a measurement typed into the application. No measurement is performed.

L
LAX: the long axis view in wall motion scoring.

M
Medical Record Number (MRN): a unique alphanumeric identifier assigned to a specific patient.

P
Pictorial View: a display of miniature images that gives an overview of a study.
Placed Study: a study associated with a specific patient.

R
Reporting Profile: defines the measurements, finding codes, and additional study-specific options that you can see in the user interface.

S
SAX: the short axis view in wall motion scoring.
Section (report template editor): a block of information you can drag into the template preview area to make building a template faster.
Section (Interpret Area Sheet): an area of the user interface that contains one or more finding groups.

**NOTE:** the word “section” can also be used in a general way to point to an area that is part of a larger place.

**U**

Unplaced Study: a study not associated with a specific patient.

**W**

Wall Motion Score Index (WMSI): the sum of all segment scores divided by the total number of scored segments.
## 15 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>BIOS (Basic Input Output System)</td>
</tr>
<tr>
<td>C</td>
<td>CD (Compact Disc)</td>
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<tr>
<td>CT</td>
<td>CT (Computed Tomography)</td>
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<tr>
<td>D</td>
<td>DICOM (Digital Imaging and Communication in Medicine), sometimes referred to as DICOM Standard, or NEMA PS3; defines the protocols used to transfer medical data</td>
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<tr>
<td>DVD</td>
<td>DVD (Digital Versatile Disc)</td>
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<tr>
<td>E</td>
<td>ECG (ElectroCardioGram, also abbreviated as EKG)</td>
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<tr>
<td>EMC</td>
<td>EMC (Electro-Magnetic Compatibility)</td>
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<tr>
<td>EMR</td>
<td>EMR (Electronic Medical Record)</td>
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<tr>
<td>EP</td>
<td>EP (Electrophysiology)</td>
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<tr>
<td>F</td>
<td>FPS (Frames Per Second)</td>
</tr>
</tbody>
</table>
### Abbreviations

**H**
- **HIPAA**
  Health Insurance Portability and Accountability Act

**HIS**
- Hospital Information System

**HL7**
- Health Level 7 - a standard in hospital informatics (HIS)

**HTTP**
- HyperText Transport Protocol

**HTTPS**
- Security-enhanced version of Hypertext Transfer Protocol used on Internet servers that use Secure Sockets Layer (SSL)

**I**
- **IVUS**
  Intravascular Ultrasound

**L**
- **LAN**
  Local Area Network

- **LV**
  Left Ventricle

- **LVA**
  Left Ventricular Analysis. Program for analysis of the left ventricle of the heart

**M**
- **MOD**
  Magneto-Optical Disk

- **MR**
  Magnetic Resonance

- **MRA**
  Magnetic Resonance Angiography
Abbreviations

MRI
Magnetic Resonance Imaging

MRN
Medical Record Number (the patient identification number)

N

NM
Nuclear Medicine

NTP
Network Time Protocol; the standard Internet protocol for synchronizing computer clocks

P

PACS
Picture Archiving and Communication System

PDF
Portable Document Format

PET
Positron Emission Tomography

Q

QCA
Quantitative Coronary Analysis

QVA
Quantitative Vascular Analysis

R

RV
Right Ventricle

S

SAN
Storage Area Network
SPECT
Single Photon Emission Computed Tomography

SSL
Secure Sockets Layer; protocol that ensures privacy between communicating applications and their users on the Internet

T
TAVI
Transcatheter Aortic Valve Implantation

TCP/IP
Transmission Control Protocol/Internet Protocol

U
URL
Uniform Resource Locator; used to indicate an Internet address

US
Ultrasound

UPS
Uninterruptible Power Supply

V
VLAN
Virtual Local Area Network

W
WMSI
Wall Motion Score Index

WW
Window Width

WL
Window Level

X
**XA**

X-ray Angiography
Appendix A: Network Safety, Security, and Privacy

Customer’s Role in the Product Security Partnership

Philips recognizes that the security of Philips Healthcare products is an important part of your facility’s security strategy. However, these benefits can only be realized if you implement a comprehensive, multi-layered strategy (including policies, processes, and technologies) to protect information and systems from external and internal threats.

The customer is responsible for setting up and maintaining a secure and stable IT environment according to general IT standards.

Following industry-standard practice, your strategy should address:

- Physical security (e.g., do not allow unauthorized people to use IntelliSpace Cardiovascular)
- Operational security (e.g., make sure that any sensitive information left on the system—such as exported files—is removed; make sure that users of IntelliSpace Cardiovascular do not leave the open system unattended)
- Procedural security (e.g., create awareness with regard to the dangers of social engineering; every single user should be given a separate account; do not forget to remove an account when it is no longer needed)
- Risk management
- Security policies (e.g., make sure that the IntelliSpace Cardiovascular Service Documentation and media are securely stored)
- Contingency planning.

The practical implementation of technical security elements varies by site and may employ a number of technologies, including firewalls, virus scanning and anti-spyware software, authentication technologies, network segmentation (VLAN—Virtual Local Area Network), etc.

As with any computer-based system, protection must be provided such that firewalls and/or other security devices are in place between the medical system and any externally accessible systems.

Although the system incorporates state-of-the-art protection mechanisms to protect it against the intrusion of malware (for example, viruses), a remote possibility remains that a system can become infected. System safety remains guaranteed in all circumstances, but the user might notice unfamiliar system behavior and/or performance. If this happens repeatedly, e.g. also after the system has been switched off and on again, the user is advised to contact a Philips Healthcare service representative to have the system checked and, if needed, to remove the malware.
The USA Veterans Administration has developed a widely used Medical Device Isolation Architecture for this purpose. Such perimeter and network defenses are essential elements in a comprehensive medical device security strategy.

Additional security and privacy information can be found on the Philips Healthcare product security web site at http://www.philips.com/security:

If you are interested in overviews of validated Security Patches:

- subscribe to the RSS Feed on this subject
- request an account that enables you to download documents illustrating the validation status for IntelliSpace Cardiovascular and other Philips Healthcare products (to do so, navigate to the “Vulnerability Tables” section of the site).

Antivirus software is not provided with the IntelliSpace Cardiovascular system. To protect the data stored in the IntelliSpace Cardiovascular system, Philips recommends that you run antivirus software on any IntelliSpace Cardiovascular server and all workstations, and keep the antivirus software up-to-date on any IntelliSpace Cardiovascular server and all workstations.

**WARNING**

**Philips Healthcare is not responsible for the installation or maintenance of antivirus software or for the integrity of the IntelliSpace Cardiovascular system infected with a computer virus.**

Philips Healthcare has qualified the following antivirus applications as being compatible with the IntelliSpace Cardiovascular software:

- McAfee VirusScan

Contact your Philips Healthcare service representative for information about qualified versions and configuring these applications so they do not affect IntelliSpace Cardiovascular functionality or performance. For more details on security, please refer to the Appendix, Network safety, security and privacy in the Systems Administrator Guide.

**WARNINGS**

- **When disposing of the hard drive, erase all sensitive privacy information.**
- **Media such as CDs, DVDs, and printouts need to be disposed of in a secure manner when they are no longer needed, since they might contain sensitive privacy information.**
- **It is the responsibility of the users to keep their password secret.**
- **It is advised to use SSL or TLS to secure the communications over TCP/IP networks.**
- **The usage of a wireless LAN is not part of an approved IntelliSpace Cardiovascular configuration. However if a Wireless LAN is used, it is advised to use a secure and encrypted connection.**
- **It is advised to enable Windows Auditing and to inspect the audit log file on a regular basis to detect possible security threats.**
- **Users should guard their sessions and log off when they leave the IntelliSpace Cardiovascular Server and Workstation.**
- **Keep rooms where IntelliSpace Cardiovascular Server or Workstation are located locked.**
• Make sure that in the BIOS of the IntelliSpace Cardiovascular Server and Workstation the option to boot from CD is disabled.
• Make sure that a BIOS password is configured for the IntelliSpace Cardiovascular Server and Workstation.
• It is the responsibility of the user to guard removable media at all times.
• Make sure (patient) data is encrypted before transporting it out of the hospital facility.
• It is recommended to apply the appropriate OS hardening for the Microsoft Windows platform and the appropriate hardening for Microsoft Enterprise Services (e.g. IIS) before using the product as described in the installation instructions.
• Philips recommends installing the validated and published security patches.
• Philips recommends making backup copies of configuration data, the database, and the archive as described in the System Administrator’s Guide.
• Trained users are recommended to be careful when deleting patient or study data.
• External circumstances can influence the availability of the clinical data, e.g. network failure, power failures, environmental disasters, etc.

Security and Privacy Requirements

It is the policy of Philips Healthcare to adhere to all the required standards and regulations. To assist the hospital in fulfilling the Health Insurance Portability and Accountability Act (HIPAA) requirements, introduced by the United States Department of Health and Human Services, the following functionality has been added to the IntelliSpace Cardiovascular system:

Access Control

Intended to restrict access to the system to authorized users only:

• customizable on/off, a user Log-on/Log-off procedure is required to gain access to the system. Take care that a suitable password procedure is used to log on to your IT equipment, for instance:
  – use a mixture of upper- and lower-case letters, digits, and special characters
  – change the password frequently
• access to the system is granted according to a customizable list of authorized users.

Audit Trail

Required to log user activities which are critical to information security:

• applies to logging-on, reading and/or modifying clinical information
• requires that means be provided for auto-backup on a hospital server, for example the use of an external standard ‘Syslog’ server.
Network Time Synchronization

Intended to synchronize system time to an external time-standard:

- uses a standard Network Time Protocol (NTP).
- the coupling is configured by Field Service during system installation.

Computer systems cannot be guaranteed to be safe in an insecure network. The user should provide some level of network protection e.g. installing firewalls.

Secure Sockets Layer

Ensure the utilization of a secured network connection by using the SSL protocol.

When using the Internet, user credentials and URLs (the latter can contain privacy sensitive information), be aware that this information is transmitted in plain text if no security provisions are implemented. The standard used HTTP protocol does not implement any security control. Therefore all information transferred via this protocol can be intercepted and used for unauthorized purposes.

This can be easily solved by utilizing the HTTPS protocol which requires a SSL Certificate to be installed and used on the system. The installation and configuration instructions for this certificate are mentioned in the Release Manual accompanying the product. It is strongly advised to use this SSL feature since it will ensure that data being transferred over a network, be it the LAN or the Internet, is encrypted and as such the confidentiality of any sensitive information is preserved.

Field Service

Field Service is used to enable the following configuration items based on information supplied by the hospital:

- authentication and encryption
- time synchronization
- configuration of the 'Syslog' server
- configuration of any other programs

HIPAA Security and Privacy rules

HIPAA defines a number of physical and technical safeguards which are either required or addressable. Some features, that could implement these functions, are differently implemented or not implemented, for reasons mentioned below:

Backup Procedure

It is not the intended use of the system to permanently store electronic personal health information. Information should be exported to a storage device as soon as possible.
Emergency Access Procedure

The system supports a generic emergency account. However, the user should be aware that the knowledge of this generic account and access to the system should be restricted to avoid unwanted access to electronic personal health information.

Automatic Logoff

The system supports automatic activation of the logoff function with administrator adjustable expiration time.

Screen Blanking

The system supports manual and automatic blanking of displays to prevent casual viewing of electronic personal health information. The system also supports password protection to prevent any unauthorized access (i.e., screen lock).
## Appendix B: Study Types, Categories, and Modalities

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<th>Abbreviation</th>
<th>Category</th>
<th>Modality</th>
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<td>MS_Ivc_Iliac_V</td>
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<td>MS LE Raynauds</td>
<td>MS_LE_Raynauds</td>
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<td>MS LE Saph Vein Map</td>
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<td>MS LE Segmental With Digit</td>
<td>MS_LE_Segmental</td>
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<td>MS Lower Extremity Arterial</td>
<td>MS_Art_Low_Extr</td>
<td>3 (Vascular)</td>
<td>US</td>
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<tr>
<td>MS Lower Extremity Venous</td>
<td>MS_Ven_Low_Extr</td>
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<td>US</td>
</tr>
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Appendix C: Icon Functions

Applets Toolbar

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
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<tbody>
<tr>
<td>🔄</td>
<td>Swap applets</td>
</tr>
<tr>
<td>🕯</td>
<td>Minimize applets</td>
</tr>
<tr>
<td>🧿</td>
<td>Maximize applet</td>
</tr>
<tr>
<td>🙉</td>
<td>Pop out applet</td>
</tr>
<tr>
<td>🗺</td>
<td>Collapse applet</td>
</tr>
<tr>
<td>⬅️</td>
<td>Expand applet</td>
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Home Tab: Search/Worklists

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<tr>
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<td>Filtered Worklist (Study, Patient or Private)</td>
</tr>
<tr>
<td>🔗</td>
<td>Links patients on a Patient Worklist and the Patient Search tab</td>
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<tr>
<td>🔒</td>
<td>Modify</td>
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<tr>
<td>📌</td>
<td>Study Worklist</td>
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<tr>
<td>🧥</td>
<td>Patient Worklist</td>
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<td>🏡</td>
<td>Private Worklist</td>
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Settings

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<tr>
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<td>Settings</td>
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<tr>
<td>🧧</td>
<td>New Group/Add/New Application</td>
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<tr>
<td>Icon</td>
<td>Function</td>
</tr>
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<td>----------</td>
</tr>
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<td>✍️</td>
<td>Edit</td>
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<td>🗑</td>
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**Patient Tab: Cardiology Timeline Toolbar**

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<tr>
<td>⏪</td>
<td>Go to first or last procedure, depending on timeline setting (ascending or descending)</td>
</tr>
<tr>
<td>⏪</td>
<td>Go to previous or next procedure, depending on timeline setting (ascending or descending)</td>
</tr>
<tr>
<td>⏪</td>
<td>Go to next or previous procedure, depending on timeline setting (ascending or descending)</td>
</tr>
<tr>
<td>⏪</td>
<td>Go to last or first procedure, depending on timeline setting (ascending or descending)</td>
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**Patient Tab: Cardiology Timeline Study Categories**

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<td>16</td>
<td>☦</td>
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<td>☦</td>
<td>EP</td>
<td>19</td>
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<td>Inv vascular</td>
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<td>CT</td>
<td>21</td>
<td>☦</td>
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<td>9</td>
<td>☦</td>
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## Image Viewer Applet

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<td><img src="image" alt="Fit width" /></td>
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<td><img src="image" alt="Rotate counter-clockwise" /></td>
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<td>Mirror</td>
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<tr>
<td><img src="image" alt="Add or remove image row" /></td>
<td>Add or remove image row</td>
<td><img src="image" alt="Add or remove image column" /></td>
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<td>Set tiling for up to 4x4 images</td>
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<td>View a series of MR, CT, or NM studies in their default order or sort them by phase, slice, bin, or frame</td>
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<td>graphic information</td>
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<td>Display or hide image information</td>
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<td>Display ECG curve</td>
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<td>Save and add image to list of images to be saved</td>
</tr>
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<td>Clear list of saved images</td>
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### Appendix C: Icon Functions

<table>
<thead>
<tr>
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<td>Previous and next color map</td>
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<td>Reset all image viewing settings</td>
<td><img src="image4.png" alt="Icon" /></td>
<td>Stack of images</td>
</tr>
<tr>
<td><img src="image5.png" alt="Icon" /></td>
<td>Viewing protocol</td>
<td><img src="image6.png" alt="Icon" /></td>
<td>Pictorials of series/runs/loops/images that have been viewed</td>
</tr>
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<td><img src="image8.png" alt="Icon" /></td>
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</tr>
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<td>Pause movie</td>
</tr>
<tr>
<td>Use slider</td>
<td>Decrease frame rate</td>
<td>Use slider</td>
<td>Increase frame rate</td>
</tr>
<tr>
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<td>Reset frame rate</td>
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<td>Cycle study</td>
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<td>Next series</td>
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<td><img src="image17.png" alt="Icon" /></td>
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### Additional Image Viewer Functions (using the mouse)

<table>
<thead>
<tr>
<th>Mouse button (click and hold)</th>
<th>Pointer image changes to:</th>
<th>Drag the mouse to:</th>
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<tr>
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<td>Scroll (default)</td>
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<tr>
<td></td>
<td></td>
<td>NOTE: To use the left mouse button for other functions listed in this table, select the appropriate icon in the toolbar</td>
</tr>
<tr>
<td>Middle</td>
<td><img src="image19.png" alt="Icon" /></td>
<td>Gray level adjustment</td>
</tr>
<tr>
<td>Left + middle</td>
<td><img src="image20.png" alt="Icon" /></td>
<td>Pan</td>
</tr>
<tr>
<td>Left + right</td>
<td><img src="image21.png" alt="Icon" /></td>
<td>Edge enhancement</td>
</tr>
<tr>
<td>Middle + right</td>
<td><img src="image22.png" alt="Icon" /></td>
<td>Zoom</td>
</tr>
</tbody>
</table>
Appendix D: References

About References

This section lists references for the set of standard IntelliSpace Cardiovascular measurements and calculations. For more detail on the complete set of measurements and calculations available with IntelliSpace Cardiovascular, including the formula used in the calculation, see the Measurement Configuration Tool.

The set of measurements and calculations can be customized; therefore, your configuration might not have the complete set. See your system administrator for questions or for more information.

For a complete listing of all the default cardiac and vascular ultrasound measurements, see the Measurement Configuration Tool. See your system administrator for questions or for more information.

Mathematical Quantities Calculated from Primitives

Philips Healthcare performs software testing to validate that measurement values and calculations are implemented as specified. Velocity is validated using a frequency generator and a cosine multiplication table. Slope calculations are validated using a calculator.

This section provides information about the following types of measurements:

- Acceleration
- Area
- Circumference
- Mean Pressure Gradient
- Method of Discs Biplane Method
- Method of Discs Ellipsoid-Single-Plane Method
- Slope
- Velocity
- Velocity-Time Integral
- Volume

Acceleration

The Doppler spectral acceleration measurement is derived from the change in velocity divided by the change in time, using the simple slope formula.

\[ \frac{\Delta v}{\Delta t} \]
where $\Delta V$ is the change in vertical dimension Doppler velocity (cm/sec) and $\Delta t$ is the time interval change (sec).

**Area**

The area measurement is derived using the length measurement primitive. Green’s Theorem is used to calculate the area.

The clinical accuracy of area measurements is highly dependent on the ability of the operator to accurately trace the area of interest.

The following formula calculates the area ($A$):

$$\frac{1}{2} \sum_{i=1}^{N-1} X_i(Y_i - Y_{i-1}) - Y_i(X_i - X_{i-1})$$

**Circumference**

The circumferential area measurement is derived using the length measurement primitive. Green’s Theorem is used to calculate the area.

The clinical accuracy of circumference measurements is highly dependent on the ability of the operator to accurately trace the area of interest.

The following formula calculates the circumference ($C$):

$$L_{N,1} + \sum_{i=1}^{N-1} L_{i, i+1}$$

where $L_{i, i+1}$ is the line segment length between point $i$ and point $i + 1$, and where $N$ is the total number of points in the enclosed shape.
NOTE
The points on the circumference are assumed to be traced so closely that the traced contour closely approximates the real circumference.

Mean Pressure Gradient
The mean pressure gradient measurement (\(PG_{\text{mean}}\)) is proportional to the integral of the square of the Doppler spectral instantaneous velocity (\(V_i\)) over time (\(t_i\)). The integral is approximated by the following sum:

\[
PG_{\text{mean}} = \frac{4}{10,000T} \sum_{i=1}^{N} V_i^2 \times t_i
\]

where \(T\) is the total time interval (the sum of all \(t_i\) time increments), 4 is the approximate units conversion factor for the Bernoulli equation, and 10,000 is the scaling factor from centimeters to meters squared.

Method of Discs Biplane Method
The Method of Discs (MOD) biplane volume calculation uses two orthogonal-plane, apical-view area traces (one using the two-chamber apical view and the other using the four-chamber apical view) and a long-axis view (the longest of the two long axes). The area traces are divided into 20 elliptical disk segments.

Method of Discs Ellipsoid-Single-Plane Method
IntelliSpace Cardiovascular includes Method of Discs ellipsoid-single-plane methods for apical, two-chamber view measurements and apical, four-chamber view measurements. The distinction was not necessary for the non-MOD single-plane ellipse, the biplane ellipse, and the bullet volume calculations. The area traces are divided into 20 circular disk segments.

Slope
The slope and MMode measurements are derived from the length and time measurement primitives using a simple slope formula. The following formula calculates the deceleration measurement:

\[
\frac{\Delta v}{\Delta t}
\]
where $\Delta V$ is the change in vertical dimension Doppler velocity (cm/sec) and $\Delta t$ is the time interval change (sec).

**Velocity**

The velocity measurement is derived by multiplying the frequency primitive measurement and the cosine of the angle of blood flow.

**Velocity-Time Integral**

The velocity-time integral (or flow integral) measurement is the integral of the Doppler spectral instantaneous velocity ($V_i$) over the total time interval (T, the sum of all ti time increments). The integral is approximated by the following formula:

$$V_{TI} = \sum_{i=1}^{N} V_i \times t_i$$

**Volume**

The volume is calculated using either the Method of Discs (MOD) or Single-Plane Ellipse method (Area–Length). These methods are illustrated in the following figure:

- **MOD Calculation**
  
  $$V = \frac{\pi L}{4n} \sum_{i=1}^{n} a_{di}^2$$

- **Single-Plane Ellipse Method Calculation**
  
  $$V = \frac{8A^2}{3\pi L}$$
## Measurements Common to 2D Mode and MMode

The following table lists measurements common to 2D mode and MMode, and the first-level calculations dependent on those measurements:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Dependent Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS</td>
<td>None</td>
</tr>
<tr>
<td>Ao root diam</td>
<td>Ao root area, LA/Ao, Qp/Qs (V, Ao)</td>
</tr>
<tr>
<td>IVSd</td>
<td>%IVS thick, IVS/LVPW, LVmass (C)d</td>
</tr>
<tr>
<td>IVSs</td>
<td>%IVS thick, LVmass (C)s</td>
</tr>
<tr>
<td>LA dimension</td>
<td>LA/Ao</td>
</tr>
<tr>
<td>LVId</td>
<td>EDV (bp-el), EDV (cubed), EDV (Teich), FS, LVmass (C)d, Vcf mean, Vcfc mean</td>
</tr>
<tr>
<td>LVIds</td>
<td>ESV (bp-el), ESV (cubed), ESV (Teich), FS, WS (merid.), LV mass (C)s, Vcf mean, Vcfc mean</td>
</tr>
<tr>
<td>LVOT diam</td>
<td>AVA (I, D), AVA (V, D), LVOT area, Qp/Qs (V, LVOT)</td>
</tr>
<tr>
<td>LVpWd</td>
<td>%LVPW thick, IVS/LVPW, LVmass (C)d</td>
</tr>
<tr>
<td>LVpWs</td>
<td>WS (merid.), %LVPW thick, LVmass (C)s</td>
</tr>
<tr>
<td>RA dimension</td>
<td>None</td>
</tr>
<tr>
<td>RVAW</td>
<td>None</td>
</tr>
<tr>
<td>RVdd</td>
<td>None</td>
</tr>
<tr>
<td>RVds</td>
<td>None</td>
</tr>
</tbody>
</table>

## Unlabeled Measurements

The following table lists unlabeled cardiac and vascular measurements that you can perform with IntelliSpace Cardiovascular.

<table>
<thead>
<tr>
<th>Unlabeled Cardiac Measurement</th>
<th>Use to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D Length</td>
<td>Length (cm) measurement on 2D images.</td>
</tr>
<tr>
<td>2D Trace</td>
<td>Area (cm squared) and circumference (cm) measurements on 2D images.</td>
</tr>
<tr>
<td>2D Volume</td>
<td>Method of discs (MOD) volume (ml) measurement on 2D images.</td>
</tr>
<tr>
<td>Dop Slope</td>
<td>Slope (cm/s) and time seconds) measurements on Doppler images.</td>
</tr>
<tr>
<td>Dop Trace</td>
<td>Mean velocity (cm/s), mean pressure gradient (mmHg), and velocity-time integral (cm) measurements on Doppler images.</td>
</tr>
<tr>
<td>Dop Vel</td>
<td>Peak velocity (cm/s) and peak pressure gradient (mmHg) measurements n Doppler images.</td>
</tr>
<tr>
<td>MMode Slope</td>
<td>Height (cm), time (seconds), and slope (cm/sec) measurements for MMode images.</td>
</tr>
<tr>
<td>Physio Time</td>
<td>Time (seconds) measurements in Physio regions.</td>
</tr>
</tbody>
</table>
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