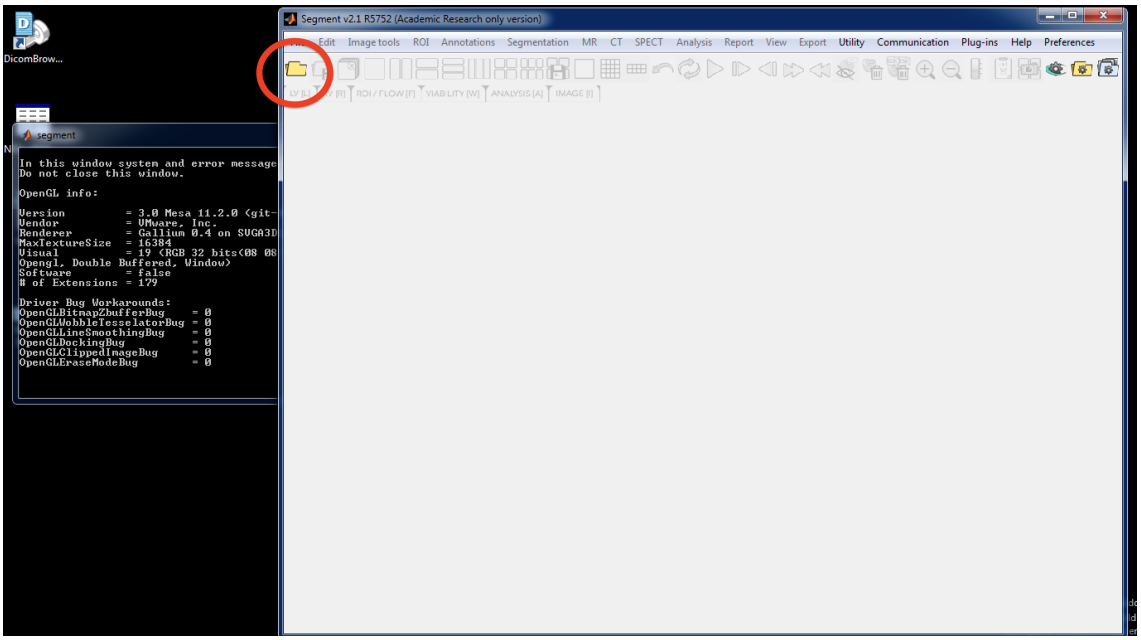
Segment Manual

July 5, 2017

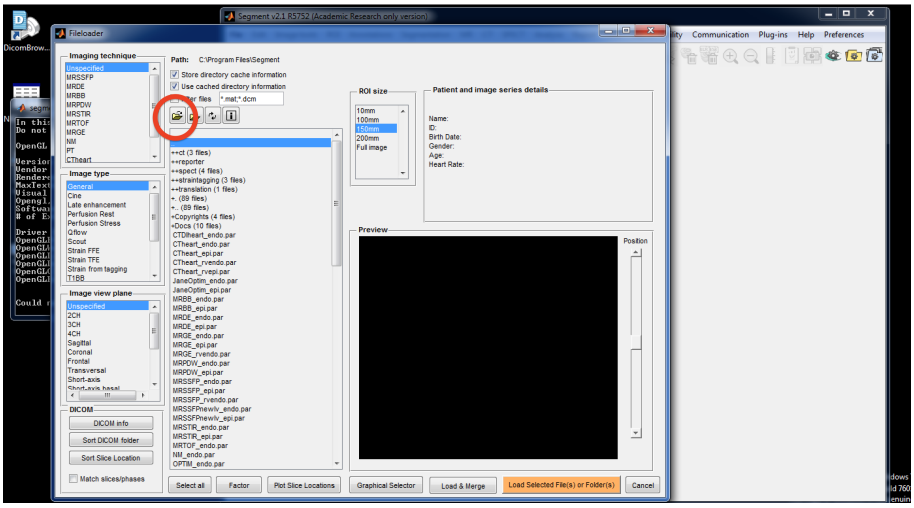
Step 1 – Open Segment

This manual is done with Segment version 2.1. When opened, the program should look like the image below. It is important to view the terminal window at all times, such that possible errors can be detected. Use the file icon marked below to open your DICOM images.

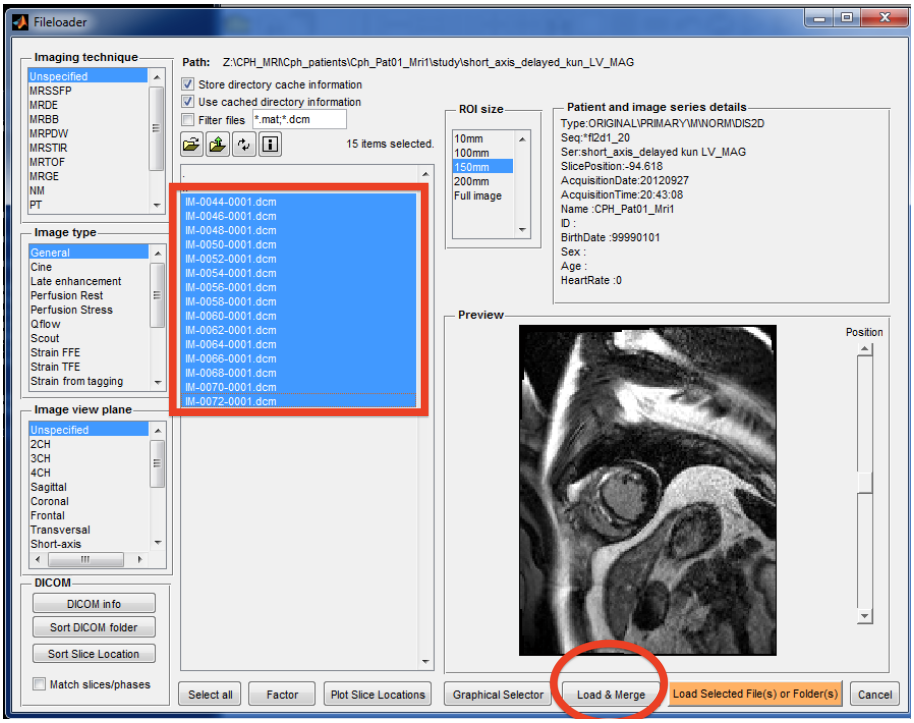


Step 2 – Choose Files

The fileloader window will now appear as shown below. Click on the marked icon to access your folders.

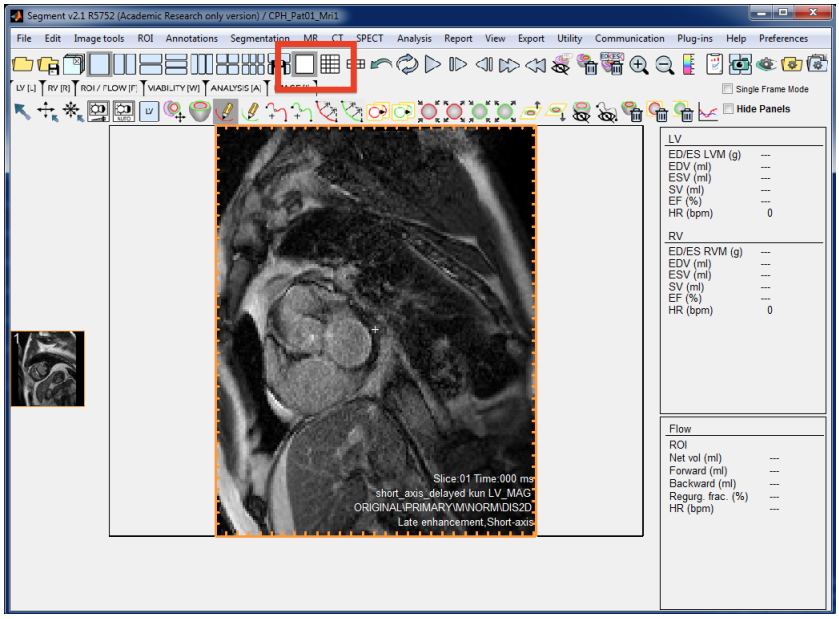


After you have chosen a folder, the images inside it will appear as shown below. Make sure that all of the marked images are correct, then click on Load & Merge.

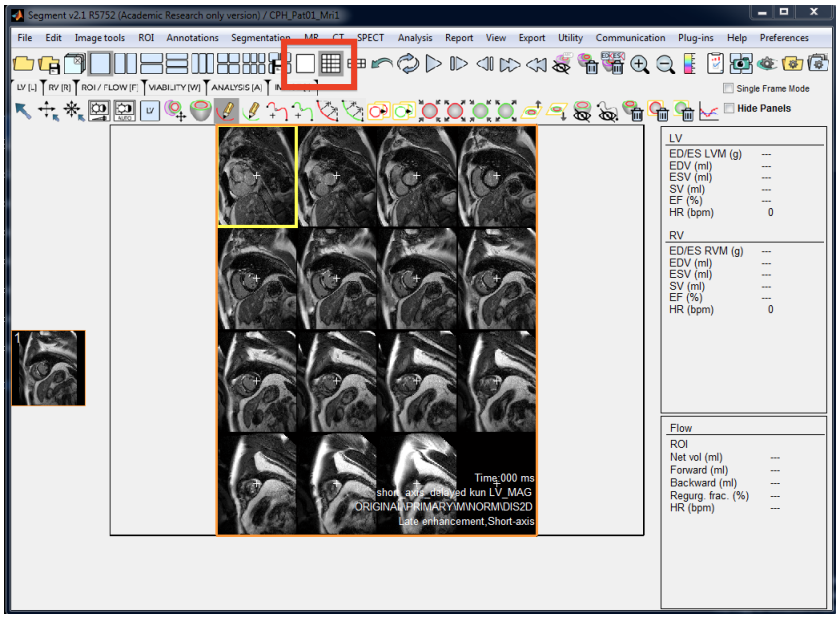


Step 3 – Switch Between Images

When loaded, Segment should look like the image below, viewing the first slice only.



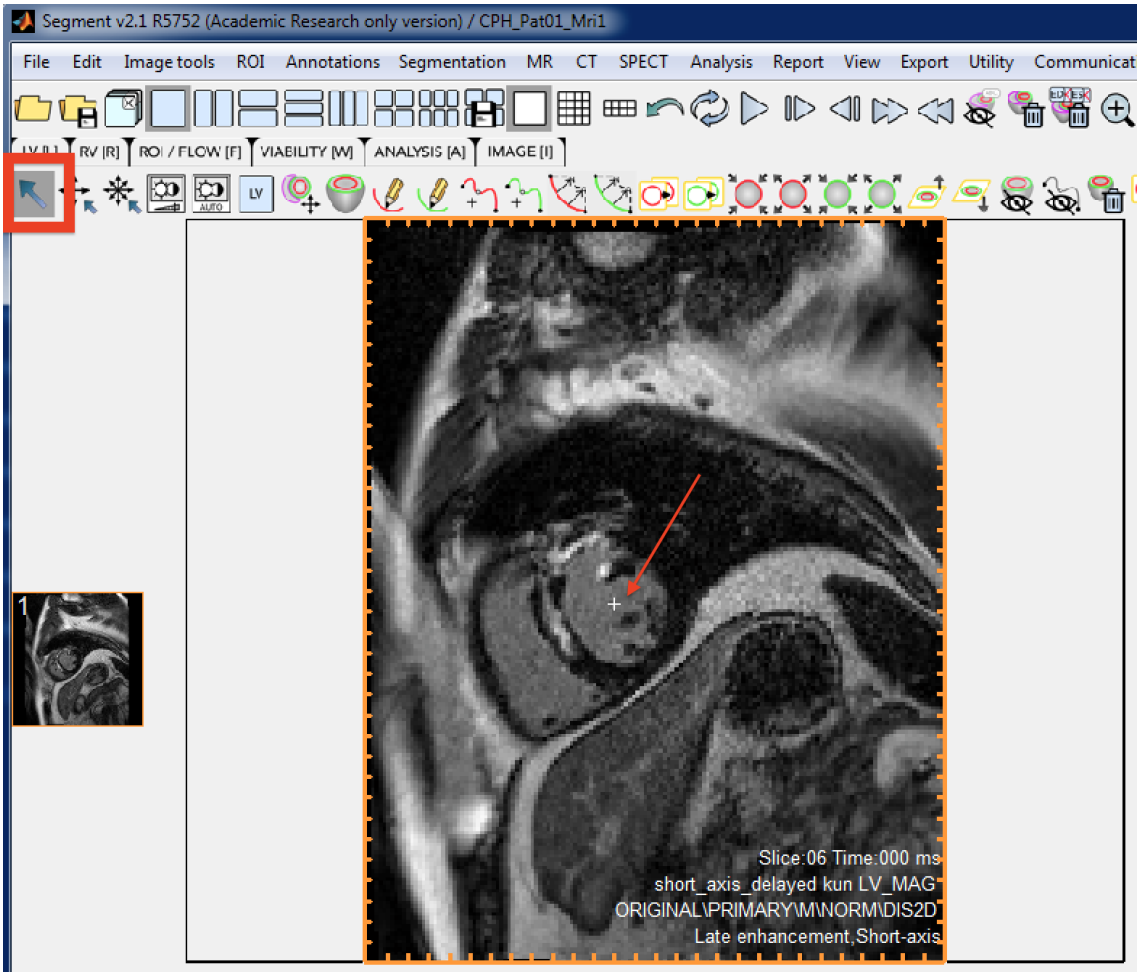
To view all of your loaded slices, click on the icon marked next to the chosen icon. You can now see all of you MRI images. Use these two icons to switch between viewing one and all images throughout the segmentation.



Step 4 – Mark LV Endo Center

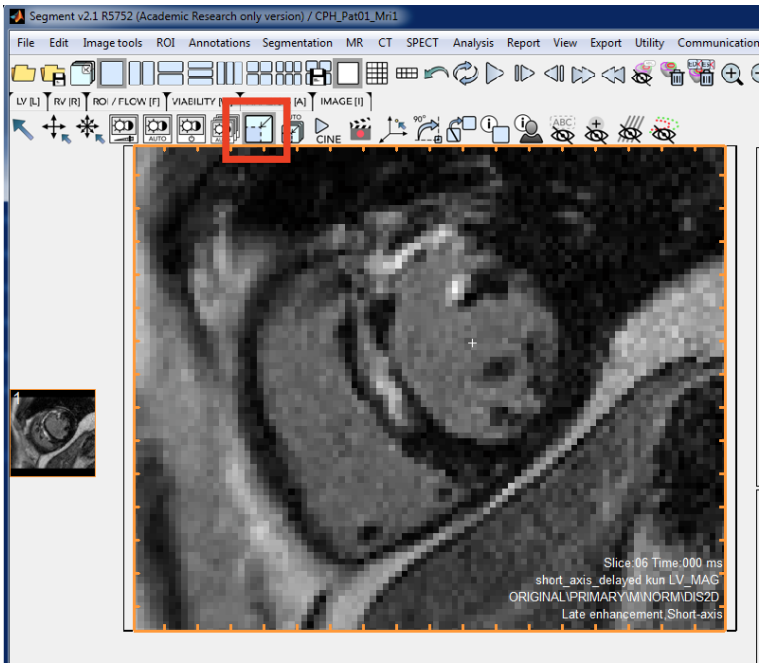
As seen in the image on the previous page, the right ventricle is not defined in the first slices. This is common, and the reason for starting the segmentation at a later slice. For this patient, we started the segmentation at slice number 5.

After deciding which slice you want to start segmenting, switch to a one slice view as shown below. Use the arrow icon to move the white cross to the middle of the LV Endo.

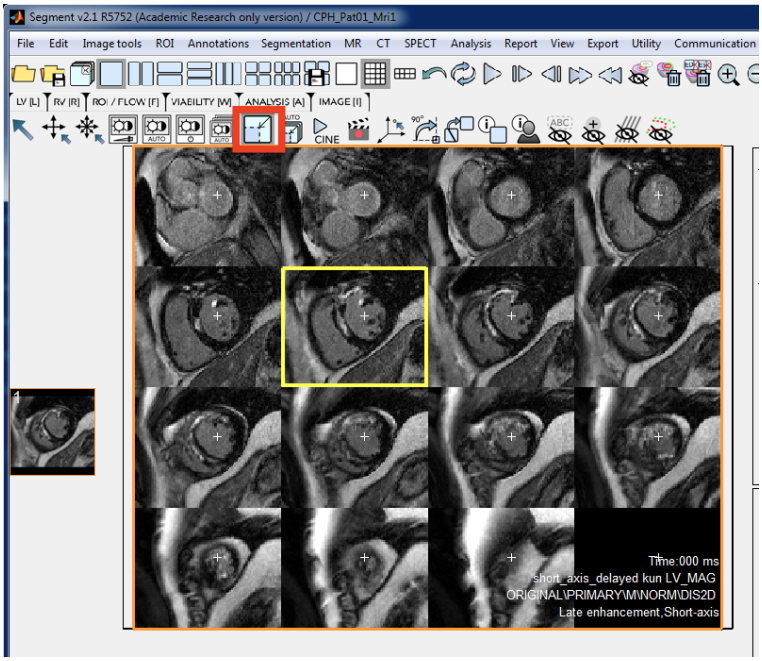


Step 5 – Crop slices

To make the segmentation easier, we always crop the slices. You can find the icon for manual cropping Under IMAGE[I], as viewed below.

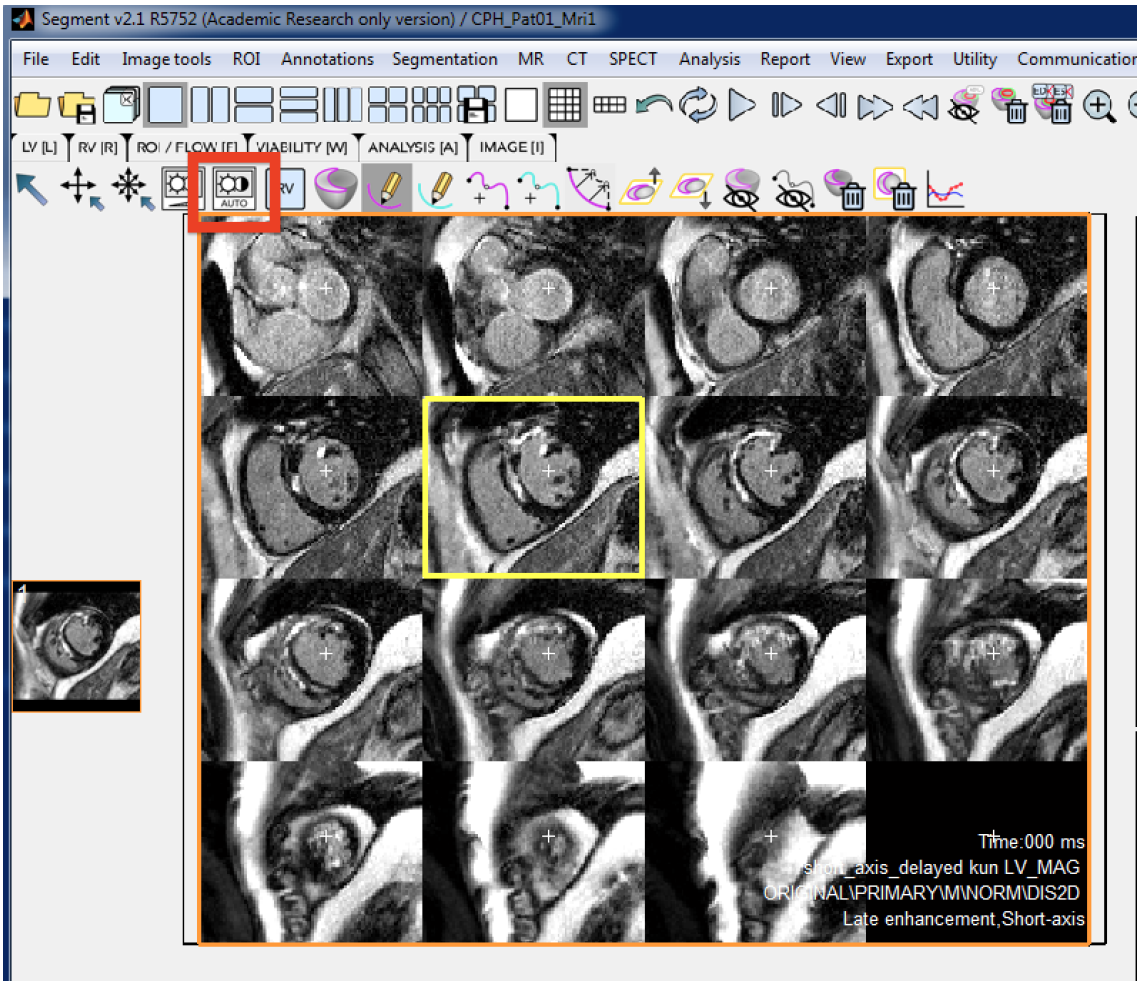


Segment automatically crops all the other slices as well.



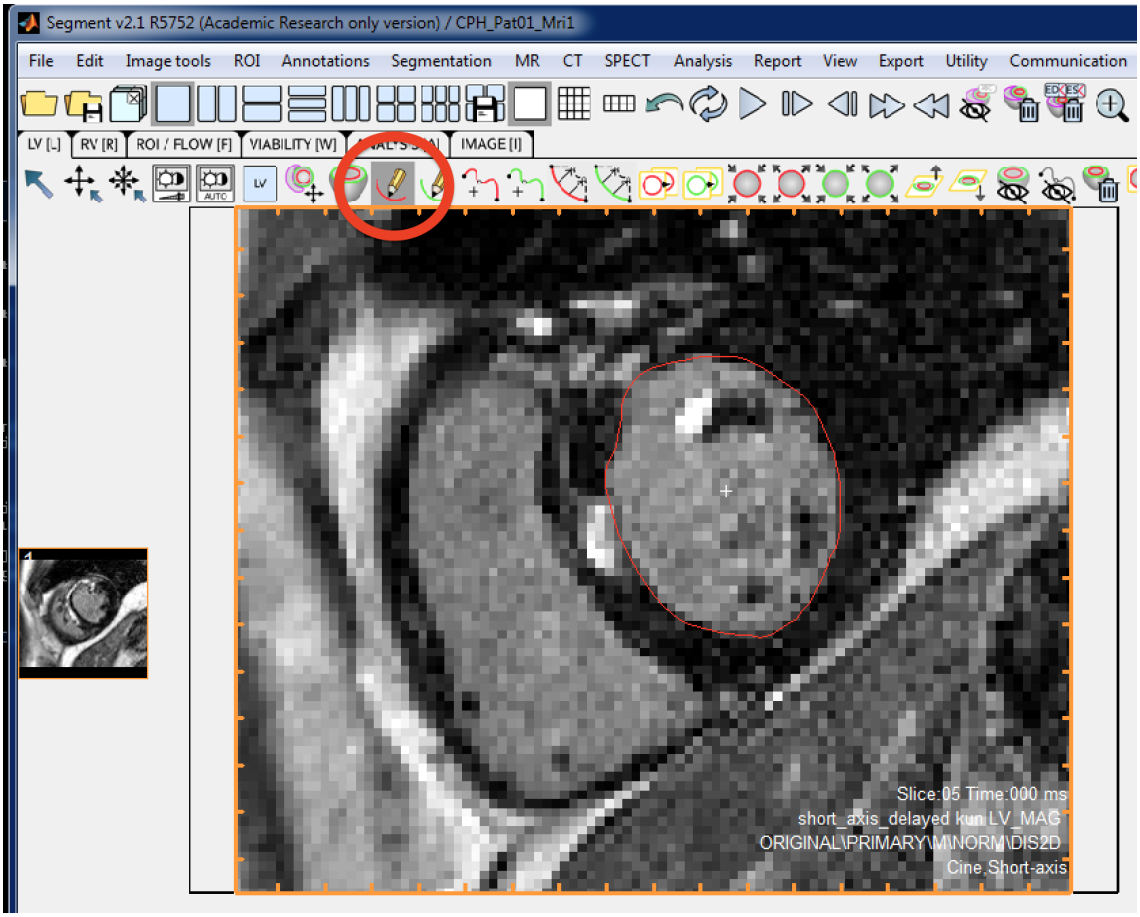
Step 6 – Adjust Contrast

The last part before beginning the segmentation is to adjust the contrast, such that it is easier to divide between different parts of the heart. The contrast icon is marked below. All images will be corrected automatically.



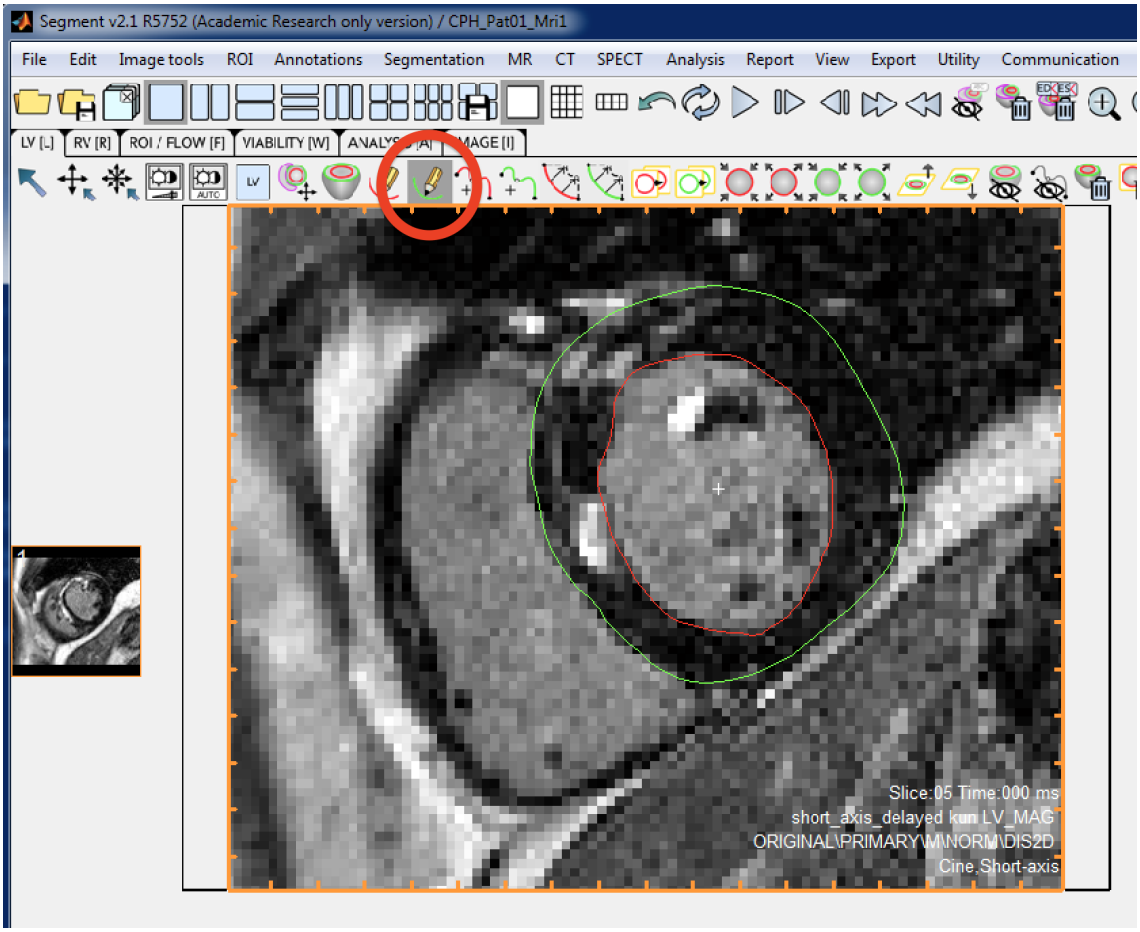
Step 7 – LV Endo Segmentation

The first part we segment at all slices is the LV endo (red pen). The icon to be used is marked below, and can be found under LV[L].



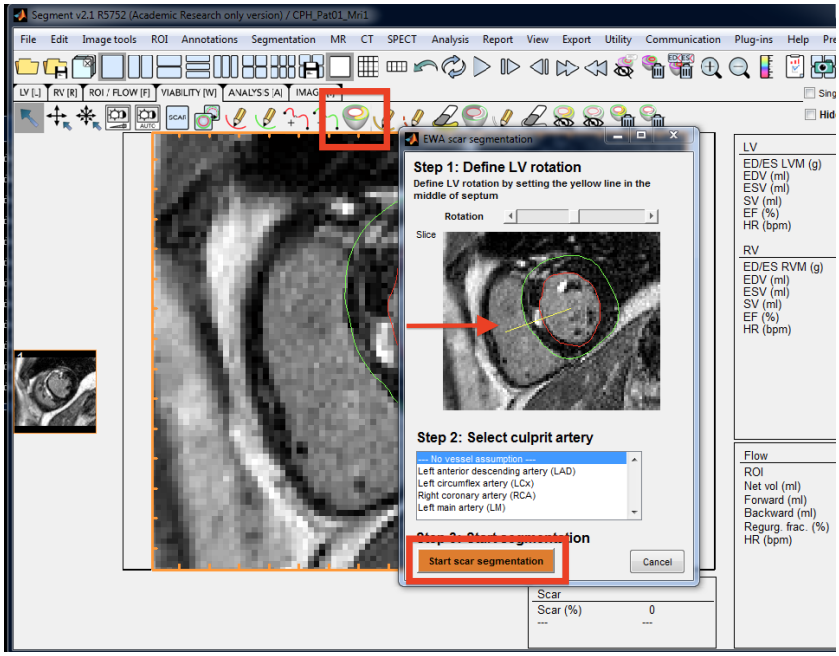
Step 8 – LV Epi Segmentation

In the same slice as in the previous step, we now segment the LV epi (green pen). The icon to be used is marked below, with an example of how the segmentation can look.

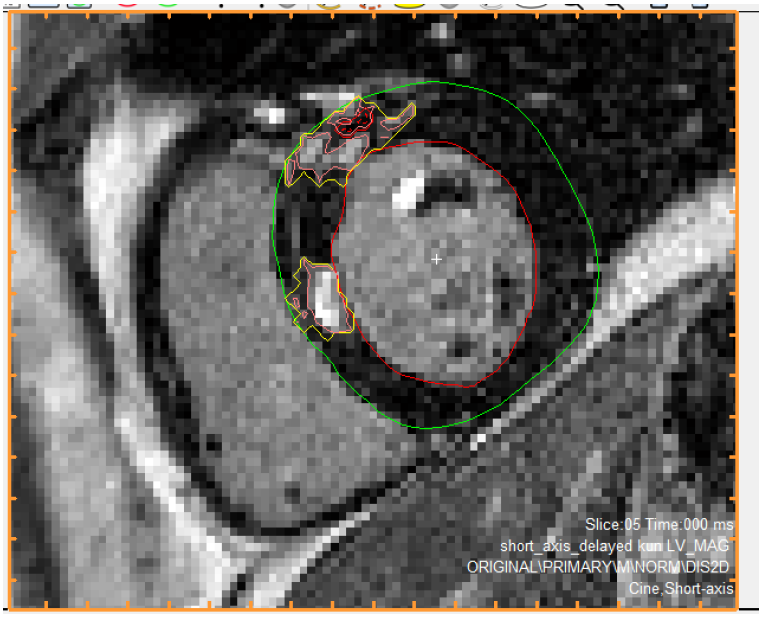


Step 9 – Scar Segmentation

In Segment, we only mark scar regions between the LV endo and epi. This can be done by clicking on the icon shown below under VIABILITY[W]. The scar segmentation window will appear, where you have to move the yellow line to the middle of the septum.

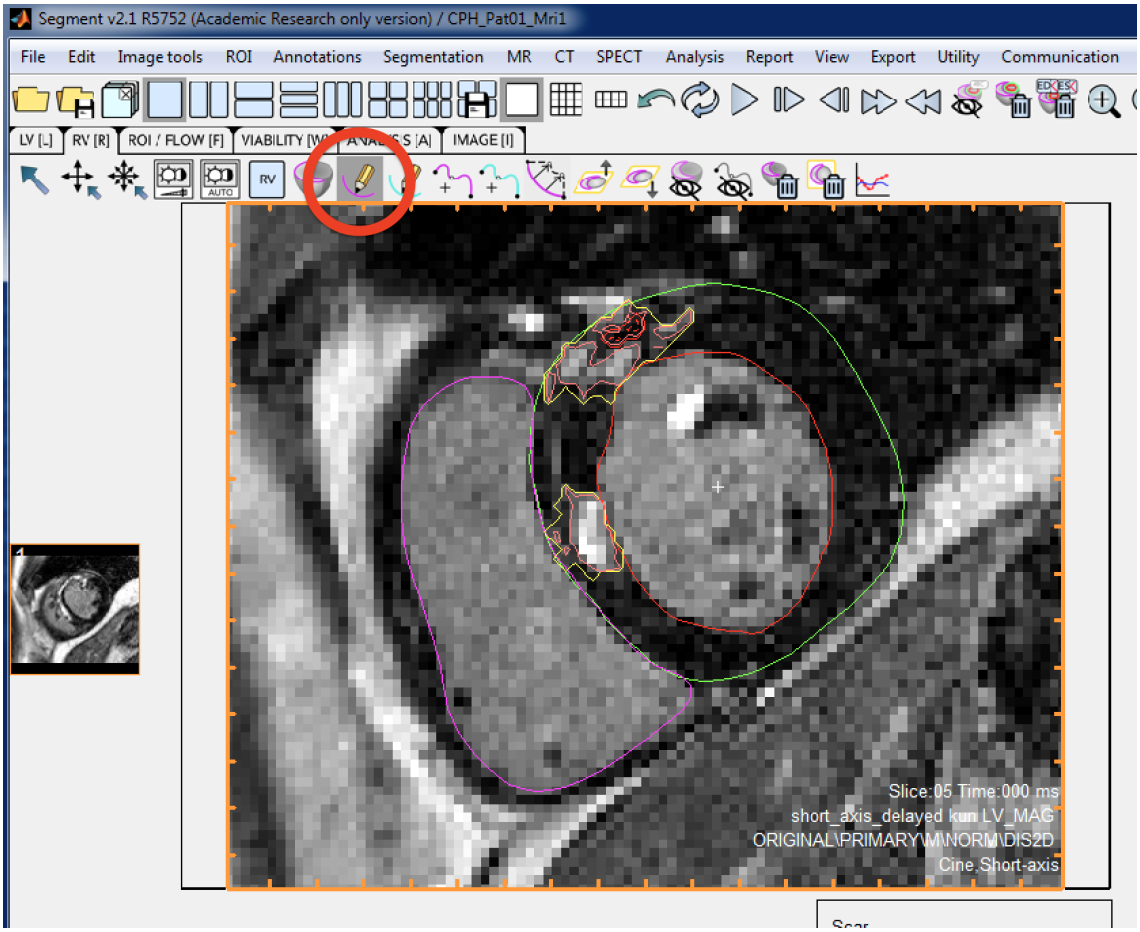


Finally, click on Start scar segmentation, and scar regions will be detected as shown below.



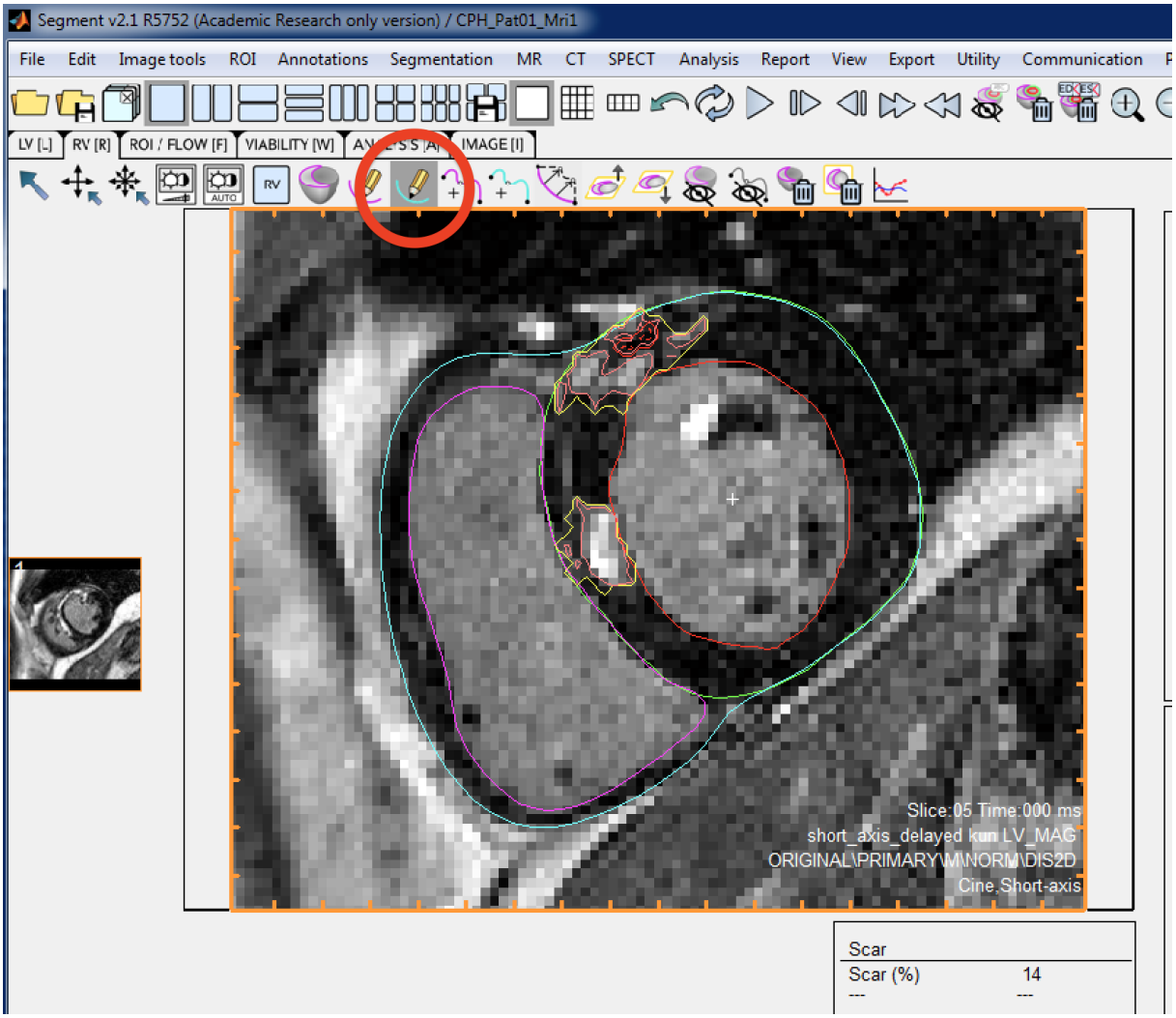
Step 10 – RV Endo Segmentation

In the same slice as in the previous steps, we now segment the RV endo (purple pen). The icon to be used can be found in RV[R] and is marked below.



Step 11 – RV Epi Segmentation

In the same slice as in the previous steps, we now segment the last part: RV epi (blue pen). The icon to be used is marked below, with an example of how the segmentation can look.



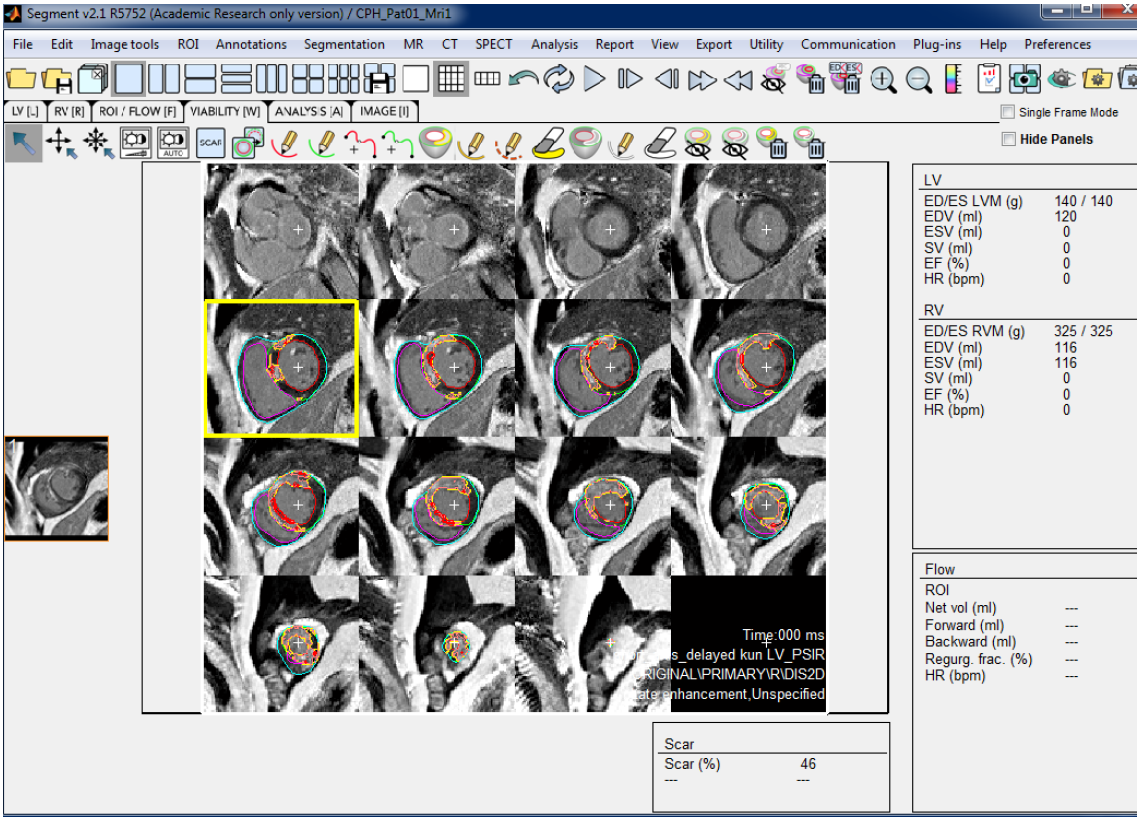
The segmentation for this slice is now done. It is important to remember that not all slices need to have scar regions.

Step 12 – Save Your Segmentation

It is recommended to save as often as possible. The first time you save the segmentation, it can be done under File → Save As. Later on it is sufficient to type Ctrl + S to save. If an error suddenly appears in the terminal window, it is a possibility that the program stops responding. However, if you currently saved your segmentation, you can restart the program and reopen the file. We recommend you to save after each slice segmentation.

Step 13 – Segment all Slices

Perform segmentation for the rest of the slices, until all of them are done. The result will look somewhat similar to the image below.



The total scar percentage is shown at the bottom of the program.

Step 19 – 3D Model

Under View → 3D Model, a visualization of the heart model can be viewed similar to the image below.