What is Panoramic Photography?

Panoramic photography, also known as wide format photography, is a special technique that stitches multiple images from the same camera together to form a single, wide photograph (vertical or horizontal). The term "panorama" literally means "all sight" in Greek and it first originated from painters that wanted to capture a wide view of a landscape, not just a certain part of it. The first panoramic photographs were made by simply aligning printed versions of film, which did not turn out very well, because it was close to impossible to perfectly align photographs. With the invention of personal computing, advancements in computer software and digital photography, it is now much easier to stitch digital images together using specialized software. In fact, using a proper photography technique and panoramic equipment, it is now possible to create near-perfect panoramas at extremely high resolutions.

While the word "panorama" automatically assumes that it will be a wide horizontal or vertical image, in my opinion, it does not necessarily have to be. If I stitch several images together and it turns out to be a square image, I still consider it to be a high resolution panoramic image. Here is how I define panoramic images:

Wide angle panoramas – anything that looks like a wide angle photograph, which covers less than 180 degrees, whether horizontal or vertical. Wide angle panoramas can even look like regular images, except they are stitched from several photographs and therefore would have more resolution.

180 - 360 degree panoramas   These types of panoramas look very wide, covering a large area. In fact they can be somewhat confusion to the eye when trying to understand the image

Taking vertical shots   a preferred way to capture panoramas. Vertical images capture more of the sky and ground and yield higher resolution panoramas compared to horizontal ones.

Overlap - In order for any program to be able stitch multiple images together, the images have to overlap each other by a certain margin, so that alignment points are properly identified. The alignment points serve as flags for the stitching algorithm that seamlessly merges the images and cuts out the rest of the image. The overlap margin is a subject of opinion, I recommend 20 - 30% overlap.

No-parallax point: The essence of Panorama Photography

Just as the pupil of your eye is the centre of the world it sees, so it is that the entrance pupil of the camera lens is the centre of the scene it sees. It is about this point that you want to rotate the camera The point is sometimes referred to as the no-parallax point (NPP).

In order to get a series of shots that will perfectly lineup and overlap, you must rotate/swivel your camera on this No-Parallax point. This will allow the stitching software to perfectly align its reference points to blend the image into one continual shot, without distorted overlap. Basically it will make a perfect picture.

No Parallax Point

Subject

Sensor (film)

Panorama head mounting

Normal tripod mounting
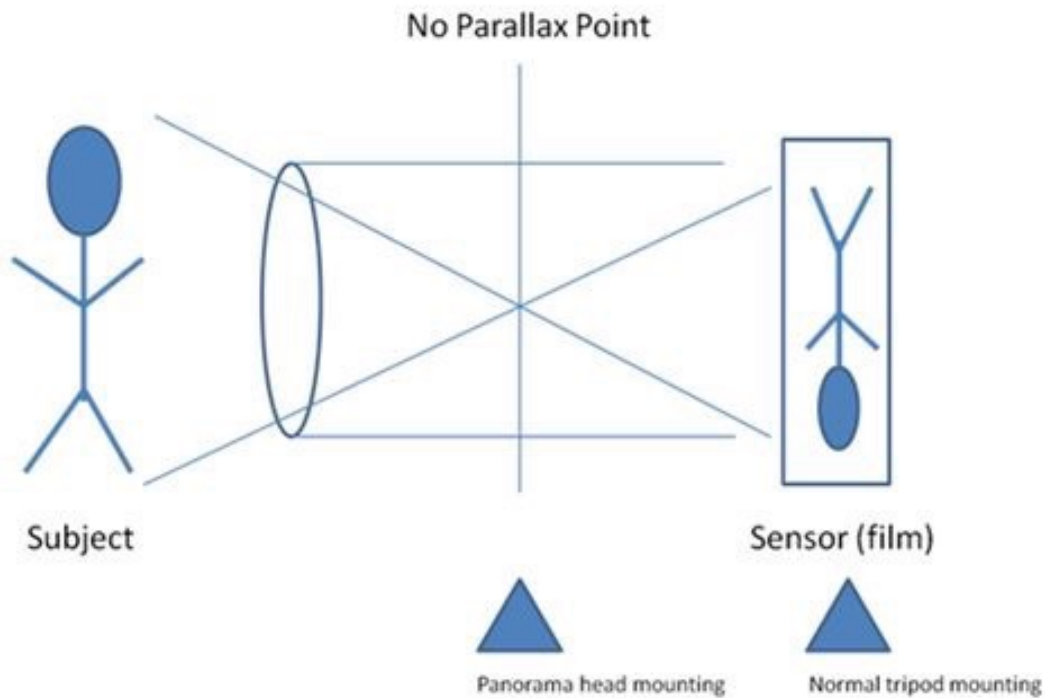
Camera Equipment:

1 Digital Camera   as far as the camera itself, you want a digital camera that can shoot in full Manual mode (preferably a DSLR).

2 Lens   I find zoom lenses to be the most useful for panoramic photography. You can certainly photograph panoramas with fixed/prime lenses, but being able to zoom in and out will give you more options and versatility, especially in difficult conditions where your movements are limited.

3 Lens Filters   I recommend taking filters off your lens while shooting panoramas.

4 Tripod   a tripod is almost mandatory, but make sure that the head is flexible enough for you to be able to pan from left to right with ease.

5 Cable Release   optional, but recommended for capturing shake-free images.

6 Panoramic Setup/head (optional) a full panoramic setup is ideal for best results, but it is very expensive ($500+). Not recommended for beginners due to complexity of use, but a must-have for professionals that want to sell their images

Camera Set-up:

- Shoot in "Manual" mode   the most important thing in panoramas is consistency of exposures. It is imperative that no matter how bright or dark parts of the scene might be, your images must have the same exposure.

- Set your lens to Manual Focus   if you have a DSLR, focus your lens on a distant object (infinity or near infinity), then switch to manual focus. You do not want your camera to change focus every time you take a picture.

- ISO   make sure that your ISO is NOT on Auto, but is set to manual

- Aperture and Shutter Speed   for panoramic images, you want to have everything in focus. Therefore, make sure that your aperture is set to a good number that will put everything, including any foreground elements, into perfect focus. (f/8 to f/16 is excellent)

- Metering   in terms of metering, do not meter off the brightest or darkest areas of the scene, but rather try to find a "sweet middle" and set your shutter speed based on that area for the entire panorama. Take a couple of pictures and make sure that the images are not too overexposed or underexposed for the brightest and darkest parts of the scene.

- Shoot in RAW   I always recommend shooting in RAW for best results.

Note: The biggest challenge with panoramic photography is stitching problems due to parallax errors. I highly recommend reading the Wikipedia article on parallax to fully understand why it presents such a big problem for photography. Once you learn the right ways to take images and minimize parallax, you can start taking great panoramic images

Stitching software for Panoramas:

Once you are done taking the pictures, you then need to stitch them using specialized software that is capable of handling panoramas.

Top stitching software:

I'm not going to go into this very much since each software package is different but once you stitch it together, take the image back to you Photo shop, Lightroom, Aperture etc to finish image cropping and processing. Some of the Stitching programs are free, others cost money. You can do your own research two figure what works best for you.

1. Hugin
2. Image Composite Editor
3. Kolor Autopano
4. Autostitch
5. PTGui
6. PanoramaPlus X4
7. ArcSoft Panorama Maker
8. Panoweaver 9