The 2D Auto EF measurement

EF=11%

4CH
EF	11 %
CO	2.8 l/min
ESV	310 ml
EDV	351 ml
SV	40 ml
Ls	9.6 cm
Ld	10.2 cm
HR	70.3 bpm

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NOTE
This hand out is additional training material.
For more information please refer to the user manual and/or reference manual.

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Configuration

General

These set-ups only needs to be done once on the scanner.

Set-up of the Scanner

Configuration

Press Config (F2).
Select the **Imaging** button on the lower part of the screen.
Then choose the tab for Global settings.
There are two possibilities to set up time frames:
Time before / after each heart cycle.
Change the default setting and enter 100 for both (before and after).
Press Config (F2) again to exit the configuration page (settings are automatically stored).

What is it doing

Usually the system stores a cineloop from beginning of one R-wave to beginning of another R-wave. With this new set-up the system takes additionally 100 ms before and after the normal triggering of the loop. This is to make sure that all frames within a complete heart cycle are analysed.

What is it not doing

It's not affecting the review of the loop. The loop will run smooth when reviewing raw data.

Configure the auto processing

What is it doing

While doing any AFI or Auto EF you need to set three points in order to get the region of interest (ROI) /endocardial border. After setting the three points the ROI appears and can be adjusted. After 4 seconds where no cursor movement is done the system then starts automatically the analysis process. The delay before the auto process starts can be configured or turned off.
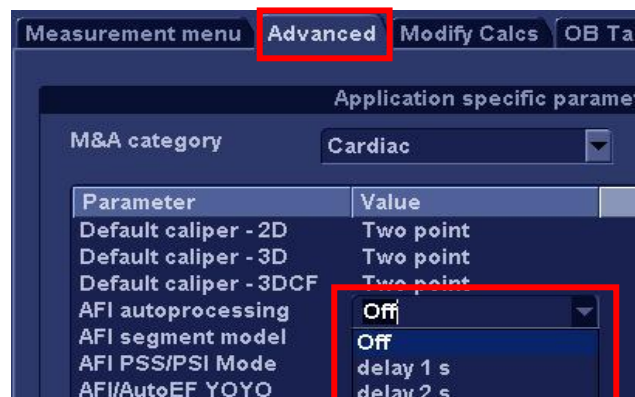
Configuration

To adjust the behaviour of the system at this point please enter the **config**.
Select the **Meas/Text** menu
From the menu select now the **Advanced** tab.
Search for **AFI auto processing**, by default this is set up to 4 second.
Click on the time and select the option from the list, which fits best.

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Off: This means the system will not start automatically – user has to press the process button. This gives the user as much time, as needed to review the contours.
1-4 seconds: After the ROI appears the system waits x sec without any cursor movement before starting the analysis of the loop.

2D requirements

Frame rate should be between 37 – 80 fps
IQ needs to be good enough to identify the endocardial border throughout the cardiac cycle.
Sector size not too small, myocardium needs to be visible in the sector during the complete heart cycle.

Starting the data acquisition

Enter the patient data into the system before starting the analysis.
Acquire your data and store the images in the clipboard.
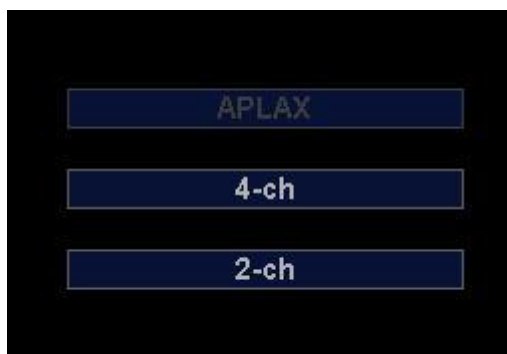
Starting the measurement

When finished with the data acquisition, recall the image you want to analyse.
Open **measurement** package
Scroll down and select the folder **Auto EF**.

In the menu select either **4CH** or **2CH** according to the running image.

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EF measurement can be done from

- Only on 4-Chamber (monoplane) or
- Only on 2- Chamber (monoplane) or
- On both 4-, and 2- Chamber in order to get biplane EF.

Three point definition

Set your three points according to the systems guidelines
4Chamber (basal septum – basal lateral wall – Apex)
2Chamber (basal inferior wall – basal anterior wall – Apex)
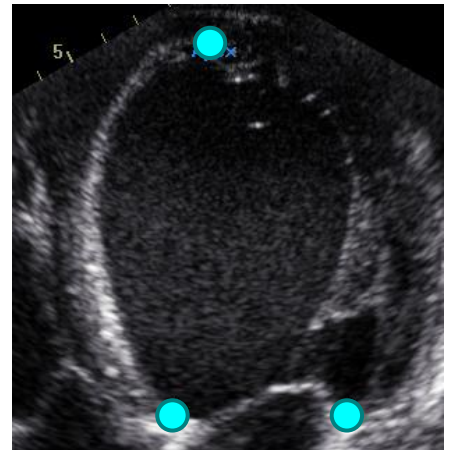
Adjustment of the endocardial border

In case the automatic endocardial border detection doesn't fit exactly to the user perception adjustments can be done either automatically or manually.

Automatic adjustment

To adjust the detection wall by wall; use the rotational knob for
Edge shift left or Edge shift right.

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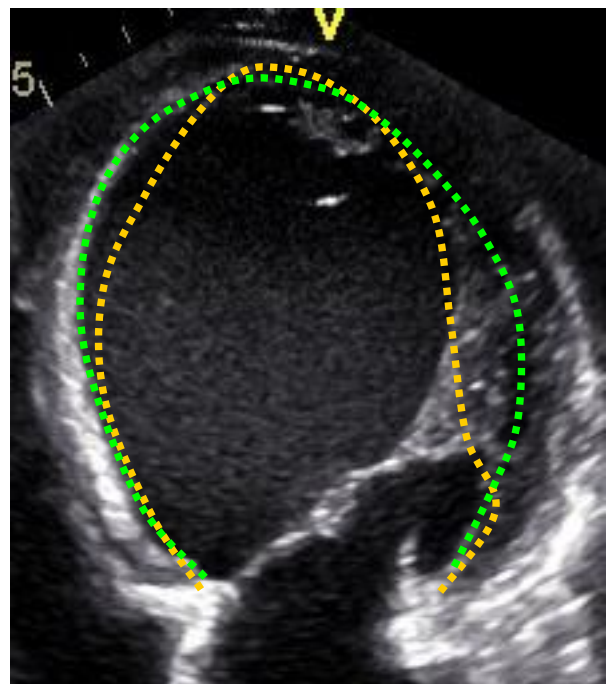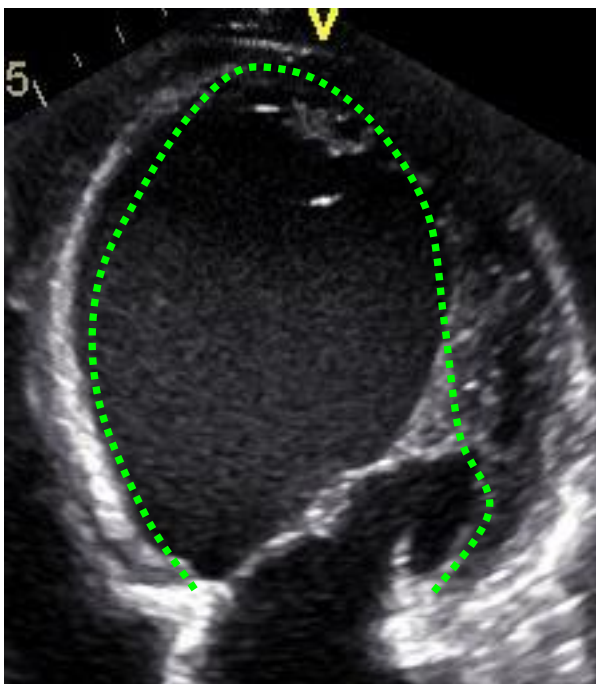
Manual adjustment

In order to adjust the borderline manually – move the cursor on the green line. The line will change to a blue line with dots inside. Click once on one of the dots and move it to the new position. Click once again in order to set the point at the new position.
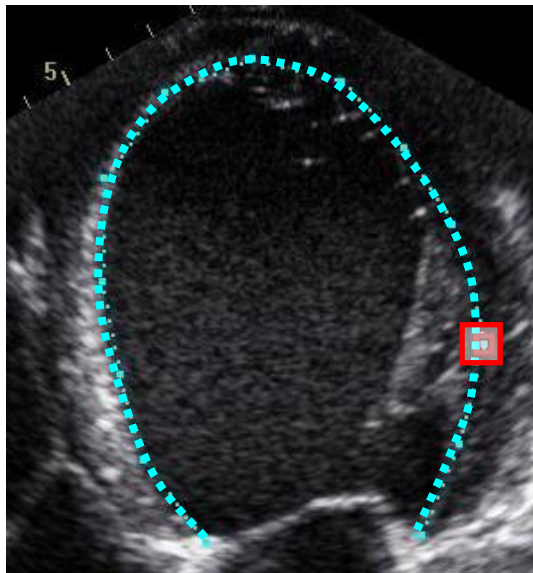
Processing the loop

Depending on your set up in the configuration the system:
- either the analysis starts automatically after x sec (if no cursor movement) or
- you need to press process in order to start the analysis.

The result

On the final screen you see the running loop with the endocardial border detection and EF.
On the right side two still frames from end-diastole and end-systole with the calculated volumes.

On this borderline in the cineloop the system gives a feedback on the tracking quality of this image.
If the line is green, the tracking quality was good
If there are red segments inside, this means in this area the tracking quality is not sufficient. The user has to check the results very carefully and if needed make some more adjustments.

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Good endocardial border tracking –
All segments got green validation
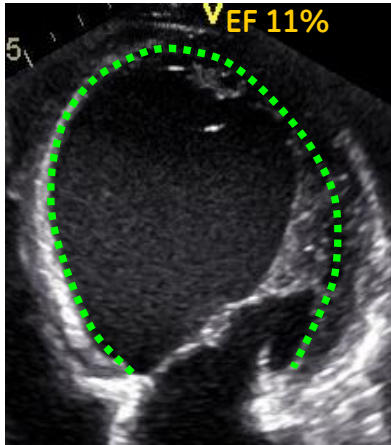
Bad tracking quality in apical-mid lateral wall
Sector is too small and endocard moves out of
the image throughout the heart cycle.
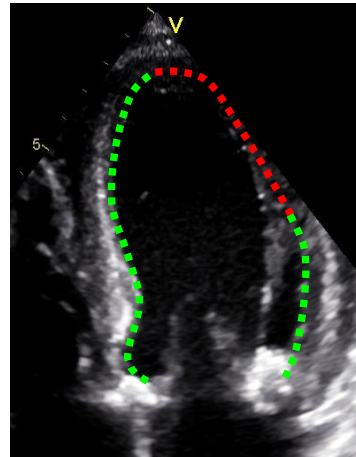
Final adjustments

Adjustments can be done directly in the two still frames from end-diastole and end- systole on the right half of the image.
Easily click on the borderline on one of the dots and move this to a new position.
Once the new endocardial border is set, the results will change automatically. As an indication of user interaction the volume and EF will get an *.

EF*=14%   **ESV*=301 ml**

Store the measurements

In order to store the results in the worksheet, press the approve bar.
The colour will change from red to green for approved measurements.

Approve

Approved

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Leaving the analysis

While leaving the analysis, system asks to store the loop? Press Yes in order to store your analysed image for later review. The image will be stored at the end of the image list.
To identify images with already processed Auto EF measurement the loop is indicated with a small EF in the upper right corner.
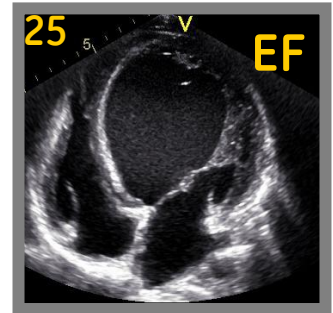
Recalling Auto EF process data

Select the Loop with the EF symbol and recall it onto the screen.
Open the measurement package and select auto EF. The system will run through the process and you will see immediately the result page.

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