

Panoramas

by Joseph C. Dovala

The extensive wide angle view in paintings, known as the panorama, has been around a long time. Irish painter Robert Barker has been given credit as the first artist to coin the term “panorama” in the late 18th century. Less than 50 years later, in 1844, the first successful photographic panorama camera was invented by photographer Friedrich von Martens. Since these early pioneers, there have been countless cameras and techniques utilized in the pursuit of the wide format view. Of course, the digital age has now brought the often tedious and challenging procedures to just a few clicks of the computer mouse. Well, maybe a little more effort is required than that but anymore it doesn't take a skilled artist to produce interesting images – even underwater!

Not too long ago wanting to shoot panoramas automatically meant using a tripod. While this option produces the best results, especially with critical end use requirements, it's by no means necessary. None of the images accompanying this article used a tripod in their making. There are some considerations that one needs to think about when stitching



Stitching a series of images together give the viewer a better “sense of place” of a ship wreck’s final home.

Subal ND2 housing, Nikon D2x w/ Nikkor 10.5mm FE, 1/200sec, F/11, ISO 200.

(Right) This image is only composed of two frames. Due to the depth and dark conditions a full panorama wasn't doable but putting two pics together did give the wreck more scale.

Subal ND2 housing, Nikon D2x w/ Nikkor 10.5mm FE, 1/30sec, F/7.1, ISO 200.



underwater images together. The main one, of course, is subject matter. Just sewing up a bunch of shots willy-nilly not only will be very difficult on the computer, but they're not likely to have much of a visual impact. When deciding on a panorama it's best to give a voice to the resulting photo. A section of reef or ship wreck can be a good choice as long as the flow

makes sense. That is, will the finished wide angle give the viewer a sense of place?

As we all know, creating a sense of place underwater is a big challenge. Even in the best visibility we just don't have the opportunity to share something like the grandeur of the Grand Canyon. And the widest fisheye lens still gives only a close snippet

of what we experience as divers. The physics of water plays havoc in other ways too. The blues or greens across an underwater pano may change hues and create all kinds of post processing problems; thus creating blotches of color shifts from one image to another. Remember, all those dense H2O molecules along with all the other “stuff” in the water column are



Often it's necessary to make sure you have some kind of reference toward scale. None of these images contain a diver, which would have clued the viewer into the size of the shipwreck.

Subal ND2 housing, Nikon D2x w/ Nikkor 10.5mm FE, 1/125sec, F/5.6, ISO 200.

likely to mess with light rays trying to penetrate the surface. This scattering and absorbing of the photons can make a non-uniform color spectrum across the angle of view. If you have the Photoshop skills and the desire, you can rectify much of this during post processing using layers and masks. I don't have the skills or the desire to spend so much time in front of the monitor so there are a couple of tricks that can help.

The first isn't really a trick but one of the main rules in shooting wide angle underwater and that's to shoot at an upward angle. Capturing some of the surface ripples and sunlight reflections help to break up the background, and allow the stitching to be more camouflaged than

straight monotone color and lighting. Another way to achieve this is to use the natural elements in the shot. For example, in a kelp forest there are lots of possibilities to use the upward fronds to frame out certain areas. That way the color variations aren't as noticeable and much easier to isolate with software to smooth out tonal gradations. This same technique could be used with reef formations or with sections of a ship wreck.

On land, the first rule of making panoramas is lots of overlap. In other words, make sure that each image overlays the preceding photo by at least 30% more. This makes sense underwater as well but it's not a deal breaker if you don't. To make a "perfectly" clean panorama



without needing to clean up artifacts or misalignments is asking a lot, especially underwater. In addition, getting the whole view from a static position is often not possible due to limited vision. And moving around is pretty much a requirement for many shots. Couple this with the lack of a tripod and the physics of the fluid environment and you've got quite a challenge. Fortunately, with the many software tools available today breaking the rules has never been easier.

Processing programs are too numerous to list, but they range from free to pick your price. I personally use Panorama Maker 3.5 (new version is now 4.0) and find it very easy to use. You have some manual control on where the program decides to create the overlap, so with a few clicks and drags you can modify the look of the final composition. I believe this feature to be critical for underwater stitching. Like many aspects of photography the best way to learn it is to do it. This is an inexpensive



Shooting a panorama with moving subjects can be done but they can't be moving too fast; and they require far more work in post processing. Jack mackerel school at Anacapa Island off the Southern California coast. Subal ND2 housing, Nikon D2x w/ Nikkor 10.5mm FE, 1/125sec, F/8, ISO 200.

experiment at only \$40.00 or so. Of course, Photoshop and other image file editors can do multiple stitching too. You can make it as simple or complicated as you like.

There are basically three steps from start to finish in producing your panorama; this is true whether you're topside or 200 feet below the surface.

Step One: Setting up the camera and acquiring desired images.

It is important that some camera settings be done manually or else the auto programs will try and optimize each frame capture. This will cause problems when you try to put them together. White balance should be adjusted to a favorite setting. I typically use cloudy so that all the images will have the same light temperature. Color variances are

troubling enough without building them in right up front during capture. Also, by shooting in RAW, you can modify white balance during post processing and get more manageable outcomes.

I have also obtained better results by shooting in manual exposure mode. With camera meter auto settings there maybe too much variability between shots. It's also important to isolate subject movement as much as possible to a single frame. This will ensure sharper subject matter and eliminate the same person in two places at one time (unless that's what you want). Having multiple moving subjects like fish and divers across more than one frame works, it just may take more effort to create smooth transitions. I also don't usually change

aperture or focus position between frames. A point to keep in mind is the fewer parameters changed between one image to another will make construction of the panorama that much easier.

Another consideration is lens choice. There is no doubt that rectilinear lenses are more suitable for seamless overlaps. Rectilinear lenses yield images where straight lines show as straight lines as opposed to a curvilinear lens, i.e. fish eyes, which show strong barrel or pincushion distortions. Of course, in the real world, most wide angle lenses show some type of distortions depending on the lens, focal length, manufacturer, etc. But curvilinear lenses can wreck havoc with the flow of a pano because of what they do to a horizon.

Fortunately for us we don't need to worry about this underwater. Also, you can reduce the distortions by making sure you have enough overlap between the images. I haven't had any significant issues using a fish eye lens for u/w panoramas.

Step Two: Importing images to panorama making software.

Much of this procedure depends on the software you're using but some details are consistent across all types. One of the criteria for choosing the type of software is the degree of automation you prefer. The more "decisions" left to the program, the less control you'll have. On the other hand, being too much of a control freak may bog you down with unnecessary minutia. Usually, the most effective manual intervention is best used in fine tuning overlap control set points. I have found that many times Panorama Maker selects just fine and no further alignment has to be done by me. Where there's not enough overlap or lots of featureless area like blue water then I often get involved.

It may only take a single effort by the software to sew the images together in an acceptable way, or it could take repeated control set point modifications to properly join them. It really depends on how the image sequence was taken and somewhat on the subject matter.



A panorama helps to give a more expansive view of a giant kelp forest, such as this one at Anacapa Island off the Southern California coast.

Subal ND2 housing, Nikon D2x w/ Nikkor 10.5mm FE, 1/125sec, F/9, ISO 200.

Step 3: Post processing of the stitched panorama.

No matter how wonderful the individual pictures were sutured together, there will always be at least some clean up of seams and artifacts. You will usually have to crop the finished rough pano as well, for the program often needs to adjust photos vertically. In fact this can be extensive when hand holding the sequence.

Clean up of the image mainly consists of some localized cloning and use of the spot healing brush. Both of these tools can take care of most rough areas caused from the stitching. This may also be the time to do some dodging and burning once you see how all the elements work together in the final output.

While certainly not a new technique, the underwater panorama can put some pizzazz into your wide angle views. These don't have to be confined to the traditional concept

of wide angle either. Vertical or horizontal wide format macro views may do the trick. So if you're looking for a new way to tell a story, try your hand at knitting a few photos together for that extra wide vista.

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Bikini Atoll is now closed once again! But at least you can still see some of the majesty of the "Nuclear Fleet."



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