GE Healthcare
Vivid Club

2015

Application News

JB27202XX

GE imagination at work

4D Auto Aortic Valve Quantification (4D Auto AVQ)

on

Vivid™

E95

and associated

EchoPAC™ Software only

Content

NOTE

This hand out is a summary and is not comprehensive.

For more detailed information please refer to the user manual and/or reference manual.

Acquisition

Probe

Only images acquired with the 6VT-D probe can be analysed.

Imaging requirements

- Images must be taken from a mid-esophageal position
- The 4D image should be centred on the Aortic Valve
- 2-4 cm of the LVOT and Aortic root should be included in the sector
- Multi- Beat acquisition is preferred
- No stitching artefacts should be visible
- Min Framerate 12 fps
- A Zoomed image acquisition is recommended.

Store an image and recall it from the clipboard.

Starting the analysis

Open the Measurement package.
Open the folder for **Valves** and select **4D Auto AVQ**

Alignment

The system tries automatically to align the image, but manual correction might be necessary.

Frame

The system automatically selects a mid-systolic frame, check that the Aortic Valve is fully opened.
You may use the rotational knob for frame by frame selection.

Or the arrow keys on the alphanumeric keyboard, if you use an EchoPAC.

Slice images

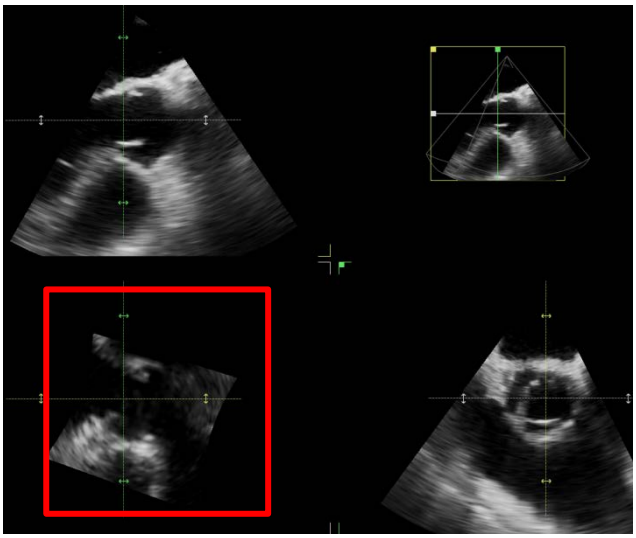
Make sure the image is aligned properly around the centre lines by following these rules:

- Lines (yellow/white) are centred in the middle of the cross section view (lower right)
- Lines (yellow/white) are centred and oriented in parallel to the walls of the Aorta, in the long axis views (left images)
- Grab the green line and adjusted to the position where the measurements at the end should be performed on

Note

You have to move the image and adjust it, since the lines (yellow/white) are fixed and cannot be moved.

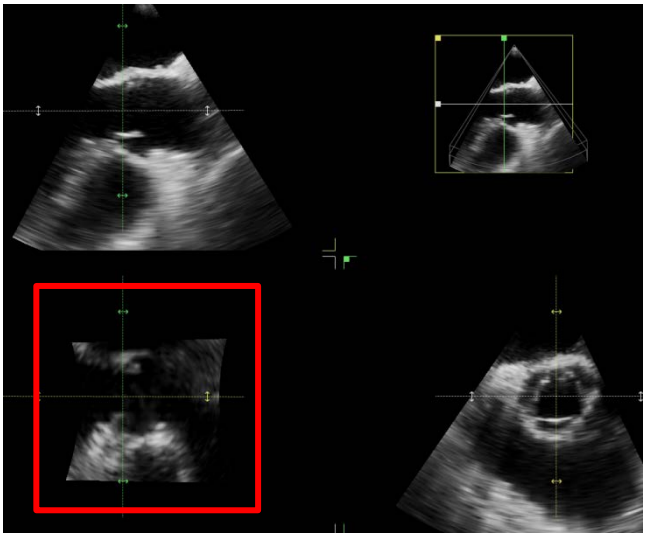
Before



Use the Trackball/Mouse to **Tilt** the dataset (applies to all slice images)

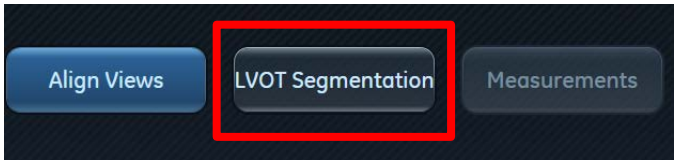
Or to **move** the dataset (only applies to cross section)

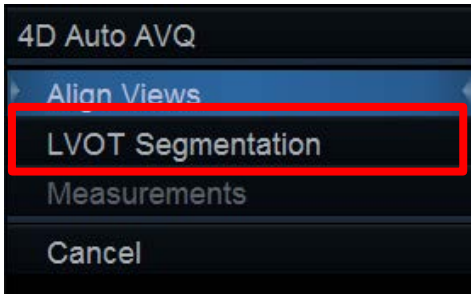
After



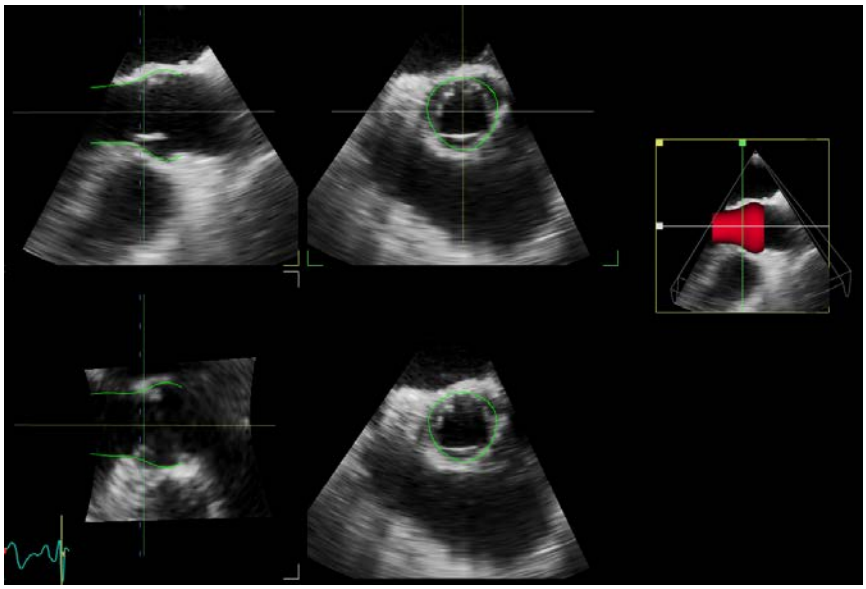
Segmentation

Use the **LVOT Segmentation** button on the touch screen or in the Measurement Menu to start the segmentation process.



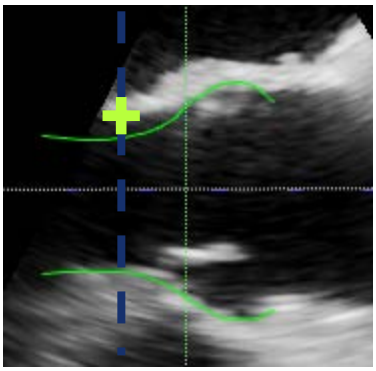


The system automatically tracks the contours of the LVOT, Aortic annulus and part of the Aorta.

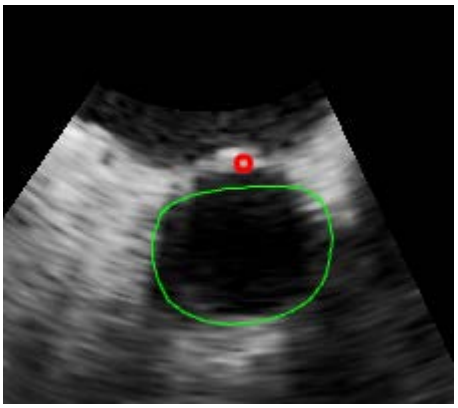


Dynamic image

Static images are shown from long axis views on the left part of the screen; a short axis view is displayed in the upper right section.
On the lower right corner of the screen, the system will display a dynamic image, corresponding to the cut plane obtained from the cursor position.
Example:Example
Cursor is placed in the upper left image



Corresponding dynamic image lower right



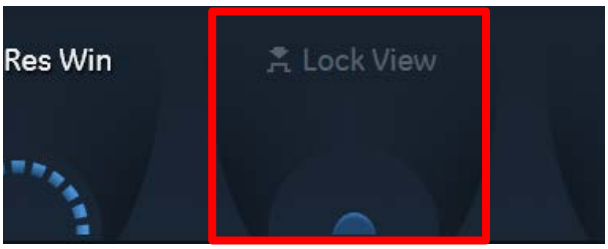
See the cursor position in the long axis view marked by the green cross.
In the dynamic image the system is showing a red circle indicating the position of the green cross in the other views.

When moving the cursor along the long axis views, the dynamic image will provide a short axis view.
When moving the cursor along the short axis view (upper right) the dynamic image will provide a long axis view.

This should help when adjusting the tracking and adding attractors (additional points to correct the tracking) to identify the proper position, since it can be seen in two perspectives.

Lock dynamic

The dynamic image can be locked if needed – the loop will stop.
Move the cursor to any slice image and get the associated second view in the lower right corner.
Press the rotational knob for Lock view.



Even when the dynamic view is locked, it is still possible to move the cursor over that view and add attractors in this image as well.

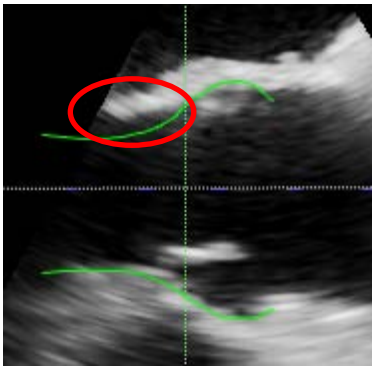
Adjust tracking

Check the tracking of the edges and adjust if necessary. It is not recommended to add too many changes, it is always better to start a new analysis from the beginning

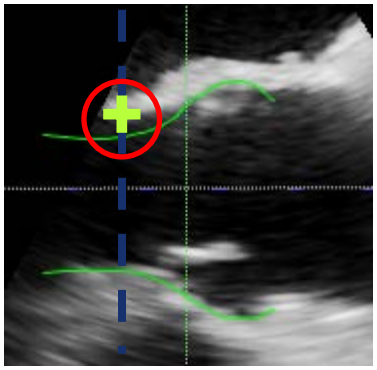
Long axis

First check the long axis views
Add attractors by clicking once on the correct position (no drag and drop).

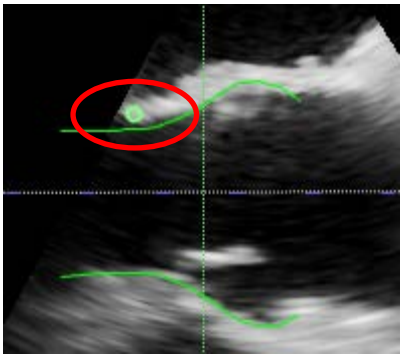
Automatic Tracking



Add attractor

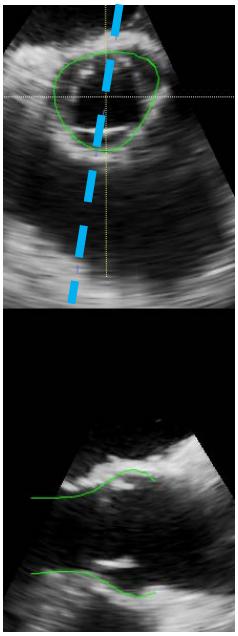


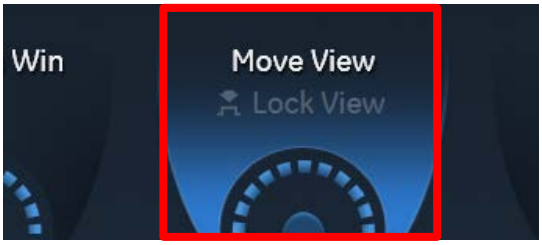
optimised Tracking

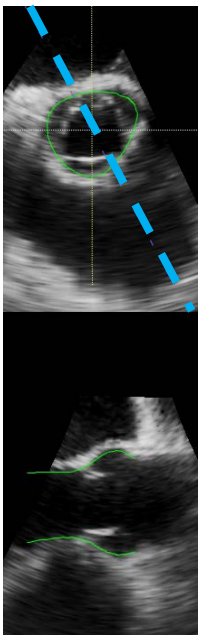


Short Axis

Move the cursor to the short axis view and lock the dynamic image.
By using the rotational knob to Move Views, the system will circle around this position.







Add attractors where needed.

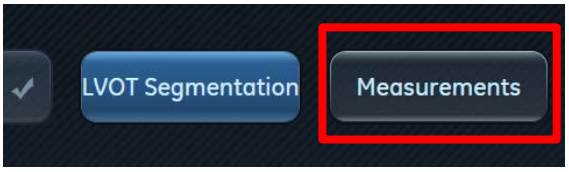
Note

Tracking at the MV leaflet might not be perfect, due to fast movements; this is inherent to the algorithm.

Measurements

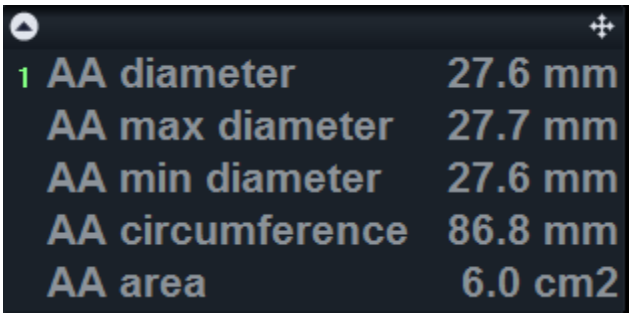
After the check of the tracking is done, press the Measurement button to get the results.

Touch Screen or Measure Menu



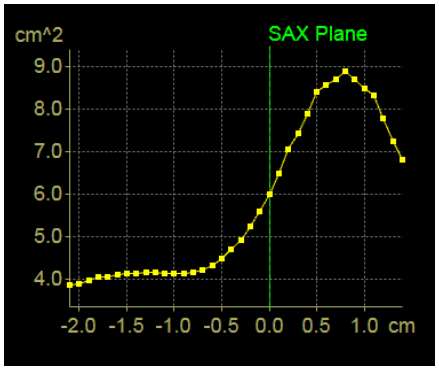
Results

Available parameters are:
AA diameter = Diameter derived from circumference
AA maximum Diameter = longest axis of ellipse fitted to the AV annulus
AA minimum Diameter = shortest axis of ellipse fitted to AV annulus
AA circumference
AA area



Graph

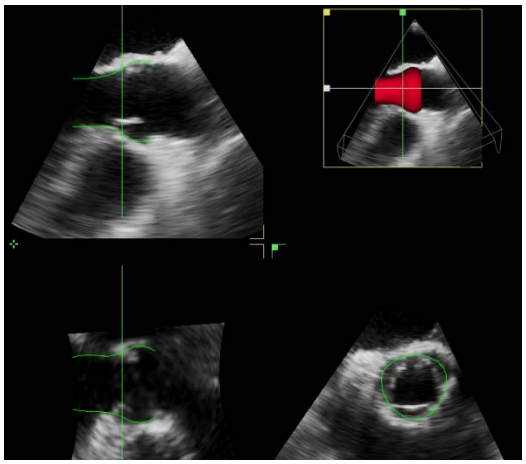
The graph is showing the area over the entire lenght of the Beutel model, starting left from LVOT moving towards Aorta.
The green line on the graph indicates the position of the green line adjusted during the alignment phase to the Aortic Ring. The results are measured in this position of the aortic model.



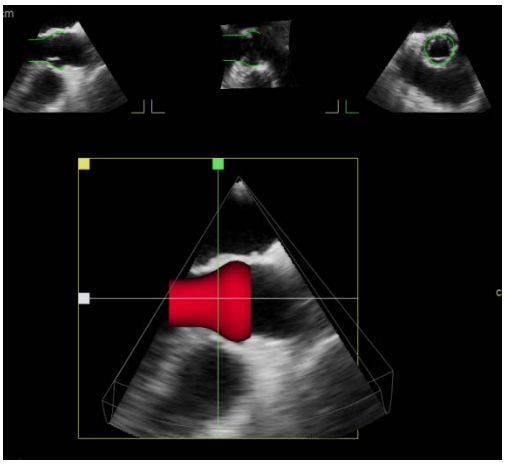
Layout

By pressing the **Layout** button, the size of the Beutel can be increased.

Default

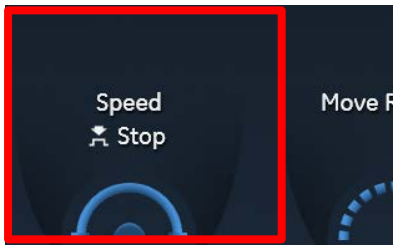


Increased Beutel size

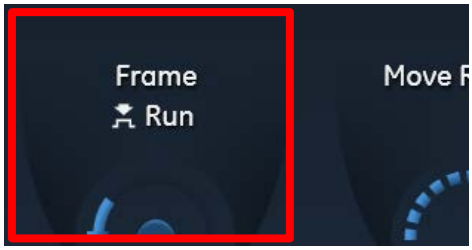


Measurement frame

To identify the measurement frame
Stop the image, by pressing on the rotation knob

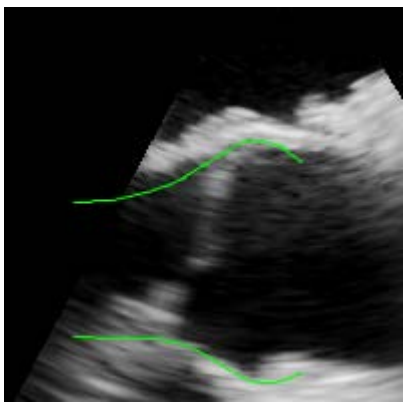


Move Frame by Frame

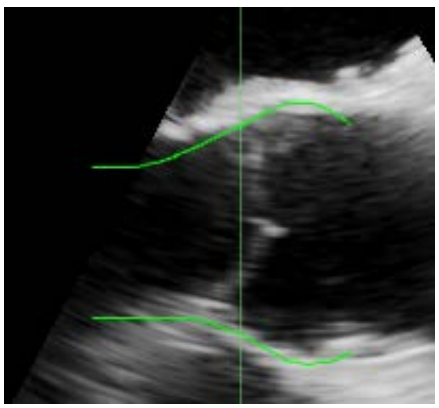


While looking on the images along the heart cycle a green line will fade in and out.
Select the frame where the green line is clearly visible.

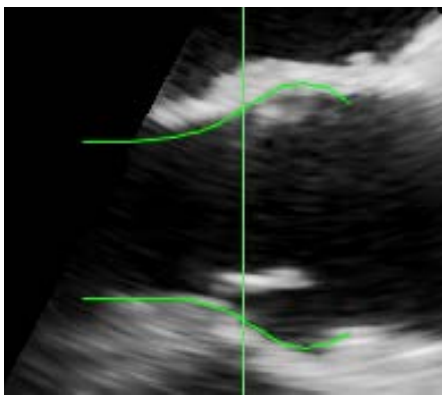
No marker



thin marker

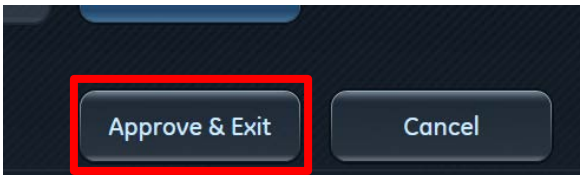


thicker marker



Approve and Exit

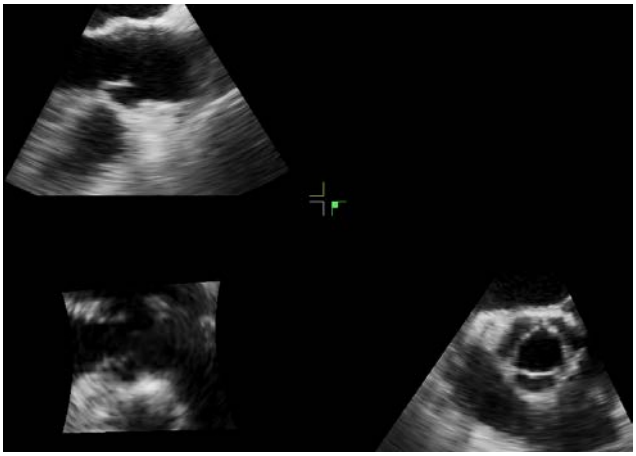
To store the measurements to the worksheet select **Approve & Exit**.



If no measurements should be stored, select **Cancel**.

Other measurements

After finishing the Analysis, the system will display the images in the previous orientation (used for the measurements)



Further manual measurements can now be performed, using the regular measurement menu.