



photo & video

Text and photos
by Larry Cohen

When it comes to cameras, traditionally, gear is divided into compact point-and-shoot or single lens reflexes (SLR). By definition a SLR camera had a mirror and prism positioned inside the camera, so the photographer could look directly through the lens. This way, they could see the exact framing of the image. When the shutter opens, the mirror quickly moves out of the way, so the film or sensor could be exposed to light. SLRs are advanced cameras with manual exposure control and interchangeable lens systems. In the past and today, these cameras are used by professional photographers and advanced amateurs.

Digital single lens reflexes are referred to as DSLR cameras. They have very little shutter delay and can shoot uncompressed RAW files. The sensor that captures the

image, is larger than the sensor in a point-and-shoot camera. So, the pixels are larger, and the image quality is better. Many shoot video files that could be used for broadcast productions. The disadvantage is these cameras and accessories are expensive, large and heavy.

Compact point-and-shoot cameras, on the other hand, are simple devices that many people use just for snapshots. In the days of film, the camera would have a separate window viewfinder. The disadvantage was that the photographer would see the scene from a different angle and placement than the lens. So, one would not see the image exactly the same way the lens would capture it. Some digital point-and-shoot cameras still have these viewfinders, but most don't. The camera uses a LCD screen that obtains the image through the lens.

Typically, point-and-shoot cameras have built-in lenses. In order to keep the price low, the lenses are not as sharp as the ones designed for SLRs. Some compact cameras are compatible with add-on conversion lenses to expand their range.

Many point-and-shoot cameras only have automatic exposure control. The ones that do have manual controls are limited. Many of these cameras only shoot compressed jpg files, but all of them have a video mode. These cam-

eras and accessories are more economical than a SLR camera. They are easy to travel with because of their small size.

There is now a new category, the mirror-less camera. These cameras are in the middle. No mirror, so they are smaller, but they have interchangeable lenses and advanced controls. Some of them are very fast. These cameras and underwater gear will be discussed in a future article.

The past

Digital photography has changed the way we document the world. In a very short period of time, film and silver halide prints—once the standard—have become an alternative process. This major change has affected the way the high-end professional photographer to the snap-shooter create images.

This revolution in imaging has had a major influence in the world of underwater photography. We are no longer limited to 36 frames of film per dive. Since the more we shoot, the better our images, this is important.

We now get to see our image instantly on the camera's LCD screen. This allows us to review the image, make corrections and reshoot. Back in the days of film, sometimes one would not have a chance to process the film until one was back home.

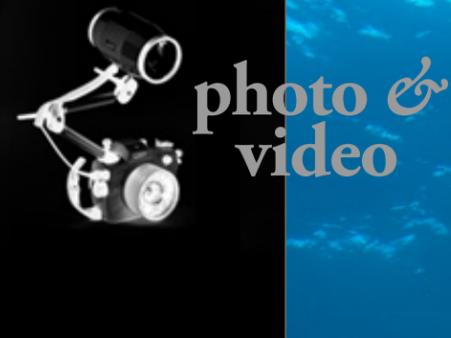
In the early days of digital

Diver with Nikon Coolpix P7100 in the Fantasea P7100 housing, Sea & Sea YS-01 strobes, Light & Motion Sola 1200 with Beneath the Surface tray and arms at the pump house in Dutch Springs quarry



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Diver with Fantasea P7100 housing, BigEye dome, Sea & Sea YS-01 strobes, Light & Motion Sola 1200 with Beneath the Surface tray and arms photographing turtle in Bonaire

Point & Shoot

the market. There are still some cameras with advanced features that are suitable for underwater imaging. Nowadays, the price of DSLRs have dropped dramatically, but using a point-and-shoot camera does have some advantages.

Besides the price, point-and-shoot cameras are small and easy to travel with. Now that airlines charge us as much for our gear as our seat, size and weight does matter. Although they have limitations, the simplicity of a point-and-shoot camera does appeal to many photogra-

phers of different levels. The principals of producing a well-crafted underwater image have not changed. The rules stay the same for film, expensive digital pro or inexpensive snapshot cameras. Let's explore these rules and how they relate to our gear choices.

Get close

The less water between the camera lens and the subject, the better the images will be. In order to get close to the sub-

posable cameras. They started making housings for the Nikon Coolpix 990 in 2000. These days, Ikelite manufactures housings for more camera models than any other company.

Camera manufactures including Olympus, Canon, Sony, Fujifilm, Casio and others started manufacturing their own low-cost underwater housings for simple digital cameras. This allowed any scuba diver, snorkeler or beach bum to protect their camera and produce images around and under the sea. This brought underwater imaging to the masses.

Notice that Nikon is missing from the above list. In 2002, Howard Rosenstein started Fantasea Line. Their first housing was the CP4 for the Nikon Coolpix 885 and 4300. This low-cost

imaging, SLR cameras were large and expensive. So many photographers starting using compact, point-and-shoot cameras to do serious underwater photography. Many of these early digital cameras had professional features including manual control, hot-shoes, and could shoot RAW files. Most were also very slow.

Light & Motion made a housing for the Olympus C3030 back in 2000. This was an aluminum housing with bulkheads for the strobes and complete camera control access. In 2002, they came out with the Titan for the Olympus E-10. This was an over-sized point-and-shoot camera that did have a through-the-lens viewfinder. So technically, this was the first

housing for a DSLR. Since the camera did not have interchangeable lenses, it still shared many characteristics with point-and-shoot cameras. Before this Light & Motion manufactured video housings and were primarily a producer of bicycle lighting.

Aquatica, a major producer of SLR film camera housings, started in 2000 with the Coolpix 995. This aluminum housing had dual bulkheads and shared many of the features of their film SLR housing. They produced their first DSLR housing for the Nikon D100.

Ikelite always produced reasonably priced polycarbonate housings for film SLRs. They also had low cost options for film, point-and-shoot, and even dis-

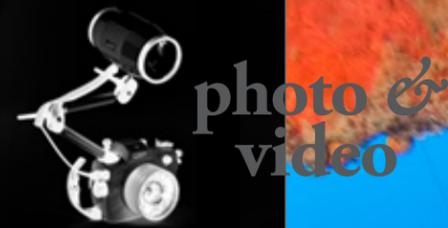
housing still had many features needed to do serious underwater photography. This allowed many people to be able to afford shooting with their Coolpix camera underwater. Today, Fantasea Line still produces housings for the Nikon Coolpix Line, and other reasonably priced underwater photo accessories.

The present

Today, the number of compact point-and-shoot cameras is staggering. Cheap auto-only cameras seem to dominate

Diver with Fantasea P7100 housing, BigEye dome, Sea & Sea YS-01 strobes, Light & Motion Sola 1200 with Beneath the Surface tray and arms photographing turtle in Bonaire





Diver with Fantasea P7100 housing, BigEye dome, Sea & Sea YS-01 strobes, Light & Motion Sola 1200 with Beneath the Surface tray and arms on the HILMA HOOKER wreck in Bonaire



version lens.

Our other problem is vignetting. Unless the conversion lens is designed for the optics on a particular camera, we might get cut off in the corners. Even if we have to zoom in a little to remove this, we are still better off using a conversion lens.

Some housings use a conversion dome instead of a conversion lens. This corrects for the 25 percent size distortion that happens underwater. The camera's built-in lens will have the same angle of view underwater as it does above. Ikelite uses a conversion dome on many housings for cameras where a conversion lens would not be effective. This includes their Canon G12.

Fantasea Line also has a conversion dome they call the BigEye. Besides having the dome for their P7100 housing, you could get them for certain Canon, Sony, and Fujifilm housings. They also make one that fits housings with a 46mm filter thread. The problem with these domes is they could cause flair. If you are filtering for color, this is not an issue. If you are using dual strobes, you might get flair that could be retouched or cropped out.

An advantage of this kind of optical system is that conversion lenses or domes can be attached or removed underwater. This allows us to shoot macro and wide shots on the same dive. With a DSLR, we have to pick a lens and stick with it for the entire dive. So, we always see that rare nudibranch when shooting wide-angle, and the whale shark when shooting macro!

When picking a housing, it is important to make sure some sort of optical accessories are supported. Many of the housings manufactured by the camera companies might not be compatible with any optical accessory.

Color correct

Water changes the color of our image. Warm salt water will turn your image blue, while fresh and cold salt water will



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ject, one needs to have a wide-angle lens for large subjects or a macro lens for small subjects. All point-and-shoot cameras have a macro mode. Cameras with small sensors excel at small subjects. All one has to do is put the camera in macro mode (usually a flower icon) and move in close.

Many housings allow the use of optical accessories on the lens port. Use of a close-up lens will allow us to have a little more distance from the subject, but still get the magnification. This has two

advantages: first, we will not scare a camera shy subject; second, it gives us room to be creative with lighting.

Large subjects are harder to deal with when shooting with a point-and-shoot camera. By design, these cameras do not have interchangeable lenses. So, we need to start with cameras that have a wide-angle lens. In the past, most cameras had a lens with an equivalent angle of view of a 35mm lens. Add in the 25 percent size distortion that happens underwater, and we have to move too

far back. Nowadays, we do have cameras with 28mm and even 24mm equivalent focal lengths. Although this is an improvement, it is not wide enough. So, the solution is to use wide-angle conversion lenses on the outside of the housing port.

These lenses will have a magnification factor of around 0.56X. By multiplying this factor with the focal length of the lens, we get our angle of view. A camera with a 28mm lens will have an angle of view of a 15.68mm lens when using this con-





Using the Fantasea P7000 in the ice fields of Alaska

have a green look. Sometimes this color shift will add spice to an image. Certain subjects including shipwrecks could benefit from this color shift. Usually, we will want to correct this shift so we can see the natural colors of the underwater world.

Many point-and-shoot cameras will have an underwater mode. This is like putting a digital orange color-correcting filter over the lens. It will correct your image when shooting in blue water. This gives you an average correction. Sea conditions and depth will change the color and might need a stronger

amount of filtering. All digital cameras have a custom white balance mode. By using a white colored target, the camera will create a digital filter pack to correct the color for the current conditions. This takes slightly more skill than using underwater mode, but it will get you better results.

Using filters is another way to correct the color. Both Fantasea Line and Ikelite produce blue and green water color correction filters.

Magic filters are a gel filter that can be cut to size. One would then attach the filter to the lens or place inside the

lens port. Magic filters are available for green or blue water. These filters are designed to do a custom white balance along with using the filter. They will get you the best results and will be effective even in deep water. The company also makes a filter to be used with an auto white balance setting.

Filters are effective in shallow water, and they flatten out the image. This is because they are color correcting the background and the subject.

By using a strobe, the daylight balanced light will bring back the natural color of the subject. By their nature,

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strokes will only light up a small area. So, the background will continue to have a vibrant blue or green colorcast. This could create a very dramatic image. Never use a filter, underwater mode, or custom white balance when using a strobe. Auto white balance will work best when using strobes.

Since we want to work close, with a wide-angle lens, strobes with a wide beam angle are needed. If our flash has a continuous power dial, this will make exposure control much easier. Traditionally, the strobe connects to a waterproof bulkhead on the outside of the housing. There's a connection on the inside to the camera's hot-shoe. The problem is, not every point-and-shoot camera has a hot-shoe, but they all have a built-in flash.

The camera's flash is not powerful enough and is in the wrong position to use underwater, but it could be used to trigger an external strobe. The external strobe has to have a built-in slave sensor, or we need to be able to add one. When the camera's flash fires, it will set off the external strobe.

The camera's built-in flash fires off a pre-flash to gather exposure information. It is important that the slave sensor can recognize this pre-flash and only fire the external strobe when the shutter is open. Some systems now allow the external strobe to mirror the pre-flash information and give you automatic flash exposure. This is called DS-TTL. Using a strobe with an exposed slave sensor will also be triggered by other photographers strobes.

Some companies including Sea & Sea have their slave sensors setback. Here, we need to use a fiber optic cable to move the light from the camera's built-in flash to the slave sensor. This is a very efficient way to fire a strobe. Now many housings for advanced DSLR cameras use this system.

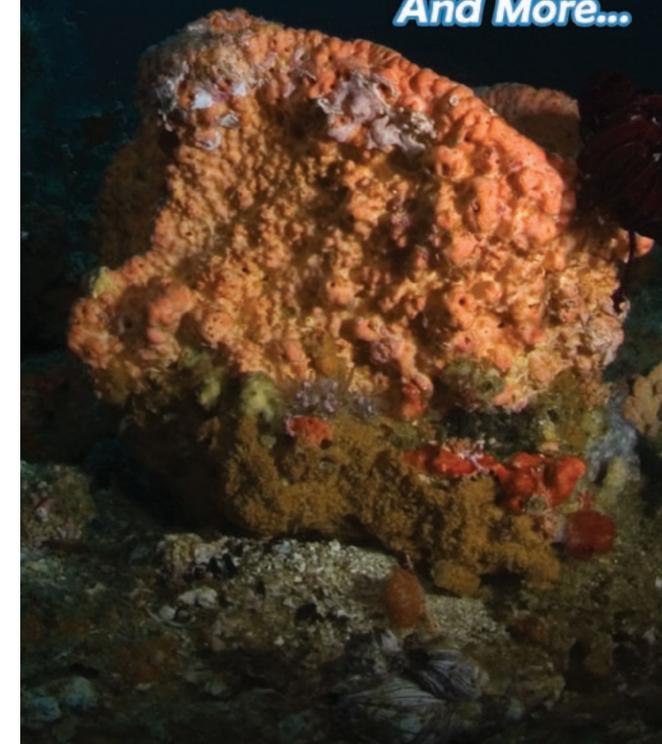
Manual exposure

Automatic and program modes are set-up to work with surface conditions.

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| <p>ADVANTAGES</p> <ul style="list-style-type: none"> • Economical • Compact and easy to travel with • Simple to use • Conversion lenses can be attached or removed in the water. Allows for both macro and wide-angle subjects to be photographed on the same dive. | <p>DISADVANTAGES</p> <ul style="list-style-type: none"> • Smaller sensors—image quality not as good as a DSLR • Built-in lenses not as sharp as lenses designed for DSLRs • Less control • More shutter delay • Many point-and-shoot cameras shoot jpg files only. The ones that shoot RAW files are very slow. |
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The underwater environment will confuse these systems, and one will get over or under exposed images. When using an external strobe, the background is affected by the available light exposure. This is controlled by the shutter speed and f-stop.



we could use exposure compensation to control available light. The problem is the camera might change the f-stop as well as the shutter speed. This of course will also

pressed file with minimally processed data. They require post processing in the computer. This takes more skill and time, but allows us to really tweak the image to perfection.

Since these are larger files, they could slow down a compact camera. DSLRs have large buffers and can handle these files better. Some point-and-shoot cameras have larger buffers, so they can capture RAW files without putting you into deco.

The foreground is affected by the strobe. We control this with the camera's f-stop and the strobe-power. Often, a correct exposure might not be what we want. Usually, we will want to under-expose the available light, so the background gets darker. This way our subject will stand out, and our image will have more contrast. This is why it is important to work in manual mode.

Many of today's compact digital cameras have auto and program modes only. In program or aperture priority mode,



change our foreground exposure. So, ideally, we want to use a camera with manual mode.

Speed

In the past, point-and-shoot cameras focused very slowly, and there was a delay between pushing the shutter button and the shutter opening. This is called shutter delay and is responsible for many photos of fish-butts. These days, compact digital cameras are much faster, but there is usually some shutter delay. In order to get fish heads instead of fish butts, we should use a camera with as little shutter delay as possible.

The file format could also affect the camera's speed. It is best to shoot RAW files. This is usually an uncom-

Housings

It seems obvious, but make sure there is a housing for the camera. No housing, no underwater images. It is amazing how many people get a camera



and then try to find a housing for it. They are disappointed when they discover none exist. It is also important to make sure the housing has the required features. If we are doing a 300-foot tech dive, we need a housing rated to that depth. It is important to make sure the housing can access all the major camera controls and accepts optical accessories on the lens port. We also need to be able to easily attach a strobe arm and be able to fire our strobes. When shopping for a camera to take under-



water, we need to look at the housings at the same time as the camera models.

Choices

Point-and-shoot cameras have an extremely short life span.

So, the models we talk about today might not exist an hour from now. We need to ask ourselves the question: why are we taking photos underwater? The

majority of divers will be happy with an advanced point-and-shoot camera. Many of us just want images to show our non-diving friends why we spend so much time underwater.

The advantage of a small travel-friendly system that is simple to use is huge compared to a DSLR system. The explorer that is already burdened with heavy dive and scientific gear will also find a compact camera a blessing. The important thing is to make sure the camera, housing and strobe work together the way you need it to.

In the next issue, we will discuss compact camera models that are best suited for underwater photography. We will also go over housings and other accessories.

CLOCKWISE FROM TOP RIGHT: Fantasea FP7100 housing for the Nikon COOLPIX 7100; Olympus PT-050 housing for the Olympus XZ-1; Ikelite wide-angle conversion dome for the Ikelite G12 and other housings; Ikelite housing for the Canon PowerShot S100; Ikelite housing for the Canon PowerShot G12



Canon made their first underwater housing in 1959 for the Canon VT 35mm rangefinder camera



Edited by
Don Silcock

Canon Rebel T4i/EOS 650D DSLR

Canon has announced the release of the Rebel T4i/EOS 650D DSLR camera, which features an 18 megapixel APS-C sensor and DIGIC 5 processor with a native ISO range of 100 to 12800. The sensor is stated to be a "hybrid" design, with pixels dedicated to phase detection autofocus (AF) to improve the performance of AF in Live View mode and provide continuous AF in video mode. The 650D can capture 1080p HD video at 30-, 25- and 24fps and has touchscreen control on the LCD which provides focus point selection and shutter Release in Live View, multi-touch type gestures for image review and menu selection. The Rebel T4i/EOS 650D will ship at the end of June for an estimated retail price of US\$850.



Sea & Sea Canon EOS 5D Mk III Underwater Housing

Sea & Sea has released CAD drawings of their new housing for the Canon EOS 5D Mark III SLR. Although full details and specifications of the housing are not currently available, Sea & Sea stated that it will be available in July 2012. It appears that the housing will continue with electrical strobe triggering and that the controls and latch system will be very similar to those of the previous MDX-5DMkII housing.

Aquatica A5DMkIII Canon EOS 5D Mk III Housing

Aquatica has announced the release of their A5D Mk III housing for the new Canon EOS 5D Mark III SLR. The new housing features a redesigned camera tray and both the zoom/focus gear and the lens release lever can now be retracted to provide additional room to allow larger lenses to be inserted. Aquatica has clearly prioritized the housing for video use, a major strength of the 5D cameras, and the video controls are very easy to reach. Plus, they have provided a total of three ports to allow for monitors, etc., to be added. Additionally, the AF-ON and star button now has a locking collar to prevent the control from being activated by water pressure, and the zoom gear has been redesigned to enable a smoother action—another key feature for video users. The Aquatica A5D Mark III will retail at US\$3,199.



Nauticam NA-5DMKIII Canon EOS 5D Mk III Housing

Nauticam has released its NA-5DMKIII housing for the Canon 5D MkIII DSLR. The housing features a double paddle lever for the right thumb that activates AF-On and Record plus "piano key" controls for the Set and Quick Control functions, and a multi controller pad for the camera's joystick. In addition, the ISO, Live View/Movie and Focus point selector controls are all available from the right hand handle. Nauticam has released the NA-5DMKIII housing initially with a Nikonos-type sync port, although other bulkheads are available, but it appears that a fiber-optic solution for the housing and camera will be offered in the future. The housing retails at US\$3,600.



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World ShootOut 2012

This is the second year in a row that the World ShootOut universal underwater photo competition takes place worldwide, including a special new category for children.

Introducing new categories and glorious prizes, the organization is proud to invite all divers, underwater photographers, diving centers, liveboards and media partners to take part in one of the most innovative, creative, international and festive events ever produced.

During the month of August 2012, the whole underwater world will be performing as a huge underwater festival, hosting young, amateur and professional photographers from all over the world, competing with each other for some very worthy prizes, including cash prizes, luxurious diving trips, diving equipment, photo gear and more.

Producer David Pilosof initiated the first World ShootOut competition in

2011, breaking all boundaries and introducing an international competition as never featured before. Hundreds of photographers from 27 countries around the world took part in the first World ShootOut competition and over 1,500 images were submitted, ranging from those that captured the calm lakes of the Nordic countries and Canada to others that showcased the exotic secrets hidden in Alaska and dramatic images of the great white shark in the Gulf of Mexico.

Up until now, the competitions have awarded underwater photographers with over half a million dollars of prizes!

Please see the competition website for full details on this year's ShootOut: Worldshootout.org

Acquapazza APSO-NEX5N housing for Sony NEX-5N

Acquapazza has announced the release of its housing for the Sony NEX-5N EVIL camera. The APSO-NEX5N is available with either a bayonet or threaded port attachment systems and Acquapazza offers a total of eight ports, which cater for virtually all the Sony lenses available for the camera including the A mount 16mm wide-angle, and the 50mm and 100mm macro manual focus lenses. Acquapazza offers both mechanical and magnetic zoom/focus control, with the possibility of both being available, and the user can vary the LCD viewing angle via an external control. Comes in 14 cool colors!



Sony DSC RX100 High End Compact Camera

After a seven-year absence at the very top end of the compact digital camera market, Sony has returned with a vengeance and announced its new DSC-RX100 enthusiast compact. The highlights of the RX100 are its impressive 20.2MP 1-inch digital sensor and Carl Zeiss sensor 28-100mm f1.8-4.9 zoom lens. The sensor is at least double the size of the ones in the other cameras competing at the premium end of the market—the Canon S100 and Olympus XZ-1. The lens is also one of the brightest available. The camera also features 1080p60 HD video and is equipped with extensive manual camera controls and RAW image capture making it a very appealing candidate for underwater photography. It is expected to generate a lot of interest among the housing manufacturers. The RX100 will be released in July and is priced at US\$649.



Watershot V1800 Action Sports Camera Lighting Kit

Watershot has released an underwater lighting kit that is designed to be used with both video and still cameras. The kit uses a 1,800-lumen video light that's configured with a mounting bracket and is powered by Watershot's eGrip rechargeable batteries that are stored inside the handle grip. The light delivers an evenly distributed 75-degree flood beam pattern and provides 1.5 hours of illumination when set on full power, and up to six hours when set to low. It has a battery level indicator located on the light head. Depth-rated to 492 feet, the light offers four modes: high, medium, low and strobe. The kit retails at US\$979.



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