

VistA Imaging Exchange (VIX) Enhancements

MAG*3.0*348

Enhanced Image Viewer User Guide



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1. Introduction

1.1. Purpose

This manual describes the "Viewer" web application which is also known as the:

- Central VistA Imaging Exchange (CVIX) Viewer
- Enhanced Image Viewer
- Image Viewer
- VistA Imaging Exchange (VIX) Viewer
- VistA Imaging Viewer

The Viewer displays and provides tools for clinical and medical media in web applications like the Joint Legacy Viewer (JLV). The media can be:

- Audios
- Data
- Documents – Typically medical reports with extensions of DOC, Portable Document Format (PDF), Rich Text Format (RTF), and Text format (TXT)
- Images
 - Digital Imaging and Communications in Medicine (DICOM)
 - Non-DICOM, such as Joint Photographic Experts Group (JPEG) and Tag Image File Format (TIFF)
- Videos

To keep things simple, henceforth in this document, we use the term images to identify all media types unless a specific type is applicable. We also use the term VIX to mean CVIX or VIX.

This manual assumes you are familiar with web applications. This manual also assumes you are using the Viewer with the latest release level. The release level appears on this document's cover page and at the top of its Revision History page. Section 5 describes how to see the complete release number on the main Viewer page.

1.2. Document Orientation

1.2.1. Organization of the Manual

This document contains the following sections to assist you in using the Viewer:

- **Section 1 – Introduction**
Describes the document and helps you to follow the document.
- **Section 2 – System Summary**
Describes a summary of the Viewer.
- **Section 3 – Getting Started**
Describes a quick overview to start using the Viewer.

- **Section 4 – Using the Software**

Describes in-depth instructions how to use the Viewer. References the main and image navigation toolbars and buttons and explains how to close the Viewer. Describes how to use the Quality Assurance features of the Viewer.

- **Section 5 – Troubleshooting**

Describes how to access some of the information contained in the Viewer. The information assists you in troubleshooting some issues that might occur when using the Viewer.

- **Section 6 - Acronyms**

Defines the Acronyms and Terms used and referenced in this document.

1.2.2. Assumptions

The user has been provided the appropriate active roles, menus, and security keys required for the VIX Viewer. Also, the user has basic knowledge of the use of a web browser, menu options, and navigation tools.

1.2.3. Coordination

Use of the Viewer is subject to the following provisions:



Caution: Federal law restricts this device to use by or on the order of either a licensed practitioner or persons lawfully engaged in the manufacture or distribution of the product.



The Viewer is not intended for the primary interpretation of radiology exams. When the Viewer installs on approved and properly maintained hardware, primary interpretation of other image types is permissible by licensed practitioners at their discretion.



The Food and Drug Administration (FDA) classifies VistA Imaging and the Viewer (as a component of VistA Imaging) as a medical device. Unauthorized modification to VistA Imaging, including the Viewer, such as installing unapproved software, adulterates the medical device. The use of an adulterated medical device violates US federal law (21CFR820).

1.2.4. Disclaimers

This is a controlled document. No changes to this document may be made without the express written consent of the VistA Imaging Office of Enterprise Development group.

While every effort has been made to assure the accuracy of the information provided, this document might include technical inaccuracies and/or typographical errors. Changes are periodically made to the information herein and incorporated into new editions of this document. Product names mentioned in this document might be

trademarks or registered trademarks of their respective companies and are hereby acknowledged.

- VistA Imaging Office of Enterprise Development Department of Veterans Affairs
- Internet: <http://www.va.gov/imaging>
- Imaging VistA Imaging SharePoint:
<http://vaww.oed.portal.va.gov/applications/VistAimaging/default.aspx>

1.2.4.1. Software Disclaimer


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1.2.4.2. Documentation Disclaimer

The appearance of external hyperlink references in this manual does not constitute an endorsement by the VA of the website or the information, products, or services contained therein. The VA does not exercise any editorial control over the information you may find at these locations. Such links are provided and are consistent with the stated purpose of the VA.

1.2.5. Documentation Conventions

This document uses the following conventions:

- Button names, menu names, and menu option names are shown in **Bold**.
- A vertical bar is used to separate menu choices. For example: "Click **File | Open**" means: "Click the **File** menu, then click the **Open** option."
- Keyboard shortcuts are shown like **Ctrl+C** which means to press the control (Ctrl) key on your keyboard, keep it pressed, and press the C key.
- When this document is used online, hyperlinks are indicated by [blue text](#).
- Useful or supplementary information is shown in a **Tip**. Important or required information is shown in a **NOTE**.
- Critical information is indicated by: 

1.2.6. References and Resources

Additional information about VistA Imaging can be found at:

- VistA Imaging: <http://www.va.gov/vdl/application.asp?appid=105>

1.3. Enterprise Service Desk and Organizational Contacts

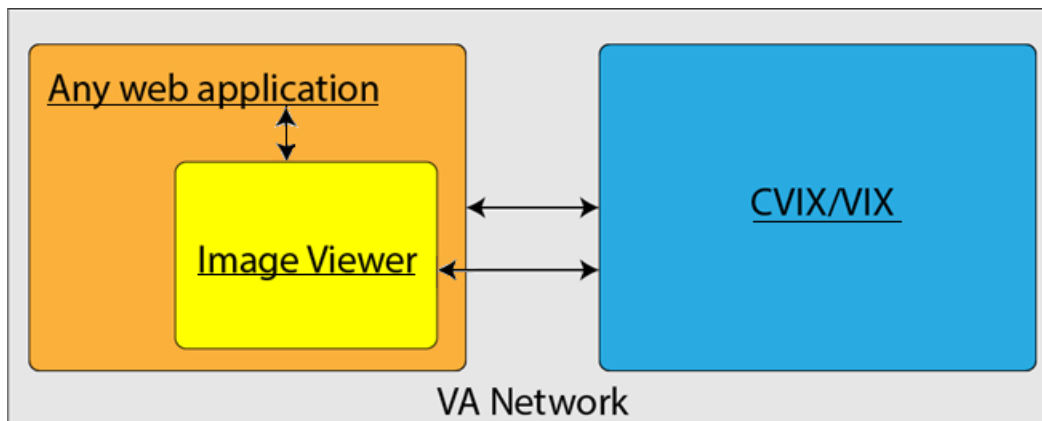
If you encounter any problems using the Viewer, contact your local Imaging Coordinator or support staff. If the problem cannot be resolved locally, use YourIT Service Desk Manager to place a service request, or contact the Enterprise Service Desk at 1-855-673-4357.

2. System Summary

Vista Imaging provides formal authorization to a web application to embed, or host, the Image Viewer. The web-hosting application authorizes users to use its own functions as well as the functions in the Image Viewer.

Web-hosting applications, such as the JLV, embed the Image Viewer (Figure 1) in the host application's web page. The Image Viewer communicates with the CVIX/VIX application. The host application might also directly communicate with the CVIX/VIX application. The Image Viewer operates inside the VA network.

Figure 1: Image Viewer System Summary



2.1. System Configuration

The Viewer adds image display capabilities to web applications in a similar way as the Clinical Display desktop application adds image display capabilities to the Computerized Patient Record System (CPRS).

The Viewer is a web-based application that provides a subset of features of Clinical Display. This means it does not supply all features that Clinical Display offers.

2.2. Data Flows

The Viewer is a web application that enables you to access patient images using VA approved versions of Chrome or Edge.

The Viewer allows users to locate and display any patient images available to the VA from VistA Imaging, including Department of Defense (DoD) images.

2.3. User Access Levels

Users use a service account in VistA with the DICOM VISA [MAG DICOM VISA] and CPRSChart [OR CPRS GUI CHART] secondary menu options, at a minimum, to access the Image Viewer through the web application.

2.4. Continuity of Operation

Since the Viewer is embedded in another application, the Viewer relies on the other application's continuity of operation.

3. Getting Started

After logging into the web-hosting application and selecting a patient study, the hosting application launches the Viewer (Section 4.1) to display the study on its main page (Section 4.2).

3.1. Logging On

To access the Viewer and authenticate, the user logs on through the web-hosting application. The hosting application logs in users to authenticate their credentials by getting a security token. This token is used throughout the Viewer's web pages.

3.2. Exit System

To exit the system, close the Viewer's web pages that are open in the web browser tab(s).

3.3. Caveats and Exceptions

If encountering issues, clear the cache in the web browser for the Viewer, and refresh the page.

4. Using the Software

This section describes how to use the Viewer web application.

4.1. Launching the Viewer

Upon launching the Viewer, the following loading message (Figure 2) displays while the Viewer loads the study's images:

Figure 2: Loading Message

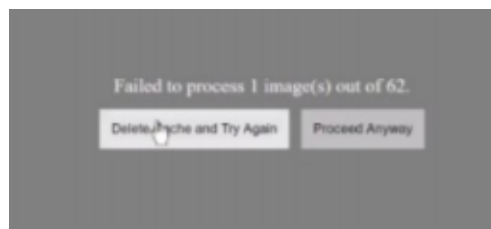


NOTE: The VA's and your network's bandwidth dictate the amount of time it takes to transfer the images. Some images can be very large which usually means they take a while to load, sometimes even minutes. The faster the bandwidth, the faster the computer can transfer data.

The first time a study launches, the Viewer pre-processes the study's images and loads them into a cache on the VIX server. Caching images reduces the load time for later subsequent views.

If there is trouble loading one or more images, the following message displays (Figure 3) with the option to either proceed or empty the cache and try again. If you select proceed, the study loads without the problem images. If you choose to empty the cache and retry, the Viewer attempts to re-process all the images for the study.

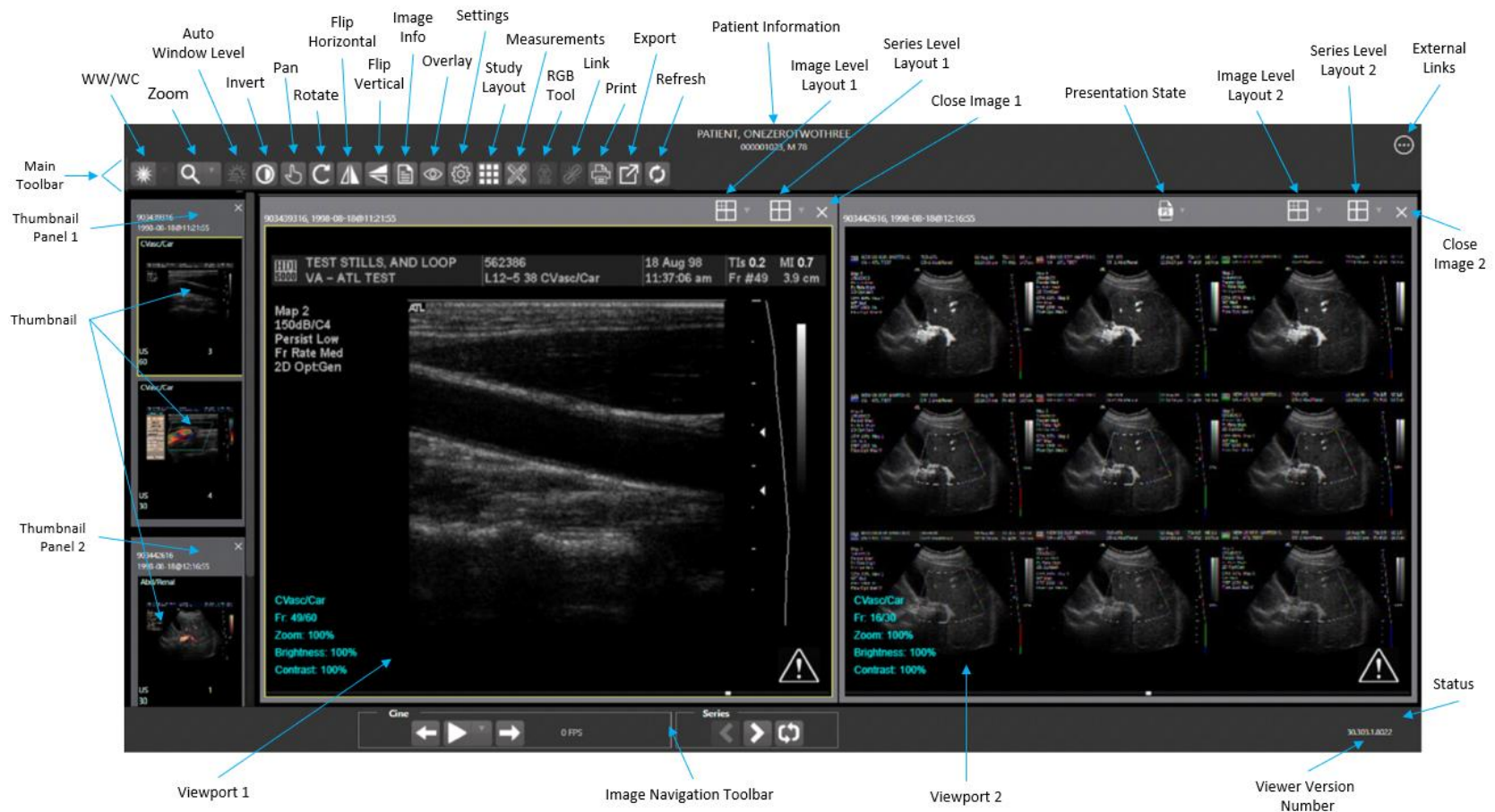
Figure 3: Images Not Loading



4.2. The Main Viewer Page

When the main Viewer page opens, it shows the patient information, main toolbar, external links button, thumbnail panel(s), viewport(s), image navigation toolbar (Section 4.2.2), status, and Viewer version number (Figure 4). The Viewer displays thumbnail placeholders until the thumbnails are retrieved, then displays the images in the viewport(s). Section 4.3.15 describes the components that appear and are enabled according to the active viewport's image as indicated by a yellow outline.

Figure 4: Main Viewer Page



4.2.1. The Main Toolbar

The main toolbar (Figure 5) provides buttons to access the Viewer functions while viewing an image. The Viewer enables (brightens) and disables (grays out, Figure 6) the buttons depending on the image type in the active viewport. See Figure 5 for an image of the toolbar.

Figure 5: Main Toolbar

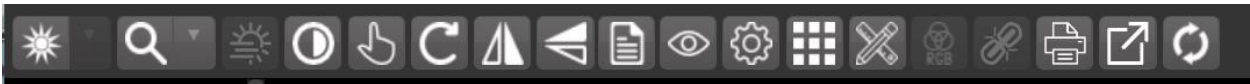











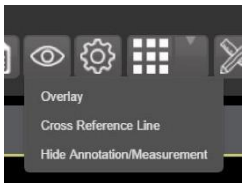


Figure 6: Sample Disabled Toolbar Button









Table 1 describes the functions and uses of each button in the toolbar.

Table 1: Toolbar Icons - Names, Functions, and Descriptions

Button Icon	Button Name and Function	Description
	WW/WC (Window Level)	Manually click and drag an image to make the Viewer alter the grayscale value of the image. For Computerized Tomography (CT) images, a preset dropdown menu displays with the following options: Default (the image as initially loaded and displayed), Abdomen, Bone, Brain, Head/Neck, Lung, and Customize.
	Zoom	Click and drag on an image to zoom in and out. A preset dropdown menu provides the options to resize the image to 100%, or Fit to Window, or Fit Width to Window, or Fit Height to Window, or to Customize the sizing.
	Auto Window Level	Click and drag a rectangular area on an image to adjust the window level based on the image's minimum pixel value.

Button Icon	Button Name and Function	Description
	Invert	Invert an image so that dark is light, and light is dark.
	Pan	Click and drag an image to move its viewing area.
	Rotate	Rotate an image 90 degrees clockwise.
	Flip Horizontal	Flip an image horizontally.
	Flip Vertical	Flip an image vertically.
	View Image Info	Display an image's DICOM attributes and metadata.
	Overlay	Toggle the overlay on and off. The Cross Reference Line option toggles the scout lines on and off. The Hide Annotation/Measurement option toggles the annotations and measurements on the image. The 6000 Overlay option appears when the image contains a 6000 Overlay and toggles its display on and off.
	Settings	Set the Electrocardiogram (ECG), Annotation, Cine, and Layout Preferences. For more information on the settings, see Sections 4.3.3 and 4.3.10.
	Study Level Layout	Set the layout for displaying the study's viewports to 1x1, 1x2, 1x3, 2x1, 2x2, 2x3, 3x1, 3x2, or 3x3 tiles.

Button Icon	Button Name and Function	Description
	Measurements	Measure the 2D Length, the Angle Tool, 2D Point, 2D Length Calibration, or Delete All according to Section 4.3.13.
	RGB Tool	Access the Red Green Blue (RGB) Tool as described in Section 4.3.14.
	Link	Select two image stacks and scroll.
	Print	Access the Print Tool as described in Section 4.3.7.
	Export	Access the Export Tool as described in Section 4.3.7.2.
	Refresh	Refresh the page to the original settings without reloading the images from the server.

4.2.2. Thumbnails and Image Loading

The following describes the steps that occur when the main Viewer page displays:

1. The thumbnail panel(s) display on the left side of the page.
2. The Viewer selects the first thumbnail, indicated by a yellow outline.

3. The Viewer displays the loading progress (Figure 7).
4. The Viewer displays the loaded image associated with the thumbnail in the viewport.
5. After the above steps are complete, you can click the thumbnail for your desired image if it isn't already selected, and its image displays in the viewport. Section 4.3 describes how to work with images.

Figure 7: Main Viewer Page with Thumbnail Panel

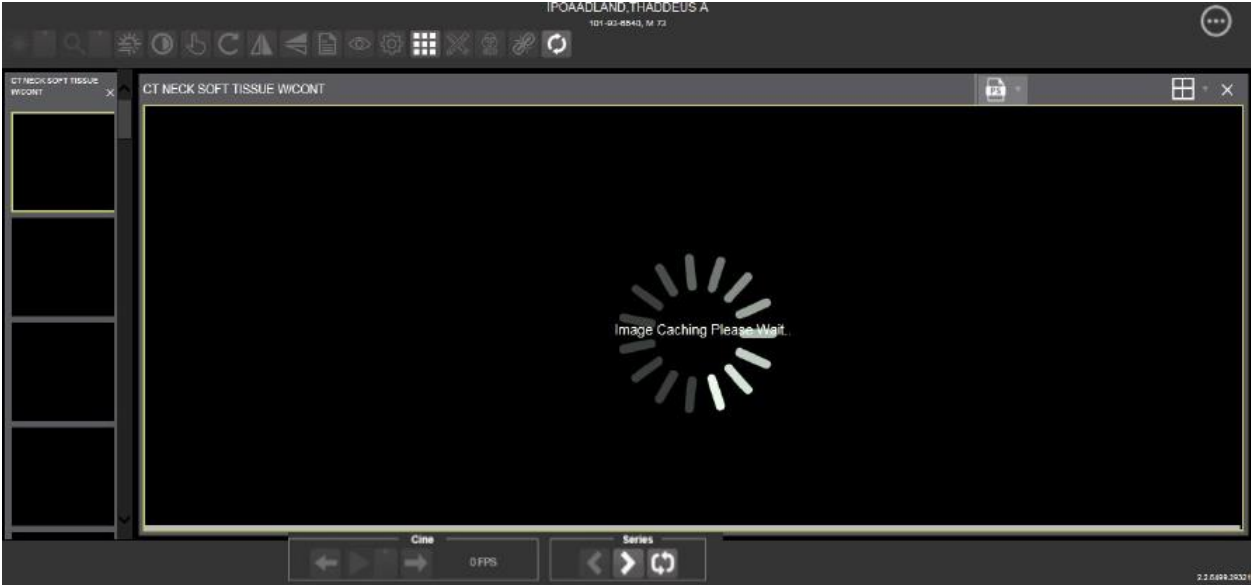




Table 2 describes the thumbnail elements.

Table 2: Thumbnail Elements, Names, Functions, and Descriptions

Web Page Element	Element Name and Function	Description
	Thumbnail	The title of the series appears at the top left of the thumbnail. The image type appears at the bottom left, with the number of images in the series directly below that. The series number displays on the bottom right of the thumbnail. For DICOM images, the modality code appears on the bottom left.

Web Page Element	Element Name and Function	Description
	Thumbnail Panel	To adjust the size of the thumbnail panel, click and drag the right edge of the panel to the left or right. This affects how many thumbnails are shown per row within the panel but does not alter the size of the thumbnails. When hovering over the panel with stacked images, if you have a mouse wheel, you can use it to scroll between the different series thumbnails. Use drag-and-drop to drag thumbnails to the viewport. A yellow outline appears around the thumbnail that currently shows in the viewport.

4.2.3. The Image Navigation Toolbars

An image navigation toolbar appears automatically when the Viewer determines it applies to the image displayed in the active viewport. Figure 8 shows samples of these toolbars.

Figure 8: Sample Image Navigation Toolbars

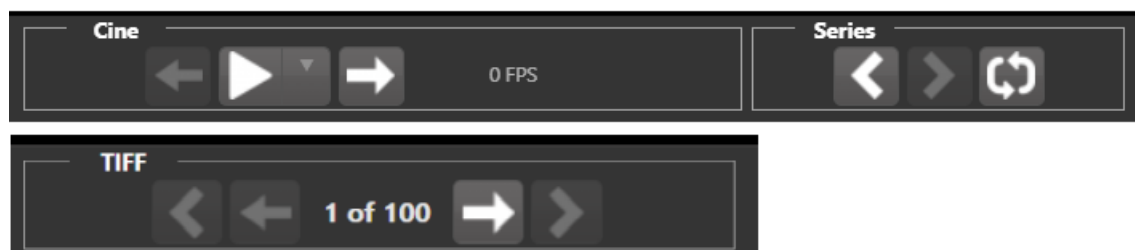






Table 3 describes the functions and uses of each button in the image navigation toolbar.

Table 3: Functions and Uses of the Image Navigation Toolbar Buttons

Button Icon	Button Name and Function	Description
	Previous Series and Next Series	Navigate through the study's series. Alternatively, you can click the thumbnail for the series to view.
	Previous Image and Next Image	Navigate through the active series' or TIFF's images. If you have a mouse wheel, you can also use it to scroll through the frames when you hover over the viewport.

Button Icon	Button Name and Function	Description
	Play and Stop	Begin and end playing through a cine image scene. The down arrow changes forward or backward direction.
	Repeat	Select to repeat the series. Deselect to play through the series before repeating the series.

While a series plays, a number (Figure 9) appears in the navigation toolbar. The number is the frame rate the series is currently playing.

Figure 9: Frame Rate



- **NOTE:** The first time a series plays, it might play slower while caching the images. Once the images are cached, the series plays faster.

4.3. Working with Images

If the image in the active viewport is not the one you desire, you can:




- Click another viewport, if any.
- Click the thumbnail for your desired image, and its image displays in the viewport.

The remainder of this section explains how to work with images.

4.3.1. Manipulating View Layout

Table 4 describes the buttons and functions to change how the images display in the viewport.

Table 4: Viewing Images and Manipulating View Layout

Button Icon	Button Name and Function	Description
	Image Level Layout	Manipulates the number and position of the series' images that can display on the viewport.
	Series Level Layout	Manipulates the number and position of the study's series that can display on the viewport.
	Close Image	Closes the currently selected image from the viewport.

4.3.2. Viewing DICOM Images

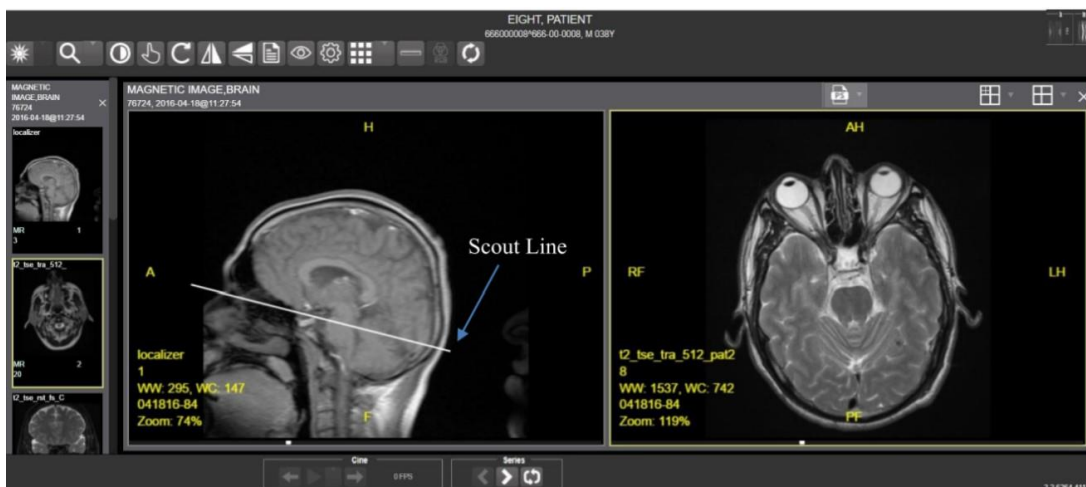
The Viewer displays DICOM images by simulating Picture Archiving and Communication System (PACS) functionality. For example, when a CT scan displays, you can manipulate its window level, zoom, annotate, and so on as described in Sections 4.2.1 and 4.2.3. You can work with other modalities in a similar fashion, but they do not support window leveling.

4.3.2.1. Viewing Stacked Images

Stacked images (such as for the CT, MR, and US modalities) represent a series, each with its own thumbnail in the thumbnail panel. When viewing a stacked image series and you have a mouse wheel, you can use it to scroll between the images in the stack when hovering over the thumbnail panel. You can also scroll through the stack by clicking the **Series** buttons described in Section 4.2.2.

Upon scrolling, if multiple series display in the viewport, scout lines appear on the images of the other series in a different plane to indicate what part of the body the series displays as shown in Figure 10 below.

Figure 10: Main Viewer Page with Images Loaded



4.3.3. Viewing an Electrocardiogram (ECG/EKG)

Electrocardiograms, typically referred to as ECGs in the United States and EKGs in Europe, measure the electrical activity of the heartbeat. Sometimes people refer to ECGs as 12-Lead ECGs, because the standard ECG involves medical staff placing 10 electrodes in precise locations on the patient's body to obtain 12 different perspectives (leads). Each lead is a graphical representation of the electricity in one or more electrodes.

An electrical impulse (or “wave”) travels through the heart with each beat. This electrical wave causes the muscle to squeeze and pump blood from the heart. A normal heartbeat on an ECG shows the rate and rhythm of the contractions in the upper and lower chambers.

The Viewer displays three types of ECG files: bitmap (such as JPEG), PDF, and DICOM. The bitmap and PDF renditions are simply snapshots of the ECG reading and offer little functionality compared to what you can do with DICOM files.

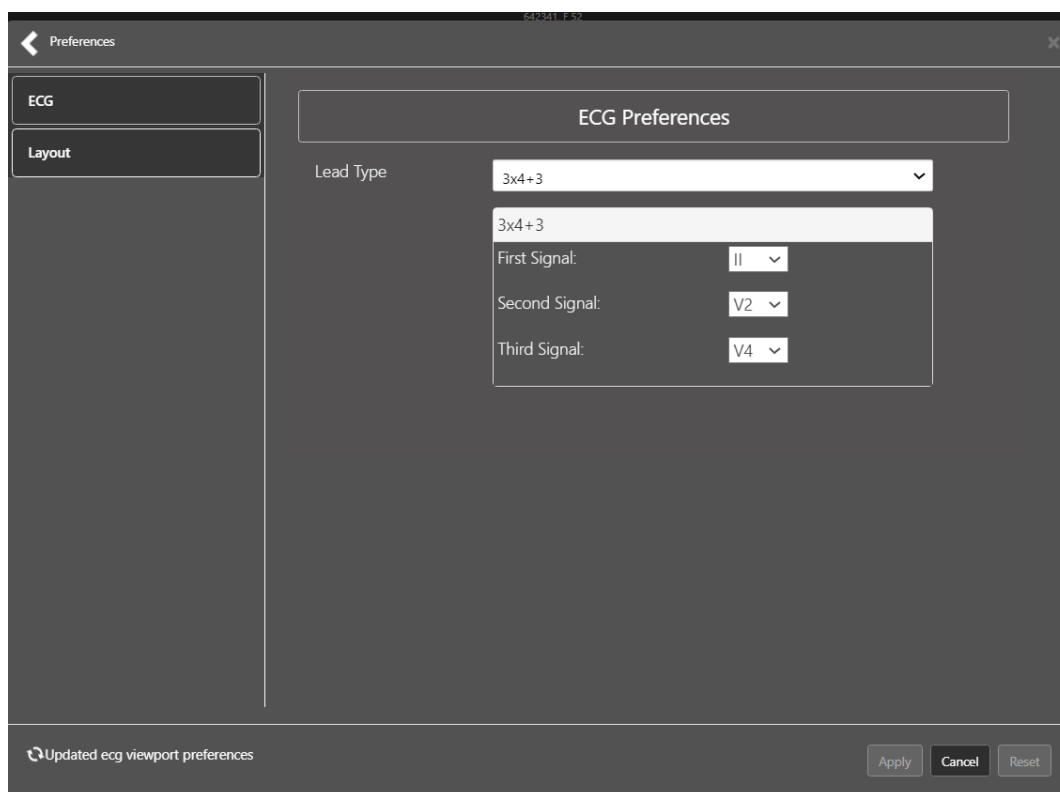
With a DICOM ECG, you can right-click on the grid to display a context menu as shown in Figure 11 below. The context menu lets you modify the following characteristics: Grid Type, Grid Color, Lead Format, Gain, Signal Thickness, Hide Caliper, Print, and Export.

Figure 11: DICOM ECG with Context Menu



Click the **Settings** main toolbar icon to change the ECG Preferences (Figure 12). After changing the settings, click the **Apply** button, and click the **Cancel** button after the update message leaves.

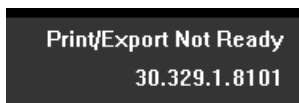
Figure 12: ECG Preferences



4.3.4. Viewing TIFF Images

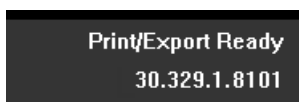
When an image is in the TIFF format (one or multiple pages), the Viewer converts each page to the JPEG format to display it easily and quickly in the browser. Meanwhile, behind the scenes, the Viewer converts the entire TIFF file to PDF, sets the status to indicate the PDF is not yet ready (Figure 13), and disables the **Print** and **Export** main toolbar icons.

Figure 13: PDF is Not Ready Status in the Lower Right Corner



When the PDF is ready, the Viewer updates the status (Figure 14), enables the **Print** and **Export** main toolbar icons, and displays **Print** and **Export** options on the context menu as described in Sections 4.3.7 and 4.3.7.2.

Figure 14: PDF is Ready Status in the Lower Right Corner



You can use the **Next Image** and **Previous Image** navigation toolbar icons to move the displayed images forward and backward as described in Section 4.2.3.

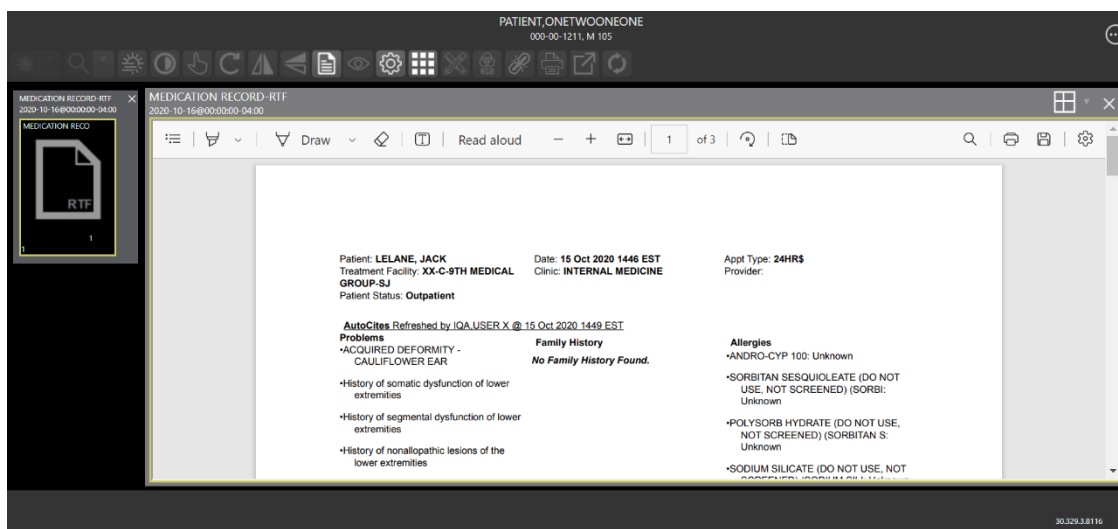
4.3.5. Viewing Normal Web Images

The Viewer enables most main toolbar icons when displaying normal web images such as JPEG and single-page TIFFs. Window leveling, however, does not apply.

4.3.6. Viewing Documents

When viewing a document, the document viewport displays (Figure 15), and the Viewer disables most of the main toolbar icons. The display might look different than shown depending on the browser.

Figure 15: Main Viewer Page with a Document Loaded



4.3.7. Printing and Exporting Images

Table 5 shows when you can print and export images if your VistA account has permission. Use either the **Print** and **Export** main toolbar icons or context menu items to print or export images.

When you can print and export items elsewhere in the application, the applicable section describes how you may do that.

Table 5: Image Print/Export Behavior

Media Type	Print/Export Main Toolbar Icon	Print/Export Context Menu Items	Note
Audio and Video	Disabled	Not shown	Such as Audio Video Interleave (AVI), Compact Disc Audio (CDA), QuickTime Movie Format (MOV), Media Picture Experts Group 4 (MP4).
DICOM (not with embedded PDF)	Enabled	Shown	N/A
Documents (DOC, PDF, Rich RTF, TXT)	Disabled	Not shown	Use the PDF Viewer plugin.
Embedded PDFs in DICOM	Disabled	Not shown	Use the PDF Viewer plugin.
Non-DICOM and Non-TIFF Images	Enabled	Shown	Such as Bitmap (BMP), JPEG, Graphics Interchange Format (GIF), Scalable Vector Graphics (SVG).
TIFF	Enabled only when its converted PDF is ready.	Shown only when its converted PDF is ready.	See Section 4.3.4.

4.3.7.1. Printing an Image

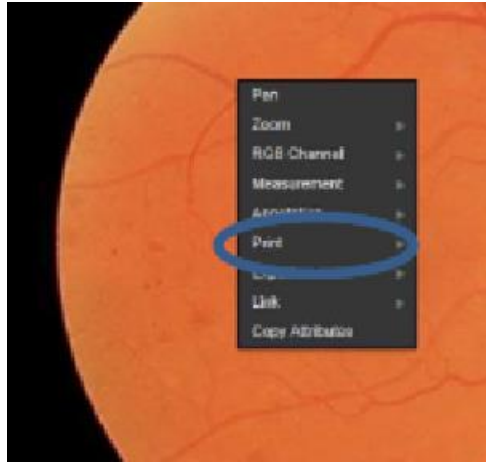
To print an image, do one of the following:

- Click the **Print** main toolbar icon.

- Right-click on the image to display a context menu. See Figure 16 below for an example.

NOTE: For non-Claims users, their VistA account requires the MAG ROI or MAG SYSTEM keys to print an image, and they do not have to enter a print reason or digital signature.

Figure 16: Print Menu



After selecting to print, you must select a print reason, enter your digital signature, and can select print options. After selecting the print options, the image opens in a new tab to preview and select the device. See Figure 17 below for an example.

Figure 17: Print Menu - Device Selection

4.3.7.2. Exporting an Image

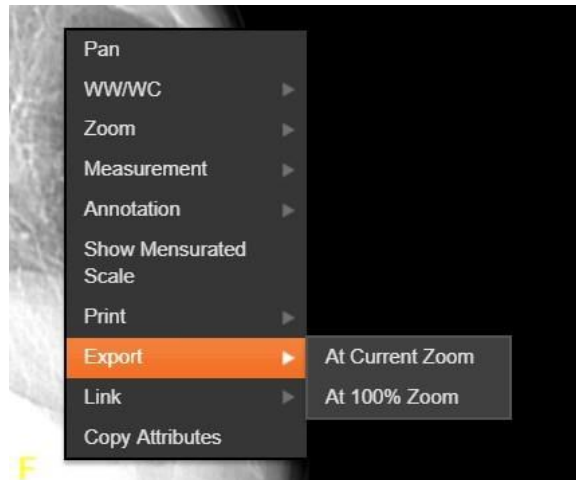
To export an image, do one of the following:

- Click the **Export** main toolbar icon.

- Right-click on the image to display a context menu. See Figure 18 for an example.

NOTE: For non-Claims users, their VistA account requires the MAG ROI or MAG SYSTEM keys to export an image, and they do not have to enter a digital signature.

Figure 18: Exporting an Image



After selecting the desired zoom, you must enter the digital signature before exporting the image using the browser.

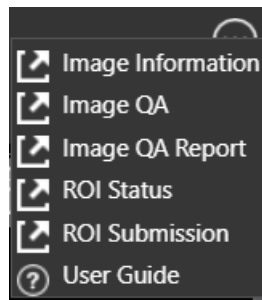
4.3.8. External Links

Click the button in the top right corner (Figure 19) of the Viewer page to view the **External Links** menu (Figure 20).

Figure 19: External Links Button in the Top Right Corner



Figure 20: External Links Menu



4.3.8.1. Release of Information (ROI) Print Queue Status and ROI Submission

To view the ROI Print Queue Status, click **ROI Status** on the **External Links** menu, and the following screen displays (Figure 21).

Figure 21: ROI Print Queue Status

Patient Name	SSN4	Patient ID	Status	Last Updated	DICOM Routing
IPOACEVEDA, VANCE MALCOM	*****2884	icn(1008689586V678823)	EXPORT_QUEUE	06/23/2022@16:06:52	ROI TEST - CD BURNER, 500
IPOACEVEDA, DEWAYNE DEAN	*****9203	icn(1008689586V409506)	EXPORT_QUEUE	06/17/2022@15:33:39	ROI CD WRITER, 994
IPOACEVEDA, DEWAYNE DEAN	*****9203	icn(1008689586V409506)	EXPORT_QUEUE	06/22/2022@10:09:24	ROI TEST - CD BURNER, 500
IPOACEVEDA, DEWAYNE DEAN	*****9203	icn(1008689586V409506)	EXPORT_QUEUE	06/28/2022@14:52:49	ROI TEST - CD BURNER, 500
IPOACEVEDA, DEWAYNE DEAN	*****9203	icn(1008689586V409506)	EXPORT_QUEUE	07/20/2022@16:47:35	ROI TEST - CD BURNER, 500
IPOACEVEDA, DEWAYNE DEAN	*****9203	icn(1008689586V409506)	EXPORT_QUEUE	07/21/2022@12:11:34	ROI TEST - CD BURNER, 500
IPOABUD, BRYANT E	*****1215	icn(1008689413V585605)	EXPORT_QUEUE	12/08/2022@16:07:11	ROI CD WRITER, 994
IPOAASEN, LUCIA A	*****3472	icn(1008689511)	EXPORT_QUEUE	01/22/2019@02:15:33	ROI TEST - CD BURNER, 500
IPOAASEN, LUCIA A	*****3472	icn(1008689511)	EXPORT_QUEUE	01/22/2019@02:16:18	ROI CD WRITER, 994
IPOAASEN, LUCIA A	*****3472	icn(1008689511)	EXPORT_QUEUE	01/22/2019@02:17:38	

To perform ROI Submissions, click **ROI Submission** on the **External Links** menu and the following screen displays (Figure 22).

Figure 22: Print Queue

Procedure	Date	Location	Release
RAD CT	2018-08-28T16:44:00-04:00	VA	<input type="checkbox"/>
	2018-08-28T16:44:00-04:00	VA	<input type="checkbox"/>
	2018-08-28T16:44:00-04:00	VA	<input type="checkbox"/>
CLIN	2018-06-25T00:01:00-04:00	VA	<input type="checkbox"/>
RAD PR	2017-10-11T13:02:00-04:00	VA	<input type="checkbox"/>
XRAY	2017-10-11T13:02:00-04:00	VA	<input type="checkbox"/>
CLIN	2017-09-26T00:01:00-04:00	VA	<input type="checkbox"/>
CON/PROC	2017-09-20T10:44:00-04:00	VA	<input type="checkbox"/>
CON/PROC	2017-09-20T10:44:00-04:00	VA	<input type="checkbox"/>
RAD CT	2017-09-12T18:43:00-04:00	VA	<input type="checkbox"/>

To print:

- Select one or more items and click **Submit ROI CD Request**, where CD stands for Compact Disc.

4.3.9. Viewing Information in an Image

To view the image's information, select the **View Image Info** button. To view the DICOM information, select **DICOM Header**, and the screen shows the DICOM attributes as shown below (Figure 23).

Figure 23: DICOM Attributes

Dicom Header				
Group	Element	Description	VR	Value
0008	0008	Image Type	CS	ORIGINAL\PRIMARY\AXIAL\CT_SOM5 SEQ
0008	0016	SOP Class UID	UI	1.2.840.10008.5.1.4.1.1.2
0008	0018	SOP Instance UID	UI	1.2.840.113754.1.7.500.0.20160419.113013.1
0008	0020	Study Date	DA	20160418
0008	0023	Content Date	DA	19980907
0008	0030	Study Time	TM	
0008	0033	Content Time	TM	
0008	0050	Accession Number	SH	041816-72
0008	0060	Modality	CS	CT
0008	0070	Manufacturer	LO	SIEMENS
0008	0090	Referring Physician's Name	PN	PROVIDER*TWENTY
0008	1030	Study Description	LO	CT HEAD W/O CONT

Close

To view the Imaging Data for the Image, select the **Imaging Data** option, and the screen displays the image's metadata as shown below (Figure 24).

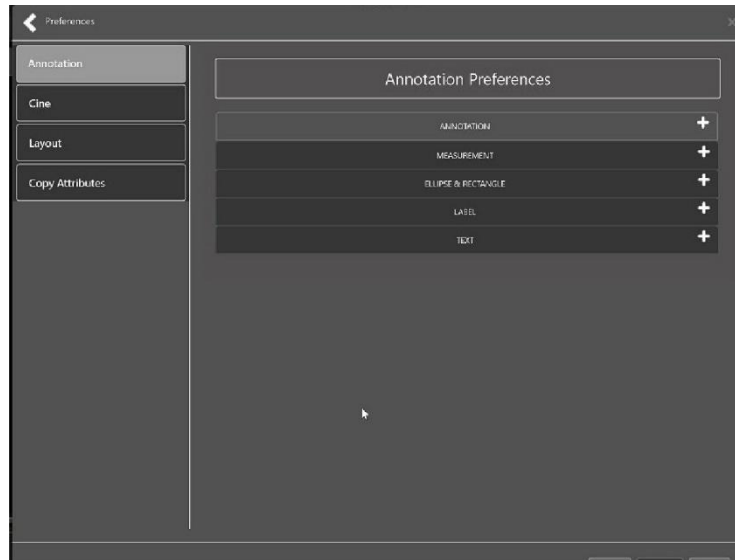
Figure 24: Image Metadata

[illegible]

4.3.10. Changing the Settings of an Image

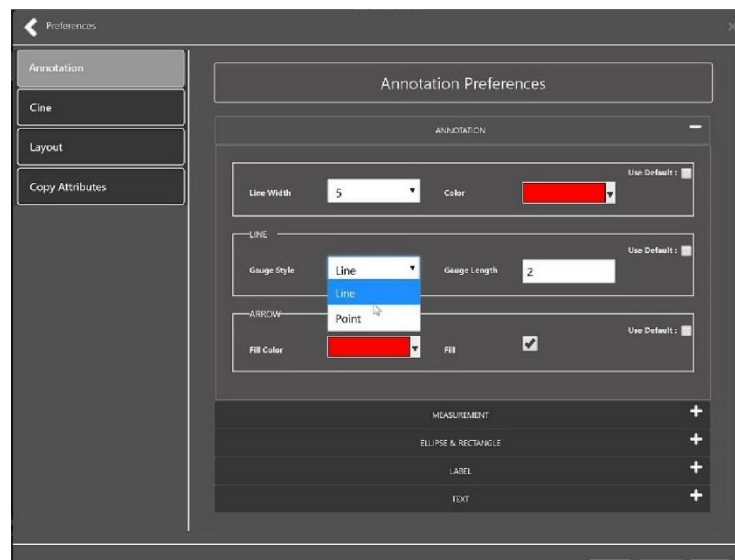
Select the **Settings** main toolbar icon to view or update the settings options (Figure 25).

Figure 25: Settings Menu



Click **Annotation**, and the following screen displays (Figure 26).

Figure 26: Annotations Preferences



Click **Measurement**, and the following screen displays (Figure 27).

Figure 27: Measurement Preferences

The screenshot shows the 'Measurement Preferences' dialog box. On the left is a sidebar with 'Annotation' selected. The main area has a title bar 'Annotation Preferences' and a list of categories: 'ANNOTATION', 'MEASUREMENT' (selected), 'LENGTH', 'ANGLE', 'ELLIPSE & RECTANGLE', and 'LABEL'. The 'MEASUREMENT' section contains settings for 'Line Width' (2), 'Precision' (2), 'Color' (red), and 'Measurement Units' (Centimeter). Below this are sections for 'LENGTH' (Gauge Style: Point, Gauge Length: 10) and 'ANGLE' (Arc Radius: 6). At the bottom are 'Apply', 'Cancel', and 'Reset' buttons.

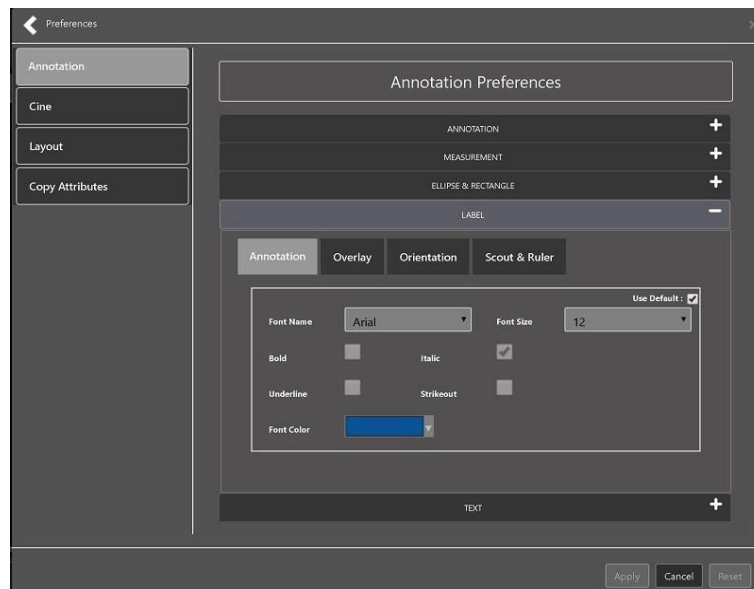
Click **Ellipse and Rectangle**, and the following screen displays (Figure 28).

Figure 28: Ellipse and Rectangle Preferences

The screenshot shows the 'Ellipse and Rectangle Preferences' dialog box. The sidebar remains the same. In the main area, the 'ELLIPSE & RECTANGLE' category is selected. It shows settings for 'Line Width' (1), 'Color' (green), and 'Fill Color' (yellow). There is also a 'Fill' checkbox which is currently unchecked. The 'LABEL' and 'TEXT' categories are visible below. 'Apply', 'Cancel', and 'Reset' buttons are at the bottom.

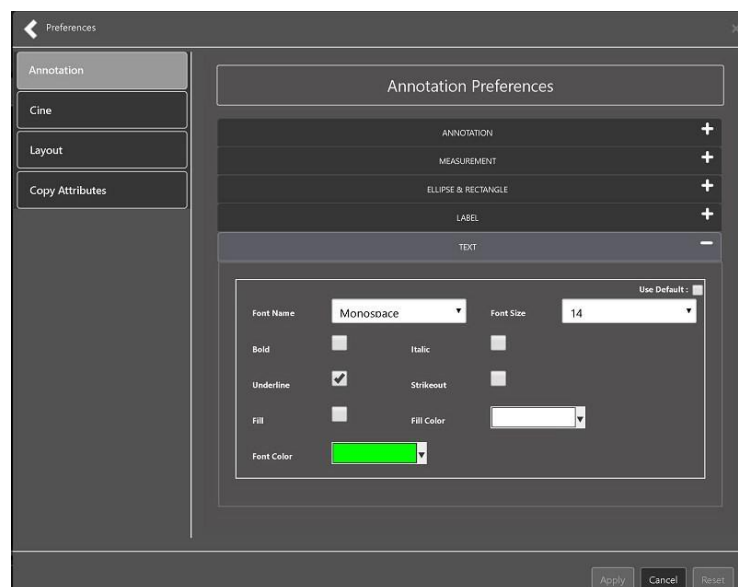
Click **Label**, and the following screen displays (Figure 29).

Figure 29: Label Preferences



Under Label preferences, choose Annotation, Overlay, Orientation, or Scout & Ruler. Click **Text**, and the following screen displays (Figure 30).

Figure 30: Annotation Preferences



To view or update the Cine Settings, select the **Cine Preference** and the following screen displays (Figure 31).

Figure 31: Cine Preferences

The screenshot shows the 'Cine Preferences' dialog box. On the left, a sidebar contains four options: 'Annotation', 'Cine' (which is highlighted), 'Layout', and 'Copy Attributes'. The main panel is titled 'Cine Preferences' and contains the following settings:

- Cine mode:** A dropdown menu currently set to 'Stack'.
- Repeat cine run:** A text input field containing the number '3', with '(times)' written below it.
- when the number of frames in a cine loop are less than or equal to:** A text input field containing the number '9'.
- When looping through a study, pause single frame images for:** A text input field containing the number '3', with '(seconds)' written below it.

At the bottom right of the main panel, there is a checkbox labeled 'Use Default' which is currently unchecked. At the bottom of the dialog box, there are three buttons: 'Apply', 'Cancel', and 'Reset'.

To view the Layout settings, select the **Layout Preference** to display the following screen (Figure 32).

Figure 32: Layout Preferences

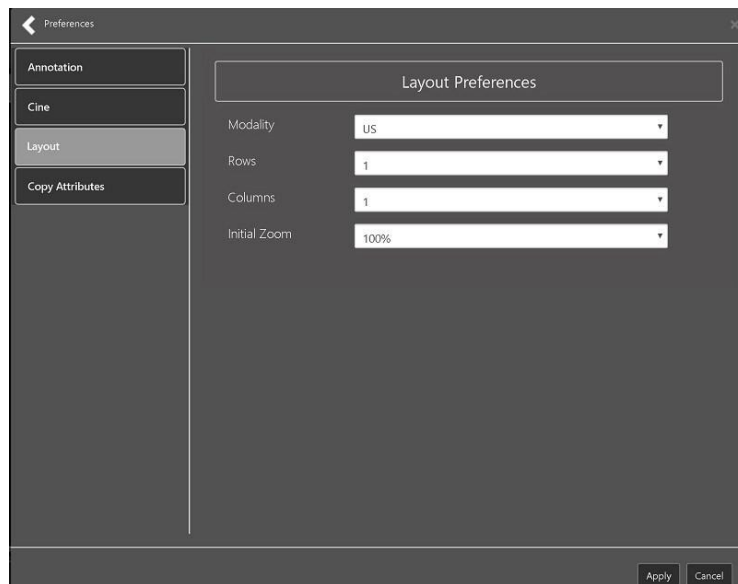
The screenshot shows the 'Layout Preferences' dialog box. On the left, a sidebar contains four options: 'Annotation', 'Cine', 'Layout' (which is highlighted), and 'Copy Attributes'. The main panel is titled 'Layout Preferences' and contains a table with the following data:

Modality	Rows	Columns	Zoom Mode	Actions
MR	1	1	100%	<input checked="" type="checkbox"/>

At the bottom right of the main panel, there is a checkbox labeled 'Use Default' which is currently unchecked. At the bottom of the dialog box, there are three buttons: 'Add', 'Apply', and 'Cancel'.

Click **Add** in the bottom right of the page to add a new layout preference (Figure 33).

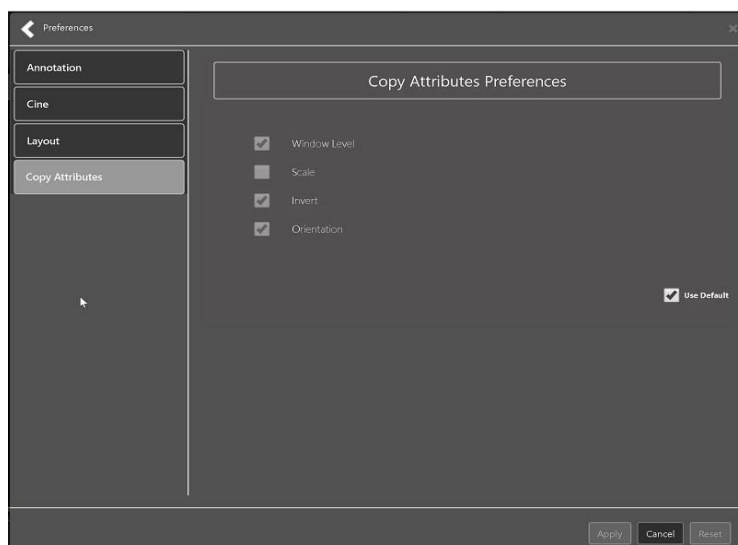
Figure 33: Layout Preference Choices



The screenshot shows a 'Preferences' window with a sidebar on the left containing four items: 'Annotation', 'Cine', 'Layout', and 'Copy Attributes'. The 'Layout' item is selected and highlighted. The main area of the window is titled 'Layout Preferences' and contains four settings, each with a dropdown menu: 'Modality' is set to 'US', 'Rows' is set to '1', 'Columns' is set to '1', and 'Initial Zoom' is set to '100%'. At the bottom right of the window are 'Apply' and 'Cancel' buttons.

To view the Copy Attributes settings, select the **Copy Attributes Preference**, and the following screen displays (Figure 34).

Figure 34: Copy Attributes Preferences

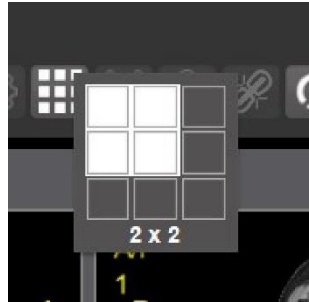


The screenshot shows the same 'Preferences' window, but now the 'Copy Attributes' item in the sidebar is selected and highlighted. The main area is titled 'Copy Attributes Preferences' and contains four checked checkboxes: 'Window Level', 'Scale', 'Invert', and 'Orientation'. There is also an unchecked checkbox labeled 'Use Default' at the bottom right. At the bottom of the window are 'Apply', 'Cancel', and 'Reset' buttons.

4.3.11. Changing the Study Layout

To change the study layout, select the **Study Layout Button**, and the following screen displays (Figure 35).

Figure 35: Layout Attribute Preference Choices



Select the **study level** that best suits your purpose.

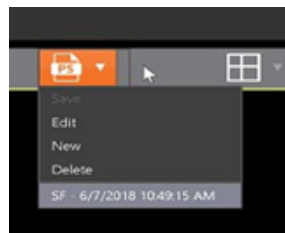
4.3.12. Presentation State

To view presentation state options, click the **PS Icon** (Figure 36), and the following menu appears (Figure 37).

Figure 36: Presentation State Button



Figure 37: Presentation State Menu



The presentation state icon is available only if there are presentation states associated with the study and there is an annotation drawn on the image. The bottom of the context menu displays all the saved presentation states associated with the study. To view additional information about a specific presentation state, hover over it in the context menu.

4.3.13. Using the Measurements Tools

To use the various measurement tools, select the **Measurements** button, and the following screens display depending on the option you choose (Figure 38, Figure 39, and Figure 40).

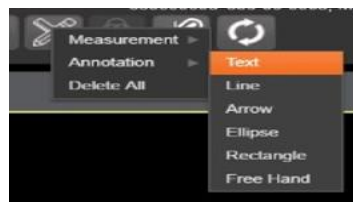
Figure 38: Measurement Tool View 1



Figure 39: Measurement Tool View 2



Figure 40: Measurement Tool View 3



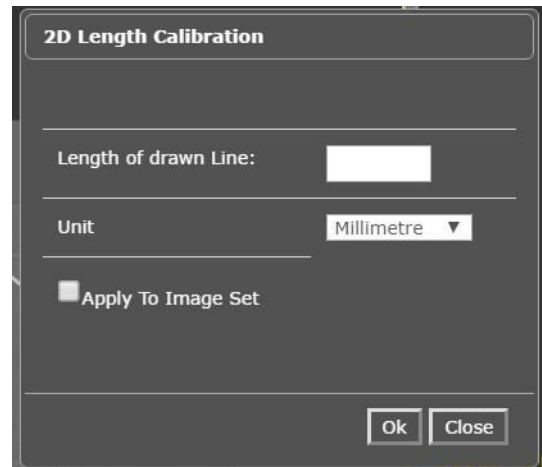
The **2D Length** option draws the necessary line(s) to obtain the desired measurements.

The **Angle Tool** draws the necessary line(s) to measure the desired angle.

The **2D Point** tool places the necessary dots to obtain the desired measurements. Use this option for ultrasound studies to measure velocity.

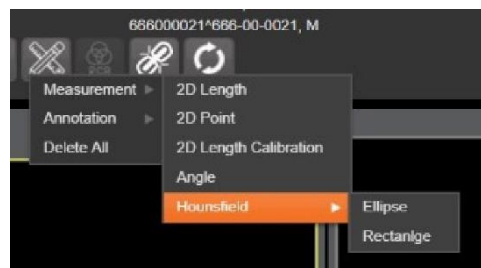
The **2D Length Calibration** option calibrates measurements to ensure accurate data. Images with DICOM info use the DICOM info to inform measurement calibration, but images without this data need calibration to show accurate data. See Figure 41 below.

Figure 41: 2D Length Calibration



The **Hounsfield** tool takes circular and rectangular density measurements. See Figure 42 below.

Figure 42: Hounsfield Measurement Tools



The **Text** tool creates text boxes on the image.

The **Line** tool draws straight lines on the image.

The **Arrow** tool draws straight arrows on the image.

The **Ellipse** tool draws ellipses on the image.

The **Rectangle** tool draws rectangles on the image.

The **Free Hand** tool connects points that you have specified to create any desired shape.

To delete all the measurements and markings you made on the current image, select the **Delete All** option.

4.3.14. Using the RGB Tool

The **RGB Tool** button filters the image for certain color channels to allow for various observations. When selected, a context menu (Figure 43) appears that allows you to select the desired color channel.

Figure 43: RGB Tool Button



4.3.15. Conditions for Image Viewer Functions

Table 6 describes the Viewer functions dependent on certain conditions.

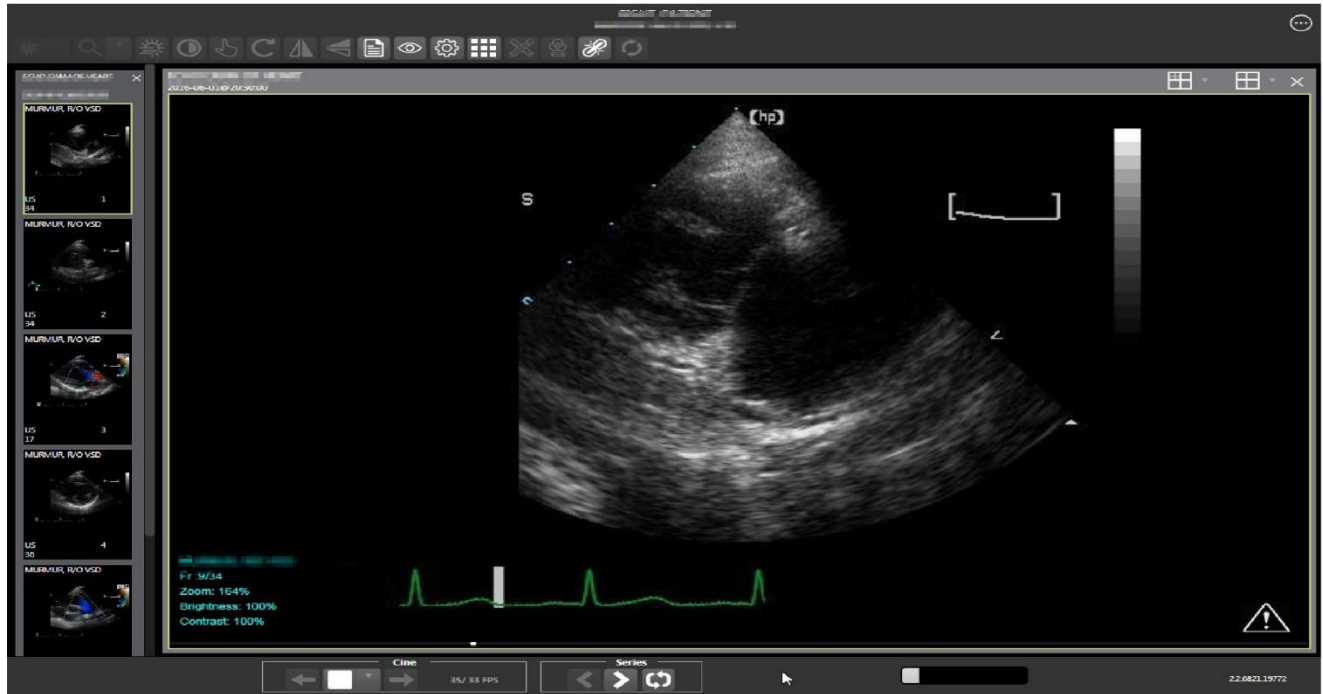
Table 6: Conditional Image Viewer Functions

Function	Section Reference	MAG Keys
Delete an image	Not applicable at this time	MAG DELETE or MAG SYSTEM
Edit an image	4.4.3	MAG EDIT, or MAG QA REVIEW, or MAG SYSTEM
Image navigation toolbar	4.2.2	Not applicable
Main toolbar buttons	4.2.1	Not applicable
Print and Export an image	4.3.7 and 4.3.7.2	For non-Claims users, their VistA account requires the MAG ROI or MAG SYSTEM keys to print and export an image. Claims users have special permission to print and export.
Status	4.3.4	Not applicable

4.4. Image Quality Assurance (QA)

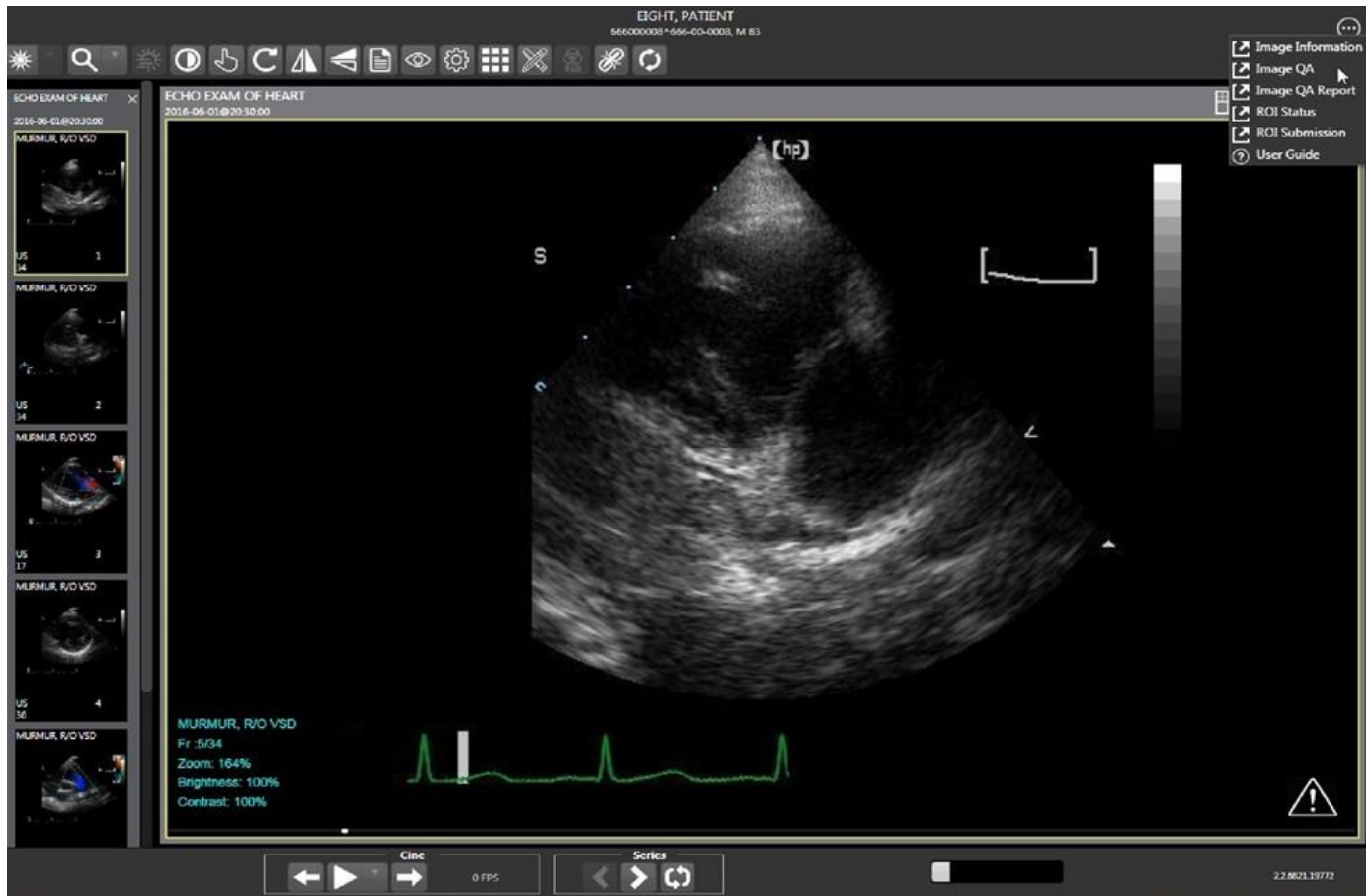
To use the image quality assurance features, load an image in the Viewer (Figure 44).

Figure 44: Main Viewer Page with Image Loaded



Click the **External Links** button on the Viewer page and a drop-down menu (Figure 45) appears.

Figure 45: External Links Menu on Main Viewer Page



4.4.1. Image Information

Select the **Image Information** link from the menu. The image information page (Figure 46) displays.

Figure 46: Image Information

The screenshot displays the 'Image Information' page. On the left, there are six thumbnail images of echocardiograms, labeled 1 through 6. The top-left image is the largest and shows a heart cross-section. Below the thumbnails, the text 'ECHO EXAM OF HEART' is visible. On the right side of the page, there is a detailed metadata table for the selected image (Image 1).

***** Fields for Image ID# 1665 *****	
ACQUISITION DEVICE	= (7)
ACQUISITION SITE	= (150)
CAPTURE APPLICATION	= (10)
CLASS INDEX	= (1)
CONTROLLED DATE	= (3160613,2016023)
DATE/TIME IMAGE SHOT	= (3160613,2016023)
DOCTOR CLASS	= (10)
DIRS & VOLUME, ABSTRACT	= (1)
DIRS & VOLUME, MAGNETIC	= (2)
DOCTOR DATE	= (3000223,154702)
FILEID	= (1665)
GROUP INDEX	= (1665)
LAST ACCESS DATE	= (3160114,094155)
NEW REF INSTANCE UID	= (1.2.840.1137154.1.7.500.0.2016013,2016023,0)
REFID	= (1665)
REFID DATE	= (3160114,094155)
REFID TYPE	= (100)
PACKAGE INDEX	= (730)
PAGE PROCEDURE	= (730)
PAGE UID	= (1.2.840.1137154.1.7.500.0.2016013,2016023,0)
PARENT DATA FILE#	= (741)
PARENT GLOBAL ROOT ID	= (72)
PATIENT	= (3)
PROC/EVENT INDEX	= (100)
PROCEDURE	= (730)
PROCEDURE DATE/TIME	= (3160601,203)
RADIOLOGIST REPORT	= (722)
SERIES UID	= (1.2.840.1137154.1.7.500.0.2016013,2016023,0)
SERIES DESCRIPTION	= (730)
SERIES INDEX	= (10)
STATUS	= (1)
STATUS DATE	= (3160613,2016023)
TYPE INDEX	= (75)

Select any image, then click the **Image Edit** main toolbar button. The image editor dialog (Figure 47) opens. To edit a field, click on the **checkbox** to the left to enable the dropdown control or the textbox. Click **Save** to save the image index fields.

Figure 47: Image Editor

ECHO EXAM OF HEART		Image Editor	
		Site Name : CAMP MASTER	Clin Procedure Date : JUN 01, 2016@20:30
		Capture Date : 2016-05-13@20:16:00-04:00	Image Creation Date : FEB 23, 2000@15:42:30
		Patient Name : EIGHT,PATIENT	Patient ID :
		Image Type : IMAGE	Image Date : 2000-02-23@15:42:00-05:00
		Image ID : 1662	
ECHO EXAM OF H... 1	ECHO EXAM OF H... 2	<input type="checkbox"/> Origin	<no change>
		<input type="checkbox"/> Type	IMAGE <no change>
		<input type="checkbox"/> Spec/SubSpec	RADIOLOGY <no change>
		<input type="checkbox"/> Procedure/Event	ULTRASOUND <no change>
ECHO EXAM OF H... 3	ECHO EXAM OF H... 4	<input type="checkbox"/> Short Description	ECHO EXAM OF HEART (#2) <no change>
		<input type="checkbox"/> Controlled Image	NO <no change>
		<input type="checkbox"/> Status	Viewable <no change>
ECHO EXAM OF H... 5	ECHO EXAM OF H... 6	<input type="checkbox"/> Status Reason	<no change>
		<input type="checkbox"/> Image Creation Date	FEB 23, 2000@15:42:30 <no change (mm-dd-yyyy)>
		<input type="button" value="Save"/> <input type="button" value="Cancel"/>	

4.4.2. Image QA

Select **Image QA** from the **External Links** menu to open the QA review page (Figure 48).

Figure 48: QA Review Page

QA Review

Search Filters

Select Date Range

Today

Select

Captured By

Max Status of

Select image status

Number Of Items

1

Or

Select Filter

Search

Image Information

Patient

<patientname>

SSN

<SSN>

Short Desc

<short_desc>

Type

<type>

Specialty

<specialty>

Proc/Event

<proc/event>

Status

<status>

Reason

<reason>

QA Reviewed

Prev

Next

Needs Review

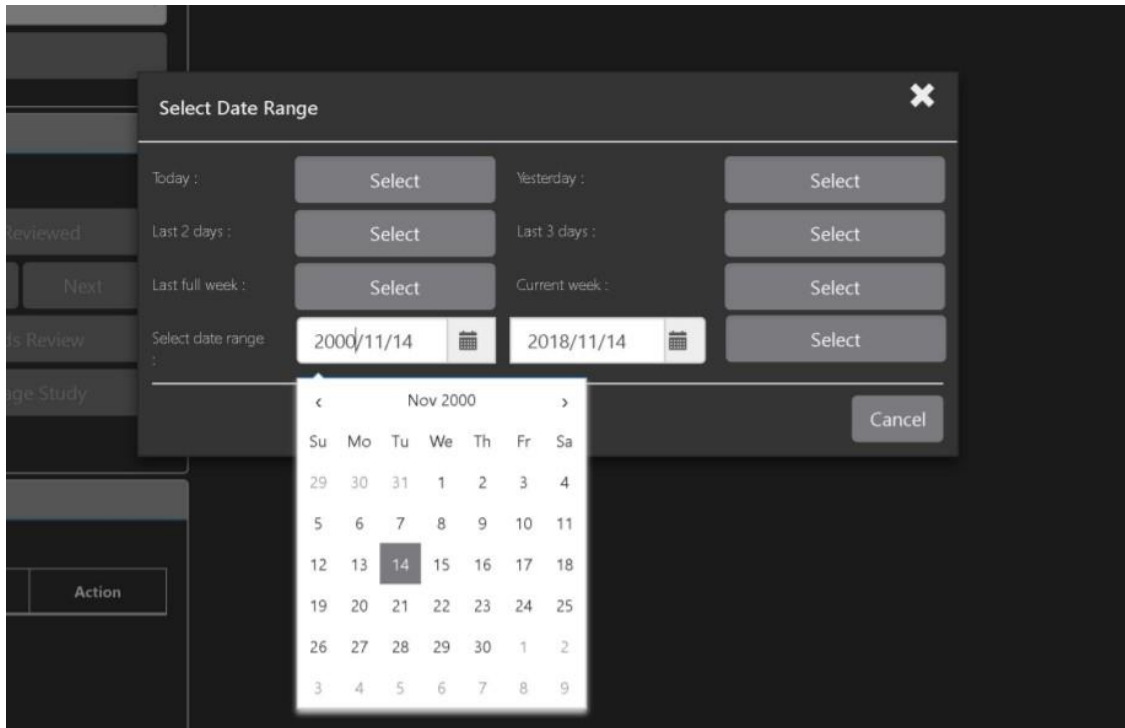
Manage Study

Search Results

Item	Patient	Img	Image ID	Action
------	---------	-----	----------	--------

Click the **Select** button from the **Search Filters** group to open the **Select Date Range** pop-up (Figure 49). Select a date range.

Figure 49: QA Filters and Date Range



The **Captured By** dropdown populates with a list of valid users for the date range (Figure 50).

Figure 50: Search Filter Details

Click the **Has Status of** dropdown, and choose one or more images to choose the status (Figure 51).

Figure 51: QA Status Choices

The screenshot shows the 'Search Filters' panel. The 'Has Status of' dropdown is open, displaying four options with checkboxes: 'Viewable', 'QA Reviewed', 'Needs Review', and 'Image Never Existed'. Other filters visible include 'Select Date Range' with a 'Date range' input and 'Select' button, 'Captured By' with a dropdown showing 'Radtech,Fiftytwo', and 'Percen (%) return'.

Restrict the study count in the search results using the % **return** dropdowns (Figure 52). The left dropdown is in the percentage of study items to display. The right dropdown is the maximum number of items to display.

Figure 52: Percentage of Images to Display

The screenshot shows the 'Search Filters' panel. The 'Percen (%) return' dropdown is open, displaying two columns of options. The left column contains percentages: 1, 3, 5, 10, 20, 30, and 50. The right column contains maximum item counts: 200, 300, 500, 750, and 1000. Other filters visible include 'Select Date Range' with a 'Date range' input and 'Select' button, 'Captured By' with a dropdown showing 'Radtech,Fiftytwo', and 'Has Status of' with a dropdown showing '4 selected'.

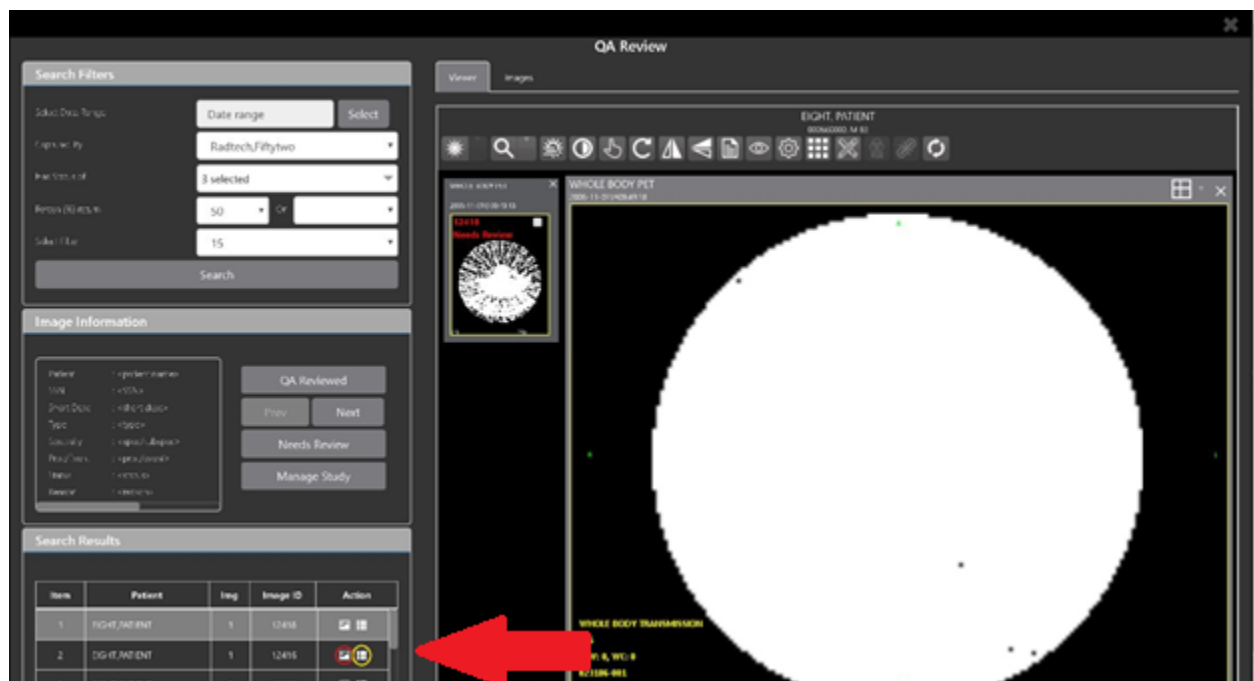
Choose a filter using the **Select Filter** dropdown (Figure 53).

Figure 53: Saved Filters

The screenshot shows a software interface with a 'Search Filters' section. It includes several filter options: 'Select Date Range' with a 'Date range' input and a 'Select' button; 'Captured By' with a dropdown showing 'Radtech,Fiftytwo'; 'Has Status of' with a dropdown showing '4 selected'; 'Percen (%) return' with two dropdowns, the first showing '1' and the second with an 'Or' label; and 'Select Filter' with a dropdown showing '15'. The 'Select Filter' dropdown is open, displaying a list of filters: '15' (highlighted in blue), 'TEST FILTER', 'TEST FILTER 2', 'NST ORIGIN', 'Clinical All', and 'Admin All'. Below the 'Search Filters' section is an 'Image Information' section with fields for Patient, SSN, Short Desc, Type, and Specialty, each followed by a colon and a placeholder value. A 'Needs Review' button is visible at the bottom right of the 'Image Information' section.

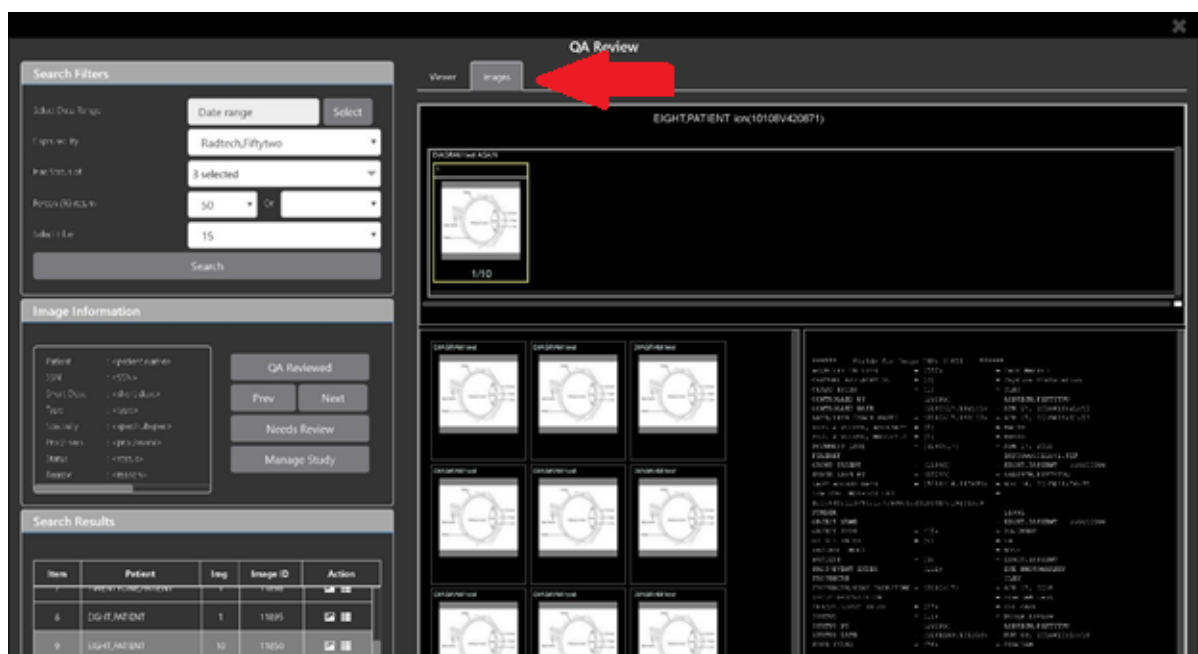
Click **Search** to search for studies. The first study in the list of studies found displays automatically on the right. Click on the **Viewer** icon (circled in red, Figure 54) to display the study. Click on the **Images** icon (circled in yellow, Figure 54) to display the images tab for the study.

Figure 54: QA Filter Results



You can click on the **Images** tab at the top after displaying the study (Figure 55).

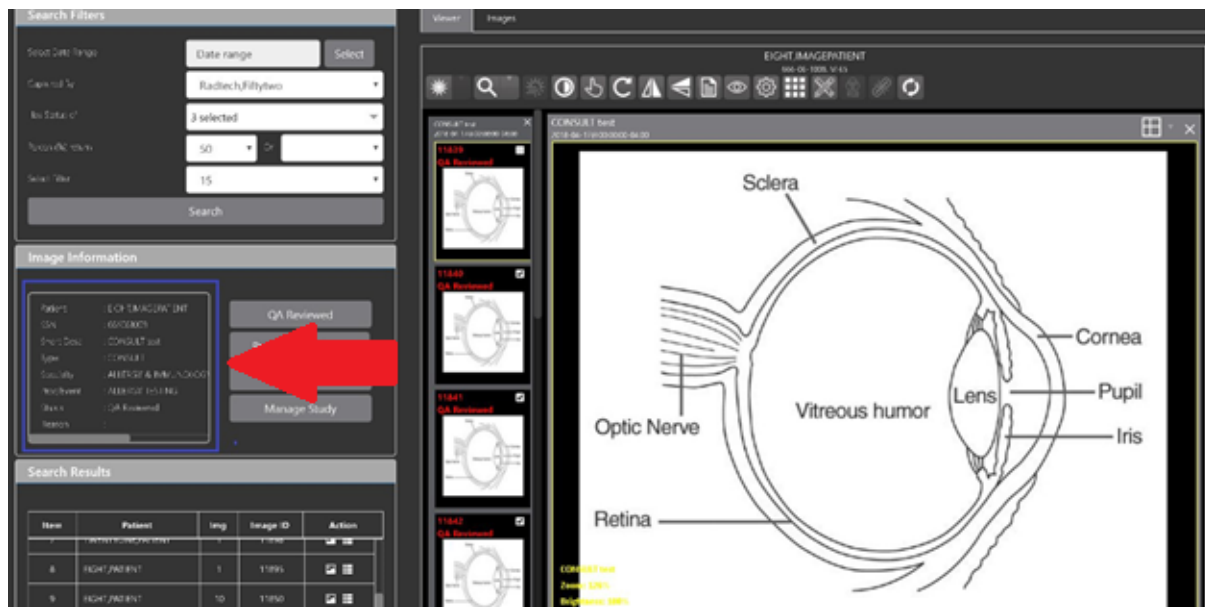
Figure 55: QA Filter Results and Image Information



4.4.3. Viewing and Setting Image Status

Click on a thumbnail. Its image information, including the view status, displays in a panel on the left (highlighted in blue, Figure 56).

Figure 56: QA Thumbnail

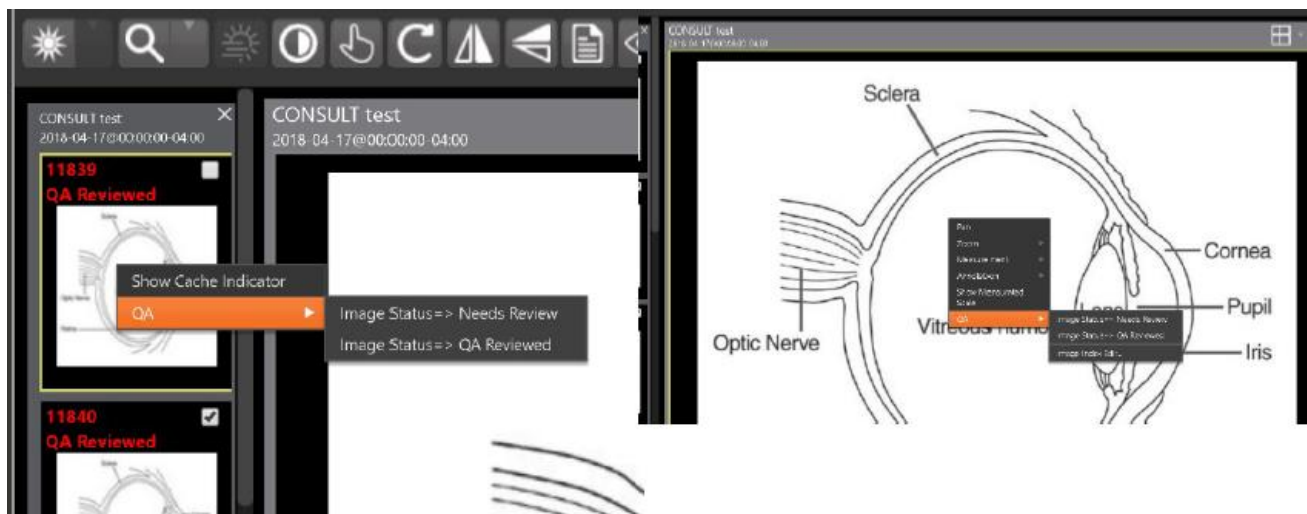


Click on an **image thumbnail** to display the corresponding image. More than one thumbnail can be selected using the shift key.

NOTE: The user's VistA account requires the MAG EDIT or MAG QA REVIEW keys to edit/set this information.

Click the **QA Reviewed** or **Needs Review** button to set the corresponding image status. You can also right-click on the image or the image thumbnail to set the image status (Figure 57).

Figure 57: QA Review Status Update Menus



You can invoke the Image Index Editor page by clicking on the **Image Index Edit** menu item.

Use the **Prev** and **Next** buttons to traverse the search results.

Click the **Manage Study** button to display the **Images** tab for the study.

4.4.4. Image QA Report

Select the **Image QA report** from the Viewer page's **External Links** menu to open the QA Statistics Reports page (Figure 58).

Figure 58: QA Statistics Reports Page

The screenshot displays the 'QA Statistics Reports' interface. On the left, the 'New Report Parameters' panel allows configuration of the report. The 'Date Range' section shows 'From' and 'To' dates both set to 2023/05/20, with a 'Range: Today' option. The 'Include Deleted Images' section has an unchecked checkbox, while 'Include Existing Images' is checked. Under 'Return Image Counts By', the 'Grouped by Status' radio button is selected. A 'Run Report' button is located at the bottom of this panel. The main area on the right, titled 'QA Statistics Reports', indicates it is for user 'TEST,VIXVIEWER'. It features a table with headers: 'Report Type', 'Status', 'From', 'To', 'Started At', and 'Ended At'. The table body is empty. 'Refresh List' and 'View Report' buttons are positioned at the bottom right of the table area.

Fill in the report parameters fields and click the **Run Report** button (Figure 59).

Figure 59: Run QA Report

New Report Parameters

Date Range

From :

2013/05/20

To :

2023/05/20

Range : 10 year(s) 2 day(s)

☒ Include Deleted Images

☒ Include Existing Images

Return Image Counts By

☐ Grouped by Status

☐ Grouped by Users and Status

Run Report

QA Statistics Reports

Report requests for user : TEST,VIXVIEWER

Report Type	Status	From	To	Started At	Ended At
TBD	TBD	05/15/2023	05/15/2023	05/15/2023 16:23:24	05/15/2023 16:23:24
TBD	TBD	01/16/2021 01:01:33	02/16/2021 02:02:33	03/16/2021 03:03:33	04/16/2021 04:04:33
TBD	TBD	05/16/2021 01:01:33	06/16/2021 02:02:33	07/16/2021 03:03:33	08/16/2021 04:04:33
TBD	TBD	09/16/2021 13:52:33	10/16/2021 13:52:33	11/16/2021 13:52:33	12/16/2021 13:52:33

Refresh List

View Report

Select any item, and click **View Report** button, then the selected image report statistics display (Figure 60).

Figure 60: View QA Report

New Report Parameters

Date Range

From :

2013/05/20

To :

2023/05/20

Range : 10 year(s) 2 day(s)

☒ Include Deleted Images

☒ Include Existing Images

Return Image Counts By

☐ Grouped by Status

☐ Grouped by Users and Status

Run Report

QA Statistics Reports

Report requests for user : TEST,VIXVIEWER

Report Type	Status	From	To	Started At	Ended At
TBD	TBD	05/15/2023	05/15/2023	05/15/2023 16:23:24	05/15/2023 16:23:24
TBD	TBD	01/16/2021 01:01:33	02/16/2021 02:02:33	03/16/2021 03:03:33	04/16/2021 04:04:33
TBD	TBD	05/16/2021 01:01:33	06/16/2021 02:02:33	07/16/2021 03:03:33	08/16/2021 04:04:33
TBD	TBD	09/16/2021 13:52:33	10/16/2021 13:52:33	11/16/2021 13:52:33	12/16/2021 13:52:33

Refresh List

View Report

Image Report Statistic

This Report Was Started At: 05/15/2023 16:23:24 For Date Range: 05/15/2023 thru 05/15/2023 Range : Today

Report Flags :
Include existing images
Return image counts grouped by users and status

Export

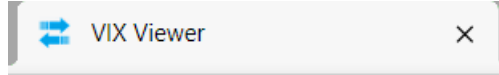
User	Status	Entities	Pages	QA%
Akiona,Kari	Viewable	29	29	
Akiona,Kari		29	29	0
Alaghari,Vydehi	Viewable	4	4	
Alaghari,Vydehi	Needs Review	1	1	
Alaghari,Vydehi		5	5	0
Atteburg,Cedric: 8 OD	Viewable	62	62	

Click **Export** to generate a .csv file using the results.

4.5. Closing the Viewer

To close the Viewer page, click the "X" on the browser tab. See Figure 61 below.

Figure 61: Viewer Close Button



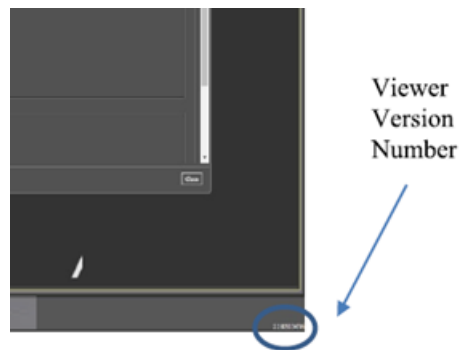
NOTE: Depending on the hosting application, the Viewer page might automatically close when you select a different patient.

5. Troubleshooting

The **View Image Info** main toolbar button can offer data to help you troubleshoot. See Section 4.3.9 for more information.

To display version information and message history about the Viewer, first click the **Viewer Version Number** located in the lower right corner of the Viewer main page (Figure 62).

Figure 62: Viewer Version Number



In the Viewer Information dialog (Figure 63) that opens, click on **Version History** to display version release information or click on **Message History** to display message history items.

Figure 63: Viewer Information Dialog



If encountering issues, clear the cache in the web browser for the Viewer, and refresh the page.

5.1. Special Instructions for Error Correction

Please refer to the VIX Overview - View Image Viewer – Troubleshooting Section in [MAG3_0P348_VIX_ADMIN_GUIDE.PDF](#).

6. Acronyms and Abbreviations

Acronym/Term	Definition
AVI	Audio Video Interleave
BMP	Bitmap
Cache	A temporary storage place allowing faster access to data.
CD	Compact Disc
CDA	Compact Disc Audio
CPRS	Computerized Patient Record System
CT	Computerized Tomography
CVIX	Central Vista Imaging Exchange
DICOM	Digital Imaging and Communications in Medicine
DoD	Department of Defense
ECG / EKG	Electrocardiogram
FDA	Food and Drug Administration
GIF	Graphics Interchange Format
JLV	Joint Legacy Viewer
JPEG	Joint Photographic Experts Group
MOV	QuickTime Movie Format
MP4	Media Picture Experts Group 4
OIT	Office of Information and Technology
PACS	Picture Archiving and Communication System
PDF	Portable Document Format
QA	Quality Assurance
RGB	Red Green Blue
ROI	Release of Information
RTF	Rich Text Format
SVG	Scalable Vector Graphics
TIFF	Tag Image File Format
TXT	Text
VA	Department of Veteran Affairs
VistA	Veterans Health Information System and Technology Architecture
Viewer	Enhanced Image Viewer
VIX	VistA Imaging Exchange Services
WW/WC	Window Level