

IAPP e-MONITOR



STEP BY STEP DIGITAL PANORAMAS

How to create Panoramas with a digital camera

Most panoramic photographs have been shot with film. And those photographs have usually been made with those wonderfully technical instruments known as Panoramic Cameras. They have expanded upon regular-sized photographic images and stretched them into an art form that encompasses something larger and more lifelike than the standard images that are far more commonplace.

These panoramic cameras are amazing machines and are still churning out magnificent photographs of breathtaking beauty. Technology, however, is never stagnant; it is relentlessly moving forward, and we find ourselves in a transitional period between the glory days of film and the onrush of the digital image. We know that we can't stay forever in the past and must move ahead as the technology pulls us along. Perhaps one day we will have a digital panoramic camera similar to today's Fuji GX617 but it won't come to-

morrow. Digital sensors are getting larger and the larger ones are getting cheaper but it will still be awhile before digital panoramic cameras are commonplace (even though digital panoramic scanning cameras are starting to come into vogue).

In the meantime we must use what's available in the digital realm to create our panoramic photographs. That means that we much stitch! Fortunately, software has made it reasonably easy for us to do just that. The purpose of this article is to give the reader an understanding of the process that he or she needs to go through that will lead to a final panoramic image.

Now, a word of caution - there are many ways you can get from here to there, the method I use is just one of them and, not necessarily the best one for any other person except me. However, it should outline the basic steps for anyone starting out in the world of digital panoramas and provide

enough information to get you there. Once there, you can experiment with other methods that may be more comfortable for you.

Creating a digital panorama involves 4 basic steps: 1) Prepare, 2) Shoot, 3) Stitch, and 4) Process. While all of the steps are important I view the initial step as being the most important of the four. Without the proper preparation the other three steps will yield mediocre results at best.

PREPARE

The first portion of preparing for a digital panorama is to remember that a panorama is just a wide (or tall) photograph and, like any photograph, composition is the most important aspect. If it is not composed properly or if there is no photo there when you look at your target, skip it. It won't work. However, if you feel the photo calling to you and you can see a wonderful composition then the rest falls into place. Many film-based panoramic camera have a set aspect ratio, usually around 2:1, 3:1, and some will wrap around a full 360 degrees. With a digital camera the aspect ratio (the ratio of the horizontal to the vertical) can be anything you want it to be. You can take several shots along a single row or, if your target is tall AND wide, you can shoot several horizontal shots and then return to your initial location and pivot the camera up to where it overlaps the just completed row. You can then shoot a second row for an even more detailed panorama (or even a third or forth, etc).

Once you have a target panoramic photo in mind you must now use the technology necessary to shoot the individual images to where they will stitch together properly. Some of the stitching software is good enough to (sometimes) combine images that are handheld but the best way to shoot images that will be combined into a panorama is by using a panoramic adapter on your tripod (I will be reviewing some of the panoramic adapters that are available in future issues of the e-Monitor). Most adapters operate on much the same principles so I will give a general outline of what is needed and how to use it to capture your individual images.

First, choose the lens that you feel is best for capturing the panoramic image before you. I very seldom use a wide angle lens for this. You can capture more detail with a longer focal length lens by stitching several images together to form your panorama. You can get the same panoramic feeling by using a 20 mm lens and cropping out the top and/or bottom of the single shot but you will be limiting the size of print that you can make from it. For many of the panoramas I shoot I prefer to use a 45 mm PC (perspective control), also known as a Tilt/Shift lens. You don't need a T/S lens but it is what I have so I use it. There is no more hard and fast rule for the lens you will use than having a hard and fast rule for the lens you use for any other type of photograph. The composition of your panorama will dictate your lens choice.

The panoramic adapter does one thing and it does it very well — it overcomes any paral-



lax distortion that comes from trying to shoot multiple images when you have close foreground objects AND distant background objects in the same panoramic photo. If you don't use it and you are shooting an image that has a large rock or boulder in the foreground and parts of it are in several of your individual images it will be difficult (sometimes impossible) to align them together in the final panoramic image. (To find the nodal point/entrance pupil for each of your lenses that you will use is covered later in this issue). Also, for further details, especially for VR photography you can go to:

<http://www.vrphotography.com/data/pages/technical/tutorials/technotes/nodalptalign-tn.html>



SHOOT

Set up your panoramic adapter on your tripod and attach your camera and lens. You want to have an overlap from one image to its adjacent partner. Most people like a 25% overlap but I have shot images with a 10% overlap and, as long as there is plenty of detail for the software to recognize, there should be no problem. Start out with a generous amount of overlap and you will soon learn how much you can get away with. If you have used the Fuji GX617 or a similar film camera and you like the 3:1 aspect ratio then you can shoot the panorama with the camera horizontally positioned (landscape) and shoot three images (with a generous overlap). Or, if you want your panorama to have a little more height to it then shoot with the camera vertically positioned (portrait) and shoot 5 images. I've found that I prefer to shoot the individual images from left to right as this positions the sequence correctly when I examine them on the computer and when I check the overlap on the camera's monitor.



I usually set my camera's meter on (M)anual and take readings from each individual image and average the resulting exposures. If the contrast is very high (if I am forced to shoot in mid-afternoon) I will use a

handheld Incident Light Meter and that seems to work well. The best method I've found is to shoot three shots of each individual image in the sequence - 1 stop underexposed; properly exposed; and 1 stop overexposed - and then combine them in HDR (High Dynamic Range) before I stitch the resulting HDR images together to form the panorama. If you have not worked with HDR before then go back and shoot the average exposure for each image in the panoramic sequence and this should give you a good panorama. Whichever method you use make sure to examine the histogram on the camera's monitor and make sure that the light areas are not slammed against the right side of the histogram or the dark areas are not slammed against the left side or else you will lose detail in those areas.

It would also be good to use any ND filters you have on the sky if it is overly bright. The best image you can get in your camera will make it much easier when you get to the processing section. Don't forget the polarizing filters. Treat the panoramic sequence as you would a regular photograph, utilizing all the filters and experience you have. Having said that, here is a caveat. If you are shooting with a polarizer keep in mind the problems you might have with a very wide angle lens. The polarizer is limited to a section of the sky 90 degrees away from the sun's position. With a normal lens and a normal photograph the polarizer can work quite well, but with an Ultrawide lens the polarizing effect will, quite possibly, work with only part of the photo. The same thing will happen with a panorama so you need to experiment with your polarizer before you commit to using it with your sequenced images that will make up your final panoramic photo.



You now have your digital camera attached properly to your panoramic adapter and you have placed the adapter on your tripod head. Make sure that the adapter is level or your panorama will arc up or down if your camera setup is pointed slightly up or down from level. I use a Manfrotto 3047 three way Tilt/Pan Head. As I said in a previous article, I like to know what type of equipment other photographers use so I always include what I use in case other people think as I do. You can just as easily use a small torpedo level (from Lowe's or other Home Improvement Store), or a tiny level that attaches to the camera's hot shoe, or the bubble level that may be built-in to your panoramic adapter; it doesn't matter, use what you have.

You have your composition, your proper exposure dialed into your camera, your camera/adapter/tripod level, and you are now

ready to shoot. One other thing I do is to use a cable release and I usually set the camera's custom function setting to allow me to use the Mirror Lockup. This is probably not necessary but I am a retired astronomer and have spent decades shooting objects through high powered telescopes and minimizing any shake in equipment is ingrained in my photographic routine.

Shoot the left-most image. Rotate your camera/panoramic adapter to the right, overlapping your previous shot by about 25%. Shoot your next image. Rotate your setup and, once again overlap your previous shot by about 25% and shoot your third image. You could continue for as many individual images as you want but, to get started, three will work fine. Again, this will depend upon your initial composition. You now have the images for your digital panorama.

To be continued... Next Month!

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I NEED YOUR HELP!

(Reprinted from the Oct. Issue)

For the December Issue of the e-Monitor I am putting together a Tips & Techniques article on tips on photographing in the winter-time. This will include a variety of ideas on how to stay warm, how to keep your equipment safe and working, things to take along with you for comfort and safety, in short, suggestions to the membership (and from the membership) on what we do to continue our passion when the temperatures plummet and the cold wind and the snow and ice make staying at home, by the fire, far more enticing than recording images in the great outdoors.

I don't need entire articles from everyone, but rather a sentence or a paragraph or two about your favorite winter tip; something that you won't go out in the winter without doing, taking, or donning. We have a lot of winter experience packed within our members and I would like for as many as possible to share that with the rest of the organization.

Email your ideas to me at: bryan@snowprophoto.com on or before November 15th and I will assemble them in the December Tips & Techniques section of the e-Monitor and credit everyone who sends in their ideas. When you send your email to me place the phrase "Winter Ideas" in the subject line and it will make collecting them easier. This should be an interesting experiment to see how the members will react on a shared article.

— Bryan Snow, Editor

TIME IS RUNNING OUT!

If you read the October issue of the e-Monitor you will remember the request I made of the IAPP readers. If not, it is reprinted to the left of this article.

I really want IAPP members to be involved in what goes out to the IAPP membership by having a say in what goes in this newsletter. If you can't write an article then at least send a tip or suggestion that you have found in the years you have been into photography. Consider a new member trying to shoot panoramas in the cold of winter. There are a number of problems that the member and their equipment must face. If you've solved some of these problems please pass this knowledge along and add to the December article. Keep in mind the absolute deadline of November 15th.

How to Submit Articles to the e-Monitor

This is your organization. And your newsletter. If the subject matter isn't what you want to read about, then send in the perfect (to you) article. If the organization is making a turn that you do not agree with, step in. We welcome all volunteers.

Email (to bryan@snowprophoto.com) your article as a document, with notations within your article where you want your photographs to appear. Please do not place your photographs within your document as this will compress the images too much. Please send them as separate files: tiffs or jpegs; 300 dpi and not larger than 7 inches on the long side.



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TIPS & TECHNIQUES

Adjusting your Panoramic Adapter to your Lens

In order to stitch images together to form a digital panorama you should use a panoramic adapter that will allow you to pivot your camera's lens around its entrance pupil or some refer to its nodal point. Without pivoting on this position, parallax can cause your stitching of the individual images to be inaccurate. This is especially true if you have areas in your images that are both close to and far away from the camera, such as boulders close up and a mountain range in the distance.

A lens does not usually indicate where its entrance pupil is located and the easiest way to find it is through a trial and error procedure.

Using digital cameras are ideal because you can instantly see the results without shooting film and waiting for it to be developed. To find the entrance pupil location you will need the following: 1) a digital camera (preferably a DSLR), 2) a panoramic adapter, 3) a tripod, 4) something thin and vertical that can be set up close to you, and 5) something immovable in the distance like a mountain range or a distant building or tower.

For the "thin and vertical" thing I use a lightweight light stand. It has a built in tripod stand and I can raise or lower it to a convenient height.

Setup:

First, set up your camera in its horizontal or landscape position atop your panoramic adapter. This adapter is secured to your tripod and leveled. Next, decide what you will use as a distant marker. This could be a cleft in a mountain range, a distant tower, or even the edge of a distant building. You just need to remember where it is every time you need to. This will be your "far marker". Next you need to point your camera/adapter/tripod unit towards your distant marker and position your "thin and vertical thing" (henceforth denoted as the "near marker") about 2-3 feet in front of your camera and lined up on the distant marker. Adjust the camera position to place the near marker near the right side of your frame and directly in line with your distant marker. Now, pivot your camera on the panoramic adapter to the right (clockwise as seen from above) and, in doing so you will be moving your near and far markers to the left side of your camera viewfinder's frame. You will notice that the near marker will NOT be aligned with the distant marker anymore. That's because parallax

has shifted the near marker's position in relation to the distant marker. What we need to do is to position the camera's lens to where it pivots over its entrance pupil and when that happens, the near marker will align with the far marker and the stitching of the individual images will fit properly.

How do we do that?

It's a trial and error thing! Your panoramic adapter should be able to allow your camera/lens combination to be positioned forward and backward along the pivoting plate of the adapter. My adapter has a millimeter scale along this plate so that as I shift the camera/lens along I can read its position accurately on this plate. Moving the camera/lens along this plate will allow you to vary the position of the lens over the pivoting part of the adapter. This is the key to stitching panoramas: you must locate the lens in the exact position above the pivot point to coincide with the lens's entrance pupil or nodal point (yes, there are two nodal points for a lens but this exercise will locate the correct one). How do you know where that point is?

Follow these steps:

1. Looking through your camera's viewfinder, place your far marker near the right portion of your camera's viewfinder.
2. Place your movable near marker about 2-3 feet (about 1 meter) in front of your camera and, as you look through the camera's viewfinder, position the near marker to align with the far



marker.

3. Focus on your far marker. Set your camera's meter to Aperture Priority and

stop down your camera's aperture to its maximum, meter the scene, and expose.

4. Rotate your camera/lens by pivoting your camera adapter to the right (clockwise when seen from above) and, in doing so, the entire scene will shift your markers to the left side of your camera's viewfinder.



5. Expose this frame. Notice that the near marker is no longer perfectly aligned with your far marker. If

the near marker ends up to the left of the far marker, your camera/lens combination is too far forward of the pivot point. If it is to the right of the far marker, it is too far back of the pivot point.

6. Adjust the camera/lens combination in the appropriate direction along the adapter's movable plate.
7. Lock the combination down and pivot the adapter back to place the far marker once again on the right side of the frame.



(You will probably need to re-align the near marker to line up with the far marker).

8. Expose this frame.



Again pivot the adapter to place the near/far markers on the left side of the frame. If the near marker is to the left of the

far marker your camera/lens combination is still too far forward. Move it backward again. If the near marker is to the right of the far marker it is too far backward. Move the combination forward.

9. Return to step 6 and continue until the near and far markers are aligned on both sides of the frame. When this occurs you have located the entrance pupil/nodal point.



10. Mark this location on the movable adapter plate and this is the position you will place your camera and this particular lens for perfect panorama photography. You will

need to perform this exercise for each lens you wish to use with your panoramic adapter. Once you do this a couple of times it will become second nature. Record all the positions of each lens you will be using.



Note: We will be reviewing Panoramic Adapters in a future issue of the e-Monitor!



TIPS AND TECHNIQUES (2)

Simple Digital Panoramas

While most photographers will opt for the use of Panoramic Adapters to shoot the images necessary to create digital panoramas there is a much simpler way provided you have the right lens. If you shoot architectural photography and you have access to a PC (perspective control) lens, commonly referred to as a Tilt/Shift lens you can make instant panoramic images with only your camera, T/S lens, and a tripod.

Your panoramic image is basically set as far as its aspect ratio is concerned but it is still better than a normal sized photograph. I use two of Canon's PC lenses, a 24 mm and a 45 mm.

The secret to making these simple panoramas is to set your camera/lens combination to landscape (horizontal), place it on your tripod and level it before you shoot. Next, center all your tilt and shift settings to zero. Next, rotate the lens to where your Shift axis is horizontal (in Large Format speak this horizontal movement is "Shift". When that movement is up/down it is referred to as "Rise/Fall") - Set your camera meter on (M)anual and take a

reading when the movement is centered. Keep that meter setting throughout your individual image shots. Next, shift the PC lens until it is fully shifted to the left and take the first image. Next, shift the lens back to the center and take the second image. Next, shift the lens all the way to the right and take the third and final image. Your digital panorama shoot is now complete. The three images automatically overlap. Take the images and download them into your computer and proceed to stitch them and then process the final panoramic image as you would any other digital photographic image.

Hint: I usually take several different sequences of panoramic images of the same area. It is important to know where one sequence stops and the next one begins. The easiest way to differentiate the individual sequences is to place your hand over the lens after you complete one sequence and shoot a "dark" frame in between the previous sequence and the next one. Then as you review your images you can see each sequence with that dark frame in between.

IAPP e-MONITOR

The monitor on the rear of a digital camera is a device we use to quickly examine information about our photos. The IAPP e-Monitor was designed to give our membership a quick look at what is going on with the IAPP and with panoramic photography in general. It was originated to give our membership quicker information while they await the release of the PANORAMA.

We welcome any and all articles and photos from IAPP members for inclusion into the IAPP e-Monitor. This is a publication

for the IAPP, by the IAPP, and about the IAPP. There are many talented members that have images and information to share and we welcome all articles. Please send all articles and photos to:

IAPP

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Coming Next Month!

Feature:

Digital Panoramas Part II

Review:

Star Island Retreat

Tips & Techniques:

Cold Weather Photo Tips