

Define Regions of Interest on an Object

This tutorial demonstrates how to define [regions of interest \(ROIs\)](#) for an object.

ROIs are portions of an object's surface model that have been labelled as belonging to a particular group. They are used to calculate distance maps for articulating bones by finding the shortest distance from each point in one ROI to the corresponding ROI on a neighboring bone. More information can be found for Orient3D's [Regions of Interest](#) widget.

Before Your Begin

Before you begin, ensure that you have defined the object's [local coordinate system](#) (LCS). This is because ROIs are created to be aligned with the LCS, making it easier to interpret distance calculations and to ensure that all ROIs on an object align with each other.

Defining an ROI

Begin by getting Orient3D ready:

1. Load the subject file and choose the session and object or load a surface model directly.
2. Turn on the display of the local axes.
3. Open the [Regions of Interest \(ROIs\)](#) widget by selecting the *Regions of Interest (ROIs)* item in the View menu.

Creating an ROI

Now create an ROI:

1. Click on the *Add* button to create a new ROI.
2. Double-click on the new ROI's name field and enter an appropriate name, such as "medial" or "lateral."
3. Select the appropriate type and orientation of ROI. Refer to the descriptions of the ROI types to determine the proper choices for this object and LCS.
4. Digitize the landmarks used by the ROI:
 1. Click on the name of the first landmark, then click on the surface model in the 3D view to place it.
 2. The current landmark will automatically advance to the next one after digitizing one. If you need to rotate the view of the object in order to properly place a landmark, press *Esc* to exit digitization mode, rotate the view as needed, then click on the name of the next landmark that needs to be entered.
 3. If you want to move a landmark after it has been placed, just click on its name and re-digitize it.
5. Press the *Place* button to create the ROI from the landmarks, and place it over the surface model.

1. You can now check the placement of the ROI and determine if it will label the desired polygons when projected onto the surface. While the ROI is placed, you can re-digitize any of the landmarks, as well as change the type, orientation, N (number of subregions along one axis), or M (number of subregions along the other axis) and press *Place* to update the ROI.
6. Once you are reasonably sure that the ROI will project as desired, make sure that the yellow search box is sized appropriately. The ROI will be projected only onto polygons that are within this search box and which are facing the projection axis.
 1. To change the box, change the values of the *Principal, Secondary, and Tertiary ROI Expand* parameters in *Parameters* box. The *ROI Offset Factor* parameter controls the height of the ROI above the surface model. When placed, the ROI should be entirely above the surface because when projected it is projected only downwards. After changing any of these parameters, press *Place* again to update the ROI.
7. Press *Project* to project the ROI onto the surface model.
8. Check the projection to see if any undesired polygons are labelled. If there are, you can erase them by selecting *Erase ROI Polygons* from the *Surface* menu. Then you erase ROI labels by pressing the left mouse button and “painting” over the polygons you want to de-label. Press *Esc* when you are done erasing.

You have now created an ROI for your object. Repeat steps 5 - 12 for the other ROIs you want to define on this object.

Erasing ROI Polygons

Previously created ROI polygons can be simply erased:

1. Select *Surface→Erase ROI Polygons* or apply the Alt + E shortcut.
2. Move the mouse to the 3D View and it will change to a cross with the label ROI Eraser.
3. Left click the mouse button and drag the mouse across the ROI polygons in order to delete the surface.

Saving the Surface and Subject Files

Finish up:

1. Select *File→Save Surface (local frame)* to write the *ROI Surface File* for this object. If this file is already specified for this object in the subject file, it will be [over-]written without prompting you for a file name. Otherwise, select the name of a new OBJ file. Select “meters” as the units so the file can be used in Visual3D.
2. Select *File→Save Subject* to save the subject file with the LCS and the link to the *ROI Surface File*. If you later add regions of interest to the surface model and save them to an OBJ file, this *ROI Surface File* will be overwritten. This is by design; if you create a surface model in the LCS with ROIs, the DSX Suite does not also need a surface model in the LCS without the ROIs.

See Also

Go back to the [Orient3D Overview](#).

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