Creating a 3D Panorama Immersive Video

Digital Media Commons
Fondren Library
Basement 42B

Required Equipment and Software:

- Digital Camera
- Tripod with 360˚ fluid motion panoramic head (Velbon Videomate Tripod)
- Adobe Lightroom
- Agisoft Metashape
- Adobe Photoshop (Optional)
- Adobe Premiere Pro, or whichever video editing program you prefer

Step 1: Shooting photos for the panoramas

Shooting a 360˚ panorama can be feasibly done with just about any camera/lens combination, but for ease of shooting and processing, the best option is to use a wide-angle rectilinear prime lens. Specifically, avoid using a fisheye style lens or one that has particularly noticeable distortion, as it will complicate the process of stitching together the photos. For crop sensor cameras, something around 18mm (the typical wide end of a kit zoom lens) should be suitable, for a full frame camera, anything around the 24mm range should work well.

To set up your camera to shoot, you will need a tripod that has a head that rotates freely 360˚, like the Velbon Videomate Fluid Head Tripod available for checkout from the DMC. This is because you will be taking a series of photos in full rings, rotating the camera about the tripod and tilting it upwards or downwards to cover a complete sphere of the location you are shooting.

For best results, set your camera to manual and select a moderately small aperture, such as f/8. Set your ISO to ideally 100, but in the event that the lighting of your scene is very dark, increase it to 400. Adjust your shutter speed accordingly to achieve proper exposure, using the light meter of the camera as a guide. Switch your lens to manual focus, and adjust your focus until you are happy with what is focused, which should be the majority of the scene. Proceed to take photos, rotating the camera between each exposure such that roughly 1/3 of the new frame overlaps the last one you took. This is to make sure there is enough material for the processing software to align later. You may notice that as you turn your camera, the light meter indicates that the photo is no longer properly exposed. It is important that you keep the settings the same regardless for the purpose of stitching together. Once you complete a pass, tilt the camera up or down and repeat the same process until you have photographed a complete sphere. It is possible that your shutter speed may be very slow, which may necessitate the use of a remote trigger or the time delay shutter release available on most cameras to avoid camera shake in your images from your pressing the shutter button. While the process can be done with jpg images, it is preferable to shoot in your camera's raw format, as corrections in Lightroom prior to stitching together the panorama will be easier with raw files.

Step 2: Editing and Processing the Photos

Once you have your photos, load them into Lightroom and perform any batch editing you may want. To avoid causing problems with stitching, avoid anything particularly drastic in terms of color processing, sharpness, or spot removal. Minor editing of contrast, exposure/brightness, and lens correction is fine, as is white balance correction. The most important part is that you apply the same edit to all photos. Once you are happy with how your photos look and are ready to stitch them into a panorama, export them as .tif files.

Step 3: Generating a Panorama

Open Agisoft Metashape. Go to **Workflow > Add Photos…** and select and add all photos you will be using for the panorama. Next, align them by going to **Workflow > Align Photos.** This process may take a little while, and when it completes, you may get a notice that some photos could not be properly aligned. In the event that you have unaligned photos, you can quickly identify them, as they will have "NA" after them in the list of photos on the left (if you do not see a list, expand the **Chunk** and **Cameras** folders and it should appear). Select those that are not aligned in that list, right click and select **Reset Alignment**. Confirm, and then right click once more and select align photos. Typically, this will fix the issue. One or two unaligned photos is fine, but avoid having large blocks of unaligned photos. Once your photos are aligned, select all of them and right click, selecting **Move Cameras > New Group**. Right click on the new group that is created, and change the **Group Type** to **Station**. At this point, based on the generated points you can see, use the region rotate tool (the square icon, use the dropdown to select rotate) to try to align to the best of your ability the X/Y axes to the horizon of your images.
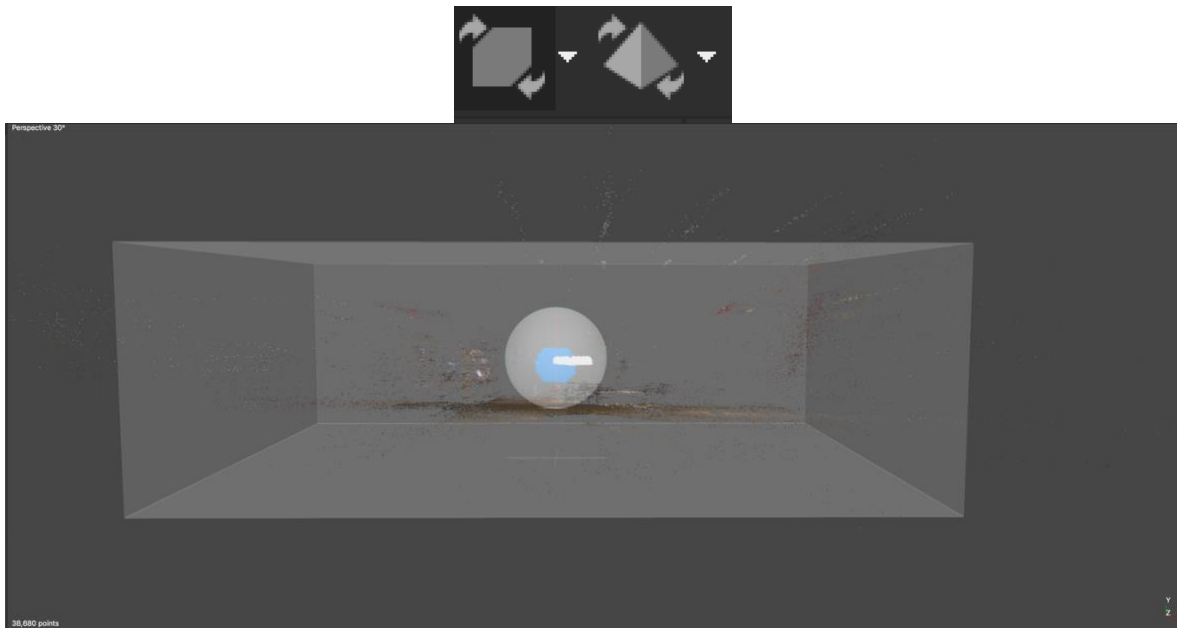
Once you think it is aligned, go to **File > Export Panorama**. The buttons to the right of the preview will let you rotate the panorama as needed if it is upside down, and the directional arrows will move the center point of the image 90 degrees in the direction of the arrow. This is useful if you would like the starting point of the video to point at a particular feature in the panorama. Here you will be able to note how well the horizon line is aligned. Ideally, you want the center line of the image to be your horizon line, though you may have a horizon that snakes like an S from one corner to the other diagonally across it. If this is the case, cancel the export and try to rotate the region to better align things. Once you are happy with the image, set the pixel dimensions to 12288 x 6144 export it.

Open the new panorama in Photoshop. Fill any areas with tripod legs or black areas at the top or bottom of the image by selecting the area with the lasso tool and right clicking, selecting **Content Aware Fill**. Apply and flatten the image (either **Layers > Flatten Image** or **cmd+shift+e**). Save changes.
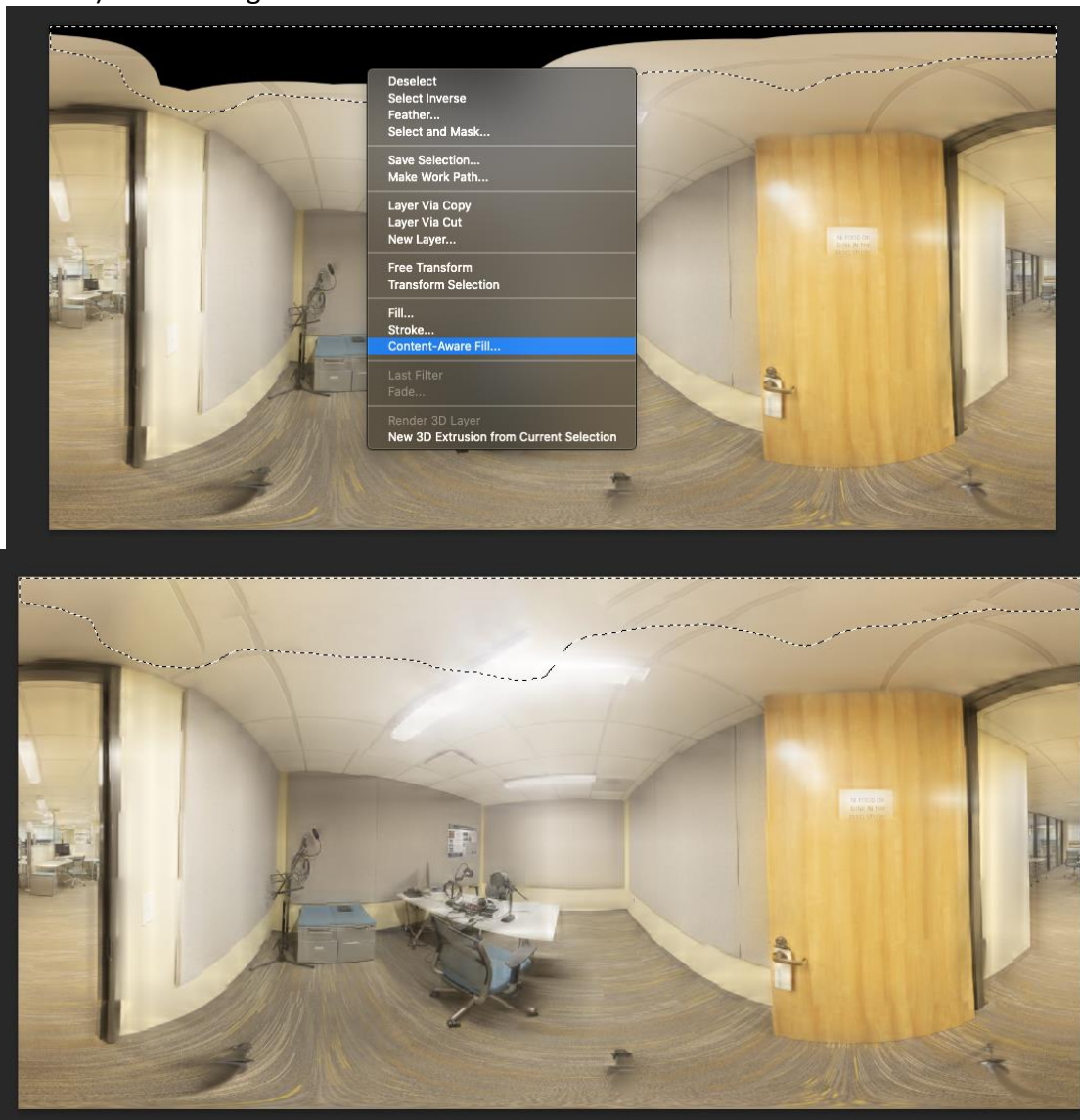
Step 4: Creating a 3D Video in Premiere

Create a new Premiere project and sequence. For the sequence, go to **settings** and set the editing mode to **Custom**. Set the dimensions of the frame to **12288 x 6144**, and make sure you are using **square pixels**. Framerate and other settings are less important, as you will be using still images, but 30 fps is a fine go-to. Click on the **VR Video** tab and set the projection to **Equirectangular** and the layout to **Monoscopic**.
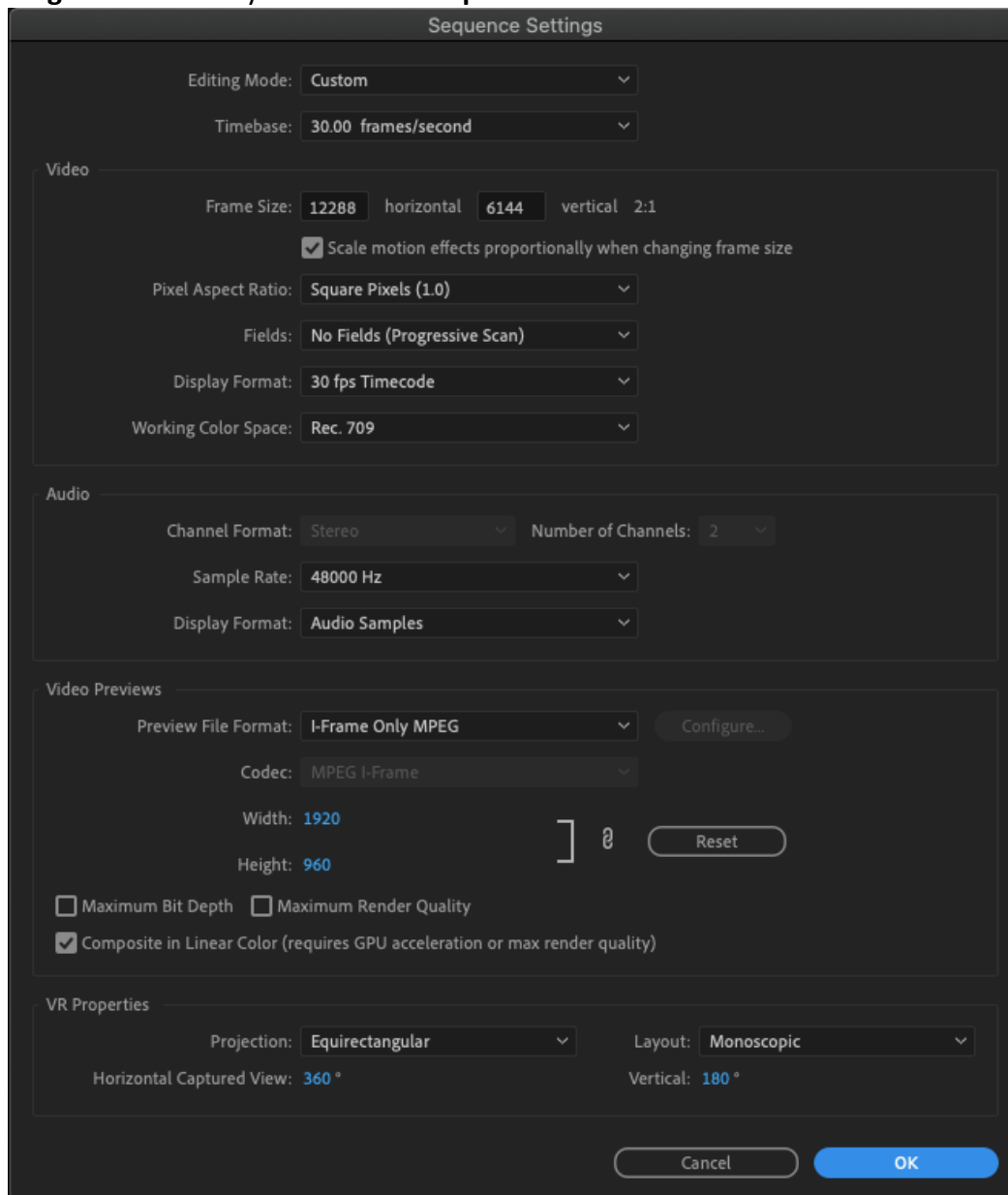

Import and ingest all of the panoramas and arrange them in your timeline as needed, coupled with whatever voiceover and background music tracks you are using. As they are still images, you can extend or shorten them to any duration to match your narration for each area. You will

notice that the preview will show your equirectangular panorama, not a 3D view. Underneath

the preview pane, click the **+** button for the button editor, and drag in this:
That button will allow you to toggle back and forth between VR and normal display mode for
the preview pane. In VR mode, you can click and drag on the preview pane to get a sense of
how it will look in 3D form.
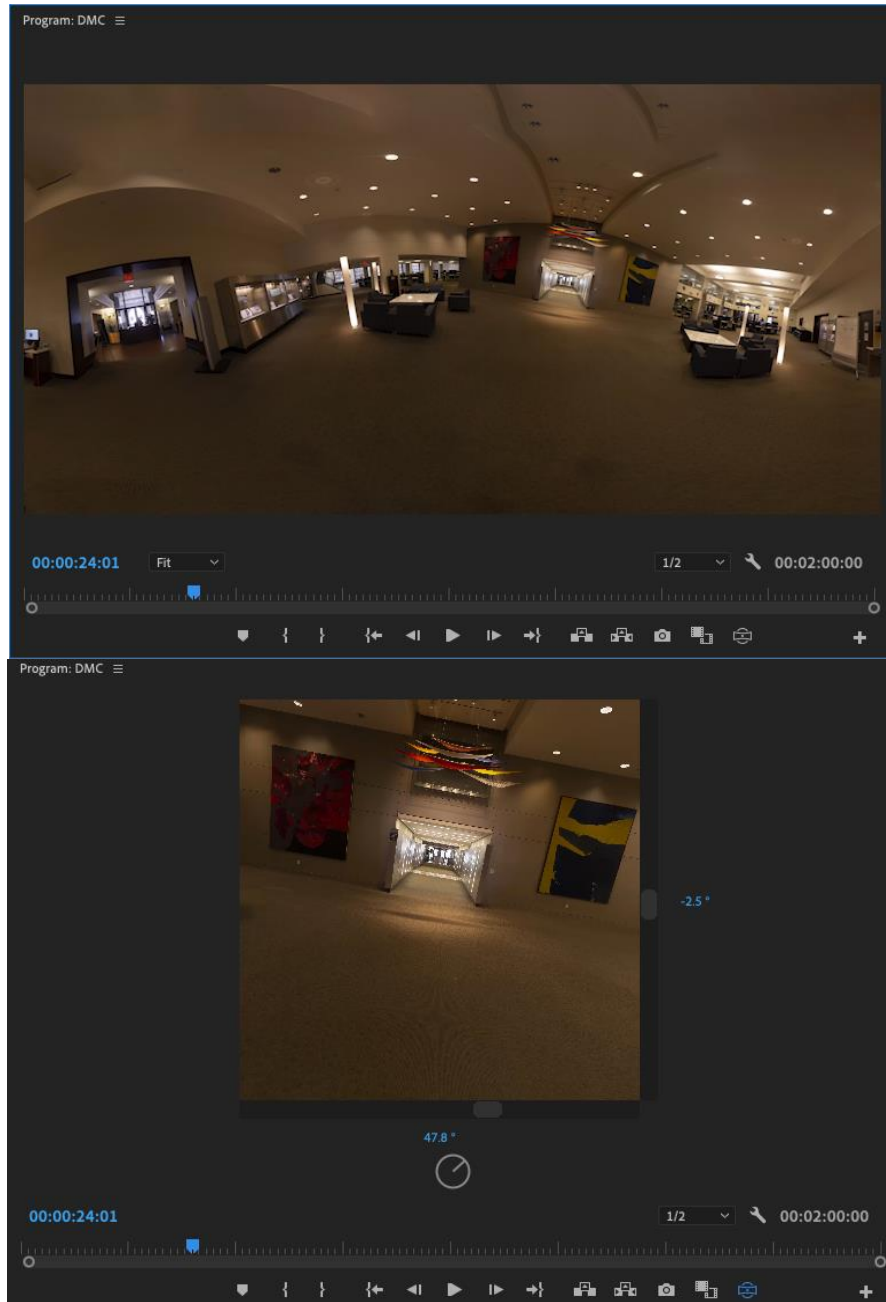
Once you have edited the video to your liking, export it as you normally would, making sure that the preset matches your source, and that under the **Video** tab the **Video Is VR** option is checked and the **Frame Layout** settings match your sequence.
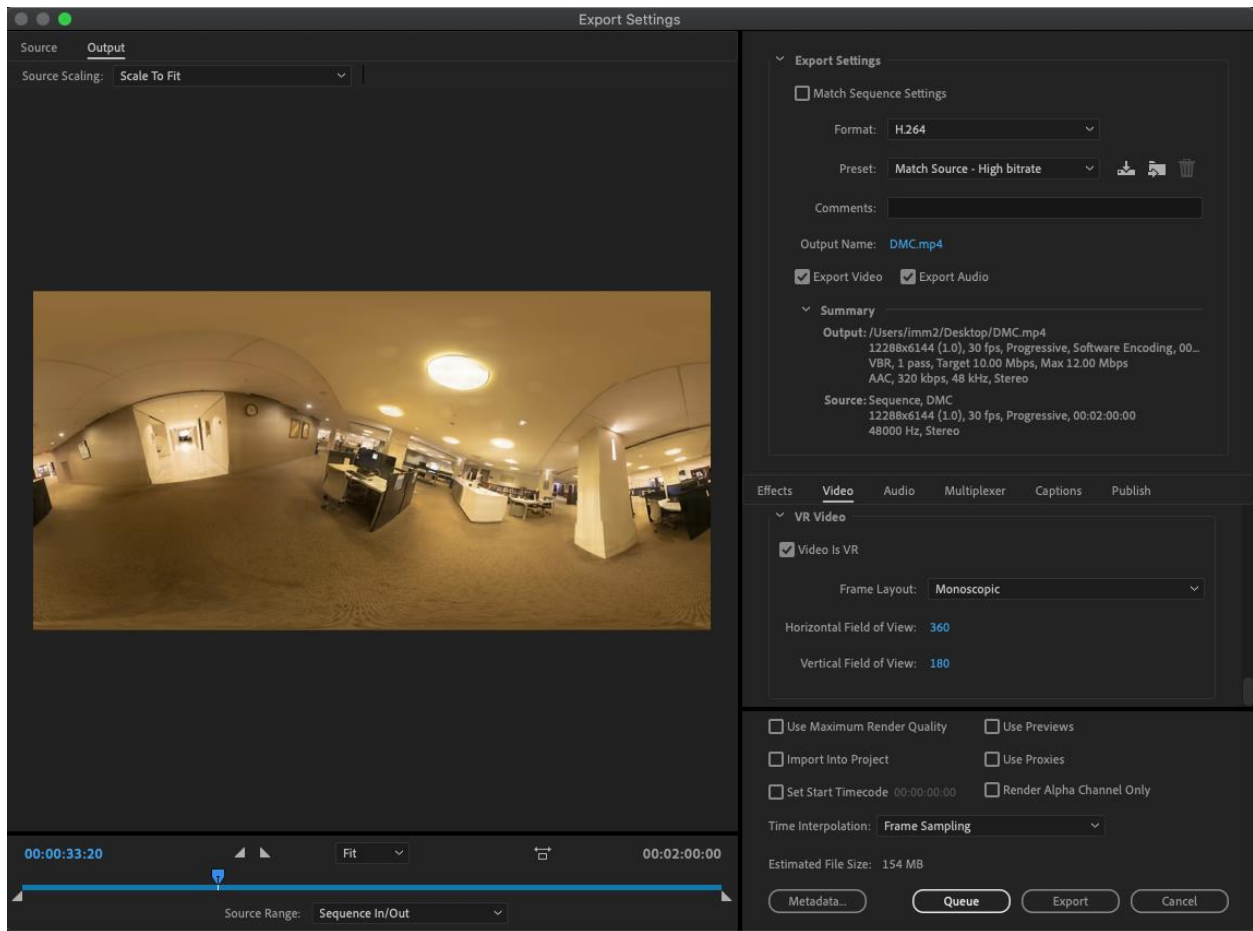
Once it has exported, you can upload it to Youtube, which will automatically process it as a VR video and display it as such.