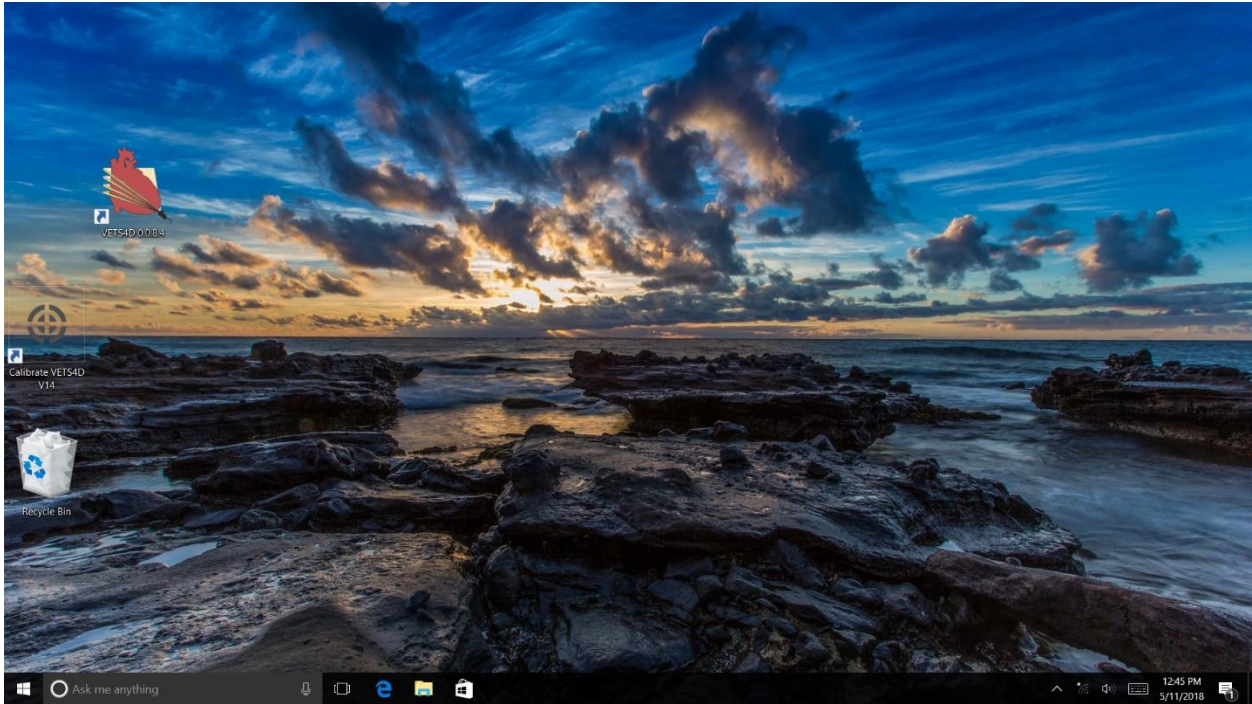


Echo Simulator Manual

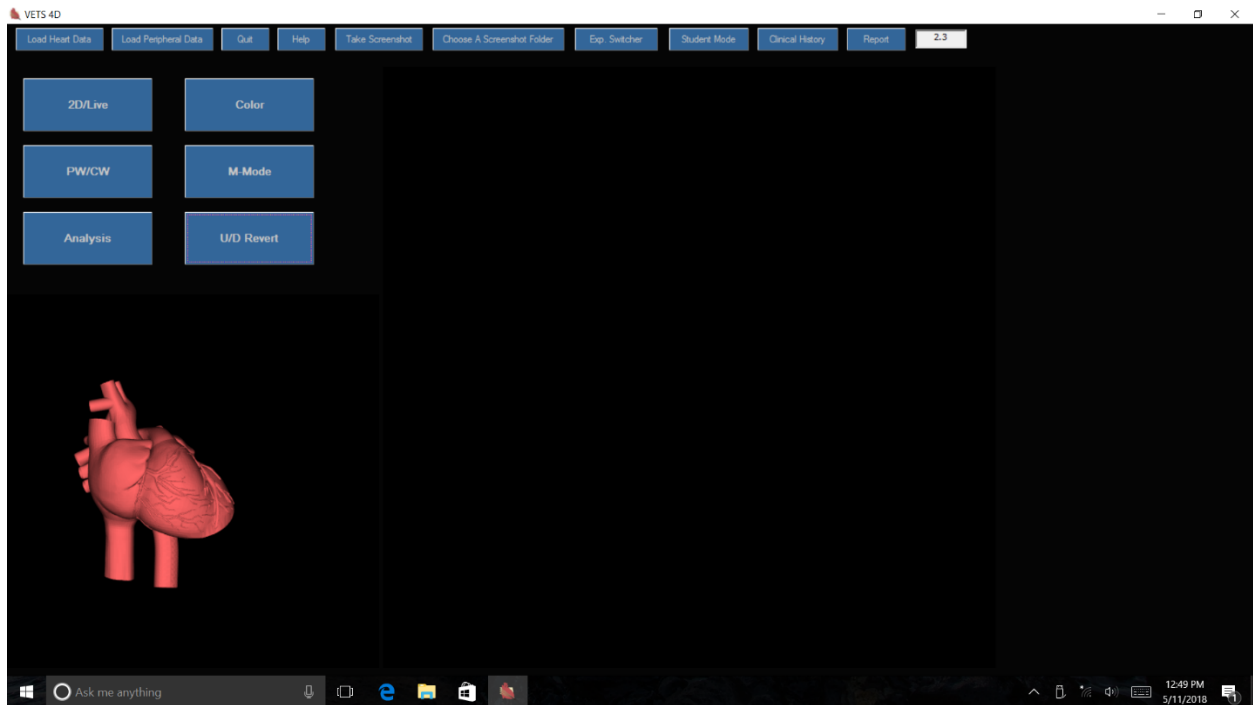
Starting Program



Click on VETS4D icon to start the program.

Echo Simulator Manual

Top Bar

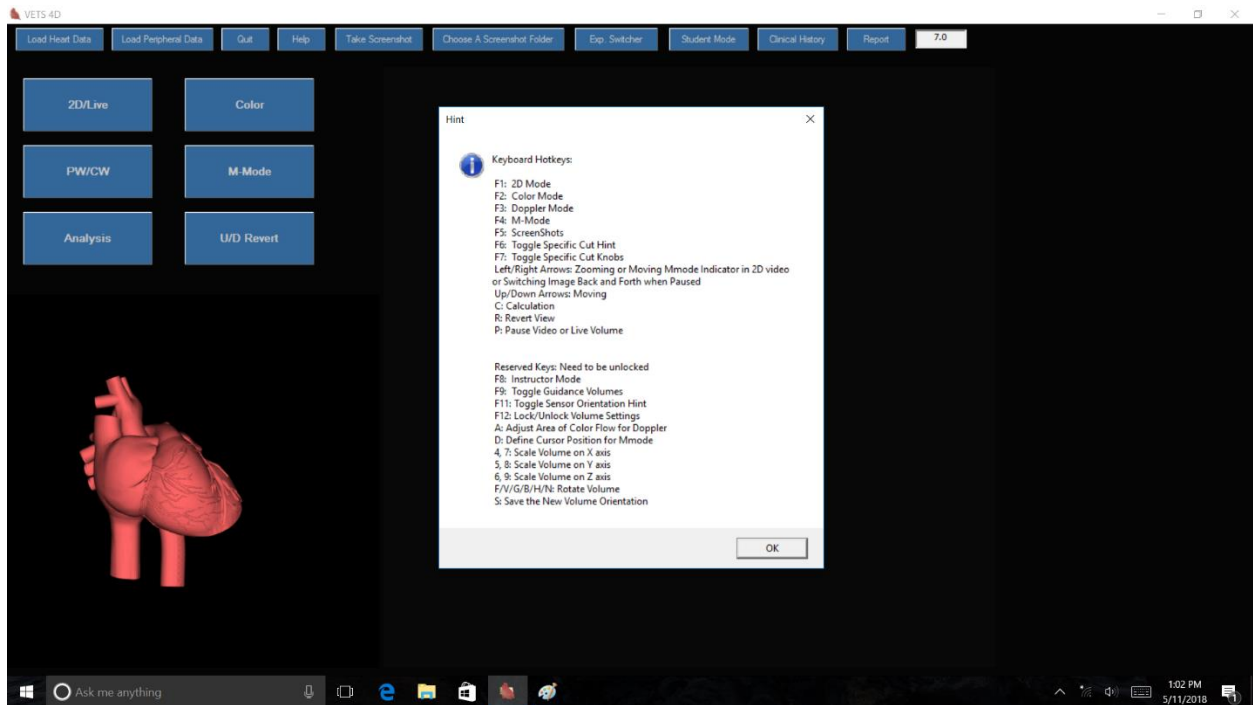


On the top bar:

- **Load Heart Data:** Click once to bring up cardiac cases for simulation.
- **Load Peripheral Data:** This function is for bringing up peripheral blood flow cases but not yet available.
- **Quit:** To quit the program.
- **Help:** Menu will be explained subsequently.
- **Take screenshot:** Will take a screenshot when program is active.
- **Choose a Screenshot Folder:** Indicates the destination folder for the screenshots.
- **Exp. Switcher:** Not active at present.
- **Student Mode:** Used for testing the trainee (see below).
- **Clinical History:** Describes the case.
- **Interference indicator:** Indicates the degree of magnetic interference due to surrounding metal, especially iron and steel. If greater than 10, a warning message appears on the screen alerting to the presence of high interference. In such a case, change the location of the doll.
- **Report:** Displays the report of the measurements already obtained for a given case. Also, allows for clearing the report.

Echo Simulator Manual

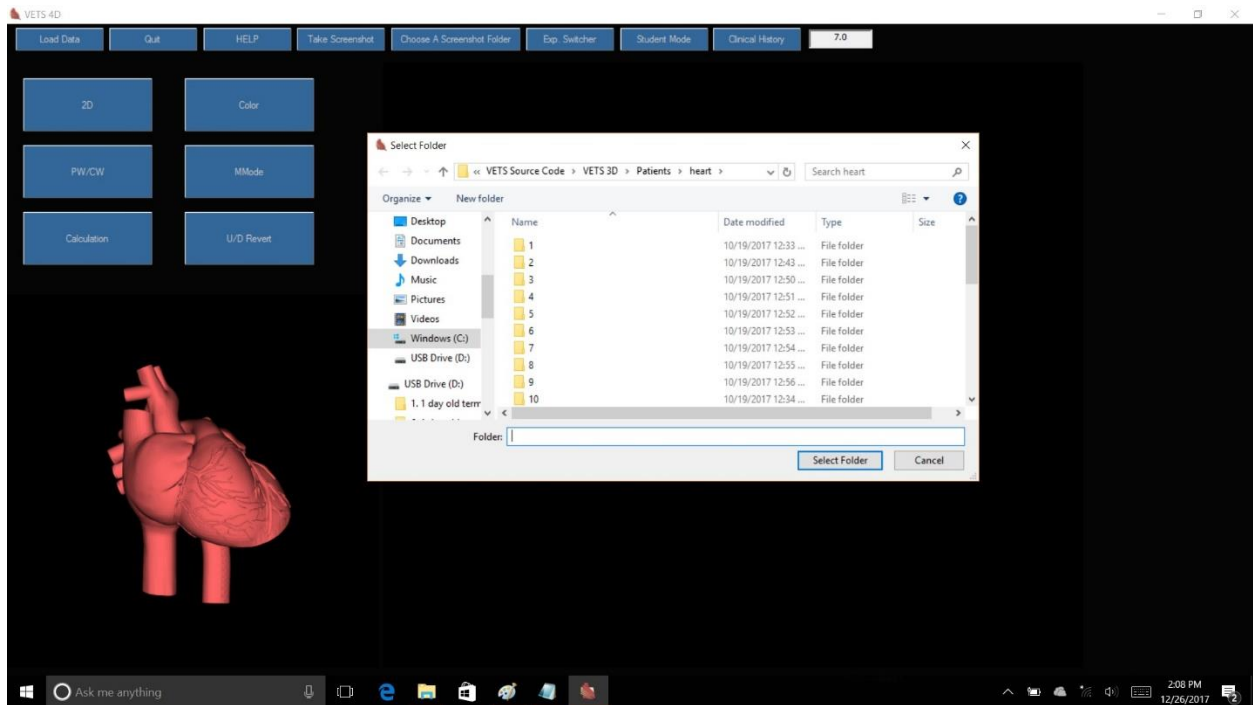
Help Menu



Help Menu: Explains all the keys that are active when the program is running. There are 2 sets of hotkeys; only the top group is accessible by the user.

Echo Simulator Manual

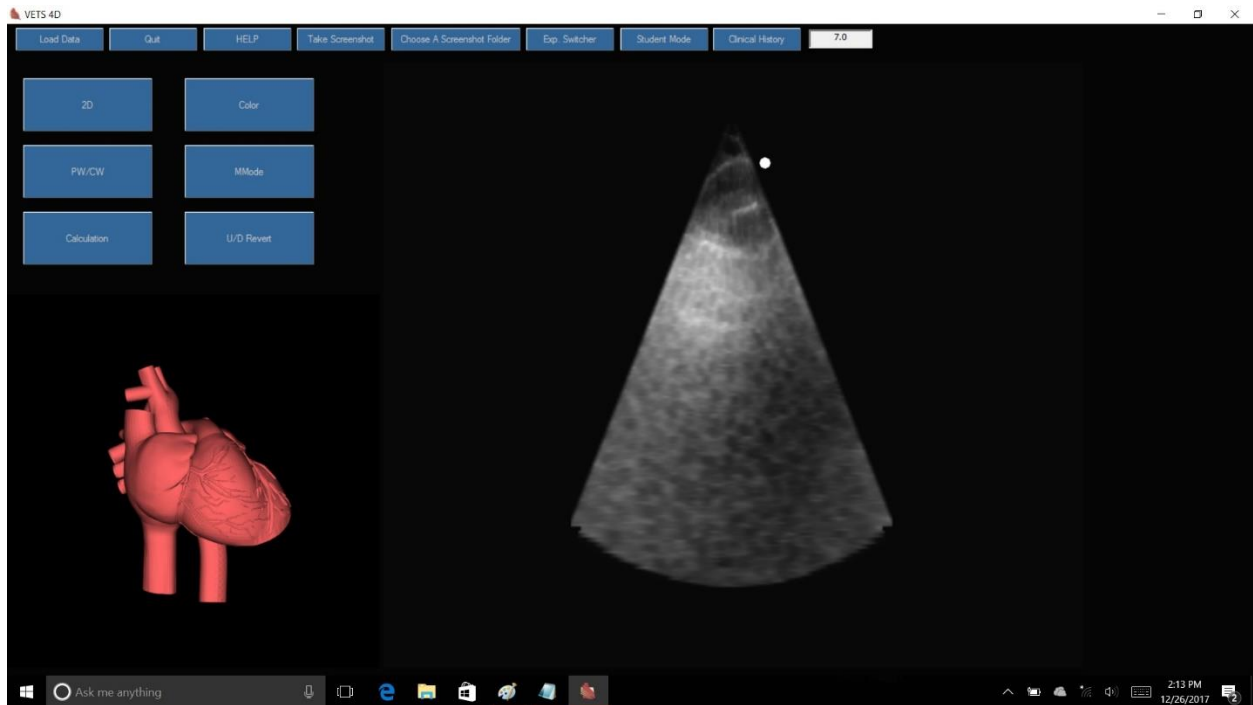
Case Selection



- Clicking “Load data” once, will display the folder of all the cases installed in the simulator.
- Choose any folder by clicking once and then click “Select Folder” to access the case for echocardiography.

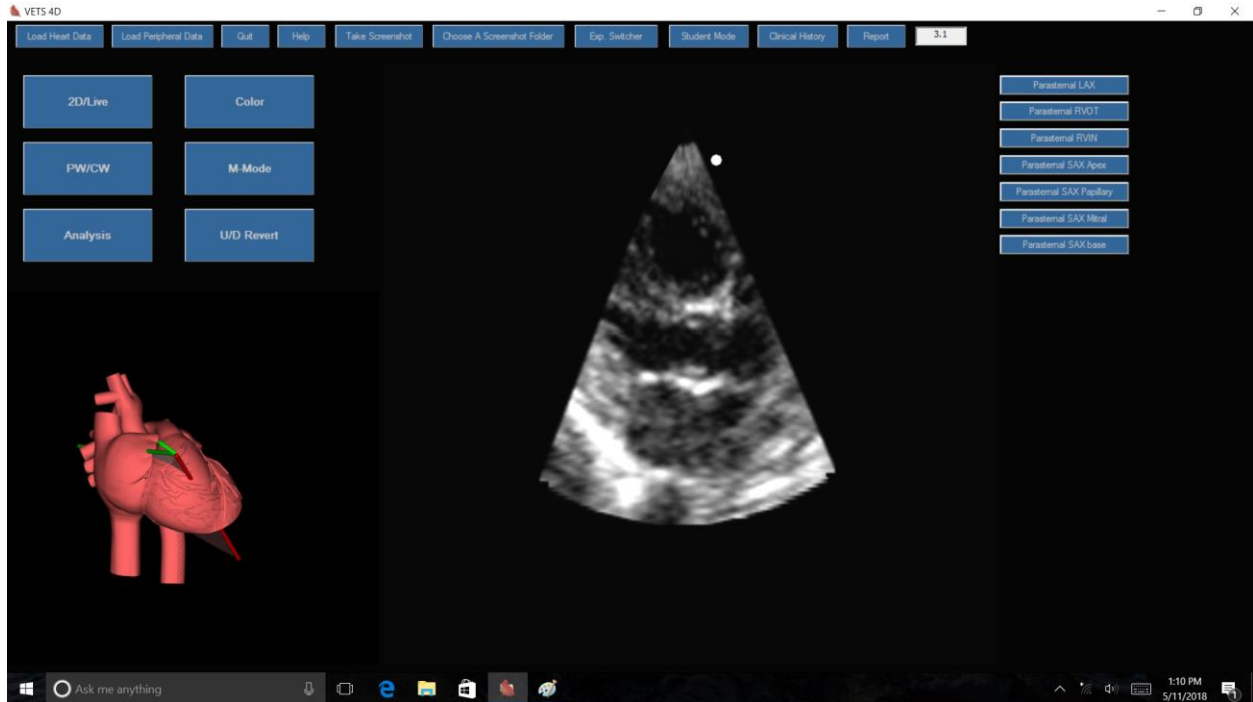
Echo Simulator Manual

Active Mode



- Now you are ready to perform an echocardiography simulation.
- Please note that you have 2 options: “Hint” on or off.
- By pressing F6 you can activate or remove “Hint”. The program starts with “Hint” option off.
- Only with “Hint” on, and with the hint message in yellow at the bottom of screen in display, one can perform color and spectral Doppler, M-mode and hemodynamic measurements.
- In cases when there are difficulties in displaying the “Hint” despite the hint option being on, by pressing F7 while imaging from the acoustic window, the Specific Cut Knobs will appear on the right side of the screen. Pressing the desired knob will allow for access to the color and spectral Doppler, M-mode and hemodynamic measurements (see below).
- Note that color, spectral and M-mode are recorded loops and therefore not live. They are intended for measurement/analysis and viewing purposes.

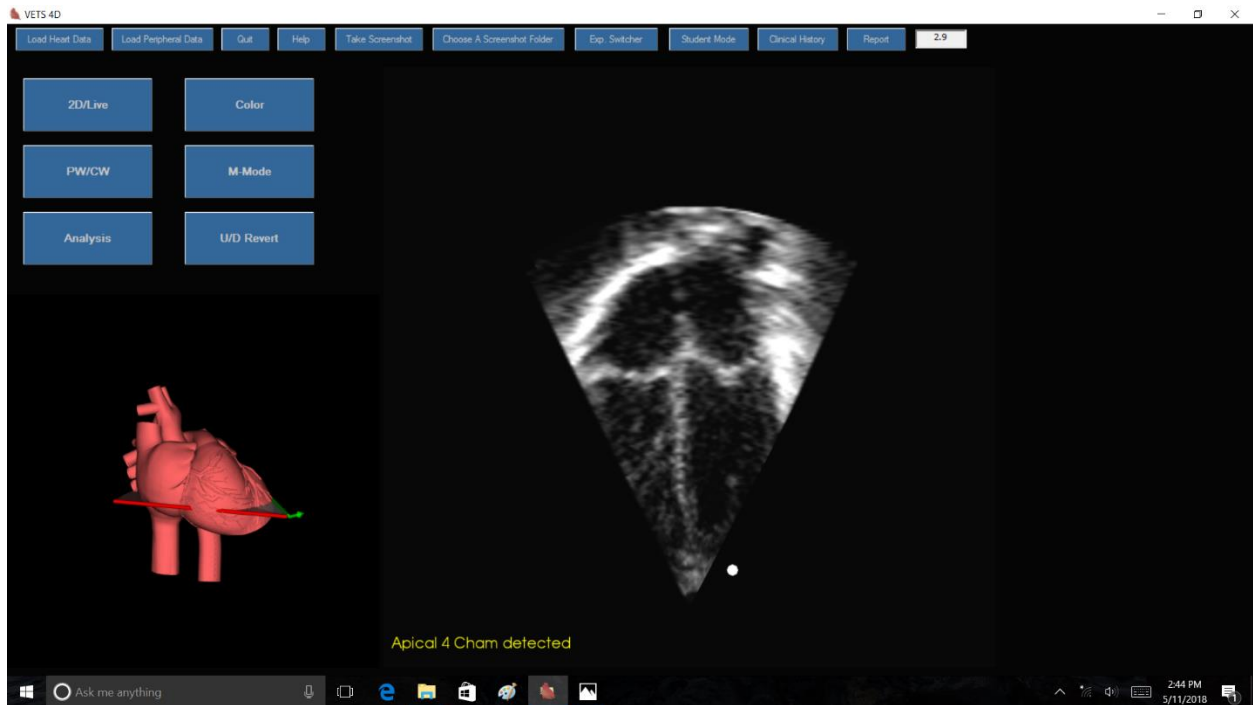
Echo Simulator Manual



- In this example, F7 was pressed while in parasternal window and as a result the Specific Cut Knobs for parasternal window were brought to display. This option allows for access to the color and spectral Doppler, M-mode and hemodynamic measurements without the need for specific “Hint” to be in display.
- Also, note the 3D heart model on the side screen. The cutting plan helps the trainee to appreciate the sector cuts. The arrow indicates the direction of the marker on the transducer.
- The size of the 3D heart model can be adjusted. Using a mouse, click on the heart model and scroll up or down to increase or decrease the size, respectively.
- The echo image size and position also can be adjusted by using the arrow keys on the keyboard. Up and down arrows move the image up and down, respectively. Right and left arrows increase and decrease the image size, respectively.

Echo Simulator Manual

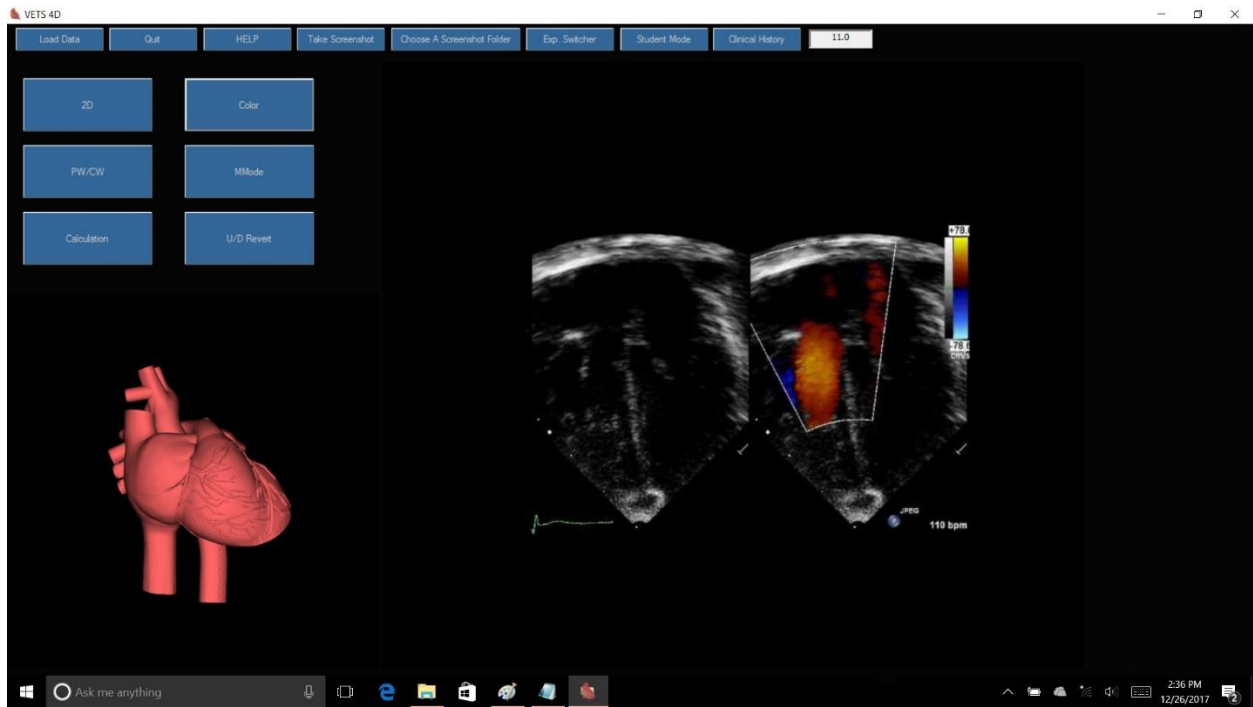
Example: 4 chamber view



- An example of four-chamber apical view with “Hint” mode on.
- The hint “Apical 4 cham detected” is necessary to go to other modes if available (i.e. Color, PW and M-mode).
- Once the “Hint” is in display, press the desired mode icon on the screen to switch mode.
- In each view, only one, two or all modes may be available depending on the view and the case.
- Apical and subcostal views in live or hybrid mode can be imaged in standard or inverse orientation.

Echo Simulator Manual

Example: color mode



- An example of color mode from 4 chamber apical view.

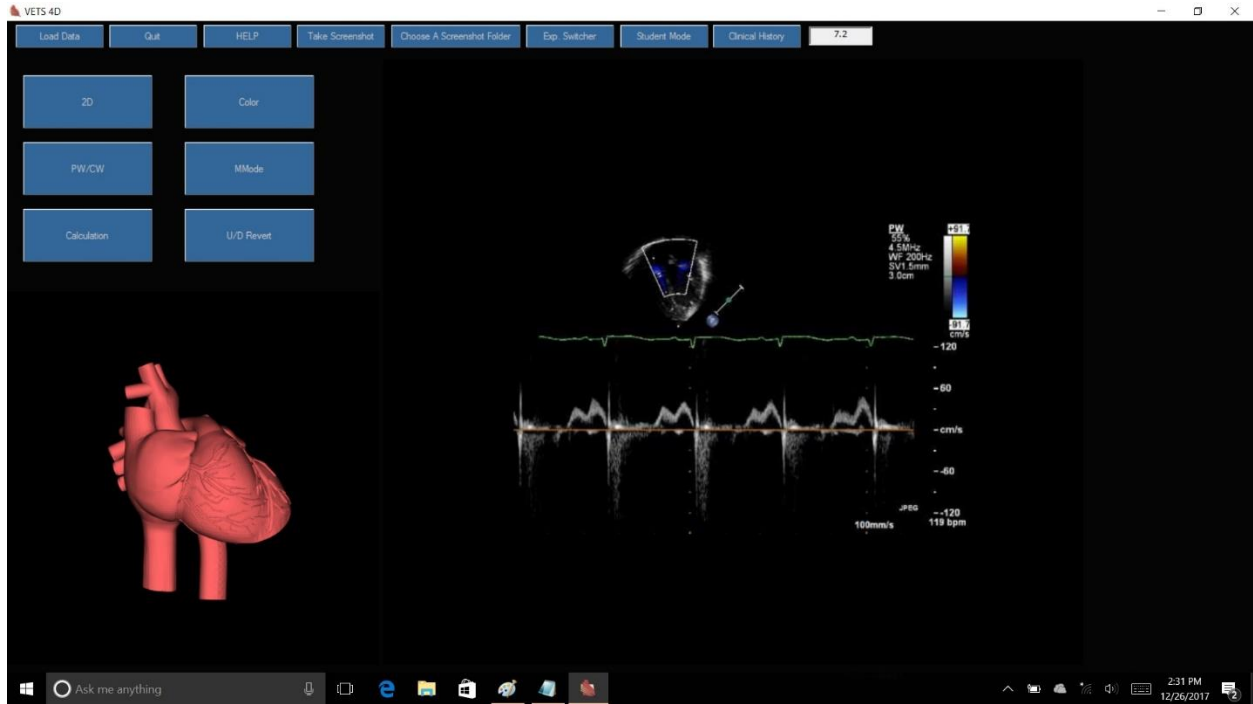
Echo Simulator Manual

Example: Spectral Doppler mode



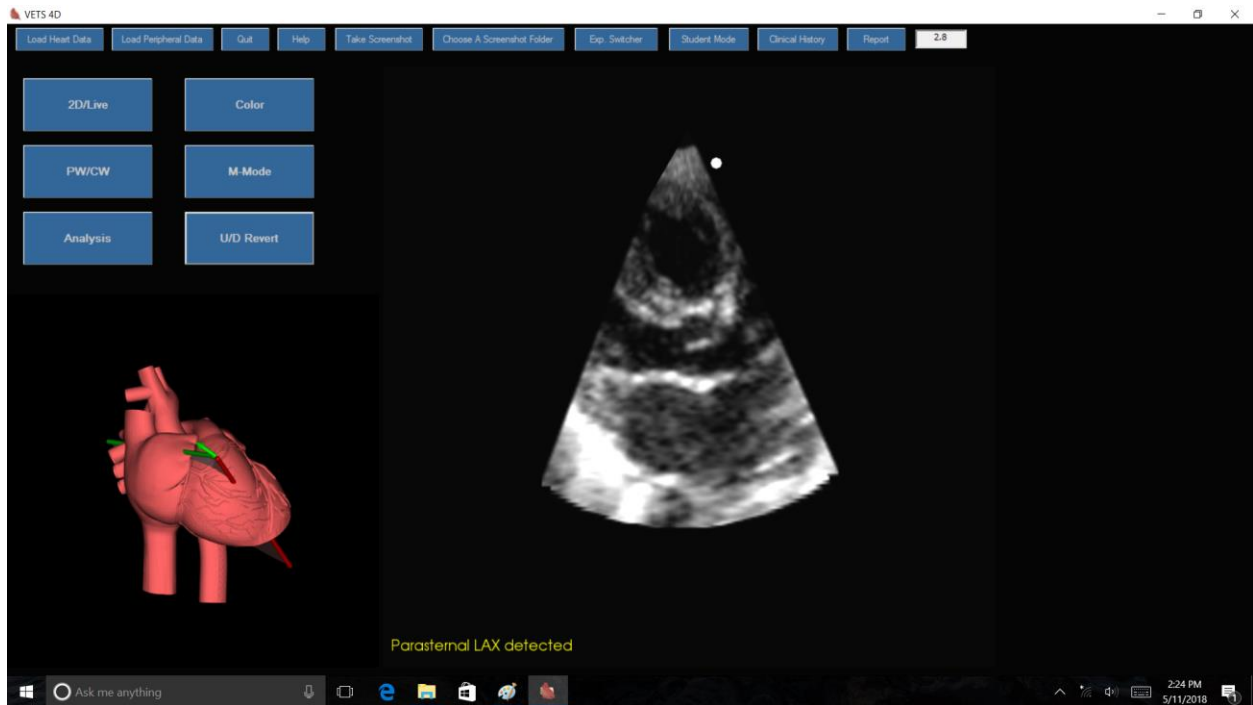
- An example of the process of obtaining a spectral Doppler from 4 chamber apical view.
- The hint "Apical 4 cham detected" is necessary to go to PW/CW.
- Once the "Hint" is in display, press PW/CW on the screen. The color mode will appear on the screen with instruction to use the pointer to obtain spectral Doppler from the desired location. It is also possible to obtain a spectral Doppler by clicking on the desired location on the color Doppler without first pressing the PW/CW icon.
- Below, PW Doppler of right ventricular inflow is displayed.

Echo Simulator Manual



Echo Simulator Manual

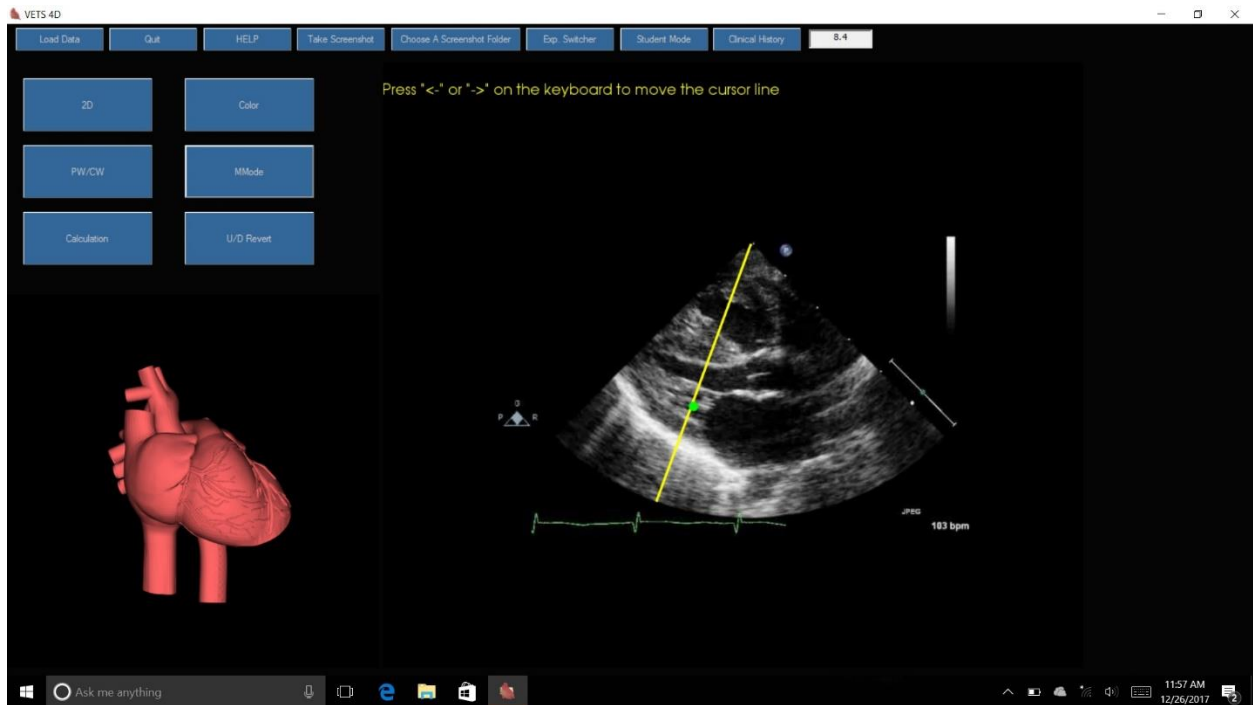
Example: LV long axis view for M-mode measurement



- To perform hemodynamic measurements, “Hint” option must be on (see above) and the hint message must be in display as in this example (“Parasternal LAX detected”).

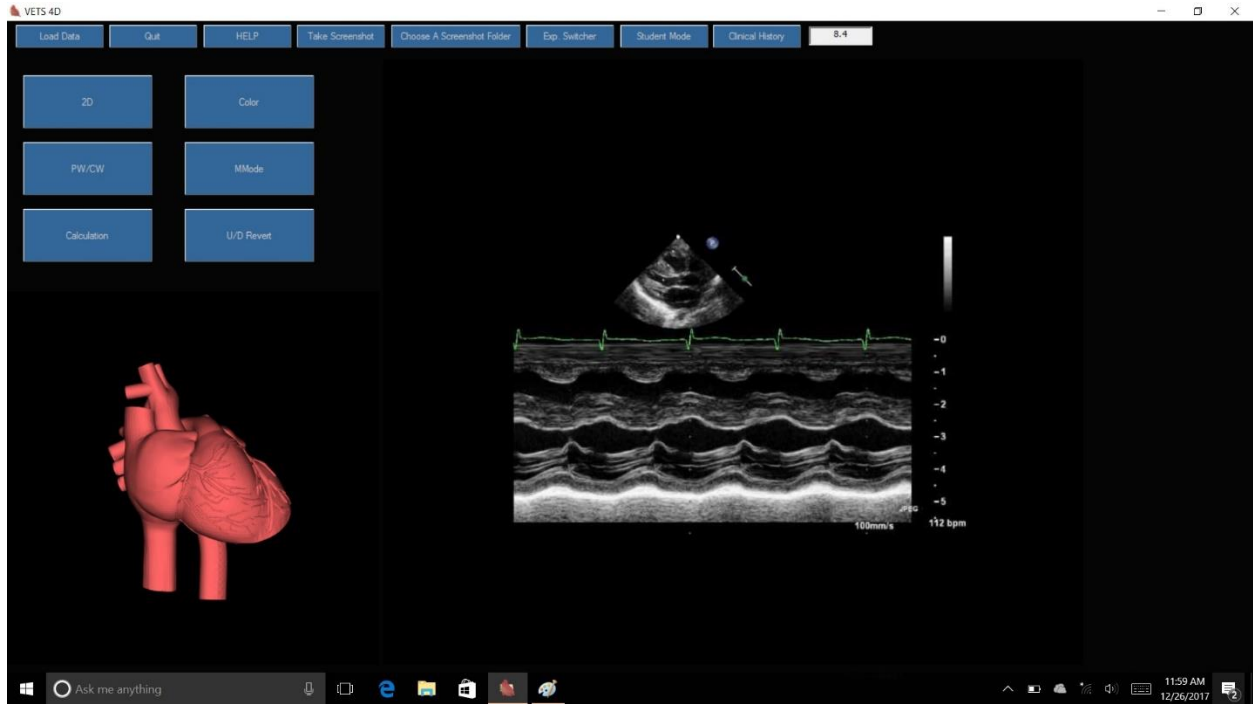
Echo Simulator Manual

Example: M-mode tracing of LV



- In this example we show how to perform M-mode measurement of LV however, from this view LA/Ao ratio can also be measured. In addition, the M-mode measurements of LV function and LA/Ao can be made from the parasternal short axis view.
- After obtaining a LAX view with the hint message in display, press M-mode icon on the screen. Then use ← and/or → keys to move the M-mode cursor line. Once in appropriate position, a green dot appears on the line. Now by pressing M-mode on the screen, the M-mode tracing is displayed. Note that if a red dot is present on the cursor line, M-mode tracing can be accessed as well however, this tracing would not be appropriate for analysis of LV function.

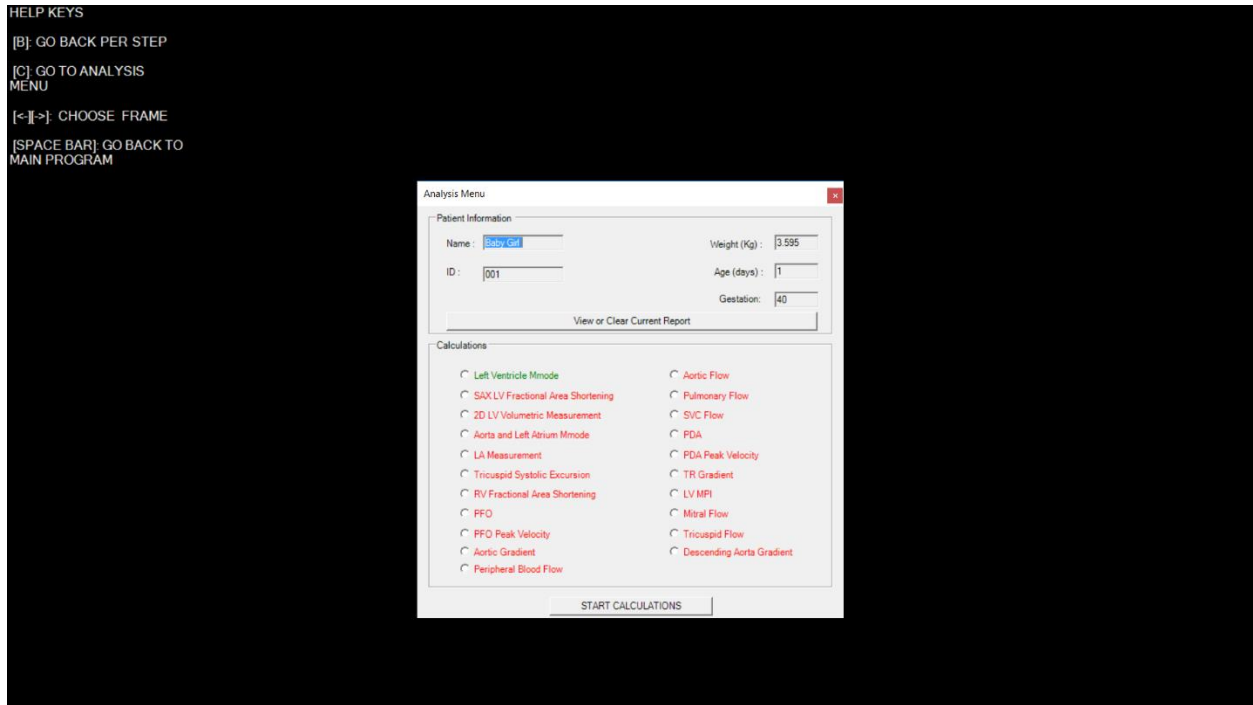
Echo Simulator Manual



- An example of appropriate M-mode tracing for assessment of LV function.
- Press “Analysis” icon on the screen to start measurement.

Echo Simulator Manual

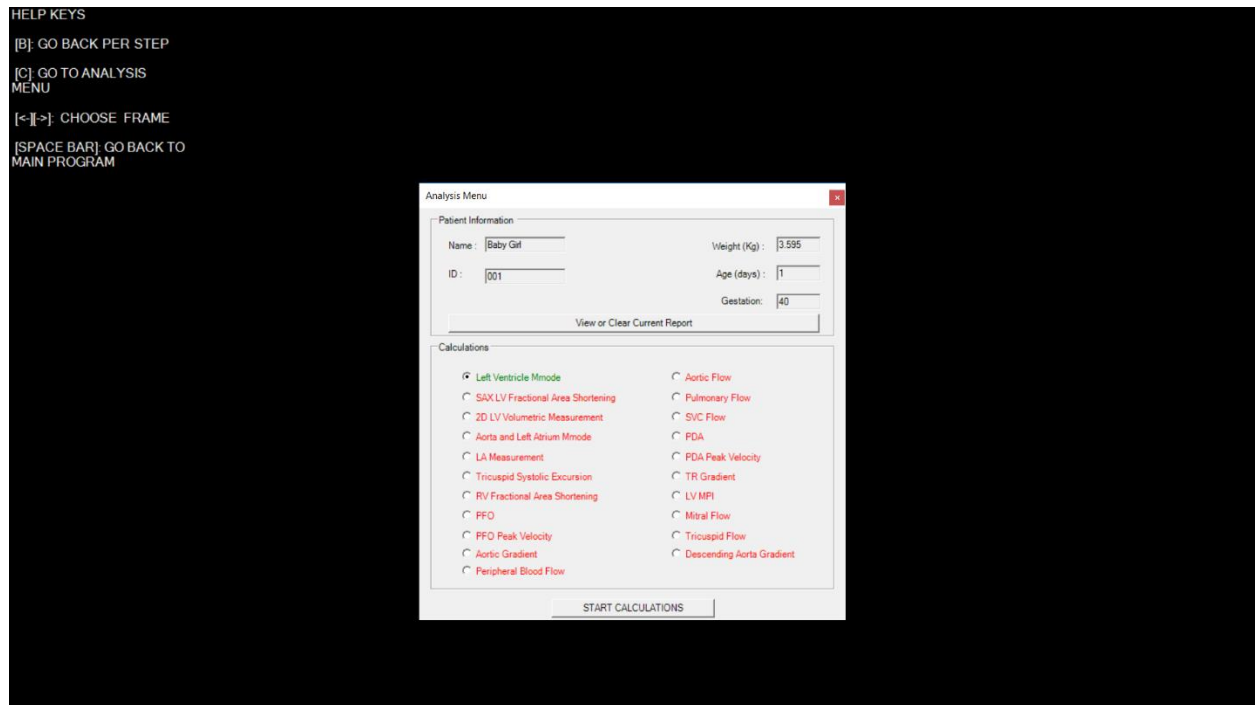
Example: analysis options



- Once in analysis mode, you have the option to clear the previous report by pressing on “View or Clear Current Report”

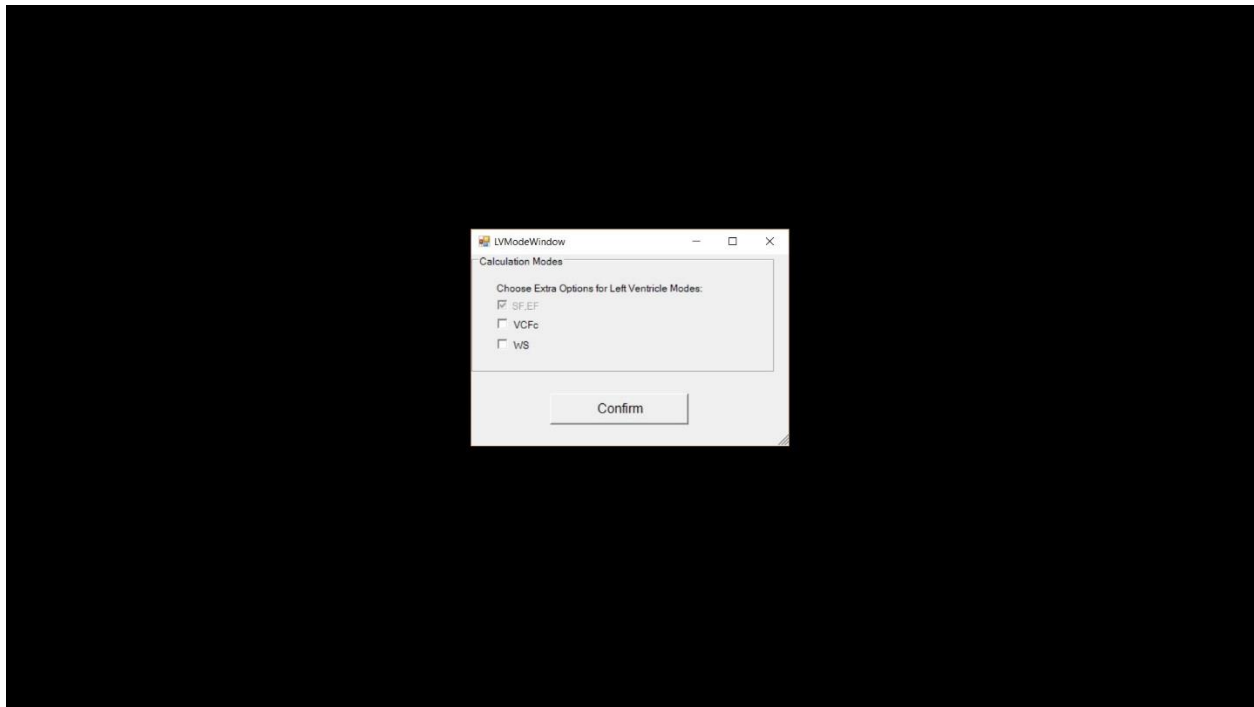
Echo Simulator Manual

Example: allowable analysis options



- In analysis, you can choose the desired calculation.
- Only the appropriate calculations for the view are permissible which are highlighted in green. In this example Left Ventricle M-Mode is possible.
- Checking “Left Ventricle M-mode” will take you to another screen to choose from different measurement index options.

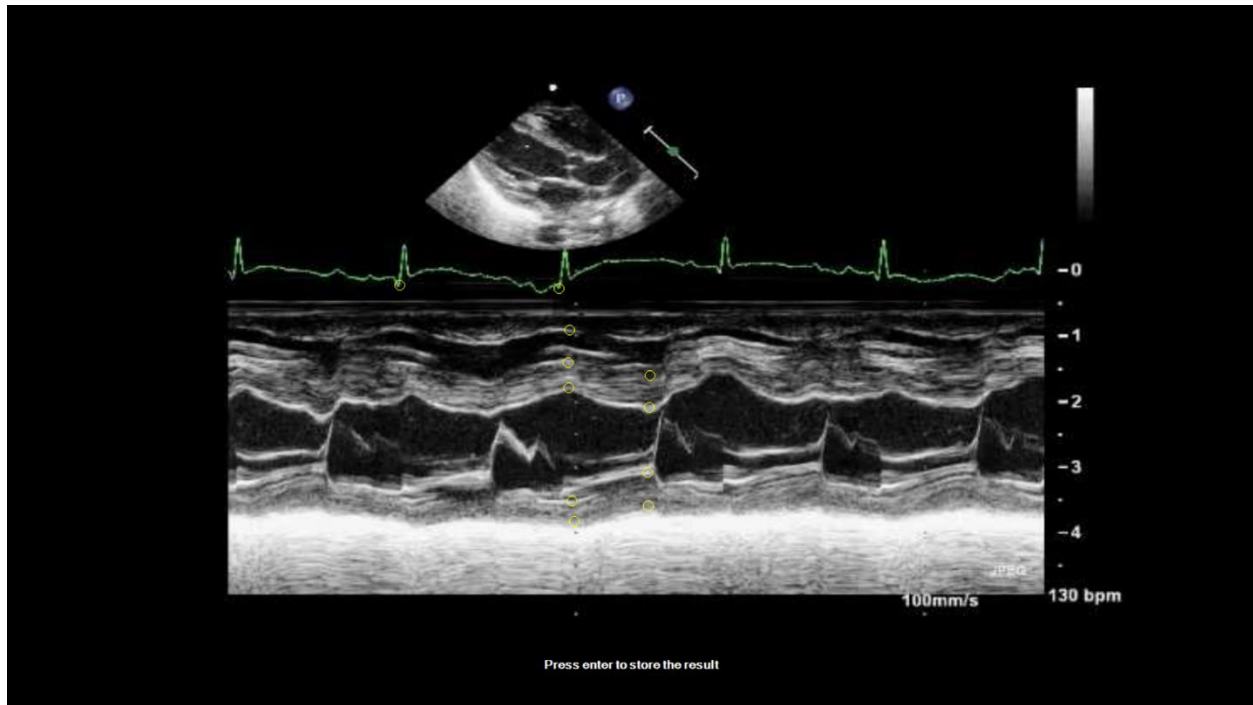
Example: selection of different indices for measurement



- For M-mode of left ventricle, SF, EF is the default selection.
- VCFc and/or WS calculation can also be added.

Echo Simulator Manual

Example: performing measurement in M-mode



- To start performing the measurement, follow the instruction at the bottom of screen.
- It is advisable to use a mouse when performing analysis.
- In this example, LV M-mode measurement is shown.
- The instruction walks you through the traditional style of measurement by starting from endocardium of RV free wall.
- Use “B” key to go one step back. This function is useful when error in placement of marker is made.
- After completing the measurement, hitting “enter” will open the analysis report.

Echo Simulator Manual

Example: report after completion of measurements

HELP KEYS
[B]: GO BACK PER STEP
[C]: GO TO ANALYSIS MENU
[<=>]: CHOOSE FRAME
[SPACE BAR]: GO BACK TO MAIN PROGRAM

Echocardiographic Report

Create Excel Print/Save Report Clear Report

Patient Information
Name : Baby Girl Weight (kg) : 3.595
ID : 001 Age (days) : 1
Gestation (weeks) : -

M-mode of Left Ventricle Measurements

	LAX	SAX		LAX	SAX
Heart Rate	138	-	bpm	LVPWd	0.26 - cm
LVIDd	1.73	-	cm	LVPWt	0.38 - cm
LVIDs	1.17	-	cm	LVPWT	32.3 - %
LVSF	32.1	-	%	IVSd	0.41 - cm
LVEF	68.8	-	%	IVSs	0.59 - cm
RVIDd	0.47	-	cm	IVST	45.5 - %
EDV (Tach)	0.8	-	ml/kg	VCFc	- - circ/s
LVSV	0.5	-	ml/kg	WS	- - g/cm2

M-mode of Aorta and Left Atrium

	LAX	SAX	
AO	-	-	cm
LA	-	-	cm
LAAO	-	-	

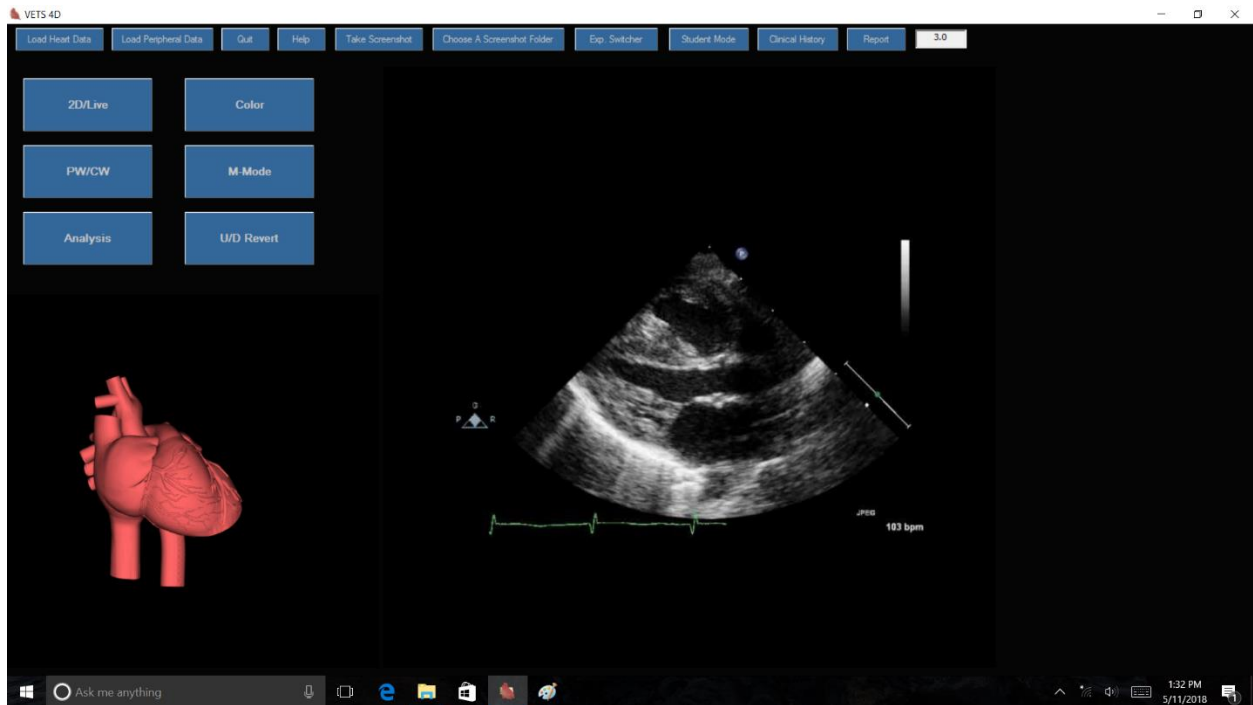
100mm/s 130 bpm

Press enter to create the report
Press space bar to go back for further analysis
Press C to go back to analysis menu

- Example of analysis report of LV M-mode measurements.
- This report can be printed or saved. In addition, you have the option to export the measurements into an excel file.
- Closing the report box and pressing “C” key will take you back to Analysis Menu.
- Space bar will take you back to the main menu.

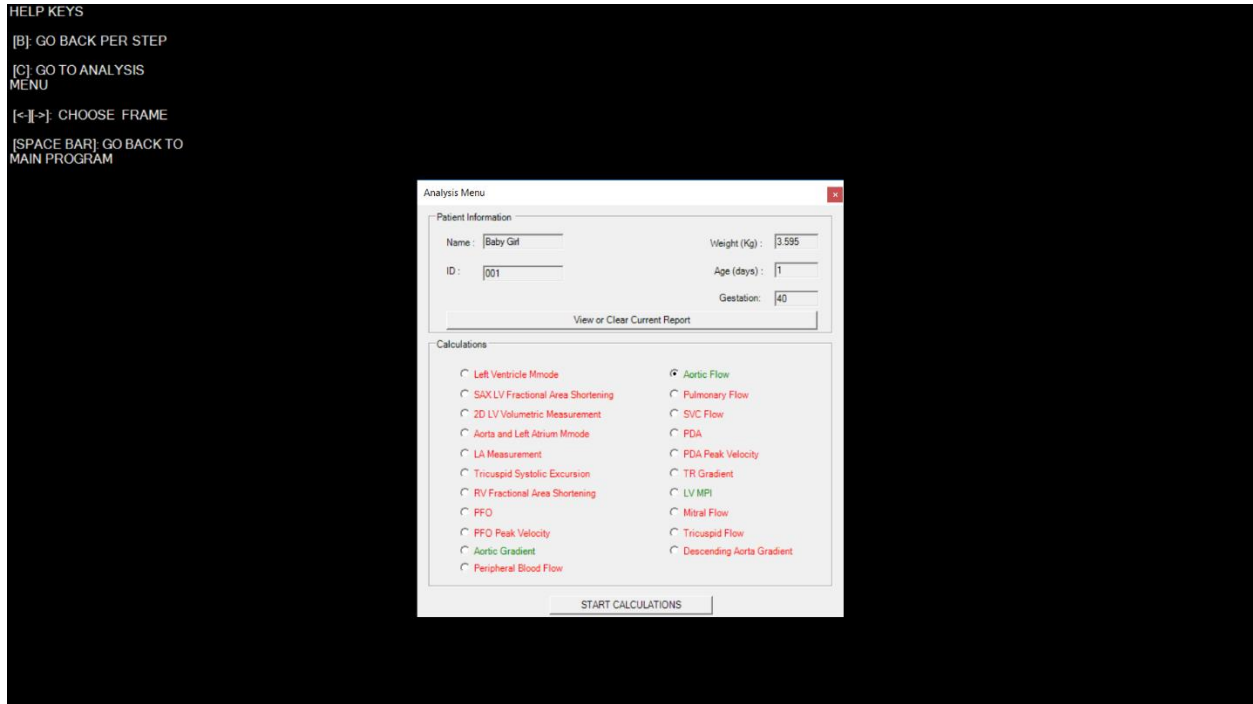
Echo Simulator Manual

Example: flow measurement

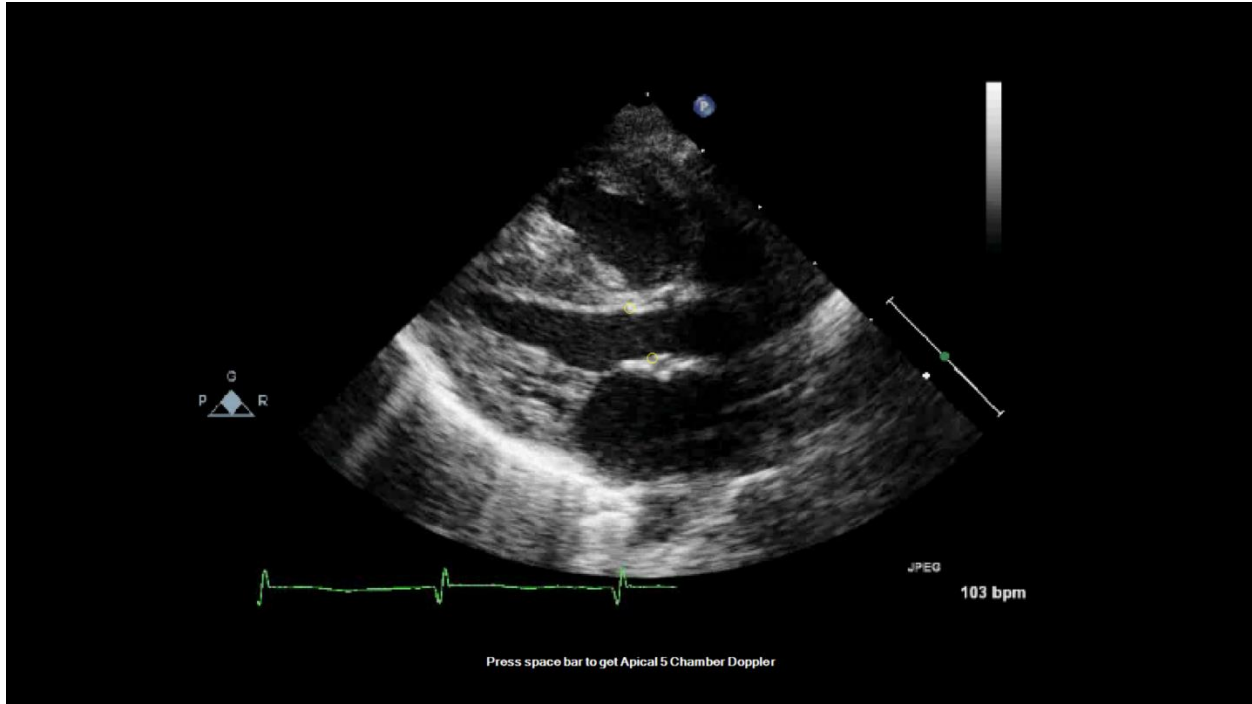


- Example of aortic flow (LVO) measurement.
- You can start by measuring the aortic diameter (as in this example) or flow Doppler.
- After obtaining LAX view and with the hint “Parasternal LAX detected” in display, touch the “2D” on the screen to initiate the process of measuring aortic diameter.

Echo Simulator Manual



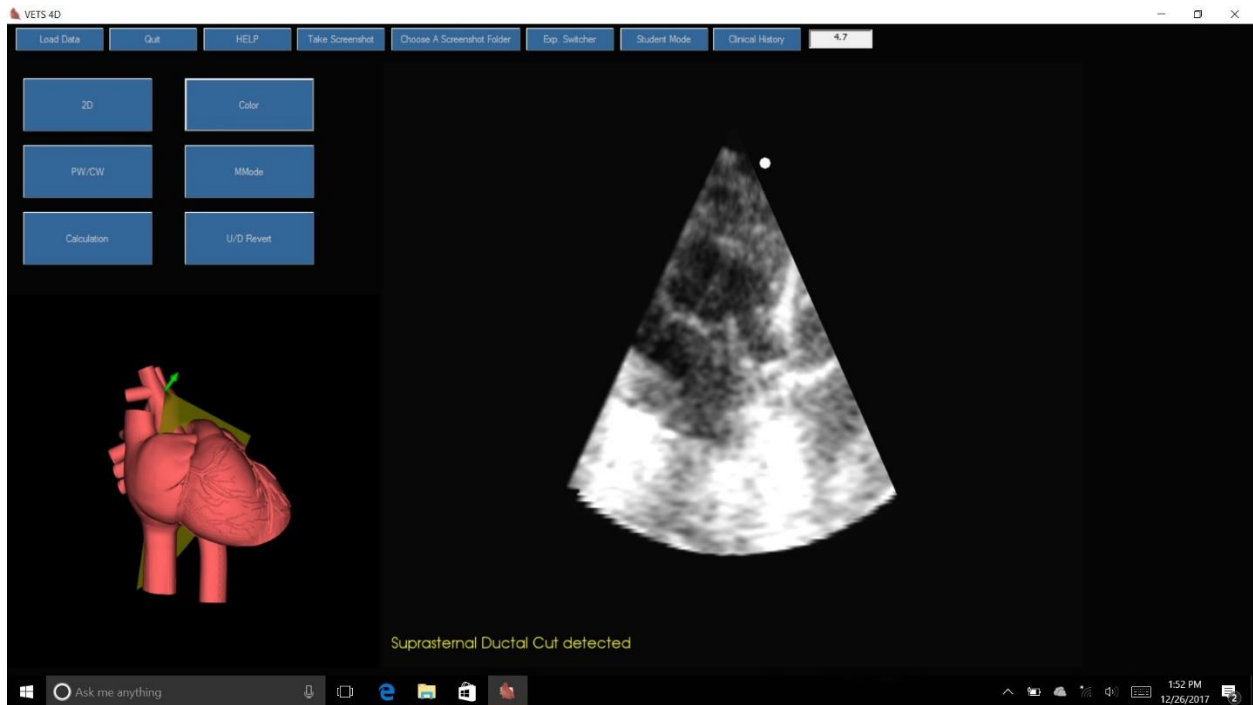
- Press “Analysis” on the screen.
- Select “Aortic Flow”.



- Measure the aortic diameter.
- Press space bar to go to live mode and then obtain apical 5-chamber view to measure flow velocity and complete the calculation of the aortic flow (not shown).

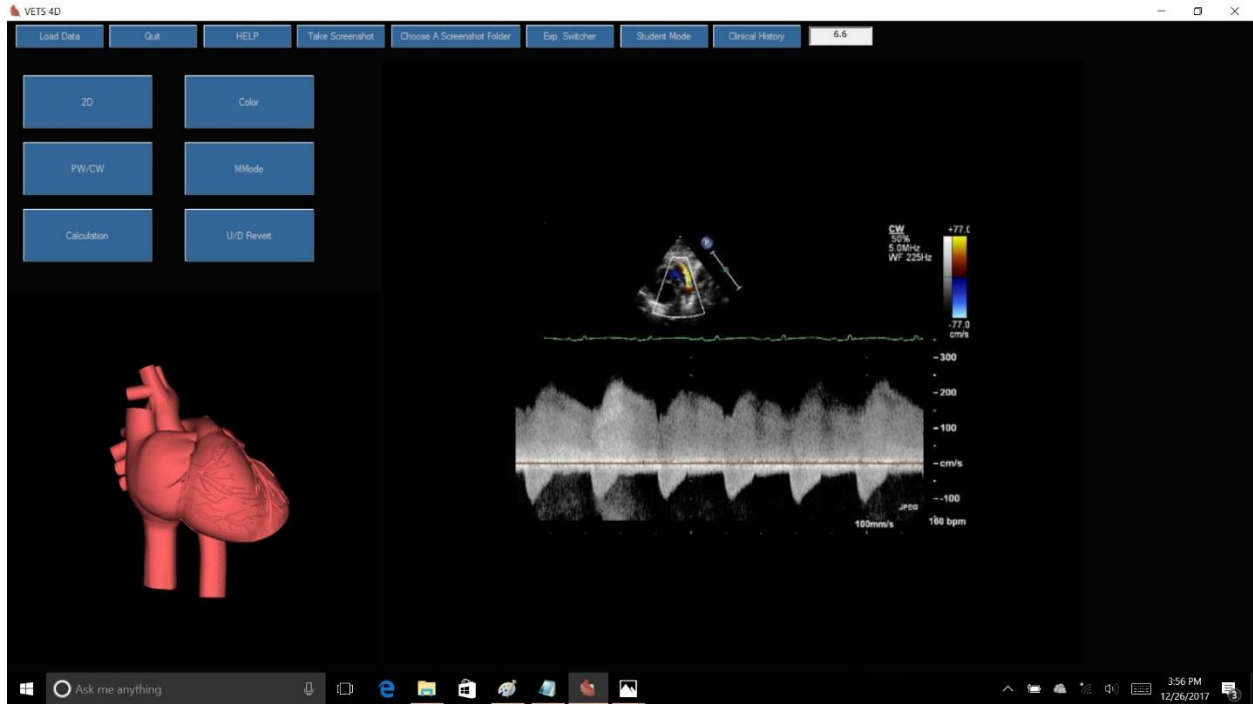
Echo Simulator Manual

Example: suprasternal ductal cut in 2D



- An example of suprasternal ductal cut in 2D view.
- Note the message “Suprasternal Ductal Cut Detected” allowing access to color or spectral Doppler.
- Below, CW Doppler of the PDA is shown.

Echo Simulator Manual



Echo Simulator Manual

Example: suprasternal ductal cut in color



- Example of suprasternal ductal cut in color mode.
- Note that color, spectral and M-mode are recorded loops and therefore not live. They are intended for measurement/analysis and viewing purposes.

Echo Simulator Manual

Student Mode

- This mode is used for acquiring images by the trainee for later review and evaluation by the trainer.
- First deactivate the “Hint” option using F6 key.
- Press “Student Mode” from the top bar.
- Select one of the 3 options: Beginner (12 cuts), Intermediate (16 cuts) and Advanced (26 cuts)
- Select a Folder to store the images and test results.
- Follow instruction on the top of the screen to obtain the required images (see pic below).
- After completing the process of obtaining all the required images for the selected level, the images are stored in the preselected folder.
- Please note that the software automatically rates the quality of the image on the image itself and transfers the scores (good=3, acceptable=2, poor=1, no image or wrong window=0). However, this feature is not fully developed yet.

