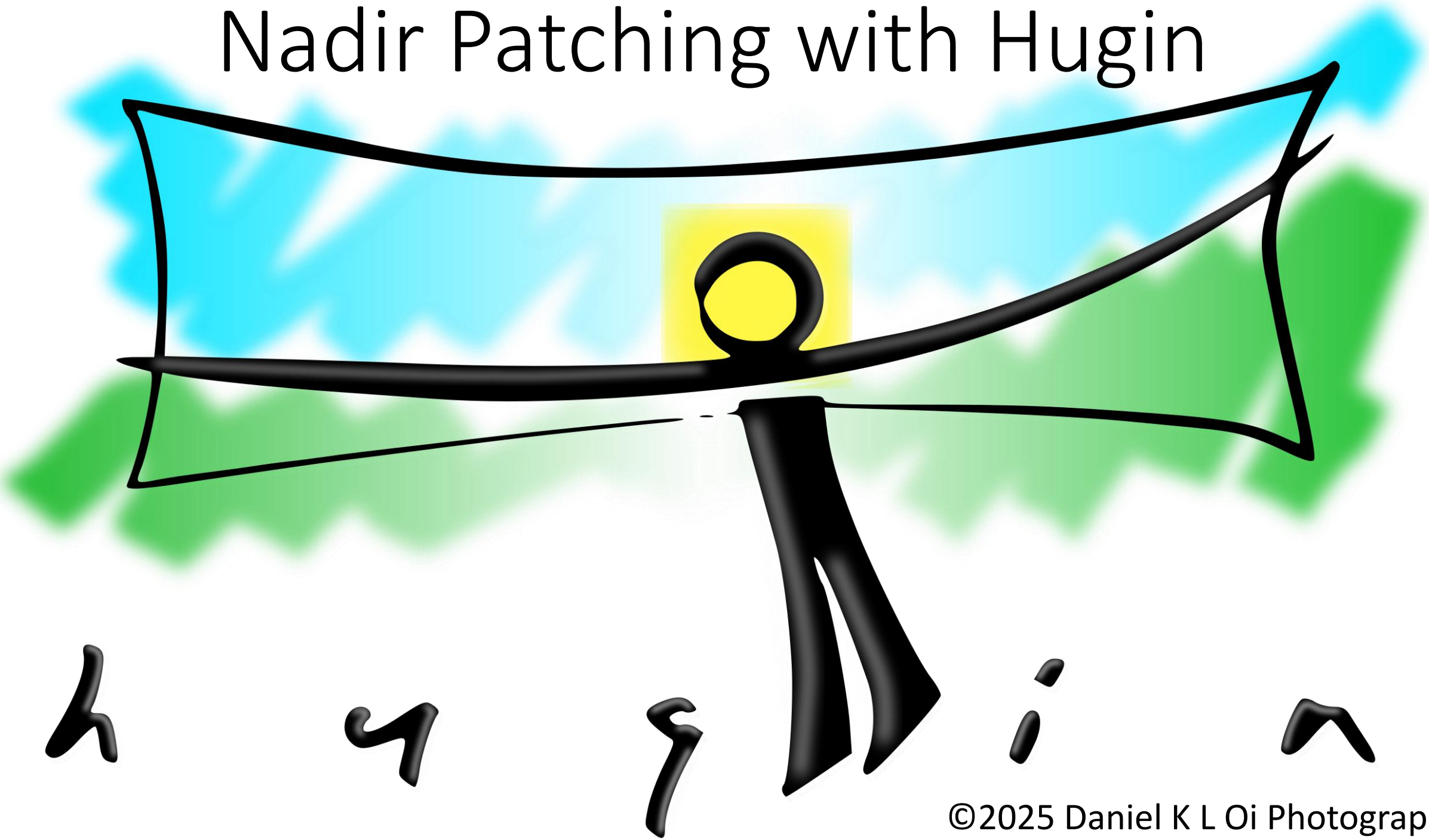
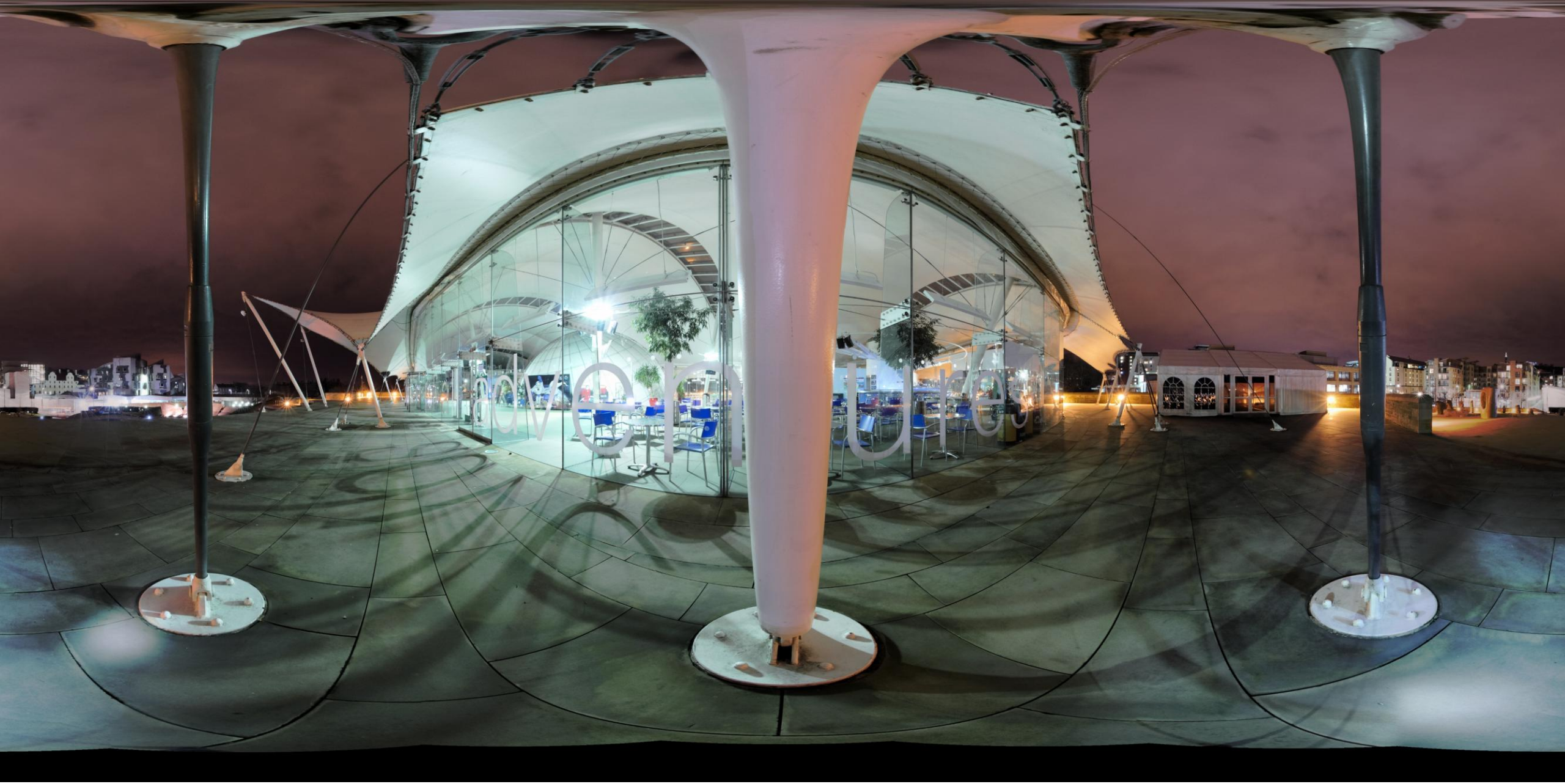
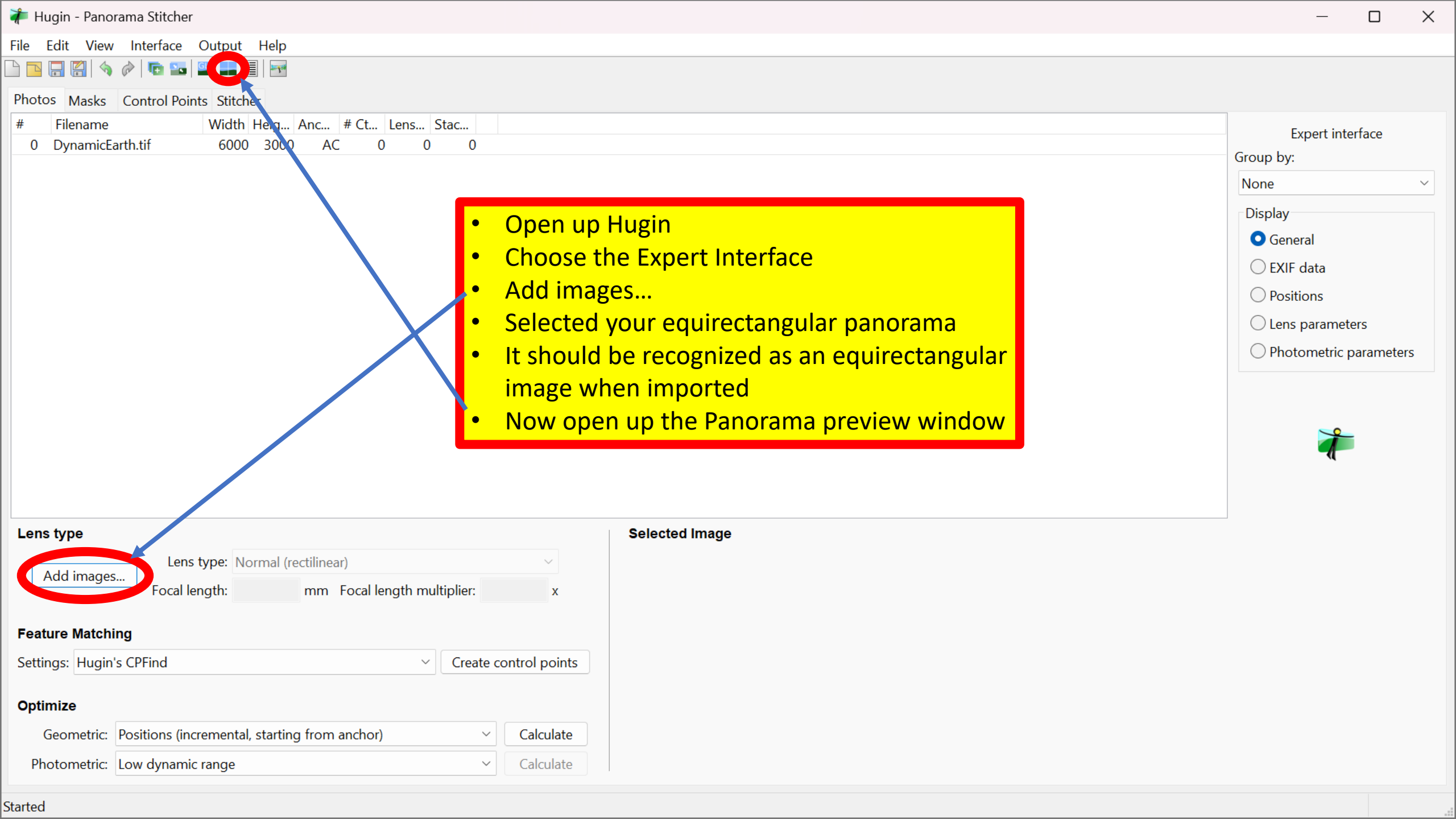
Nadir Patching with Hugin



©2025 Daniel K L Oi Photography



This panorama is incomplete, the nadir shot was not able to be taken. We will extract a bottom cube face, edit it in Photoshop, and reinsert the altered part back into the original panorama.


Hugin - Panorama Stitcher
File Edit View Interface Output Help
Photos Masks Control Points Stitcher
Filename Width Hei... Anc... # Ct... Lens... Stac...
0 DynamicEarth.tif 6000 3000 AC 0 0 0
Open up Hugin
Choose the Expert Interface
Add images…
Selected your equirectangular panorama
It should be recognized as an equirectangular image when imported
Now open up the Panorama preview window
Expert interface
Group by:
None
Display
General
EXIF data
Positions
Lens parameters
Photometric parameters
Lens type
Add images...
Lens type: Normal (rectilinear)
Focal length: mm Focal length multiplier: x
Selected Image
Feature Matching
Settings: Hugin's CPFind
Create control points
Optimize
Geometric: Positions (incremental, starting from anchor)
Calculate
Photometric: Low dynamic range
Calculate
Started

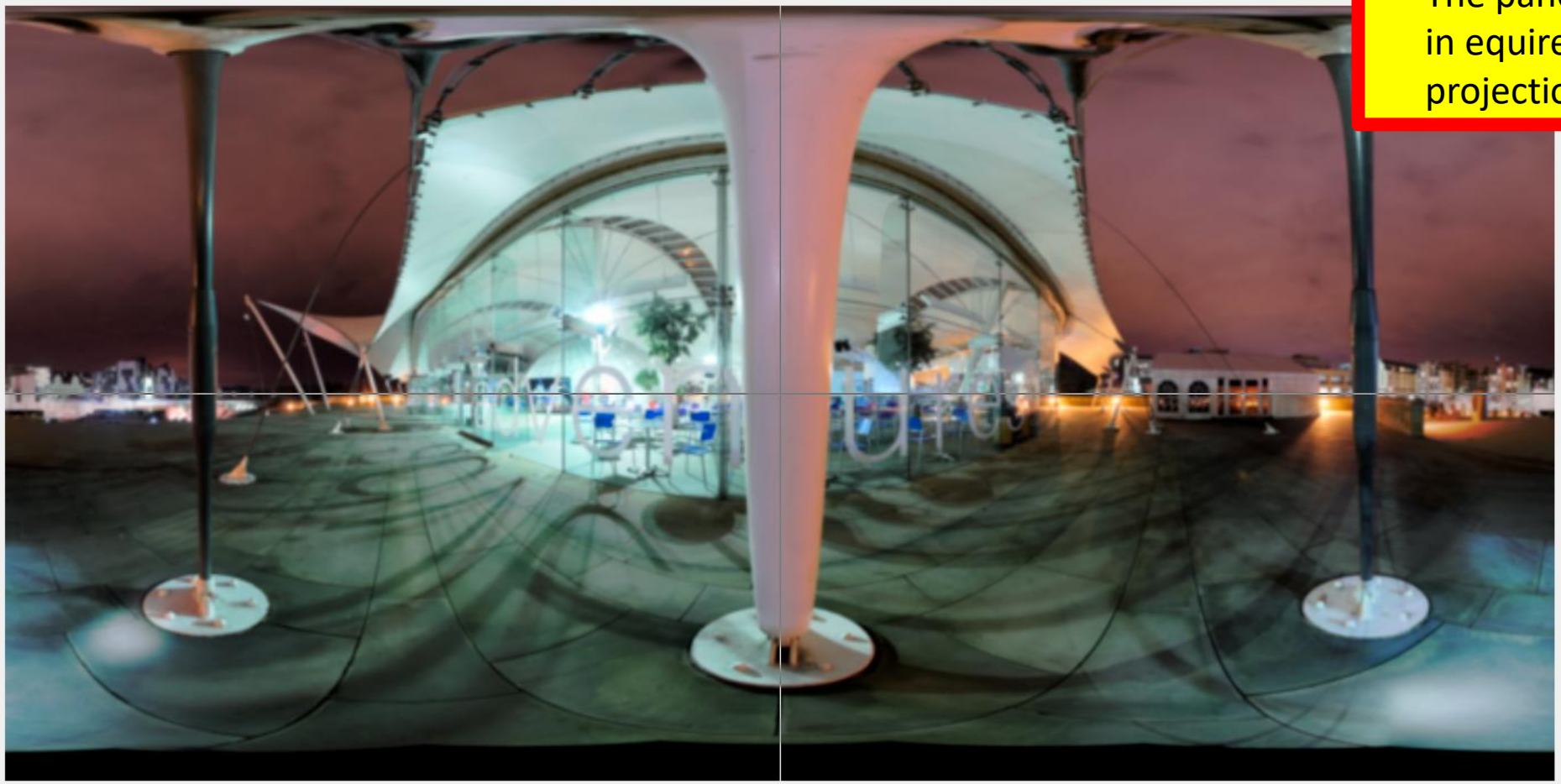
Panorama preview

Center | Fit | Straighten | Num. Transf. | Auto | Update | All | None

displayed images

0

- Switch to the panorama preview window
- The panorama is shown in equirectangular projection



Preview Options

projection (f): Equirectangular | Blend mode: difference | Output: LDR | EV: 0 | Range compression: 0

Left click to define new center point, right click to move point to horizon.

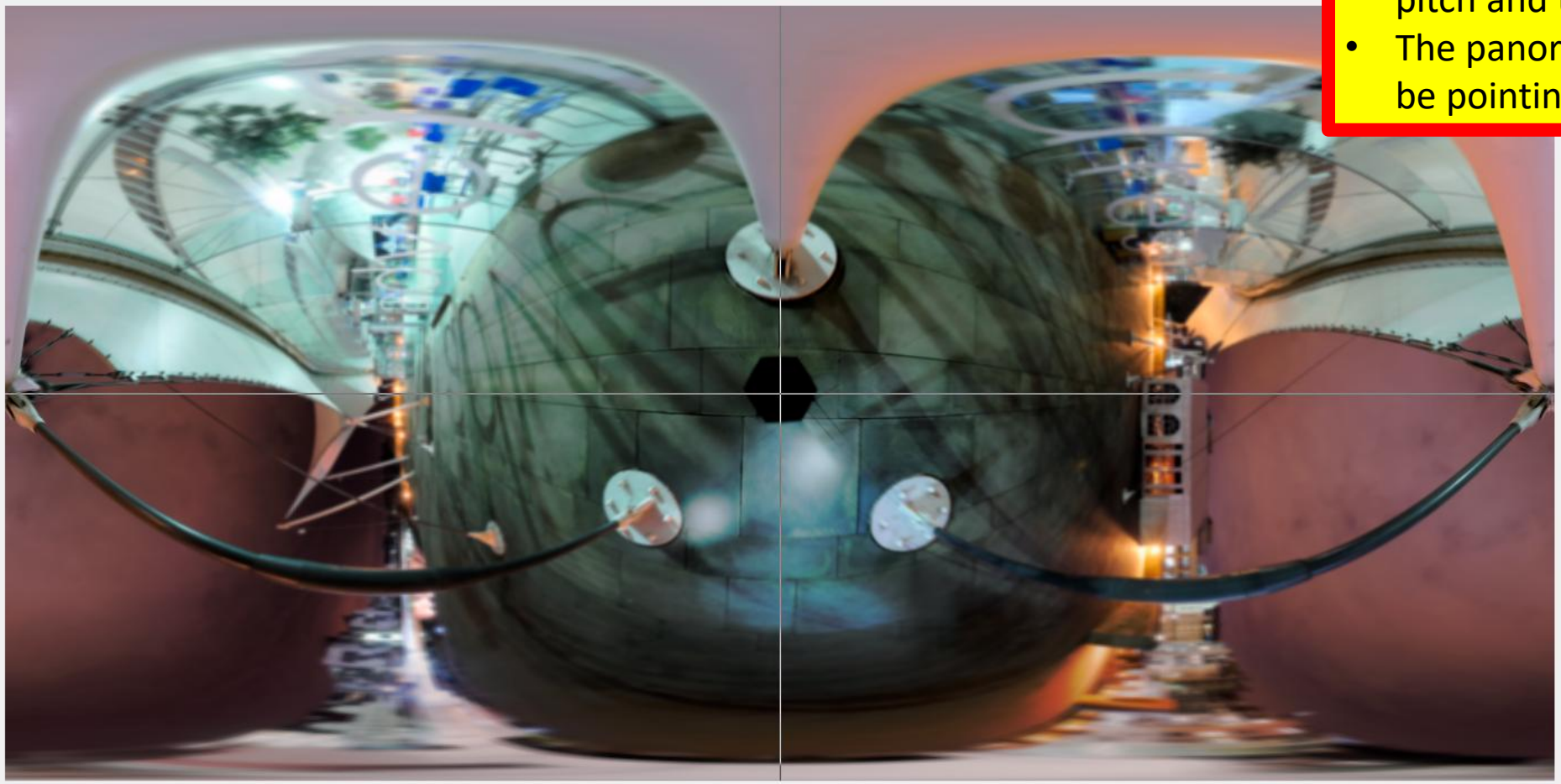
-74.4 -89.2 | 360.0 x 180.0

Panorama preview

Center | Fit | Straighten | Num. Transf. | Auto | Update | All | None

displayed images

0



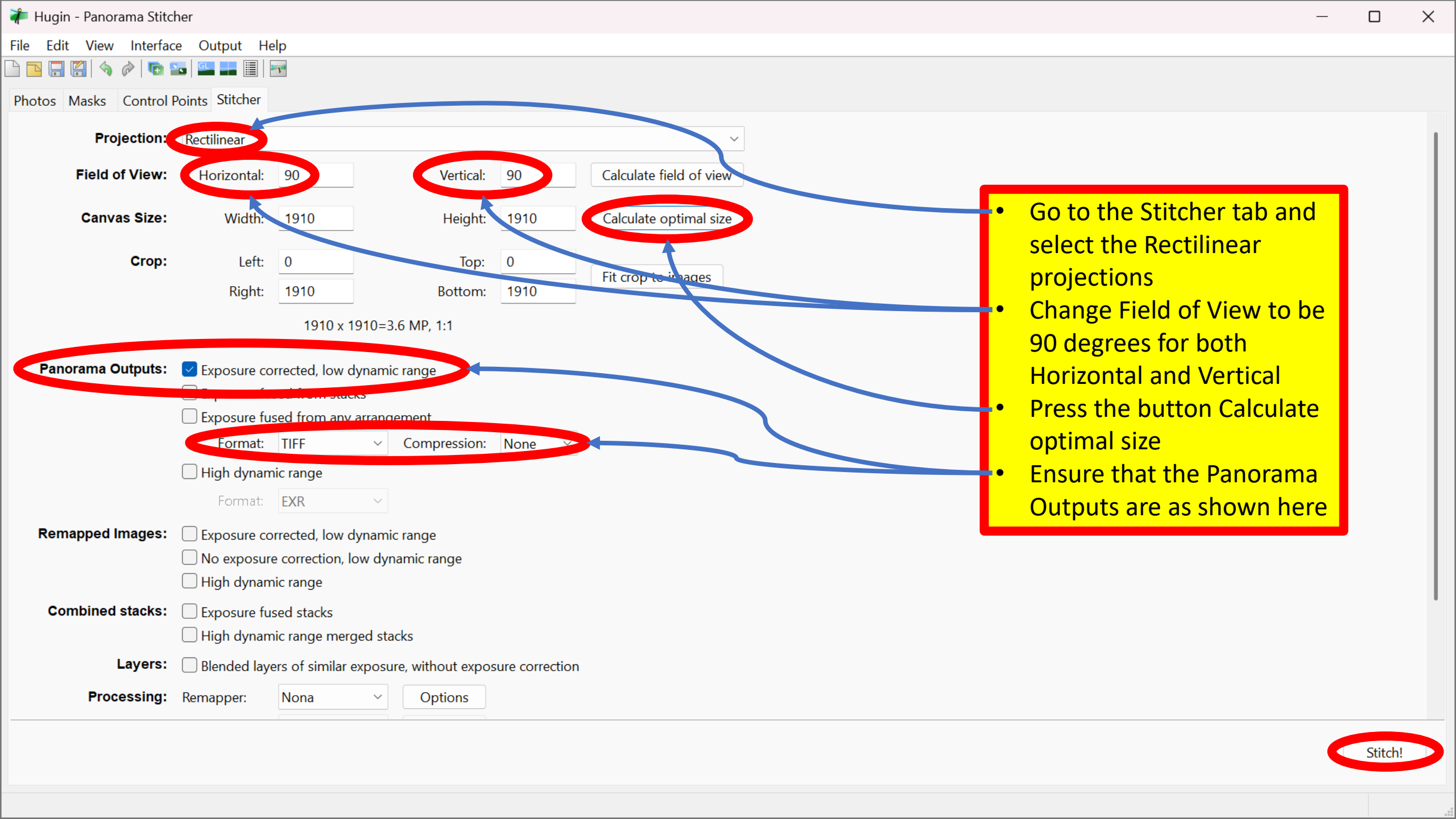
- In the Num. Transf. dialogue, enter 90 degrees pitch and then OK
- The panorama should now be pointing straight down

Preview Options

projection (f): Equirectangular | Blend mode: difference | Output: LDR | EV: 0 | Range compression: 0

Left click to define new center point, right click to move point to horizon.

-121.2 -76.2 | 360.0 x 180.0

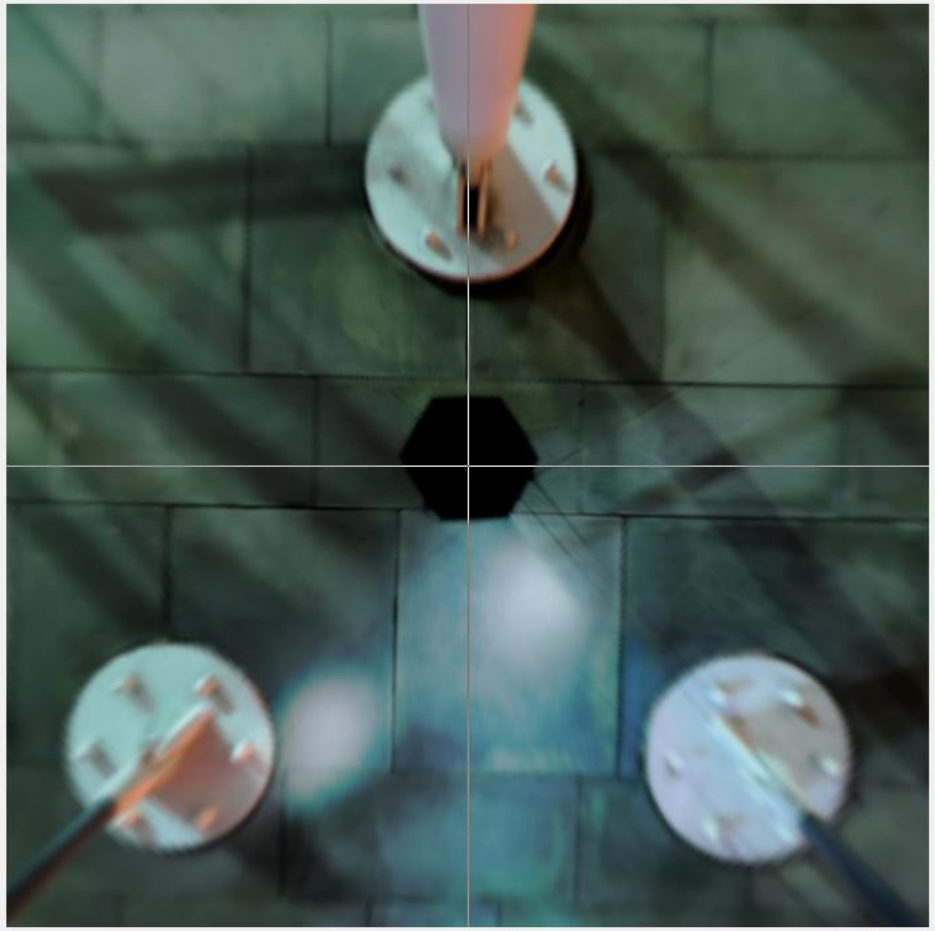

Hugin - Panorama Stitcher
File Edit View Interface Output Help
Photos Masks Control Points Stitcher
Projection: Rectilinear
Field of View: Horizontal: 90 Vertical: 90 Calculate field of view
Canvas Size: Width: 1910 Height: 1910 Calculate optimal size
Crop: Left: 0 Top: 0
Right: 1910 Bottom: 1910 Fit crop to images
1910 x 1910=3.6 MP, 1:1
Panorama Outputs: Exposure corrected, low dynamic range
Exposure fused from any arrangement
Format: TIFF Compression: None
High dynamic range
Format: EXR
Remapped Images: Exposure corrected, low dynamic range
No exposure correction, low dynamic range
High dynamic range
Combined stacks: Exposure fused stacks
High dynamic range merged stacks
Layers: Blended layers of similar exposure, without exposure correction
Processing: Remapper: Nona Options
Stitch!
• Go to the Stitcher tab and select the Rectilinear projections
• Change Field of View to be 90 degrees for both Horizontal and Vertical
• Press the button Calculate optimal size
• Ensure that the Panorama Outputs are as shown here

Panorama preview

Center | Fit | Straighten | Num. Transf. | Auto | Update | All | None

displayed images

0



- In the Panorama preview window, you will now see the bottom Cube Face of the panorama
- Go back to the Stitcher tab on the other window and press Stitch
- Save the output image as you like. In this example it is called NadirToPatch.tif

Preview Options

projection (f): Rectilinear | Blend mode: difference | Output: LDR | EV: 0 | Range compression: 0

Stitching

-121.2 -76.2 | 90.0 x 90.0



The extracted bottom cube face (left) can now be edited. In this example, the generative fill tool in Photoshop was used to patch the nadir hole (right). The image was then saved as NadirPatched.tif

Hugin - Panorama Stitcher

File Edit View Interface Output Help

Photos Masks Control Points Stitcher

#	Filename	Width	Heig...	Anc...	# Ct...	Lens...	Stac...

- Open up Hugin again
- Add images… selecting the patched nadir image file
- Hugin will ask what are the image parameters. In the Camera and Lens data dialogue, enter the HFOV as 90 degrees
- Press OK

Camera and Lens data

No or only partial information about field of view was found in image file
C:\Temp\2025-05-15 Hugin Nadir Patch\NadirPatched.tif

Please enter the horizontal field of view (HFOV) or the focal length and crop factor.

Lens type: Normal (rectilinear) Load lens data...

Enter horizontal field of view (HFOV) or focal length and crop factor:

HFOV (v): 90 degrees

Focal length: 15.3 mm Focal length multiplier: 1 x

OK Cancel

Expert interface

Group by: None

Display

- General
- EXIF data
- Positions
- Lens parameters
- Photometric parameters

Lens type

Add images... Lens type: Normal (rectilinear)

Focal length: mm Focal length multiplier: x

Feature Matching

Settings: Hugin's CPFind Create control points

Optimize

Geometric: Positions (incremental, starting from anchor) Calculate

Photometric: Low dynamic range Calculate

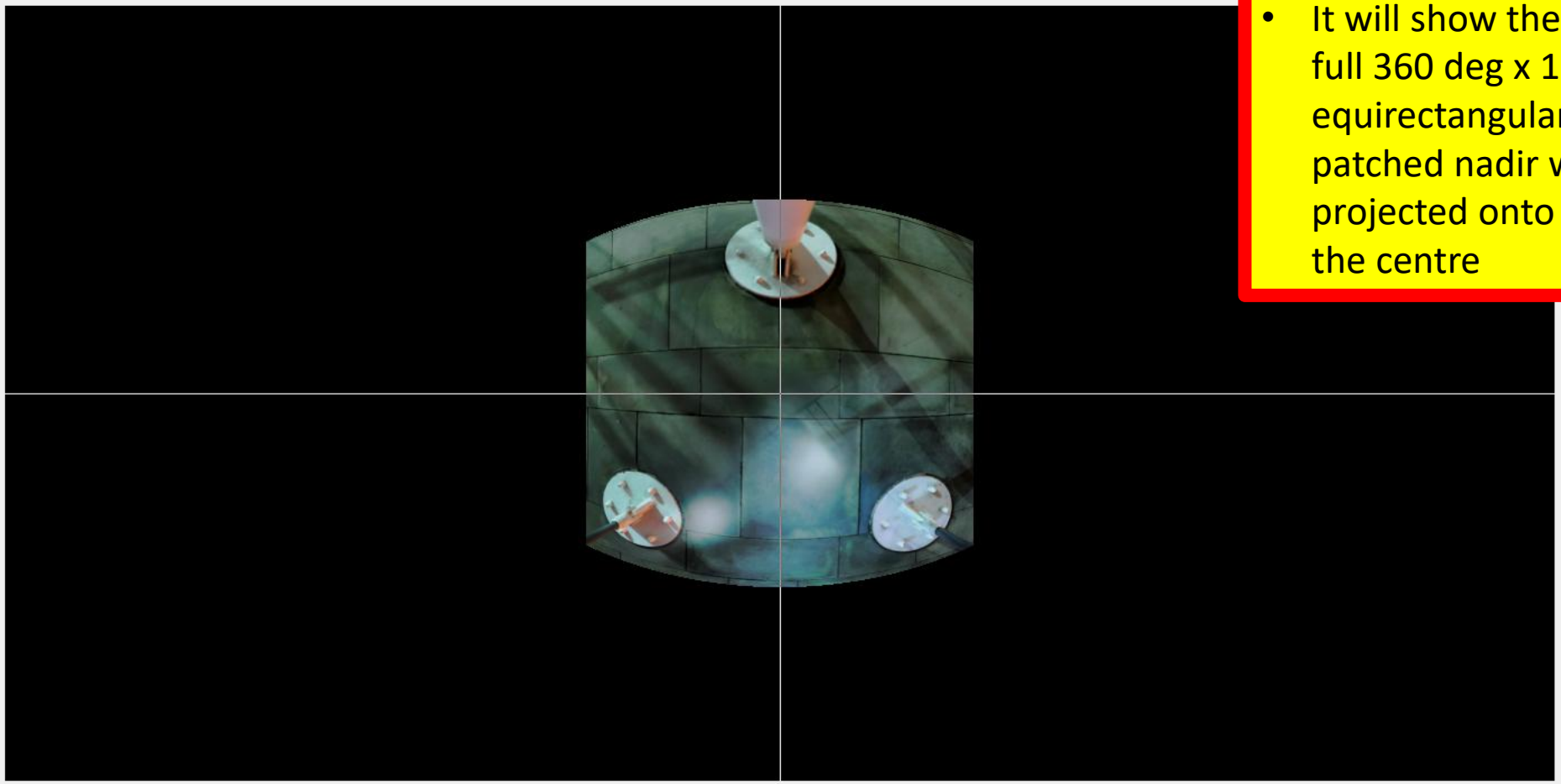
Started

Panorama preview

Center | Fit | Straighten | Num. Transf. | Auto | Update | All | None

displayed images

0



- Open up the Panorama preview window
- It will show the canvas for a full 360 deg x 180 deg equirectangular image. The patched nadir will be projected onto the canvas at the centre

Preview Options

projection (f): Equirectangular | Blend mode: difference | Output: LDR | EV: 0 | Range compression: 0

Stitching

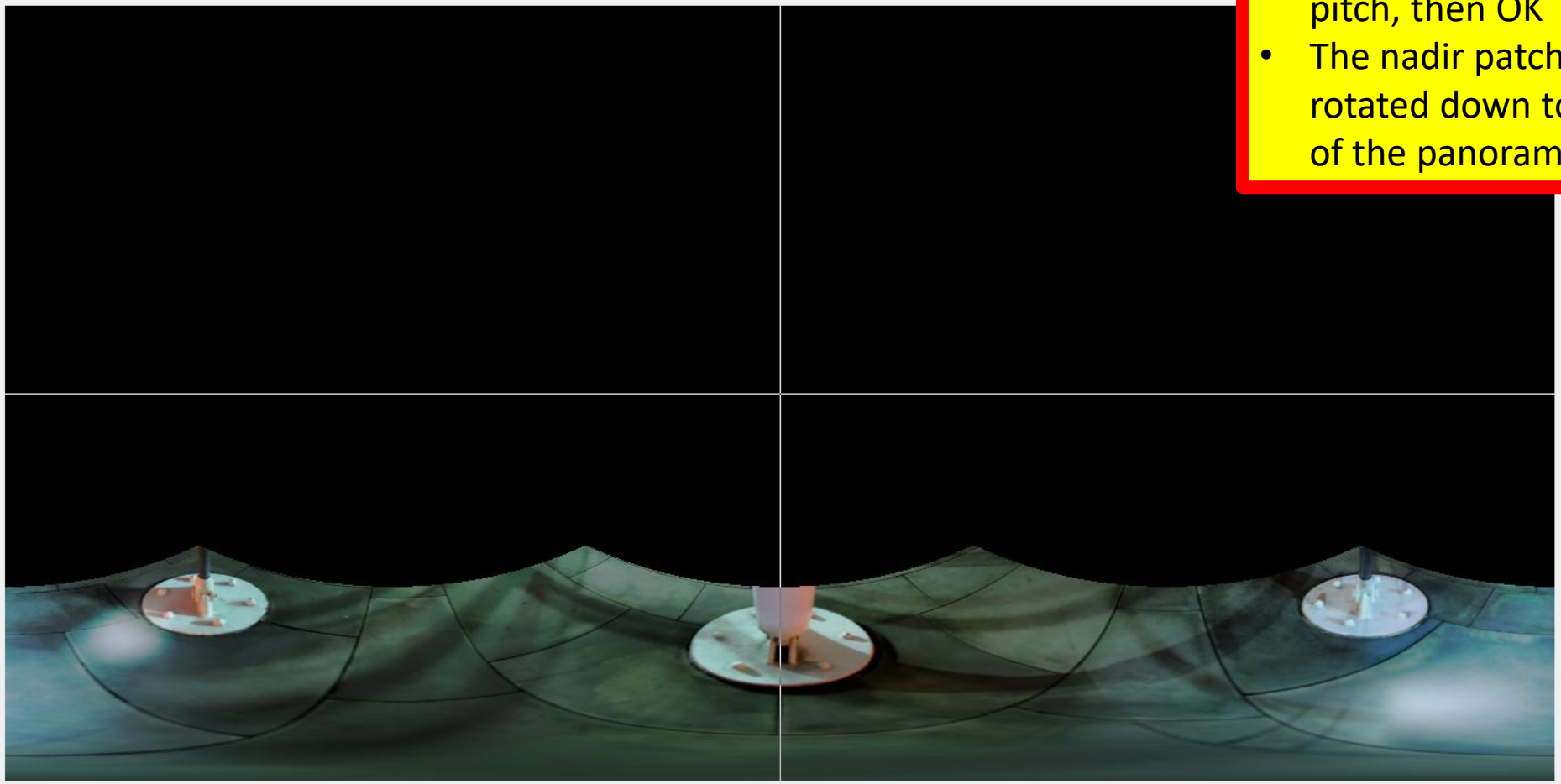
360.0 x 180.0

Panorama preview

Center | Fit | Straighten | Num. Transf. | Auto | Update | All | None

displayed images

0



- Press Num. Transf.
- Enter -90 degrees for the pitch, then OK
- The nadir patch will now be rotated down to the bottom of the panorama

Preview Options

projection (f): Equirectangular | Blend mode: difference | Output: LDR | EV: 0 | Range compression: 0

Left click to define new center point, right click to move point to horizon.

113.4 -53.8 | 360.0 x 180.0

Hugin - Panorama Stitcher

File Edit View Interface Output Help

Photos | Masks | Control Points | Stitcher

Projection: Equirectangular

Field of View: Horizontal: 360 Vertical: 180 Calculate field of view

Canvas Size: Width: 6000 Height: 3000 Calculate optimal size

Crop: Left: 0 Top: 0 Right: 6000 Bottom: 3000 Fit crop to images

6000 x 3000=18.0 MP, 2:1

Panorama Outputs:
- [x] Exposure corrected, low dynamic range
- [ ] Exposure fused from stacks
- [ ] Exposure fused from any arrangement

Format: TIFF Compression: None

- [ ] High dynamic range

Format: EXR

Remapped Images:
- [ ] Exposure corrected, low dynamic range
- [ ] No exposure correction, low dynamic range
- [ ] High dynamic range

Combined stacks:
- [ ] Exposure fused stacks
- [ ] High dynamic range merged stacks

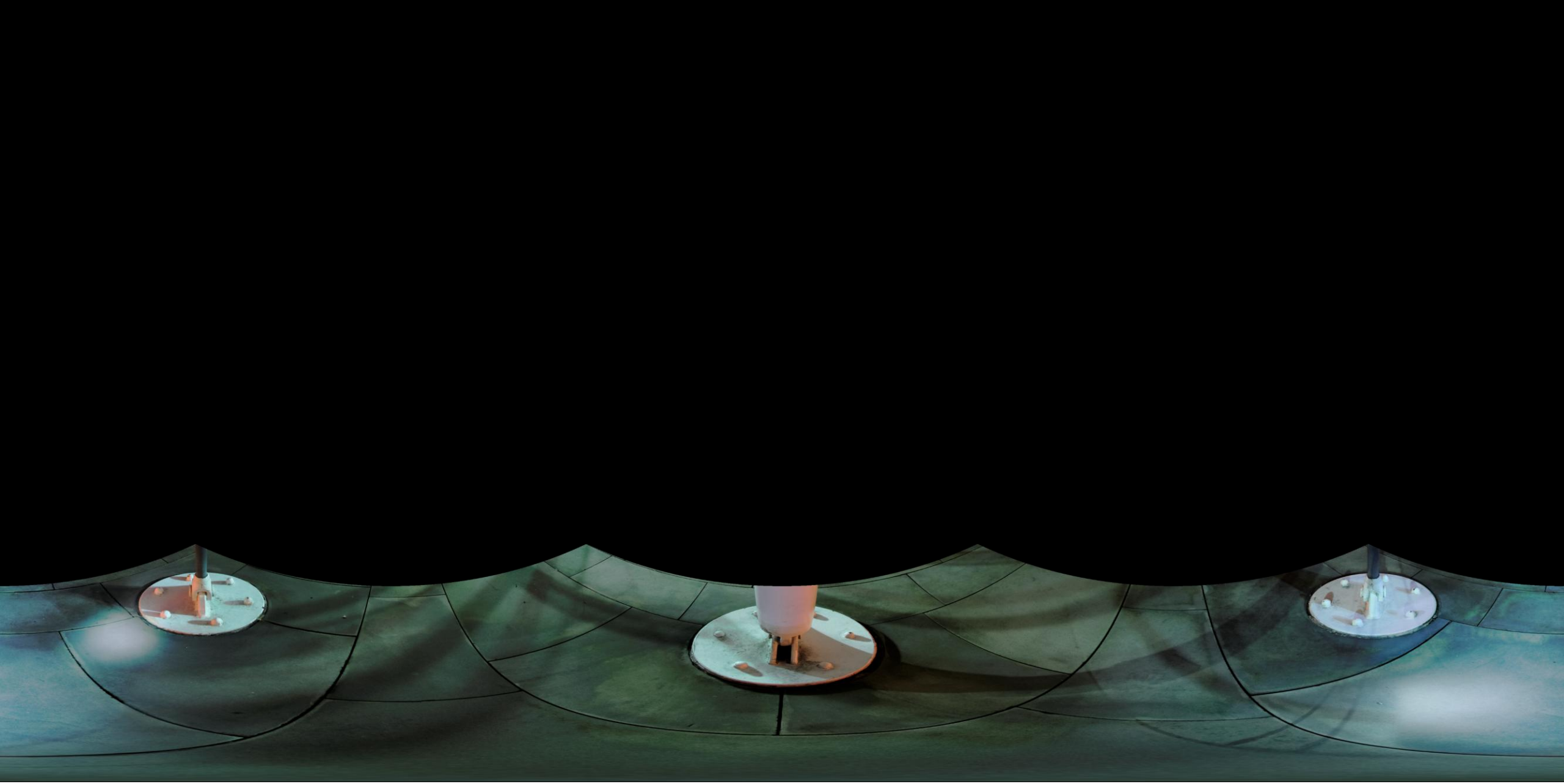
Layers:
- [ ] Blended layers of similar exposure, without exposure correction

Processing: Remapper: Nona Options

Stitch!

Started

- Back in the main Hugin window, go to the Stitcher tab
- Press Calculate optimal size
- The canvas size should be the same as the original equirectangular panorama
- Press Stitch! Save the image, here it is called NadirToInsert.tif



Equirectangular projection of bottom
cube face with patched nadir

Picture Window Pro 8.0.485

File Edit Transformation Script Help

1 - DynamicEarth.tif (1:9.15 - 6000 x 3000)

4 - Composite (1:9.15 - 6000 x 3000)

1 - File Open - D

Original pano

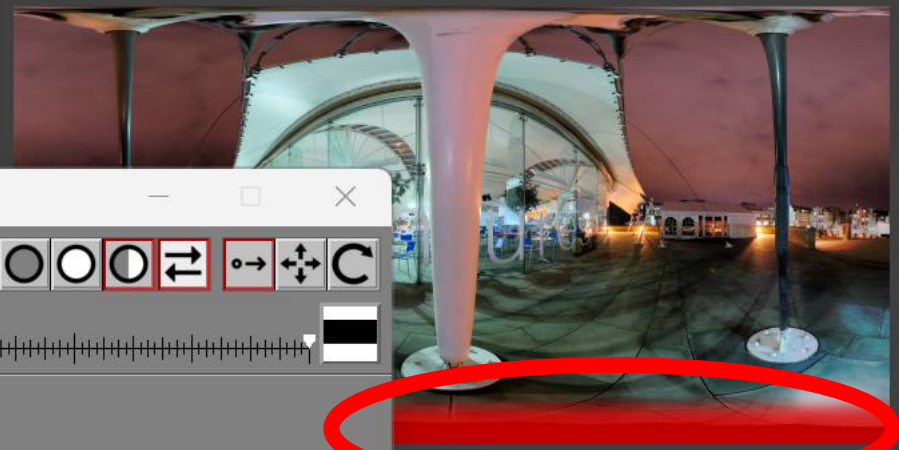
4 - Composite

Base Mask

2 - File Ope

NadirToInsert.tif

- In your image editor of choice, you can composite the patched region of the NadirToInsert.tif image into the original panorama using a mask to only select the fixed nadir region
- The rest of the original panorama is thus untouched



Masked Area



Composited result

Composite

Cancel OK Apply In Ov

Amount:0.0% .. 100.0%

Overlay:

Overlay Amount:100.0%

Operation: Blend

Alignment: None

Base Mask

8 16



Final panorama with fixed nadir

Note: A slightly different version with a mirror ball is posted at https://www.360cities.net/image/edinburgh-dynamic-earth-night