Operator's Manual

CUBEvue

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CubeVue Operator's Manual

Introduction

It is important to use the software correctly, following all instructions and cautions in this manual and labeling/warnings on the software itself.

For technical support or questions contact CurveBeam at +1-267-483-8081

Cautions and Notes:
Before attempting to use the software, it is recommended to read this manual thoroughly including all cautions and notes. This guide uses the following conventions to describe situations that can cause potential loss of data.

CAUTION
Cautions are intended to alert the user that failure to follow the procedure could cause data loss.

NOTE
Notes are used to highlight important or unusual points to be brought to the operator's attention.

Indications for Use:
CubeVue serves as an accessory to Cone Beam CT extremity imaging devices with the intended use to retrieve, display, and distribute 2D and 3D volumetric image data. The image displaying component allows users to manipulate the images to aid in diagnosis and treatment planning, including rotating and navigating through 3D renderings and 2D MPR slices, adjusting display settings, and making measurements.

It is the user's responsibility to ensure monitor quality and ambient light conditions are consistent with the clinical application.

Overview of the Software:
CubeVue serves as an accessory to Cone Beam CT extremity imaging devices with the intended use to retrieve, display, and distribute 2D and 3D volumetric image data.

CubeVue provides a list of patient scans that have been sent to the image database through its DICOM interface or imported locally by the user. The user can browse, search, and sort the patient list to select a DICOM-compliant patient dataset to view and process thereafter, as needed.

The main screen displays a 3D rendering of the image in addition to axial, sagittal, and coronal slices. In the slices, the user can navigate through the volume by paging and rotating. The user can also adjust the window level, zoom, and pan of the 2D slices. In the 3D rendering, the user can rotate the volume, cut through a plane, and change the displayed tissue density threshold and rendering style. The user can make measurements on the image including distances, angles, and density values. The user can export patient data to a file or media, with the option to anonymize patient demographic information. It supports DICOM and JPEG for image communication. The software does not use any irreversible compression ratios and it utilizes only lossless JPEG compression.

The software is not designed for use with mammography scans.

System Hardware Requirements:

CubeVue requires 64 bit Windows 10 or higher operating system with a minimum of 8GB RAM and screen resolution with a vertical height of at least 1024. It can use any CPU that supports the Intel x64 instruction sets with SSE3 extensions, including AMD-based systems. Administrative rights on the computer are required for the installation of the CubeVue software.

About the Operator's Manual:

This documentation describes the safe and effective operation of the CubeVue software. The information is intended to provide trained technologists and physicians with the necessary guidance to operate the software safely and effectively. CurveBeam assumes no liability for the use of this document if any unauthorized changes to the content or format have been made.

Conventions Used in the Operator's Manual:

Main Menu items and Tabs are in italics.

Cyber Security Recommendations:

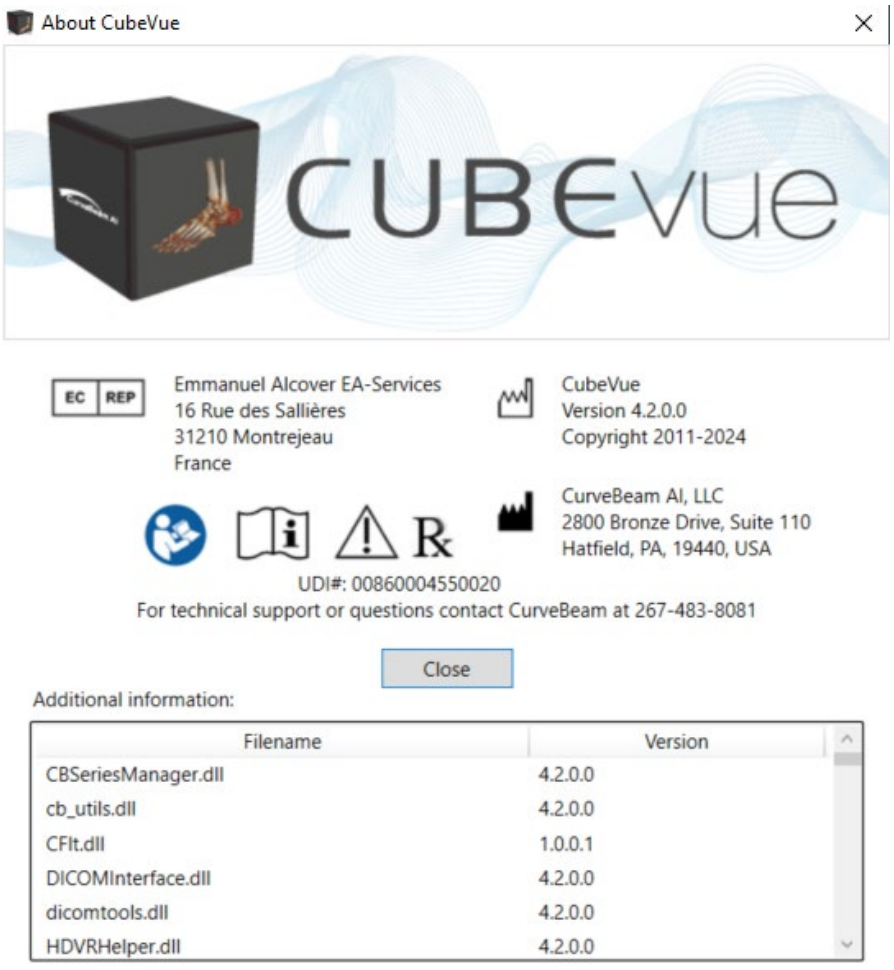
CurveBeam uses commercially available software in the device that may be susceptible to unintended installation of malware or other malicious software that could compromise the full functionality of the device. Therefore, it is highly recommended that steps be taken to protect against possible vectors of infection. An industry standard, commercially available active monitoring program such as anti-malware and antivirus program should be installed to protect the device against such attacks. Other protections such as strong security policies, access control policies and strong network protection including the use of hardware and software firewalls are recommended in addition to active monitoring to avoid infection or otherwise unintended consequences related to infection. It is important to protect the equipment from unauthorized access, unauthorized software and insecure network access. Failure to sufficiently protect the equipment from possible attacks may result in unintended consequences including failure of the device.

Overview of CubeVue Software

CubeVue can be accessed by any computer that is connected to a CurveBeam imaging device (HiRise, PedCAT, LineUP or InReach) server via the facility network and has CubeVue software installed. Or can be accessed as standalone software.

On a computer with the CubeVue software installed, click on the CubeVue icon  to launch the application. It may take a couple minutes for the software to load, but do not click on the CubeVue icon again as this will cause two instances of the application to open.

The 'About' Screen will appear showing software version & details. This can also be accessed by selecting *Settings/About.*



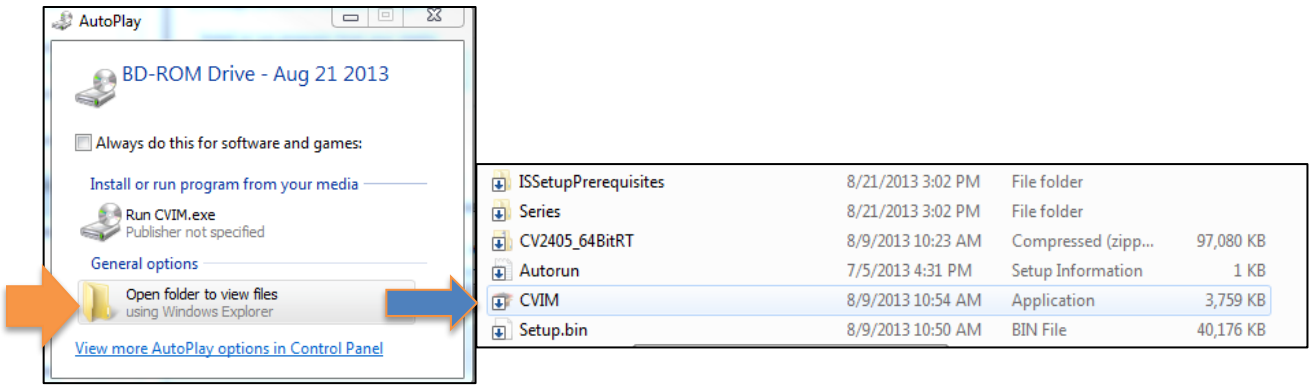
The CubeVue software has the following main components (which are detailed in sections to follow)::

- Patient List: for accessing, importing & exporting patient datasets.
- Review: for reviewing and processing patient datasets.
- Media Export: for transferring patient data and CubeVue installer to external media.

Installing from a Media Export CD

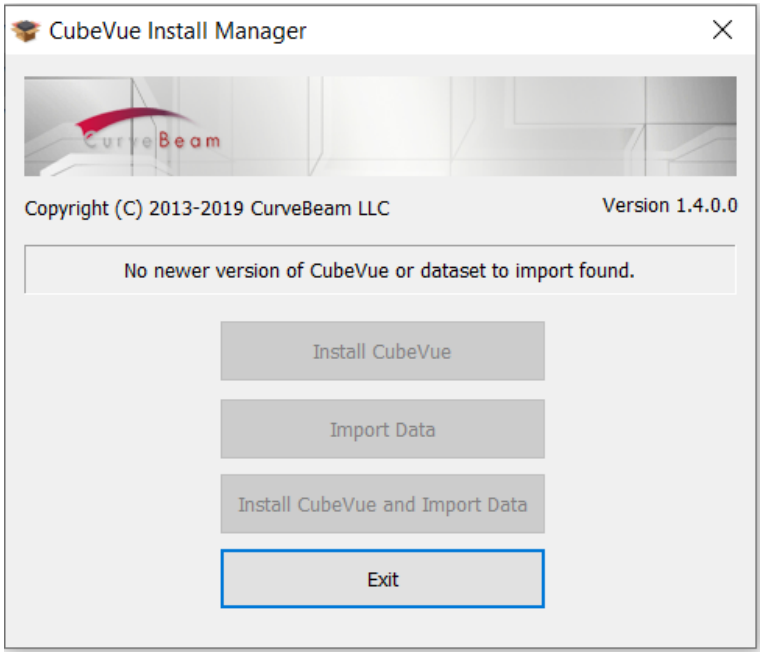
NOTE: Configuration parameters as configured on the 'Settings' UI will NOT be retained when upgrading from a previous CubeVue Beta release (e.g., 3.9.1.995, etc) to CubeVue version 4.2.0.0.
As such, so as not to lose user configured values, the user may take a screenshot of the 'Settings' UI prior to upgrade for reference. Alternatively, the user may choose to copy the 'GlobalDicomReceiver.xml (contained within C:\ProgramData\CurveBeam\CubeVue\Settings)' prior to upgrade and paste it into the mentioned location once CubeVue version 4.2.0.0 has been installed successfully.

- Insert the disk into the disk drive. From AutoPlay, select **Open folder to view files on the disk.**
- Run the **CVIM.exe application** file As Administrator to launch the CubeVue Install Manager.



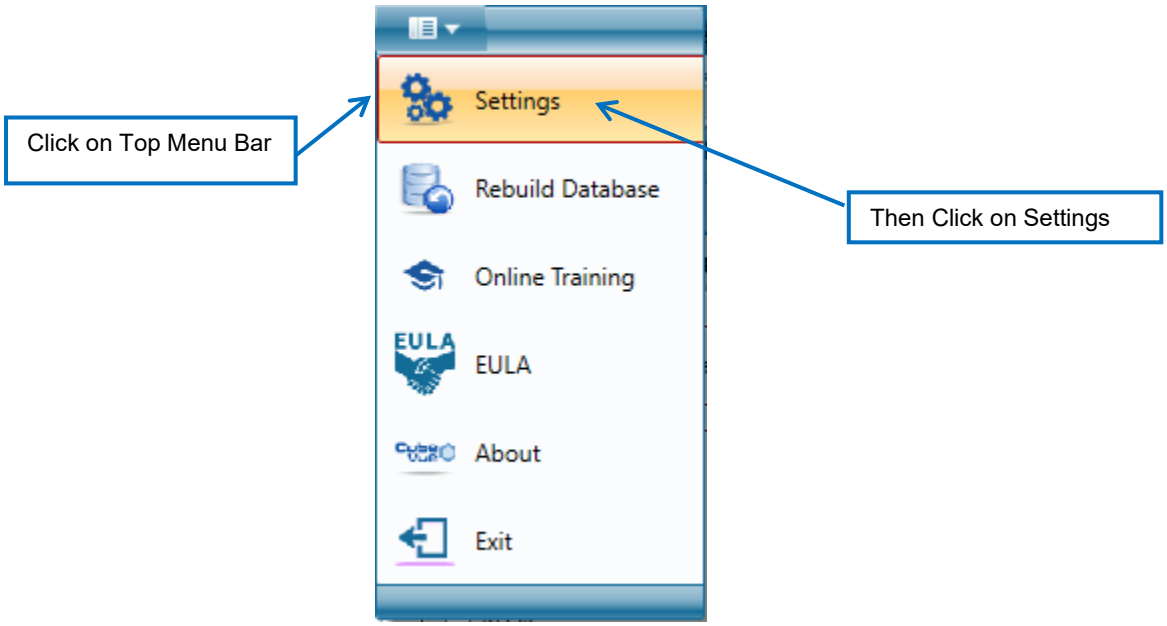
In the *CubeVue Install Manager*, Click **Install CubeVue & Import Data**. If CubeVue is already installed the Install CubeVue button will be disabled, so just import the data by clicking the **Import Data** button. The dataset as well as any Saved Session files and Save as JPG to patient folder files will import.

NOTE: If there were JPEG images that were Saved to Folder on this Media, then those can now be viewed in the 3D rendering window in the Review Tab/Combined 3D/MPR Tab



Settings Options

There are various options available under the CubeVue Settings described in subsequent sub-headings. From the upper left-most menu button, click on Settings as shown below:



From the CubeVue Settings window, click on the Options Tab as shown below: And the Setting pop-up window will appear. Click on the Options Tab as shown below:

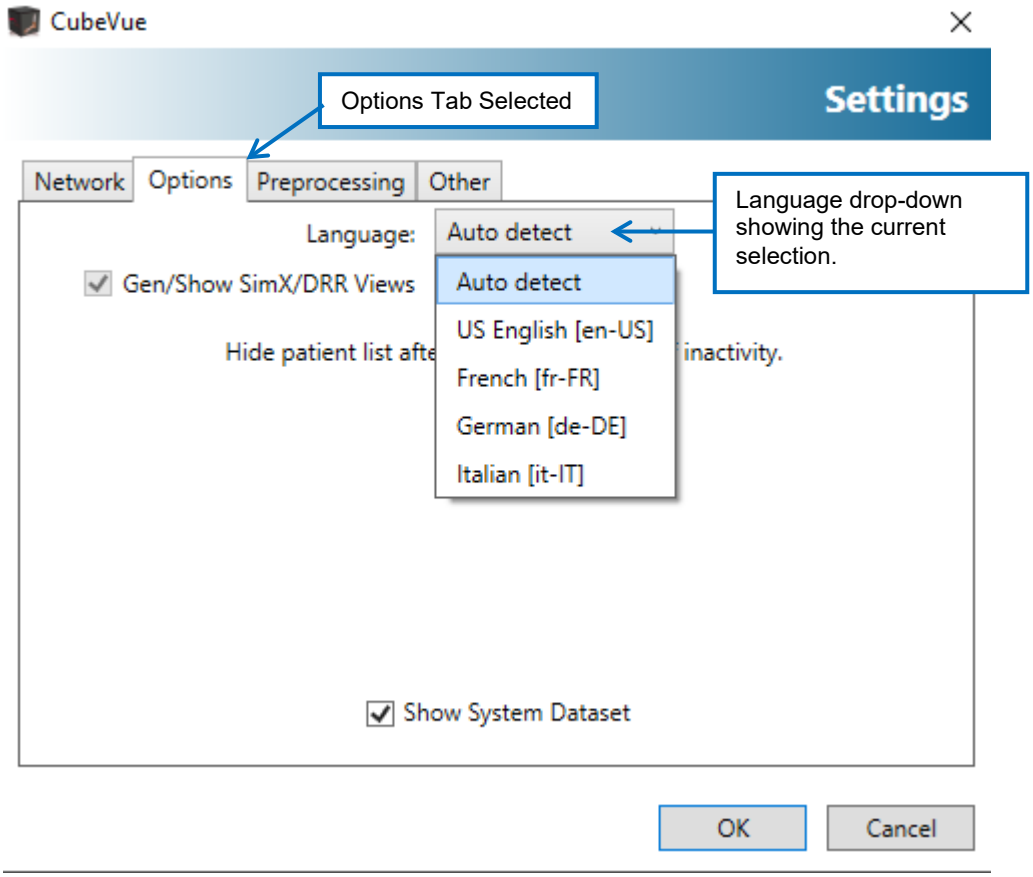
Language Support

CubeVue supports French, German, Italian and English (US) languages.

Under the Options tab, the *Language* option is visible along with the current selection, if the *Auto detect* is selected it will automatically detect the language selected for the Operating System and display CubeVue text (menus, buttons, information messages) accordingly.

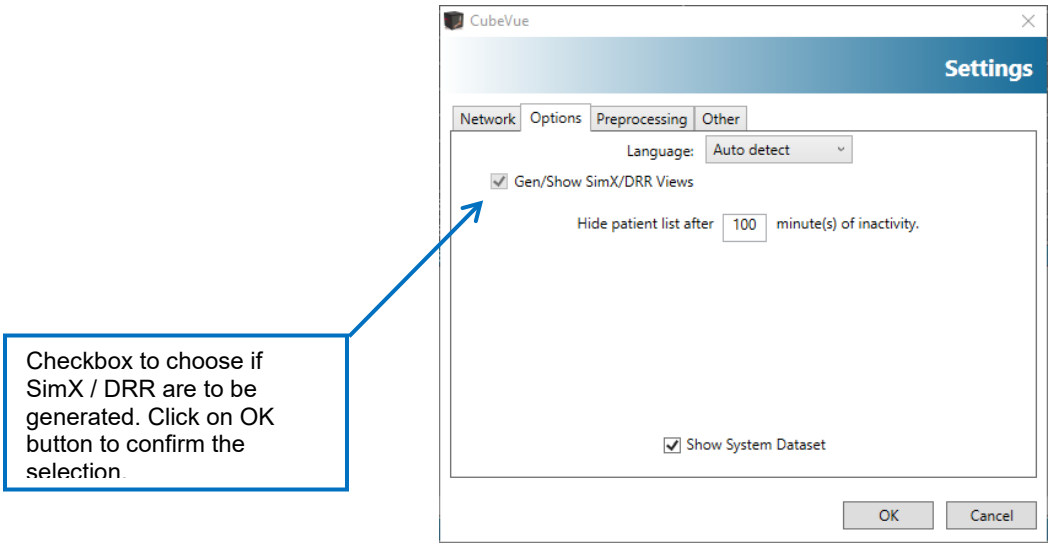
The user can also manually select the desired language.

To do so click on the Language drop-down which will then display the available options as shown below:



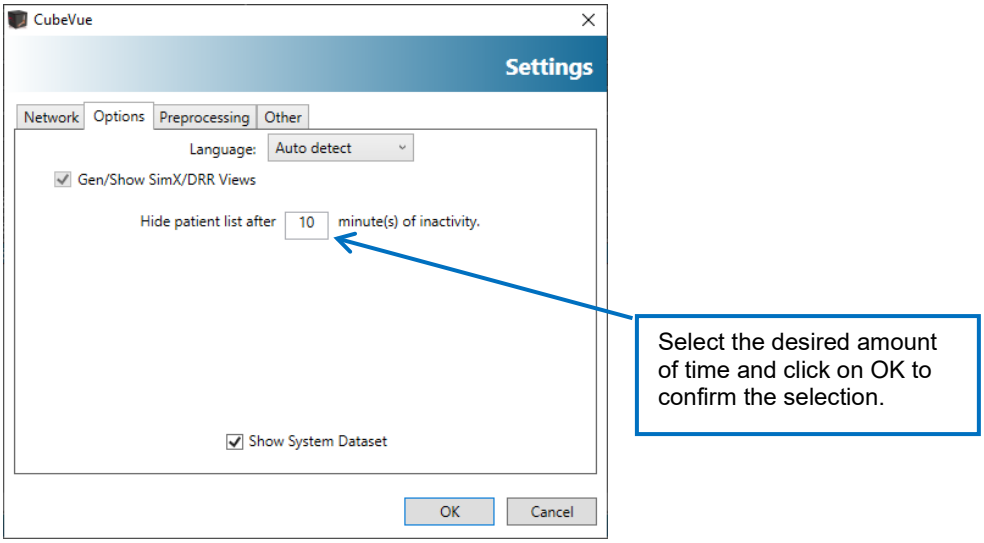
Generate SimX / DRR Views

On the Options tab of Settings a checkbox is present which gives the option to enable or disable the generation of SimX / DRR views. Check the box to generate SimX / DRR views and click on the OK button to confirm the selection.



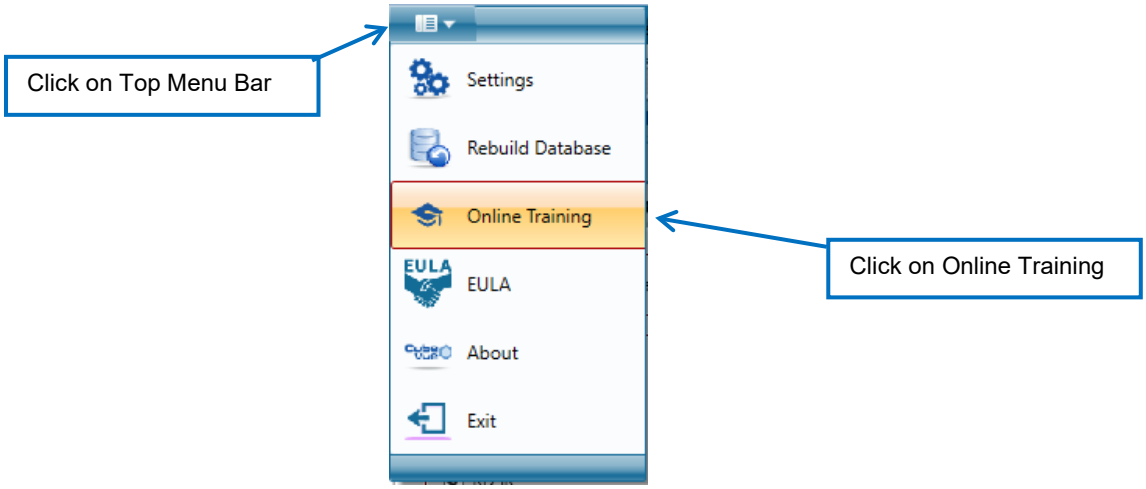
Automatically Hide Patient List and Images After a Desired Amount of Time:

On the Options tab of Settings Hide the patient list after __ minutes of inactivity. The desired amount of time can be entered in the box and click on OK to confirm the selection. The default value set is 10 minutes. When the system is idle for a defined amount of time, the software will hide the patient scan (if already opened) and display the patient list tab with patient list also hidden. The *Hide List* button on the Main Menu Bar can be clicked to hide/unhide the scan and the patient list (See *Patient List*, page 13).



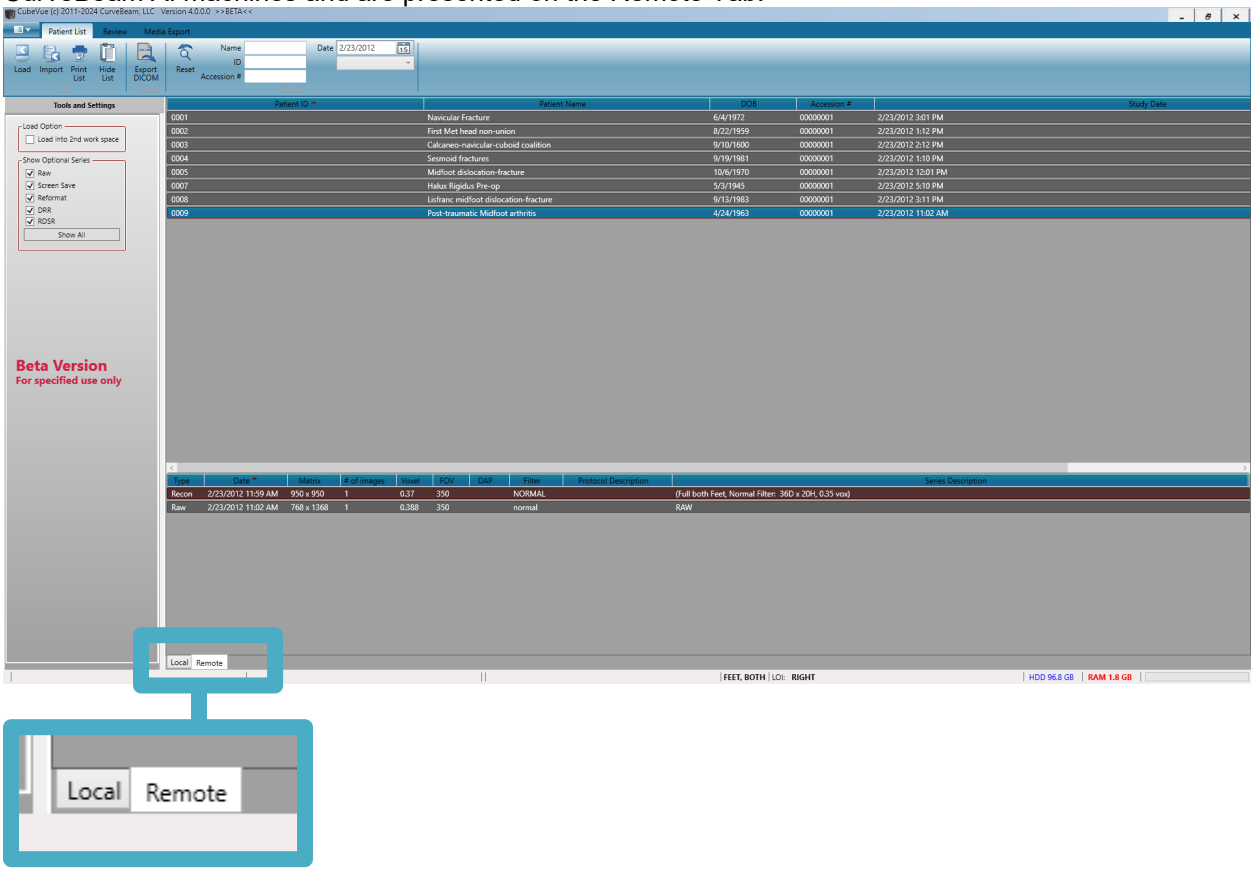
Online Training

The online training option available under the Menu Bar can be used to access the video tutorials of CubeVue software. The computer should be connected to the internet to use this feature.



Patient List Tab

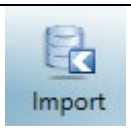
Upon launching the CubeVue application on the users' PC, all available patient study datasets will be displayed in the Patient List Tab. The Patient List is exclusive to the viewing of datasets acquired by CurveBeam AI machines and are presented on the Remote Tab.

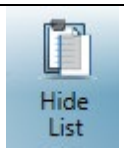
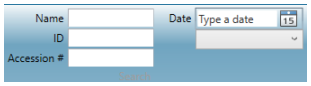


If a patient study dataset is not readily available in the Patient List, the user will be given the option to import the dataset into the Local Patient List or to directly load the dataset from their PC.

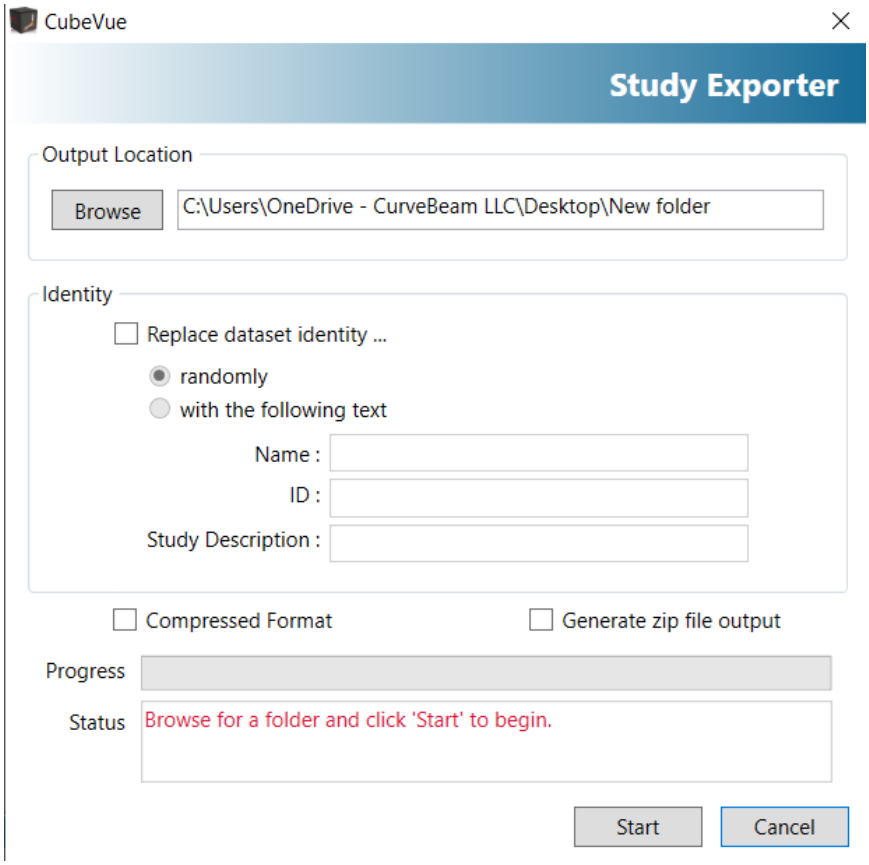
CAUTION – Any changes made to the scan that was opened using the Load Function will not be saved. These changes are only effective during the session in which the dataset is loaded.

Main Menu Bar

Operation	Description
 *Load*	The Load function allows the user to view the Raw or Recon file data from their patient study without importing the data to the Patient List (changes and operations made to the data will not be carried over to the user's next session).
 *Import*	The Import function allows the user to upload their patient study data into the Patient List. Datasets present in the Patient List allow the user to carry over changes and operations to data. An imported study will reside in the Local Tab.

 *Print List*	The Print List function allows the user to print a hard copy of the Patient List.
 *Hide List*	The Hide List function allows the user to maintain HIPAA confidentiality by hiding the Patient List.
 *Export DICOM*	The Export DICOM function allows the user to export patient study DICOM files. This function permits the user to maintain HIPAA confidentiality by providing them the option to anonymize patient information fields. (see additional details below)
 *Reset*  *Search*	The Reset function allows the user to reset any filter criteria (Name, ID, Accession #, and Date). To identify a patient study in the Patient List using Search and Reset, begin by completing the Name, ID, Accession #, or Date field. As the user inputs criteria, the CubeVue application will automatically display all applicable patients in the Patient List. If the desired patient study corresponds to a new patient, the user can utilize the drop-down menu below the Date entry to select the time frame in which the study was acquired.

Export DICOM



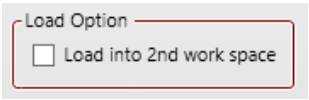
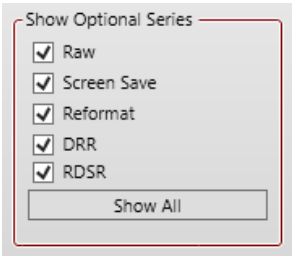
Output Location: allows the user to 'Browse' to a desired location to save exported DICOM files.

Identity: allows the user to replace the Patient Name, Patient ID and Study Description with user provided text. Alternatively, the user can select the 'randomly' radio button to replace the abovementioned DICOM tags with system generated random values.

Compressed Format: this checkbox allows the user to save DICOM files by utilizing lossless compression encoding techniques to preserve the integrity of the original DICOM files.

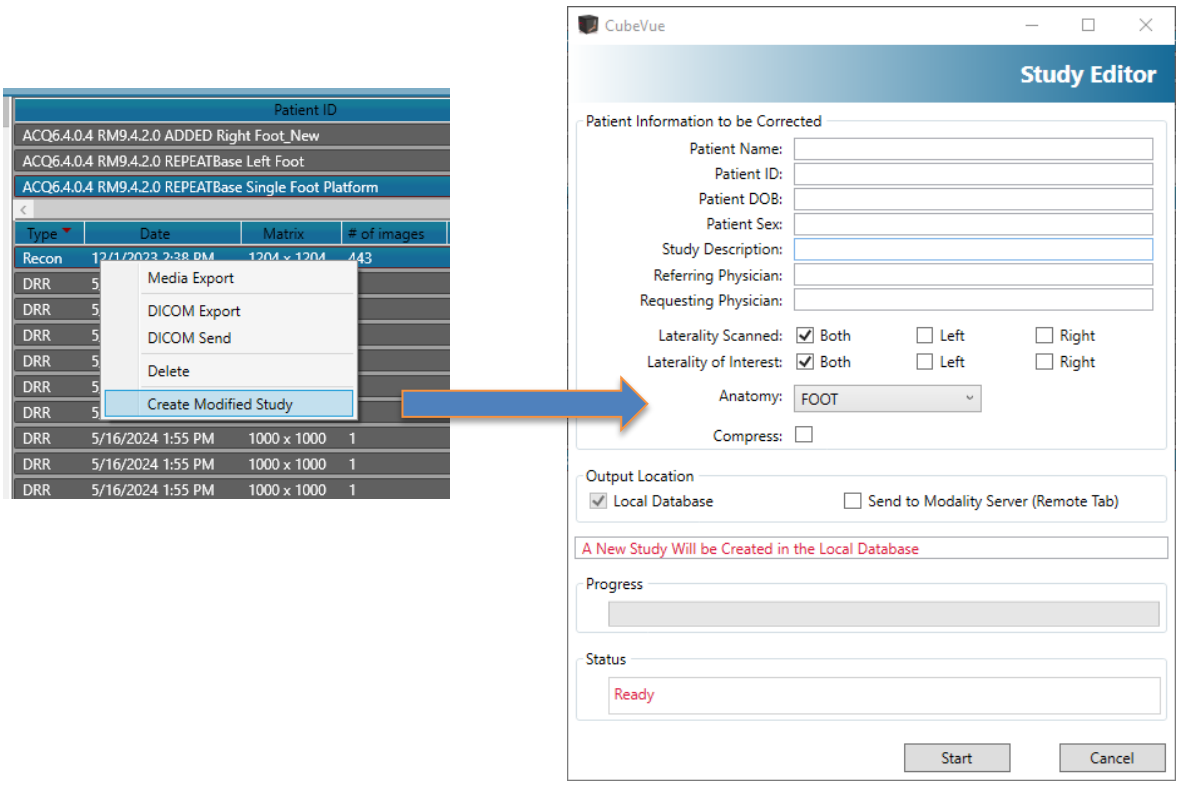
Generate zip file output: this checkbox enables the user to generate a DICOM file in a zipped format, thereby making file sharing easier.

Tools and Settings

Feature	Description
 *Load Option*	The user may load two patient studies in adjacent windows. This feature is useful for the comparison of two scans done on the same person (a progression/before-and-after type case study) or for the comparison of two scans subject to similar evaluation criteria (See *Sync Series*, page 32). To utilize this feature, load the first study and then return to the Patient List Tab and check the "Load into 2nd work space" checkbox before loading the second study.
 *Show Optional Series*	The Show Optional Series checkboxes allow the user to identify and organize patient study data within the patient study menu by applying series type filter criteria. NOTE: With the DRR option not selected, SimX images will be presented in the SimX tab. With the DRR option selected, DRRs will be displayed in the Series list; double clicking on the Recon for such a dataset will render DRR images in place of the SimX images (This is dependent on whether DRRs were acquired when scanning the patient).

Study Editor

If a data entry error occurs during acquisition or import of the patient study, the user may correct this error by right-clicking the associated *Recon/DRR* file and selecting the "Create Modified Study" option to access the Study Editor.



From the Study Editor, the user may edit any of the available patient information fields before saving the corrected patient study to the local database on their computer. Once saved, the corrected patient study will be accessible through the Local Patient List. If the user wishes to make the corrected patient study available to another computer, they must check the "Send to Modality Server (Remote Tab)" checkbox. Doing so will save a copy of the corrected study to the central scan repository corresponding to their CurveBeam AI machine. All patient study datasets within the central scan repository are made accessible to CubeVue users with the proper network setting configuration.

NOTE The Patient DOB field (format: YYYYMMDD) must always be designated before patient study correction is initialized.

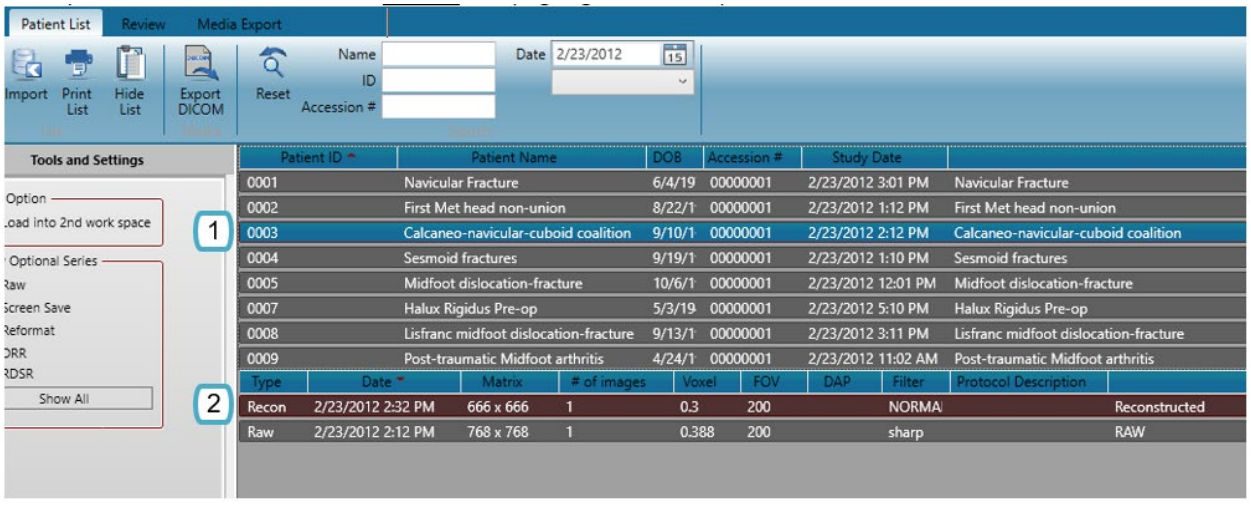
Review Tab

The Review Tab is the environment in which users analyze, enhance, and optimize patient study data.

To launch review mode:

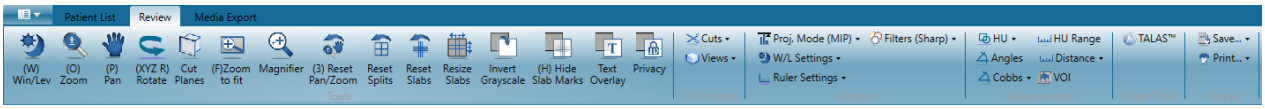
1) From the Patient List Tab select the patient study for a list of associated files to display at the bottom division of the window.

2) Double-click the ***Recon*** file from this list to launch the Review Tab and access the 3D rendering and multi-planar reconstruction of the patient study dataset.



Review Tab Layouts

The Review Tab consists of four viewing windows and a Main Menu Bar (Ribbon) of image processing tools:



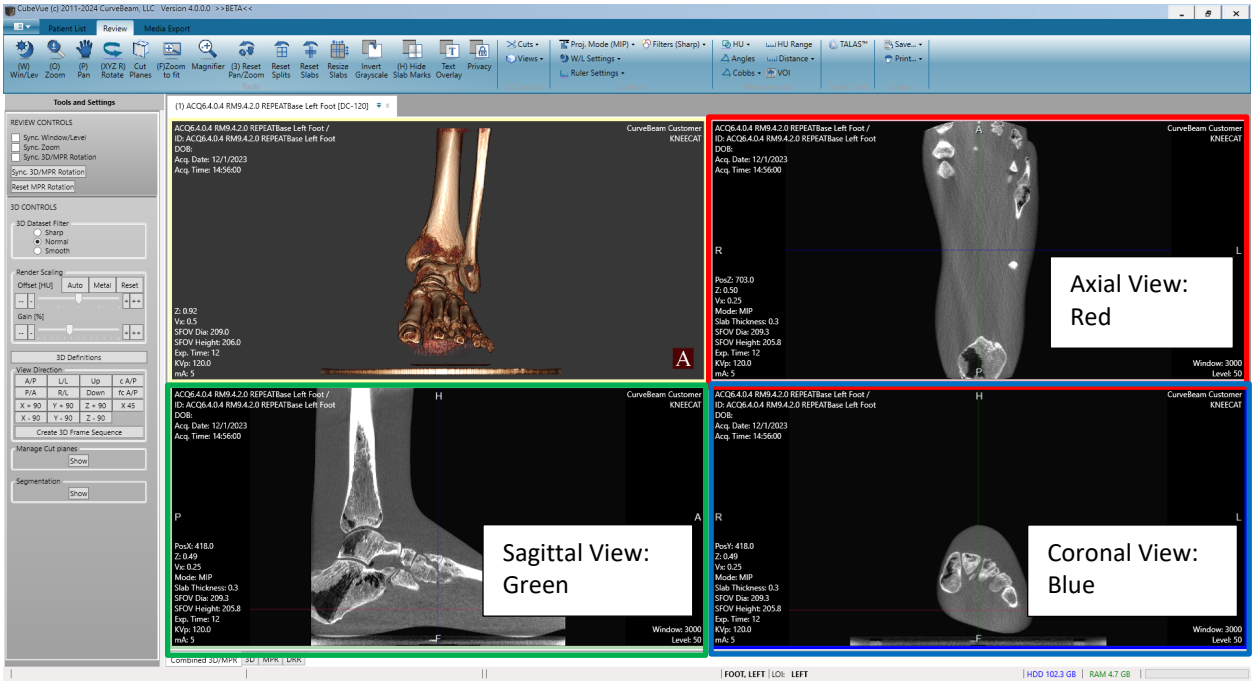
These image enhancement tools prepare and assist the user to optimize the dataset for analysis.

The Review Tab layout is designated by the following tabs:

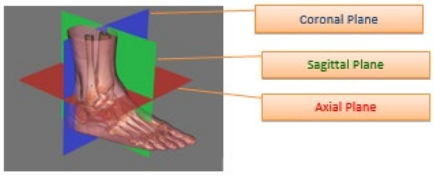
Tab	Function
Combined 3D/MPR	Review a 3D rendering and axial, sagittal and coronal views of the anatomy of interest.
3D	Review a 3D rendering of the anatomy of interest (license file needed).
MPR	Review axial, sagittal and coronal views of the anatomy of interest.
SimX / DRR	Review standard radiographic views.

Combined 3D/MPR Tab

The 3D/MPR Tab consists of four viewing windows and a Main Menu Bar of image processing tools:

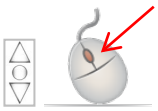


Each MPR window corresponds to an anatomical plane.



- **Axial:** Red plane. Cross-sectional slices from the patient's head to toe.
- **Sagittal:** Green plane. Cross-sectional slices from the patient's left to right.
- **Coronal:** Blue plane. Cross-sectional slices from the patient's front to back.

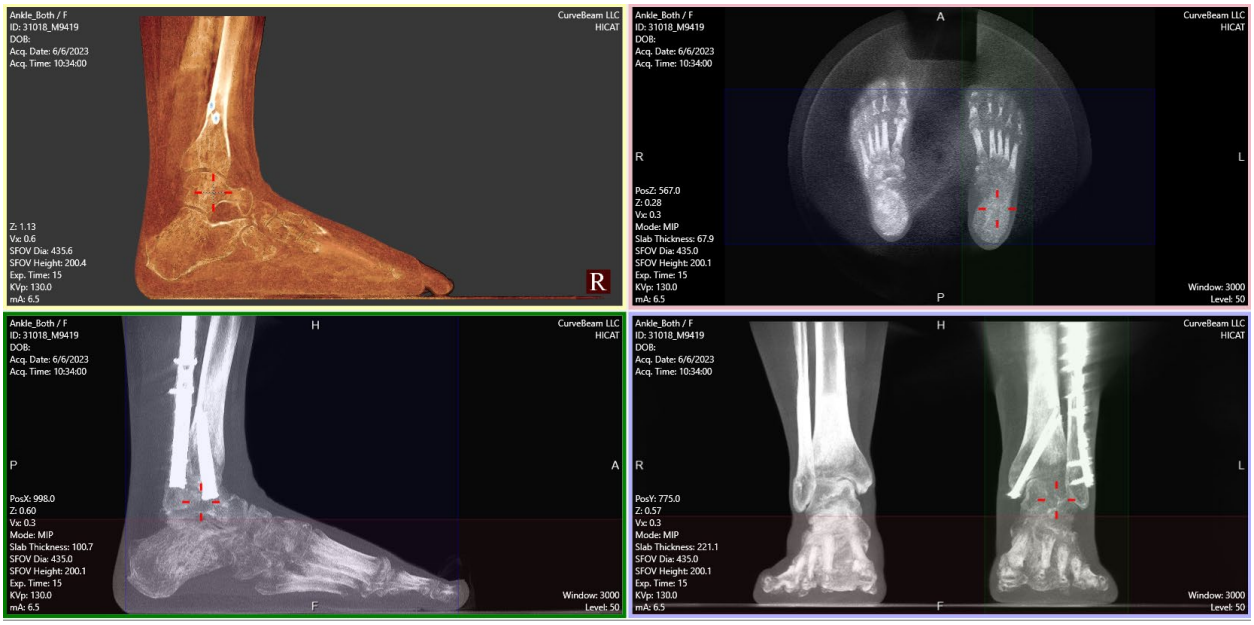
Scrolling through cross-sectional slices in the MPR view

The scrolling cursor is the Default cursor.  To scroll through slices, hover the mouse cursor over a desired view and this cursor should be enabled**. Left Click, hold and drag to scroll through slices.**
Alternately, each colored line in a Window can be clicked and dragged to scroll through its corresponding views (axial, sagittal, or coronal).

The red line that cuts through two images, the Coronal and Sagittal, is the reference point for the Axial slice that is shown in the red outlined box. Moving the red line in either the Coronal or Sagittal views will change the slice location and the image displayed in the Axial view. The red reference markers will always depict the location of the Axial slice. This reference is the same for both the Coronal and Sagittal views as well, with the Coronal in green and the Sagittal in blue.

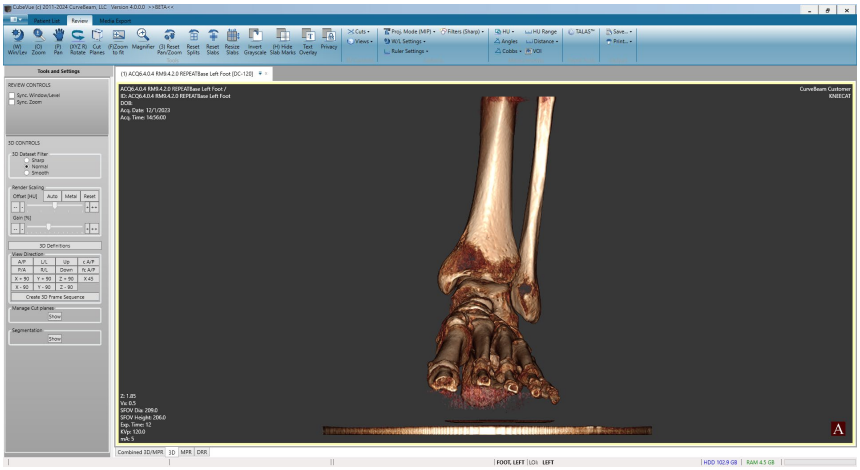
Alternately, for scrolling through slices in fine increments, when the cursor is hovered over an MPR image, use the mouse wheel to scroll through slices.

Correlation/Identify



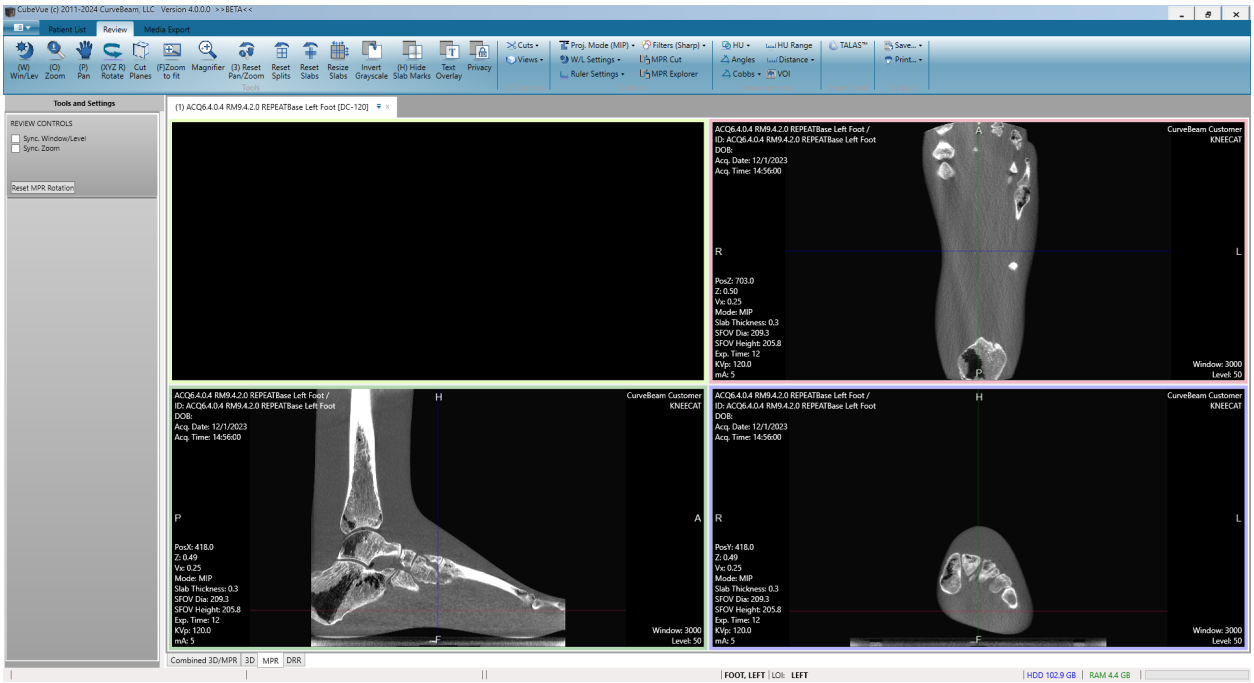
On the ‘Combined 3D/MPR’ and ‘MPR’ screen layouts “i” (for identify) key on the keyboard can be held down while moving the mouse cursor over any part of the MPR slab to see the location of the anatomy in other two MPR slabs. Additionally, in the ‘Combined 3D/MPR’ screen layout a temporary cut plane will cut the 3D rendering such that the location indicated by the current mouse position over an MPR slab, will reside on the cut plane and the location is also marked. This allows the identified locations to be viewed inside the 3D volume. Double-clicking the display in the 3D image window will allow the user to retain the current display even when the “i” key is released. 3D Tab

The 3D Tab consists of only the 3D viewing window.

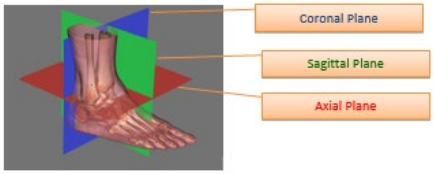


MPR Tab

The MPR Tab consists of three MPR viewing windows.



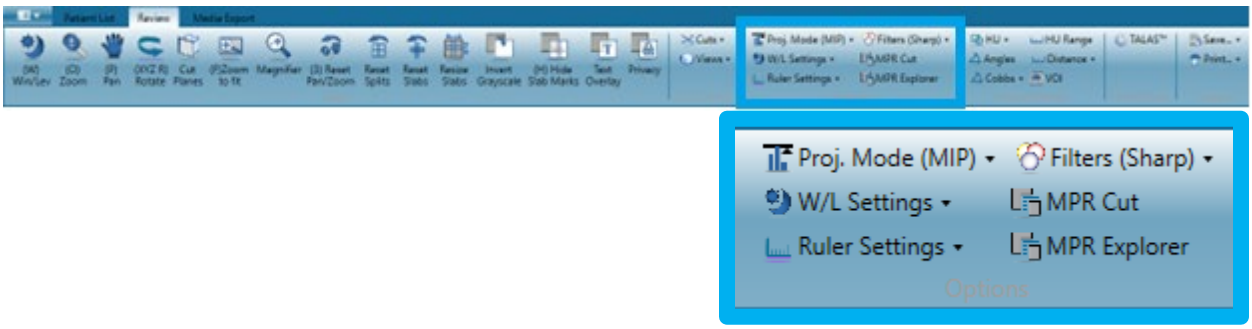
Each MPR window corresponds to an anatomical plane.



- **Axial:** Red plane. Cross-sectional slices from the patient's head to foot.
- **Sagittal:** Green plane. Cross-sectional slices from the patient's right to left.
- **Coronal:** Blue plane. Cross-sectional slices from the patient's front to back.

MPR Cut and MPR Explorer

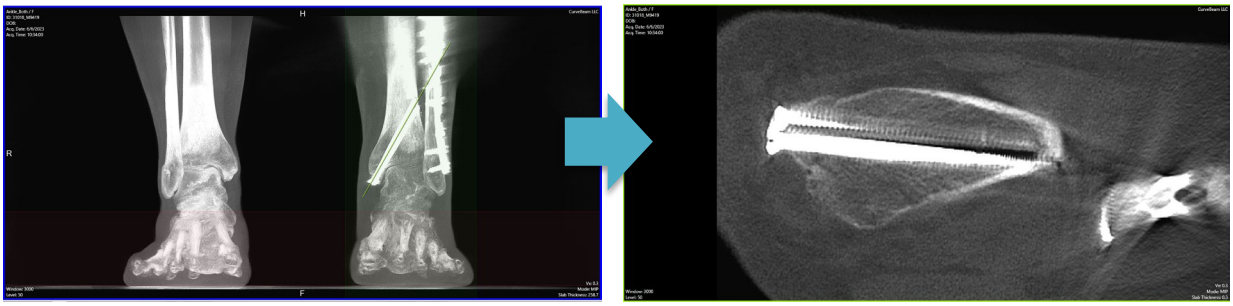
The MPR Cut and MPR Explorer tools are exclusive to the MPR Tab under the Options section of the Main Menu Bar.



MPR Cut

When MPR Cut is selected, the cursor allows the user to draw a “cut line” on any of the three MPR images to display a customized slice in any direction in the upper left-hand corner window.

After selecting MPR Cut, click anywhere in an image to start the MPR Cut Line. The cut line can be straight or curved. For a straight-cut line, click in two spots, then double-click to complete the sequence. For a curved cut line, make multiple clicks in a curved direction.

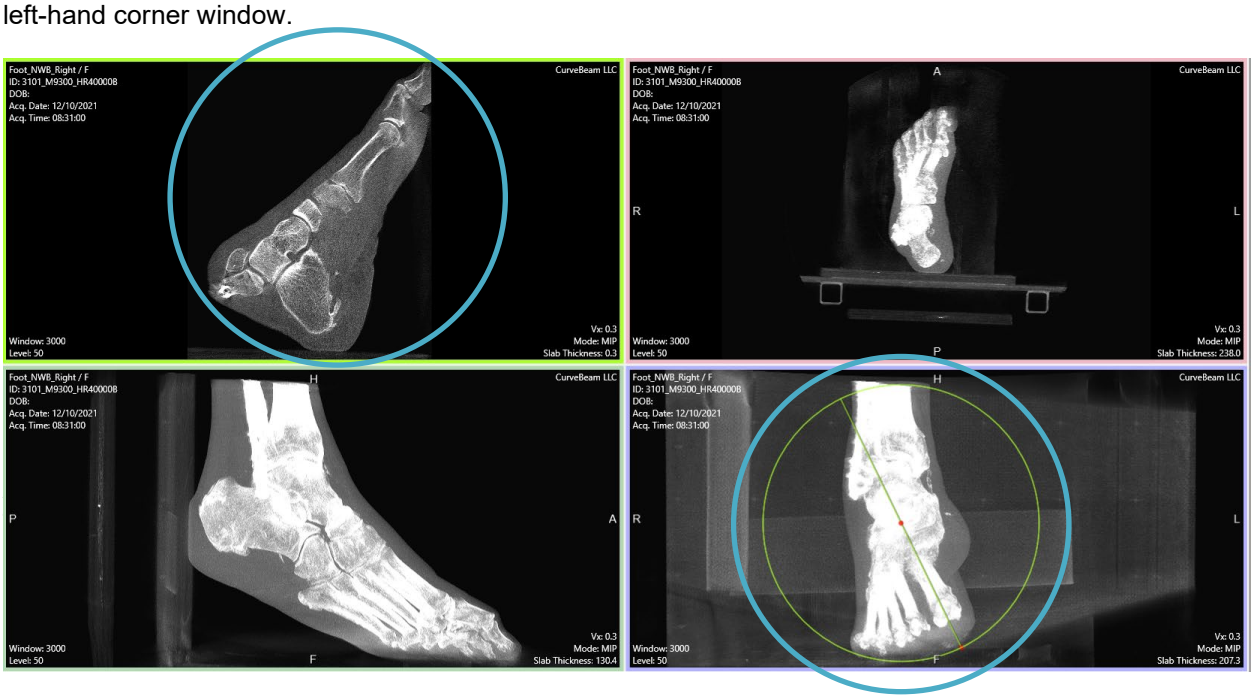


Right-click on the MPR Cut Line for more options:

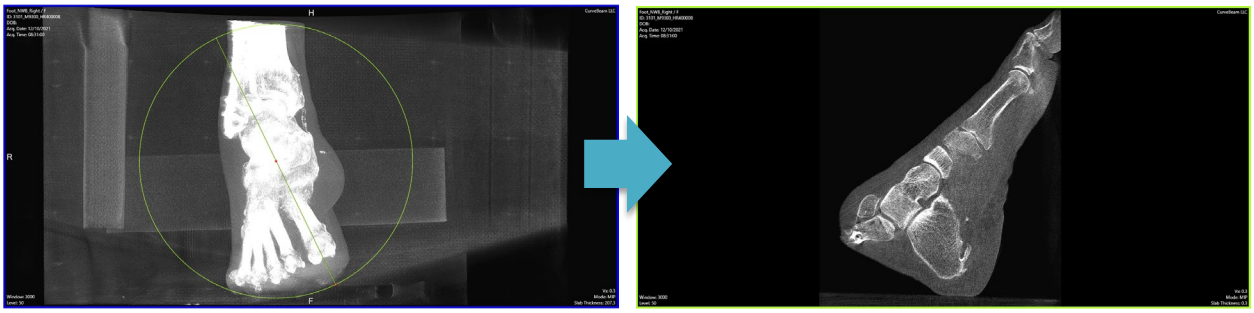
The “Remove MPR Cut line” will remove the MPR Explorer tool from the image. This allows the tool to be placed in a different window if desired. The “Transfer image to SimX page” will transfer the image the tool is on to the SimX tab. To have the image represented by the tool, the image in the lower right-hand window, moved to the SimX tab, right click on that image and select to move it from there.

MPR Explorer

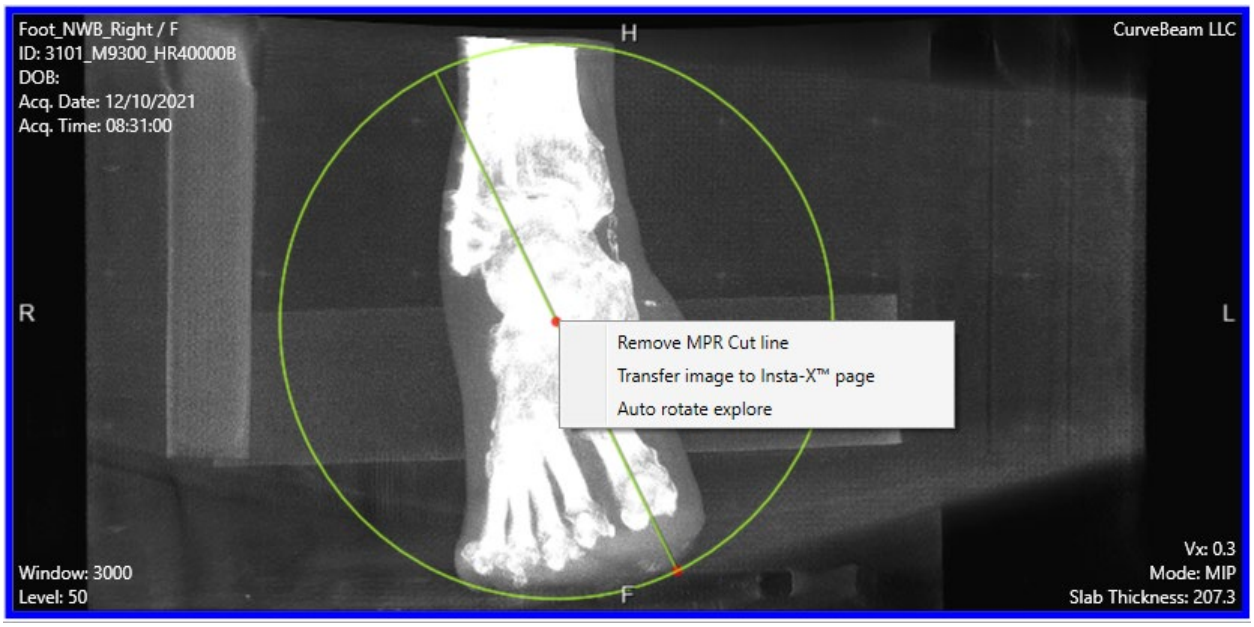
When MPR Explorer is selected, the cursor allows the user to set a focal point on any of the three MPR images to display customized slices from every direction radiating out from the focal point in the upper left-hand corner window.



The MPR Explorer can be moved around the image by clicking on the center red dot and dragging the tool to the desired location. To expand the area displayed, click on the red dot on the outer edge of the circle and drag the dot for either a larger or smaller region to view using the tool. Also use the red dot on the outer edge of the circle to rotate it around to view different images in the upper left-hand window. The image shown will correspond to the green line drawn through the circle, so as the red dot is moved around the circle, the image in the upper left-hand corner will adjust accordingly.



Right-click on the center green line, with the cursor that points up, to get the following options:



The “Remove MPR Cut line” will remove the MPR Explorer tool from the image. This allows the tool to be placed in a different window if desired. The “Transfer image to SimX page” will transfer the image the tool is on to the SimX tab. To have the image represented by the tool, the image in the lower right-hand window, moved to the SimX tab, right click on that image and select to move it from there. To allow the image to rotate freely without needing to manually rotate it, select the “Auto rotate explore” option. Right-clicking on the outside of the circle will do all the same options except it will not allow for the auto-rotate option.

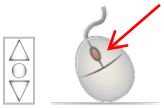
To use the MPR Explorer tool in a different MPR window, such as changing from axial to sagittal window, delete the tool from the axial window and redraw it in the sagittal window.

These tools are exclusive to the MPR Tab and become enabled in the Options section of the Ribbon.

Scrolling through cross-sectional slices in the MPR view

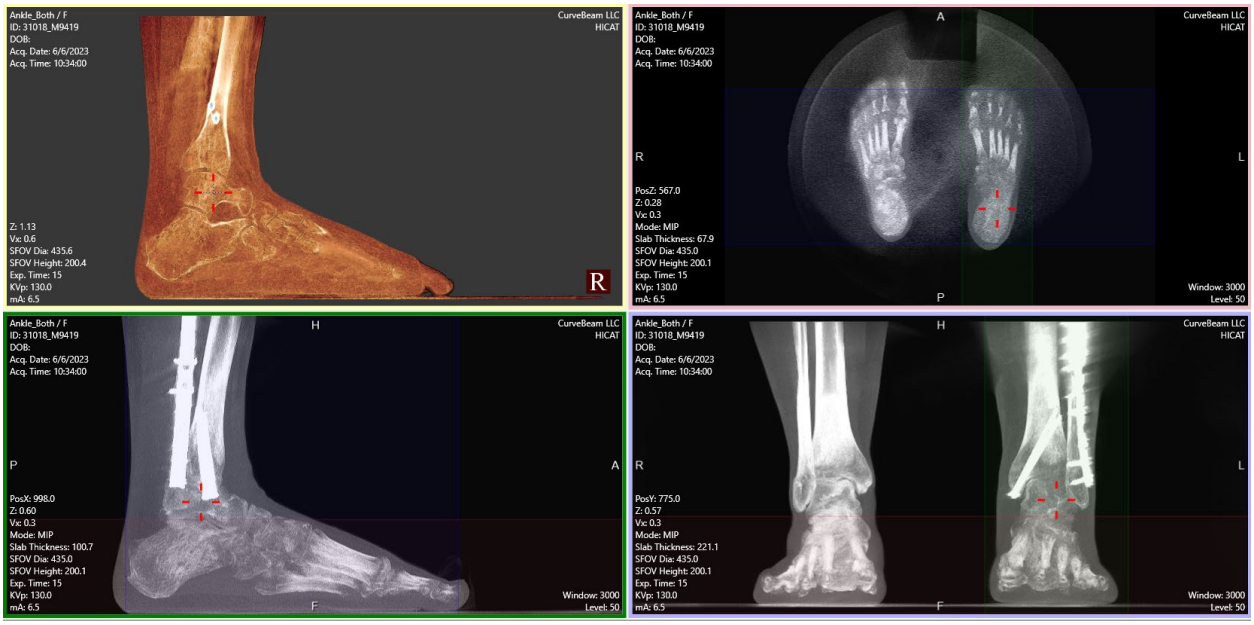
The scrolling cursor is the Default cursor.  To scroll through slices, hover the mouse cursor over a desired view and this cursor should be enabled**. Left Click, hold and drag to scroll through slices.** Alternately, each colored line in a Window can be clicked and dragged to scroll through its corresponding colored views.
The red line that cuts through two images, the Coronal and Sagittal, is the reference point for the Axial slice that is shown in the red outlined box. Moving the red line in either the Coronal or Sagittal views will change the slice location and the image displayed in the Axial view. The red reference markers will always depict the location of the Axial slice. This reference is the same for both the Coronal and Sagittal views as well, with the Coronal in green and the Sagittal in blue.

Alternately, for scrolling through slices in fine increments, when the cursor is hovered over an MPR image, use the mouse wheel to scroll through slices.



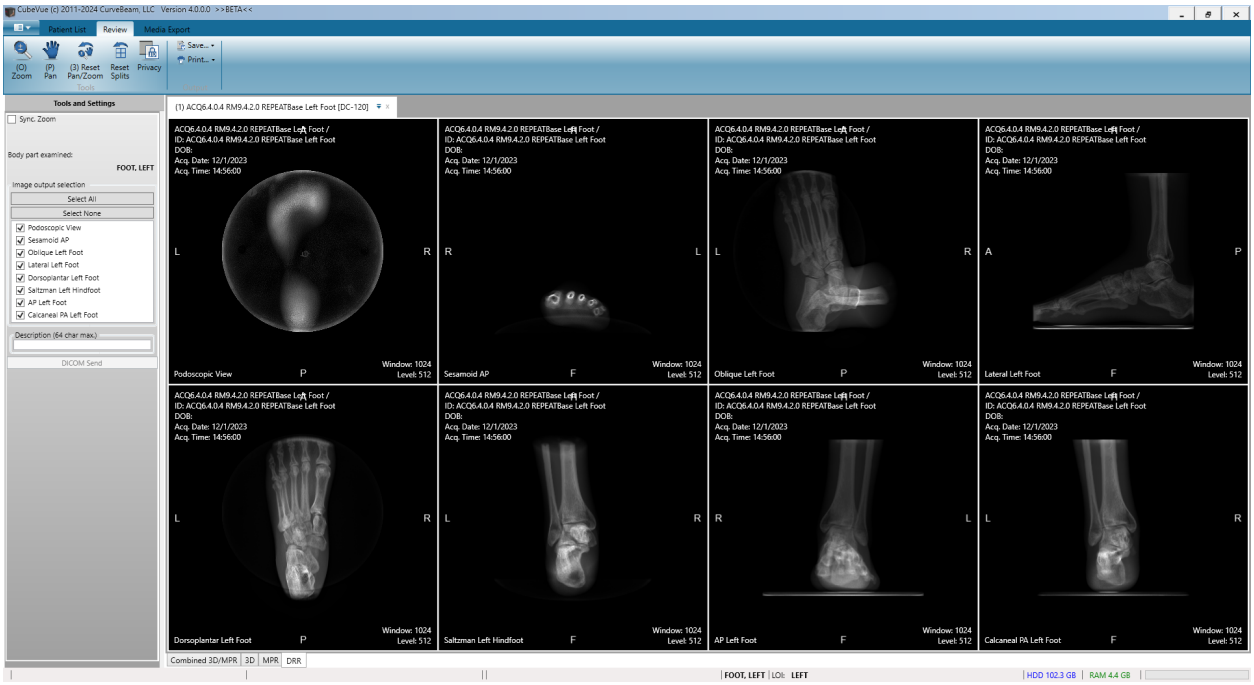
Correlation/Identify:

On the ‘Combined 3D/MPR’ and ‘MPR’ screen layouts “i” (for identify) key on the keyboard can be held down while moving the mouse cursor over any part of the MPR slab to see the location of the anatomy in other two MPR slabs. Additionally, in the ‘Combined 3D/MPR’ screen layout a temporary cut plane will cut the 3D rendering such that the location indicated by the current mouse position over an MPR slab, will reside on the cut plane and the location is also marked. This allows the identified locations to be viewed inside the 3D volume. Double-clicking the display in the 3D image window will allow the user to retain the current display even when the “i” key is released.

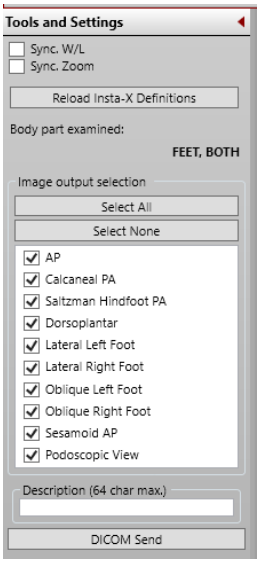


SimX / DRR Tab

The SimX / DRR tab is used to display the standard X-ray views as shown below:



The number of default SimX images may vary depending on the type of anatomy scanned. For instance, a both-feet scan will have more SimX images compared to a single foot scan. To show only certain images, the checkboxes (left pane) should be selected accordingly. *Select All* and *Select None* buttons help in selecting all or none images respectively with a single click. The Tools and Settings selection for the SimX tab is shown below:

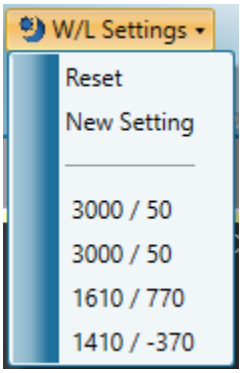


The Description field in the above image depicts the description given for the selected image and can be changed as desired. Just type in the field and the corresponding image will have the description updated.

All images can be viewed full screen by double clicking on them. All of the usual measurement and navigation functions, such as Pan, Zoom, etc are still accessable. *Sync. W/L* checkbox can be checked if the Window/Level needs to be changed for all the SimX images simultaneously; the Window/Level for all the SimX images will become same in that case. *Win/Lev* button from the main menu bar can be used to change the Window/Level. Similarly check *Sync. Zoom* checkbox and then change the zoom level of a single image to change the zoom level of all SimX images to same level simultaneously.

Any of the non-3D images throughout the software can also be added to the SimX tab by right-clicking on them and selecting “Transfer image to Sim-X page”.
Once the W/L is changed for any desired Sim-X from its default value, this change is retained; the dataset (e.g. Left foot) can be unloaded and if the same dataset is reloaded or a similar type of another dataset (e.g. Left Foot) is loaded, even for the first time, then the Sim-X image will have the W/L value set by user. Following are the steps to undo or reset the W/L of any particular SimX image to its default value:

- Select the desired SimX image by clicking on it.
- Make sure the Sync. W/L checkbox is NOT checked if the reset is required for any particular SimX image.
- Now from the ribbon menu click on W/L Settings and select the Reset option as shown in the screenshot below:

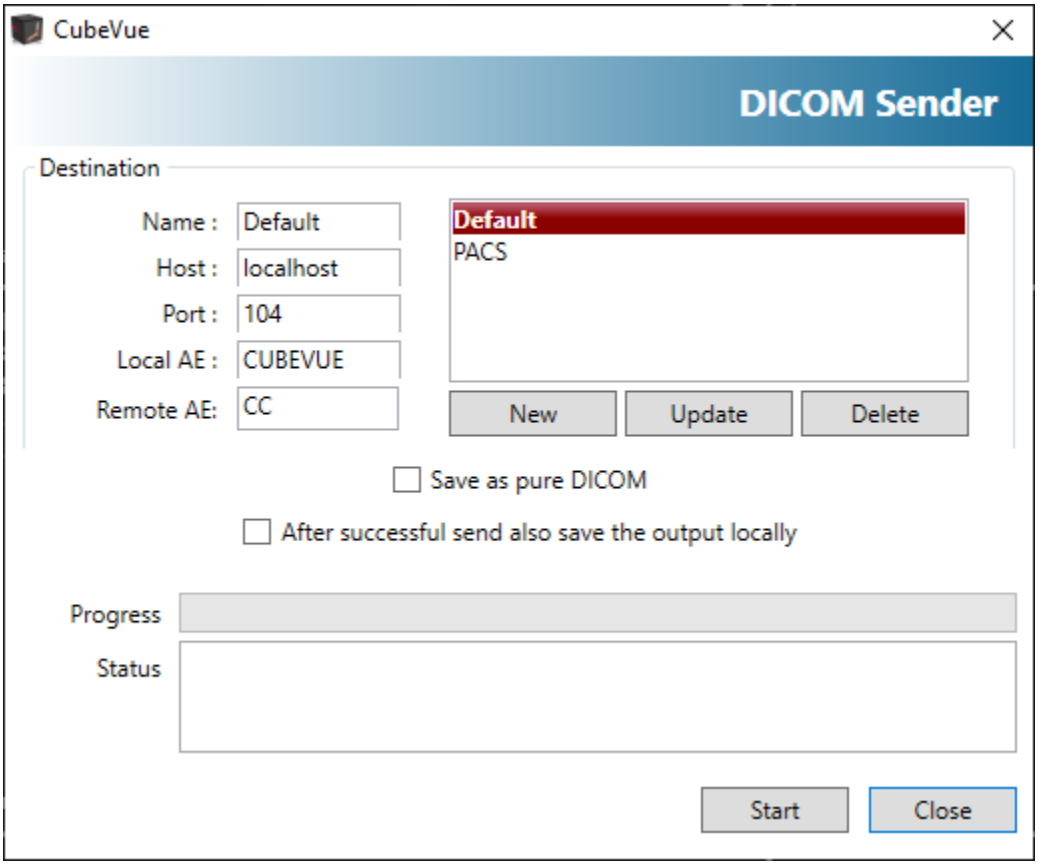


- If W/L of all SimX images need to be reset in one go, check the Sync. W/L checkbox and then from the ribbon menu click on W/L Settings and select the Reset option as shown in screenshot above.

Reload SimX Definitions: This button reloads SimX images and is normally used when any change is made in SimX definitions. Pressing this button reflects the changes in SimX definitions without the need to restart CubeVue. It is recommended to contact CurveBeam technical support if the customer wants to make any change in definitions of SimX images.

NOTE: Please be aware that if customer clicks on this button all the SimX images will be reloaded and all measurements on SimX images will be removed unless saved in the *Session*. If measurements are saved in sessions, then the Saved Session can be loaded to restore saved measurements.

DICOM Send*:* When the *DICOM Send* button is selected, the DICOM Sender box will be displayed. In this window, one or multiple **Destinations** for the data send can be configured. Configure a Destination with the appropriate data and click the **Update** button to Save. To add another Destination, click on **New** and edit the Destination items, click Update to Save. Once one or more Destination(s) are configured, they will remain in the list unless deleted.

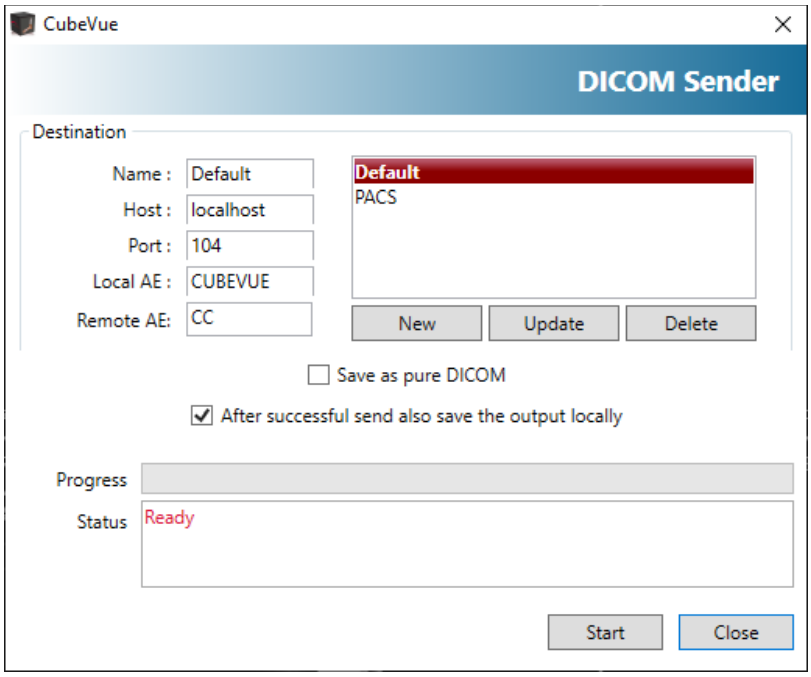


SimX images can be sent as pure DICOM objects or DICOM-wrapped JPG imagery. The former allows HU-based Window/Level manipulations while the latter allows alpha-numeric overlays, like distance and angle measurements, or the reference length scale.

To send the SimX images as “pure DICOM objects”:

1. Select the *Save as pure DICOM* checkbox shown in the DICOM Sender dialog.
2. Selecting Save as pure DICOM checkbox will disable the ‘*After successful send also save the output locally*’ checkbox. So, CubeVue currently does not allow local saving of pure DICOM SimX images.
3. Make sure the correct and desired DICOM Destination(s) is/are selected on the DICOM Sender dialog.
4. Click on Start button to send the SimX images as pure DICOM to a desired DICOM destination; the images will be sent and status bar will show “Completed” as shown in screenshot on right side.
5. Close the DICOM Sender dialog.

To send the SimX images as DICOM-wrapped JPG imagery, un-check the “Save as pure DICOM” checkbox in the above steps. This also enables the checkbox which when checked allows SimX images to be saved locally after a successful send as shown in the screenshot below (notice the enabled checkbox “After successful send also save the output locally”):

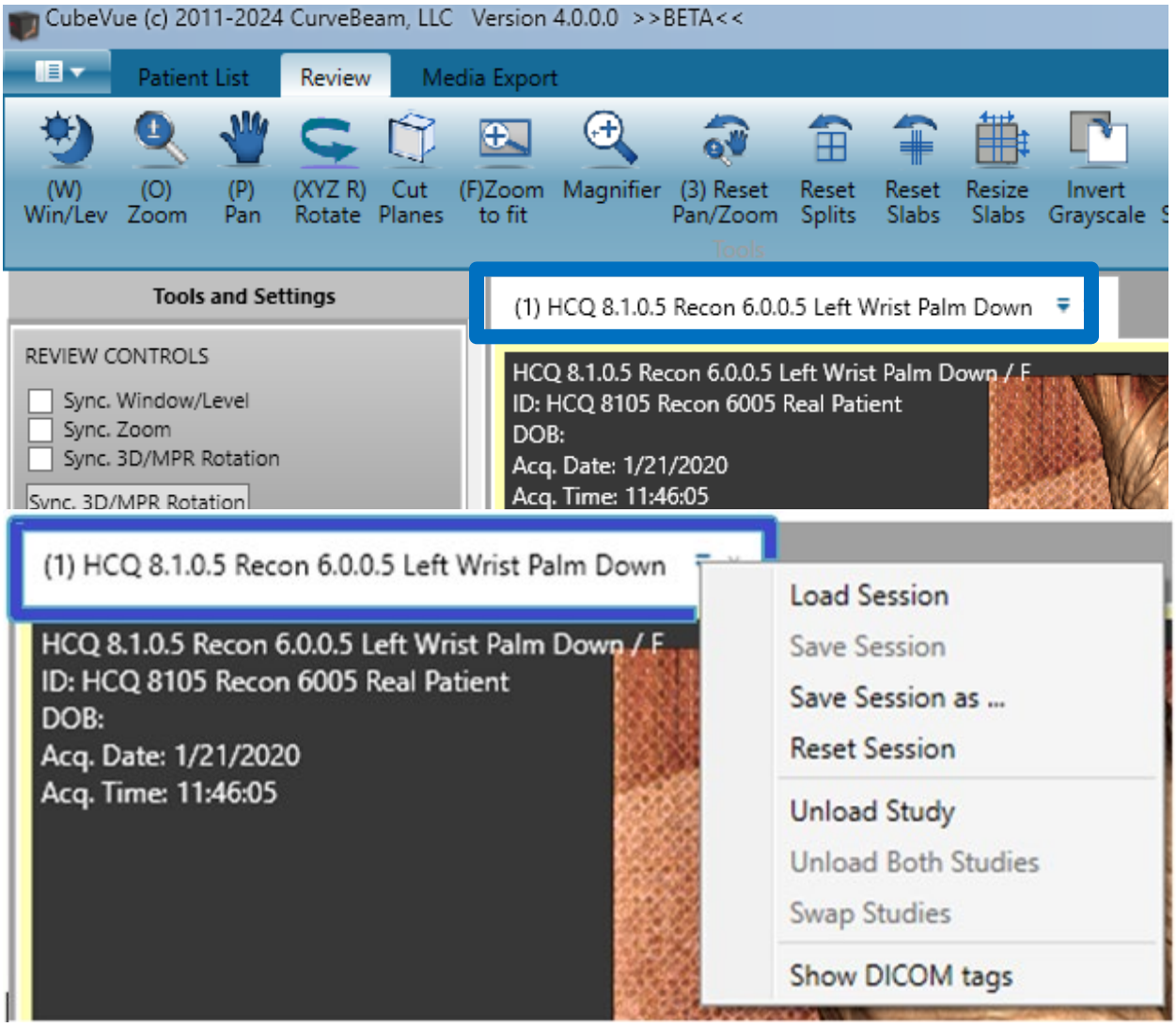


NOTE: There will be no overlays on the receiving end on the SimX images sent as pure DICOM.

CAUTION: All SimX images sent as pure DICOM do not have orientation markers and name information. This information is the same for all SimX images i.e. all the images have the same name and orientation marker information.

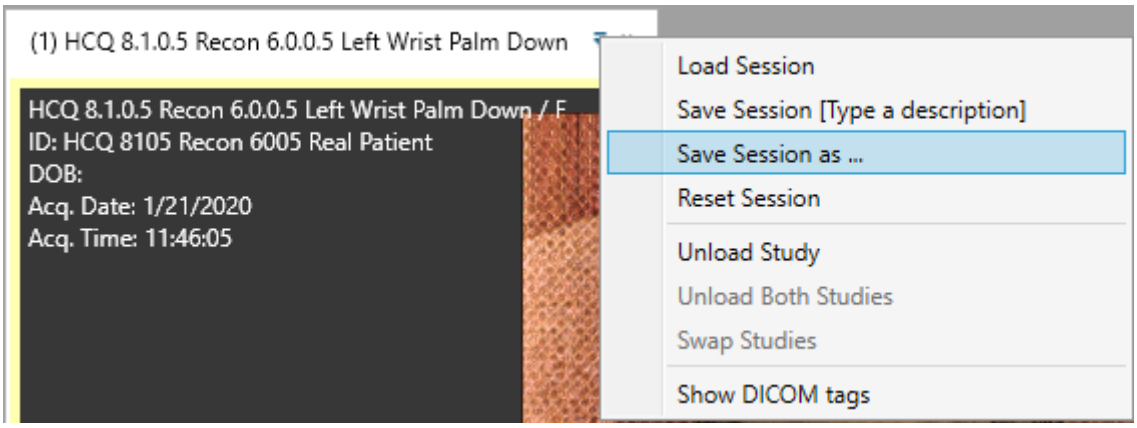
Saving Sessions and Series Tab Functions

When a study is loaded, the Patient Series Tab will display that current study name. The dataset can also be closed or "unloaded" from this tab by clicking on the **"x"** in the corner. The session work that has already been completed will be auto saved, so when the study dataset is re-loaded again, the session's work will automatically load.

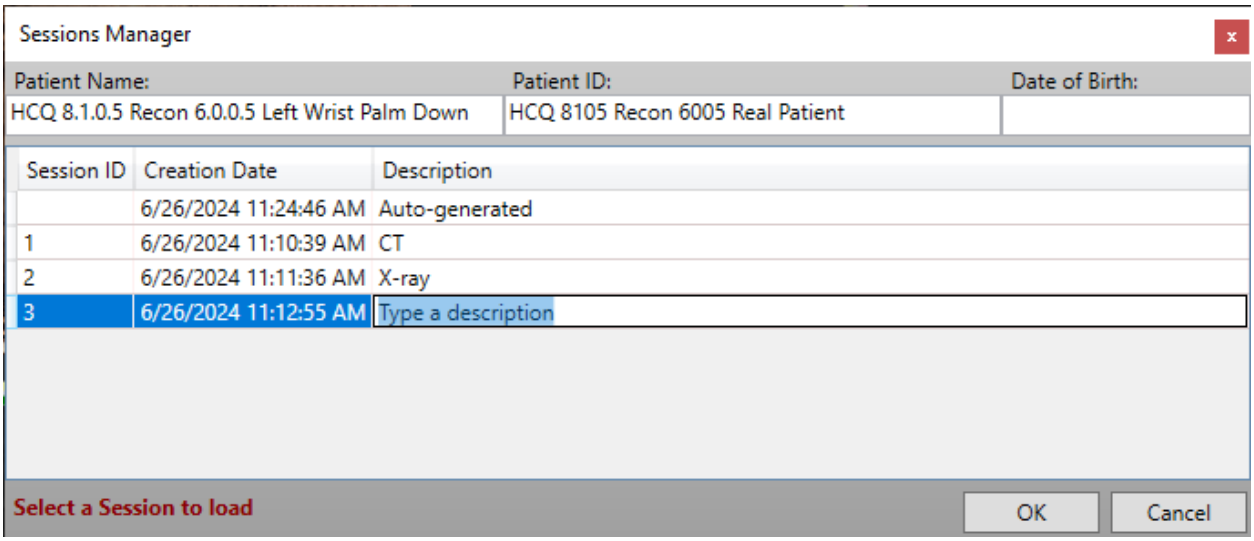


However, there is also a drop-down menu that provides a "Save Session" functionality to save several different sessions if the need arises.

Click the drop-down icon to access the drop-down menu to save the session:



From this menu, then select “Save Session as …” for the Session Manager Dialog Box. Enter an appropriate Session Name over the “Type a Description” Session Description. Click inside this text box to enable the cursor for typing. Click OK to close the Session Manager.



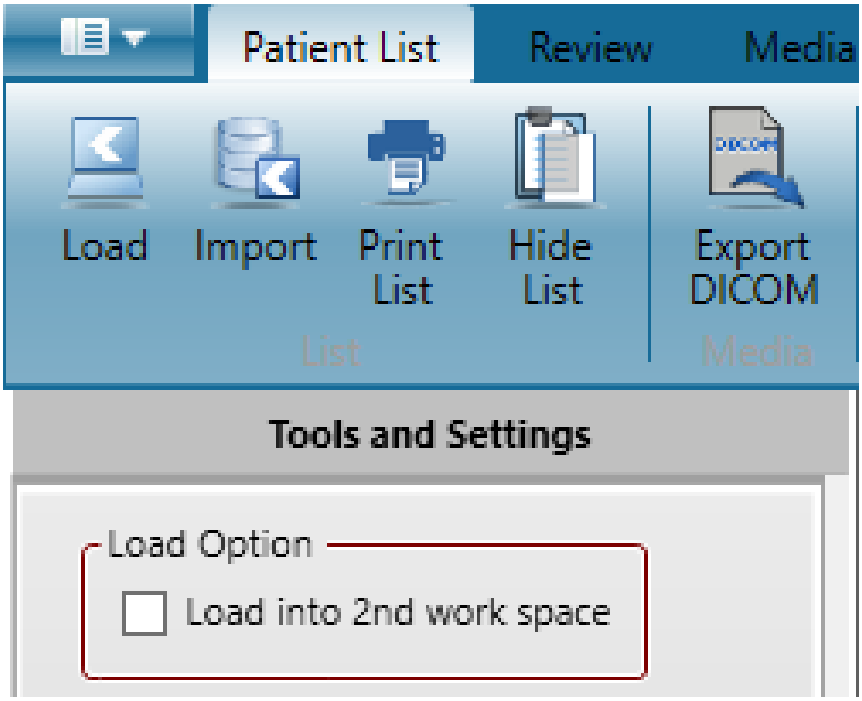
Then at any time, a Saved Session can be accessed and loaded by selecting “Load Session” from the drop-down menu. This will open the Session Manager where you can then highlight the desired Session and click OK to load.

From the drop-down menu, the Dataset Study can also be Reset, which will re-load the original dataset to its original state prior to modifications. And a Dataset Study can also be “unloaded” from this drop-down menu as well.

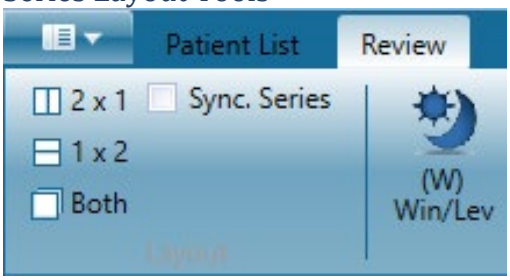
CAUTION – If a session is not saved before closing or not saved before Reset, the modifications will be unavailable.

Sync Series

CubeVue allows the user to have more than one scan loaded at the same time. This can be useful when comparing two scans done on the same person, a progression or a before-and-after type scenario, or comparing aspects of the scan in CT and X-ray mode simultaneously. This is accomplished by first loading up a single scan. Then, from the Patient List tab (at the top), click first on "Load into 2nd work space" and then select the second series (scan) to open from the patient list.

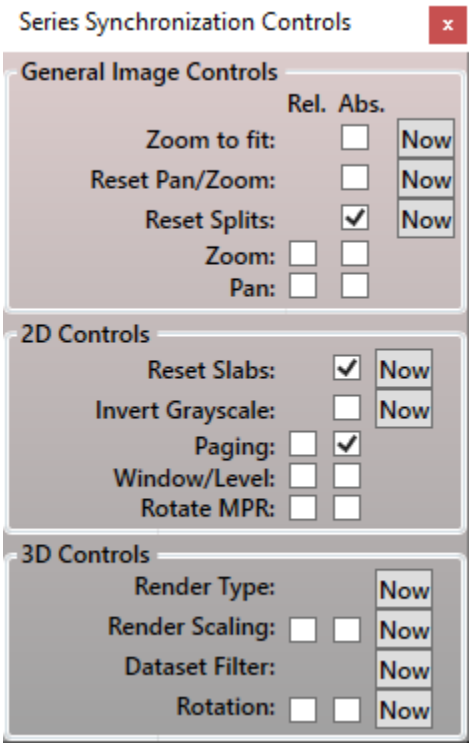


Series Layout Tools



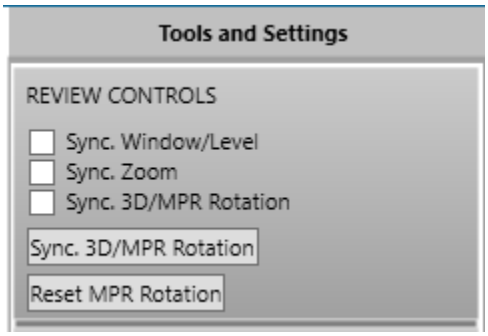
The user can select which way to view the images, either both of the scans in a vertical mode (select 2x1) or a horizontal mode (select 1x2). The limit to the number of scans that can be opened at once is just two scans. To remove the scan and load a different second scan, close the series to be unloaded and then return to the Patient List. Repeat the steps above to load a different series into the 2nd workspace.

Series Synchronization Controls



Tools and Settings

Review Controls



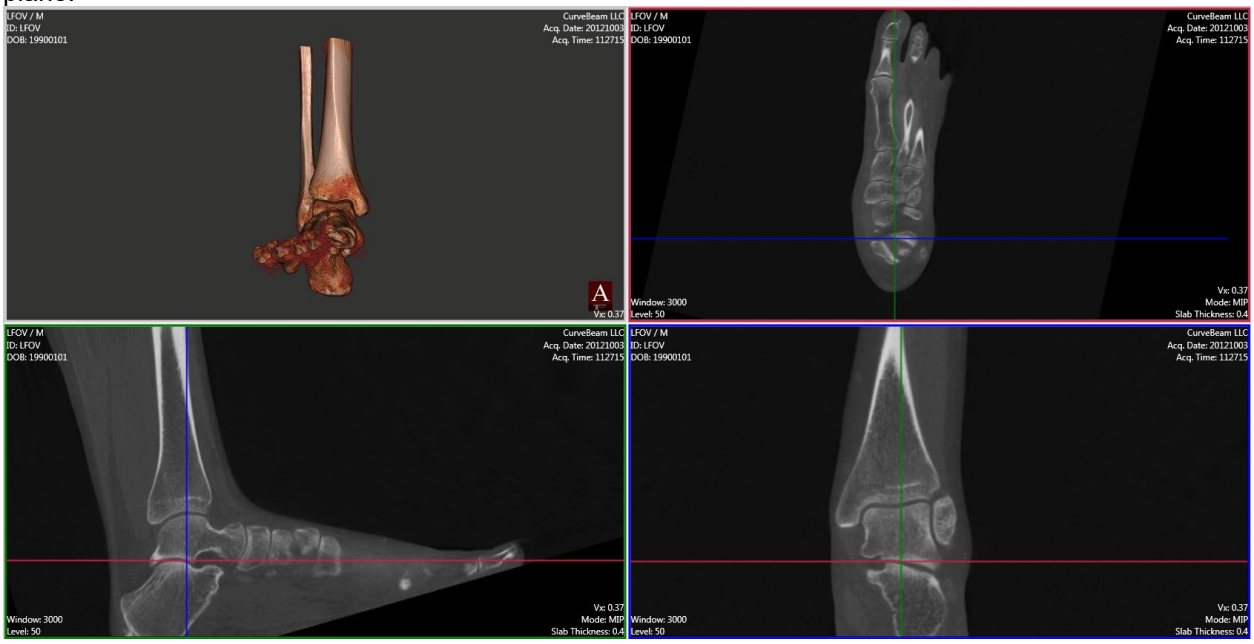
Review Controls	Description
Sync. Window/Level	Window/Level adjustments to an MPR image will be applied to all MPR images.
Sync. Zoom	Zoom adjustments to an MPR image will be applied to all MPR images. See 3D/MPR Rotations, page 36).
Sync. 3D/MPR Rotation	Rotation of the 3D rendering will be applied to all MPR images. See 3D/MPR Rotations, page 36).
Sync. 3D/MPR Rotation (Button)	Current rotational position of the 3D rendering will be applied to all MPR images. See 3D/MPR Rotations, page 36).
Reset MPR Rotation	MPR images will revert to default positions (See A/P View Direction, page 49).

3D/MPR Rotations

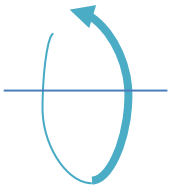
The default image planes of MPR views are as the scan was taken. However, if you wish to rotate or tilt the MPR images to different planes, this can be achieved using the 3D rendering and the Sync 3D/MPR functionalities.
Below is an example.
If this is the starting view below and then the 3D image is tilted upwards either with the Sync 3D/MPR Rotation or by clicking the button after the rotation, then the MPR rotation will change from picture A to picture B:

Picture A: the 3D rendering is in an A/P direction.

Picture B: The 3D rendering has been rotated with the toes up slightly. Observe how the upward tilt of the 3D rendering is now reflected in the MPR views. The first metatarsal is now on the same horizontal plane.

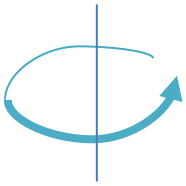


For fine control of the X, Y and Z rotations of the 3D rendering, press the associated keyboard letter and HOLD while rotating the 3D image.



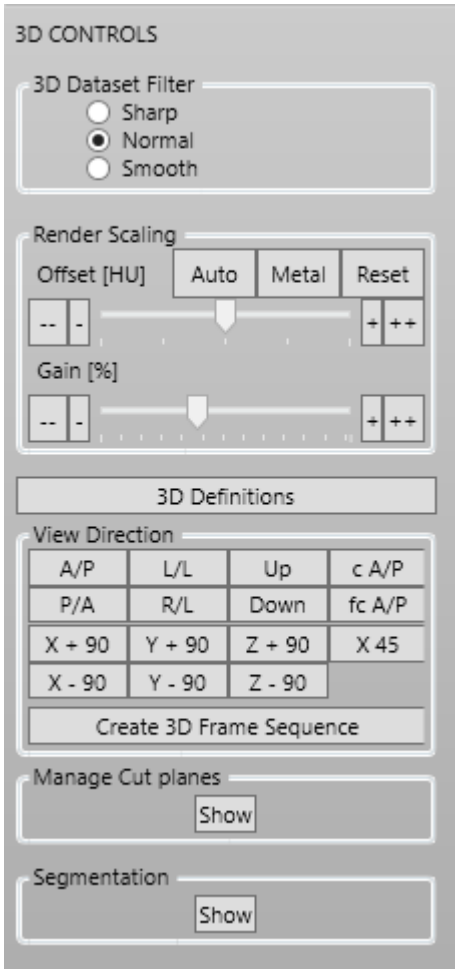
X key: Hold the key down and move the mouse up or down on the 3D rendering. This will tilt the rendering in an even up/down plane.

Y key: Hold the key down and move the mouse in a clockwise or counterclockwise direction and this will move the 3D rendering clockwise or counterclockwise.



Z key: Hold the key down and move the mouse left or right on the 3D rendering. This will tilt the rendering in an even side-to-side plane.

3D Controls

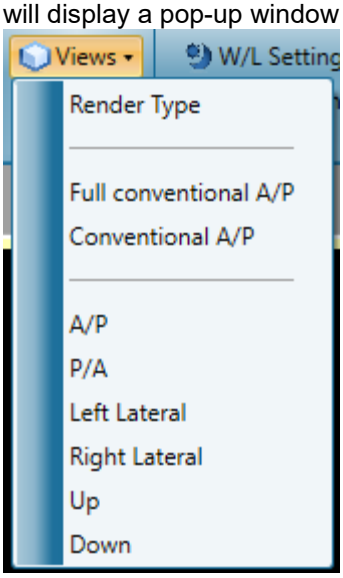

3D CONTROLS
3D Dataset Filter
Sharp
Normal
Smooth
Render Scaling
Offset [HU]
Auto
Metal
Reset
--
-
+
++
Gain [%]
--
-
+
++
3D Definitions
View Direction
A/P
L/L
Up
c A/P
P/A
R/L
Down
fc A/P
X + 90
Y + 90
Z + 90
X 45
X - 90
Y - 90
Z - 90
Create 3D Frame Sequence
Manage Cut planes
Show
Segmentation
Show

3D Dataset Filter

The 3D Dataset Filter adjusts the resolution of the 3D rendering.

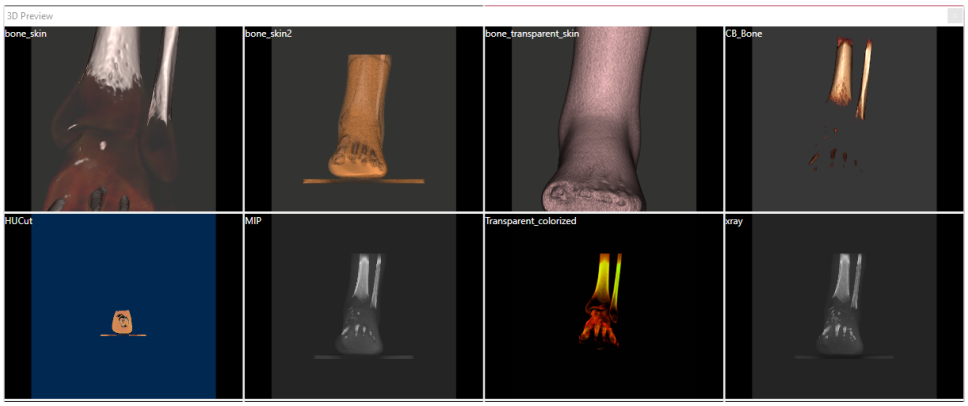
Render Types/Render Scaling

CubeVue provides preset 3D Definitions in the Render Type menu selection. To select from these various 3D Rendering types, click on the Views icon in the 3D Control area from the main menu bar. This will display a pop-up window with various options to select from. Select Render Type.

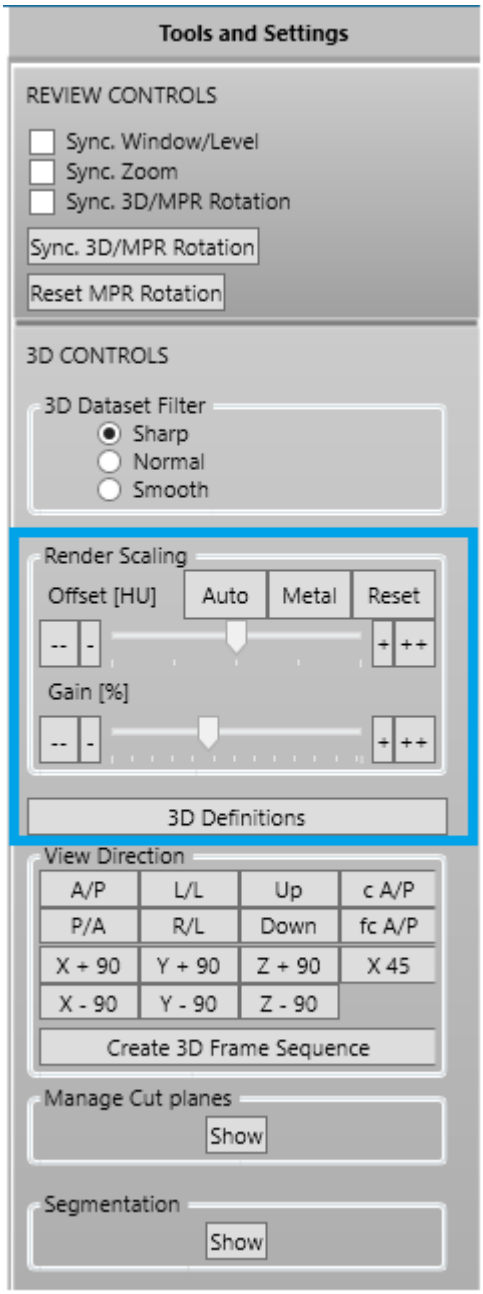


When Render Type is selected, a window will display thumbnails of the various default types of 3D renderings currently available, some of which are:

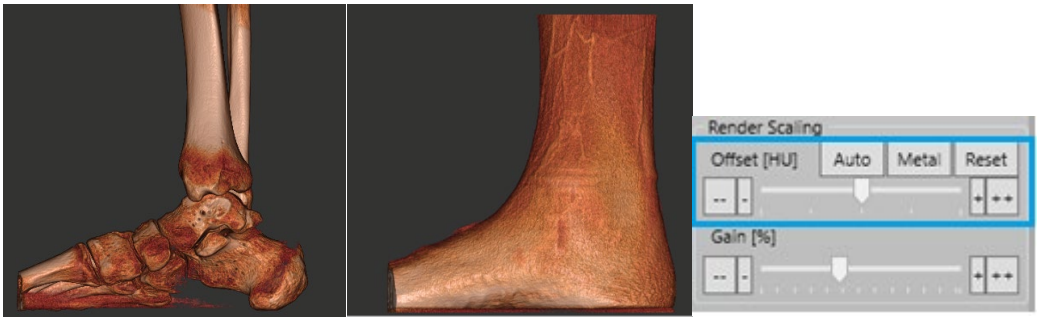
1. bone_skin
2. bone_skin2
3. bone_transparent skin
4. CB_Bone
5. HUCut
6. MIP
7. Transparent_colorized
8. x-ray



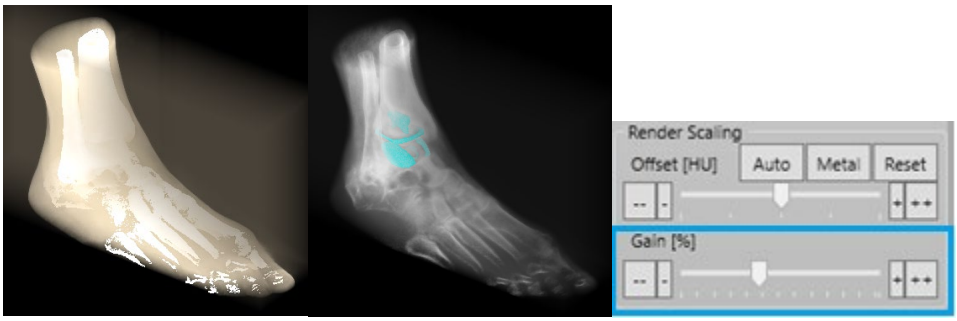
When one of these options is selected, that render type will display in the 3D Render window, which can be adjusted by using the Render Scaling tools within Tools and Settings.



These tools adjust the thresholding for the 3D rendering. Adjust the Offset [HU] to add/remove soft tissue.



Adjust the Gain [%] to adjust the range of anatomical features displayed (i.e. bones, metal artefacts, and soft tissue).

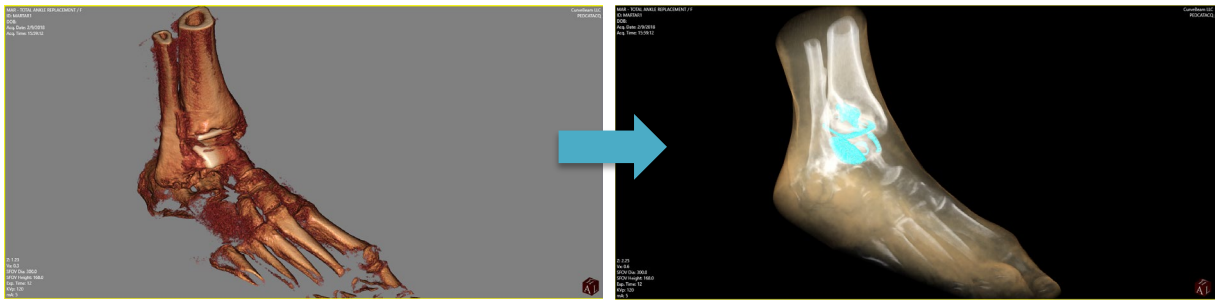


The left and right arrow keys on the keyboard can also be used for fine adjustment. To revert the 3D render to default, click the Reset button.

The Render Scaling sliders have an Auto, Metal and Reset button for Offset and Gain. The Metal button can be used if the study is loaded for the first time and nothing, but a piece of metal (screws, etc) is visible. Only click on the button **once**. Clicking on it repeatedly will apply the scaling multiple times and the render ranges will become useless. If this does occur, click on the Reset button to reset the image to the original render. Click on the *Auto* button to let the software set an optimum value of Offset and Gain.

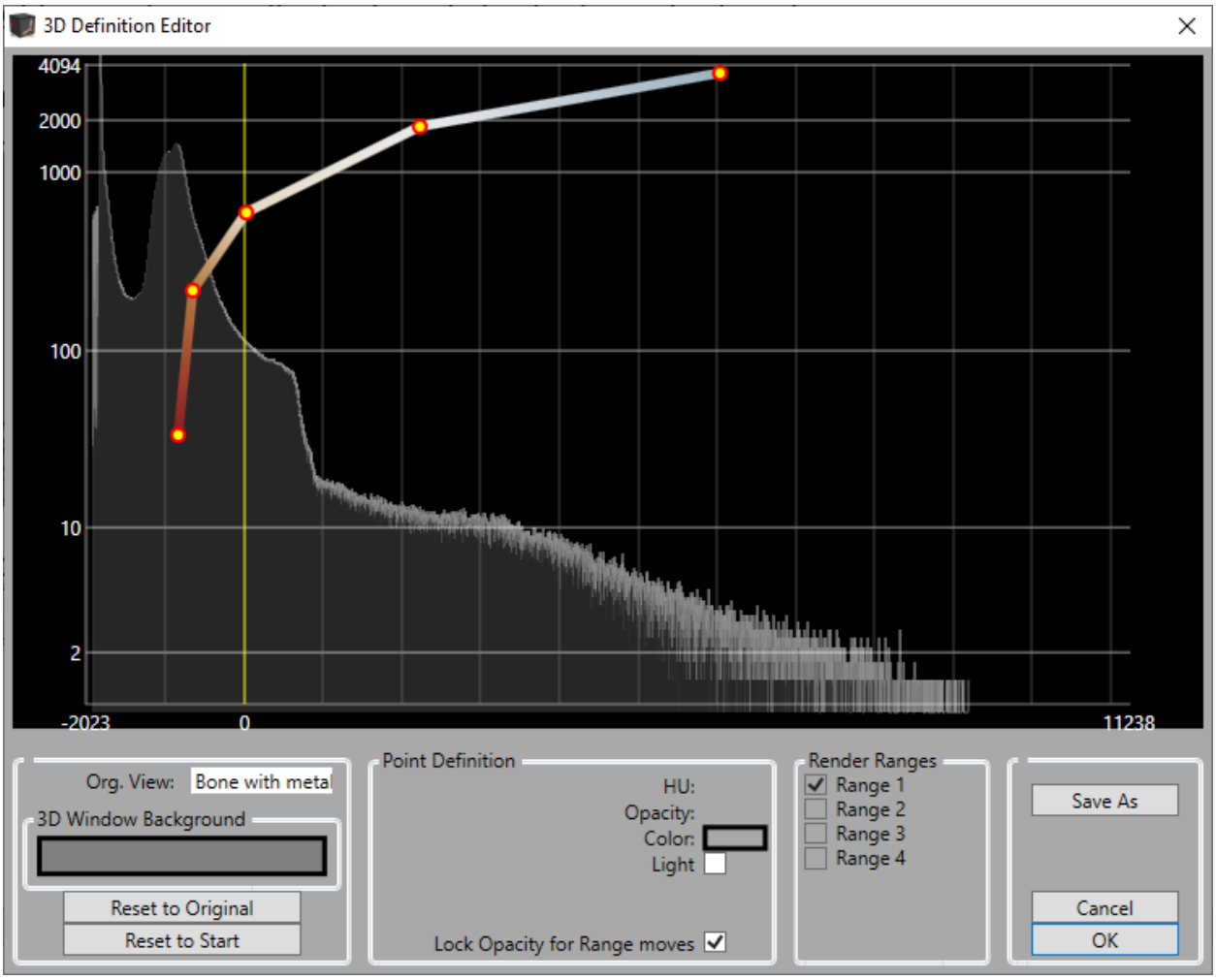
3D Definitions

A way to edit the transfer function has been added, allowing the user the ability to highlight certain features of the 3D rendering.



The process is started by clicking on the “3D Definitions” button under the Render Scaling section of Tools and Settings.

The 3D Definitions button will bring up the following 3D Definitions Editor window:

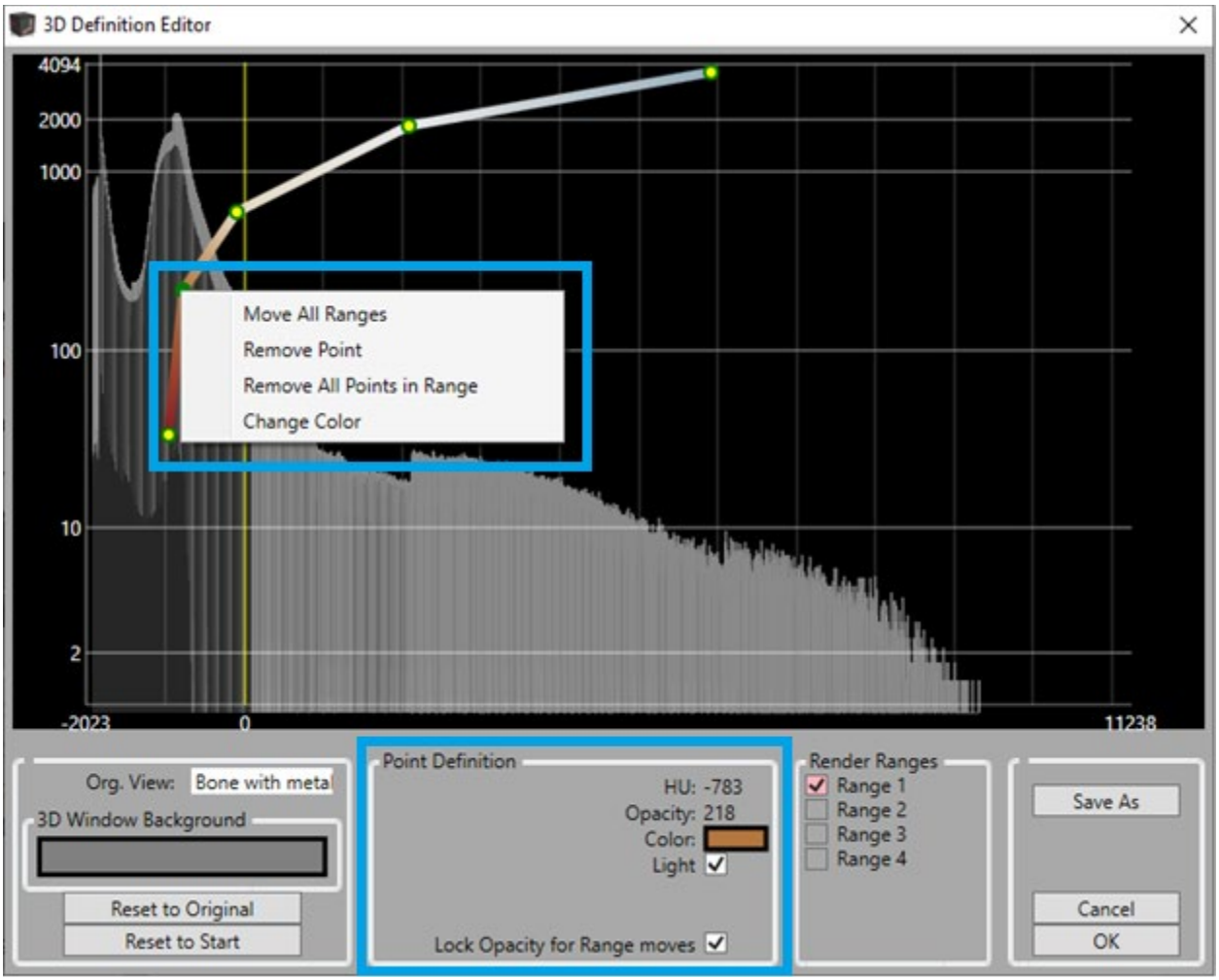


The 3D Definition Editor, also called Transfer Function Editor (TFE), once opened, shows the current volumes' histogram along with some control points and a colored render line connecting them. The continuous connection from a very left to a very right control point is called a render range, and there can be multiple render ranges. These render ranges must not overlap. If they do, a red "collision" indication will be provided, prompting the user to move a render range out of the way. The rendering of colliding render ranges is undefined and may provide unexpected results. The changes made in TFE will be visible in the 3D window. It may help to adjust the location of the Editor window so that the 3D image is also visible when the Editor is being used.

To adjust the render line, hover over a point for the plus icon to move the single point. Hover over the line for the hand icon to move the entire line left and right. To adjust the Offset and Gain for the range, use the sliders under the Tools and Settings menu. It can be desirable to move the ranges with the sliders for different scans as the HU value can fluctuate from scan to scan.

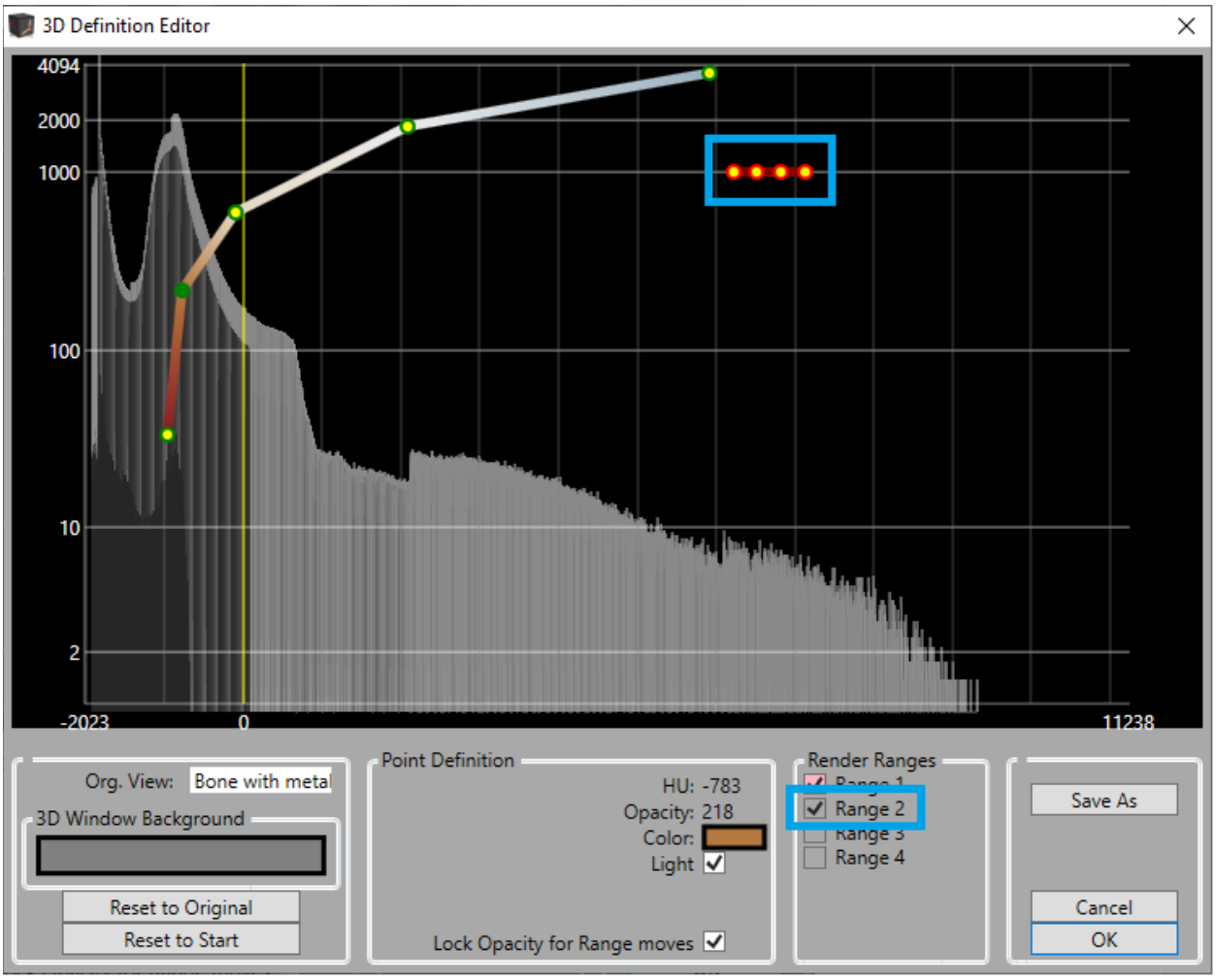
The points on the graph can be moved by left-clicking on the point and adjusting it. Also a right-click on the point will allow the user to remove the point, remove all points, or change the color of the render. It is also possible to adjust the range, but adjusting using the Tools and Settings slider allows for easier adjustments. To add a point, right-click on the line where the new point is desired to add a point.

To adjust the color of the render, either left-click on a point, then select the color box from the Point Definition section below. Or, right-click on the point to change the color. See the image below for locations.

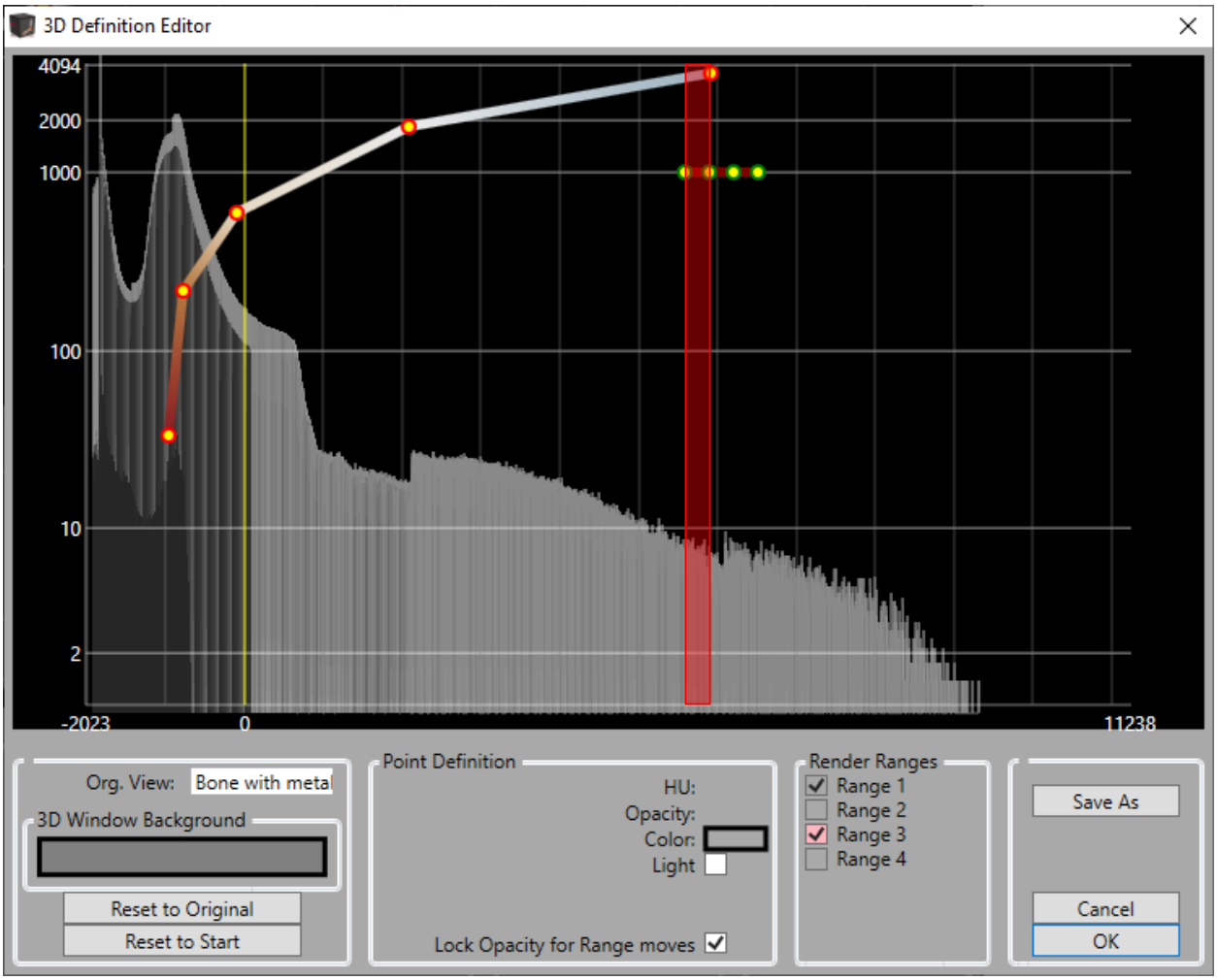


When adjusting the rendering range, the active range has a point that is solid green. The green point's values are listed in the Point Definition box, displaying the HU, Opacity, Color, and Light source. Use the Light check box to turn on/off a light source associated with that selected/green point.

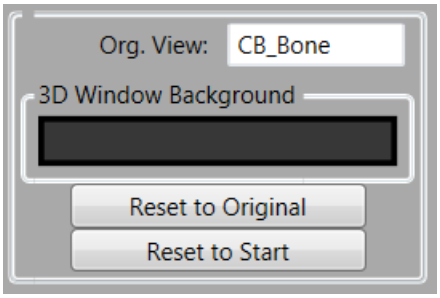
When the 3D Definition Editor starts, only 1 range is shown. To add additional Render Ranges, select the check boxes for additional ranges. There is a limit of 4 render ranges. The image below shows a second render range that was just selected. The points for the new range appear in the top right.



Each point in the new render range can be moved, but each new render section cannot cross another render section. None of the points of this second render section will be allowed left of any of the points from the first render line. If moving a single point, a red line will appear and not allow the render sections to cross into each other's range. If moving an entire render range into another render range section, a red zone will appear. Adjust the two sections so that they do not overlap each other. The image below shows what will appear if the sections cross over each other.

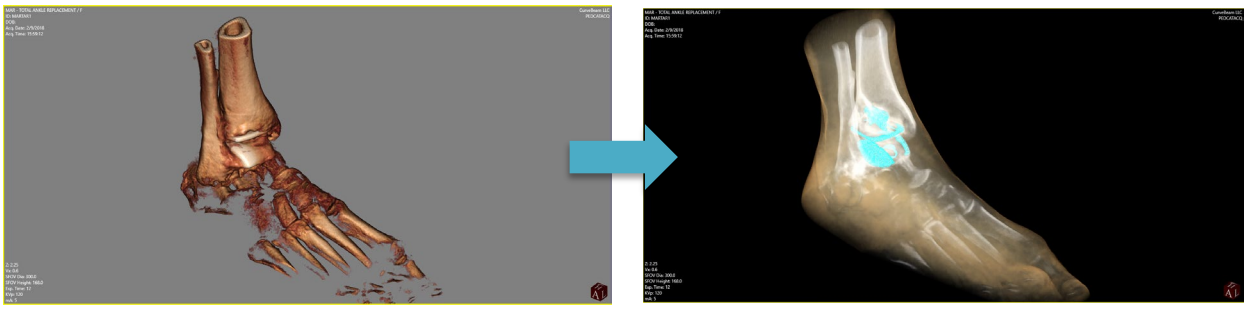


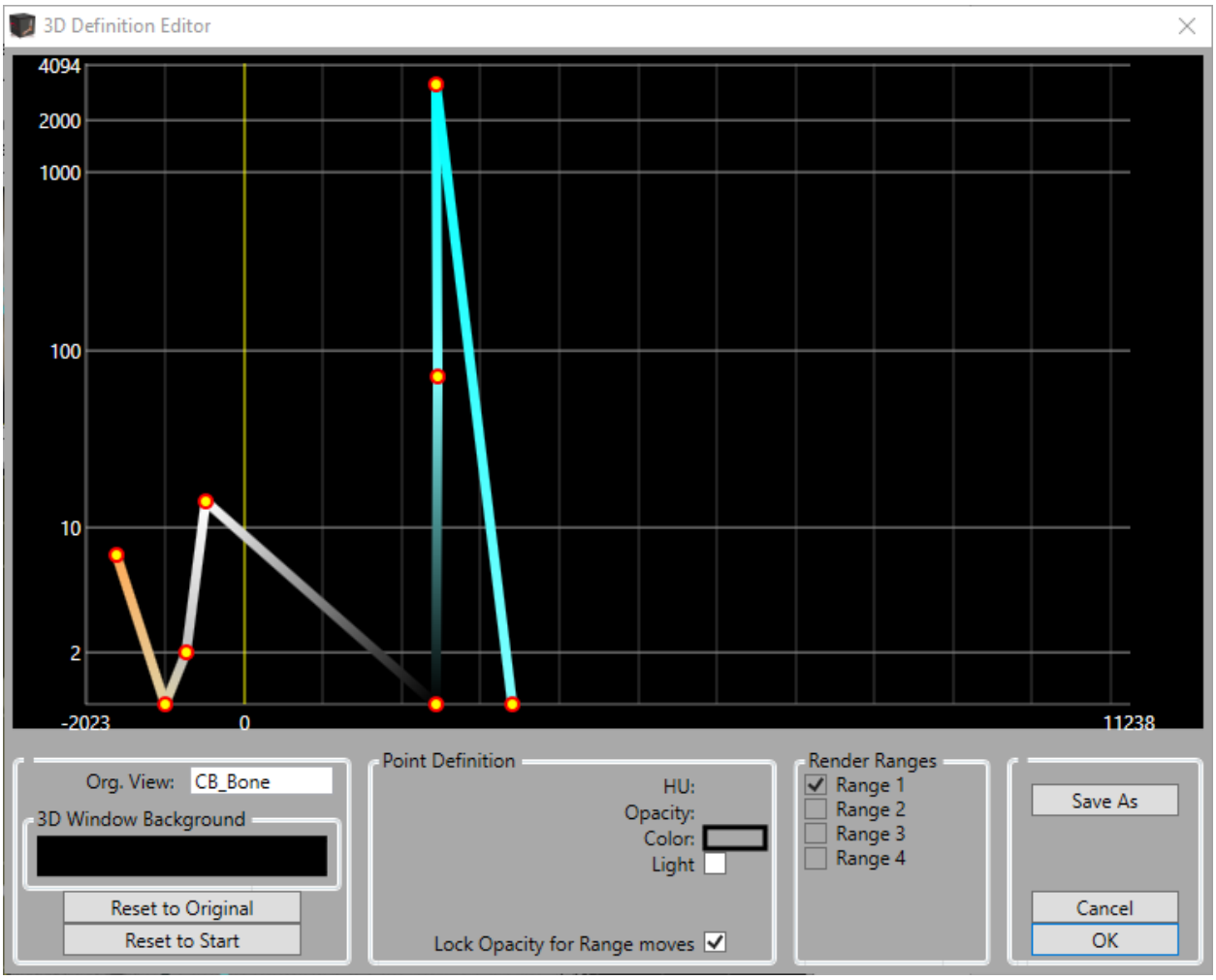
The background color of the 3D window can be adjusted by selecting a new color under “3D Window Background”. Click on the color box to change the color. The 3D window will be updated after the selection is made.



The underlying render type is listed in the “Org. View” box – in the above it is “Bone with metal”. The “Reset to Original” button can be used to reset back to the default render type listed in the “Org. View”

Once completed with the changes to the render type, changes can be saved by clicking on the “Save As” button in the lower right corner of the 3D Definition Editor (TFE).





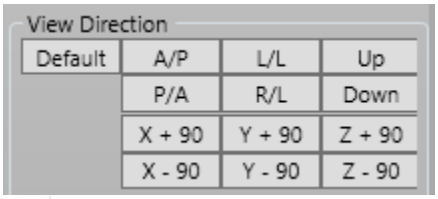
Maintain the default directory that appears with the Save As button. Provide a unique name so that it can be used with other scans in the future. The new render types created with this method will be available to select from under the Views -> Render Type. Once done with the 3D Definition Editor (TFE), select OK to maintain the changes to the current dataset.

View Directions

CubeVue provides a means to perform a quick rotation of the Rendering to a desired view:

View Directions			
A/P (Anterior / Posterior):		**Up (looking up into bottom of foot/feet):**	
P/A (Posterior / Anterior):		**Down (looking down onto top of foot):**	
L/L (Left Lateral):		**C A/P (Conventional Anterior / Posterior): down, 15 degrees from vertical.**	
R/R (Right Lateral):			

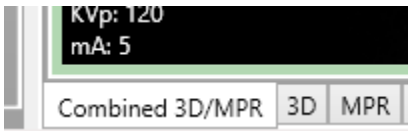
Similarly *X 45* shows the 3D image rotated at 45 degrees around X-axis.



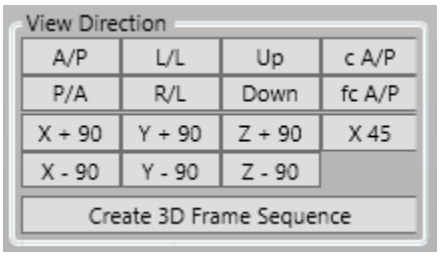
NOTE: If an **InReach dataset** is loaded then *c A/P*, *fc A/P* and *X 45* View Directions options are unavailable. *Default* view direction button is given for InReach datasets which defaults the orientation of 3D image to its original view direction as if loaded for the first time. View direction options available for InReach datasets are shown in adjacent screenshot.

Create 3D Frame Sequence

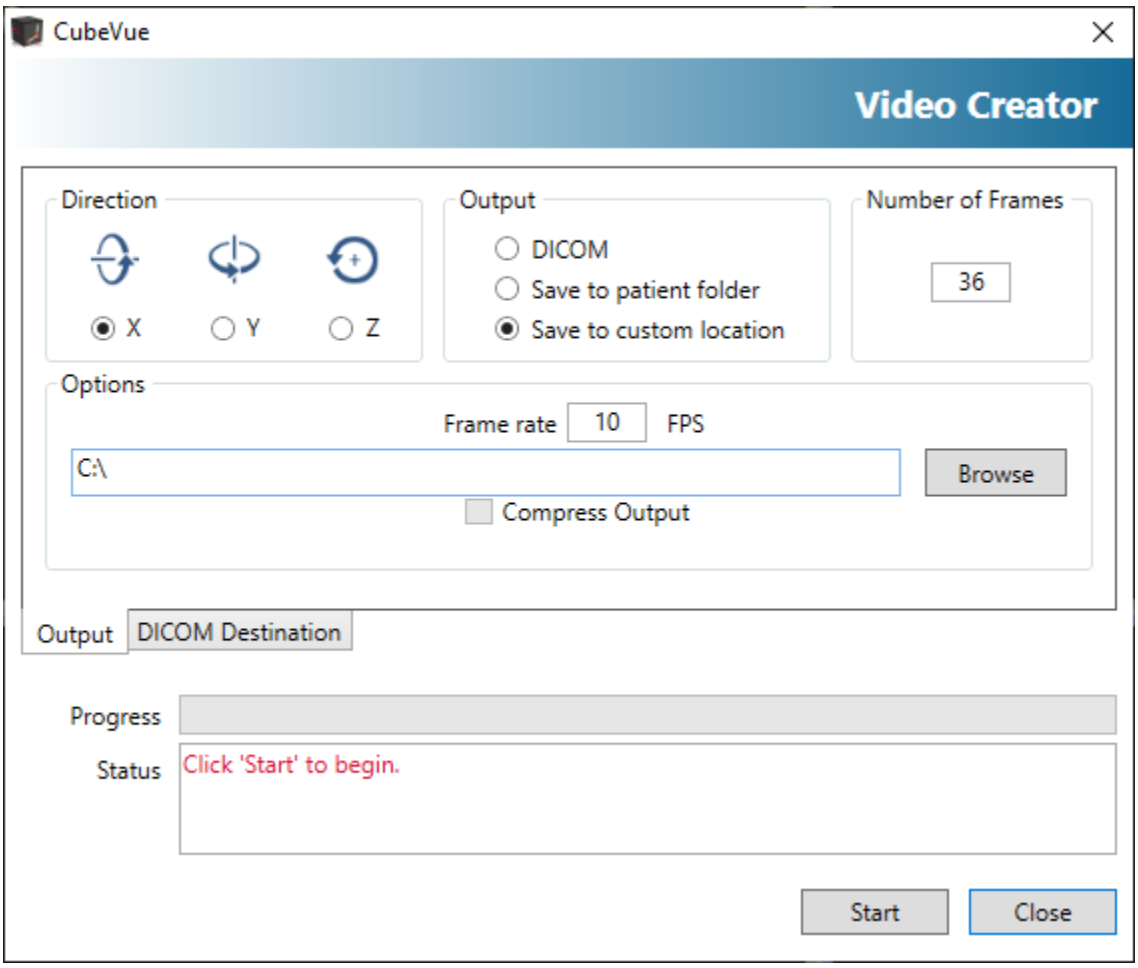
CubeVue provides the ability to create a video (.wmv) or frame sequence of the 3D image rotating around either the X, Y, or Z axis. To do this, select the Combined 3D/MPR screen at the bottom of the screen as shown below:



Then under the Tools and Settings on the left side of the screen, select the Create 3D Frame Sequence button:



A pop-up window as shown below will appear that allows for the selection of which axis to rotate around, how to save the output and how many frames to use to create 3D frame sequence. For each of the different output selections, the pop-up window will look slightly different asking the user to provide a location to save the generated video output.



Under the Direction heading, select the axis to rotate around, either X, Y, or Z axis.

Under Output, the following options are present:

- **DICOM** allows creating and saving a DICOM compliant series on the Local tab under the file type “screen”.
  The “Compress Output” checkbox allows the Frame sequences to be saved as compressed or uncompressed; when unchecked uncompressed DICOM frames are created.

  NOTE: Compress Output checkbox is applicable only when DICOM option is selected.

- **Save to patient folder** saves the video (.wmv file, not DICOM series) locally to the computer running the CubeVue application. The video file will NOT be visible in the Patient List. This option is NOT recommended.

- **Save to custom location** allows saving the generated output video to a location specified by the user. A Browse option can also be used to select the location.

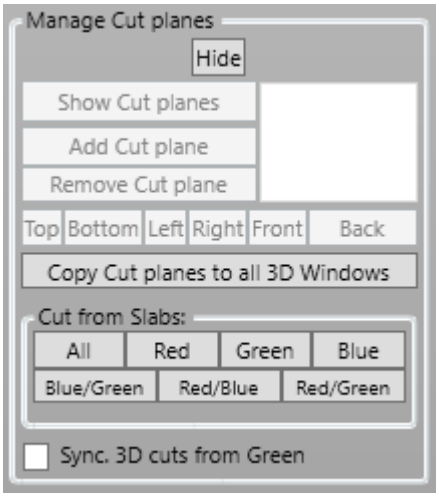
The Number of Frames represents how many total frames or images will comprise the video and can be adjusted as desired.

The Frame Rate shows how many frames will be displayed in Frames Per Second when the video is viewed.

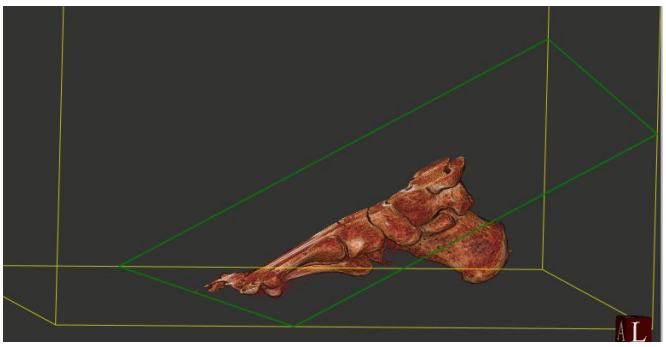
Once all the fields are set to the desired values, click on Start to create and save the video.

Manage Cut Planes

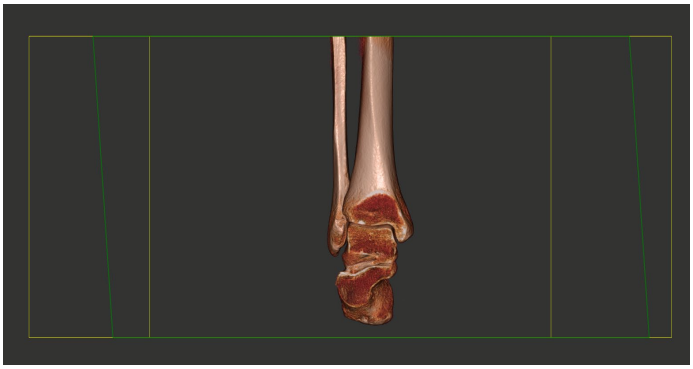
To cut a 3D rendering from an entire plane, first click the **Cut Planes** icon from the main menu bar to activate the functionality.

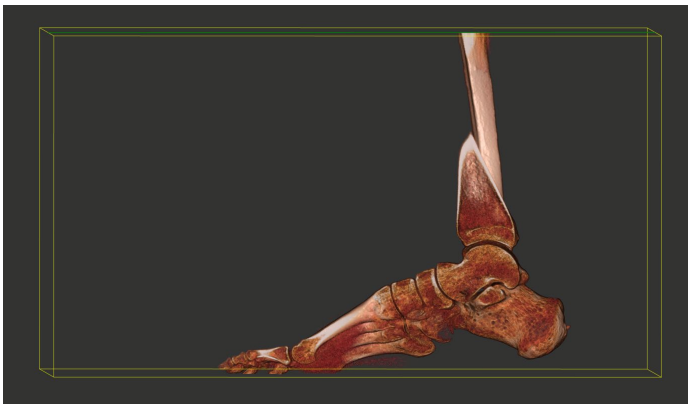


Once enabled, a cut plane is placed within the center of the 3D Rendering. Also, the “Manage Cut Planes” tools will be enabled in the 3D Tools area.

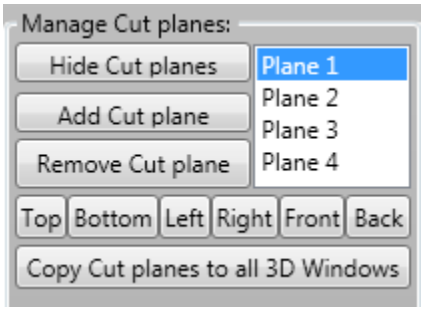


Peeling away the rendering:



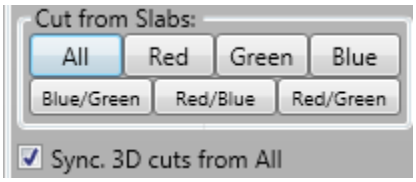


Multiple Cut Planes can be inserted and manipulated by clicking on “Add Cut Plane” button. To Remove Cut Planes, highlight the Plane in the list (Plane 1, Plane 2, Plane 3….) & click on the “Remove Cut Plane” button. To Hide a Cut Plane, highlight that Plane in the list and click on the “Hide Cut Plane” button.



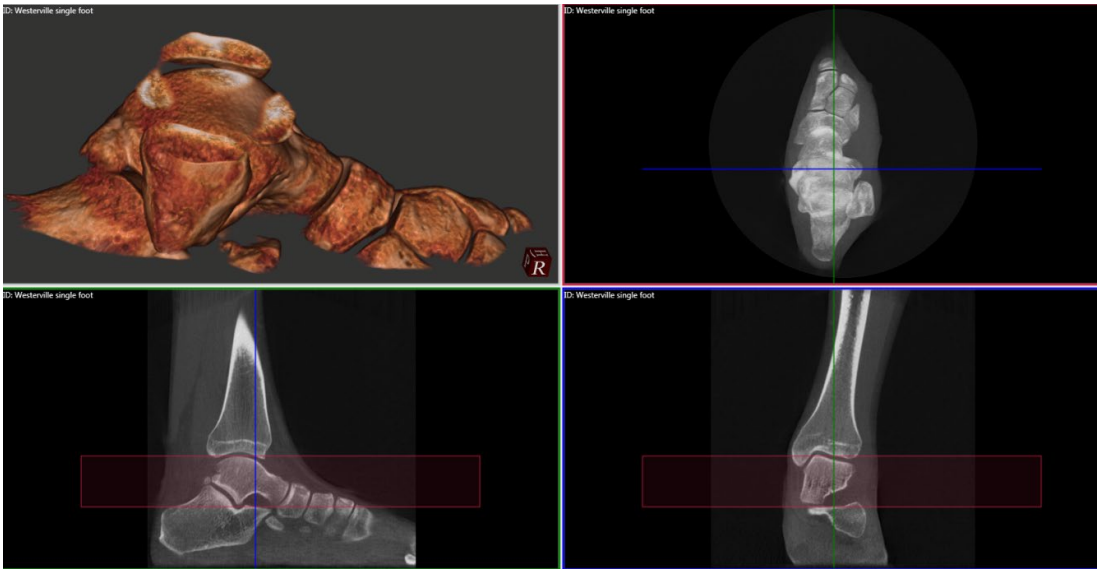
Cut from Slabs

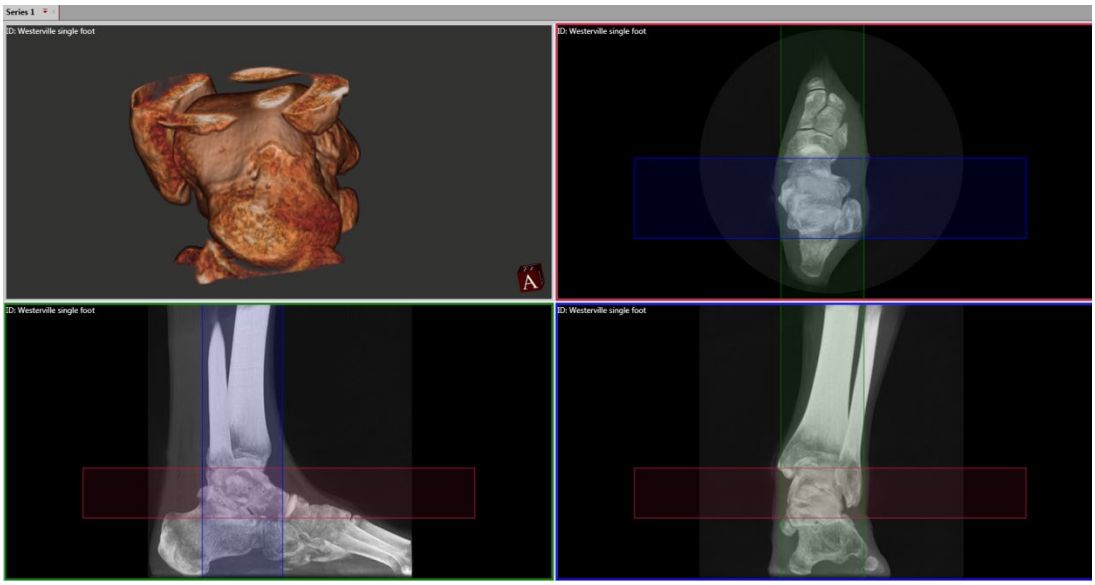
Another method of cutting a 3D Rendering is to “Cut from Slabs”. To Cut from Slabs, slabs must first be created in MPR image(s). Thereafter, “Cut from Slabs” button can be used to cut the 3D image.



For example, if you wanted to cut just one section from the rendering, you could use the sagittal view to create a slab, and then click on the “Red” button.

Or you can cut from 2 or all 3 slabs. In the example below, a slab was created in all 3 MPR views and the “All” button was clicked:



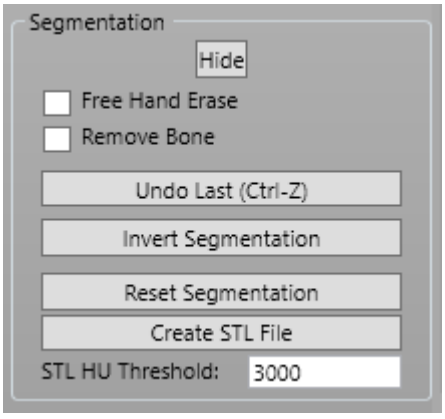


NOTE: to restore the original 3D rendering, click on the “Hide Cut Planes” button under Manage Cut Planes.

Segmentation

Segmentation function under 3D CONTROLS on the Tools and Settings panel helps bone isolation and removes a region on the 3D image. The Tools & Settings pane has two panels dedicated to cutting planes and to segmentation. Only one can be shown at a time. The cut plane pane automatically opens when the cut plane function is invoked.

When the Segmentation pane is opened (“Show”), the following options are accessible:



Free Hand Erase: When selected, draw an arbitrary shape onto the 3D rendering, and as you release the left mouse button the drawn figure closes, and all visible anatomy becomes invisible. The SHIFT Key

on the keyboard can be pressed & held to draw more regions while retaining the earlier drawn regions or bone removals (discussed below).

Remove Bone: When selected, click on a bony structure and it will disappear. If the 3D rendering offset is too low, too much anatomy may get removed. The offset can be adjusted from 'Render Scaling' under '3D CONTROLS' on 'Tools and Settings' pane. The SHIFT key on the keyboard can be pressed & held to remove more bones while retaining the previous removals & free hand erase.

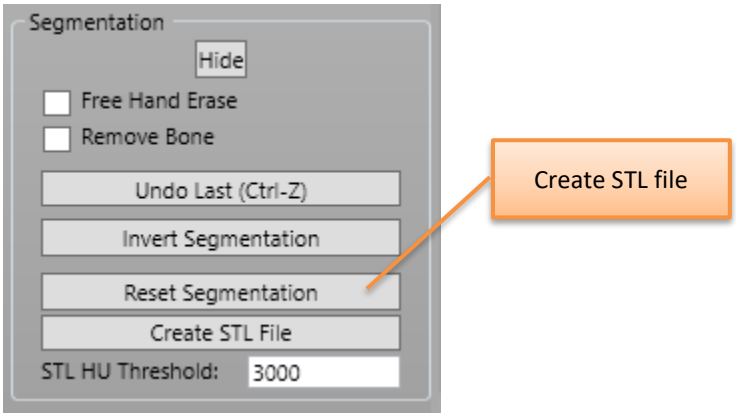
Undo Last: It restores the last segmentation action performed on 3D image.

Invert Segmentation: This inverts the segmentation selection and visible anatomy becomes invisible, while invisible becomes visible. No further segmentation can be performed when Invert Segmentation is applied. Invert again or perform Reset Segmentation (discussed below) to once again segment the 3D rendering.

Reset Segmentation: This removes all segmentation changes from the 3D rendering and it also "un-inverts" it if the Invert function had been applied.

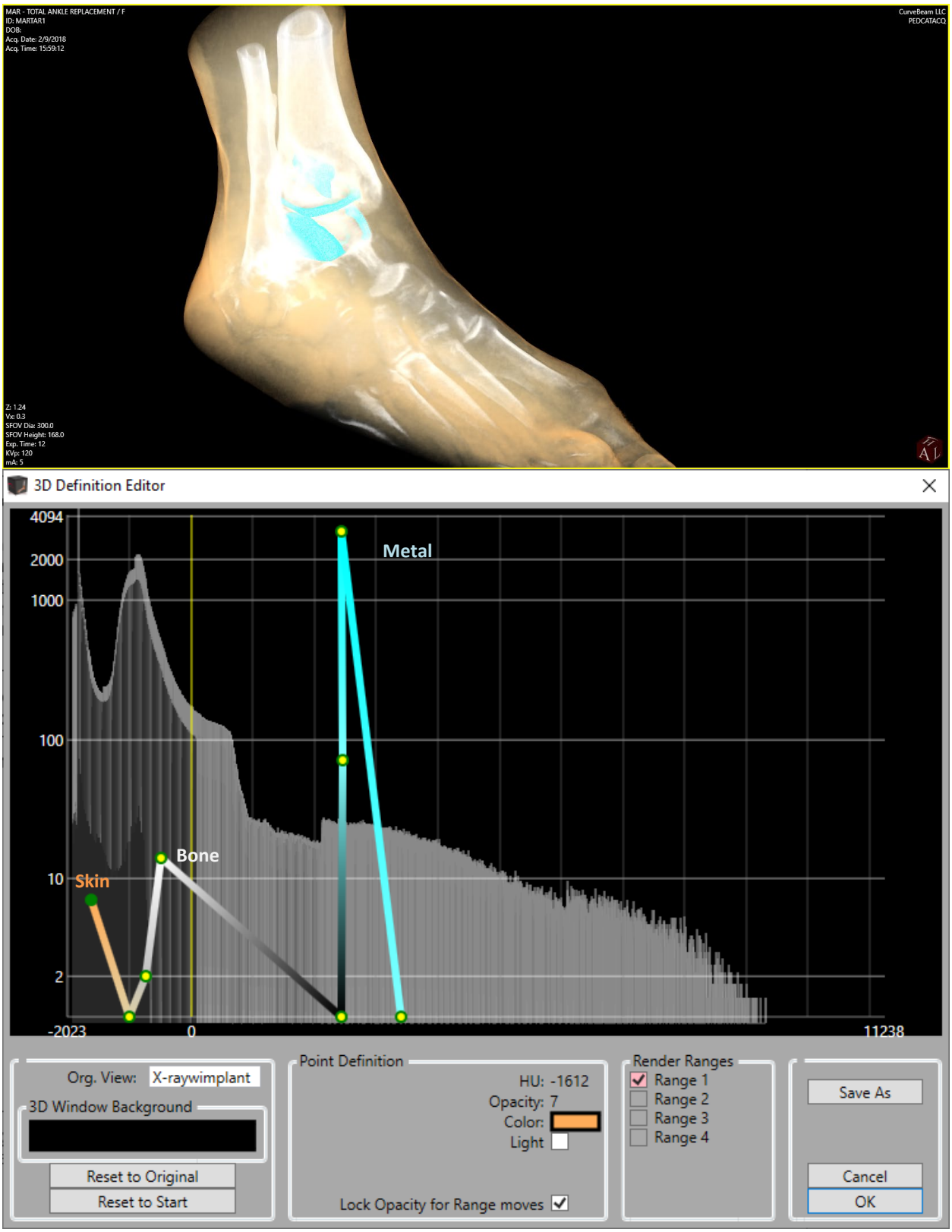
Note: when segmentation is performed on a 3D rendering, changing the 3D filter, closing a study or shutting down CubeVue may take notably longer time.

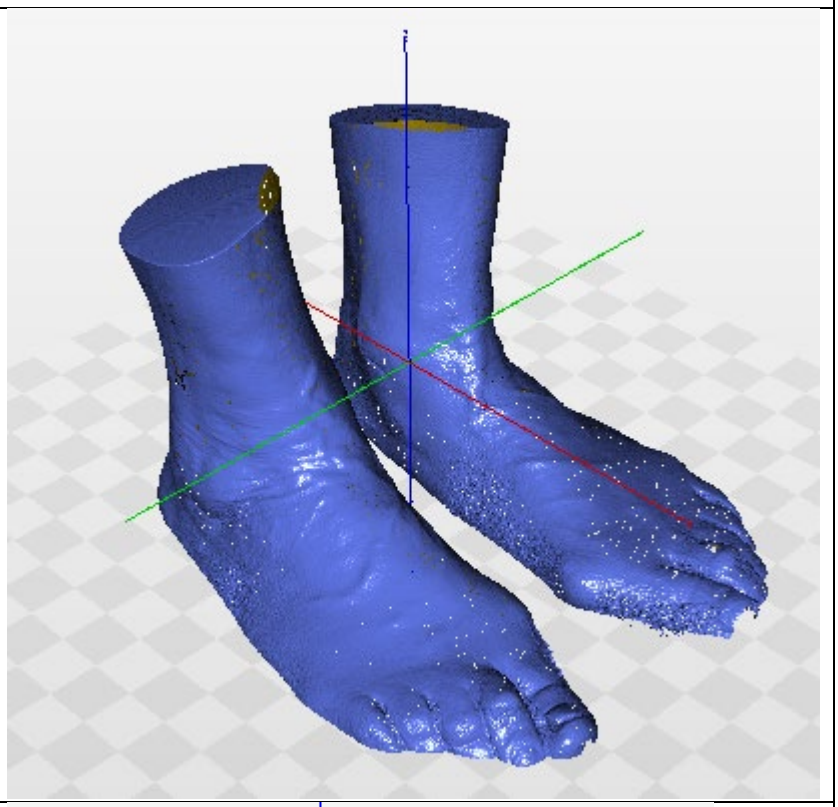
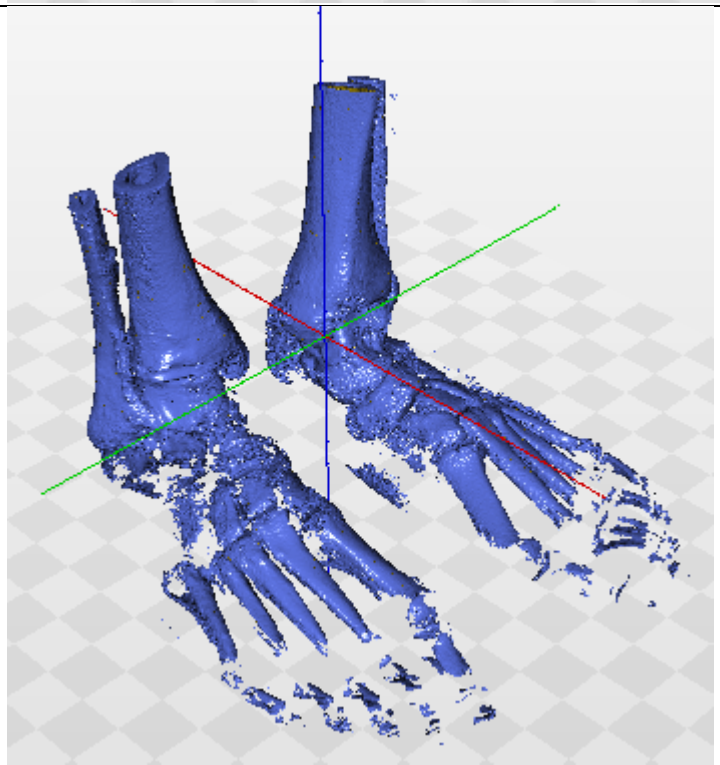
Create STL File

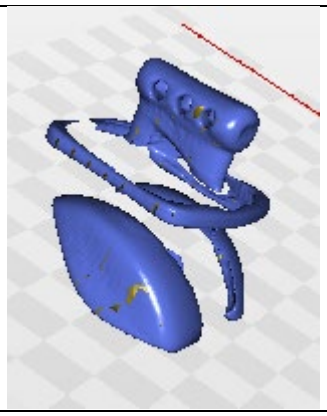


STL files can be created from CubeVue software which is based on entering the threshold value in the 'STL HU threshold' field under 3D CONTROLS\Segmentation on the Tools and Settings pane. The STL Threshold value can be determined from opening the 3D Definitions window and viewing the HU value of the point which you desire to be the HU render threshold.

For example, the following 3D render and correlated 3D Definitions chart is shown below:


MAR - TOTAL ANKLE REPLACEMENT / F
ID: MARTAR1
DOB:
Acq. Date: 2/9/2018
Acq. Time: 15:59:12
CurveBeam LLC
PEDCATACQ
Z: 1.24
Vx: 0.3
SFOV Dia: 300.0
SFOV Height: 168.0
Exp. Time: 12
KVp: 120
mA: 5
3D Definition Editor
4094
2000
1000
100
10
2
-2023
0
11238
Metal
Bone
Skin
Org. View:
X-raywimplant
3D Window Background
Reset to Original
Reset to Start
Point Definition
HU: -1612
Opacity: 7
Color:
Light
Lock Opacity for Range moves
Render Ranges
Range 1
Range 2
Range 3
Range 4
Save As
Cancel
OK

Anatomy	HU Threshold (HU Value from Point Definition)	Exported STL
Skin	-1612	
Bone	-726	

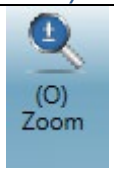
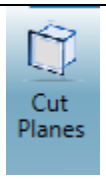
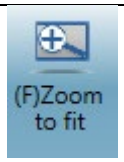
Metal	2445	

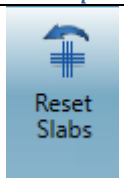
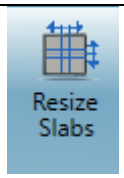
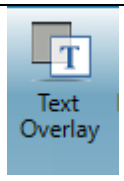
Once the STL HU Threshold value is set, click on the “Create STL File” button; a dialog box will appear asking for the path. Choose the desired path & give an appropriate file name to save the STL file.

A third-party STL viewer is required to open these STL files.

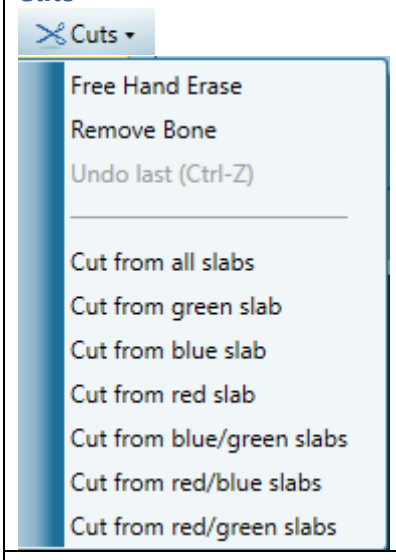
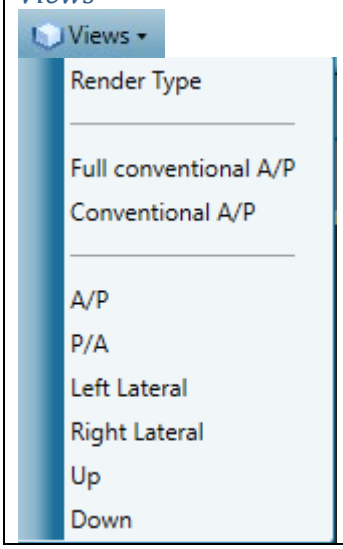
Main Menu Bar

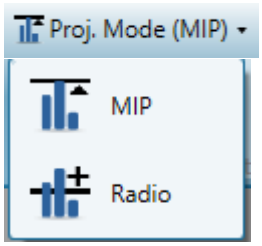
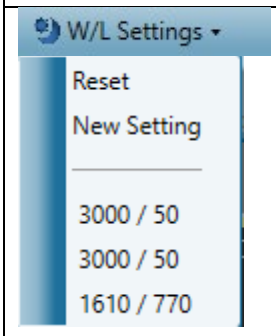
Tools

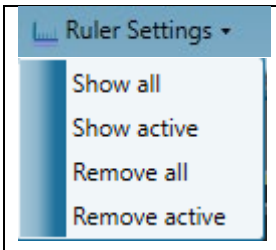
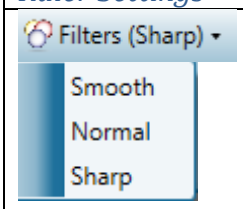
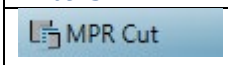
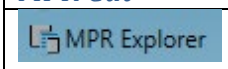
Main Menu Bar	
Tools	**Description**
 *Window/Level*	The Window/Level tool allows the user to change the brightness/contrast of MPR images by clicking and dragging the mouse on the image. Up/down for window (brightness) and left/right for level (contrast).
 *Zoom*	The Zoom tool allows the user to zoom in/out of image windows by clicking and dragging the mouse on the image.
 *Pan*	The Pan tool allows the user to center the view onto another location within MPR images by clicking and dragging the mouse on the image.
 *Rotate*	The Rotate tool allows the user to rotate the 3D rendering and the MPR images by clicking and dragging the mouse on the image/rendering. MPR images can also be rotated while the SHIFT key is pressed.
 *Cut Planes*	The Cut Planes tool allows the user to cut a 3D rendering along the MPR image planes (See *Manage Cut Planes,* page 52).
 *Zoom to Fit*	The Zoom to fit tool allows the user to automatically center and frame the 3D rendering and MPR images into their respective viewing windows.
 *Magnifier*	The Magnifier tool allows the user to view the magnified images by clicking on a viewing window and hovering the mouse over areas of interest in the image.

 *Reset Pan/Zoom*	The Reset Pan/Zoom tool allows the user to revert the MPR images to their default positioning and zoom level when the patient study was originally loaded.
 *Reset Splits*	The Reset Splits tool allows the user to revert the viewing windows to their original proportions when the patient study was originally loaded.
 *Reset Slabs*	The Reset Slabs tool allows the user to revert the slabs (MPR reference lines) to their original positions and thicknesses when the patient study was originally loaded.
 *Resize Slabs*	The Resize Slabs tool allows the user to adjust the depth (number of slices) represented in the MPR images. Clicking and dragging a slab (MPR reference line) Up/Right will increase its thickness. Slabs can also be resized while the SHIFT key is pressed.
 *Invert Grayscale*	The Invert Grayscale tool allows the user to invert the grayscale of the MPR images.
 *Hide Slab Marks*	The Hide Slab Marks tool allows the user to perform operations on the MPR images without concern of unintended interaction with the slab marks by hiding them from view and removing them from possible selection.
 *Text Overlay*	The Text Overlay tool allows the user to hide the text overlay from the viewing windows.
 *Privacy*	The Privacy tool allows the user to hide the patient and scan information text overlay from the viewing windows.

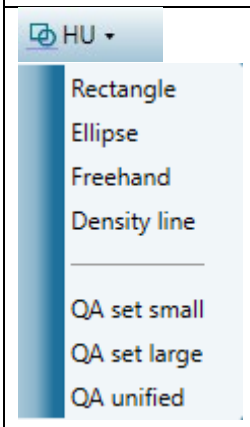
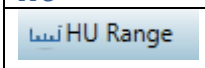
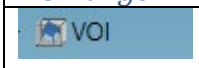
3D Controls

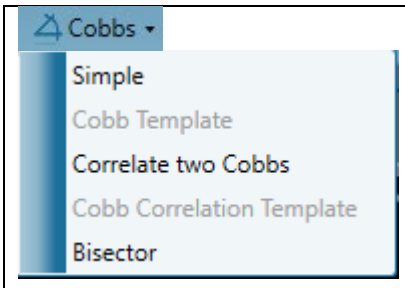
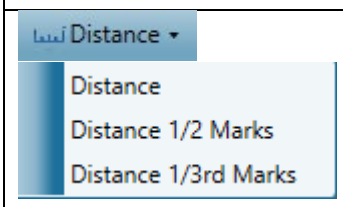
Main Menu Bar	
3D Controls	**Description**
Cuts 	See *Manage Cut Planes* (page 52), *Cut From Slabs* (page 54), and *Segmentation* (page 55).
Views 	See *3D Definitions*: *Render Types* (page 42) and *View Directions* (page 49).

Main Menu Bar	
Options	**Description**
 *Projection Mode*	The Proj. Mode option allows the user the choice to display the MPR images as CT projections or as radiographs (X-rays). The default projection mode, MIP (Maximum Intensity Projection), composes the images from their MPR slices' max-intensity voxel values. The second mode, Radio, composes the images from their MPR slices' averaged voxel values*. Below is a comparison of the two modes: A CT projection in MIP mode:  An X-ray projection in Radio mode:  *The Resize Slabs tool is necessary to adjust the slab thickness when selecting multiple MPR slices for averaging voxel values.
 *Window/Level Settings*	The W/L Settings option allows the user to reset any MPR image to default W/L (3000,50), save the current W/L setting of any MPR image, and set any MPR image to a previously saved W/L setting.

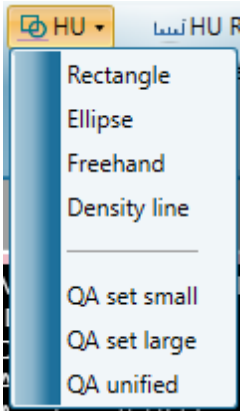
 *Ruler Settings*	The Ruler Settings option allows the user to overlay a ruler on top of MPR images as a reference measurement to scale. Select *Show all* to display the ruler at the bottom of all MPR images. Select *Show active* to display the ruler exclusively on the currently selected MPR image. Select *Remove all* and *Remove active* to remove the ruler from all/selected MPR images.
 *Filters*	The Filters option allows the user to change the resolution of displayed MPR images: *Normal* is the default setting, *Smooth* is low resolution, and *Sharp* is high resolution.
 *MPR Cut*	See MPR Cut/MPR Explorer (page 22).
 *MPR Explorer*	See MPR Cut/MPR Explorer (page 22).

Measurements

Main Menu Bar	
Measurements	**Description**
 *HU*	These are for measuring Hounsfield Units, which is the density value of an area of interest.
 *HU Range*	For identifying areas on MPR images within specified Hounsfield Units.
 *VOI*	It displays the HU values graphically for a specified volume in anatomy.
 *Angles*	These are for measuring angles on the anatomy of interest.

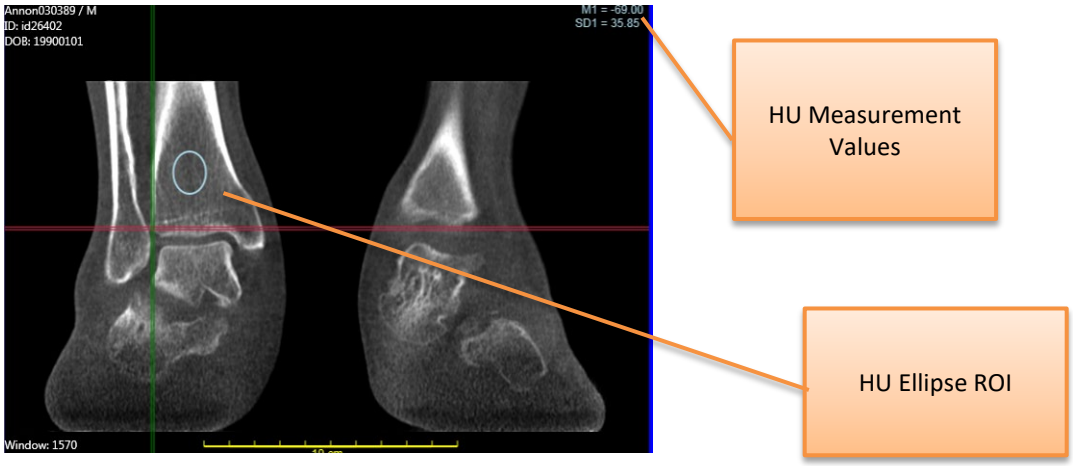
 *Cobbs*	This option will place two lines of a Cobb angle which can be modified to have the desired angle
 *Distance*	For distance measurements within the anatomy being examined. NOTE: Distance measurements are applicable to MPR images ONLY. Distance measurements performed on 3D renderings must NOT Be used for clinical purposes.

HU Measurements: The HU tool has a drop-down with 6 options; rectangle, circle, freehand and line for general use and then QA set Small and QA set Large for doing the QA procedures.



Any of the general use regions can be selected for creating a region of interest (ROI) on the bone in order to obtain a density value reading. For example, if “Ellipse” is selected, an elliptical ROI can be drawn by point click and drag. Then click a final time to anchor the ROI. The measurement reading will display in the upper right-hand corner of the image window. A maximum of 10 measurements can be made in one image window. This tool will remain enabled until disabled by clicking the selection again.

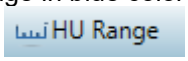
M = Mean, SD = Standard Deviation.



Follow these instructions for the rectangle or freehand as well.

The Density Profile line is displayed in graphical form. Draw a line and the graph will appear.

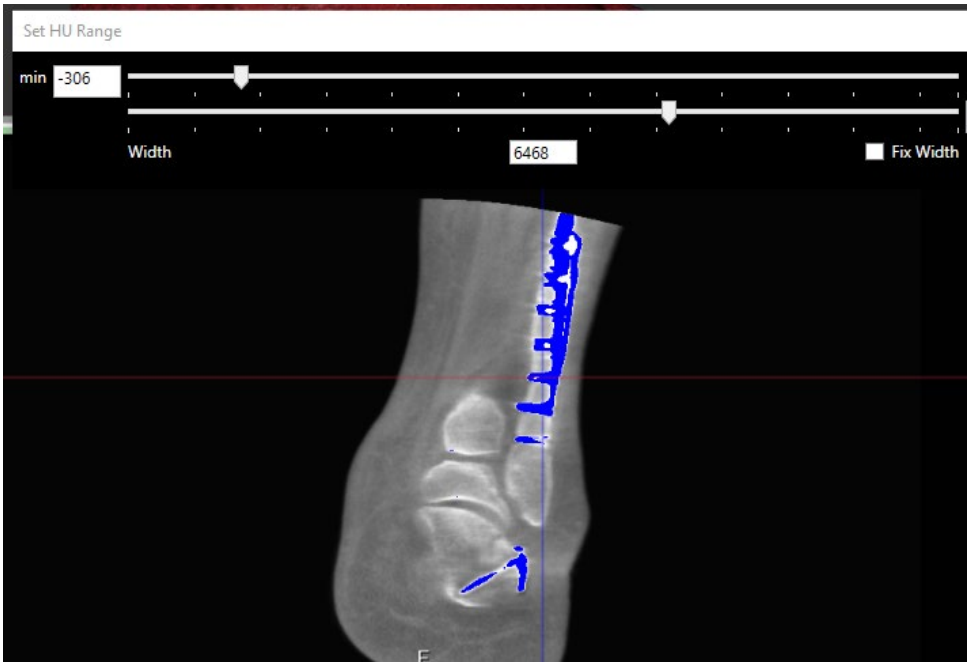
For doing the QA procedures, there are two sets of pre-sized HU regions. Selecting the “QA set Small” will draw small circles that are used to determine the HU of the various materials on the QA Line Pair Phantom. The “QA set Large” will draw large circles that are used to determine the HU of the water.

HU Range: The HU Range feature is available from the Ribbon menu bar in the measurements section. This feature enables user to view objects of desired HU range in blue color i.e. differentiate from the rest of the anatomy. To use this feature, click on the HU Range 

option under the measurements section on the Ribbon menu. A new window titled Set HU Range appears as shown in the screenshot below:

Minimum and maximum HU values can be set by the use of two respective sliders as shown in the screenshot above. The corresponding HU value for each slider position is updated in the min and max

text boxes. The difference between the displayed max and min values is called the Width and is also shown on the Set HU Range window. Any area on MPR images (Axial, Sagittal and Coronal) that falls within this Width value is displayed in blue as shown in a sample screenshot of one of the MPRs below:



Fix Width: selecting this checkbox the user can fix the width after achieving the desired value. If the checkbox is selected, changing one slider will automatically move the second slider such that the difference between minimum and maximum HU values is maintained.

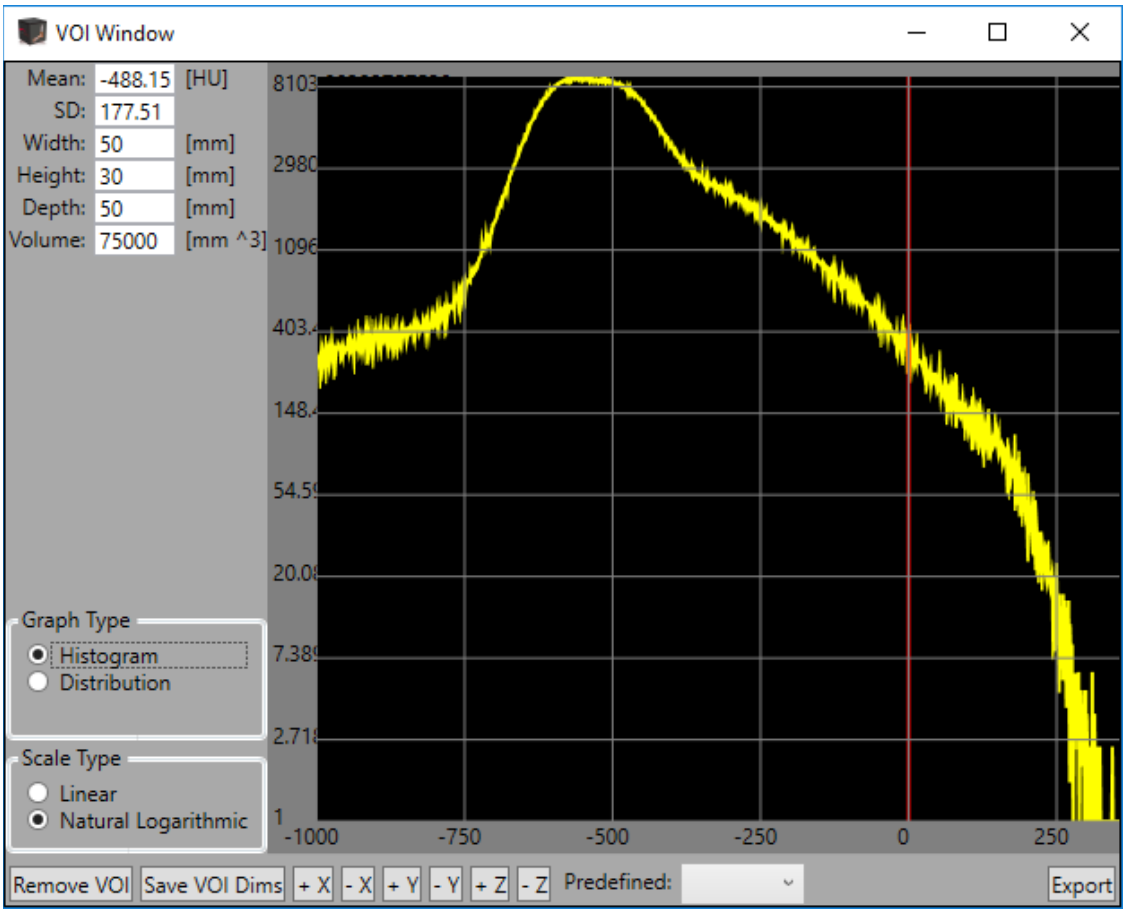
To increase or decrease the width value again, uncheck the Fix Width checkbox and move the min and/or max sliders as needed.

Volume Of Interest (VOI)

It includes histogram graphing. This function is present as the “VOI” button 

on the ribbon menu available only on the ‘Combined 3D/MPR’ tab and ‘MPR’ tab.

When this function is used, a VOI is placed symmetrically over the current slab center and a statistics window opens.



Once the VOI is placed on the MPR images it can then be dragged to other locations within image area; can also be rotated.

The statistics window displays the Mean and Standard Deviation of the VOI along with the display of dimensions (Height, Width & Depth) and volume of the VOI. Graph type can be selected between Histogram and Distribution. Similarly, the Scale Type can be selected as Linear or Natural Logarithm.

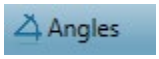
Dimensions of VOI can be changed using +X, -X, +Y, -Y, +Z & -Z from the statistics window. It also provides an option to save these dimensions as a set under “Predefined” dropdown box such that these dimensions can directly be applied for any other dataset.

An “Export” button allows saving of the histogram information to a CSV file.

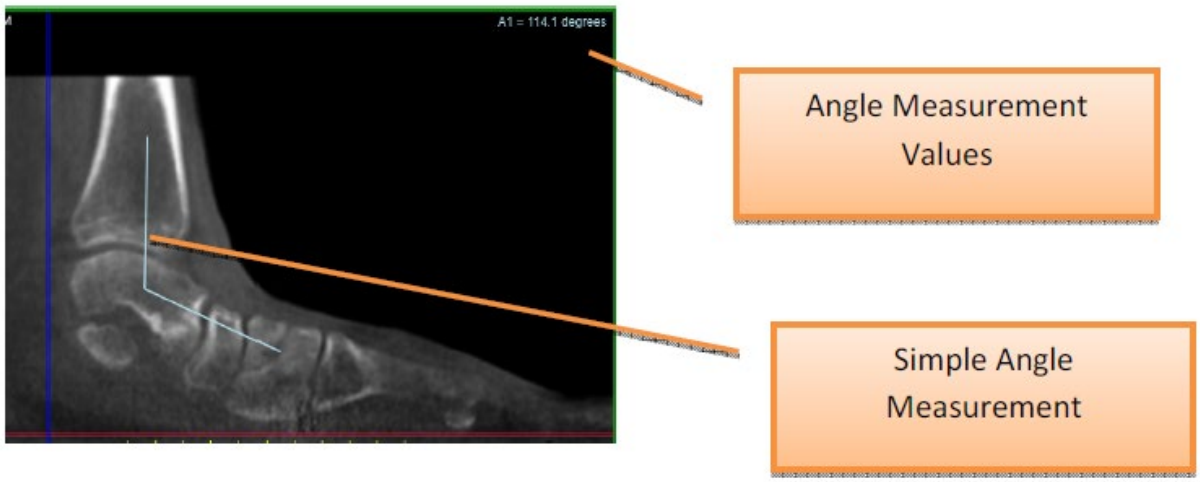
Note: Often the slab center is not located in the center of the window. A new SHIFT-Pan (i.e. Hold down the SHIFT key on the keyboard and click on the Pan button on the CubeVue ribbon menu) function will perform such panning automatically making it easier and faster to see the extent of the VOI.

Angle Measurements

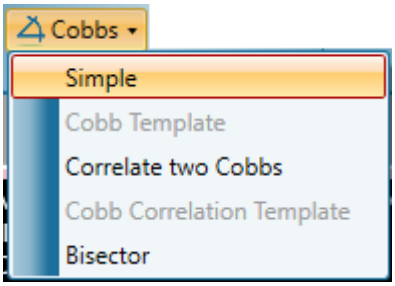
The angle tool is available on the Main Menu Bar:



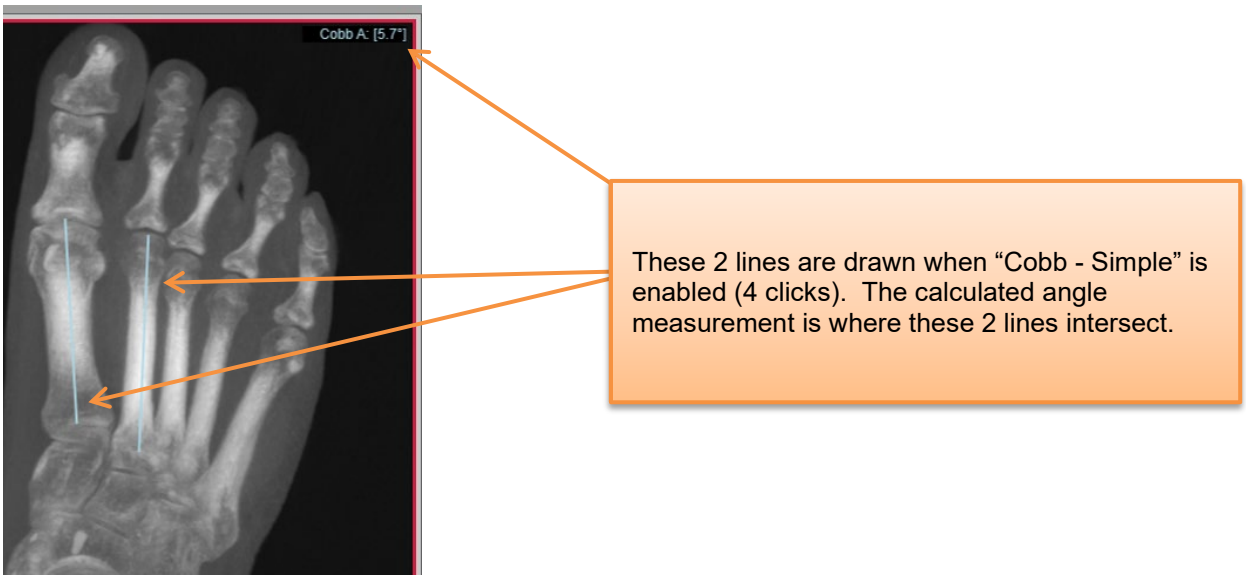
Angle: Click on *Angles* to select the angle tool. The Angle has 3 points of reference. Point, click, move, click, move, click to finish (3 clicks). This will result in an angle in degrees, and the measurement will display in the upper right-hand corner of the window. A maximum of 8 measurements can be made in one image window. This tool will remain enabled until disabled by clicking the selection again or pressing the Esc key from the keyboard.



Cobb Angle: Click on *Cobb,* then select “Simple” to enable the Simple Cobb angle Tool.



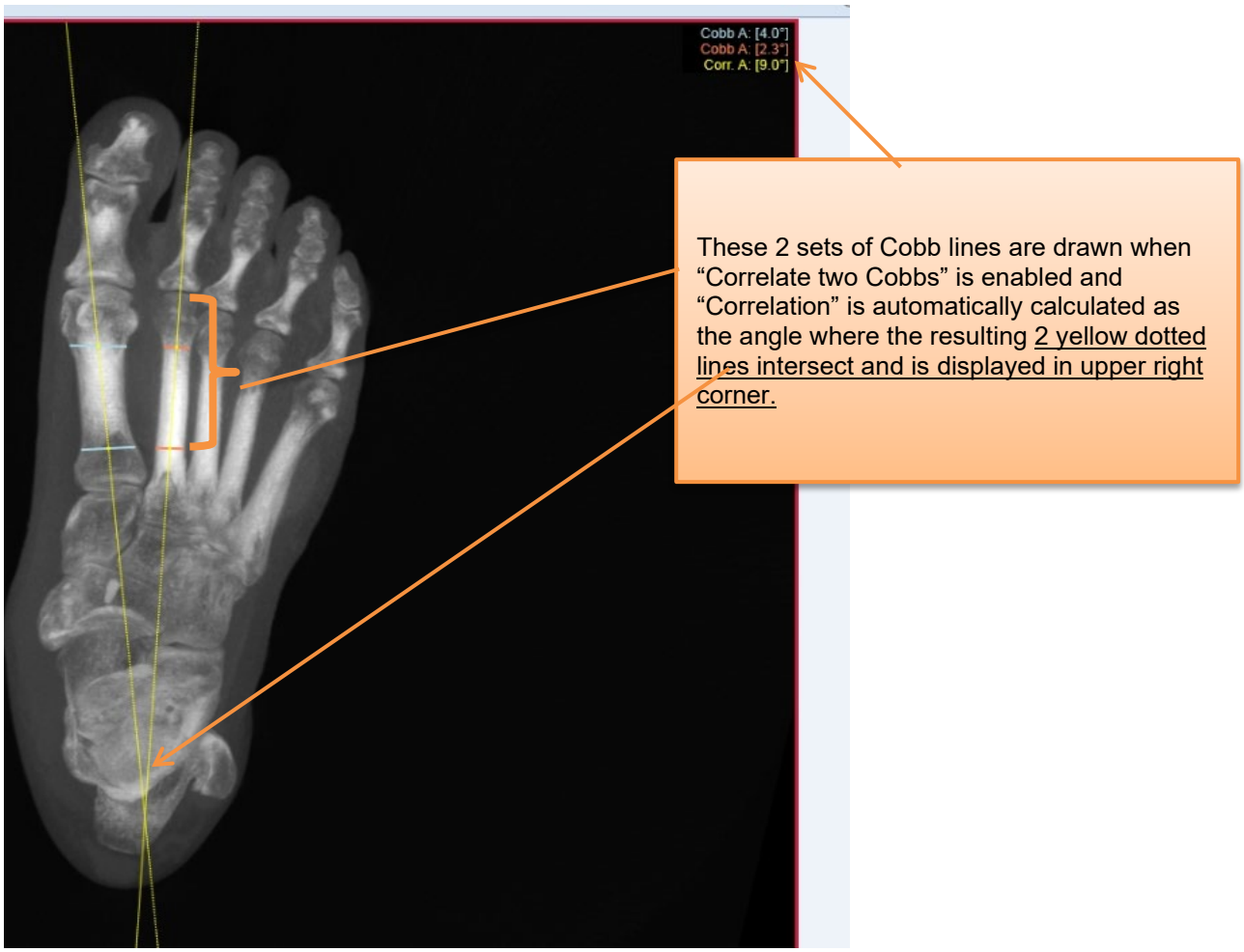
The Cobb angle requires creating 2 separate lines and the tool will calculate the angle at the point of “intersection” of those 2 lines:



Cobb Template:

This option will place two lines of a Cobb angle which can be modified to have the desired angle. To modify the Cobb angle lines, move the cursor over any of the two lines, two red dots will appear on the ends of the line which can then be dragged anywhere on the image using the mouse cursor to have the desired placement of the line.

Correlate two Cobbs: Select *Correlate two Cobbs* from the Cobbs dropdown and create 2 sets of "Cobb" lines, the system will automatically calculate and display the angle where the 2 yellow dotted lines intersect:

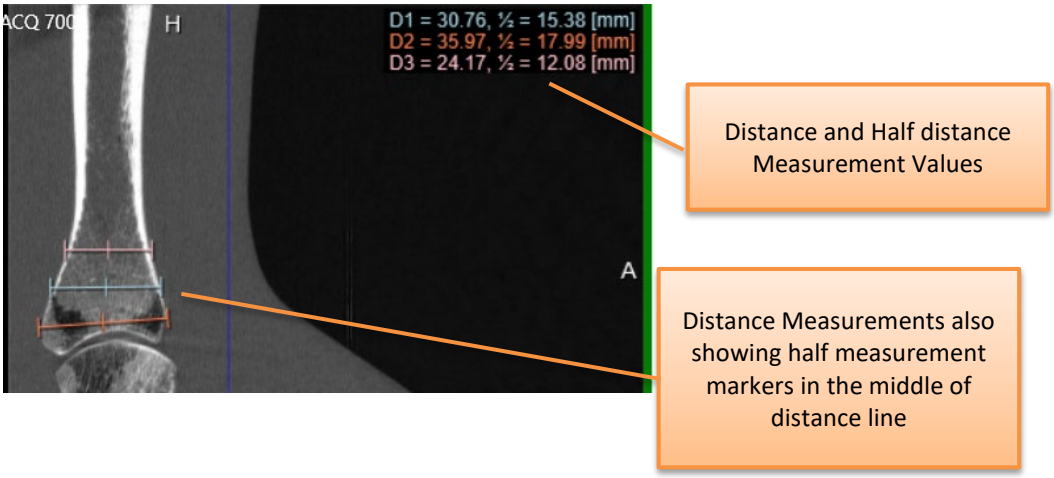


Cobb Correlation Template:

This option will place four lines of two Cobb angles which can be modified to have the desired cobb correlation. To modify the Cobb angle lines, move the cursor over any of the lines, two red dots will appear on the ends of the line which can then be dragged anywhere on the image using the mouse cursor to have the desired placement of the line.

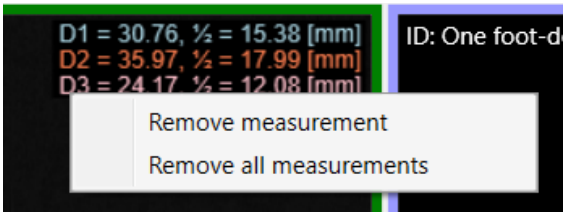
Distance Measurements

Select the Distance Tool icon to enable the distance tool. Distance has 2 points of reference. Point, click, drag, and release to create a line. This will result in a length measurement in millimeters, and the measurement will display in the upper right-hand corner of the window. A maximum of 8 measurements can be made in one image window. This tool will remain enabled until disabled by clicking the selection again.



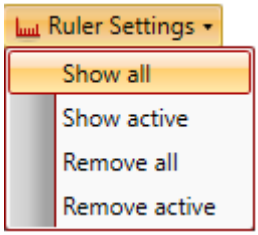
Removing Measurements:

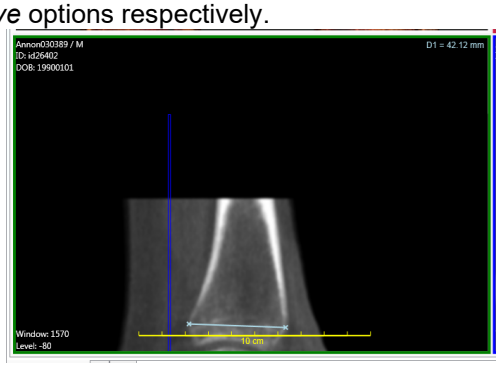
All measurements can be removed by hovering over the values in the corner and right clicking on them. This will display a pop-up window. Select either *Remove measurement* which will remove the last one drawn on or *Remove all measurements* which will remove all from both the corner and the illustration on the image.



Ruler Settings:

Also Note that there is a Ruler Tool that can be displayed on the bottom of the image window for quick distance measurements. This overlay can be enabled or disabled by selecting desired options under the "Ruler Settings" icon. Select *Show all* to display the yellow ruler at the bottom of all MPR image windows. Select *Show active* to display the yellow ruler at only the currently active MPR image; click in the image area to make it active. Similarly the rulers can be removed from all images or just the active image by choosing *Remove all* and *Remove active* options respectively.

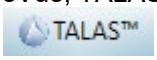




Smart Tools

TALAS™ is a software algorithm developed with the help of leading foot & ankle surgeons that can be used to automatically calculate hindfoot alignment based on reproducible three-dimensional anatomical landmarks. TALAS™ introduces the concept of 3D-specific biometric measurements, as opposed to 2D biometrics (ex. tibia-calcaneus angle), which are subject to projection and rotation error.

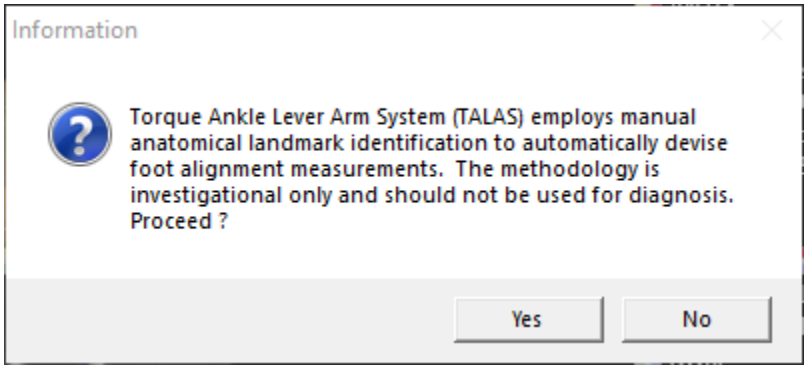
CAUTION Please note that this tool is currently being used for research purposes and is not approved as a diagnostic tool yet.

Once the patient scan is opened in CubeVue, TALAS™ functionality can be used from the Combined 3D/MPR tab using the TALAS™ button 

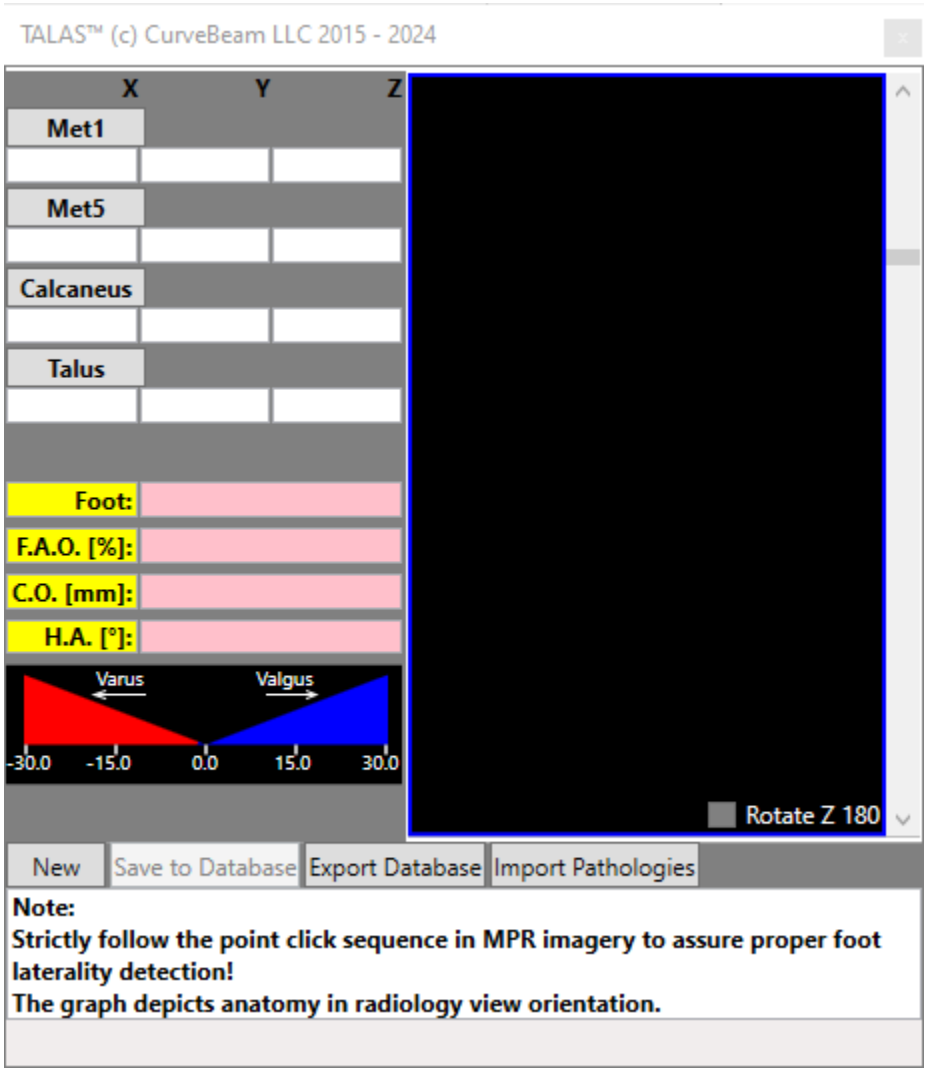
from the ribbon menu.

NOTE: TALAS™ feature is not applicable for InReach datasets.

Once the TALAS™ button is pressed an Information dialog box is displayed as shown below. Choose "Yes" to use the function. Please note that this tool is currently being used for research purposes and is not approved as a diagnostic tool yet.



TALAS™ window is then displayed as shown below (may need to be resized to view all the contents when displayed for the first time):

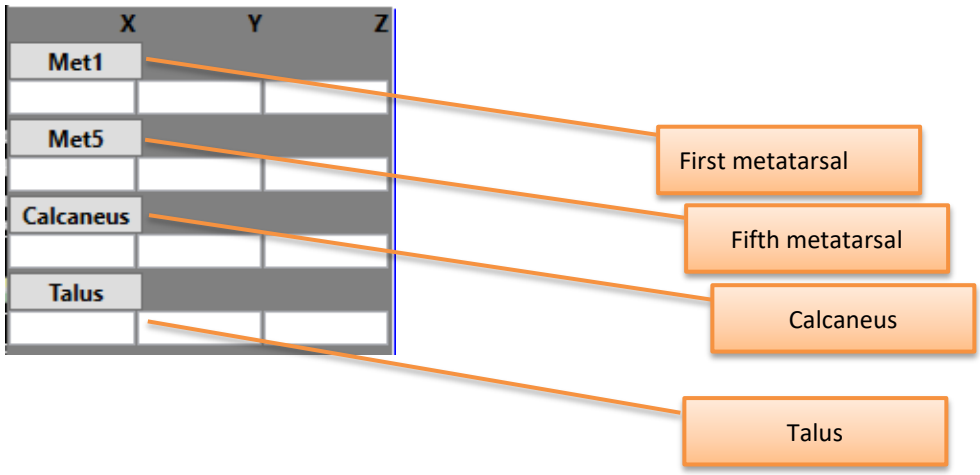


To use TALAS™, the user must first mark four critical points on any MPR view (i.e. axial, sagittal, or coronal). The sequence of clicks is important, the user needs to follow it strictly to get the correct results.

The points (to be marked on the bones in the MPR image) are in the following order:

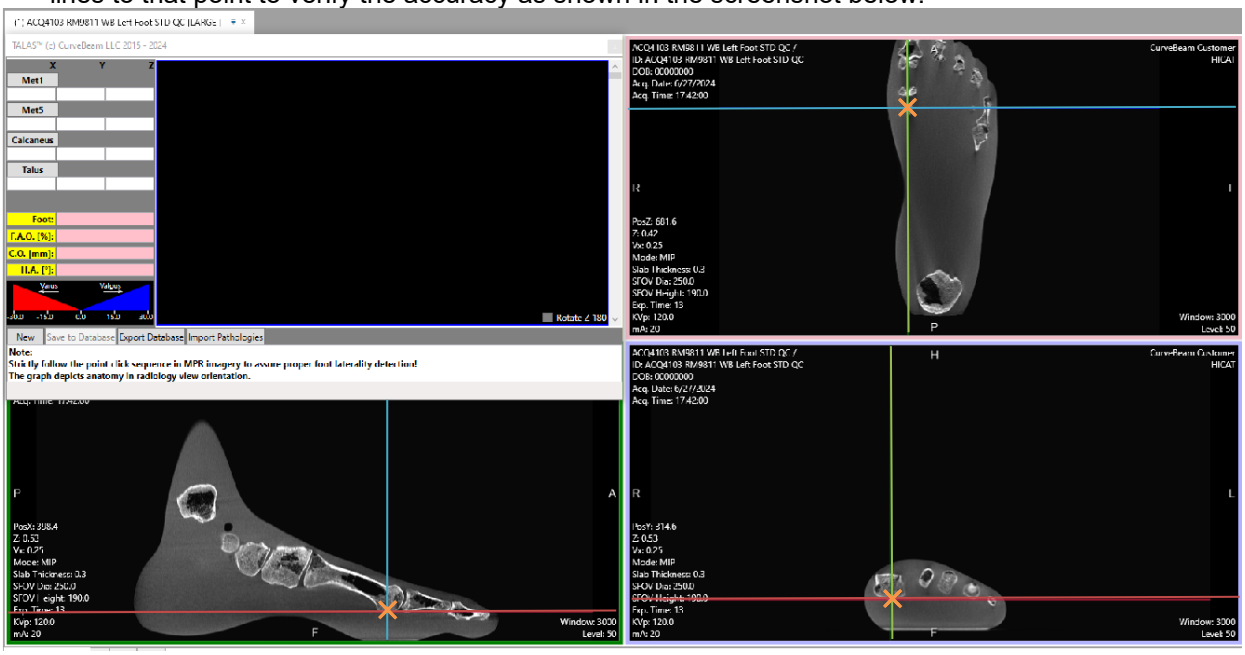
1. First metatarsal
2. Fifth metatarsal
3. Calcaneus
4. Talus

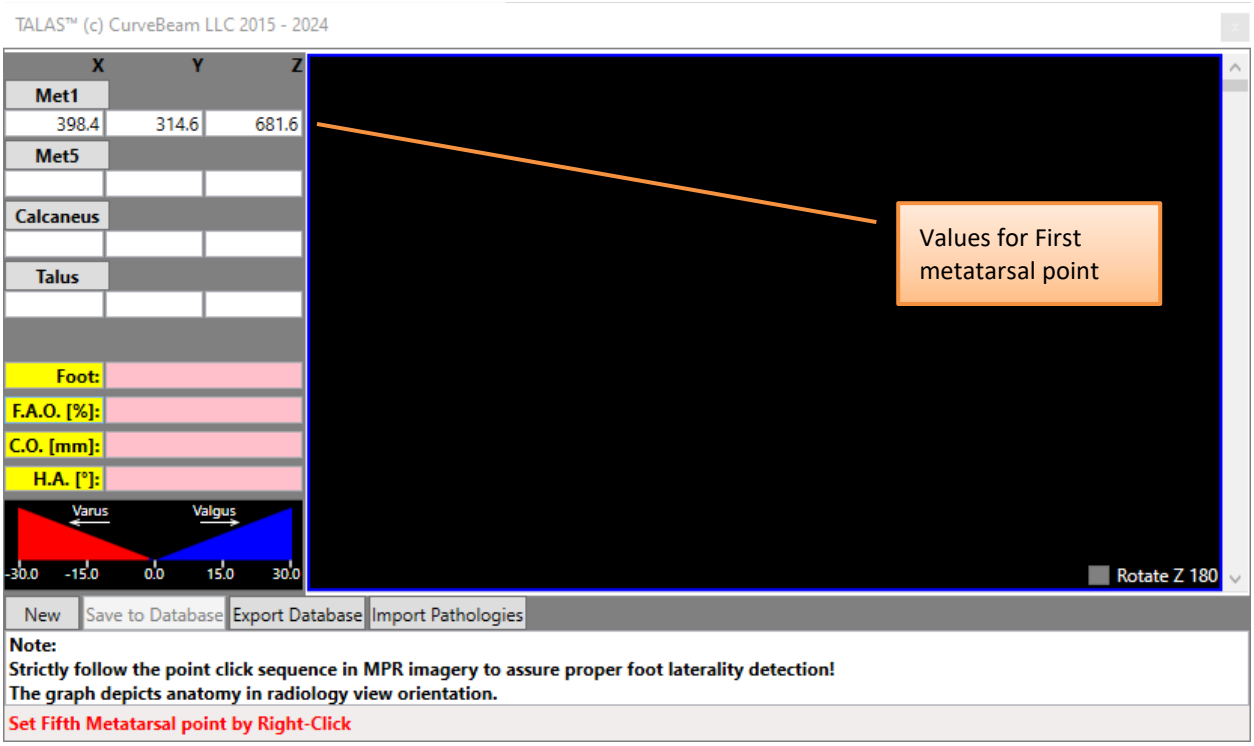
The same sequence is also mentioned on the TALAS™ window as shown below:



These four points are explained in more detail below:

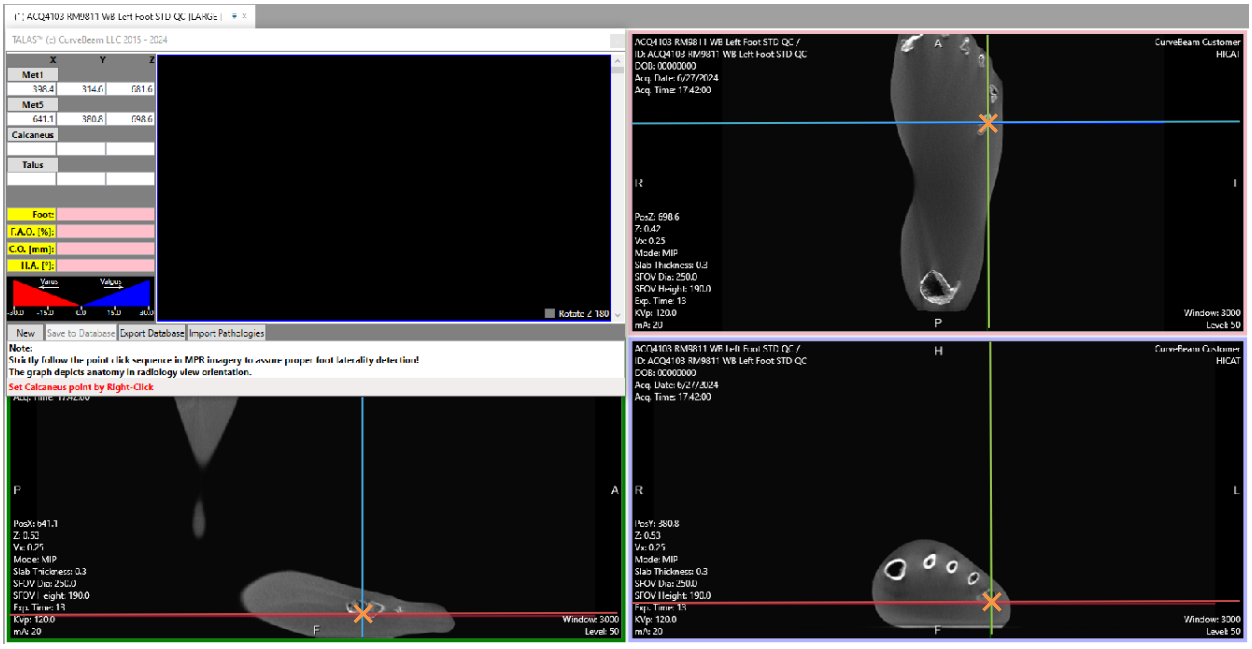
1. First metatarsal: Identify the lowest point of the distal first metatarsal head, and move all 3 slab lines to that point to verify the accuracy as shown in the screenshot below:



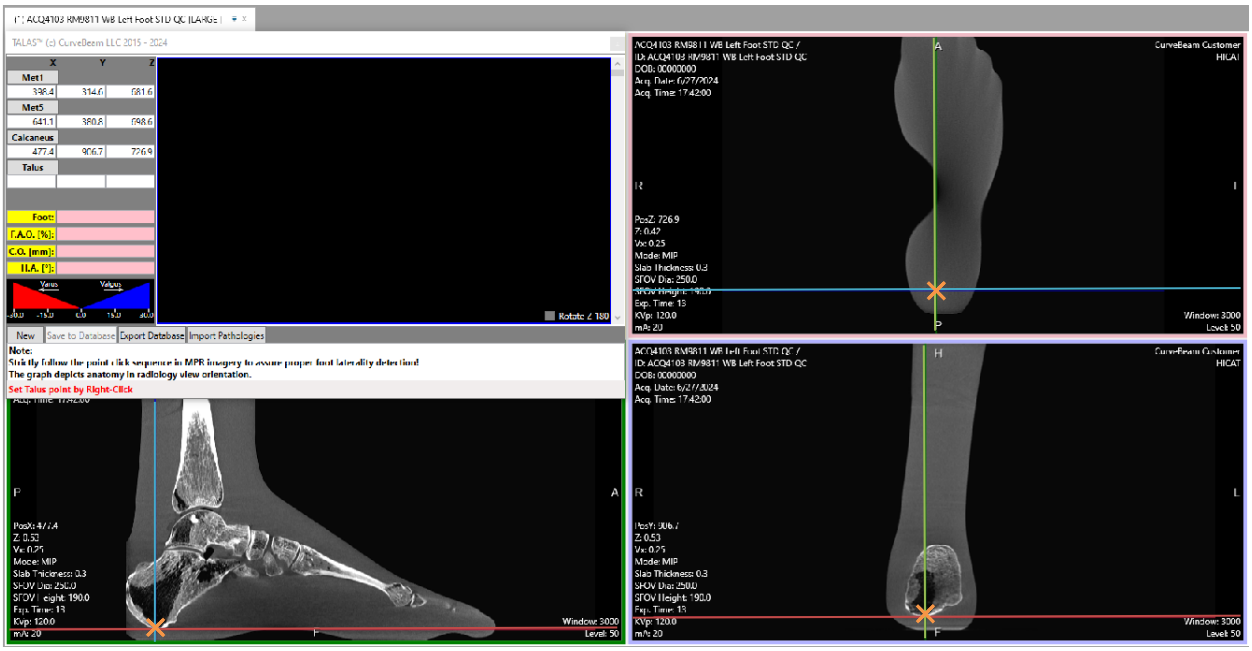


"Right click" at the point of intersection of slab lines in either of axial, sagittal or coronal image (shown inside the green boxes in above screenshot). Once a right click is made, values of X, Y and Z coordinates of that point will automatically appear in the Met1 field on the TALAS™ window similar to the below screenshot:

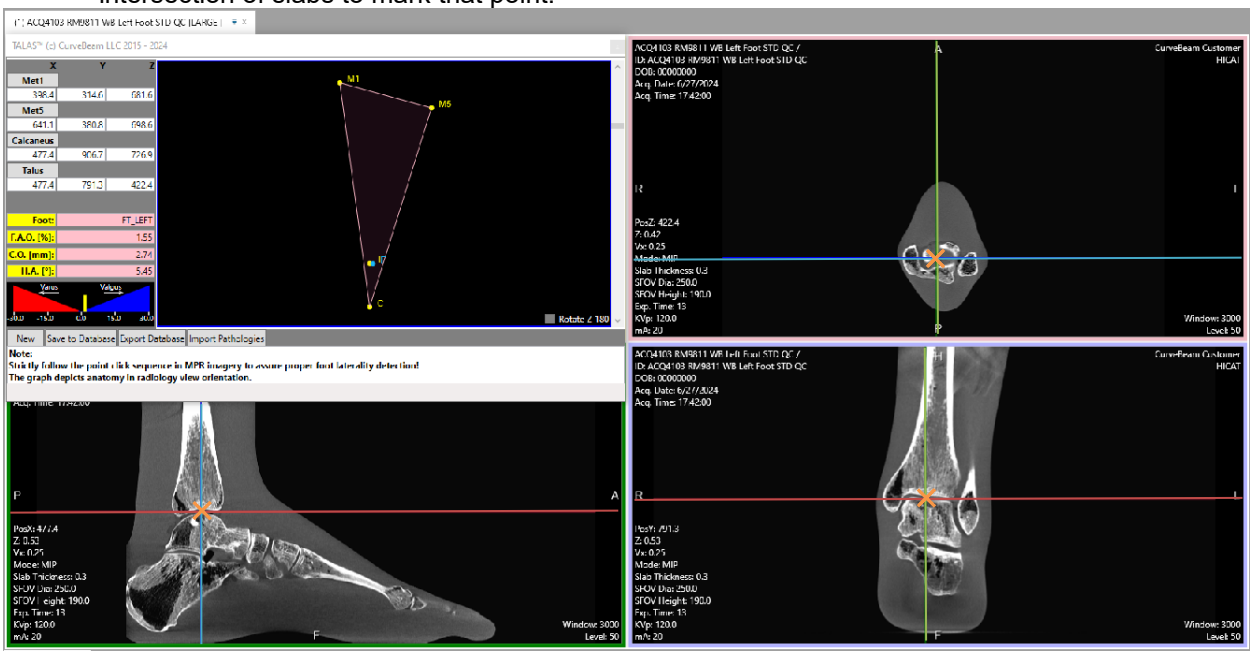
2. Fifth metatarsal: Now, locate the lowest point of the distal Fifth metatarsal head and right-click to mark it. Three-dimensional coordinate's values of that point will automatically appear in the TALAS™ window as shown below screenshot:



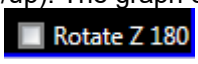
3. Calcaneus: Similarly, locate the lowest point of the calcaneus and right-click to mark it. Respective values will be shown in the TALAS™ window under the Calcaneus field as shown in below screenshot:



4. Talus: Now locate the highest point of the talar dome, then the midline and right-click at the intersection of slabs to mark that point.



As soon as the fourth point is marked, TALAS™ does the calculations automatically and displays several values in the TALAS™ window as shown in TALAS™ window in the screenshot above.

The points of click are also demonstrated on the TALAS™ window represented as M1, M5, T and C letters; an additional letter “F” is also displayed which represents the center of load-bearing or where the center of gravity of the foot lies. This graph depicts the anatomy in radiology view orientation (i.e. patient foot being viewed bottom/up). The graph can be rotated by 180 degrees about Z axis by the use of “Rotate Z 180” checkbox 

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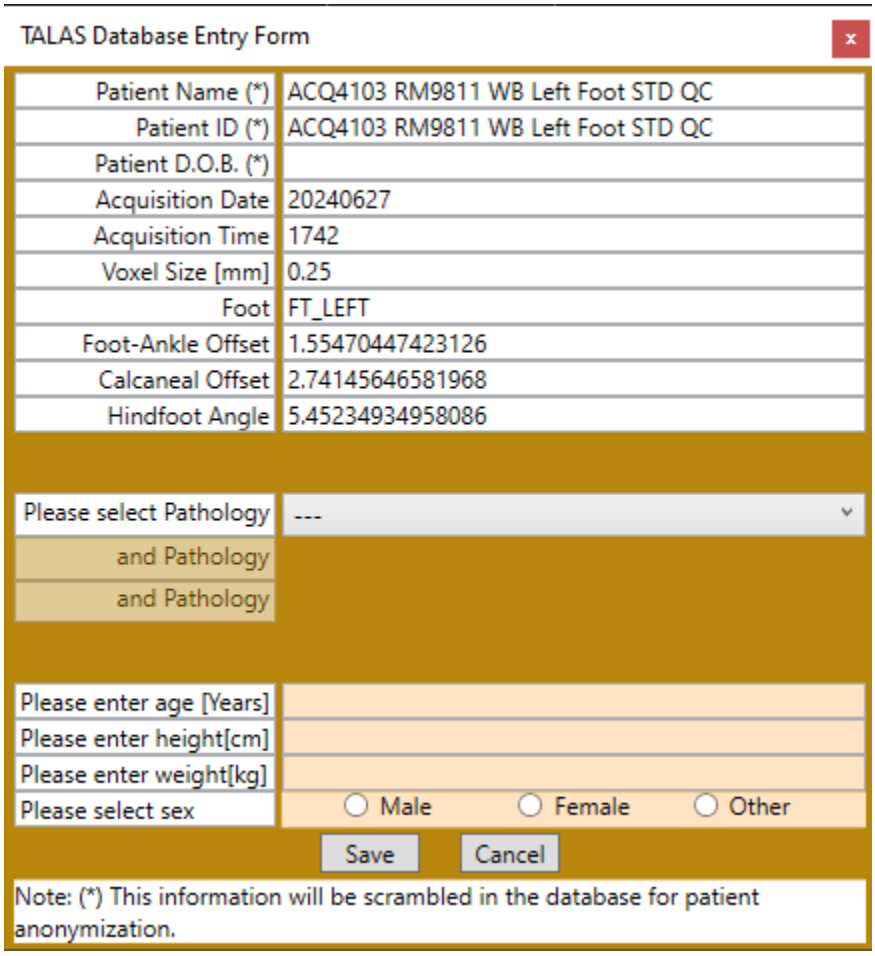
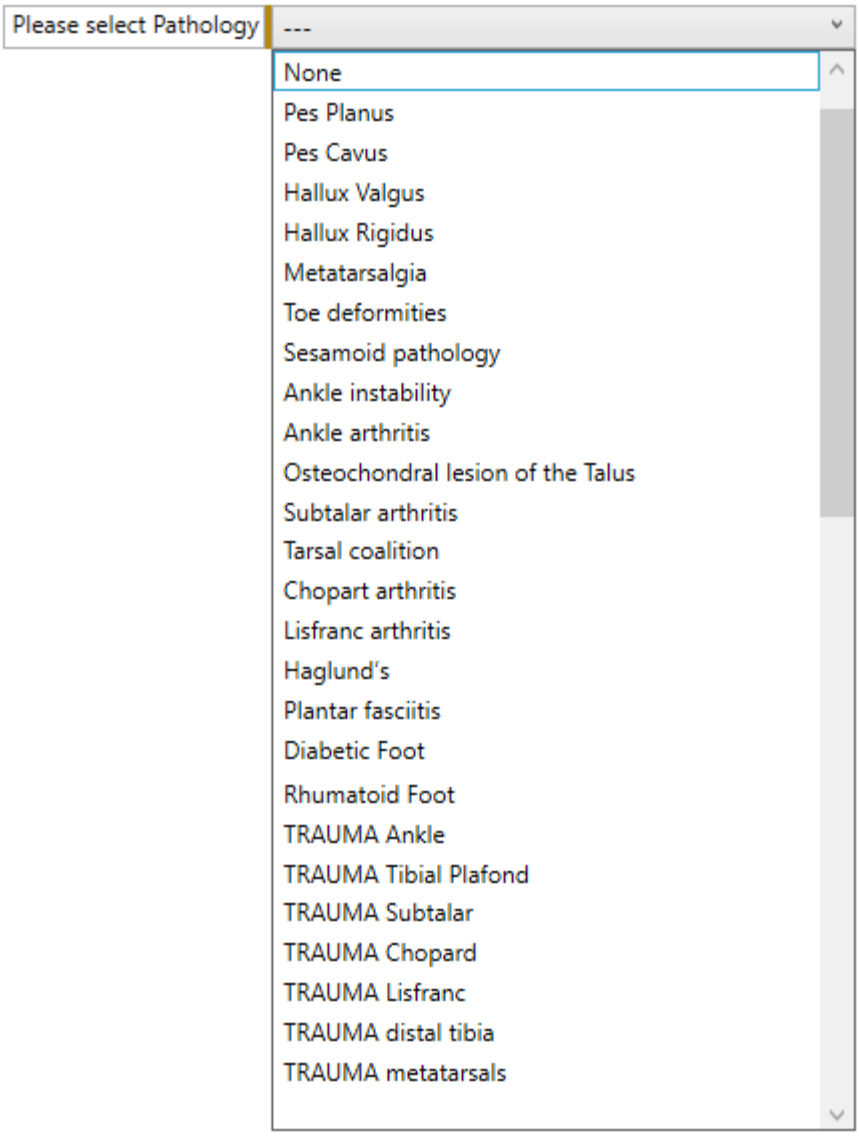
In the above screenshot, TALAS™ has identified this as a Right foot, with a Foot Ankle Offset of 0.91%, a calcaneus offset of 1.40mm, and a hindfoot alignment of 3.19 degrees. It also displays if there is Varus or Valgus condition on the gradient on the TALAS™ window. Detailed information about these can be obtained from http://www.curvebeam.com/products/cubevue-software/automatic-measurement-tools/.

NOTE: if the user has marked in the wrong order, or misplaced the mark, the “New” button on the TALAS™ window can be selected to start over.

Once TALAS™ has calculated the results, these can be saved to the Database. Click on the “Save to Database” button on the TALAS™ window & a TALAS™ Database Entry Form will be displayed as shown below:

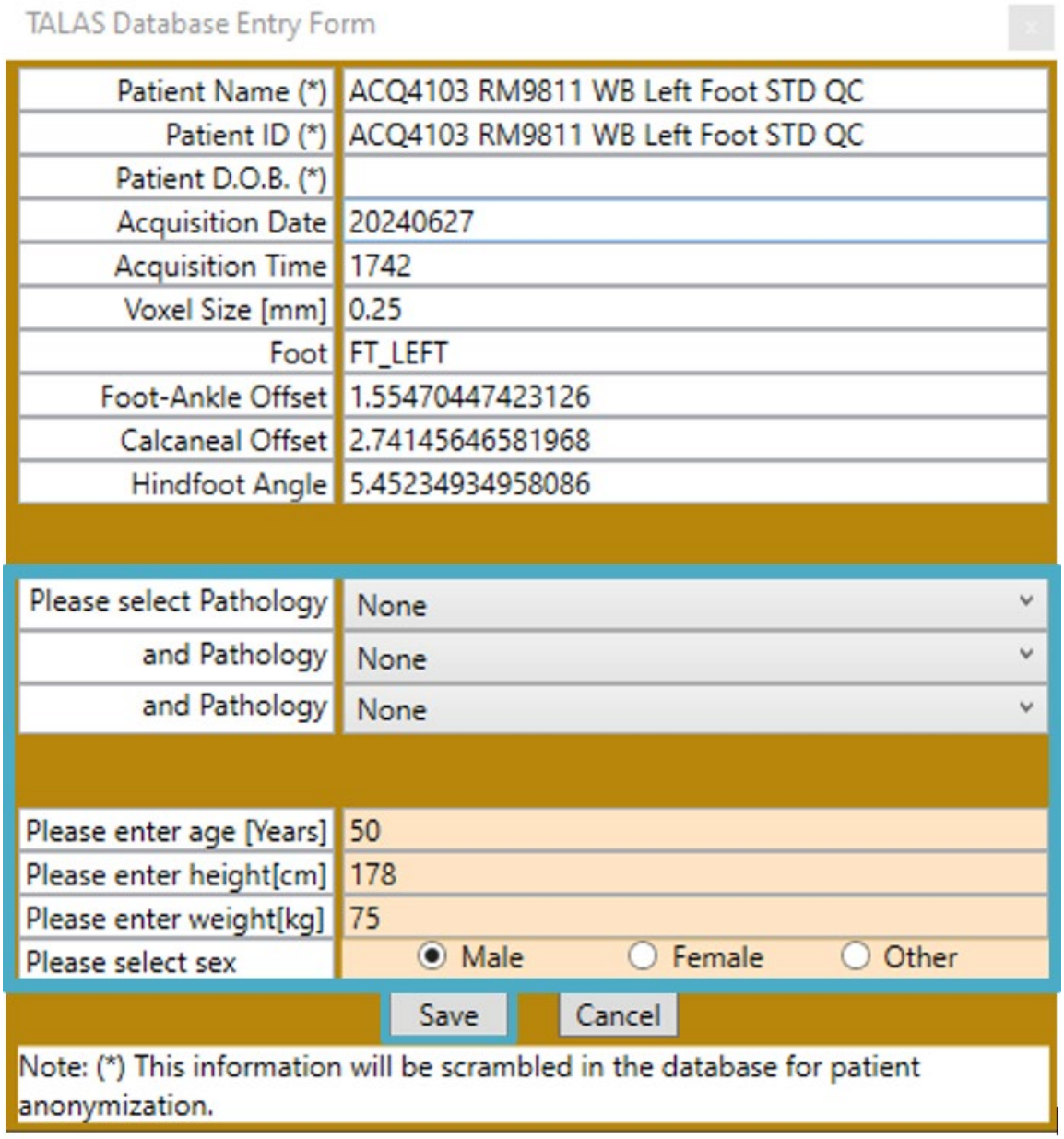

TALAS Database Entry Form
Patient Name (*)
ACQ4103 RM9811 WB Left Foot STD QC
Patient ID (*)
ACQ4103 RM9811 WB Left Foot STD QC
Patient D.O.B. (*)
Acquisition Date
20240627
Acquisition Time
1742
Voxel Size [mm]
0.25
Foot
FT_LEFT
Foot-Ankle Offset
1.55470447423126
Calcaneal Offset
2.74145646581968
Hindfoot Angle
5.45234934958086
Please select Pathology
---
and Pathology
and Pathology
Please enter age [Years]
Please enter height[cm]
Please enter weight[kg]
Please select sex
Male
Female
Other
Save
Cancel
Note: (*) This information will be scrambled in the database for patient anonymization.

Some values (Patient Name, Patient ID etc.) will be pre-filled in the form. Select the Pathology, if any, by clicking on the “Please select Pathology” dropdown. Please note that more than one pathology can also be selected from a subsequent dropdown which gets enabled after the selection from the previous pathology dropdown as shown in the next screenshot:



A maximum of 3 pathologies can be selected.

Further, enter the age (in years), height (in cm) and weight of the patient (in kg) followed by the selection of gender. Click on the “Save” button to save the database.



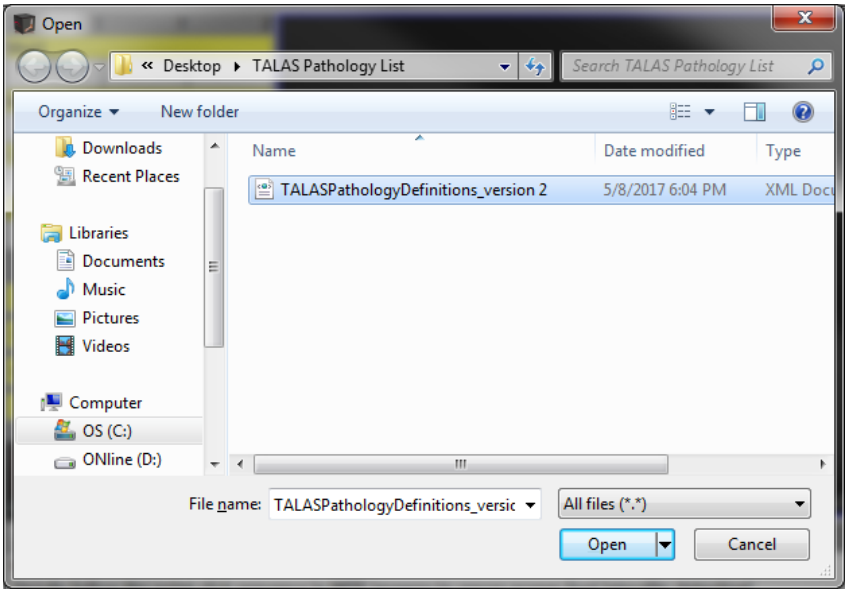
TALAS™ Database Entry Form will close automatically when the “Save” button is pressed. Please note that the patient information saved in the database will be anonymized automatically.

The database can be exported using the “Export Database” button from the TALAS™ window. A dialog box will open up to browse the desired path & to specify the desired file name. Browse to an existing folder or create a new one if required; give the desired file name & click on the “Open” button. The database will be saved at the desired location in .csv format which can be opened in MS Excel to view the contents.

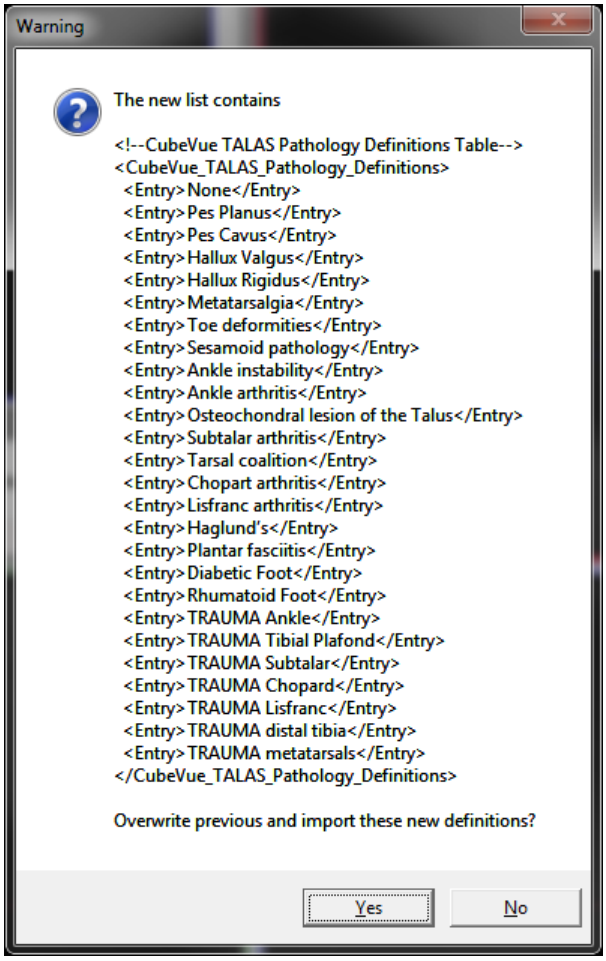
NOTE Please contact CurveBeam Technical Support to provide this database to contribute to TALAS™ research.

Import Pathologies: New pathologies may be added to the Pathologies list for TALAS™. The new/updated list can be imported by the use of the “Import Pathologies” button from the TALAS™ window. The user may contact CurveBeam Technical Support to check if a new Pathology list is available. Alternatively, if the user has new pathologies to add to the list, they can contact CurveBeam Technical Support with the new entries and obtain a file which can be used to Import the list of desired pathologies.

To start the import process, select the “Import Pathologies” button, browse to the file location and click on the “Open” button:



A warning message shall be displayed before the list is updated:

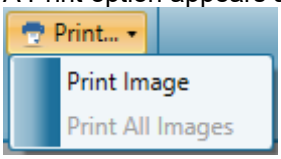


Choose the “Yes” button to complete the process of the Import of Pathologies list. The next time the user saves a patient to the database; this updated Pathologies list can be viewed and used.

Output

Printing Images as Hard Copies

A Print option appears as an Output function along the top menus.



To use click on Print and then select either “Print Image” or “Print All Images”. If Print Image is selected, the currently active image will be the one printed.

Exporting Images as Digital Files

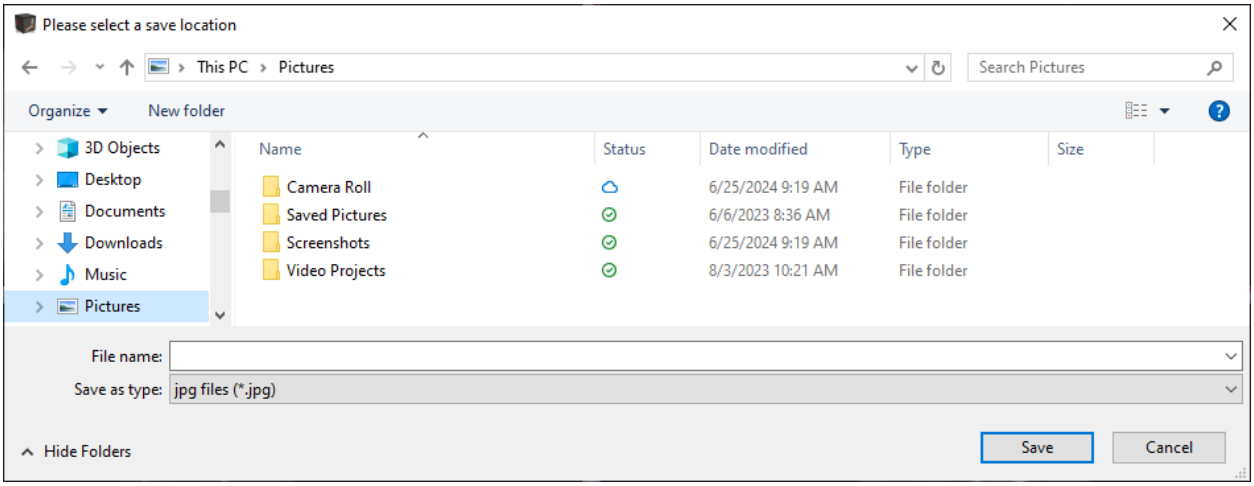
To save an image/volume as a JPG:

1) Click the viewing window to highlight the image.

2) From the *Save...*drop-down menu: select *Save as JPG/Save Screen as JPG/Save Volume as JPEG.*
3) Designate the location in which to save the JPG.

Save as JPG/Save Screen as JPG

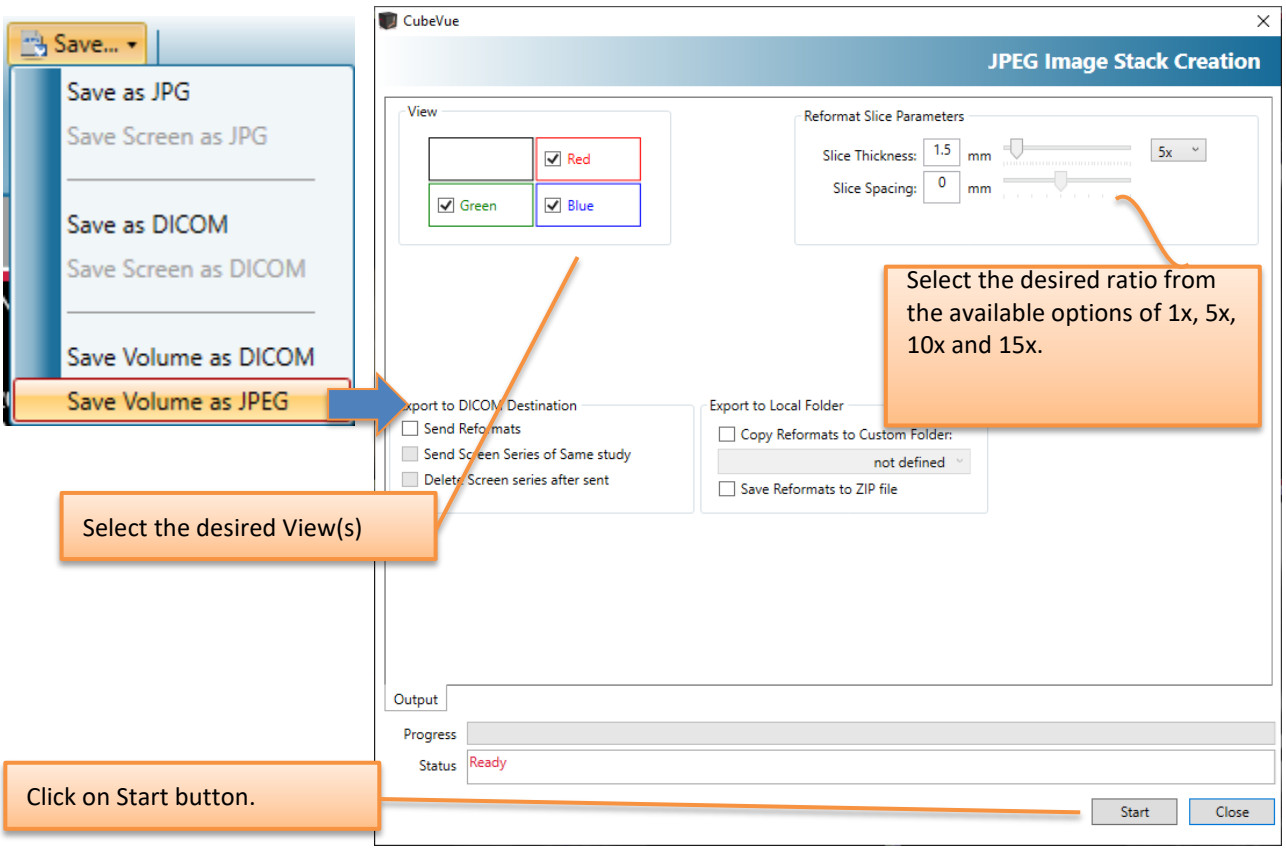
If the Save to patient folder is selected, the file will be saved to the patient's folder and remain there. The JPG can then be exported using Media Export if desired. If the Save to custom location is selected, there will be an additional prompt to browse to the desired location.



Similarly, *Save Screen as JPG* option under *Save…* dropdown can be used to save all the images in any particular tab under Review tab as a single image. Select the desired tab (like Combined 3D/MPR, 3D, MPR and Sim-X tab) and then click on *Save…* and select *Save Screen as JPG*.

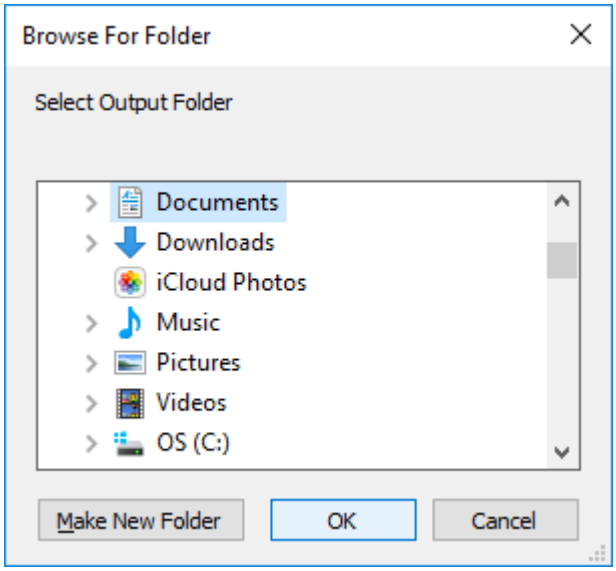
Save Volume as JPEG

Save Volume as JPEG feature provides a way to save the axial, sagittal and coronal slices as JPEG images in a desired location on the computer. Click on Save… dropdown and select Save Volume as JPEG option. JPEG Image Stack Creation dialog will pop up as displayed below:

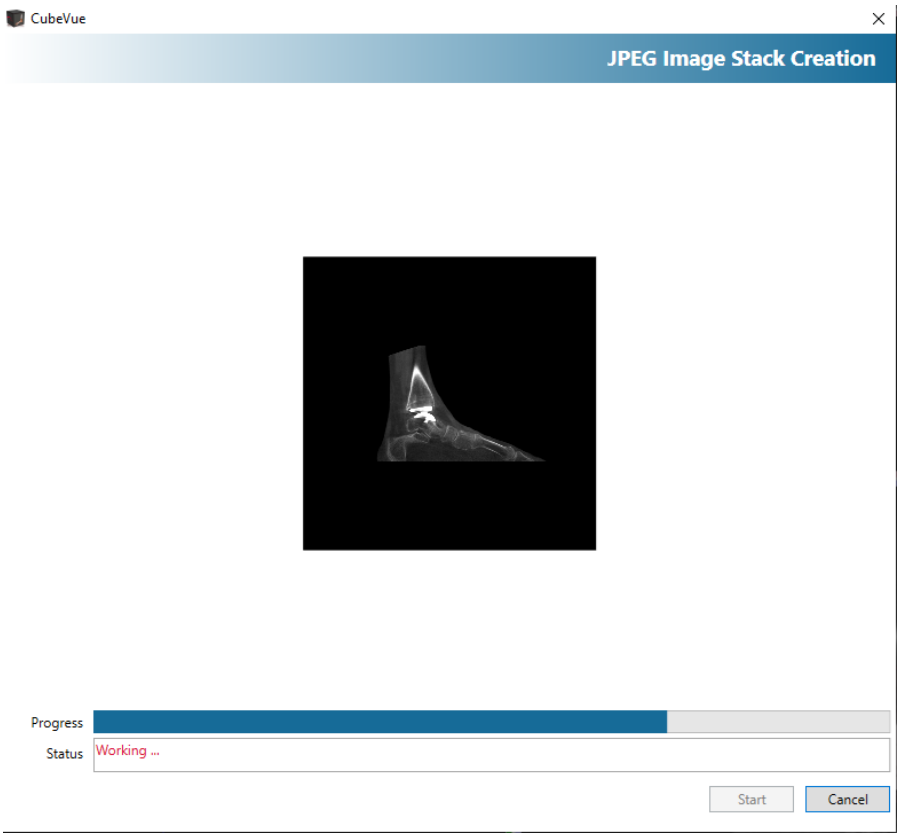


Select the desired View option (like Red/Green/Blue), then choose the desired output geometry using the Slice thickness slider or drop-down options. Click the *Start* button.

Once the *Start* button is pressed, a dialog box will appear asking for the folder:



Select the desired folder (or create a new folder if required) and click on OK button. The software will start the process of saving the images and display progress:



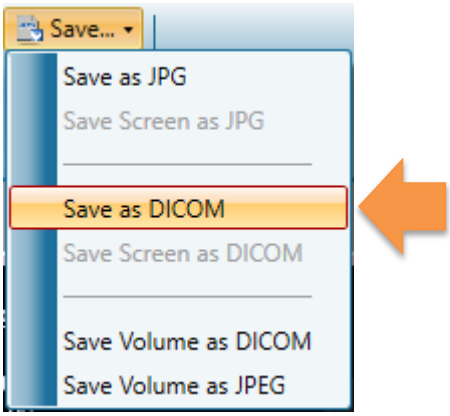
The status will change to ‘Complete’ when all the images have been saved.

Save As DICOM

The Save As DICOM function is used to save static images in the DICOM format. The purpose of Saving static images, in DICOM format, is simply an extension of Saving static images in JPEG format.

However, the intent of this is more specific to saving images that can be sent to a PACs server or DICOM Application entity, as the JPEG images are not compatible with such systems. This would most commonly be used for saving static 3D rendering images as DICOM files

To Save an Image as DICOM, click on any desired image. The last image window that has been clicked is the Active window. Next, Click on *Save…* in the Output section of the Main Menu Bar and select **Save as DICOM**.

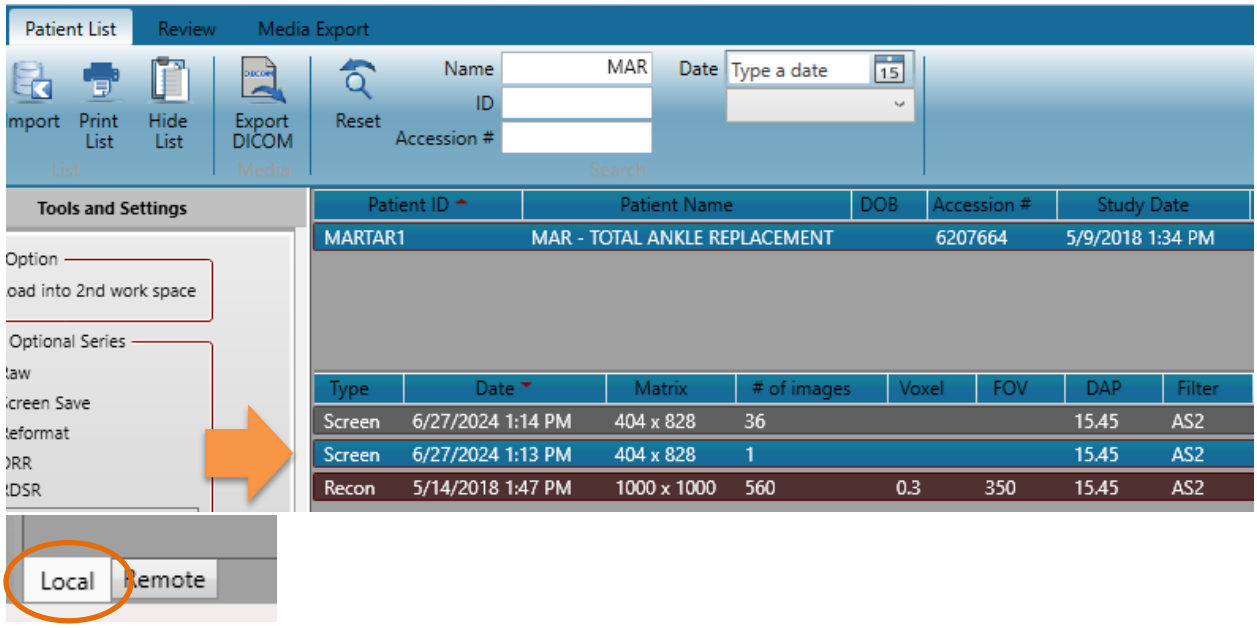


There will be an audio sound when clicked and the image will automatically be saved to the Patient Output folder. There will also be a message in green color at the lower left-hand corner of the program that reads "**DICOM IMAGE SAVED**"

Save Screen as DICOM

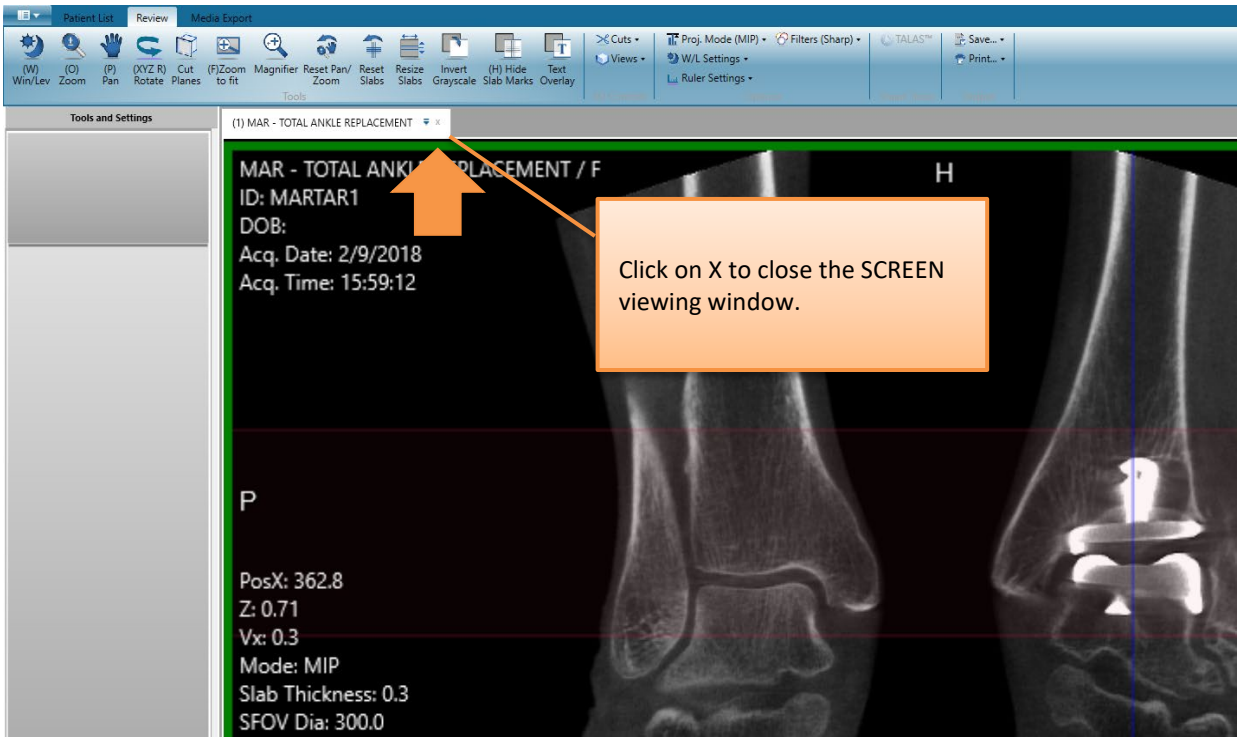
Save Screen as DICOM option under the *Save…* dropdown can be used to save all the images in any particular tab under the Review tab as a single image. Select the desired tab (like Combined 3D/MPR, 3D, MPR and Sim-X tab) and then click on *Save…* and select *Save Screen as DICOM*.

Multiple images can be saved in this fashion. These images are then accessible ONLY from the Patient List LOCAL Tab. These images can be loaded and viewed, Exported as DICOM, Media Exported, or also sent to a PACs server or DICOM AE. (see section on DICOM Send for instructions on sending).



To View the SCREEN images in CubeVue, double-click to load. Scroll the mouse wheel to advance to the next image in the Series. This series can also be loaded into the 2nd Workspace.

The usable functions for the SCREEN series are W/L, Zoom, Pan, Zoom to Fit, Reset Pan/Zoom and W/L Settings (reset). To close the SCREEN viewing window, click the “X” on the patient name Tab.

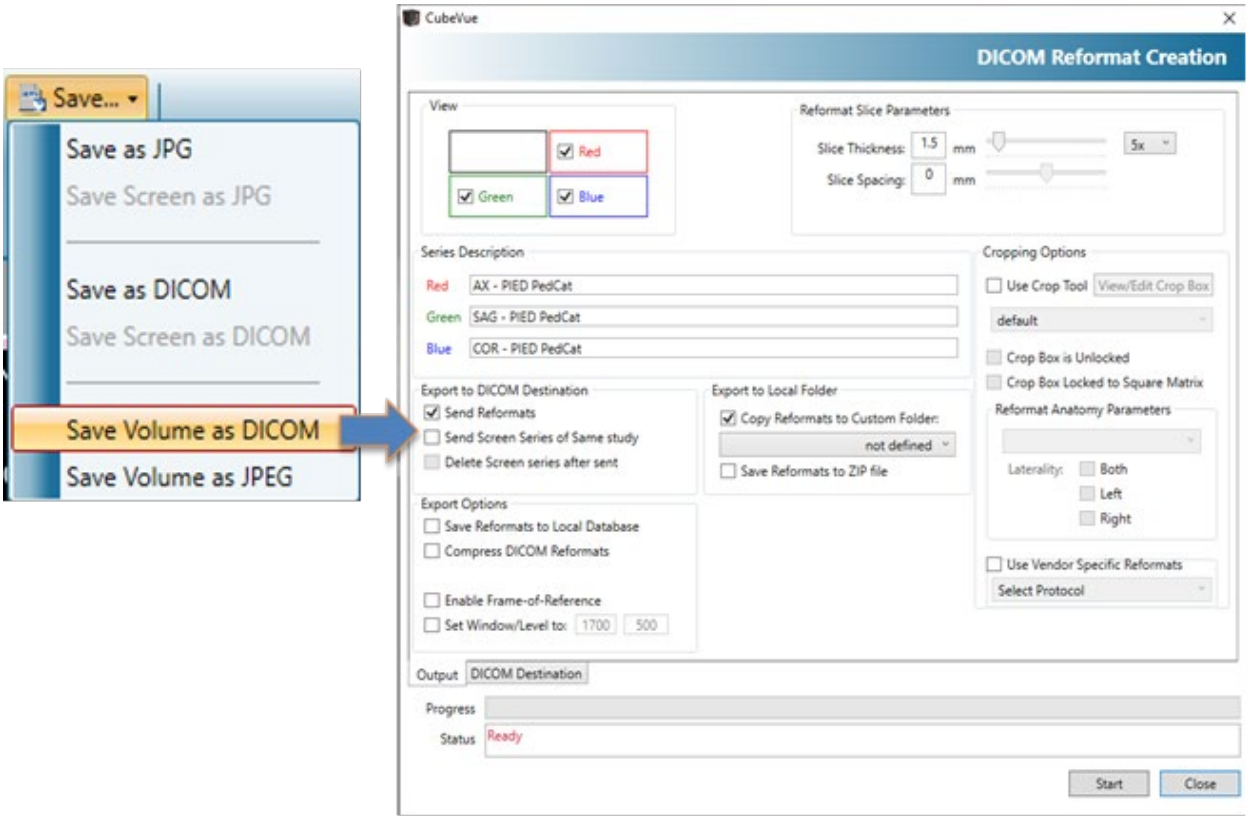


Save Volume as DICOM

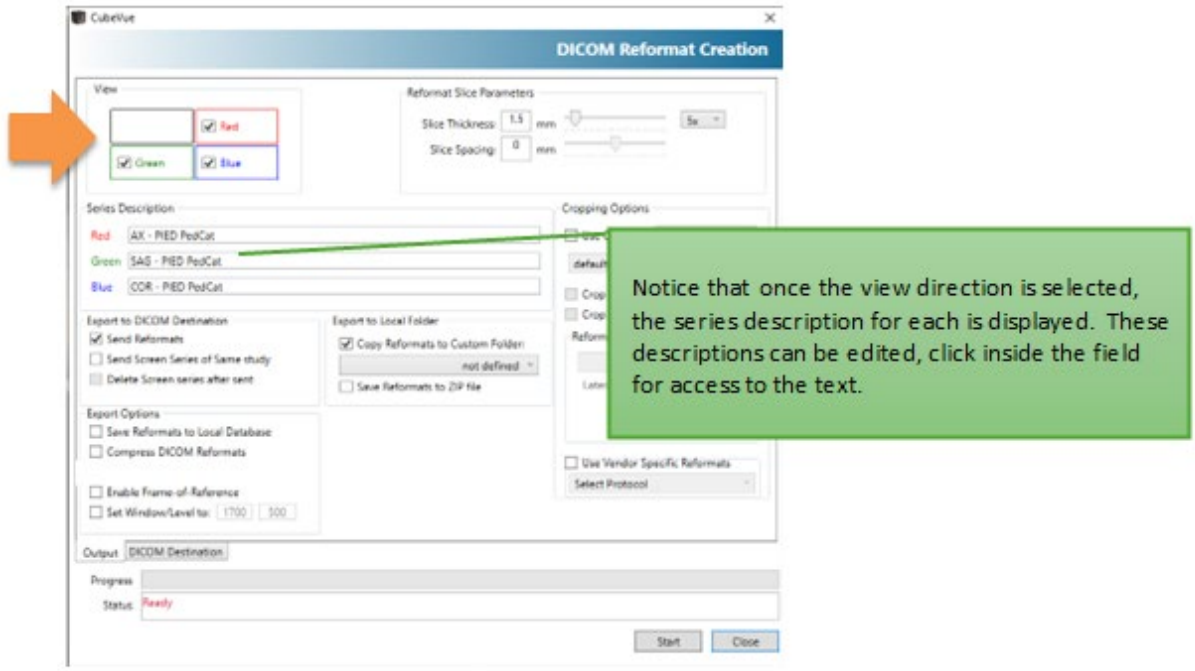
The *Save Volume as DICOM* feature provides a method to save and send DICOM volumes from a dataset after it has been re-oriented or cropped for a desired anatomical feature. The *Save Volume as DICOM* feature reformats the original dataset into corresponding axial, coronal, and sagittal image-slice slides which the receiving PACs/DICOM server can recombine into a 3D generated volume.

In the case when a dataset may be too large for the receiving PACs server, the reformat slice thickness may be adjusted to be between 1x – 40x the original voxel size.

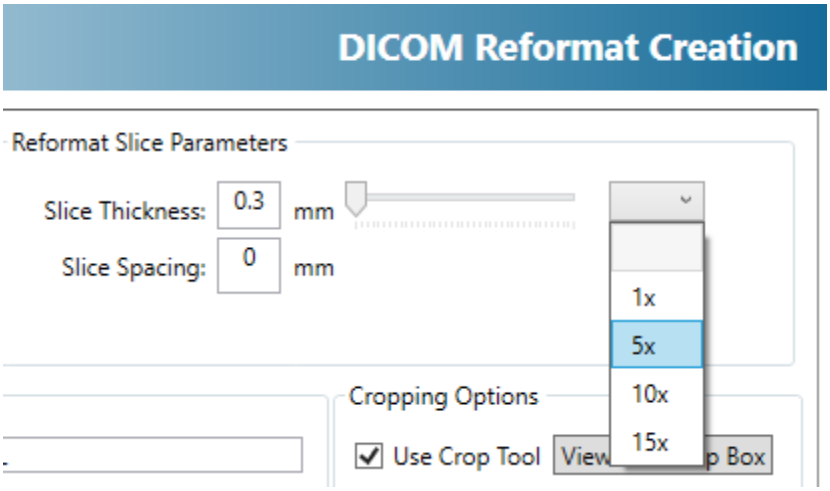
To initiate the *Save Volume as DICOM* feature, first orient and/or crop the volume that you would like to save and/or send, then select the **Save Volume as DICOM** option from the *Output* section from the *Review Tab/Combined 3D MPR* tab Main Menu Bar. This will open the *DICOM Reformat Creation* window.



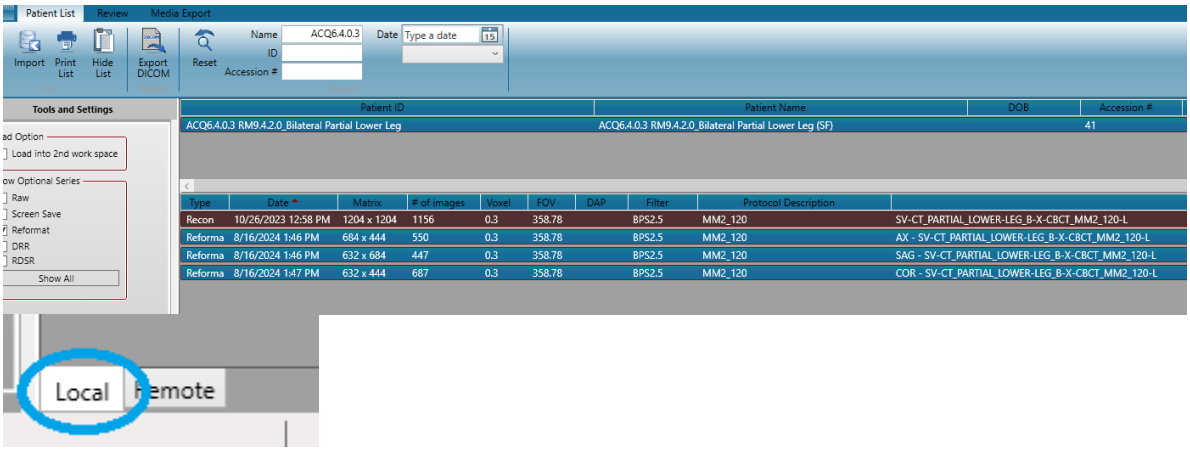
From this window, first select the desired **View Direction:** In most cases, all the views will be selected. *Red = Axial, Green = Sagittal, Blue = Coronal*. However, there may be an event where only Red (Axial) is necessary.



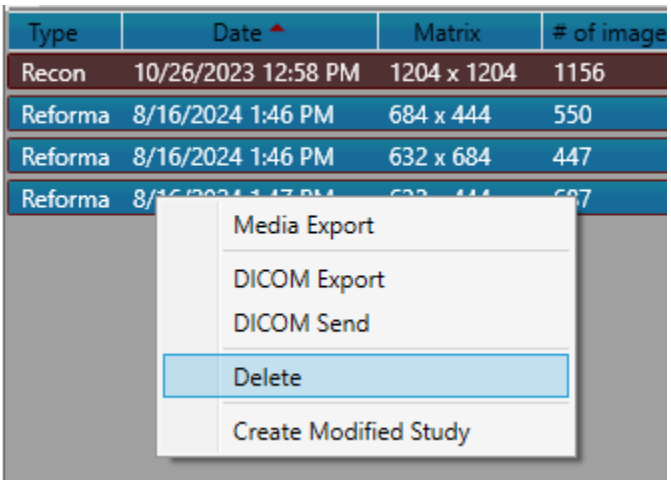
Next, select the desired **Reformat Slice Parameters**, then click **Start**. The default for slice thickness will display as the original voxel size. The options are to either click on the drop-down menu and select 5x, 10x or 15x or drag the incremental slider for additional options.



Once the Status reads Completed, click **Close**. The new reformatted datasets will reside under the Patient ID, Series Type in the Patient List LOCAL Tab only. The Series Type will be called Reformat.

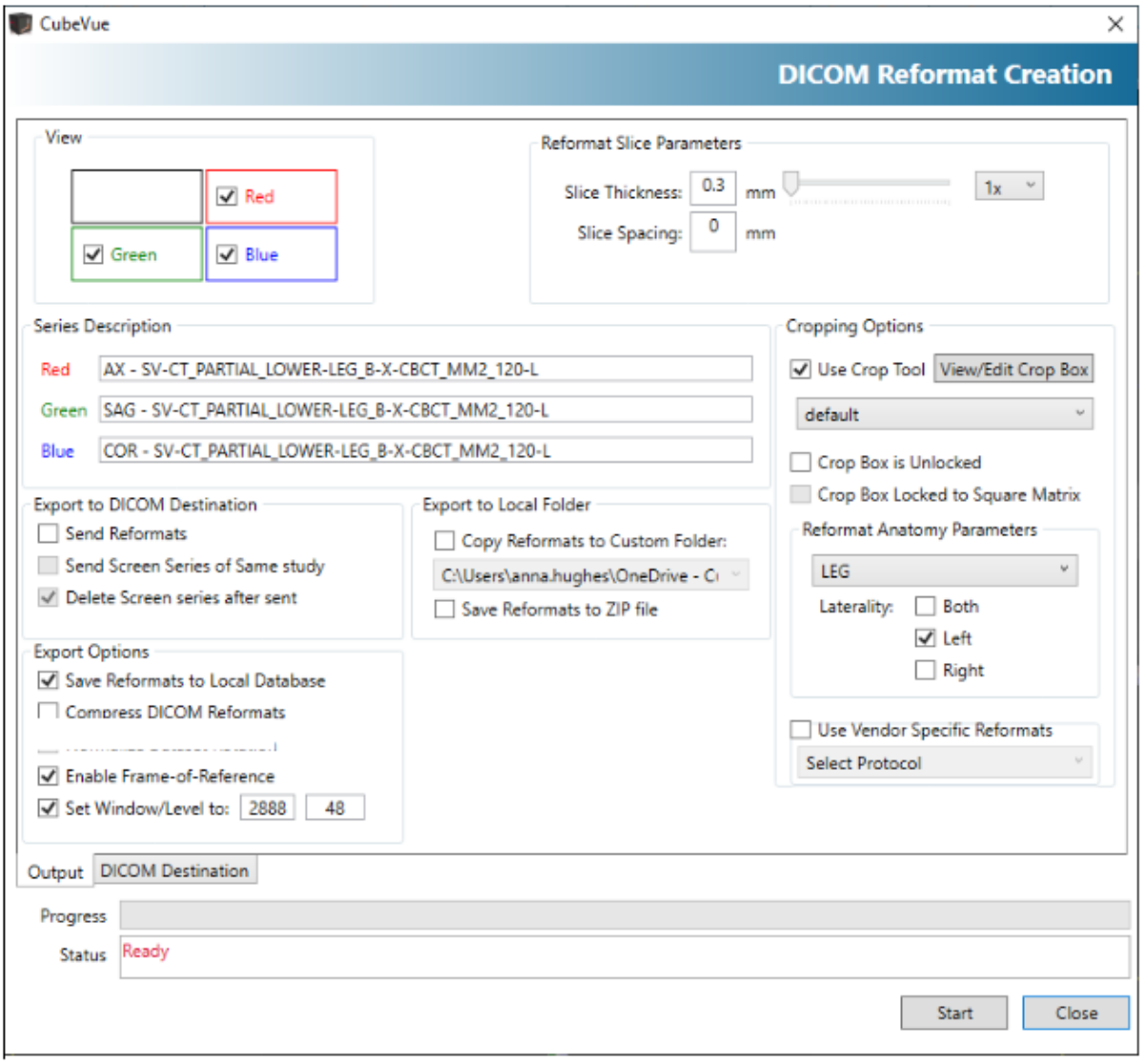


If you desire to delete any of these datasets, click on to highlight, right-click for the pop-up menu, and select **Delete** from the menu. Select multiples by holding down the CTRL button then click each desired dataset.



CAUTION – Once the scan is deleted from the Local Database it will no longer be accessible there.

There are several checkboxes on the Output tab of the DICOM Reformat Creation user interface.



Send Reformats: This checkbox should be checked if the reformat(s) need to be sent to a desired DICOM Destination. DICOM Destinations can be configured as described in the DICOM Send section.

Send Screen Series of Same Study: If there are any screen series already present for that particular scan, then those can also be sent to the DICOM Destination along with the Reformat(s).

Delete Screen Series after Sent: The screen series sent to DICOM destination in the above steps are automatically deleted from the local patient list if the “Delete Screen series after sent” checkbox is checked.

CAUTION – Screen Series datasets will be deleted after they are sent.

Save Reformats to Local Database: Select this checkbox if the Reformat(s) are to be saved in the Local Patient List.

CAUTION – If unchecked, reformat datasets will be deleted after they are sent. They will not be saved.

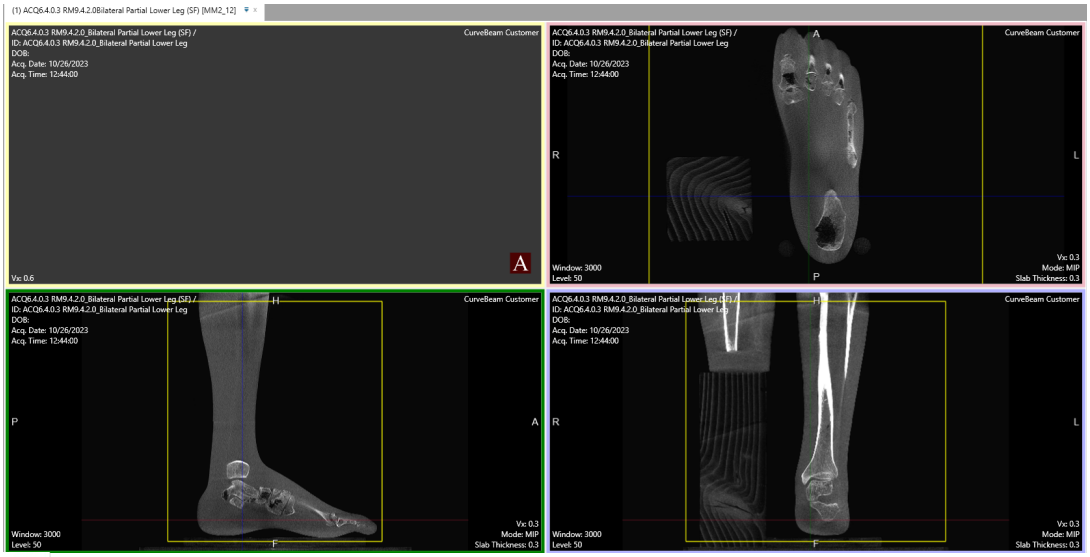
Copy Reformats to Custom Folder: Once checked, the user can set the pathway to the custom folder they wish to save the reformats in to and may also check the “Save Reformats to ZIP file” setting.. To set the folder path, right-click on the drop-down list beneath the checkbox and select “Add Location”.

NOTE: The reformats generated from CubeVue can be previewed using a 3rd party viewer before sending to remote tab or PACS. The Send Reformats checkbox should be unchecked in that case and the reformats can be saved to a local folder which can be used for preview if needed. If acceptable, check the Send Reformats checkbox keeping all the settings same on the dialog box to re-create & send the reformats to desired AE (e.g. PACS).

Set Window/Level to: This checkbox can be checked and the desired values for Window and Level can be defined in the given boxes. The reformats will have the defined Window and Level as default.

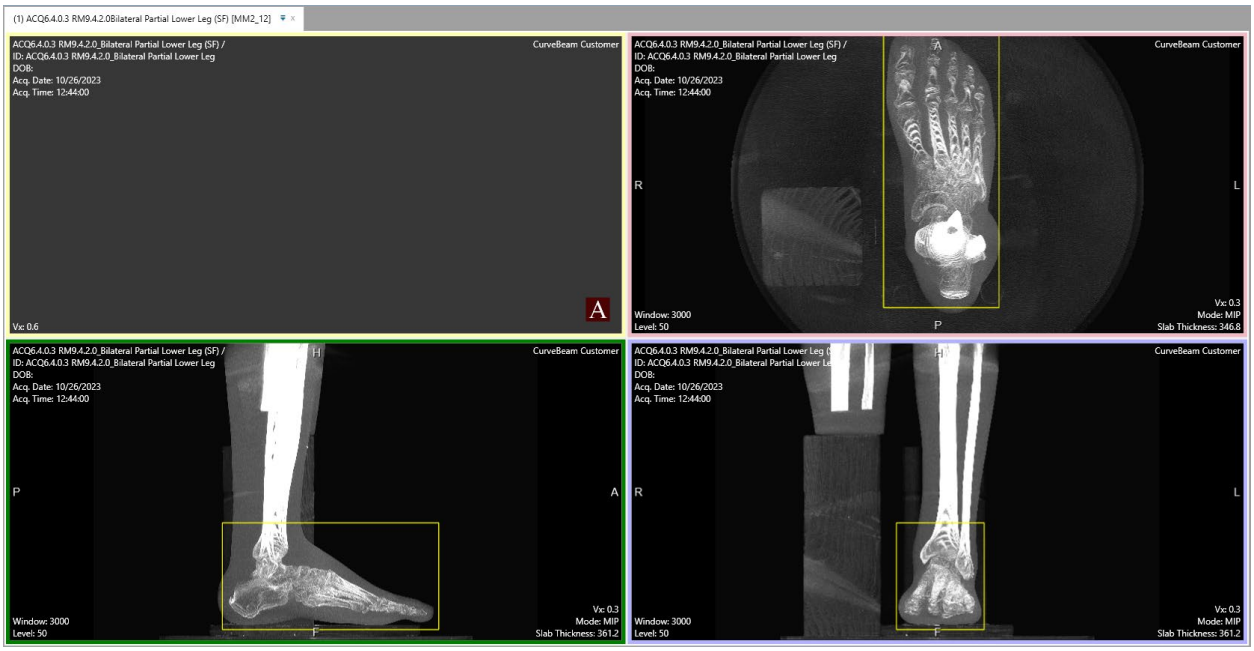
NOTE: Reformat datasets **will NOT open** in CubeVue software. These datasets are no longer isotropic and not intended to be viewed in CubeVue. The original reconstructed (RECON) datasets should be used to view in CubeVue.

Use Crop Tool: This checkbox option enables desired anatomical features to be cropped from the DICOM volume and exported as reformats. Once checked, yellow rectangles will appear on the MPR image windows to display the volume of interest to be cropped and exported. Prior to the export of the reformats, *View/Edit Crop Box* must be utilized to designate the desired anatomy within the volume of interest and the appropriate selections made from the *Reformat Anatomy Parameters* section.



NOTE: During *View/Edit Crop Box* operations the user may utilize the ”Sync. 3D/MPR Rotation” checkbox under the Tools and Settings pane in conjunction with the capability to rotate in the 3D image window to properly position a redefinition of the MPR anatomy within the volume of interest.

CAUTION: Set the Crop Box within the boundary of actual scanned volume. The software may present an error message if the crop boxes are set outside the boundary of the actual scanned volume. Use of ‘Zoom to Fit Crop Box’ option can be used to bring the yellow rectangles in view and then the rectangles can be adjusted as required.



Use Vendor Specific Reformats option: it is there on the dialog box for the future expansion of the automatic creation of reformats in some scenarios. Similarly, the checkboxes 'Crop Box is Unlocked' and 'Crop Box Locked to Square Matrix' are the features associated with the use of Vendor Specific Reformats option.

Media Export Tab

Burning a Disk with a Free CubeVue Viewer

The software has functionality that will allow for an auto burn of a disk that contains the desired dataset(s) along with a limited-function copy of the CubeVue viewing software. The limited-function viewer does not have volume render capability.

The recipient of this disk can open the dataset(s) in the CubeVue software for viewing. This function allows the end user to also export and burn individual images of 3D renderings, or any image of choice to the disk which can then be viewed via the CubeVue viewing software. This is useful if the receiving user does not possess one of our 3D licenses necessary for building 3D renderings. (If the recipient desires to have full 3D rendering functionality, a license can be purchased by contacting CurveBeam Technical Support).

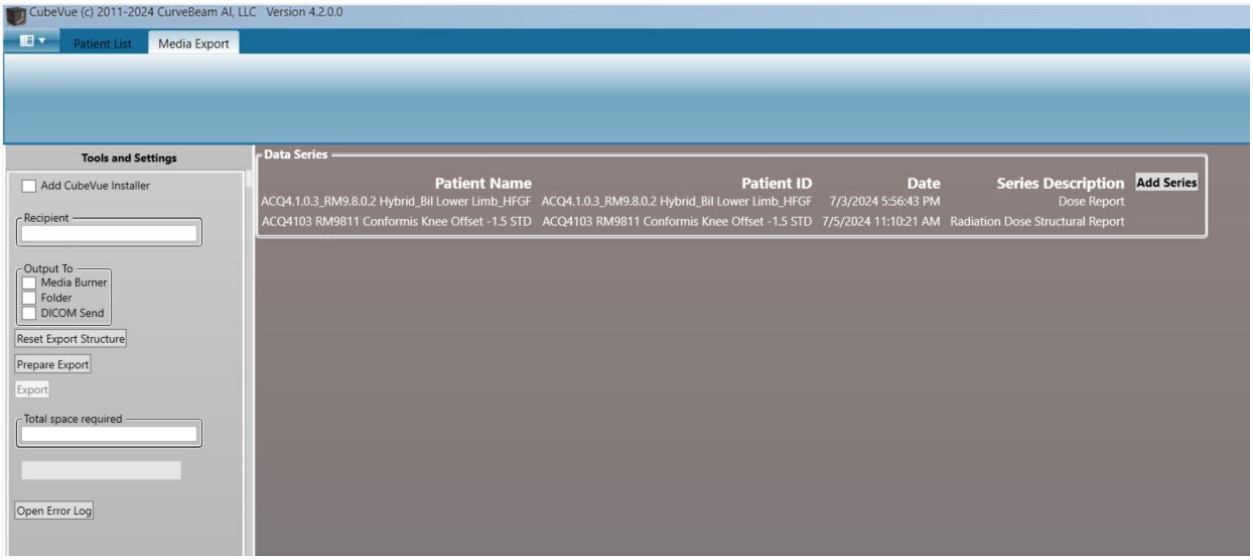
Media Export will also export any CubeVue Saved Sessions associated with a dataset. If there is an error with the export, or the DICOM data is incomplete or corrupt, an error message will be displayed.

To successfully perform Media Export, click the **Add Series** button. This will return to the patient list for selecting a dataset(s) to export.

From the Patient List, highlight the desired series to be burned to the CD and right-click on the series to access the new Pop-up box. Select the new item named **"Media Export**". This will automatically add the series to the Media Export list.

Now click the Media Export Tab again and see the Selected Series saved in the list

Multiple series can be added in the same method if desired.

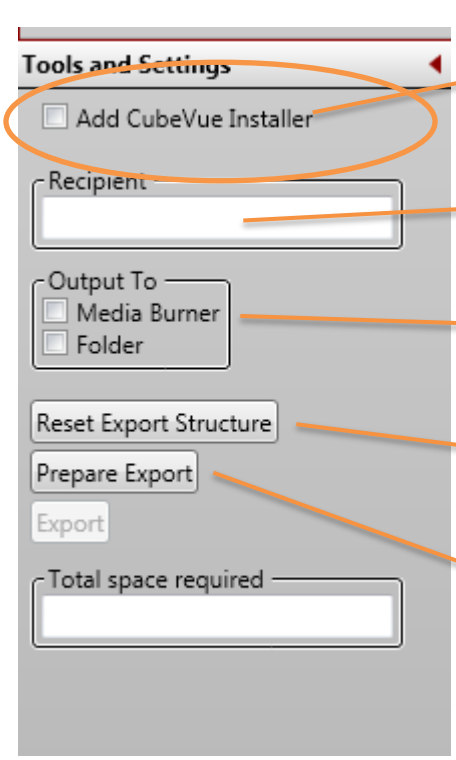


Also, if the user wishes to Add JPEG images from this case to the Media Export Data Series List, open the series and in the Review Tab, save one or multiple JPEG images to the Patient Folder.

The saved JPEG images will be listed in the Data Series List as thumbnails with check boxes for easy selection to be included as part of the Media Export.

Double-click on the thumbnail to enlarge for viewing if desired.

Next, complete the items in the **Tools and Settings** section:



Always Check this box to add the CubeVue Installer to the Media.

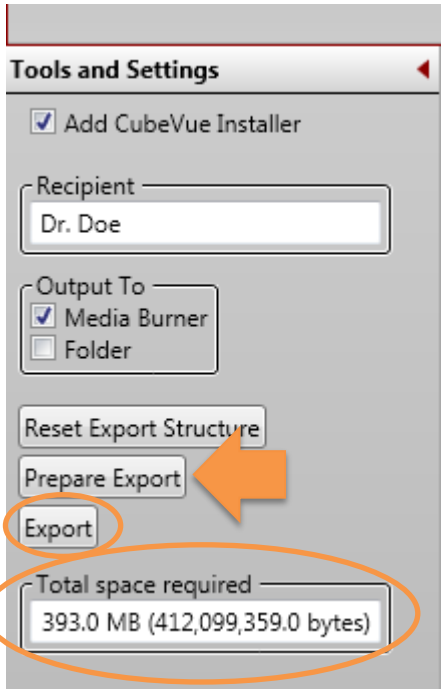
This box is **Mandatory:** A Recipient Name must be filled in or the Export button will not enable.

Choose the location for the output. If you want it to go to a folder or USB drive instead of a Disk, select “Folder”.

If this button is clicked, all the data under Data Series will be reset to no data.

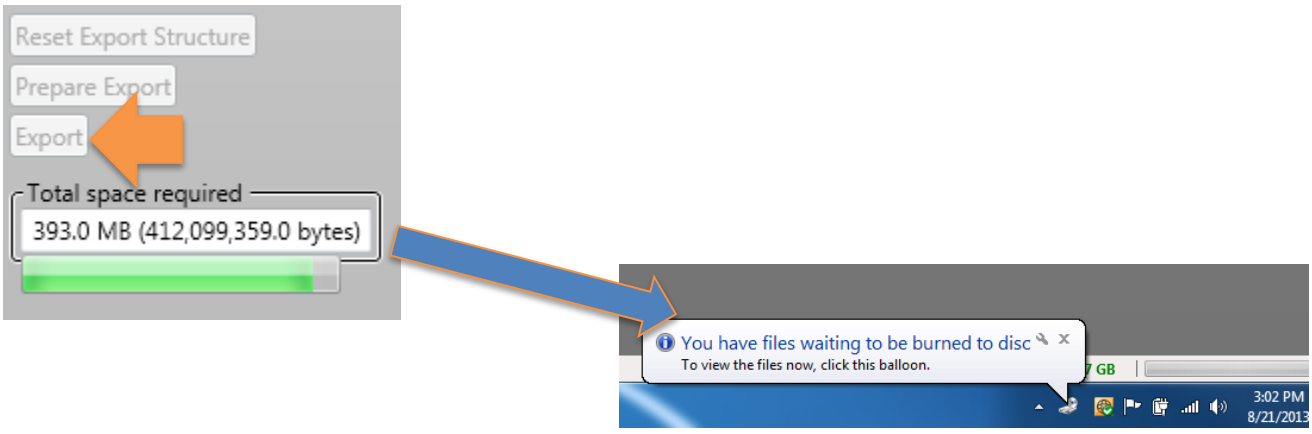
Once you have selected the Output To item, click the Prepare Export Button. This must be done before the Export button is enabled.

Once the Prepare Export Button is clicked, the **Total space required** field will auto-fill and the **Export** button will enable.



If the selected Output is to a Media Burner (disk), **INSERT the DISK NOW** into the disk drive.

Next, click the **EXPORT** button and the status bar will activate. When completed, a Balloon at the lower right-hand corner of the screen will pop up. Click on the pop-up.

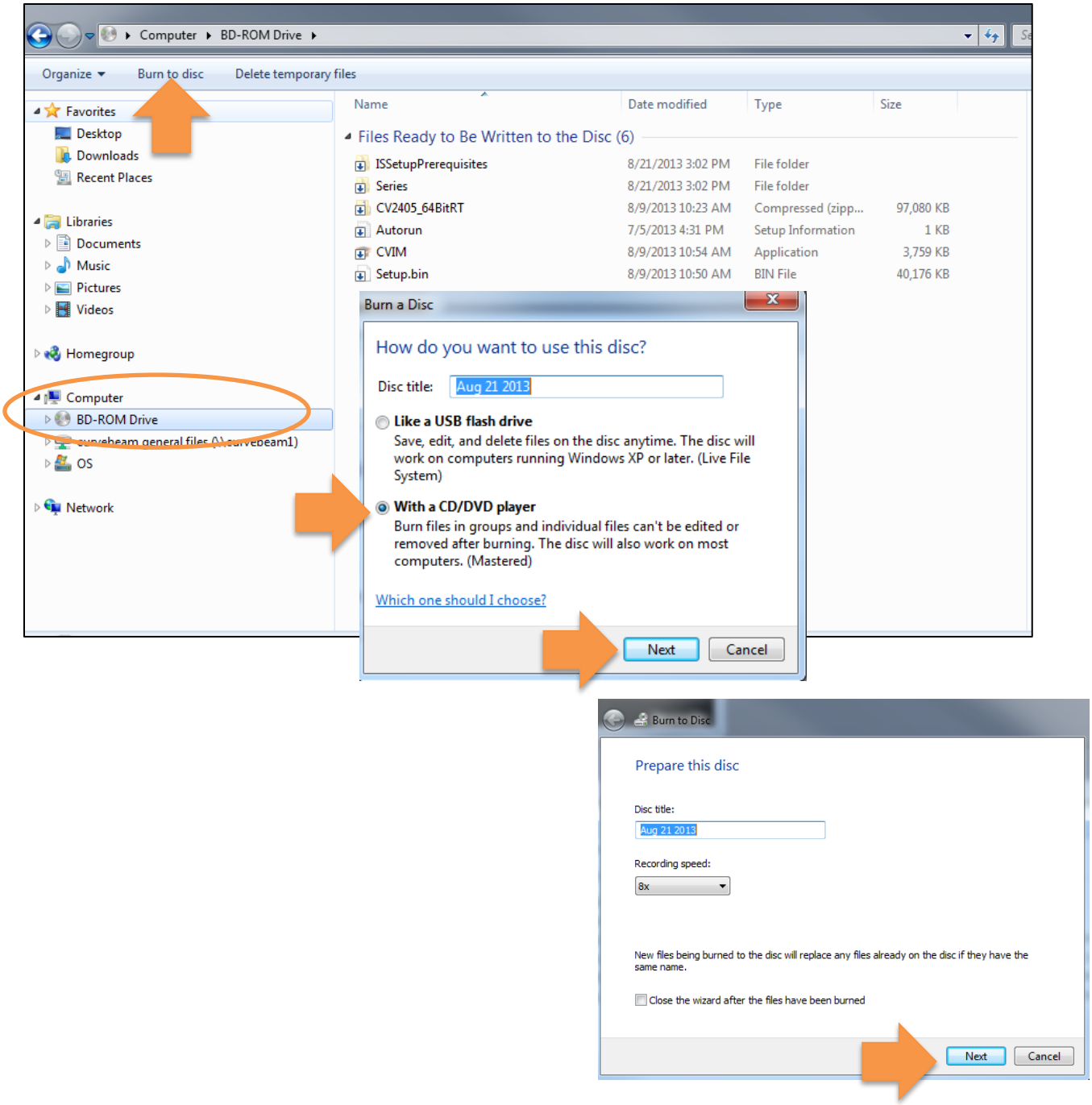


If the Balloon disappears before you had a chance to click on it, go to START/Computer and click on the CD/DVD Burner Drive. Notice the **"Files Ready to Be Written to the Disk".**

From this *Files Ready to Be Written to the Disk* Window, Click on the **Burn to Disc** button.

This will open the *Burn a Disc* Window. Select **With a CD/DVD Player**, and click **Next**.

This will open the *Burn to Disk* Window. Click **Next**. This will initiate the auto burn. The CD will be ejected when completed.



Media Export to a Folder

Add the desired Patient Series as described previously.

If you wish to perform a Media Export to a Folder or a USB Drive, select the **Output To** location as **Folder.**

NOTE: *a Media Export to a folder requires an Empty Folder, so it would be best to Create a New Folder to export to.*

Select **Prepare Export**

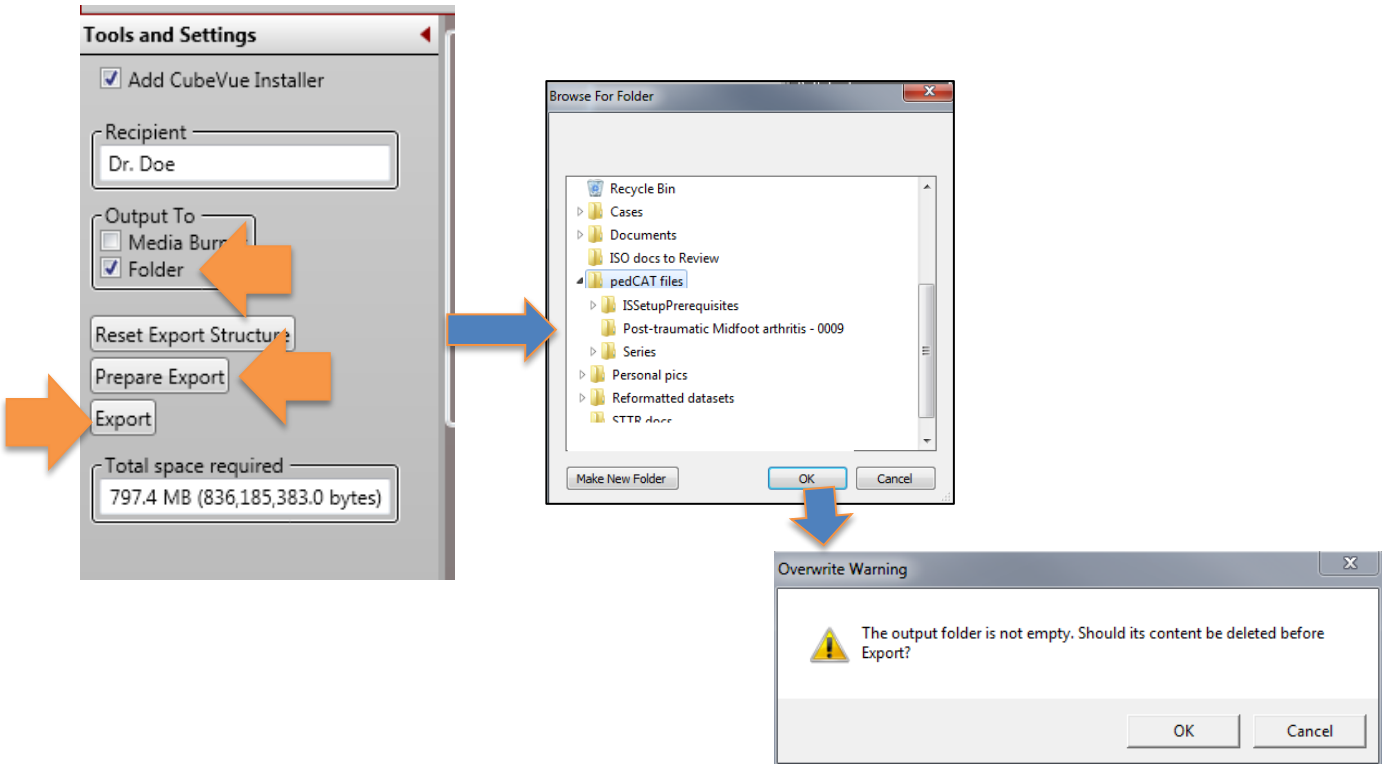
Select **Export**, there will be a prompt to **Browse to** the desired folder. If there was no folder previously created, select “Make New Folder” and then name appropriately.

Click OK.

The Overwrite Warning message will appear if the selected folder contains ANY files. ALWAYS select an empty folder or click “Make a New Folder” to create a new folder for export, or if you click OK, then the existing files will be deleted and the Media Export files will replace them.

If there is an error with the export, or the DICOM data is incomplete or corrupt, the following error message will be displayed.

CAUTION – If the folder is not empty, and the overwrite warning is ignored, the folder contents will be erased prior to export.



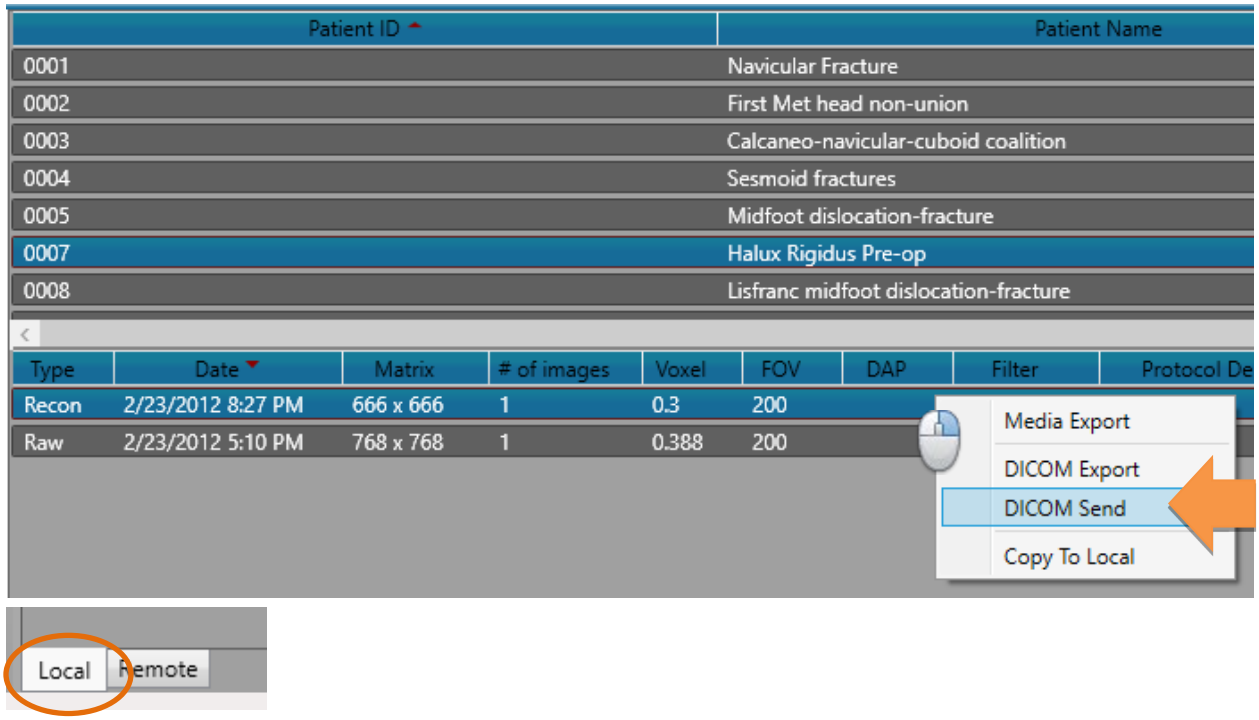
DICOM Send

Any of the datasets that reside in the Patient List LOCAL Tab can be sent to a PACs/DICOM server via the DICOM Send functionality. In most cases, the Series Types that will be desired to be sent via this method would be SCREEN and REFORMAT Series types

.

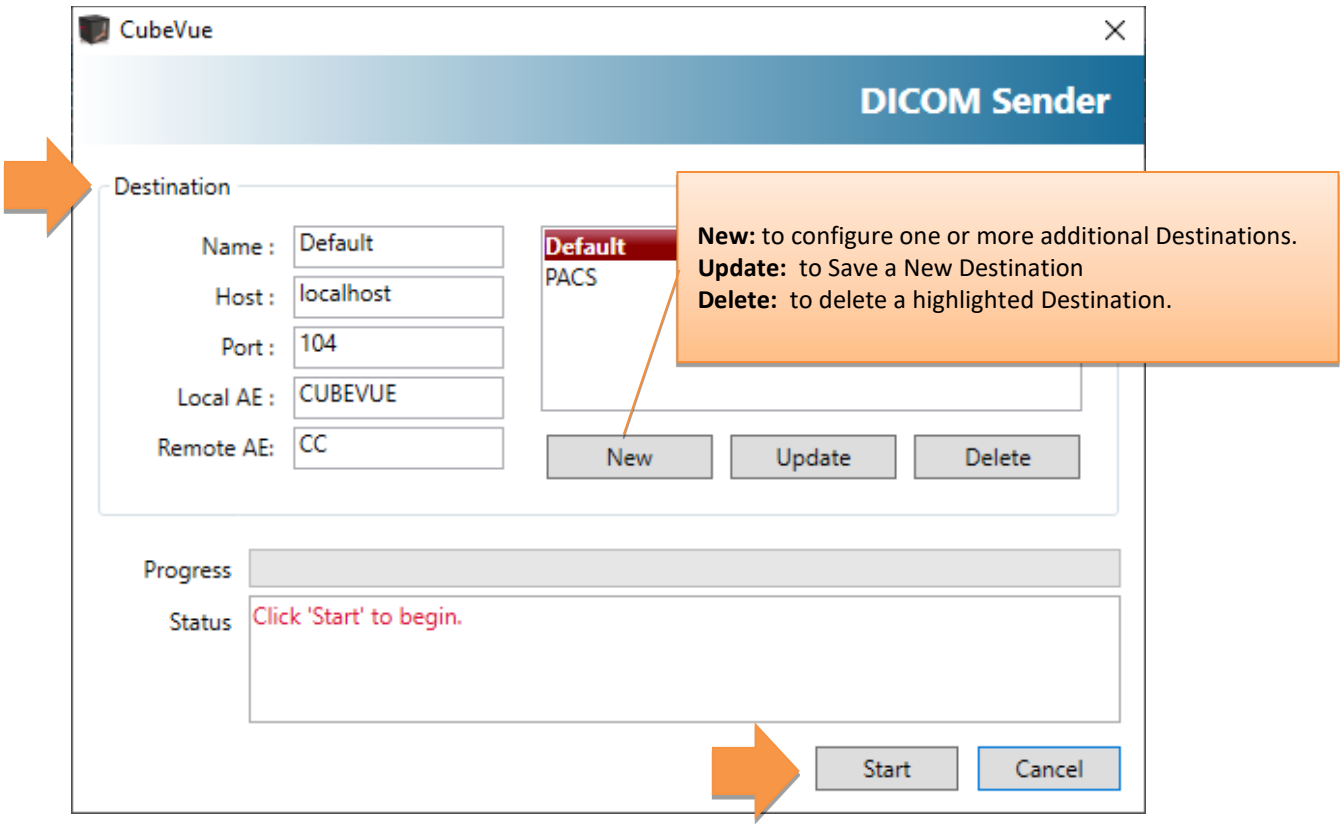
From the Patient List LOCAL Tab, **highlight any or all the desired Series to send**. Highlight multiple series using the traditional method of CTRL click, or highlight all using the traditional method with SHIFT, click on the first and SHIFT click on the last.

Right-click on the highlighted dataset(s) to access the Pop-Up menu and select **DICOM Send**.



This will open the *DICOM Sender* Window. In this window, one or multiple **Destinations** for the data send can be configured. Configure a Destination with the appropriate data and click the **Update** button to Save.

To add another Destination, click on **New** and edit the Destination items, click Update to Save. Once there are Destination(s) configured, they will remain in the list unless deleted.



Click **Start** to begin the Send. The Send time will depend on how many datasets and destinations are selected, the number of reformats created, and the speed of the PACS network.

When the DICOM Send has completed, the Status will read "Completed".

Shortcuts in CubeVue:

The following is a list of the shortcut keys that are available in CubeVue.

When in Patient List
Esc - To cancel dataset load

When in Patient List and at least one dataset is already loaded
2 - Toggles the “Load Into Second Workspace” checkbox

When in Review and at least one dataset is loaded
W - Toggles W/L function
O - Toggles Zoom function
P - Toggles Pan function
F - Toggles Zoom-To-Fit
H - Toggles Slab Marks
Esc - Deselects W/L, Zoom, Pan, Rotate, Cut Planes and Measurements
X, Y, or Z - Turns on rotation function
X while rotating 3D image - constrains volume to rotate around the X axis
Y while rotating 3D image - constrains volume to rotate around the Y axis
Z while rotating the 3D image - constrains volume to rotate around the Z axis
Hold 3 while clicking “Reset Pan/Zoom” - Resets pan/zoom for 3D image
Hold shift while clicking Pan - centers MPR images at slab centers
Hold shift while using the mouse scroll wheel - Toggles scrolling through 10 slices at a time

Magnification
F2 – Choose the magnifier option from the ribbon menu, magnify an image area and press F2 to set the magnified area in the image window.

3D/MPR Correlation
Press I while hovering over MPR images - 3D image is cut as per the location of the cursor on the MPR image.

When the cut plane function is turned on
Hold shift + left mouse button - Enables the ability to move the cut plane
Hold Control + left mouse button - Enables ability to change the angle of the cut plane

When the segmentation function is turned on
Holding the shift down while clicking will add the newly removed volume to the already removed volumes
Esc - Deselects “Free Hand Erase” and “Remove Bone”, if checked

Known Issues:

The following is a listing of known issues along with suggested workarounds.

Issue ID	Summary	Issue description	Suggested Workaround
560	Keyboard control keys	Demonstration of a mouse controlling (in SolidWorks) the pan, rotation & zoom by of a 3D object: 1. Rolling towards the user to Zoom in, away from the user to Zoom out, 2. Press down on the roller and hold (middle button) to Rotate 3. Press and hold Control key while pressing down on the roller (middle button) to Pan. This functionality can always be there & left up to the user whether or not to use it	There are separate buttons on the ribbon menu bar to perform all the mentioned functions.
708	3D frame sequence saved to patient folder does not appear on Media export tab.	A video file containing 3D frame sequences can be saved to patient folder but does not appear on Media Export tab if user want this file to be saved to a media.	There is a method in CubeVue which allows video file to be saved to a desired location on the computer which can be manually burned to media.
777	Some un-used ribbon menu items when viewing screen-save series	When viewing a ScreenSave series, there are some ribbon menu items which are of no use in case of ScreenSave series, for example, (XYZ R) Rotate, Cut Planes, Reset Slabs. These may be disabled when loading a ScreenSave series.	Does not affect the functionality of software and
794	Zoom to fit on Full screen 3D image	It is a zoom to fit issue when viewing full screen 3D image. To get this issue: 1. Load a dataset & double click on 3D image to make it full screen. 2. Rotate 3D image beyond certain degrees (this exact value is not known but rotate is by approx. 45 degrees to immediately view this issue). 3. Hit F button from keyboard to Zoom-to-Fit. 4. 3D image becomes small. Same is applicable for 3D tab as well.	One more click on F button is required to view Zoom-to-Fit image.
865	Dual screen display mode causes TALAS dialog to not appear when switched back to single screen display.	It is a Display mode related issue. When running 2 displays in extended mode and when running CubeVue in extended display, the TALAS would continue to launch in the primary display. It would then need to be manually moved to the extended display. Then when switching back to single display. CubeVue would launch as normal but TALAS would appear not to launch. Reason being it is launching in the now de-activated extended display.	Reconnect extended display and switch mode and then TALAS will appear in extended display. Move the TALAS dialog to primary display and then the TALAS would appear in primary display after de-activating the extended display.
879	Zoom factor is applied when scrolling through images under certain conditions.	Some images zoom automatically when scrolling through image slices in certain conditions. Open a new dataset when Radiology view direction is selected in settings. On Combined 3D/MPR tab adjust individual zoom factor of each MPR image (like zoom in the last MPR image). After this switch to MPR tab and check Sync. zoom checkbox and change zoom level of MPR images to a desired level. Now switch back to Combined 3D/MPR tab and scroll through slices, the image would change the zoom level.	The zoom level can be re-adjusted to any desired level by using Zoom button from ribbon menu.
881	Zooming out / Panning a screen type series image is having a cascade image effect.	The screenSave image window shows cascade effect (window within window) when Zooming out or using the Pan function.	This is a temporary effect and goes away automatically when the mouse button is released after using the Zoom or Pan function.

Issue ID	Summary	Issue description	Suggested Workaround
882	Screen Type loaded: Reset W/L applies a zoom factor on the image.	When the W/L is changed on a ScreenSave series followed by changing the Zoom level, performing a Reset W/L for any image applies the zoom to fit function, which is not desired.	The zoom level of the image can be re-adjusted to a desired level using the Zoom function from ribbon menu.
885	Axial image resets zoom when scrolling through slices.	When a dataset is loaded & it is zoomed to fit, checking 'Sync. Zoom' and then attempting to scroll through slices in any MPR image resets the zoom level of MPR images. It is applicable for Combined 3D/MPR tab and MPR tab.	The zoom level of the image can be re-adjusted to a desired level using the Zoom function from ribbon menu.
887	Auto Rotate explore missing one slice.	Using MPR explore function on sagittal image sometimes miss to show one slice when continuously displaying all the slices.	MPR explore function can be rotated manually to view all the desired slices.
888	MPR cut image does not correspond to the actual cut line drawn after making MPR cut for another dataset.	When a dataset is loaded and MPR cut image is drawn and then the cut line is moved away from the original position followed by reloading of the same dataset (or followed by loading of another dataset & then reloading same dataset), the MPR cut image may not correspond to the position it was drawn on initially.	Click on the MPR cut line brings back the image or cut line can be redrawn.
890	Reset Splits displayed on series sync. controls window when User is on 3D Tab.	Since there are no split windows on 3D tab, Reset Splits function is of no use there. It should be disabled.	It is just the presence of a non-usable function on the 3D tab which does nothing when clicked upon.
893	Reset session (dual series) after swapping series.	When two series are loaded side by side, performing a swap series and then doing a Reset Session (on the right side dataset) displays the 'Select Dataset Anatomy' dialog box on left side.	The selection of anatomy still applies to the correct dataset.
894	Dual series can't be loaded side by side after unloading a study.	When two series are loaded side by side, unloading left side dataset and then going to patient list to load another series with intent to load another series side by side does not occur. Only one series load is allowed.	If both series are unloaded, two desired series can be loaded side by side.
897	CV crashes when toggling between 3D Dataset filters without waiting for the previous filter to set	Toggling between three 3D dataset filters quickly may result in crash of CubeVue for a LFOV dataset.	It works fine if the controls are used at a normal rate. CubeVue can be started again & the same dataset can be loaded in case of a crash situation.
906	SYS- 606: failing on certain conditions JPEG Output cut off edges of the peripheral bone more than 5mm	Edges of bones are cut beyond 5 mm (the permissible limit) for MFOV (sagittal and axial cuts) when using the option Save Volume as JPEG.	There is option to save any desired slice to JPEG image using Save as JPEG option if some desired slices are not saved by Save Volume as JPEG.
957	DICOM tag (0008,2218) data not viewable	The DICOM tag (0008, 2218) for anatomic region sequence is not viewable in CubeVue.	This tag is displayed properly in dcm4chee. The mentioned tag is a sequence and sequences are not parsed in CubeVue dialog display. A third party DICOM parser can also be used to view the details of this DICOM tag.
988	With InstaX disabled, RESET Session from 3D tab or MPR tab presents the Select anatomy Dialog off center.	If Sim-X images are disabled from Settings, then perfroming a reset session from 3D tab or MPR tab presents the Select dataset anatomy dialog box off center.	The dialog box is present within the viewable area of computer screen and the desired option can be selected.
990	Unable to Export/Send/Save to Local the DICOM RDSR	RDSR (Radiation Dose Structured Report) can not be Exported, DICOM Send or Saved to local.	It can still be viewed from Remote tab.
997	CV - Settings box, click top X, changes remain in Settings box (not cancelled) for language	Change the language in Settings box, it changes the language of Settings dialog box right away. Now if the dialog box is closed by using X in upper right corner, the language in Settings dialog changes but rest of CubeVue displayed the previous one.	The language can be changed in Settings dialog and instead of X clicking on OK or Cancel accepts or rejects the changes appropriately.

Issue ID	Summary	Issue description	Suggested Workaround
1009	Two datasets loaded side by side - Saving Axial image on 2nd dataset results in saving of 3D image in certain condition.	Load two datasets side by side; on Combined 3D/MPR tab, zoom in axial images of both datasets by Double click on both axial images; click on left side axial image and Save JPEG image (either to custom or patient folder); click on right side axial image and Save JPEG image (either to custom or patient folder). For the right-side dataset, instead of axial image 3D image is saved.	One more click on right side axial image selects the axial image (as confirmed by the highlighted red boundary) and the desired image can be saved.
1013	Red dots are missing in MPR cut for angles/HU/distance measurements	In MPR tab, when MPR cut is drawn on any of the MPR images, an MPR cut image appears in upper left corner. If a measurement is drawn on this image the red dots do not appear when attempted to move the drawn measurements to a different location.	The measurements can be moved as desired.
1050	No 3D license: MPR images does not zoom to fit automatically when a new scan is opened.	If 3D license key is not present, MPR images do not zoom to fit automatically when a new scan is opened.	Zoom to fit button can be used if required.
1051	No 3D license: MPR images have fingers pointing down in Combined 3D/MPR & MPR tabs.	If 3D license key is not present, MPR images in Combined 3D/MPR tab and MPR tab displays the InReach hand/Wrist images (MPRs) with fingers pointing down instead of up.	Orientation markers are displayed fine. Reset MPR rotation button displays the MPR images as desired (i.e. with fingers pointing up).
1052	CubeVue crashes if two Screen series are opened & unloaded one after other after opening CubeVue.	When a new instance of CubeVue is started and same or two different Screen series are loaded and unloaded one after other, CubeVue may crash.	CubeVue can be started again and desired ScreenSeries can be loaded after the crash.
1057	Click on Reset MPR rotation for Left Hand Palm Up scan changes the orientation (i.e. presentation) of MPR images.	Run CV and load "Left hand Palm Up" dataset; 3D and MPR images appear fine on Combined tab; click on "Reset MPR Rotation" button; MPR images changes the orientation 180 degrees about Z axis. In other words MPR images becomes same as if Sync. 3D/MPR Rotation checkbox is checked & P/A button is pressed under 'View Direction'.	Orientation markers are displayed fine. Click on sync. 3D/MPR rotation button when 3D image is in default orientation corrects the orientation of MPR images. Reset Session option can also be used to correct the orientation.
1079	Reverse correlation for New LP Water Phantom scan acquired from CBtoolshed	1. Load a new LP water Phantom scan acquired from CBtoolshed (delete session file if it was already opened). 2. While in Combined 3D/MPR tab, move red correlation line from sagittal/coronal image to see the correlation in axial image. It is reverse. Similarly green and blue lines also perform the reverse correlation.	Only affects the scan after QA has been performed in CB-ToolShed. Only an issue on Combined tab. It works fine in MPR tab.
1084	Sync W/L and Zoom will autocheck box on user w/ 2 series open.	When user has 2 series open. If in one of the series the "Sync Window/Level" box is checked, when you move to the other series, the W/L check box becomes checked in the 2nd series as well w/o user checking it. The same behavior is exhibited for the "Sync Zoom" check box.	The checkbox can be unchecked manually for the dataset not required.
1085	CV - AP and PA can be displayed upside down in 3D window on MPR; Flickering images while changing view direction	When changing to select PA (or AP) there is sometimes a flicker of an upside down version of the PA and AP images or even up to a couple different images displayed, then the correct orientation is displayed. And other times, the incorrect (upside down) image remains as the image displayed to the user as the PA (or AP) image.	One more click on the desired view direction (A/P, P/A etc.) button corrects corrects the image display.
1086	Distance and angle measurements on 2D image are displaced to right after reloading 2D image	1. Load a 2D image. 2. Draw distance and/or angle measurement at a desired location within image. 3. Unload the 2D image. 4. Load the same 2D image & notice that the measurements are displaced to the right.	Measurements are disabled for 2D scans in latest version of CubeVue (3.6.0.3).

Issue ID	Summary	Issue description	Suggested Workaround
1090	Size of image Window reduces after every load-unload for 2D scans	1. Load and unload a 2D scan few times. 2. Notice that the image window which displays the 2D image (i.e. upper right image window) reduces in size with each unload.	Size can be manually changed to desired if needed. Double click on image to view it full screen.
1097	Measurments on Sim-X are not retained after upgrade or normal reload of datasets.	When a dataset is reloaded after drawing few measurements on Sim-X image(s), these (measurements) are not retained. Similar results were obtained when upgrade from CV 3.3.0.7 to 3.4.0.10 was performed, i.e. datasets that had measurements on Sim-X drawn in 3.3.0.7 and then opened in 3.4.0.10 didn't display measurmenets on Sim-X image(s).	Sim-X measurements can be drawn manually when needed.
1104	3D image area after Invert segmentation does not look as clear.	1. Run CV and load a dataset. 2. Select Free Hand Erase or Remove bone option. 3. Erase/Remove a bone area/bone; the desired area is hidden (which is as expected). 4. Click on Invert Segmentation; the earlier hidden bone/bone area is displayed back, but it does not appear as clear as it was at the time of removal. 5. Click on Invert Segmentation again; first time removed area is hidden again but some remnants of removed area are displayed which were completely removed initially. The same results were obtained using “Undo Last” option.	The clarity is still sufficient to idenfity the objects in the anatomy.
1107	Sim-X for InReach Ankle dataset displays only one Sim-X image	Sometimes all Sim-X images are not displayed in the first attempt. It was first noticed for Ankle dataset acquired from InReach but not limited to this dataset.	Click on Reload Sim-X definitions button once it is enabled & both the Sim-X images are displayed. Later on both the images are displayed every time.
1110	Sim-X images saved as pure DICOM on local machine do not appear good	1. Run CV and load a dataset. 2. Go to Sim-X tab and click on DICOM Send button. 3. On the DICOM Send dialog box select "Save as pure DICOM" checkbox. 4. Also select "After successful send also save the output locally" checkbox. 5. Click on Start. 6. Open the locally saved Sim-X images in CubeVue; these does not appear good.	Saving of Sim-X pure DICOM images as local series is currently disabled; they can be transferred to remote location only. These appear good in third party DICOM viewers (tested on ClearCanvas and Radiant).
1111	Pure DICOM Sim-X not appearing in local series list randomly for some datasets, when Save to local option is checked.	1. Run CV and load a dataset. 2. Go to Sim-X tab and click on DICOM Send button. 3. On the DICOM Send dialog box select "Save as pure DICOM" checkbox. 4. Also select "After successful send also save the output locally" checkbox. 5. Click on Start. 6. Make sure Completed is displayed as status & close the DICOM Send dialog. 7. Go to patient list & check if new Screen Series appears under the patient name. It does not appear in the list.	Saving of Sim-X pure DICOM images as local series is currently disabled; they can be transferred to remote location only.
1115	2D scans can not be DICOM exported.	Some of the 2D scans acquired with older version of ACQ and Recon can not be DICOM exported.	DICOM export works fine with latest version of ACQ and Recon (tested on KCQ 1.2.0.2 and Recon7.4.0.1).
1116	2D scans display the zoom level toggling between options 'Zoom to fit' and 'Reset zoom' when opening.	Sometimes the 2D appear as 'zoomed to fit' and on 2nd or 3rd load it appears as if the zoom level is 'reset'.	The zoom level of image can be set to desired level after load by using 'zoom to fit', 'Reset' or manually changing it using 'Zoom' option from ribbon menu.

Issue ID	Summary	Issue description	Suggested Workaround
1117	TALAS database save dialog appears twice	After selecting to export a database, selecting a filename, and saving successfully, a second dialog box with the title “Select Research Export Filename” appears. If the user choses to add in a filename, an error message that the file is open and cannot be written to will be displayed.	The second box that appears can just be cancelled and there is no change to the already saved file. If a filename is entered in 2nd box, the warning message can be closed by selecting “ok” with no ill effect.
1118	2D scans Imported or copied to Local does not display the image with good quality.	1. Import a 2D scan to local tab or perform 'Copy to Local' from Remote tab to local tab. 2. Load this 2D scan from Local tab. 3. The image quality is degraded.	2D scans are displayed fine in Remote tab and third party DICOM viewer (tested on Radiant and ClearCanvas).
1119	2D scan changes series type from 'Raw' to 'System' when Imported or copied to local	When a 2D scan is imported to local series list, it is displayed as type ‘System’ whereas it is displayed as type ‘Raw’ in Remote tab.	2D scans can be identified by the series description (“DX” word is used in the series description). Also Show System Dataset' checkbox need to be checked in CubeVue Settings\Options to have the type 'System' displayed in series list.
1120	2D scan does not appear good quality in Remote tab in certain scenario.	1. Run CV and go to Remote tab on patient list. 2. Select a 2D scan and perform 'copy to local'. 3. The same 2D scan now appears in local tab as well. 4. Load the 2D scan from local tab; the image quality is not good as mention in bug 1118 above. 5. Now load the same 2D scan from Remote tab; the quality of this scan is not good (it is similar to what was displayed in 2D scan from local).	On the remote tab, unload the 2D scan & load a different scan (2D or any other type) and re-load the earlier 2D scan, now it will be displayed as expected.
1126	Sometimes 3D and MPR images do not appear after loading a dataset.	Sometimes 3D and MPR images do not appear after loading a dataset.	Images appear fine after Reset Session.
1127	There are blank slices in Sagittal view when using JPEG Stack creation.	Some blank slices in Sagittal view remains when using JPEG Stack creation function (i.e. option Save Volume as JPEG).	The un-desired slices can be removed manually.
1130	Hide List (timeout) does not apply to DICOM Tags.	When "Show DICOM Tags" is selected, the Hide List never hides that information after the set timeout.	Show DICOM tags maybe closed manually after viewing the information. Alternatively the computer may be set to show screensaver after a desired time of inactivity.
1131	Export DICOM not allowed if there is blank space at the end of ID in ID field on Study exporter dialog.	1. Run CV and select a patient from patient list. 2. Select a Recon series from the series list. 3. Click on Export DICOM button from ribbon menu. 4. On the Study Exporter dialog, check the Replace dataset identity checkbox. 5. Select the 'with the following text' radio button. 6. Enter Name, ID and Study description. 7. Leave a blank space (using space bar on the keyboard) at the end of the ID field. 8. Click on Start button; Status bar displays error message.	Blank space at the end of the ID field can be deleted manually and the DICOM export proceeds as desired.
1134	Default W/L of 2D (DX) images	With the default W/L (which is 3000/50) 2D scans (or DX images) appears bright.	Window/Level can be changed manually to a desired value.
1135	Grayscale appears inverted for 2D images by default	When 2D images are initially opened, the grayscale is inverted from what was expected.	Window/Level can be changed manually to a desired value.

Issue ID	Summary	Issue description	Suggested Workaround
1136	Elbow Palm down position on In Reach data set doesn't represent the correct orientation markers.	Examined orientation markers on the left elbow-palm down (<= 45-degree rotation) and the orientations are not correct. The reconstructed sagittal should represent A-P-F-H, however the sagittal shows R-L-F-H. Same issue for Coronal plane. This set up is tested on 3rd party DICOM viewer (ClearCanvas) and the Orientations are presented correctly in double letters.	It is because of the rotation of anatomy in Elbow Palm down configuration. The orientation markers are displayed correct when the MPR images are rotated slightly more than the default or by clicking on A/P button with 'Sync. 3D/MPR Rotation' checkbox on Tools and Settings side bar. Orientation markers in third party DICOM viewer are displayed by double letters in this case and are correct.
1137	HU Values (Ar, SD, M) change slightly when dataset is reloaded.	When HU is measured, then scan is closed and reopened, the HU values will change very slightly. But if reopened a second time, values remain the same.	Adjust the HU shapes to ensure value is accurate when utilizing data.
1138	When an Sim-X image is de-selected, the other Image that comes in its place also attains the W/L of this new place.	1. Run CV and load a dataset. 2. Go to Sim-X window. 3. De-select, for example, 2nd last Sim-X image. 4. Sim-X image windows on Sim-X tab now reduces by one number. 5. Last Sim-X image goes to the place of 2nd last Sim-X image which is fine, but last Sim-X image also attains the W/L of this second last window.	W/L can be reset, using the "W/LSettings\Reset" button from ribbon menu. Alternatively, Sim-X images can be Re-loaded using Reload Sim-X Definitions or W/L can be adjusted to a desired value manually.
1140	Sim-X for Left or Right Knee (or Foot) scans from LineUP displays both the knees (or feet) where a left or right is expected.	1. Run CV and load a Right Knee scan. 2. Go to Sim-X tab and notice that image window (e.g. Right Knee Oblique) displays both the Knee scans. This is because both the knees are scanned in LineUP even if Left or Right is the anatomy of interest. Similar is applicable for foot scans if both feet are scanned even when the anatomy of interest is one of those.	The information of both anatomies is present in Sim-X images. More detailed information can be obtained/confirmed from MPR images. MPR images can be transferred to Sim-X page as well.
1141	DICOM tags window is not displayed if attempted to open from Sim-X tab.	If DICOM tags window is attempted to open from Sim-X tab, it does not open.	It can be opened from Combined 3D/MPR, MPR and 3D tabs.
1144	3D definition render range check boxes don't correspond to the actual lines displayed	When using 3D Definitions feature the editor window opens with only "Range 1" checked under Render Ranges by default. Select, Range 2, 3 and 4 and make sure they are not overlapping. Deselect Range 4, 3, and 2. when deselecting Range 4 the line that was associated with Range 1 disappears. Checking Range 4 again the first default line (range 1) shows up.	All the lines are still there and can be used as desired to get the desired result. Reset to original or reset to start options can be used in case of any undesired result.
1145	Translation of ensuring Monitor quality and ambient light related text needs to be translated to French	When the language in CubeVue is set to French, the text related to ensuring monitor quality and ambient light conditions (displayed on splash screen) is not translated to French.	Customer may contact CurveBeam customer care if the text on Splash screen can not be interpreted. No other CubeVue functionality is impacted due to this.
1151	Autobuilt may be replaced with Sim-X when sending to remote.	Send Sim-X image(s) as pure DICOM to remote Location; the text "Auto Built" appears on the remote location instead of "Sim-X".	Sim-X images can be identified clearly by viewing.
1157	Rotation of VOI rectangles reset automatically if their size is changed.	Open VOI window by clicking on VOI button on the ribbon menu. Rotate any of the VOI rectangles on MPR images. Click on X+, X- etc. button to change the size of the VOI rectangles on MPRs. Notice that the rotation of VOI rectangles is reset.	After changing the size, the rotation can be performed again.

Issue ID	Summary	Issue description	Suggested Workaround
1158	For reformats opened in CubeVue, slab thickness is displayed equal to voxel size.	1. Run CV and load a PedCAT or LineUP dataset. 2. Open DICOM Volume Creation window using the Save.../Save Volume as DICOM option from ribbon menu. 3. Create reformats with reformat ratio greater than 1x (e.g. 5x). 4. Open the Reformats in CubeVue and notice that the Slab Thickness overlay on MPRs; it should be equal to the value of Voxel Size multiplied by the reformat ratio. This value is correctly displayed as Slice thickness in DICOM tag (0018, 0050).	Third party DICOM viewers also displays the correct value.
1159	Minimize, maximize and close buttons sometimes disappear on CubeVue.	Sometimes 3 buttons (Minimize, maximize and close) in upper right corner are not visible.	These buttons are just hidden but present there which was confirmed by closing and minimizing by taking the cursor to the button's location by estimate and clicking. Hint labels also appear for these buttons which confirms that the position of cursor is as desired.
1160	Some part within metal area in case of reformats appears black.	1. Run CV and load a LineUP dataset having some metal in it. 2. Create reformats with higher reformat ratio (15x, 10x, 5x) and DICOM Send to third party DICOM viewer. 3. Notice that the metal part shows some middle part black.	Anatomy remains unaffected and appears fine.
1161	Reformats created from rotated 3D and MPR are not in the correct plane.	When sagittal reformat is opened, the sagittal foot is displayed in the top right window and same scenario for coronal foot. Expectation: axial image is always displayed on the top right window, sagittal image is on bottom left window and coronal is on bottom right window regardless of the type of reformat.	Reformats are not expected to be viewed within CubeVue. Reformats are display correctly in third party viewers.
1162	Remove Bone option in Segmentation does not work for LineUP dataset	Remove Bone option under Segmentation does not work when used for LineUP dataset.	Free Hand Erase option can be used for LineUP datasets. Remove bone option works fine for InReach and PedCAT datasets.
1164	CubeVue crashes when attempting to open the green and blue rotated reformats.	Steps to reproduce: 1. Run CV and load a PedCAT dataset. 2. Make sure sync 3D/MPR rotation box is checked and rotate the 3D image (less than 45 degrees) 3. Create reformats via Save Volume as DICOM option (set the ratio to 5X or 10X). 4. Locate the reformats in patient list and try to open them one at a time.	Reformats are not expected to be viewed within CubeVue. Reformats are display correctly in third party viewers.
1165	LineUP single knee- not maintaining the characteristics of true radiograph projection.	When reviewing the single knee image from LU 1.4.1.1, it was noted that the image did not look like a true radiograph projection. The Both Knee scan did look fine.	Sim-X images are not required to be of diagnostic quality, and therefore there is no risk to the patient.
1182	Cursors to drag the horizontal lines of VOI rectangle from DVC dialog are displayed with an offset in case of axial.	1. Run CV and load a dataset. 2. Open DVC dialog and click on Select VOI button; green box appear on each MPR image. 3. Attempt to change the dimensions of the box on axial image by dragging the upper and lower horizontal lines of the rectangular box. The cursor that allows this movement appears at an offset from the horizontal lines.	This is cosmetic only and does not affect functionality.

Issue ID	Summary	Issue description	Suggested Workaround
1202	Datasets do not appear zoomed to fit when first time loaded	MPR images on combined tab does not automatically zoom to fit.	Zoom to fit can be clicked manually
1203	Invert Segmentation displays only the last removed bone if more than one bones are removed	1. Run CV and load a dataset. 2. Remove at least two bones. 3. Click on Invert Segmentation. It is expected to show two bones (which were removed in step 2, and hide rest of 3D anatomy. 4. Actually it only displays the bone that was removed last.	Workaround: It works fine for the areas erased via Free Hand Erase option
1208	Unusable functions available on ribbon menu and side bar for DX images	There are functions available for DX image on ribbon menu and side bar (Tools and Settings) which don't have any use.	Workaround is n/a. These don't affect the workings of the software.
1217	Pressing Reset under W/L settings for a 2D scan brings the W/L to 3000/50	1. Run CV and load a 2D scan. 2. The default value of Window level for a DX-CLAHE is displayed as 45000/15000 and for a non-CLAHE 2D is 12000/-27000. 3. Press the WindowLevel Settings\Reset. The window level changes to 3000/50 which is default window level for a Recon.	W/L can be set manually as needed.
1219	Foot DX (non-CLAHE) display the image momentarily and then it disappears until w/l is reset	1. Run CV and load a Foot DX (i.e. non-CLAHE images). 2. The image appears momentarily and then it goes away.	Either perform reset W/L and then change the W/L manually or use a pre-defined W/L setting.
1229	Two series loaded side by side: anatomy/Laterality info of unloaded series gets displayed after one of two is unloaded.	1. Run CV and load a dataset; note down the anatomy/laterality info displayed in status bar. 2. Go to patient list and check "Load into second workspace". 3. Load second series such that anatomy and/or laterality info is different from first. 4. Unload any of two series. 5. Notice that the status bar in CubeVue displays the anatomy/laterality info of the unloaded series.	Workaround: Reset session can be used to reset the info.
1257	Progress bar does not show the progress when performing DVC 2nd time without closing the dialog.	1. Run CV and load a dataset. 2. Perform DICOM Volume Creation; the progress bar shows the progress properly. 3. Without closing the DVC dialog, start the DVC creation 2nd time (with same or different reformat ratio). 4. Notice that the progress bar has already reached at the end and doesn't show the progress as it shows the first time.	Workaround, close the dialog to run a second VOI on the same dataset.
1266	2D image gets displayed in upper left window after a reset session.	1. Run CV and load a 2D image. 2. Notice that the image is displayed in full screen. 3. Perform Reset session. 4. All 4 image containers are displayed and 2D image is displayed in upper right corner image container.	Workaround: Double click on 2D image to again view as full screen. Cosmetic only.
1268	Grayscale of 2D image is inverted after performing a reset session.	1. Run CV and load a 2D image. 2. Notice the default grayscale. 3. Perform reset session. 4. Notice that the graysclae of 2D image is inverted.	Reload dataset.

Issue ID	Summary	Issue description	Suggested Workaround
1292	"RDSR" is not configurable under patient name from the type of series displayed	When on Remote tab in CV, un-checking "RDSR" from the "show optional series", the RDSR is still displayed under the patient name. Note that this only happens when on remote tab but not local.	Copy to local and view on local tab
1293	Loading a CV DICOM Exported Dose Report series won't display patient information and Dose data.	When loading a screensave (dose report) to CV the screen doesn't display dose and patient info. Steps to reproduce the bug: 1- Open CV. 2- From the remote tab, select a dose report and right click on it. 3- click on " DICOM Export". 4- "Load" the DICOM file that is exported in step 3. 5- The screen opens with no patient info.	Workaround: Dose Report can be sent to PACS using DICOM Send option form CV.
1315	If two series are loaded side by side, clicking on patient name twice hides the InstaX list on side bar.	1. Run CV and load two datasets side by side. 2. Click on the patient name of the one of two dataset such that it is selected (Let's say we clicked on left side dataset). This click allows any function (like W/L, rotate etc.) to be allowed on the selected dataset. 3. Click on patient name once again and notice that the list of InstaX images on the side bar is hidden now.	Workaround: To get the list back click on the patient name of other dataset; it will display the InstaX list of other dataset. Click on the desired dataset now, its InstaX list will be visible again.
1304	Axial reformat generated from a LU Hand scan don't display the orientation markers correct in CV	1. Run CV and load a LineUP Hand dataset. 2. Create at least axial reformat using the DVC VOI option by selecting 1x reformat ratio. 3. Load the reformat in CubeVue. 4. Notice that orientation markers are not correct in CubeVue.	Reformats are not supported in CubeVue. Reformats can be viewed in a third party viewer.
1353	CubeVue crashes if a new dataset (or without session) is unloaded immediately after loading.	1. Run CV and load a Humerus dataset. 2. Notice that orientation markers are not correct.	Dataset can be re-loaded without any issues.
1378	Special characters entered in Acquisition protocol description causes DICOM tag (0018, 9424) to not display its contents in CV when accessed via "Show DICOM tags" option.	1. Enter special characters in the Acquisition protocol description field on the Acquisition software, as shown in the attached screenshot. 2. Acquire the scan and open it in CubeVue. 3. Open the DICOM Information in CubeVue by clicking on the dropdown button adjacent to patient name and choosing "Show DICOM tags". 4. Notice that the DICOM tag (0018, 9424) just displays one character and not the complete expected text.	Notes field is correctly saved in dataset and relevant information can be retrieved as needed.

Issue ID	Summary	Issue description	Suggested Workaround
1392	CV displays STL file saved message even when saving is cancelled.	1. Run CV and load a dataset. 2. Click on Create STL file button in the Segmentation section. 3. CV displays a dialog box where it gives the option to choose the desired name and location for the STL file. 4. Click on Cancel button. 5. A message box appears which says "STL file saved". This message box is not expected, after click on Cancel button in step 4.	No STL file is actually saved.
1395	Fields in CubeVue settings accept decimal values by the use of a dot rather than comma, even if the regional settings are in German	1. Go to Control Panel 2. Click on Region 3. In the "Format" drop down, choose Germany (Germany) option. 4. Click on Apply and Ok to save the settings and Close the Region dialog. 5. Open CubeVue. 6. Open the Settings dialog make sure "Auto Detect" is chosen in Options tab 7. Go to 3rd tab (i.e. preprocessing) make sure at least one of the values is in points (like 4.5 or 5.6). 8. Click on OK button to close the Settings dialog. Notice that a message is displayed "Radius reduction values must be in the range 0.0 ... 20.0 mm" based on the field in which value was entered.	No workaround needed. Widely known use of ,/. in different regions, low risk. Numbers in question do not need both.
1420	Intermittent load error displayed for Recon series after the creation of reformats	1. Run CV and load a dataset (i.e. Recon series). 2. Create and send reformats to PACS; also the reformats are saved to local tab. 3. Subsequent reloading of the Recon series (after reformat generation) sometimes displays the error message 'Unable to load study. (ID=LoadError)'.	Dataset is not lost and hence can be reloaded as needed.
1427	HiRise - Hand - DVC-VOI reformat displays incorrect orientation markers in CubeVue	1. Run CV and load a Hand (left or right) dataset. 2. Create red reformat with 1x ratio. 3. Load this reformat in CubeVue. 4. Notice that orientation markers are not correct. Also notice that the fingers are pointing down rather than up.	A third party viewer can be used to view reformats.

Issue ID	Summary	Issue description	Suggested Workaround
1490	DVC-VOI definitions are not retained if CubeVue is used from two user accounts on same computer.	1. Make sure there are at least two user accounts on the computer. 2. Login from one user account. 3. Run CV, load a dataset 4. Open DICOM Volume Creation dialog. By default, only one definition is present in CV which is named as "default". 5. Create at least one more definition from DVC-VOI dialog box. 6. Close CV. 7. Login from second user account. 8. Run CV and notice that the definition created in step 5 is not visible here. 9. Similarly if a definition is created from second user account, it won't be available in first user account.	VOI area can be set manually.
1510	DVC-VOI definitions are not retained if CubeVue is uninstalled & reinstalled.	1. Install CubeVue. 2. Open DVC dialog box. 3. Create one or more new definitions. 4. Uninstall CubeVue. 5. Reinstall same version. 6. Run CV and open DVC dialog box after reinstall. Notice that the definitions created in step 3 are not available.	The VOI area maybe set manually each time a user attempt to create a reformat. Alternatively, DVC-VOI xml file may be copied to a different location before performing the upgrade (or re-install) & then placing at original location after upgrade (or re-install) is complete.
1627	Dual screen display mode causes DVC dialog to not appear when switched back to single screen display.	a) Run PC/laptop with 2 displays in extended display mode. b) Launch CubeVue in master display and drag it to the extended display. c) Open a study and launch DICOM Volume Creation (DVC) dialog. This will open in the master display so transfer tool to extended display. d) Close cubevue and DVC dialog in extended display. e) Remove extended display and switch to single display mode. f) Launch CubeVue and open a study. g) Attempt to open DVC dialog, the dialog box opens but is not visible. h) reconnect extended display and switch mode and DVC dialog will appear in extended display.	Workaround: When the dialog box is opened & not visible (i.e., it is presented on the monitor which is now not connected), press the "Alt + Space" then press the 'm' key on keyboard and use the Left or Right arrow keys depending on the position of other monitor before it was disconnected will move the dialog box to the desired screen.
1655	Settings dialog: The default filter selection is retained even when the user click on Cancel button after the selection.	1. Run CV and open the Settings dialog box. 2. Go to 'Others' tab on the Settings dialog. 3. From the 'Default Image Filter' select a desired value. 4. Click on the Cancel button on the Settings dialog; the dialog box closes. 5. Reopen the Settings dialog and go other 'Others' tab; notice that the value (smooth, normal or sharp) selected in step 3 is retain even when the Cancel button was pressed after the selection.	User can identify filter setting in use from main ribbon. The setting can be adjusted as desired.

Issue ID	Summary	Issue description	Suggested Workaround
1657	LU Knee-Gap-Ankle - Sagittal MPR window is zoomed in 2x	1) Open a unilateral KGF scan (exclusive to the LU). 2) Center the green slab lines on an anatomical landmark of interest. 3) Observe that the default zoom setting for the Sagittal window is too high for the user to sufficiently view the anatomical landmark of interest. The zoom is too high so the Sagittal window only displays the gap between the knee and the ankle.	Workaround is to use the zoom to fit function.
1659	Save as DICOM feature does not give desired output for individual SIMX views	1) Open any scan 2) Switch to SIMX tab 3) Select any SIMX view 4) Select Save as DICOM from the Output Section of the Ribbon 5) Observe a pop-up window featuring the selected SIMX view 6) Return to the Patient List 7) Observe that no DICOM has been saved.	Workaround: Using Save Screen as DICOM will save the entire set of images (instead of a single image) which can be used.
1665	DX view settings revert to 3D volume	1) Open DX 2) Click on Axial View (anywhere on the rendering screen) and observe that MPR and Insta-X tabs appear 3) Double-Click on Window and observe that Axial minimalizes to yield 3D, SAG, and COR views as though DX were a 3D volume 4) Right-click on Axial window and select “Transfer Image to Insta-X page” 5) Click on INSTA-X tab and observe that image is there.	User is still able to view the image. Additional tab labels are displayed which does not impact the functionality.
1667	Immediate Study Importer Fails to complete if JPEG images are included in Imported Folder	1) Open CV 2) Select a RECON file for Media Export whose Patient Folder includes JPEG images 3) Media Export RECON and JPEG(s) to folder 4) Import folder and observe that Immediate Study Importer fails to complete	WORKAROUND to recover: 1) Go to Media Export Folder and navigate to Series Folder: 2) Move .jpg file to Series folder and delete now-empty Jpg folder: Import should now perform successfully Also, JPEG images can be saved to a desired folder on the computer & copied separately to the Media.

Issue ID	Summary	Issue description	Suggested Workaround
1672	DVC VOI - 'VOI is locked' does not retain VOI	1. Open any scan 2. Select Save Volume as DICOM from Output section of Ribbon 3. Under DVC VOI Options check on Use VOI checkbox 4. Right-click drop-down menu to right of 'Use VOI' and select View and Edit 5. Set the ROI along the top of the sagittal and coronal screens (see screenshot for example) 6. Return to the DVC window and check the 'VOI is unlocked' box so that it now says 'VOI is locked' 7. Close the DVC window 8. Open the DVC window and choose to not unlock the VOI 9. Observe that the ROI in the sagittal and coronal windows have stretched to include the bottom of their image windows.	This functionality is for future exansion of CubeVue and is not needed in normal workflow of creating the reformats. Even if used, it locks the crop box in x-y direction and allow the selection along the z axis (i.e., the axis going from foot to head). The checkbox can be unchecked to regain the normal usability.
1673, 1674, 1675	Switched around Head and Foot Orientation Markers - Right Wrist Palm Down Switched around Head and Foot Orientation Markers - Right Hand Palm Down Switched around Head and Foot Orientation Markers - Left Wrist Palm Down	1) Open the required anatomy 2) Use the rotational tool to click and drag X 0-45 degrees upward from A/P View 3) Use the rotation tool to click and drag Y 0-45 degreesy and observe the Coronal view: the H/F orientation markers become switched. 4) Apply any +90 rotations and observe that the H/F markers remain switched across all MPR windows	Hand/wrist are still identifiable and other orientation (L, R, A & P) markers are correct.
1678	3D FRAME SEQUENCE - Y Rotation for Hand	1) Open any hand scan 2) Export a Y 3D Frame Sequence 3) Observe that the rotation is not typical of a Y 3D Frame Sequence (compare to a Y 3D Frame Sequence for a wrist scan). For the hand's Y 3D Frame Sequence the P side faces the user and undergoes a rotation about the y axis instead of a typical Y 3D Frame Sequence in which the F side faces the user and the anatomy undergoes a rotation about the z-axis.	An enhancememt - Hand is visible during Create 3D frame sequence when the rotation is along Y axis.
1680	DX - Autogenerate Session not working: W/L Default Settings must be readjusted every time DX is opened	1) Open DX 2) Tamper with W/L settings until visibility is optimized (the default W/L is 45000/-15000, which displays a black screen with nothing visible) 3) Save session 4) Re-open DX 5) Observe that the W/L settings must be re-applied or previous session must be loaded from Session Manager (the W/L reverts back to 45000/-15000)	W/L can be adjusted manually as needed.

Issue ID	Summary	Issue description	Suggested Workaround
1687	3D Dataset Filter changes Rendering in 3D Window	1) Open one of the “NO PASS” scans from the 3D Dataset Filter evaluation chart (see list in attachment) 2) Compare 3D Image for 3D Dataset Filter for Sharp, Normal, and Smooth 3) Observe that the 3D Image for Smooth adds significantly more soft tissue to the 3D rendered image	HU Offset and Gain controls can be adjusted to desired values.
1706	Save Volume as DICOM: If there is no rotation of the anatomy, the matrix size of the reformat is still enlarged.	1. Open CV & load a dataset. 2. Create a reformat without any rotation of MPR image(s). 3. Notice that the reformat has a much larger matrix size which becomes difficult to handle especially in case of multi-pass scans (e.g. LowerLimb (full Leg)).	This could produce a large size file. The recommended method is to use of the crop tool to generate the reformats.
1716	Upgrade: Session saved in previous release version (e.g. 3.9.0.996) don't retain bisectors in 4.0	1. Install previous beta released version (e.g. 3.9.0.996). 2. Run CV, load a dataset and draw cobb angle on a MPR image. 3. Select Cobb bisector angle on the MPR image, bisector angle is displayed. 4. Save a session file with an appropriate name. 5. Upgrade CV to v4.0.0.0. 6. Run CV and load the same dataset in v4.0.0.0 7. Load the session saved in previous CV version. 8. Notice that the cobb angles are displayed but bisector angles for cobbs are not displayed.	Bisectors can be re-drawn by simply selecting the bisector option from the Cobb dropdown in the measurement section on ribbon menu.
1728	Missing Original CubeVue Taskbar Icon When Installing from Export Media	1) Open CubeVue 2) Navigate to Media Export tab 3) Check the 'Add CubeVue Installer' checkbox 4) Enter a recipient 5) Check the 'Media Burner' checkbox 6) Press the "Prepare Export" button 7) Press the "Export" button 8) Navigate to the Optical Drive in File Explorer and select "Finish Burning" from Manage>>Drive Tools 9) Uninstall CubeVue once burning has finished 10) Re-install CubeVue using the CVIM.exe from the Export Media 11) Open CubeVue and observe that the original CubeVue icon is missing from the Windows Taskbar	The icon can be placed again. Does not impact the usability of the application.
1734	‘Study Description’ is not anonymized when exporting DICOM files	When exporting DICOM files using the ‘DICOM Export’ functionality as provided by the UI, the ‘Series Description’ is not anonymized if the user selects to ‘randomly’ replace the dataset identity.	Dataset identity can be replaced by user provided text.
1744	After DVC VOI, scroll through an MPR image is not feasible (inconsistently) via mouse cursor in crop area	1. Run CV and load a dataset. 2. Perform DVC-VOI. 3. When the DVC dialog box is closed, one of the 3 MPR images don't allow the scrolling through mouse cursor in a particular area. This area is same as the area set for yellow crop/voi rectangle on that image at the time of DVC-VOI.	Opening and closing the DVC dialog box resolves the issue. Reloading the dataset also resolves this issue.

Issue ID	Summary	Issue description	Suggested Workaround
1748	Hidden slab lines become reactivated when MPR Cut is used	1) Open a patient study. 2) Navigate to the MPR tab. 3) Resize the slabs. 4) Hide the slabs. 5) Apply an MPR Cut Line to any of the MPR image windows. 6) Observe that slabs are no longer hidden.	The slabs can be hidden manually by using the Hide Slab Marks button from ribbon menu
1758	Blank images for DRRs which are exported with 'Save as Pure DICOM' and "Insta-X" remnant	1) Open a LU scan with DRRs 2) DICOM Send atleast one DRR with 'Save as Pure DICOM' checked to CC 3) Open the DRRs in CC 4) Find that the views have the right W/L settings in the lower left corner but that the images are blank. Note: The description mentions "Sim-X" instead of "DRR"	W/L can be adjusted to desired values.
1760	Copy To Local failed with error code = -3	1. From the patient list in CV, select a patient study of interest 2. (In the lower pane) Select all the series to be copied 3. Right click and select the Copy To Local Option 4. In the Copy To Local pop up window, click on Start.....Status shows the following error in red text, "Failed copying study (error code = -3)"	This was due to timeout after 20 mins of a dataset download. Can be fixed by increasing timeout to an hour+ depending on download speed. Technical Support need to be contacted to resolve this error.
1761	Loading a scan after/while a LU with DRR scan is open carries over DRR tab	1) Open a LU study with DRR tab active 2) Close the study (optional step) 3) From the Main Menu Bar load any patient study using the LOAD icon button 4) Notice that the DRR tab is carried over (including DRR views)	CubeVue can be restarted to resolve the issue.
1762	Sync Series - 3D Render Scaling is out of sync even with checkbox checked	1) Open the same series twice, side-by-side 2) In Series Synchronization Controls check off all the Abs. checkboxes and click "Now" for every option 3) Use any of the controls/buttons from within the Render Scaling section of the Tools and Settings Panel 4) Find that the Render Scaling is out of sync by an HU offset between the series	Manual adjustments can be made as needed.
1789	All the Patient Study List's DRRs display in the DRR Tab	1) Open CubeVue 2) Check the DRR checkbox beneath SHOW OPTIONAL SERIES 3) Open the scan in the Review Tab 4) Switch to the DRR Tab 5) Find all the patient study list's DRRs displayed	DRRs can be distinguished from the database, but need assistance from the Technical Support team.

Issue ID	Summary	Issue description	Suggested Workaround
1796	Invert Segmentation does not invert the entire selection	1) Open CubeVue 2) Load the HR 4103/98011 WB Left Foot dataset 3) Use the RENDER SCALING options to render the skeleton 4) Use the REMOVE BONE checkbox function to remove the first bone 5) Hold down SHIFT and remove a second bone 6) Choose to INVERT SEGMENTATION 7) Observe that only the second removed bone is recovered	Workaround: Free Hand Erase option can be used instead of Remove Bone if more than 2 bones are to be removed and Invert segmentation is required after that.
1797	DRC VOI Rectangles appear during use of JPEG Image Stack Creation	1) Open CubeVue 2) Load any dataset 3) Choose to SAVE VOLUME AS JPEG 4) Notice that the MPR image windows have the DRC VOI rectangles 5) Save the volume as a JPEG 6) View the associated JPEG files 7) Notice that the DRC VOI rectangles are featured in the JPEG files	The desired adjustments can be made on the DICOM Reformats creation dialog box which is present in Save..|Save Volume as DICOM option on the ribbon menu.
1802	W/L setting for SimX view is not retained across dataset	1) Open CubeVue 2) Load a dataset 3) Navigate to the SimX tab 4) Change the W/L setting for atleast one view and note the final values 5) Close the dataset 6) Load the second dataset 7) Navigate to the SimX tab 8) Notice that the W/L setting for the view in step 4 is not retained	W/L can be adjusted manually. The values will be retained until CubeVue is restarted or a second instance of CubeVue is started.
1809	Clicking in the Review Tab causes mouse to become confined within an imaginary space within the CV window	1) Open CubeVue 2) Load the dataset 3) Right-click on any of the image windows. It does not make a difference whether an option is selected. 4) Either select an option such as "Transfer image to Insta-X" or click off the menu to close the right-click option drop-down list. 5) Attempt to switch to any other tab besides the current Combined 3D/MPR tab and find that the mouse cannot access the bottom of the screen. 6) Attempt to access the Tools and Settings pane and find that the mouse cannot access the far-left of the screen.	Pressing the Windows key. While the start windows menu is active the mouse will no longer be confined in CubeVue.

Issue ID	Summary	Issue description	Suggested Workaround
1811	JPEG Image Stack Creation only allows user to enter folder destination once DVC has been utilized	1) Fresh install CubeVue (uninstall current version of CubeVue and then delete the Curvebeam folders from ProgramData and Users folders) 2) Install CV 4.2.0.0. 3) Open CubeVue 4) Load any dataset 5) Open the JPEG IMAGE STACK CREATION window 6) Click "Start" 7) Observe the following notification ("No Output Specified") *See screenshot* 8) Switch to DVC window 9) Initialize and complete a DICOM SEND 10) Switch back to JPEG IMAGE STACK CREATION window 11) Click "Start" 12) Observe that user can now select export destination and can successfully complete JPEG IMAGE STACK CREATION operation	Workaround: the desired adjustments can be made on the DICOM Reformats creation dialog box which is present in Save..|Save Volume as DICOM option on the ribbon menu.
1815	DRR/SimX Image Output Selection checklist becomes unavailable if the language setting is changed while tab is operational	1) Open any scan 2) Navigate to the DRR/SimX tab 3) Change the language from Settings 4) Observe that the Image Output Selection checklist disappears	Workaround: Click on Select None and then Select All button on the Tools and Settings pane resolves the issue.
1818	DICOM-Sent DRR views incorrectly titled "SimX" in Series Description	1) Open any LU scan and navigate to the DRR tab 2) Open the DICOM Sender window and send DICOM views after checking "Save as pure DICOM" 3) Notice in ClearCanvas that the title of each view is prefixed "Sim-X" 4) Return to the DICOM Sender window and send DICOM view after unchecking "Save as pure DICOM" and checking "After successful send also save the output locally" 5) Notice that the Series Description of the locally saved DICOM images is "SimX" 6) Notice that the title of the DICOM slideshow sent to ClearCanvas is "SimX"	Image quality can help to distinguish between SimX and DRR images.
1824	Save Volume as DICOM: If boundary of yellow rectangles is defined outside the region of actual scan, it causes CV to crash (sometimes error -2).	1. Run CV and load a dataset. 2. Open Save Volume as DICOM dialog box. 3. Adjust the crop boxes such that some area is outside the scanned volume (not the anatomy but scanned volume). 4. Click on Start button. CV crashes. Sometimes it gives error -2.	Properly setting the crop boxes to just select the anatomy of interest and not extraneous area outside the desired FoV can mitigate this issue.
1828	When the Windows Region settings is non-English user cannot switch language in Settings	1) Change the Region setting on the PC to non-English region 2) Open CubeVue 3) In Settings attempt to change the language to a different language than the regional setting 4) Observe the error message (see screenshot)	Workaround: Change any float values (i.e., decimal values) in the Settings|Preprocessing fields to non-decimal value

Issue ID	Summary	Issue description	Suggested Workaround
1832	Media Export cannot find Installer	1) Open CubeVue 2) Select any dataset or file for Media Export 3) Navigate to the Media Export Tab 4) Check the ADD CUBEVUE INSTALLER checkbox 4) Click PREPARE EXPORT 5) Observe the following error message: "CV Installer not found" 6) Continue to EXPORT the folder 7) Open the Media export folder 8) Notice that CVIM and autorun files are missing	The error occurs at the secondary level user. Media export works as expected when created by first user. As a workaround, the originally created media may be send to next level user.
1836	IR R/L Knee SimX Cut-Off AP View	1) Open CubeVue 2) Load an IR Knee Scan 3) Switch to the SimX tab 4) Notice that the image in the AP view is not in full view	Workaround: A custom script (c) can be created for InReach Knee SimX to be placed at customer site as requested
1840	CubeVue only opens if the user account is an admin	1) Create new local account on Windows 11 with no admin privileges 2) Log into new local account and try to open CubeVue 3) The splash screen will appear but the application automatically closes out when trying to open the Patient List	2 scenarios can occur A) CubeVue already installed on system in admin account: In this case you will not be able to install CubeVue into a user account as the Windows system sees it is already installed in an admin account and will not give you an option to install it as user. B) CubeVue not yet installed on system, you have 2 options: * install in user account (run CVIM as administrator for install, as usual) * install in admin account (run CVIM as administrator for install, as usual) the latter is the preferred method as it would be easier when adding multiple user accounts For both scenarios A) and B) The CubeVue icon will not be installed on User account desktop, so on the user account desktop you will need to create a shortcut to C:\Program Files\CurveBeam LLC\CubeVue\CubeVue.exe With this infrastructure set up, you will have to grant the user account full control permission to folder C:\Program Files\CurveBeam LLC

Issue ID	Summary	Issue description	Suggested Workaround
1841	Modify DICOM Study: if LOI (Laterality of Interest) is not selected, it causes CV to crash.	Steps to repro: 1. Run CV and load a dataset acquired from a version of Acq/Recon which does not have LOI pre-filled (e.g, IR 8.1.0.5/5.0.0.2, PC 7.0.0.9, 5.3.0.2). 2. Update any other information if needed, but do not select the LOI checkbox. 3. Click on Start button; CV crashes. Note: this is applicable for the datasets which do not have Laterality of Interest information not filled in already.	Workaround: Selecting the appropriate Laterality of Interest on the 'Create Modified Study' dialog box will fill the relevant DICOM tag (0008, 2220) with the selected LOI information & also CV will work as expected (no crash).
1842	Modify DICOM Study: DOB is updated in the DICOM tag but not updated on the study list.	1. Run CV and copy to local a dataset with or without a DOB. 2. Open the 'Create Modified Study' dialog box by right clicking on the Recon in local tab. 3. Update the DOB and nothing else. 4. Notice that DOB is updated in the DICOM tag but the patient study list does not show the updated date.	Workaround: placing a blank space in between the patient name causes the DOB to be updated on the patient study list as well.