SIEMENS

Algorithm Validation Toolkit
AVT2EXT

[redacted] **SCR-CMIV**

Image Annotation
User Manual

R1.0

Last Change: 2010-04-23

CMIV

SCR-CMIV

Archive: Date	Signature	Doc-Number	Doc-Type:	Doc-Part	Doc-Version	Misc
		r0.3	**ASD**	**01S**	**03**	**Draft**

Author		**Approved by**	
Name/Dept.:	CMIV /SCR-IM.....	Name/Dept.:	.....
Date:	.....	Date:	.....
Signature:	.....	Signature:	.....

History

Document History

Version/ Status	Date of Issue	Author	Change and Reason of Change / Change Request/CHARM
0.1 Draft		Haibin Huang	First draft
0.2		Dongjiao Lv	Revision based on revision 556
0.2.1		Jie Zheng	Formatting

History of released Versions

Version	Release date	Product Version

Table of Contents

1 Introduction

Validity of this Document

This document is only valid for the Image Annotation Application revision 556.

Safekeeping of User Documentation

Always store User Documentation in an easily accessible location in the vicinity of the system.

Conventions Used in This User Manual

The following conventions are used in this *User Manual*:

- A command followed by the > sign indicates that the command has subcommands. For example, Filter > Gaussian.
- The names of workflow functions, pages, browsers, menus, buttons, and dialog boxes appear in bold type. For example:
  - On the **Patient** menu, click **Export**, and then click **OK**.
- Buttons are represented pictorially in procedures, as appropriate.
- Names and Parameters: All parameters and images shown in this document are examples. Only the parameters displayed by the application are valid. Configuration-dependent designations, such as names of drives, network nodes, and databases used in this document, are usually not the same as the designations to be found on a particular installation of the application.

2 Getting Started

Application Startup

Before you start IA application, make sure that the following requirements are met.

- Installation of Java 6 SDK preferably jdk1.6.0_10 or later

  NOTE: AVT/XIP does not appear to be compatible with 64bit installations of Java. Download the 32bit version and be sure you also set your JAVA_HOME variable to point to the 32bit version if you have more than one version of Java installed.
- Graphics card supporting OpenGL 2.0 with hardware shaders
- Minimum 1280x1024 pixel display
- 256MB graphics memory required (512MB preferred)
- DB2 Express C 9.7 from http://www-01.ibm.com/software/data/db2/express/ (version 9.5 or later may work).

If your OS is Windows XP, please change to Windows Classic theme.

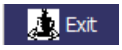
Start up IA

1. Click the **AVT** startup icon to start the XIP Host;
2. In the AD tab-card, enter the query criteria;
3. Click **Search AD**;
4. Expand the results tree until one or more series are displayed.
5. Check the checkbox in front of the (one) selected **series** in the queried results;
6. Check the **Series** box above the **Retrieve** button;
7. Click **Retrieve;**
8. After all the files have been listed in the left pane of window, click "**IA**" to open the **IA** application;

-or-

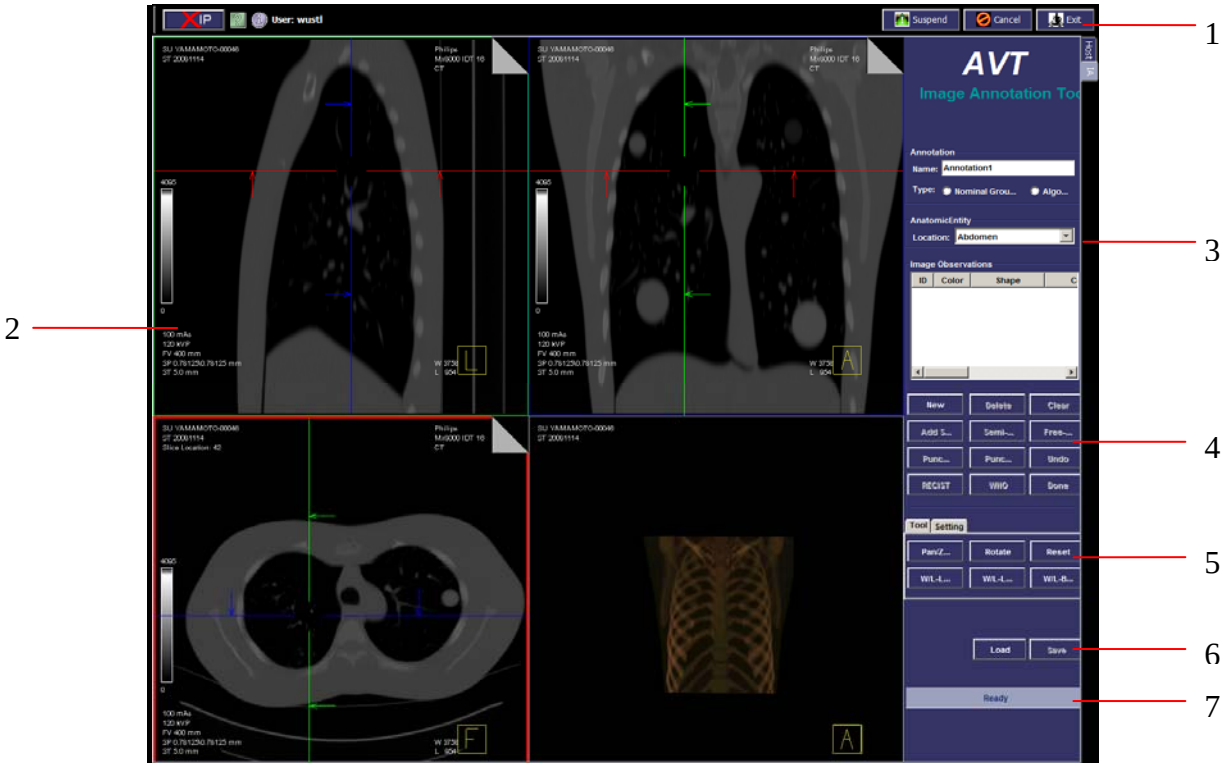
1. Click the **AVT** startup icon to start the main programmer;
2. Click "**C:**" in the upper right corner of **AVT** interface to load DICOM image files from the local folder;
3. After all the files have been listed in the left pane of window, click "**IA**" to open the **IA** application.

Application Exit

Exit the IA application by clicking the  button at the upper right corner of the screen.

3 User Interface

Figure 1: Main user interface



Legend No.	Area on the Interface	Description
1	System bar	The control panel of XIP Host
2	MPR view and volume rendering view	Three MPR views, including axial, sagittal and coronal views with special controls, such as dog ears to navigate through the series. Volume rendering view contains the fused image of series data and annotated ROI.
3	Annotation setting panel	Panel to define the annotation attributes
4	Image observation panel	Panel to define the image observations
5	Tools/Settings panel	Controls for tools and setting, including Pan/Zoom, Rotate, Reset, window size and level and image layout.

6	Load/Save panel	Load or save the results in Image observation list
7	Status bar	Show current working status of IA

Mouse Events

The application can use either a two button mouse or a three button mouse with the following mouse button associations.

Mouse Event	Location	Function
Left-Click	Quadrant	Select the active quadrant
Right-Click	Quadrant	Select the active quadrant
Left-Drag	Coordinate[1]	Move the coordinate
Left-Drag	Near image border	Zoom in/out images
Left-Drag	Image center	Move the image
Left-Click	Dog-ear controls	Change image slices
Right-Drag	Image	Adjust the window size and window level

The mouse cursor is used to indicate the current context. The cursors are described as follows.

Function button	Mouse cursor
Add Seed	
Free-hand	
Punch IN	
Punch OUT	

[1] "Coordinate" is also known as "Cross-hair"

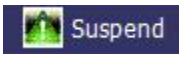
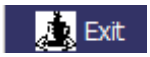
RECIST	
WHO	
Pan/Zoom	
Rotate	

4 Functions Overview

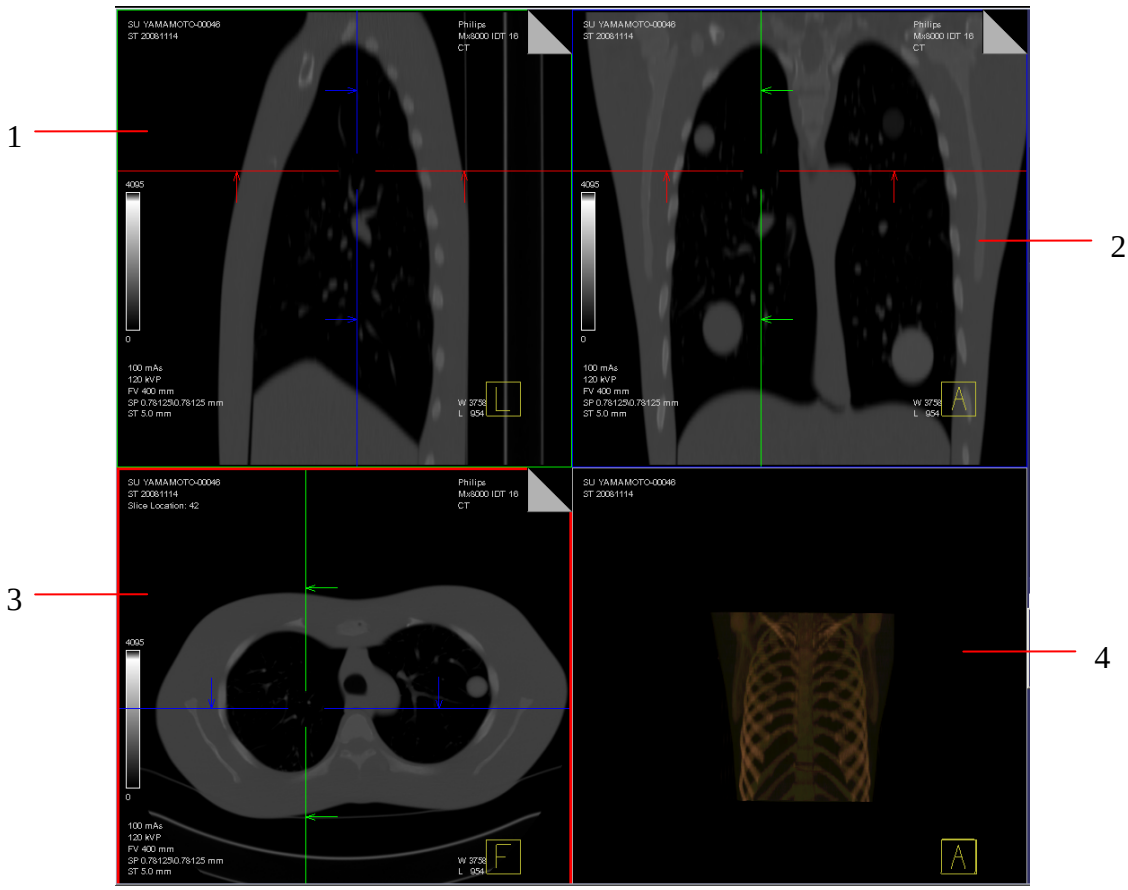
In the following chapter, you can find descriptions for all functions for the IA module of the AVT image annotation tool.

4.1 System bar

The system bar provides commands for loading and system command

	Return to XIP Host™ interface
	Display the XIP help content in command window
	Display XIP information (version, developer, contact)
	Suspend the currently-displayed application
	Cancel the currently-displayed application
	Exit currently-displayed application, or if none, XIP Host™

4.2 Image views



Quadrant	Description
1	Sagittal plane of anatomic entity
2	Coronal plane of anatomic entity
3	Axial plane of anatomic entity
4	3D volume rendering of anatomic entity

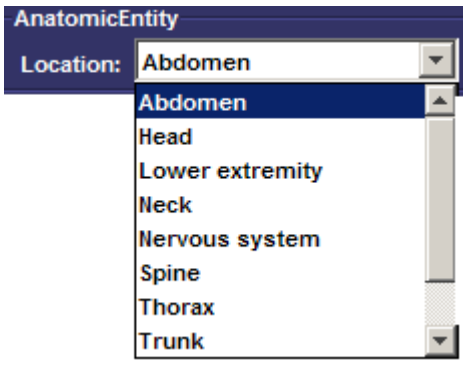
4.3 Annotation setting panel

4.3.1 Annotation type

The name entered here will be used both as the name of the annotation as a whole and the name of the reader creating the annotation.

The choice between Nominal Ground Truth and Algorithm is currently not used.

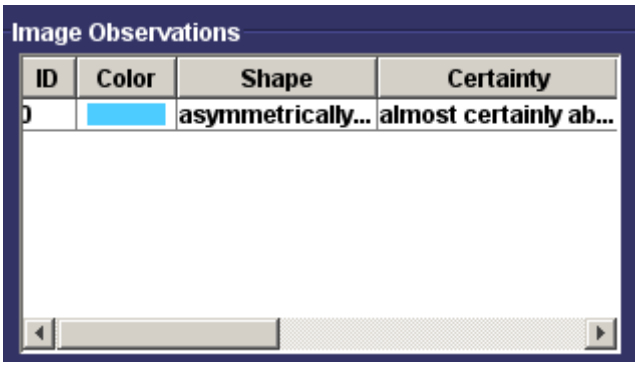
4.3.2 Anatomic entity



The anatomic entity selection indicates where the tumor is found..

4.3.3 Image observations

Each row of the table captures one lesion observation.



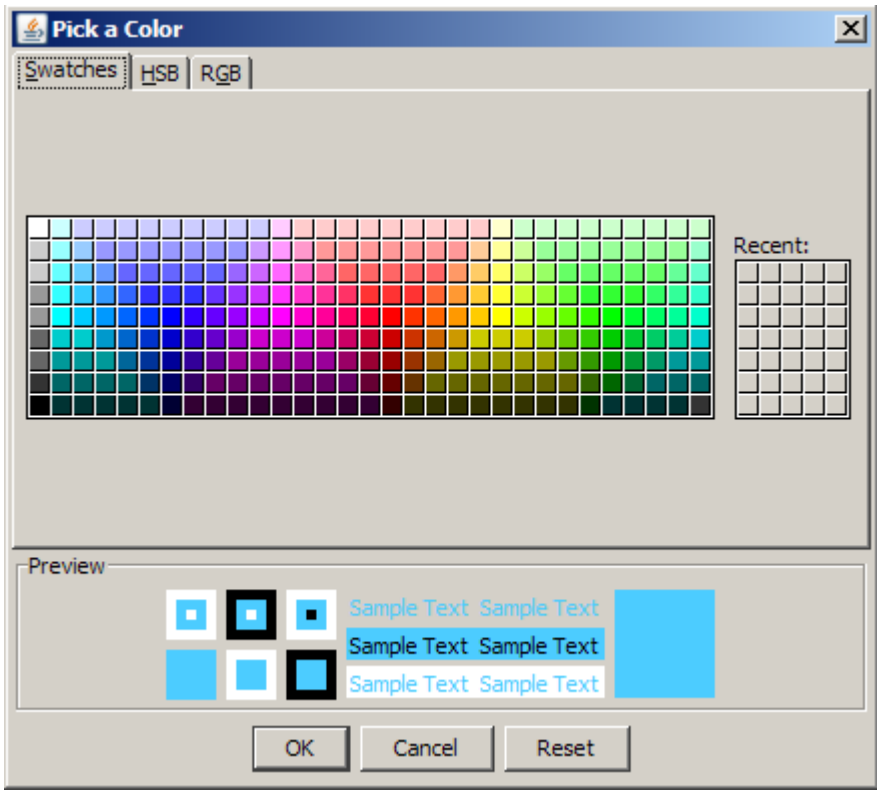
Item	Description
ID	Lesion ID
Color	Color used to annotate lesion
Shape	Lesion shape
Certainty	Confidence level
RECIST(mm)	RECIST measurement of lesion

WHO(mm2)	WHO measurement of lesion
Volume(ml)	Lesion volume
Comment	Notes in case needed

- **Pick a Color Dialog**

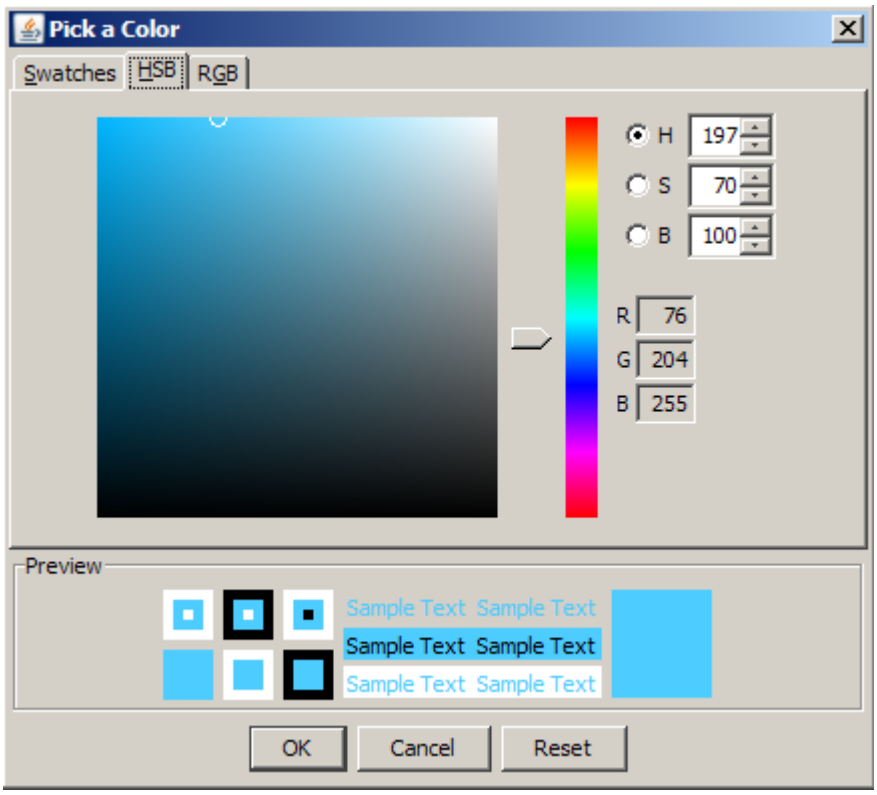
  In the **Image Observations** panel, click the **Color** cell,

  - The **Pick a Color** Dialog box opens.

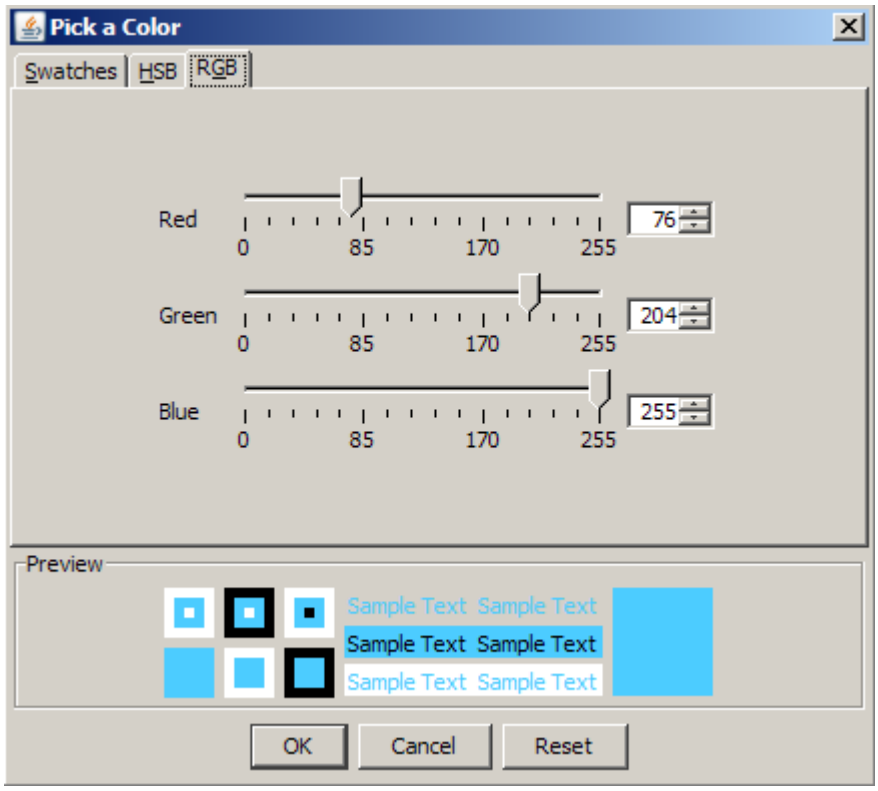


Item	Description
Color mosaic	Color mosaic for color picking
Preview	Preview of the sample text
Recent	Show recently picked color
OK	Confirm the color picking
Cancel	Close the Pick a Color dialog without doing anything
Reset	Reset the color to the default one

- Click **HSB** card, you can pick a color using the Hue, Saturation, and Brightness values



Item	Description
Color panel	Color panel for color picking
HSB	Specify the value of each of the color component in the HSB space
RGB	Specify the value of each of the color component in the RGB space
OK	Confirm the color picking
Cancel	Close the Pick a Color dialog without doing anything
Reset	Reset the color to the default one

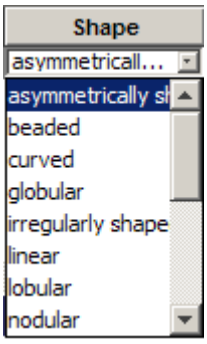


Item	Description
Red	Set the value of the “Red” component
Green	Set the value of the “Green” component
Blue	Set the value of the “Blue” component
OK	Confirm the color picking
Cancel	Close the Pick a Color dialog without doing anything
Reset	Reset the color to the default one

- **Shape**

  In the **Image Observations** panel, click the **Shape** cell,

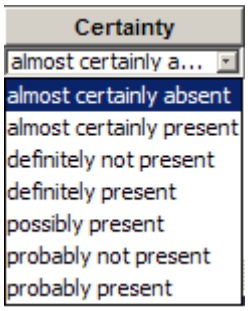
  - The popup menu **Shape** will be popped up.
  - (The choices include both shape characteristics and margin characteristics, but you can only choose one.)



- **Certainty**

  In the **Image Observations** panel, click the **Certainty** cell,

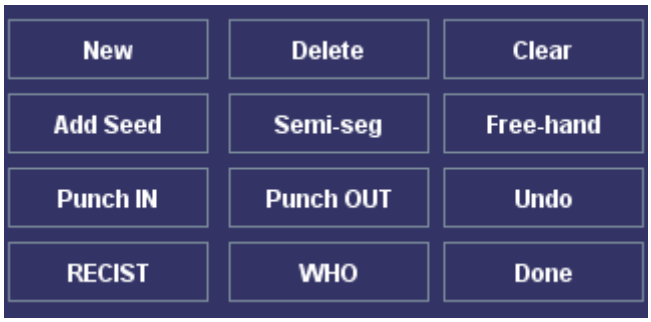
  - The popup menu **Certainty** will be opened.



- choose the phrase that best captures how confident you are that a tumor is present..

4.4 Annotation controls

With the main control buttons, you can start a new annotation, semi-automatically segment a lesion, edit the lesion contours, define RECIST and WHO for the lesion and calculate the lesion volume.



Item	Description
New	Start a new observation, this will activate other buttons such

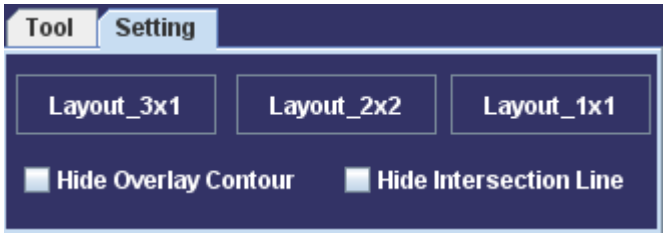
	as “**Delete**”, “**Clear**” and “**Add Seed**”
Delete	Delete an observation. You need to select the one you want to delete before this action. You can only delete one observation at a time
Clear	Clear the observation results, including the boundaries, RECIST, WHO, and volume measurements
Semi-seg	Start the semi-automatic segmentation algorithm after seed points are selected. Click on the **Semi-seg** button will activate the buttons listed below.
Free-hand	Edit the contour of the lesion in freehand mode.
Punch IN	Add the interior of the drawn contour to the interior of the lesion contour.
Punch OUT	Subtract the interior of the drawn contour from the interior of the lesion contour.
Undo	Undo the last modification of the editing
RECIST	Define the RECIST measurement for the lesion by drawing a line segment inside the lesion
WHO	Define the WHO measurement for the lesion by drawing two perpendicular line segments inside the lesion
Done	Update the RECIST, WHO and Volume measurements in the “Image Observations”

4.5 Tools/Settings

- The **Tools** provides tools to pan/zoom, rotate, reset the image orientation, and view images using Liver/Lung/Bone window/level settings.

Item	Description
Pan/Zoom	Tool for image panning or zooming
Rotate	Tool for image rotation
Reset	Reset the pan/zoom settings to what they were when the image was first loaded.
W/L-Liver	Window/level setting for optimized display of liver CT images
W/L-Lung	Window/level setting for optimized display of lung CT images
W/L-Bone	Window/level setting for optimized display of bone CT images

- The **Setting** provides controls for image layout and commands to display/hide overlay contours, intersection lines.



Item	Description
Layout 3×1	Display layout for 3×1 with the currently-selected image quadrant in the largest quadrant
Layout 2×2	Display layout for 2×2.
Layout 1×1	Display only the currently-selected image quadrant
Hide Overlay Contour	Checkbox to display/hide overlaid contours
Hide Intersection Lines	Checkbox to display/hide intersection lines

4.6 Load/Save

Item	Description
Load	Load existing annotation results from local folder
Save	Store current annotation results in image observation list to XIP Host™ via WG-23 interface

Copyright © Siemens AG 2010, 2010. All rights reserved. For internal use only.
Alle Rechte vorbehalten. Nur f 黯 internen Gebrauch.