MESH WARPING GUIDE

Learn mesh warping for perfect video mapping projections

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Introduction

White Night - Royal Exhibition Palace, Melbourne

In this tutorial we will see how to make mesh warping. It is often used for video-mapping on architectures for example, as it allows to finely match the video content on the projection surface.

It can be done easily with MadMapper, we will dive in the details, at the end you will know all the secrets for a perfect video-projection !

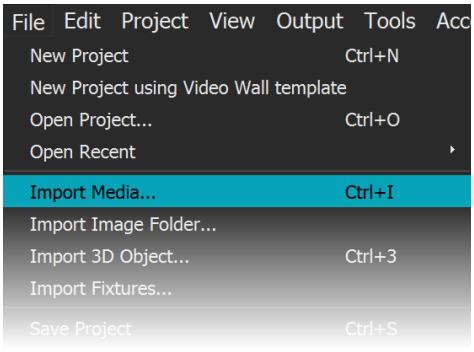
Heydar-Aliyev Cultural Center, Bakou

For this example we will try to map visuals on the center part of the building.

We selected this Zaha Hadid building because there is a grid pattern which will help us to understand the process involved in Mesh Warping.

1. Set up

❶

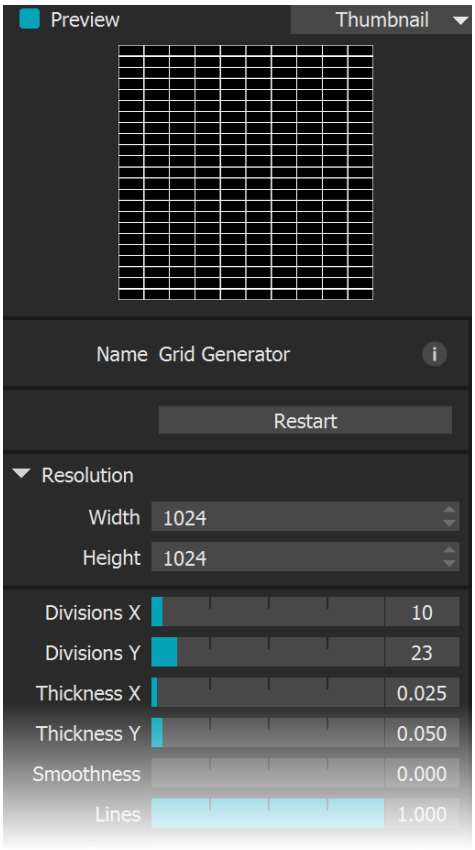


- To begin, drag and drop your background image example from your desktop to the MadMapper output source, a quad with your image should have been generated.

  Alternatively you can click on **File/Import Media** from the menu bar. ❶

  Or by clicking on the **“Plus” icon** next to “Images” in the media panel. ❷

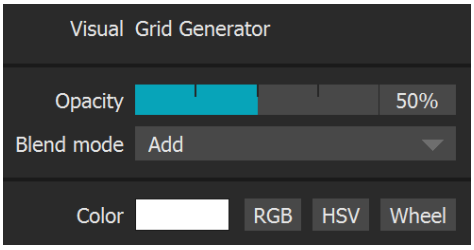
❷



- Then, add a grid generator media on top of your image.

  Modify the grid settings with 10 columns by 23 rows so that it correspond to the architectural part of the building that we want to map.

  Eventually adjust the thickness.

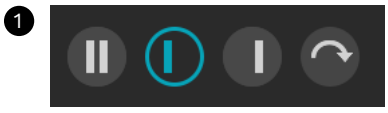


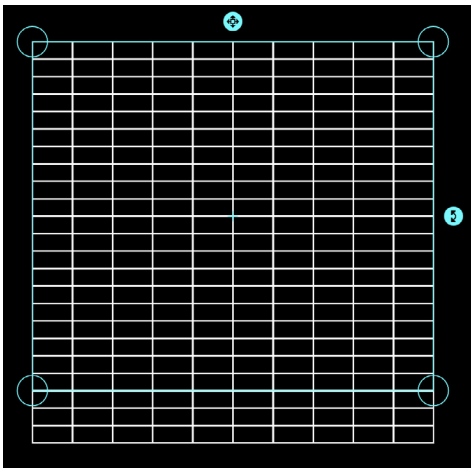
- In order to see your background behind, we need to make the grid a little transparent.

  In the left panel, change the opacity to 50% and the Blend mode to additive, now it will be easier to make the warping.

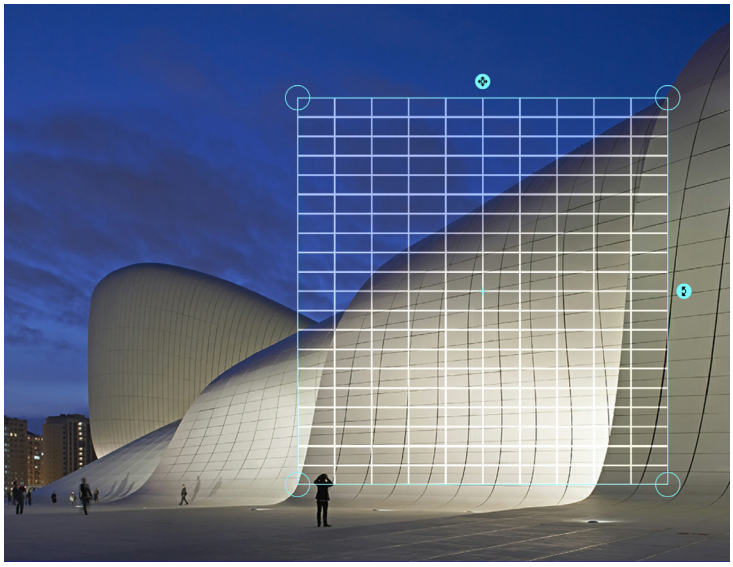
- The shape is a little complex, so we will do it in two parts. One big geometry at the top and a small one at the bottom.

  In the Input view ❶, select your quad.
  Pick a corner and resize it in order to get rid of the last three rows. It will be left for the small part of our mapping.





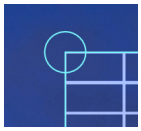
Input



Output

2. Adjust the perspective

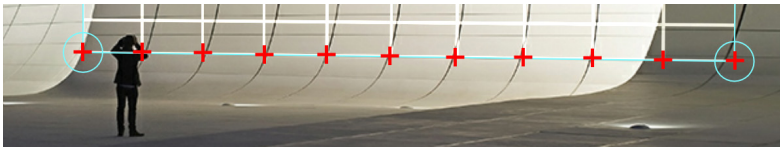
- Make sure the “Perspective” checkbox is enabled.



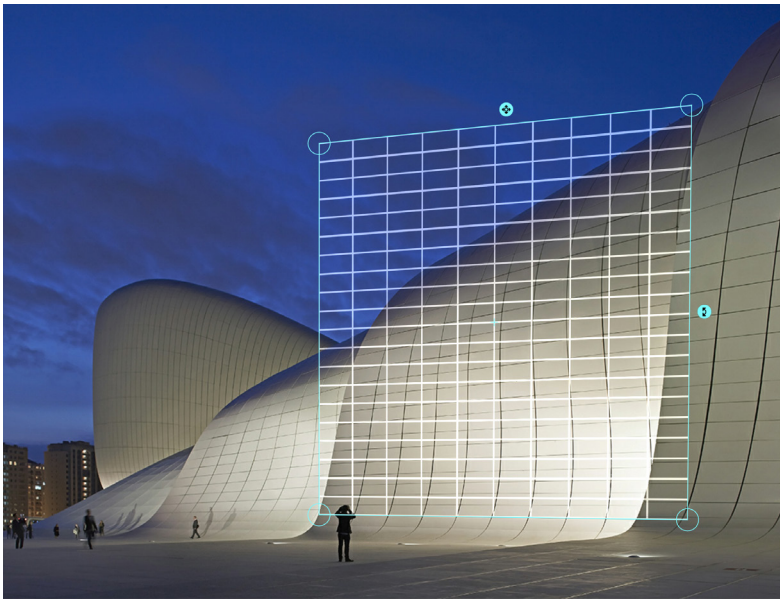
- Move every corner to fit the building perspective by clicking on them and dragging.

- Try to understand the perspective. Here the vanishing points are outside the picture.

  You can anyway find the horizon line.
  With this landmark, adjust the bottom segment of your quad to fit it.



- Try to fit the intersections of the vertical lines to the bottom one.

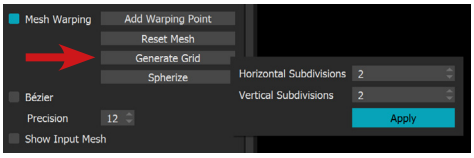


- You should get a similar result.

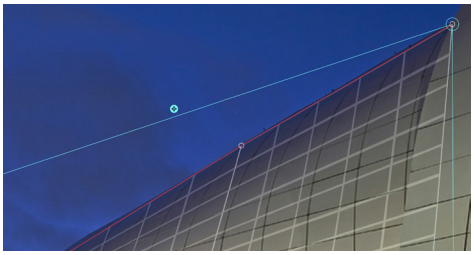
3. Position warping points

To reproduce the outline, the geometry of the quad needs extra warping points to reproduce the architectural curves.

- **Add points** with **Alt + click** and drag it to the position we want. To **remove a point**, select it and press **delete**.

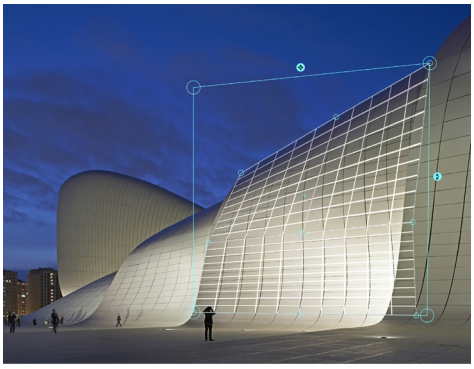


- Alternatively we could generate a grid by specifying the number of horizontal and vertical subdivisions. However for this example, we'll stick to adding the extra points manually.



- To **remove a line, right-click** on a point and select either "Remove Horizontal" or "Remove Vertical".

  Move a segment by clicking on it or an entire line by clicking it one more time. The selected segment or line should be highlighted in red.

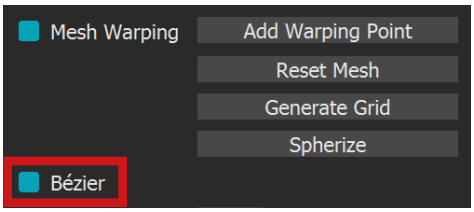


- Add 4 extra warping points in order to subdivide each side of the quad.

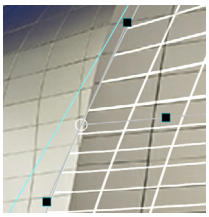
  Now adjust the positions of your points and segments to fit the building, to get a similar result.

4. Béziers curves

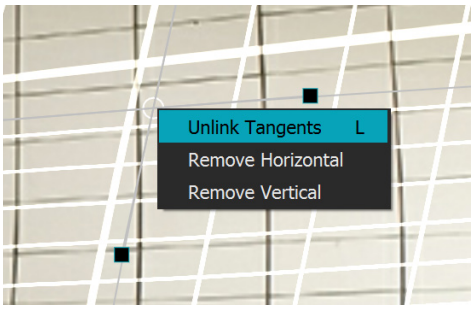
It’s time to get curves. MadMapper allows you to do this with Béziers curves just like Photoshop, but in real-time.



- Enable them via the “Bézier” checkbox on the left panel.

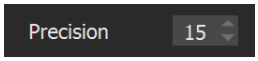


- Now when you click on a warping point, two or three handles appear, grab them to adjust the tangents of the curves at the warping point position.



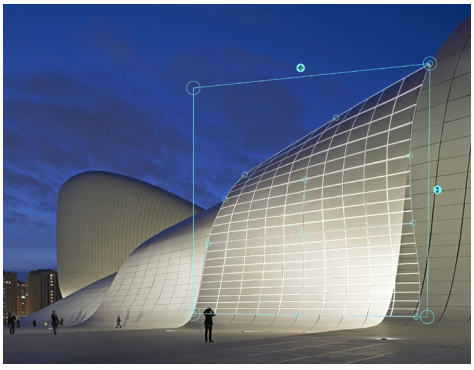
- Try to align your grid generator to the lines of the building.

  If you have difficulties, you can also right-click on a point and unlink tangents to move the handles separately, however this will break the tangent continuity.



- To add more smoothness to your surface’ geometry, you can increase the “Precision”.

  This will add more polygons to your shape so your curves will be softer.



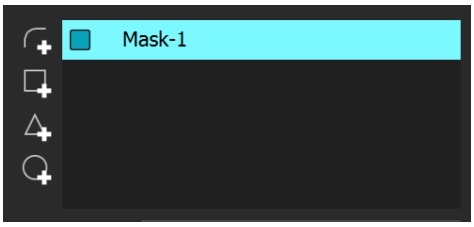
- Sparsely add more warping points to mimic the double curvature of the building’s facade.

  At this step you should get this.

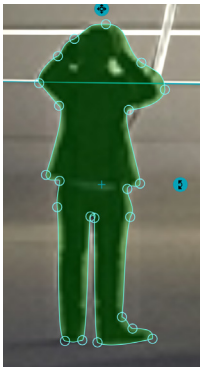
Tips The less points you add, the easier it will be to warp correctly !

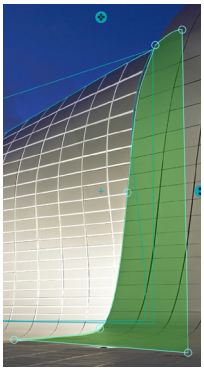
5. Masks

On the background photo, a person is standing just in front of the mapping, and we don't want to project over that person.
Please refer to the Masking Guide for an in depth description of the process.



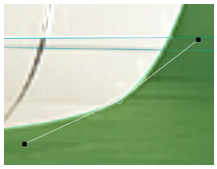
- In the left panel create a new mask by clicking the first icon.





- Now you can click and hold on your surface to draw a mask, it will add points and Béziers curves to match your drawing.

  When you are finished, press Enter to close the path.



- After this you can edit the curves with the Béziers handles like we see before.

  Also, if you need perfect shapes you can create square, triangle and circle masks with the three other icons.

- Now you should have got rid of the projection over the silhouette and the right side of your shape.

6. Be creative

- Reproduce the steps for the bottom part of the shape to finish the mapping.

At the end you just have to be creative and map whatever you want !