

Dome Free in Mexico

by Alex Mustard

In the last issue of UwP I wrote about the inherent advantages of using a properly corrected water contact lens for underwater photography, and introduced the Nauticam WACP. As that article explained, while we get excited about the advances of sensors in the latest cameras, the real bottleneck to image quality in underwater photography is the interface between air and water at the port, which, whether flat or curved, introduces significant optical problems. Water contact lenses are specifically designed to work in water, eliminating these issues and recent availability of autofocus underwater corrected lenses is what we should all be getting excited about.

I went on to conclude, in the last issue, that just as dome ports replaced flat ports for wide angle photography from the 1960s onwards, the arrival of the WACP hopefully heralds a new era for housed cameras in which domes are superseded by underwater corrected optics, for certain shots. Water contact optics have been very scarce in the digital age, but that is changing. The aim of this article is to show I practice what I preach, sharing my motivation, experiences and images from two trips that I made to Mexico at either end of 2017. Both trips had a complete focus on wide angle (shooting cenotes and

sea lions, respectively), yet on both trips I happily left my dome port at home and fully committed to water corrected optics.

After last month's tech fest, many will be pleased to hear that this is non-technical article, free from corner sharpness tests and resolution graphs! I should also stress that this is my normal gear, and highlighting these particularly trips is something of an artifice for this article. I am also keen to be honest and objective in highlighting strengths and weakness, as most commentary I see from those who own these rare treats is wholly evangelical.

I am aware that this is currently a niche interest topic. Optics might be the bottleneck for image quality,

Beneath mangrove trees. Although water contact lenses allow us to open the aperture more while still recording high detail to the corners of the frame, there are many occasions where we do not want to open the aperture. Such as when it is very bright, or, as here, we want to ensure sufficient depth of field through an extensive scene. Nikon D5 and Nikonos 13mm, Subal housing. 1/125th @ f/13. ISO 1000.





A diver in the jaws of a cave. With a dome port, f/13 is my magic number for acceptable corner sharpness with a full frame camera. With all three of these water contact lenses f/8, being conservative, gives the same level of detail. Nikon D5 and Nikon 20mm, Zeiss UW Corrector Port, Subal housing. 3 x Inon Z240 strobes. 1/320th @ f/9. ISO 1600.

but they aren't the pinchpoint controlling how many of our photos are truly memorable. If only underwater photography was so straightforward! In addition, these optics can never be a universally recommended investment, when you consider the costs involved. That said, understanding the what, why and how is valuable knowledge for all. Furthermore, part of the pleasure of underwater photography is owning and using quality equipment, and I fully understand anyone wanting to pursue these solutions for that reason alone.

Water contact optics are not new in underwater photography, the best know are certainly the

Nikonos wide angle lenses, but there have been others down the years. When properly designed they give us the truly excellent image quality we'd expect from not having to deal the problems introduced by a port. Others have been poorly designed and cheaply constructed and can be easily outperformed by well setup dome port. These have definitely made some underwater photographers sceptical of the advantages of water contact solutions. As an analogy, think of land telephotos – there are, and have been, lots of lenses capable of giving you 500mm magnification, but there is a massive performance difference between the current, fast

pro prime and a cheap, old, superzoom kit lens. Similarly, not everything marketed as water contact is created with equal optics.

I've carefully chosen the water contact optics I use for the advantages they give me over a dome port setup, while not compromising my ability to get the shot. In other words, they must have AF and an automatic aperture (something old Nikonos V lenses do not offer). The three options I took to Mexico, all providing me with distinct perspectives with my Nikon full frame SLR, were as follows:



The Nauticam WACP and Nikon 28-70mm attached to my Subal housing. With a Nikon FX camera this gives a underwater corrected fisheye with a FOV from 130° to 57°.

Nauticam WACP

Most familiar to UWP readers (at least after the last issue) is the Nauticam WACP, which when used with Nikon 28-70mm is transformed into a water corrected fisheye lens with a 130-57° FOV (FOV is the field of view of the lens – it is best to talk in these terms because water contact lenses don't have the same focal length to FOV ratio as land lenses). Although designed and built by Nauticam it can be easily adapted to other housings (I use an adaptor made by Saga). The WACP is commercially available, although there is already a sizeable pre-order queue.



The Nikonos 13mm fisheye is a water contact autofocus lens from the Nikonos RS. It can be reprogrammed to work with modern Nikon SLRs – here mounted on Seacam, Subal and Nauticam housings on my La Paz workshop.

Nikonos 13mm

Next, is the lens I use most, the Nikonos 13mm or RS-13, a 170° FOV autofocus fisheye originally built for the Nikonos RS. The RS camera is very different from the other, more numerous Nikonos cameras because it is an SLR and uses lenses with automatic aperture and autofocus. RS lenses use Nikon's classic F-mount, but with the connectors wired up differently. However, they can be rewired to work with modern Nikon SLRs. My lens was converted by Seacam, whose conversion allows the full aperture range to be used, and I use it in with a Nikonos to Subal port mount made by Andrej Belic. This option is commercially available in very limited numbers.



The Carl Zeiss “Unterwasservorsatz” optical corrector port, with a Nikon 20mm AF attached to my Subal housing, giving a rectilinear FOV of 94°.

Carl Zeiss “Unterwasservorsatz”

Third, is a Carl Zeiss Underwater Corrector with a Nikon 20mm lens, which is probably the most valuable because it is rectilinear (keeps straight lines straight, no fisheye distortion) with a 94° FOV. This is an Ivanoff style underwater corrector, originally commissioned by Hasselblad for the underwater use of their dedicated medium format Super Wide camera. I adapted this for my SLR with a Hasselblad to Subal adaptor custom made by Peter Ladell in the UK. The result is pretty much like an autofocus Nikonos 15mm (also 94° FOV)! I have been using this for a few years and it has already produced scores of published images and a winner in the Wildlife Photographer of the Year contest. I am currently the only person using this option, but

other Zeiss correctors do exist (sitting unloved on shelves - although I have not been able to find one).

The paradox of water contact glass is that you invest your hard-earned and it doesn't really look any different through the viewfinder! OK, on land, it won't focus properly, which suggests something different is at play, but it would be nice to have more reassurance of its game-changing ability! We know deep down that we are gaining image quality by not shooting through that extra window - a port. And, with a little faith, we can dial in settings that we know would be compromised with a dome. But none of this is demonstrable when we first pull the camera to our eye.

As soon as we start downloading, we're rewarded by images with finer details, although most of the time they will otherwise be identical to what we would have shot with our existing tech. Once we're adapted to the new possibilities, water corrected lenses allow us to grab images we'd miss or that would be compromised with a dome. Being able to open up the aperture more than usual is certainly valuable in the darkness of subterranean caverns of the Riviera Maya, where I was already teetering on the limits of acceptability of ISO and shutter speed. It was also prized in the Sea of Cortez, where my trip



Sealion pup with starfish toy. Capturing action with dark subjects in dark conditions makes selecting settings a challenge. Water corrected lenses give us more options. This allied to the wide zoom range of this setup, creates a very versatile system. Nikon D5 and Nikon 28-70mm @ 35mm, Nauticam WACP. Subal housing. 2 x Seacam 150 strobes. 1/125th @ f/11. ISO 800.

in early November coincided with the peak of playfulness of that year's sea lion pups, still supercharged by mum's milk. The pups are irresistibly adorable, but much darker than the

adults and like hanging out up against the dark volcanic rocks of the islands. They are the wide angle equivalent of a black, hairy frogfish on Lembeh's basaltic sands and opening the

aperture gets more strobe on them and increases our shutter speed.

Quality water contact lenses will always be sharper than a dome, but the margin of their advantage

increases at wider apertures. Conversely, the gain is much less apparent when the conditions allow for (or demand) shooting at a closed aperture. Shooting at f/8 on a full frame camera, for example, all three options very obviously outperform a dome port setup in corner detail. However, at f/16, the advantage is only visible if you really pixel peek. Three years ago, when first using the Nikonos 13mm on digital, I did back to back shots of a Red Sea reef scene with it against a Sigma 15mm and 230 dome. On showing the owner of the lens the results, he said, “wow isn’t it superb”. Then I told him he was still looking at shots from the Sigma 15mm taken at f/16! The RS-13 lens was a better (and I was motivated to convert mine based on the results), but if you always shoot with closed apertures and fisheyes you are only going from very good to excellent.

Full frame photographers have the most to gain because we struggle more than those working with smaller formats with wide angle image quality behind dome ports. Furthermore, as camera resolutions soar with each generation, so diffraction becomes more of an issue when the aperture is closed, this increases the value of the ability of water corrected optics which deliver at more open apertures.

Happily, all three water corrected optics are physically smaller than a big dome, which streamlines the housing for speed through the water (particularly good for pursuing marine mammals) and more importantly makes it easier to light subjects very close to the lens. All focus almost to the front element, although you definitely don’t want to scratch something that is borderline irreplaceable. Douglas Seifert told me recently that Seacam have said that they can polish scratches out



A diver in sunbeams. Although the sunbeams look bright, this was a very dark scene and the ability to open the lens to f/8 and still produce excellent image quality was beneficial in producing a high quality result. Nikon D5 and Nikonos 13mm, Subal housing. 1/25th @ f/8. ISO 1600.

of the RS-13. A service, I hope, I never need to try.

The other downsides of being domeless? Money. I know dome ports aren’t cheap, but water contact optics are even more expensive. And everyone I know who is using them has already bought a dome! They are an additional purchase, not an either-or. They are also not easy to get hold of. I cannot find a backup for my Zeiss corrector

port. The RS-13 is Nikon only, and Nikon only made a finite number of them, far fewer than the number of D850 shooters already out there. And while Nauticam have been thrilled with the level of orders they have received for the WACP, the production speed is limited by the challenge of obtaining high quality optical glass in the size and quantity required!

A significant downside of water contact is that split levels are not possible (you can still shoot them, but the above water portion doesn't look good). Although this sounds a niche complaint, many pros will attest that their split shots are strong sellers. On my Mexico trips, I was happy to accept this compromise, but on my 2017 trips to Cayman, Cuba and Egypt I travelled with my trusty Zen 230 too. Another black mark is the weight penalty, both in our luggage and in the water from these big chunks of glass. Big dome ports add a lot of buoyancy to housings making them close to neutral, water contact lenses do not, significantly shifting how our rigs handle underwater.

One of the reasons that underwater photography is so enjoyably addictive is that it challenges us in many ways. We need to get lots of things right before we can produce stunning images – ranging from where and how we choose to dive, to the equipment we take in, to making good decisions about lighting, exposure, focus and composition. I can always live with missing a shot because I run out of talent at the moment of shooting. But I do get frustrated when I miss a shot because of poor decisions made ahead of time, free from pressure, such as poor photographic planning or by not using the best equipment possible. This is my main motivation for water corrected optics. I know they exist, I know they are the best, therefore I want them on my camera. On many occasions, they offer only a small advantage over a standard lens and dome, but that advantage is there in every shot we take. At other times the advantage is much more significant and I will have a much better opportunity to bag a shot, that for others gets away.

The way I see it, is that we can only shoot one underwater camera at a time, so it makes sense to



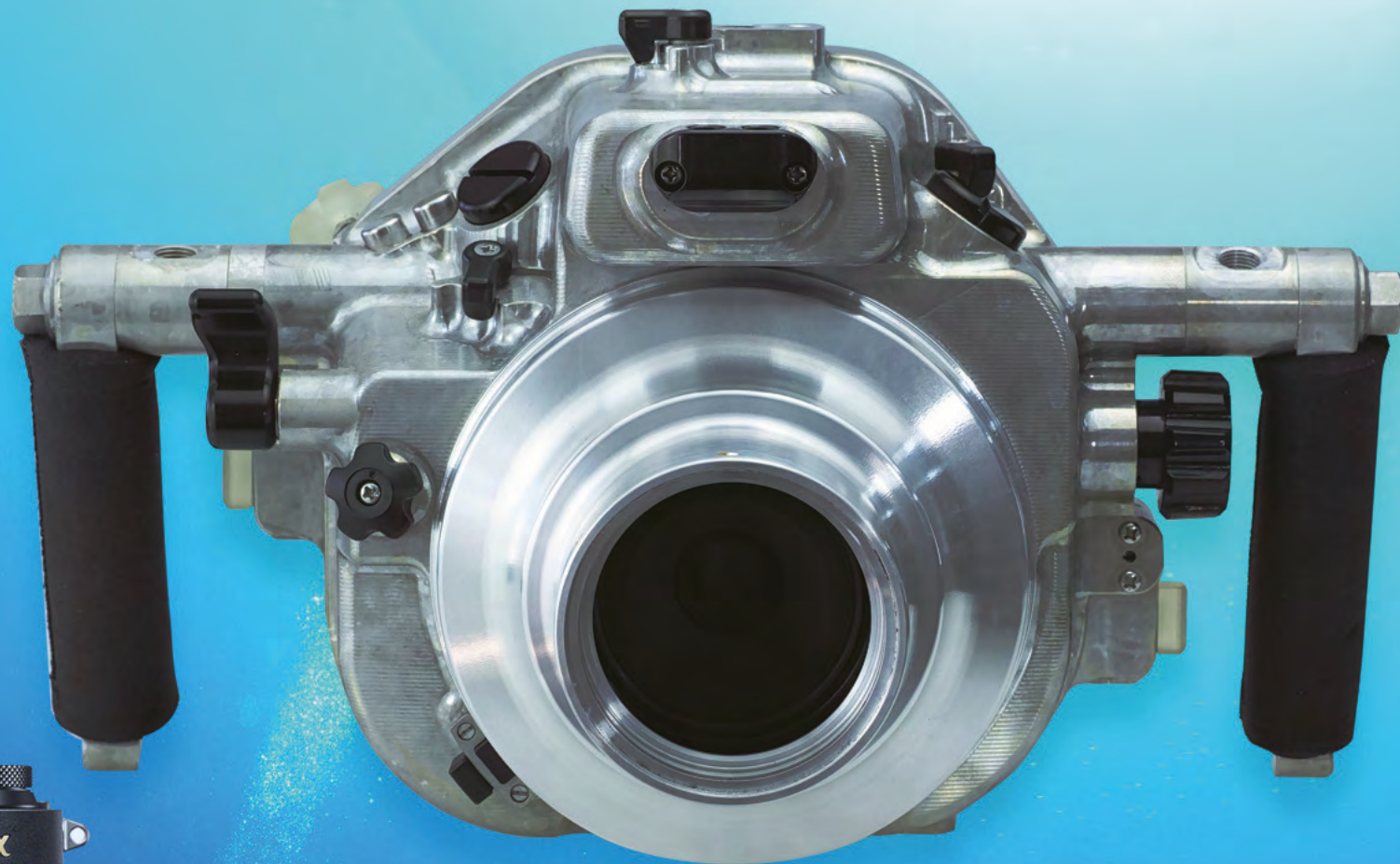
Which way is up? The three lenses I use are very complimentary. I am often asked which one should people get, but in reality the three offer very different perspectives. The RS-13 does not overlap at all on FOV, the WACP covers a huge range of FOV, and the Zeiss CP is rectilinear, without fisheye distortion. That is why I travel with all three. Nikon D5 and Nikon 20mm, Zeiss UW Corrector Port, Subal housing. 2 x Seacam 150 strobes. 1/100th @ f/11. ISO 800.

make it the best available, giving us the best chance of capturing the shot. I am pleased to be able to report, that if you feel water contact optics are right for you, that a dome free future is available right now.

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