



Looking straight up.

The original image, above, did not come out of the camera like this. I spent months editing, smoothing panels and shadows that didn't mesh up correctly. Where the edges of the image butt together is especially critical. It's just one of those things: to make a convincing illusion of reality, the artist must eliminate as much imperfection as possible. The tools involved in accomplishing this will include basic computer skills, but also painting and drawing, basic art skills.

Usually, the subject matter for panoramas is fairly standard: landscapes, cityscapes and so on. I noticed right away, that with the VRkit, you could make panoramas of very small enclosed spaces. Others, besides the Refrigerator series I have done include placing the Rotator in a liquor cabinet, and a pantry. Generally, shooting a spherical pano in a vast landscape makes for much easier editing, than a refrigerator.

Meanwhile, as prices usually do in the field of technology, VR headsets of the standalone kind became affordable for someone like me without institutional backing.

Here's a chart that shows the three models of Oculus products I've used, and their prices. Prices shown are only for the specific models I've owned and used:

Oculus Go debuted on May 1, 2018

System on a chip: Qualcomm Snapdragon 821

Operating System: Android 7.0

Resolution: 1280x1440 LCD

Tracking: 3 Degrees of Freedom Only

Price: \$249

Oculus Quest debuted on May 21, 2019

System on a chip: Qualcomm Snapdragon

835

4 cameras

Oculus Quest system software based on Android

Resolution: 1440x1600 per eye OLED

Tracking: Inside-Out SLAM

Price: \$349

Oculus Quest 2 debuted on October 13, 2020

System on a chip: Qualcomm Snapdragon XR2

Resolution: 1832x1920 LCD per eye

Tracking: Inside-Out SLAM

Price: \$299

Outside-in tracking relies on an external device to track headset.

Inside-out tracking has camera mounted on headset

The wait was worth it. I had my headset and quite a bit of practice making spherical panoramas.

II. The Technology of Headsets

Backtracking a bit, I used clamshell headsets for about a year before I bought a standalone. Clamshells are a good place to start as they are less expensive than standalone headsets. They are also good for showing you, the user, where you need to tighten your editing skills.

There are two kinds of headsets: 1) Clamshells into which the user puts a smartphone...

Virtual reality headsets and viewers have also been designed for [smartphones](#). Unlike headsets with integrated displays, these units are essentially enclosures which a smartphone can be inserted into. VR content is viewed from the screen of the device itself through lenses acting as a [stereoscope](#), rather than using dedicated internal displays. Google released a series of specifications and associated [DIY](#) kits for virtual reality viewers known as [Google Cardboard](#); these viewers are capable of being constructed using low-cost materials (and a smartphone with a gyroscope), such as cardboard (hence the naming).—Wikipedia

Dermandar with theVRkit makes use of the smartphone clamshell arrangement to give a nice result when connected to their website. Your original image is delivered back to the smartphone stereo form, so if you are looking through Google's Cardboard, you will get a stereogram experience.

2) Standalone head-mounted displays are complex devices designed to seal off input to the user's sensory system from everything except the computer feed. It follows that the HMD must then supply the stimuli to the user. The Quest 2 does this by visual experience and head-tracking.

Fresnel lenses are used in most HMDs. They are light-weight, and allow for near and far focus for the user. Smooth, seamless

updating of the image is critical. Quest 2 uses 4 cameras for head and controller/hand tracking.

Additionally, the inter-pupillary distance can be changed by the user for more comfortable-to-view, focused visual images.

The controllers with the Quest 2 enable navigation from image to image, among other things.

Why Virtual Reality Enriches the Art Experience

In some ways, art and virtual reality are already in the same business, friendly, but competing neighbors. Both aim for a heightened sense of reality.

Traditional art depends on the viewer's visual sensory apparatus. In traditional art, an image is provided, and is subject to study and contemplation, but it is a static image. If you turn your head, the image is shunted from one corner of your visual field to another. There is nothing more to see. It is what it is.

Virtual reality first screens off the user's visual senses, and replaces them with its own in the form of lenses, image updating and other optical adjustments. VR is the perfect metaphor for the human visual situation. That is to say, there is always more to the picture than any one glance will reveal. There is always something behind you or to the left or right, or above you or below you.

It is here, at this point, that the artist must be aware of the social contract between the user, who could be anyone, and

him or herself. The artist must not betray the trust the user has extended because the artist has all the power and the viewer, very little. This is not the usual situation for the artist to be in, so, do no harm.

Point of View in 180-degree Field of Vision Stereograms

I made the picture below in 2012 in Zion National Park, Utah. It was extremely hot—in the range of 110 F. There were many tourists about, including myself and Lorna. I had my new Nikon D90. I snapped this shot and moved on.

It was several months later, when I was really looking at the photos I'd taken that I began to see some of the potential this image had. For one thing, I think there are overtones of Watteau's Embarkation for the Isle of Cytherea. It may be a foolish desire to join the celebrities of the day in an outdoor party, but never underestimate the desire to belong.

When this picture is viewed in an HMD as a 180-degree FOV Stereogram, suddenly you are thrust right in the middle of the action. (The actual setting on the Quest 2 headset is 180/30.)

No hanging back! It's time to go.