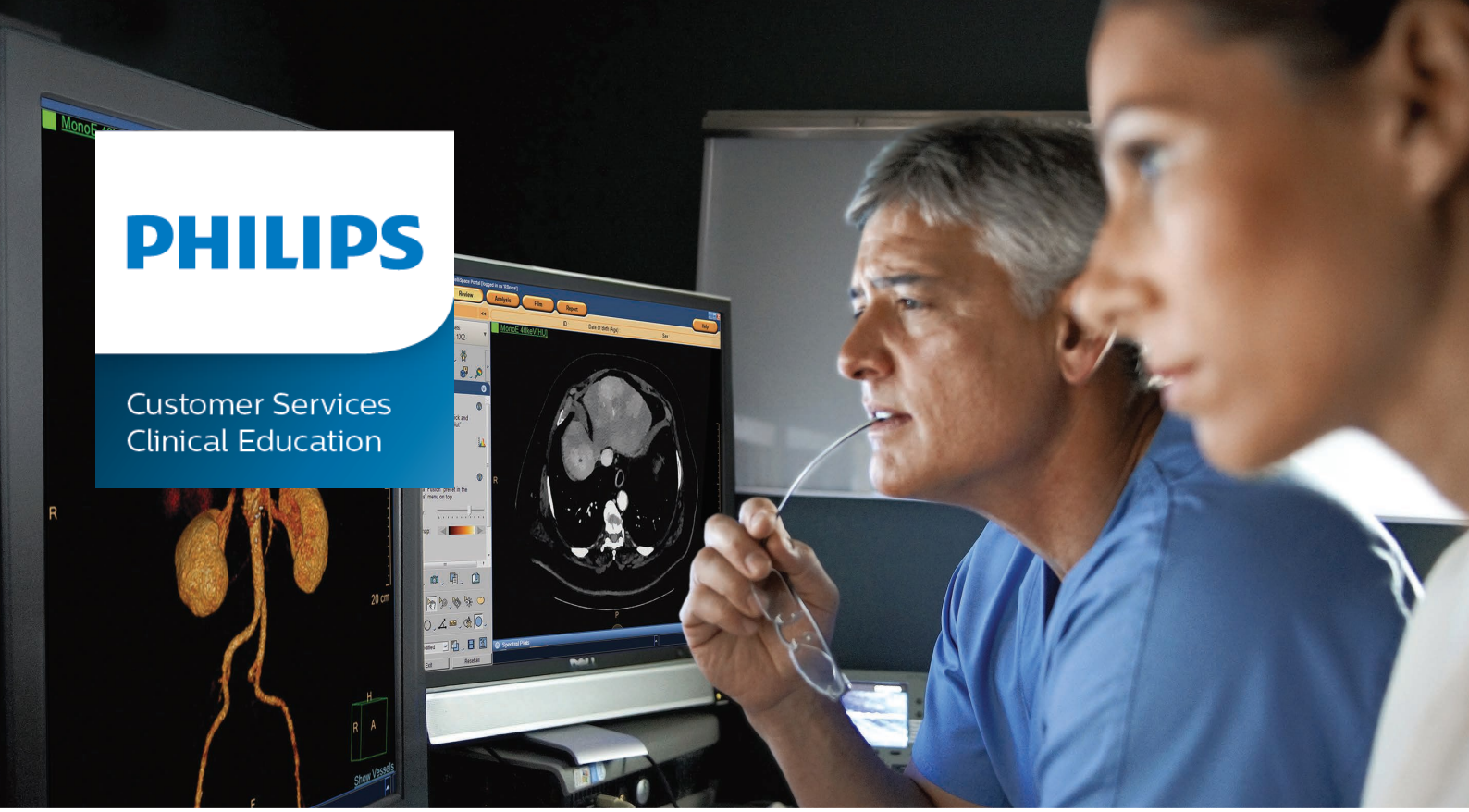


MR Cardiac Analysis Suite

Spatial Enhancement

IntelliSpace Portal

MR Applications

Quick Step Guides

Application

The Spatial Enhancement SA LV analysis package provides analysis and identification of spatial enhancement, based on time intensity signal changes. If segmentation from a Functional LV & RV analysis is available, automatic registration provides automatic contours. Spatial enhancement differences can be analyzed using different methods: FWHM, freehand threshold, reference segment, or reference area with adjustable standard deviation.

The results summary allows you to compare enhanced areas with non-enhanced areas. Guidance for this analysis package is provided in the task guidance panel.

Before you begin

The Spatial Enhancement SA LV package opens in the **Segment LV** stage displaying the LV Short Axis (SA) view.

If contours are available from a previously performed Functional LV & RV analysis, the contours are automatically loaded in the application. If multiple contours are available, they are displayed in a dialog box; select which contours to use for the analysis. The contours are registered and fitted to the loaded series.

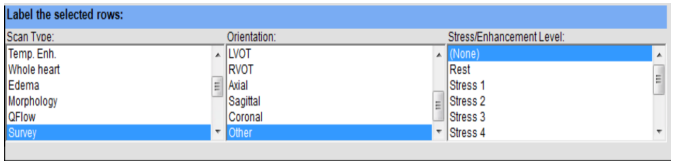
Workflow

From the **Patient Directory**, select the study and click

Labeling Stage

The **Labeling** screen displays a list of the series selec ted in the study. Thumbnail images of each series are displayed for reference. Each series should be labeled with its **scan type** and **orientation**. If applicable, a stress level label can be applied optionally. Details of currently applied labels are displayed on the right side of the series list.

When all labels are set correctly, proceed to Stage 2 of the MR Cardiac Viewer (Viewing).



Start Analysis

Select **MultiView Spat. Enh.** from the protocol list in the task guidance. Mark the **Spatial Enhancement short axis (SA)** series by clicking into the corresponding viewport. Step 3 of the task guidance should now show **Spat. Enh. SA** as the analysis method. Under 3.3, click on the **Start Analysis** **icon.**

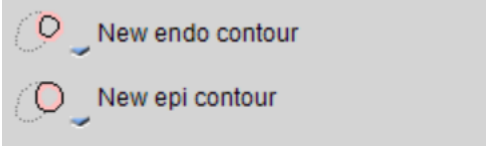
Segmentation Stage

The application will open in segmentation stage. Follow the steps of the task guidance to complete the workflow:

1. Import Contours: If contours are available from a previously performed Functional LV & RV analysis, the contours are automatically loaded in the application.

Draw and Verify contours

Review and edit the imported contouring from the previous step. If necessary, use the seedpoint option to correct minor segmentation errors or use **New epi/endo contour** to draw a new contour.



Create and Verify Spoke Wheels

In this workflow step, spoke wheels need to be defined in order to enable anatomical segmentation for the AHA bulls eye view n the result stage.

- Navigate to the desired slice and click 

- Rotate the spoke wheel by hovering over one of the yellow spokes, the curser becomes a circle

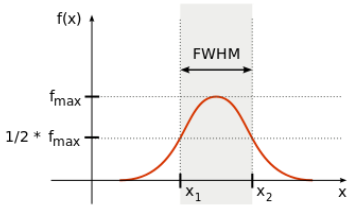
- Reposition the spoke wheel: segment 2 and 3 have to cover the septum. The green spokes can be moved to fit the segmentation.

Click **Copy Over Slices** in the task guidance panel to copy the spoke wheel to all slices that contain contours.

Once finished, proceed to the next stage by clicking on 2. Define Threshold on top of the task guidance

Define Threshold Stage

Full Width Half Maximum (FWHM) will be selected as the default calculation method (IntelliSpace Portal 7 and up). This robust algorithm will identify the the highest intensity voxels to visualize the late gadolinium enhancement in suspect tissue and to quantify the amount of enhancement compared to non-enhanced myocardium



However, the tool offers 3 additional calculation methods the user can select from:

➔ Manual Segmentation

➔ Reference Segment

➔ Reference Area

These additional cal´culation methods require manual input. It is recommanded to use the FWHM calculation.

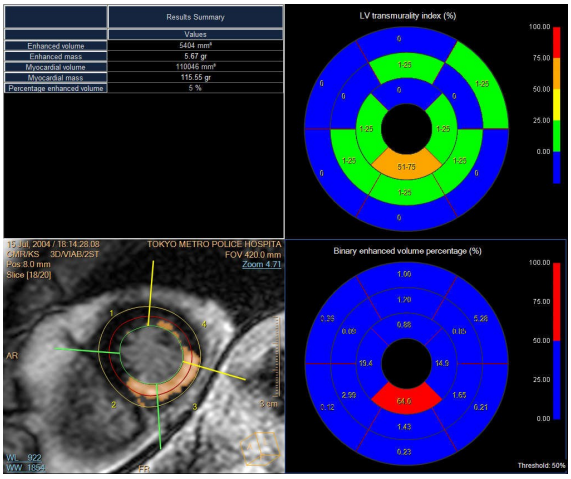
NOTE: studies not showing any late gadilinium enhancement during visual inspection should not be loaded to the quantification tool as this can result in false positive findings!

View Results

To view the results, click on the drop down menu on top of the task guidance and select **3. View Results.**

By default, the Detailed Spat. Enh. Result protocol is selected, providing a result table and bull's eye-models.

The tool automatically creates a **transmurality line**, indicated as a red contour within the myocardium, deviding the tissue into **50% epi– and 50% endo volume**.



Color LUT and Bull's-Eye Plots

The Results screen, displays a summary results table, bull's-eye plots, and the source image with contours and spoke wheels. When you click on a slice in a bull's-eye plot, the corresponding source slice image is displayed.

The upper bull's-eye plot displays the **LV transmurality index**, which is aligned with the visual scoring panel, and indicates the percentage of enhanced area.

The lower bull's-eye plot displays the **Binary enhanced volume percentage**, with the threshold set at 50%. Using the right-mouse menu, you can view the endo segment or the epi segment in this plot.

➔ Using the right-mouse menu, **LV enhanced volume percentage** plot can also be displayed, which can be viewed using **Detailed** (94 angles), **Regional** (spoke definition), or **AHA** results.

About Bull's-Eye Plots

Bull's-eye results plots are displayed in the results screen after analysis. They provide a quick

reference of the results pertaining to segments and slices. The following interactions are available with bull's-eye plots.

You can change the color scale threshold for a bull's-eye plot, a color-coded segment display, or a diagram, by adjusting the window level or window width.

To adjust the **window width**, move the pointer over the plot, hold the middle mouse button, and do one of the following:

- Drag left to decrease window width.
- Drag right to increase window width.

To adjust the **window level** move the pointer over the plot, hold the middle mouse button, and

do one of the following:

- Drag down to decrease the window level.
- Drag up to increase the window level.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