



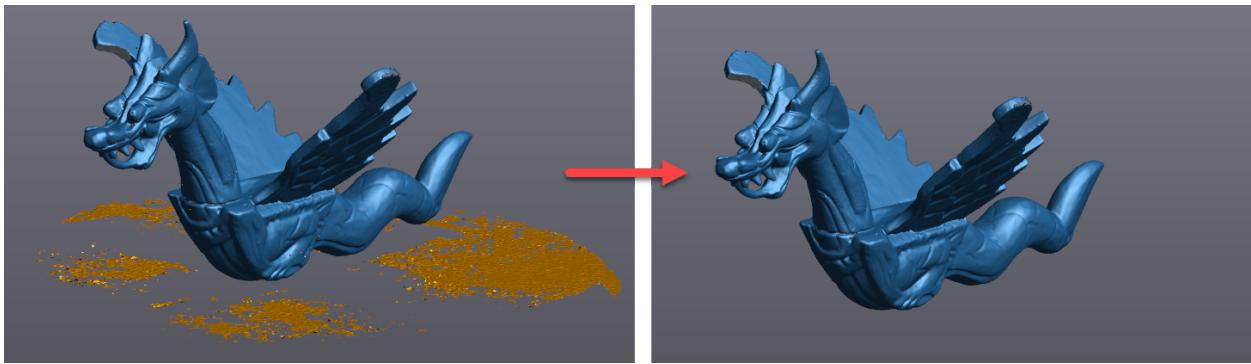
VXmodel Tutorial - Scan-to-Print 1



June 2018

Introduction

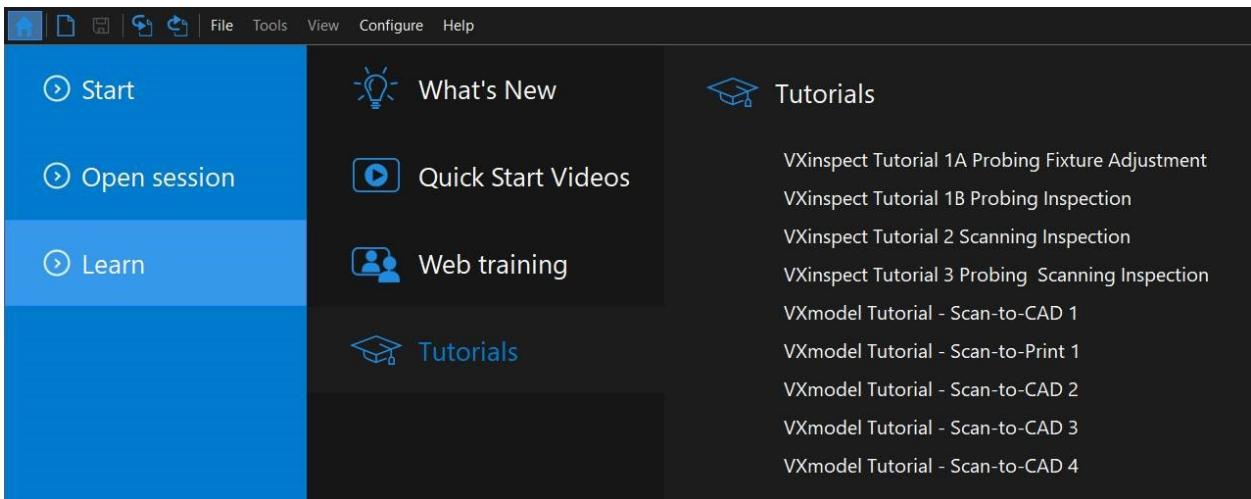
This tutorial is intended for users who need to become familiar with VXmodel. It will guide you through a Scan-to-Print workflow by cleaning and aligning the mesh followed by the modification applied to optimize the model and prepare it for 3D print.



This tutorial involves some functions using texture. The color option of the Go!SCAN 3D license is needed to access texture functions.

Importing data file

Data files associated with this tutorial can be downloaded directly from the **Learn** panel of VXelements home page.

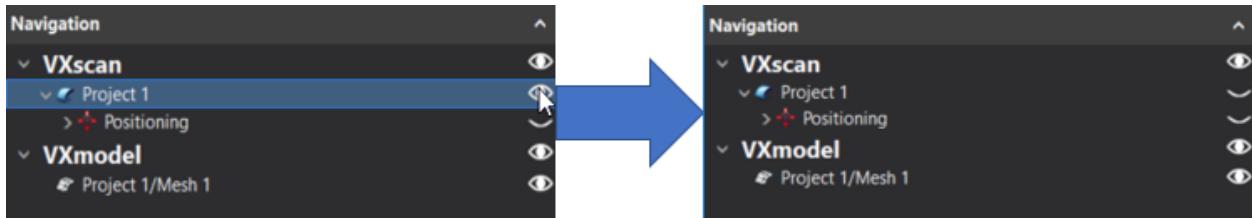


The **session file** will automatically open but the can be found here after download: *\\Documents\\VXelements\\Tutorials\\VXmodel_1_Print\\DataSet

*The sample data for this tutorial is provided by Creaform.. It is the property of Creaform and is used for informational purposes only.

Normally, after completing the scan, the **Scan** needs to be transferred to the **Meshes** node by clicking on the **Send to VXmodel** button to access VXmodel.

For this tutorial, the scan data has been already transferred to the **Mesh** node of VXmodel and the **Scan** has not been cleared to be able to apply texture.

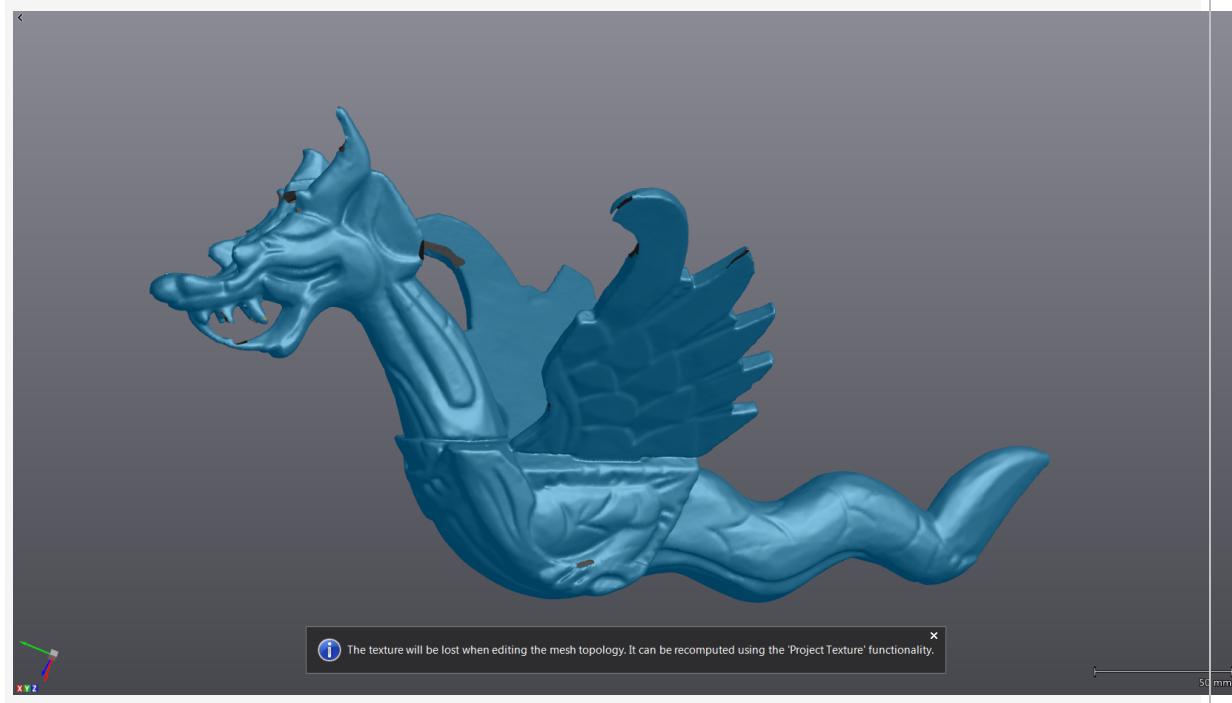


What will this tutorial cover?

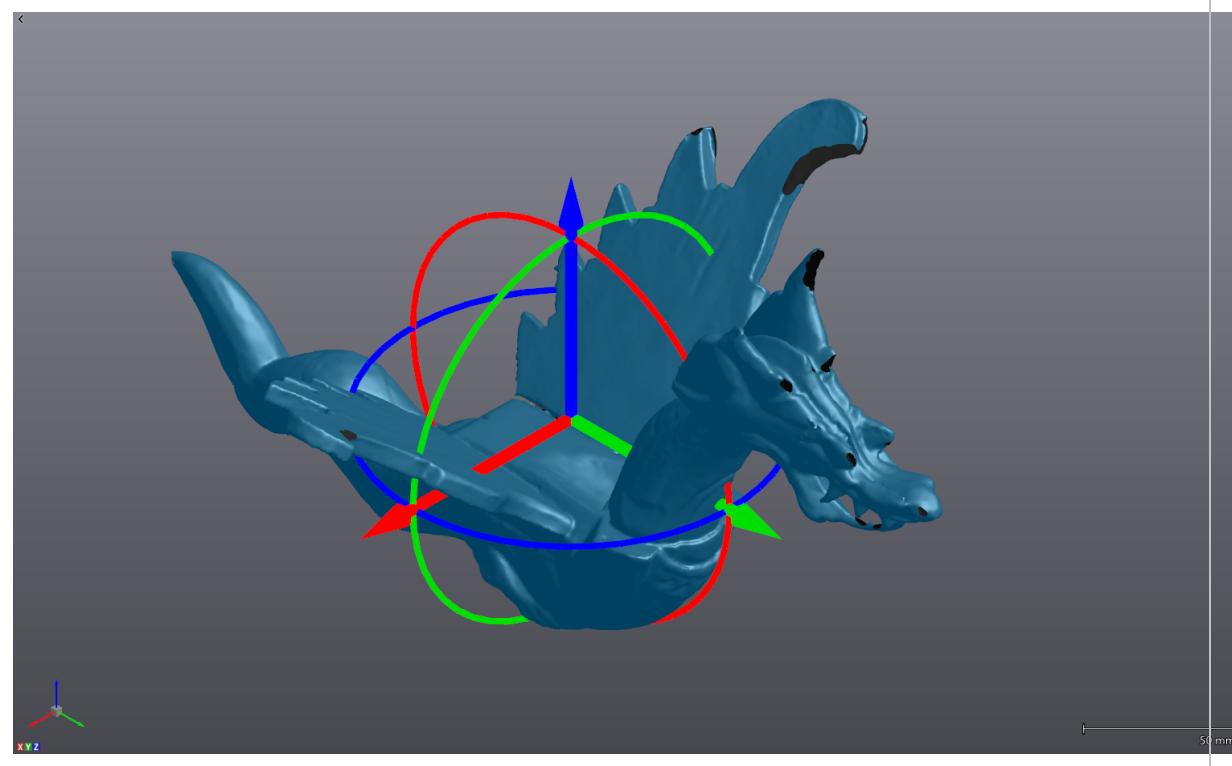
Step 1. Merge meshes



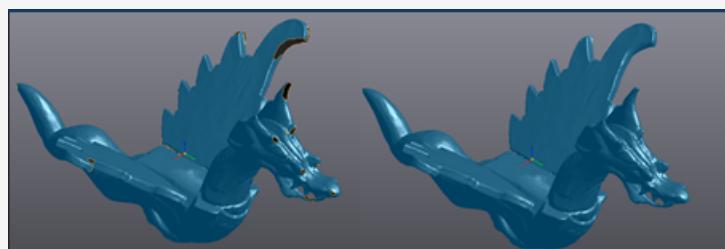
Step 2. Clean mesh



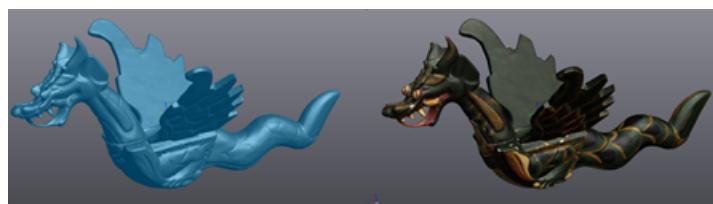
Step 3. Align mesh



Step 4. Fill holes



Step 5. Project texture

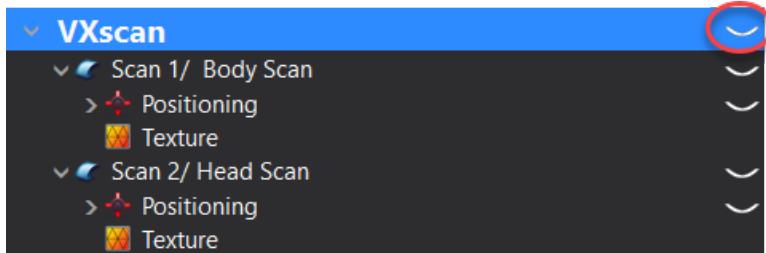


Step 6. Export the mesh

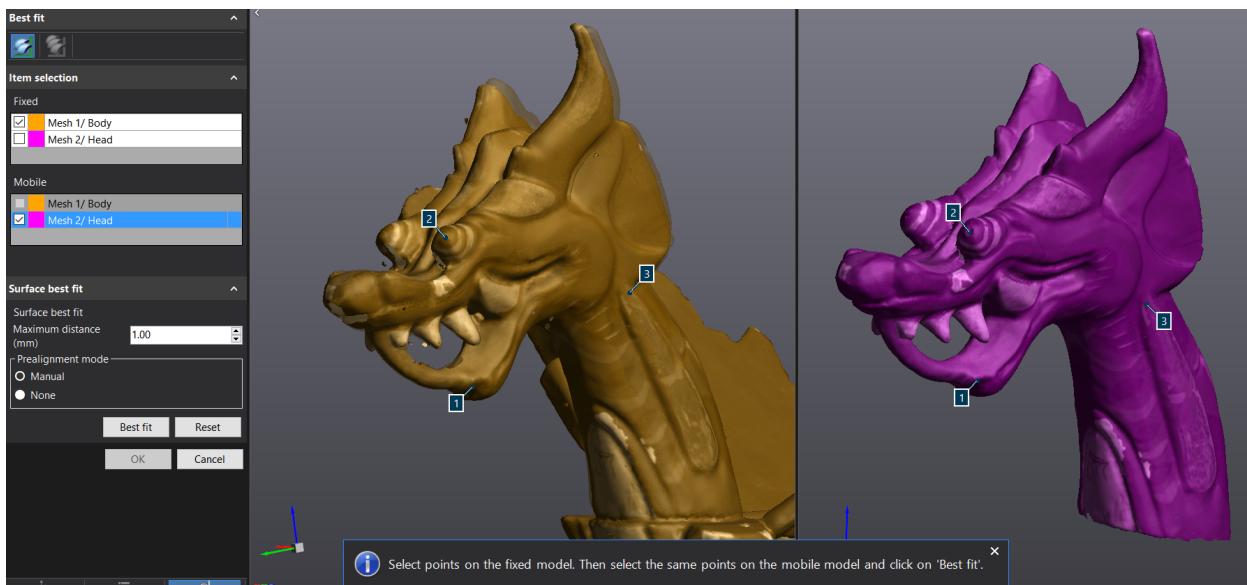
Merge meshes

This part was scanned with two different resolution and texture settings. A low resolution scan was performed for the general shape and a second one focused on the head was made in order to reach a better texture display and level of detail. The two scans need to be aligned first in order to merge them into one single mesh object with the **Merge** tool .

- » Click on the eye icon of VXscan node to hide the two scans



- » Click on the **Mesh 2/ Head** to activate the functionality of VXmodel.
- » Click on **Best fit** icon.
- » Set the **Mesh 1/ Body** as fixed and **Mesh 2/ Head** as mobile in the item selection.
- » Set **Maximum distance** to 1 mm, then manually select 3 common points on each mesh.



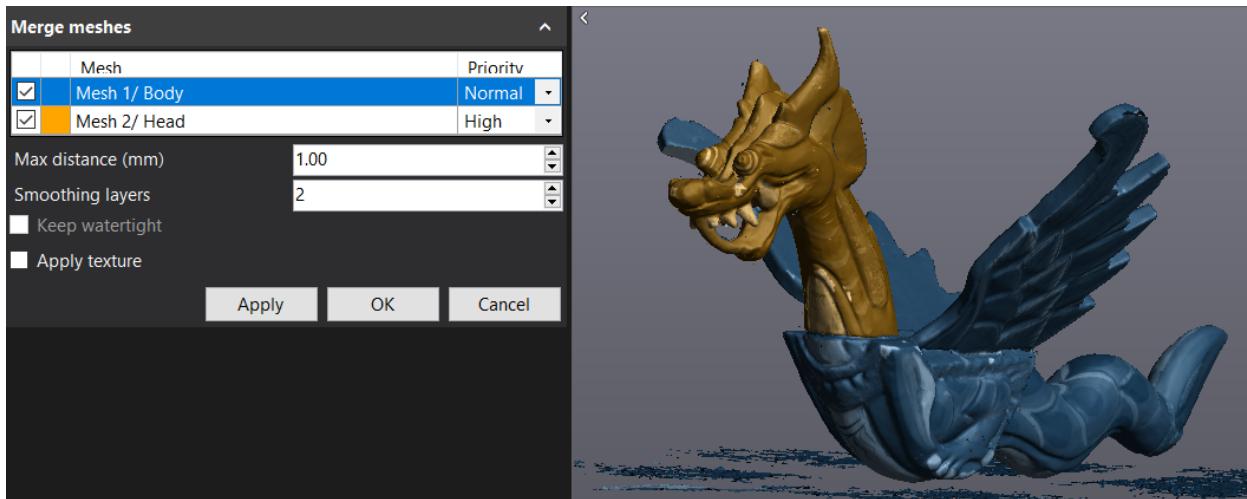
Note: As soon as 3 points are selected on each meshes, the preview of the alignment will be shown on the left side of the split screen.

» Click on **Best fit**, look at the result and then **OK**.



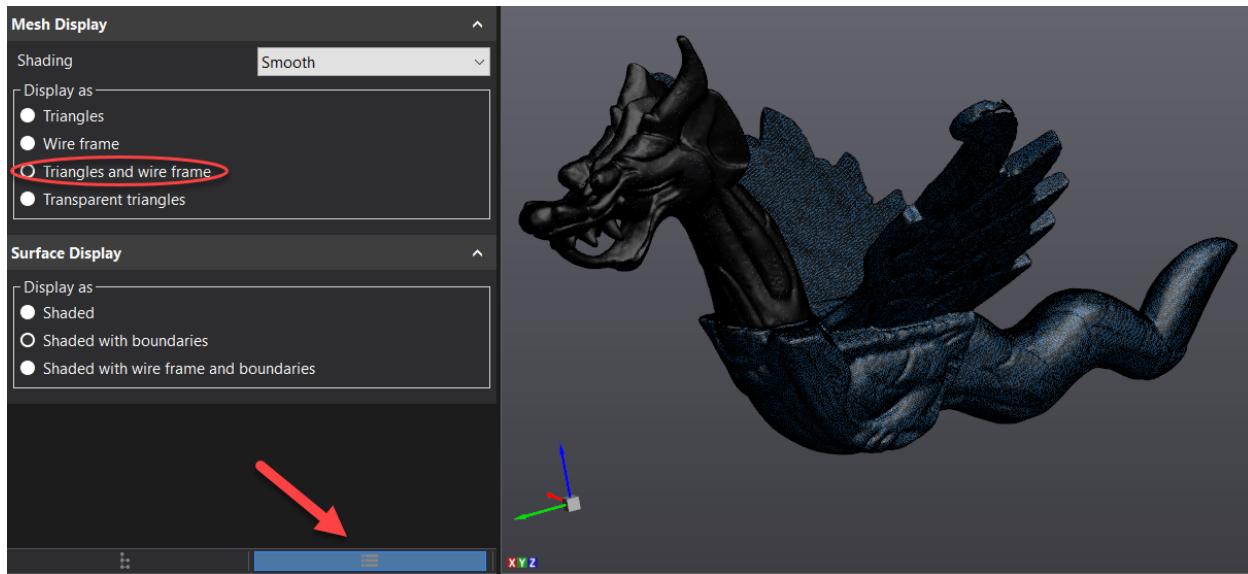
» Select **Mesh 1/Body** and then click on the **Merge** icon.

» Make sure that both mesh objects are checked. Set the **Priority** at **High** for **Mesh 2/Head** and leave it at **Normal** for **Mesh 1/Body**. Adjust **Maximum distance** to **3**, **Smoothing layers** at **2** and uncheck **Apply texture**.



Note: Applying a priority on a specific mesh will make sure that the object with the highest priority will be favored during the merge. It means that the mesh with the low priority will be overlooked when there's an overlap between two or more mesh objects.

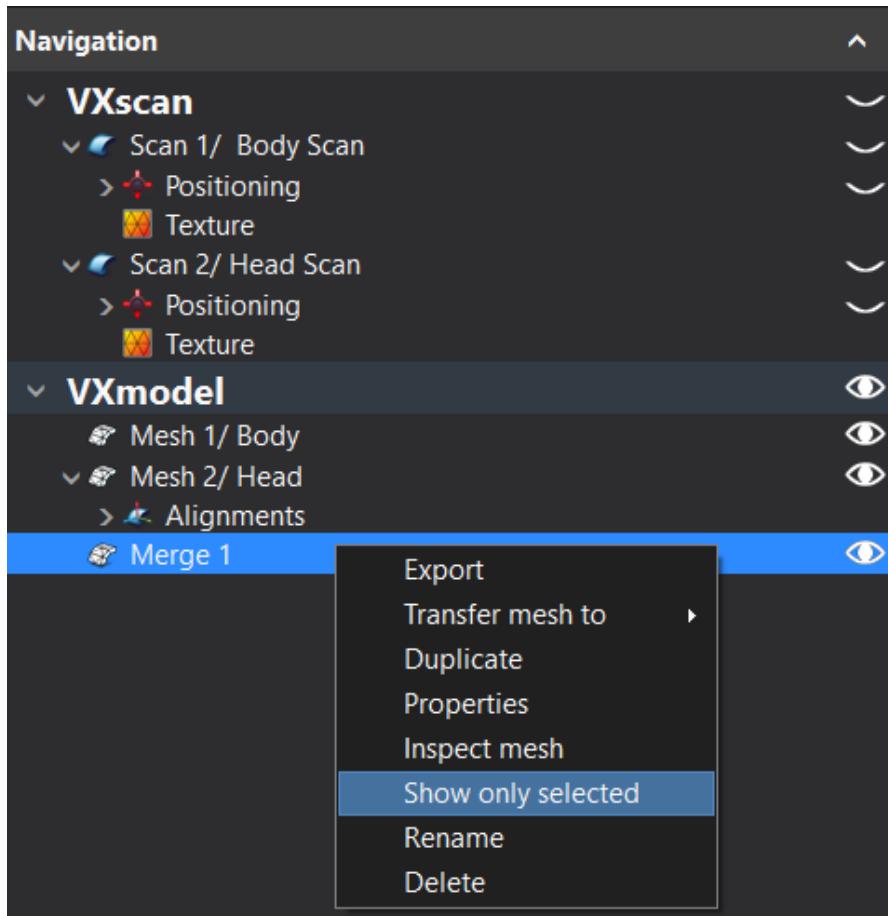
- » Click on **Apply** then **OK**.
- » Check the result by changing the **Display** of the mesh to **Triangles and wire frame** and change it back afterward at **Triangles**.



Clean mesh data

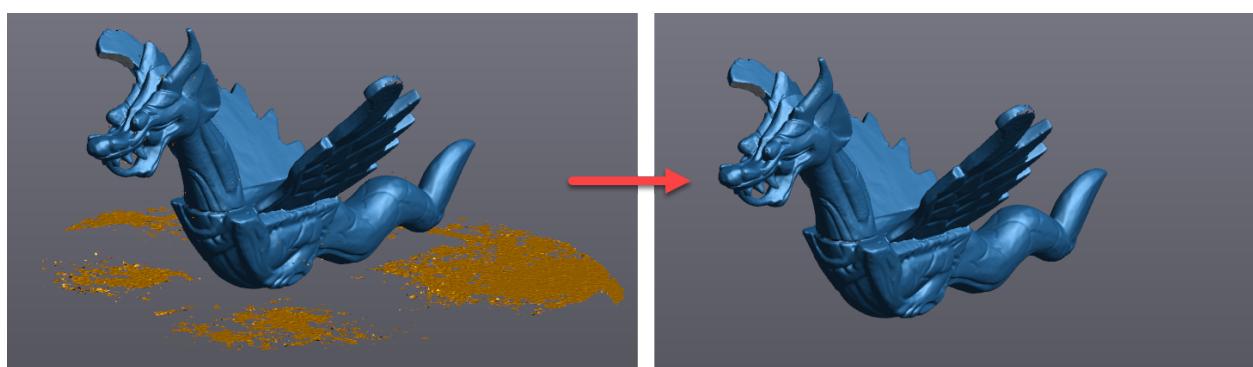
Cleaning the mesh is an important step of the modeling process. VXmodel offers various tools to help the user clean or fix the mesh once the scanning is completed.

- » Right click and select **Show only selected** to make sure that **Merge 1** is selected in the navigation tree.



Remove isolated patches

- » Click on the **Remove isolated patches**  selection tool.
- » Set the **Threshold** to **50** and click **Delete**.





Note: VXmodel will remove the small patches that are not connected to the surface. A value of 100 will leave only a single patch with the biggest surface.

Clean mesh

Applying the **Clean mesh** tool will allow user to detect and select the irregularities in the mesh such as intersecting triangles, small holes, etc.

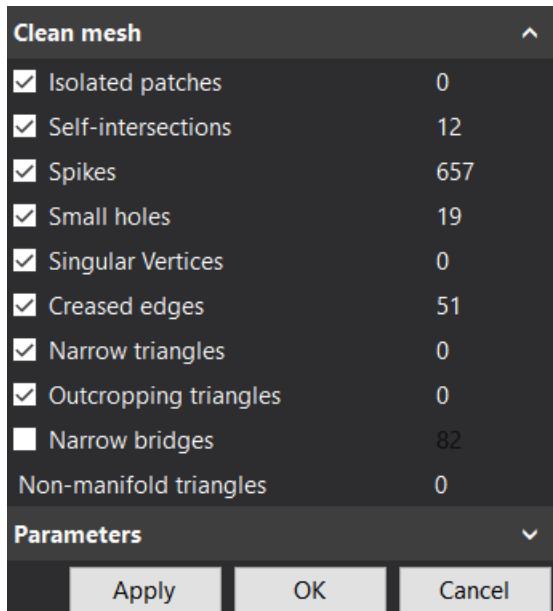
» Click on the **Clean mesh** icon.



Note: VXmodel could show you this message : "The texture will be lost when editing the mesh topology. It can be recomputed using the **Project texture** functionality." It means that it is the end of your process and you can project the texture to your model.



Note: VXmodel will gather information about the mesh and analyze it to find any triangles that need to be deleted.



Note: The numbers found on the right indicate the triangles count for each type of defect. For instance, there are 10 triangles that are considered abnormal.

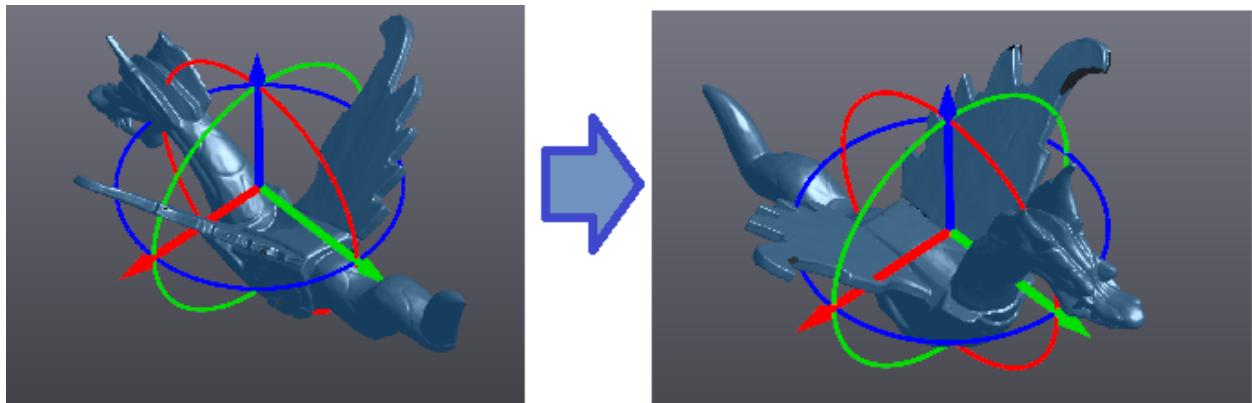


Note: For each type of defects with an active check box, the corresponding triangles in the 3D view are selected and will be deleted by the **Clean mesh** tool once applied.

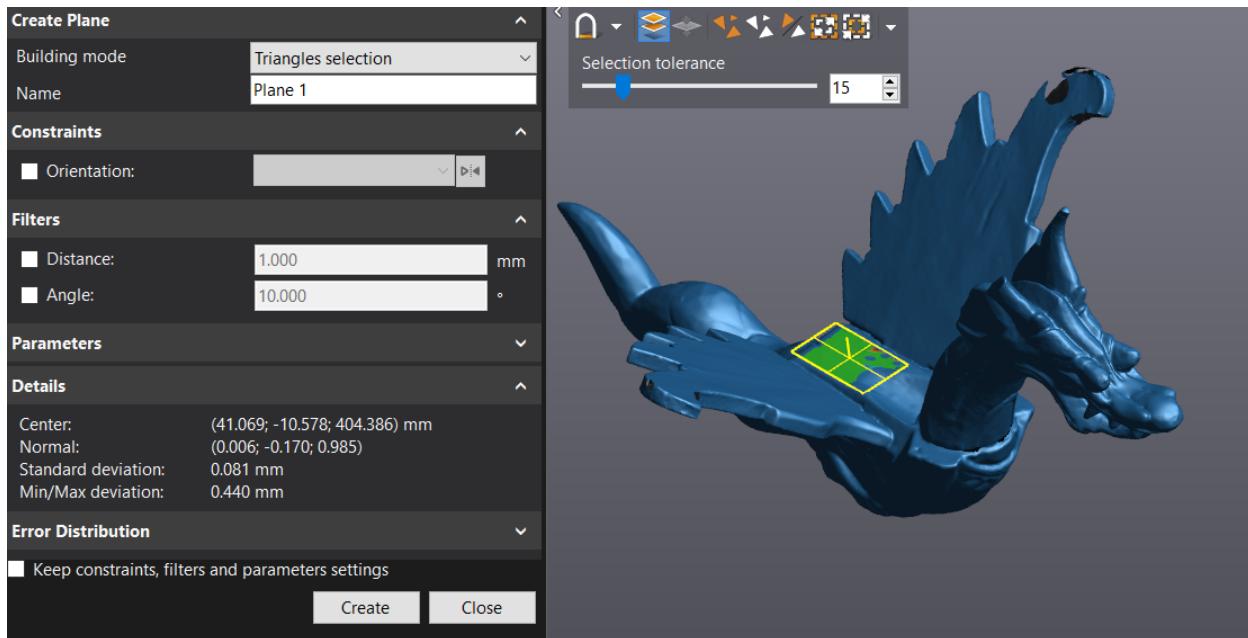
» Click on **Apply** then **OK**.

Align Mesh

The **Align to origin** function allows the alignment of the mesh to the world coordinate system XYZ.



- » Click on **Add a plane** icon to create a plane that will be used for the alignment
- » Set the **Building mode** to **Triangles selection**.
- » Hold the **CTRL** key and left-click on the flat surface of the dragon's back.



» Click on the **Align to origin** icon.



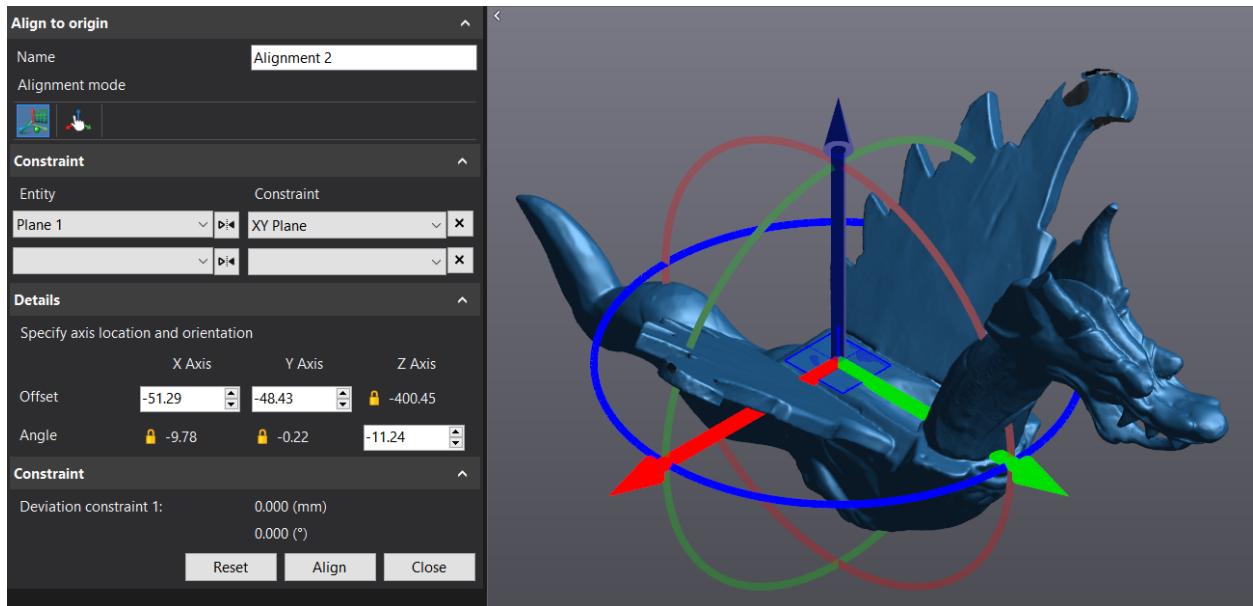
Note: By default, Align mesh will place the origin at the center of the object.

» Set the constraint to **Plane XY** and the entity to **Plane 1**.

» Click on the blue arrow to rotate manually the mesh and centered approximately the **Y axis** to the symmetry plane of the mesh.



Note : Manual alignment can be performed by dragging the arrow (translation) or circle(rotation) of the reference frame in the 3D view.



» Click on **Align** to finalize the alignment of the mesh to the origin.

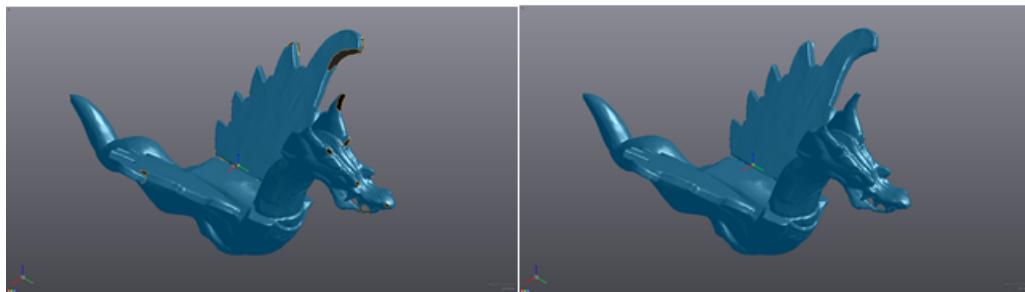


Note: With the mesh aligned, it is useful to use the **Predefined views**. Right-click on the 3D view (X+, X-, Y+, Y-, Z+, Z- and Isometric). They are based on the reference frame defined as the origin.

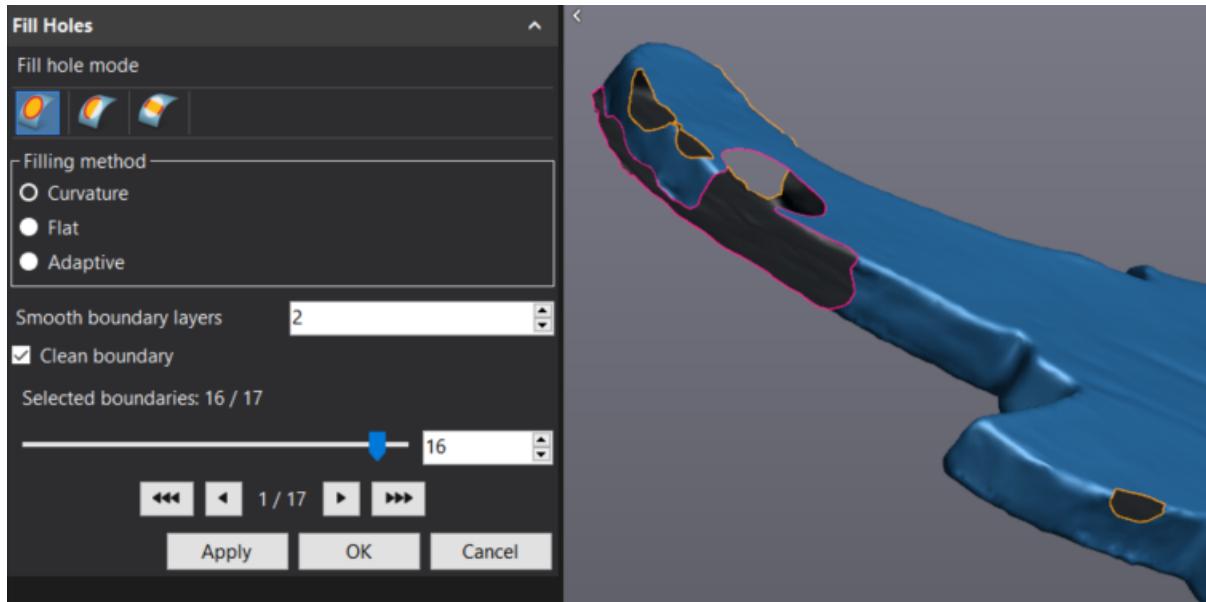
Predefined views		
	X+	Ctrl+1
	X-	Ctrl+2
	Y+	Ctrl+3
	Y-	Ctrl+4
	Z+	Ctrl+5
	Z-	Ctrl+6
	Isometric	Ctrl+7

Fill holes

This function allows filling holes in the mesh. It is mainly used with mesh preparation for surfacing or 3D printing. The small holes will be filled first, and the larger and more complex holes will be filled manually.

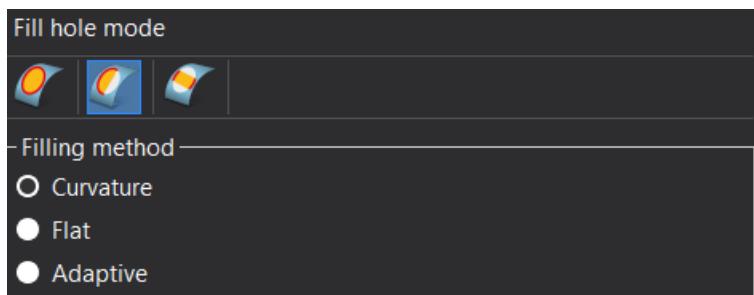


- » Click on the **Fill holes** icon.
- » Set **Filling method** to **Curvature**. Set the parameters at **2** for a **Smooth boundary layers**, **Clean boundary** checked, select **Whole** and move the slider to **16** to leave the biggest hole open.



Note: Boundary selection made with slider are chosen from smallest to the biggest holes. The amount of holes to be filled may be different from one session to the other.

- » Switch the fill hole mode from **Whole** to **Partial**.



- » Successively click the 3 points illustrated in the image below, on the boundary.



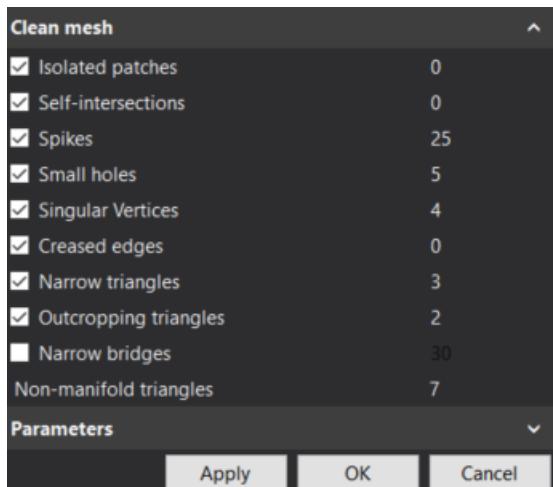
- » Switch back the fill hole mode to **Whole** and click on the open remaining boundary
- » Click **Apply** and **OK** to confirm operation.

Project texture

Clean mesh before reapplying the texture

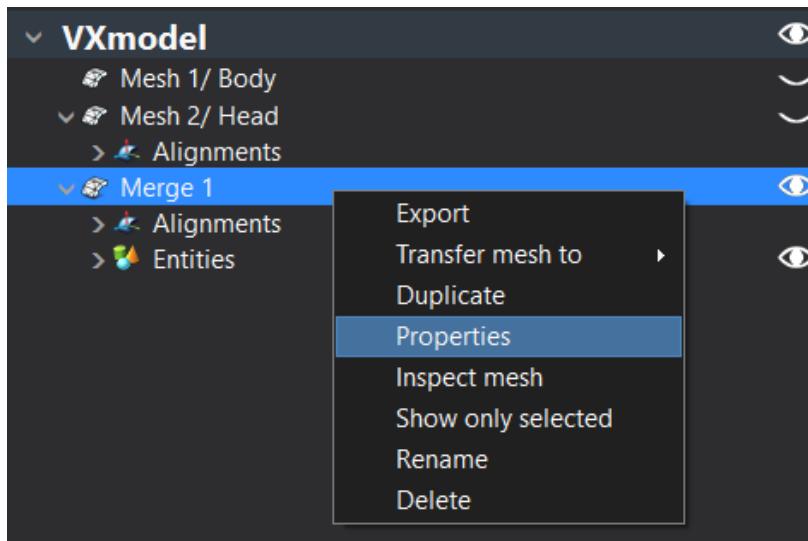
This function allows the repair of a mesh and filling the small holes.

- » Click on the **Clean mesh** icon . This iterative function allows users to repair the mesh automatically. If small holes are found for instance, they will be fixed automatically.
- » Click **Apply** and **OK** to confirm operation.

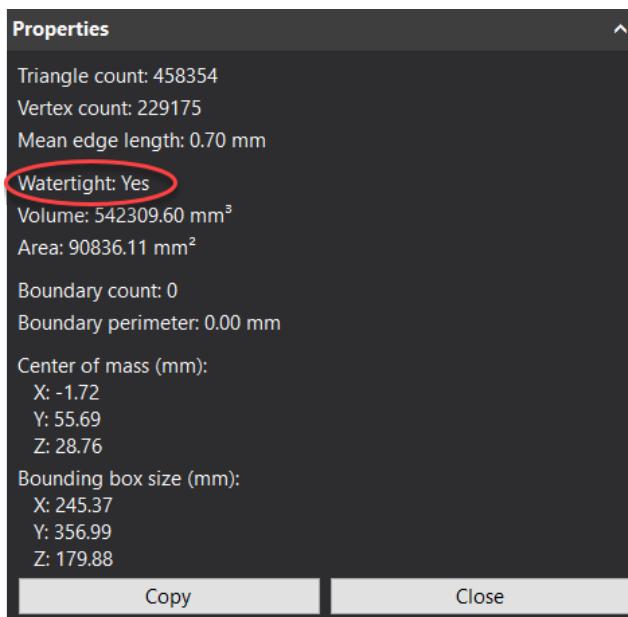


Properties watertight

» Right-click on the mesh in the tree and select **Properties**.



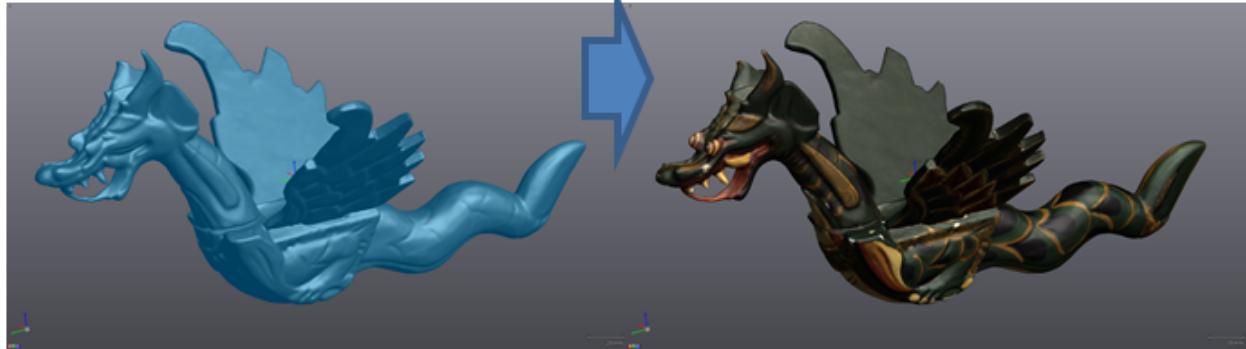
» Verify if your file is **Watertight**.



Note: By clicking on the **Copy** button, you can paste the information under **Properties** into an other document

Apply texture

- » Click on the **Apply texture** icon in VXmodel and the software will project the texture on your model.
- » Select **Scan 1/Body Scan** to apply the texture



Modify the texture by using the software paint

- » Right-click on the 3D view and select **Predefined views** and **Z+**.
- » Click on the **Texture image** button and save the snapshot.



- » Open the software **Paint**
- » In **Paint**, click the **Open** button and open the saved snapshot you did from VXmodel.
- » Click the **Paste** and **Paste from** button to import the **Creaform-Icon_RGB.png** (Location: ***\Documents\VXelements\Tutorials\VXmodel_1_Print\DataSet**)
- » Move the file by holding the left-click of the mouse and drag.



- » Click the **Save** button and go back to VXmodel.
- » Click on the **Texture image** icon to import the file.

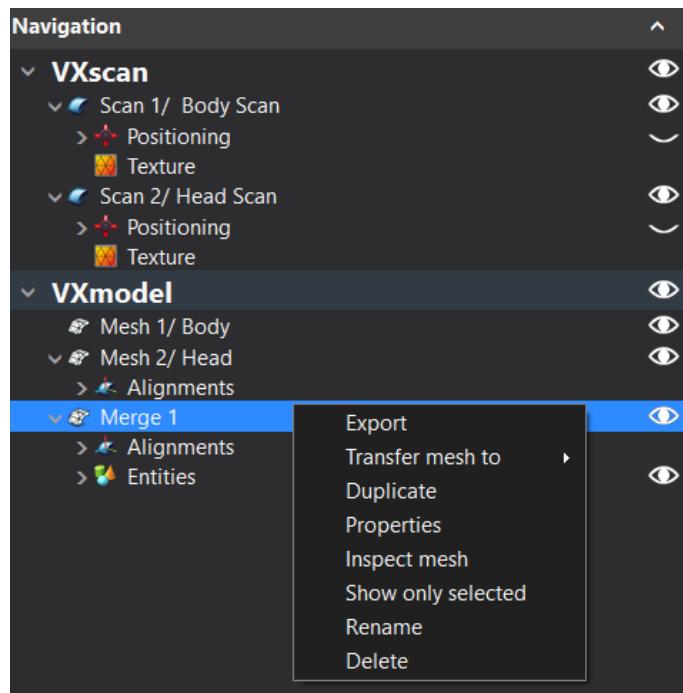


Note: After the import, a VXelements – Warning message appears.

Export the mesh

Once the mesh is aligned and cleaned, the final result is ready to be exported.

- » Click on the **Export mesh** icon of the main toolbar.
- » Or, right-click on **Merge 1** in the navigation pane and click on **Export**.



Note: OBJ Wavefront (*.obj) is considered as a standard export format for mesh with color.