23. To shut down the system, select "Exit Visualase" and "System Shutdown" from the "Start" menu. Answer YES to the confirmation message and wait for the system to power down.

The Visualase Console Window

Once you have set up and started a session in the Visualase™ software, the first interface to appear on the primary screen is the Visualase™ **Console** window. The Visualase™ **Console** window is the primary user interface and control tool for the entire Visualase™ system.
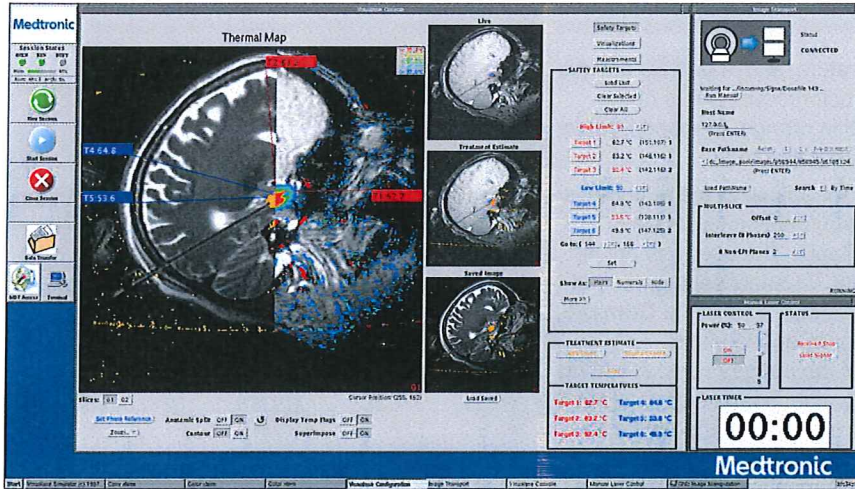

Image panels and controls

The image panels present in a graphical format, the data acquired from the MR scanner. The **Live** image window presents the conventional magnitude magnetic resonance image. The **Thermal Map** image window presents the Live image with the calculated thermal changes overlaying the image. This image is a 2D mapping of the complex phase of the MR image. Once a phase reference has been set, this image shows the net change in phase relative to the initial phase reference setting. In a gradient echo pulse sequence, this thermal map is dependent on the field strength, the echo time, and the temperature difference, and is related by the equation shown below.

Thermal map equation

$$\Delta\Phi = \gamma B_0 (0.0097)(\Delta T)(TE)$$

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Drawing distance measurements

In the **Measurements** area of the Visualase™ Console there is a **[Measure]** button. This tool allows the user to measure and display distances on the large image panel. The image field-of-view (FOV) in mm must be specified, in the Visualase™ Configuration, for both the X and Y directions. To create a measurement, you press **[Measure]**, then move the mouse into the large image panel. Left-clicking the mouse once on the image anchors the new origin to that point and as the mouse is dragged (while still depressing the left mouse button), a line is drawn and a distance measure (in mm) is reported on the large image panel. This distance corresponds to the distance in mm between the point which was clicked, or set, as the origin and the current position of the mouse, based on the image FOV values. The line may be adjusted by left-clicking and dragging either end of the line. The line may also be moved by clicking and holding the middle button on the line and dragging the line. Clicking **[Measure]** again or on any one of the **Target Selection** buttons deactivates measurement mode and the line. The **Distance Messages** also disappear. The measure functionality is also available from a menu by right-clicking on the large image panel.

The Visualase™ Viewer Window

The Visualase™ **Viewer** window provides the ability to view a specific image slice or cycle through all available slices. Both options are independent of the Visualase™ Console. The Visualase™ Viewer window displays:

- Live image
- Live image with Thermal Map overlay
- Live image with Treatment Estimate overlay
- Saved reference image
- Laser activation time
- Temperature history plots and values
- Field of view values

Troubleshooting

Symptom	Likely Cause	Solution
Not receiving images	• Wrong base pathname in the Image Transport window • Image Transport window failed to connect to scanner host	• Correct the path • Check ethernet/IP settings • Check ethernet cable connection
Not getting temperature data	• Image Transport not working • Phase reference not set	• See above • Set targets, then set phase reference
Unexpected result	• Noisy image data • Incorrect configuration settings	• For noisy images, reset the phase reference • Restart new imaging sequence • Close session, start new session, modify configuration settings in Visualase™ **Configuration** window, save changes, start session.
Laser does not operate	• Laser not in Ready mode • Temperature target WARM • Error reading temperatures	• Switch laser from Standby to Ready mode • Change target point • Set target point or limit
Noisy data or no temperature information	• Patient movement • Bad sequence parameters	• For noisy images, reset the phase reference • Restart new imaging sequence • Close session, start new session, modify configuration settings in Visualase™ **Configuration** window, save changes, start session.

Other Visualase Utilities and Components

The Review Last Log tool

At any time subsequent to completion of a Visualase™ analysis session and before completion of the next analysis session, you may review the log file from the last completed session. To do so, select the "Review Last Log" option from the Start button menu. An editor window containing the text of the log file will appear in read-only mode, that is, editing of the log file will not be possible. You may however use the Find menu to search for specific text or events in the log. A detailed description of the log file contents is presented in the Log file section.

View Tool image evaluation

The View Tool also provides the user with three diagnostic tools to glean relevant information from the images to be used in conjunction with the main Visualase™ program.

To make distance measurements, press **[Metrics]** and then left click and drag the cursor in the view pane to draw a measurement line. The length of the line will be written in the upper right corner of the view pane and along the bottom of the user interface. The entire line can be moved by clicking and dragging the middle mouse button. The line can be lengthened or shortened by left clicking on an endpoint of the line and dragging that endpoint to the desired length. To remove the line and associated measurements the user should either single click (left button) in the view pane or press **[Metrics]** again to turn off metrics.

The View Tool provides the ability to export a displayed image to the main Visualase™ console. This is done by clicking the **Export** button located in the center of the user interface. If the 1 box (located just to the right of the Export button) is selected then the image will be exported to the first slice saved image in the Visualase™ console. Whereas if the 2 box is selected then the image will be exported to the second slice saved image in the Visualase™ console. These can be accessed in the Visualase™ console by toggling between **Saved** and **Live** images.

The View Tool program will plot the intensity of sequential images for evaluation. This feature is specifically aimed at the evaluation of dynamic contrast images. The plot is displayed by pressing the **Calc** button on the lower right hand side of the user interface. When **Calc** is pressed the program may take a while to finish plotting the data so the user should be patient. The plots show time-series image intensity maps.

If the image series was acquired with an interleave, or repeatedly over a set number of slices (such as in dynamic contrast imaging) then this must be set in the **# Slices** and **#** fields. The **# Slices** should be set equal to the total number of images per time point and the **#** field should be set equal to the slice number of interest of the slices.

Then the user must right click on pixel of interest in the image to display the time dependent data in the plot. Multiple selections will be made and the plot will quickly update to plot the latest pixel's data. Note that the Calc function will automatically switch between the display of intensity history for Live(s) images and sequential values of complex phase for Phase(s) image types.

Exiting the View Tool

When finished with the View Tool Program, the user should press the Quit button in the upper right. All images that were exported will remain available to the main Visualase™ program as Saved images after exiting.

The Review Tool

The Visualase™ system generates extensive logging and diagnostic information which can be used to retroactively re-create an entire analysis session. This is useful for investigating the details of analysis methods, tracking down anomalies,

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