



photo & video

Is the bulky SLR or DSLR camera (shown) a thing of the past? Enter, the slim mirrorless camera

Text and photos by Don Silcock

There is no doubt that digital technology has revolutionized underwater photography, and what was once the exclusive preserve of a few dedicated divers, has now become so common, that you stand out if you *don't* have a dive camera. Until quite recently, the technology behind digital photography has been firmly divided into two basic genres of cameras—compact digital point-and-shoot (or *digicams*, as they are often referred to) and digital single lens reflexes (DSLR's).

In general terms, digicams tend to be considered simpler devices, which most people use just for snapshots, while DSLR's are generally thought of as much more complex and technically competent cameras.

Probably the most fundamental difference between the two types is that digicams are "all-in-one devices" that have built-in zoom lenses, which means you are basically restricted to the lens on the camera you opt for, while DSLR's can use a wide variety of different lenses.

Then, of course, there is the cost issue. Digicams start at less than a US\$100 and go up to around \$750, while DSLR's start



Using Mirrorless Cameras Underwater

from around \$700 and go up to \$8,000!

For underwater photography, most people start with a digicam, as there are cost-effective housings available for many digicams.

X-RAY MAG's editor, Larry Cohen, recently completed an excellent series of articles on the use of point-and-shoot digital cameras underwater, and Lawson Wood provided a comprehensive series

on DSLR's underwater before that. Check out X-RAY MAG's archives online to download these articles.

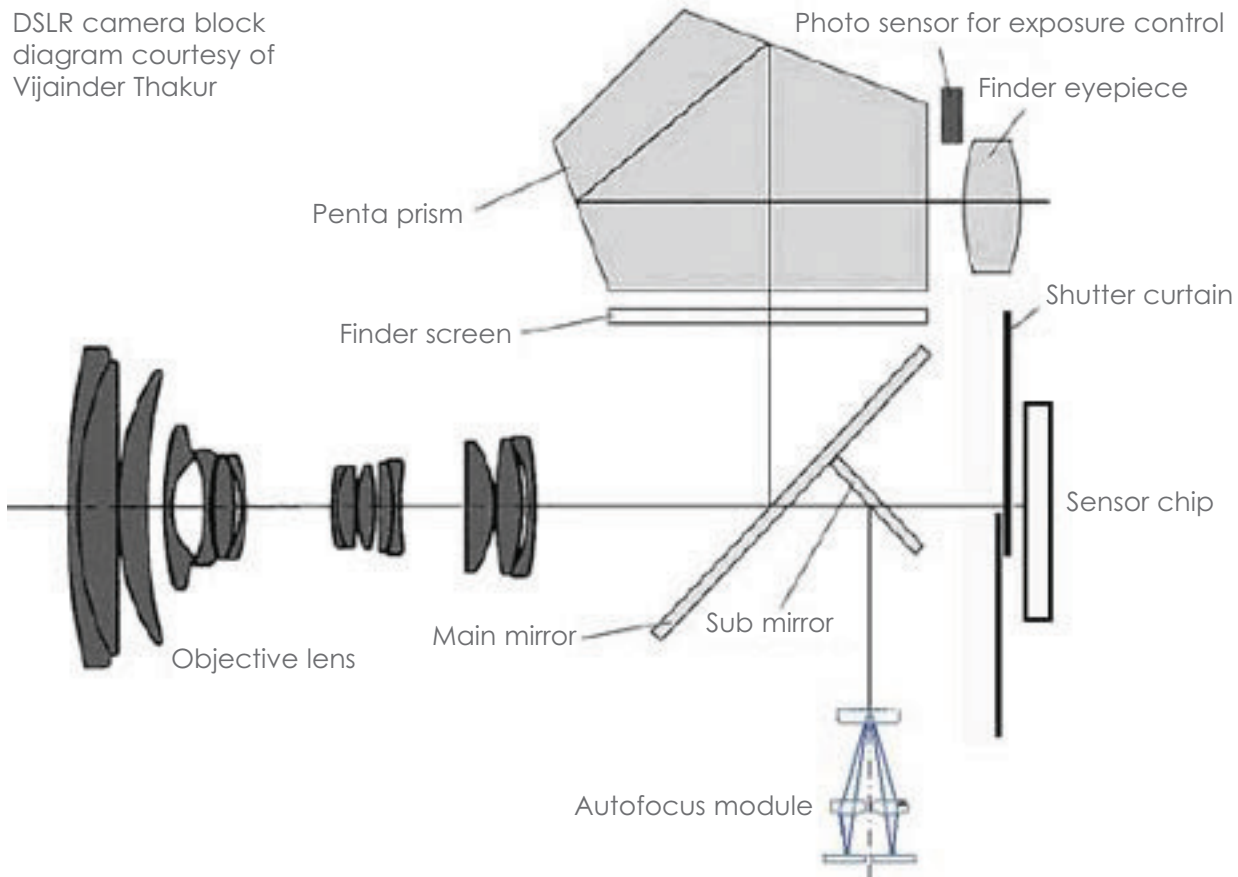
The objective of this, and subsequent articles, is to provide an insight into

the new technology space that has appeared on the photographic scene in the last couple of years—mirrorless or EVIL (Electronic Viewfinder Interchangeable Lens) cameras.



photo & video

DSLR camera block diagram courtesy of Vijainder Thakur



What's the buzz?

The new mirrorless cameras have created a lot of buzz in the diving community, because they seem to offer two very distinct advantages. First of all, they bridge the price gap between digicams and DSLR's in a very attractive manner, while offering a very cost-effective way to increase photographic capability underwater. Secondly, they are small and light and solve the travel problem all underwater photographers using DSLR's face when it comes to check-in time at the airport.

This means that mirrorless cameras are not only attractive to the digicam user looking to upgrade to a DSLR but baulking at the cost, they are also catching the attention of the existing DSLR users who are fed up with the bulk and weight of their equipment. The key question both these scenarios raise follows: Is the capability of mirrorless cameras underwater really good enough, or are they just expensive stop-gaps on the way to (or back to) a DSLR?

So, what's a mirrorless camera?

The basic concept



Size comparison, compact and DSLR, courtesy of Canon

behind Single Lens Reflex (SLR) cameras is that a hinged mirror is used to cover the image storage medium while the subject is viewed and composed. This is done by the photographer looking through the viewfinder, mounted at the top of the camera body, into an optical prism that allows the image on the mirror below to be seen.

The image that is available on the mirror is a function of the lens attached to the camera body. A wide-angle lens allows a broad sweep of the immediate area in front of the camera to be seen, while a telephoto lens isolates specific subjects in the distance.

The combination of the prism, mirror and various lenses allows the photographer to compose the subject to their taste. When the shutter button is pressed, the

hinged mirror rapidly swings out of the way and allows the storage medium to record the image.

The fundamental difference between SLR's and DSLR's is that with SLR's, the storage medium is film, while with DSLR's, the medium is a digital sensor. The rest of the camera body is basically the same.

The flexibility and usability of SLR's is why they are so popular. The downside is that the need for a prism and mirror means that a basic model is much bigger than a digicam. Top-of-the-range SLR models can be really big and heavy.

The concept behind mirrorless, or EVIL, cameras is to remove the optical prism and mirror to greatly reduce the overall size of the camera body, while providing the ability to change lenses as well as the use of the LCD panel on the back of the camera to view and compose the subject matter. The storage medium is a digital sensor; there are no film-based mirrorless cameras.

Mirrorless

Why mirrorless?

Mirrorless cameras have created a new space in the photographic world, and manufacturers love nothing better, because it allows them to bypass the existing competition in the never-ending battle for overall sales volume.

In the DSLR camera space, the Big Two—Canon and Nikon—dominate, while all the rest of the manufacturers try to find a way to grow.

Sony is a good example of this, and a few years ago, it announced aggressive plans to break the stranglehold of the Big Two by releasing a number of very good DSLR's. But most photographers had too much invested with either Canon or Nikon lenses to change brands. So, the Sony DSLR's have yet to really take off.

Then Sony decided mirrorless cameras was the new space they were looking for and developed the highly regarded NEX range. Sony has subsequently enjoyed significant sales success and established a loyal following.

Mirrorless cameras offer the primary advantage of a DSLR—interchangeable lenses—but in a much smaller and cheaper package. They have been marketed well and have been positioned as a trendy alternative to DSLR's. They are a very logical next step for digicam owners looking to upgrade and also provide a great "second camera" option for DSLR



Olympus OM-D



cinema of dreams



www.seacam.com





enthusiasts looking for a small and light travel package.

But which format? —I'm confused

Digital photography can be very confusing to the uninitiated because of all the technical jargon and acronym soup related to the size of the sensor—FX, APS-H, DX, APS-C, to name but a few—and now we have *Four Thirds* and *Micro Four Thirds*.

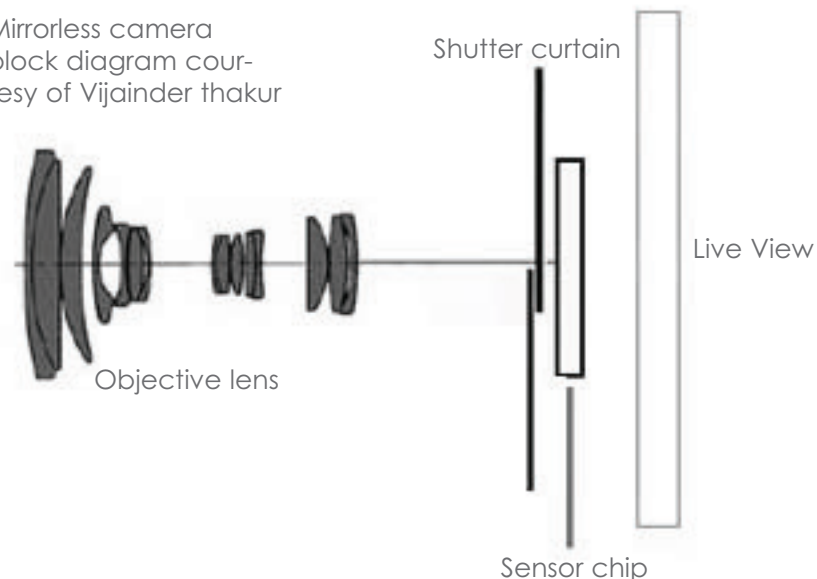
The reference point for all these sensor formats is the 36x24mm size of the piece of 35mm standard that used to record the image in the days of film—remember that stuff? FX sensors are the same size as those pieces of film, while the

others are smaller and therefore apply a *crop factor* such as 1.5 with the Nikon DX format.

The crop factor is applied to the focal length of a lens. So, for example, a Nikon 20mm FX lens on an FX camera is a 20mm lens, but the same lens used on a Nikon DX camera becomes a 30mm lens (20 x 1.5).

The premise for the Four Thirds system is that rather than design digital sensors around a size and format that relates to film, it is better to start from scratch and design for purely digital use. The original concept was developed by Olympus and Kodak (remember those Kodak moments?).

Mirrorless camera block diagram courtesy of Vijainder thakur



The Four Thirds sensors are approximately half the size of the FX sensors and use a ratio of 4:3 (width to height) rather than the 3:2 inherited from film, which means that they have a crop factor of around 2, so that a 20mm lens would be 40mm.

The small sensor is both the Four Thirds system's biggest advantage and, some would argue, its weakest point, too. The size means that the camera bodies and lenses can be much smaller than those of a DSLR. But its detractors point out that it lacks the imaging horsepower of the bigger sensors.

Olympus counters that argument by explaining that, physically, the sensor is only very slightly smaller than the DX/APS-C variants, and, because the Four Thirds system is designed from the ground up for digital imaging, the sensors can out-resolve (in optical terms) the larger sensors in the equivalent focal lengths.

The Micro Four Thirds format uses the same sensors as Four Thirds, but in a smaller and

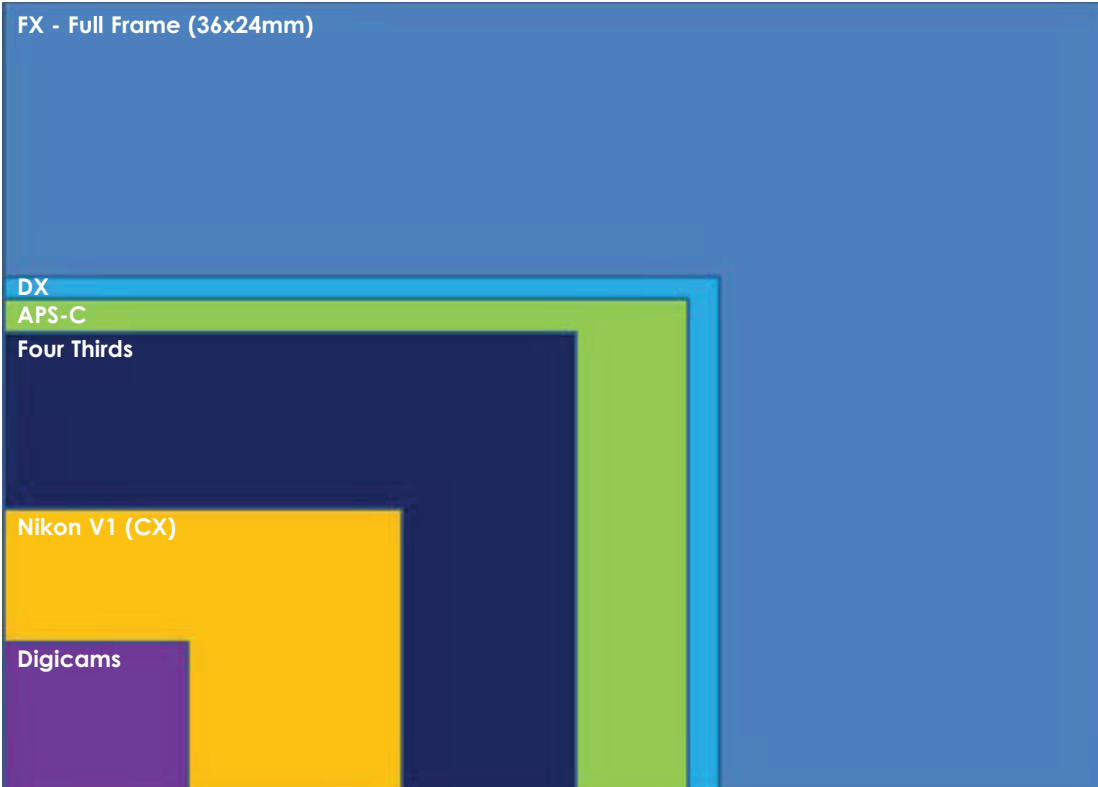
much thinner camera body plus smaller lenses, so that the overall size is even further reduced—all of which start to make a compelling story for underwater photography.

Sony NEX

Sony opted to use a larger sensor for its NEX range of mirrorless cameras, which means the lenses required are much bigger than those used in the Four Thirds systems. The results from the APS-C sized sensors are impressive, as is the fact that the NEX bodies are much smaller than their DSLR equivalents using the same sensor.

CX Nikon 1

Just to add one more potential level of confusion, Nikon recently responded to the growing popularity of mirrorless cameras and released its own versions—the V1 and J1. The fact that Nikon entered the fray, and Canon is rumored to



Digital sensor sizes



Sony NEX 5



photo & video

be following suit, is indicative of just how much momentum the mirrorless space is gaining.

While the entry of Nikon is a positive sign, they did it with a different size of sensor—one that is smaller than the Four Thirds system—plus the lenses developed for the V1 and J1 can only be used on those cameras. Nikon's mirrorless cameras are even smaller than the Micro Four Thirds versions and have

received a lot of attention for their state-of-the-art efficiency.

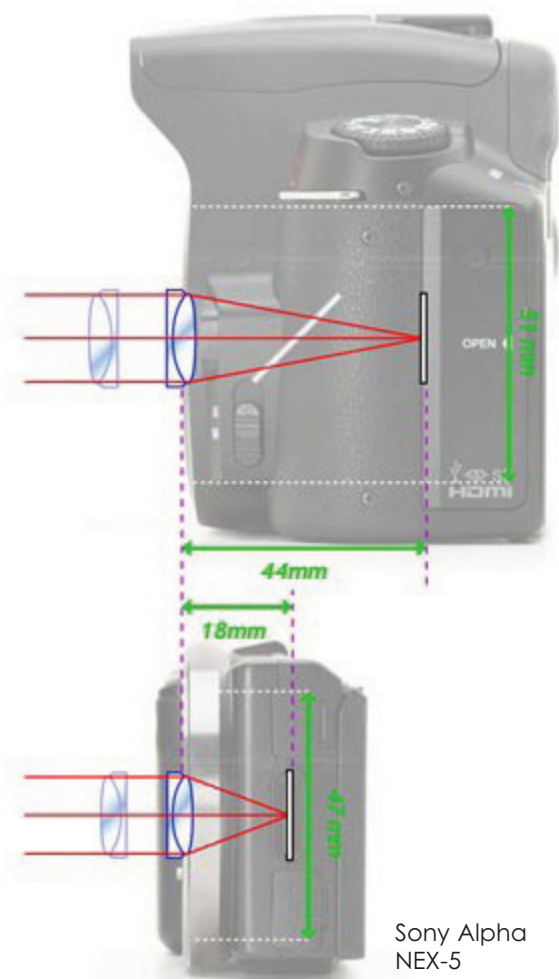
Lens choices

Because the whole area of mirrorless/EVIL camera technology is a completely new space, there are no legacy lenses available to use on the new cameras. Currently, this is probably the biggest single drawback.

Given time, this problem will go away completely, as the new systems have real momentum in the market. Nikon's entry with the V1 and J1, plus Canon's rumored entry into the space, show that they are here to stay.

Third part lens manufacturers such as Sigma are now releasing lenses for various models, which is also a very positive sign. But for now, none of the manufacturers have a complete set of lenses available, although Panasonic and Olympus, with their joint format Micro Four Thirds system, are close, followed by Sony.

For underwater photography, the biggest gap is with macro lens availability—but again, if the rumors are to be believed, the missing lenses are on their way.



Sony Alpha DSLR A330

Sony Alpha NEX-5

Size comparison: DSLR vs. mirrorless

Summary

Simply stated, mirrorless/EVIL cameras are an exciting new area of photographic technology that offer many of the most important features of DSLR's but in a smaller, lighter and cheaper way, which is particularly appealing for use underwater.

They are both a logical step up for many underwater photographers who started with a digicam and are ready for something better, and, at the same time, a logical step-down for DSLR users who are tiring of all the hassle of carrying their gear around or getting hit with excess baggage charges.

Both ways, this is a space to watch. The next article in this series will look at the housings and associated equipment needed to use mirrorless cameras underwater. ■

ADVANTAGES

- Smaller and lighter cameras and lenses than DSLR's
- Interchangeable lenses
- No mirror means one less piece of precision equipment inside the camera
- No mirror means no "mirror slap" noise and resultant camera vibration or movement
- The smaller sensor size gives deeper depth-of-field for the same equivalent field of view and aperture

DISADVANTAGES

- The sensor is smaller than the ones used in DSLR's and so (theoretically) the image quality will be less
- Autofocus is not as good as on a DSLR but is only really an issue with sports photography
- No high quality optical viewfinder
- Because there is no mirror over the digital sensor, changing lenses can introduce dirt and dust more easily than with a DSLR—although many mirrorless cameras have dust-removal systems
- The smaller sensor with its deeper depth-of-field means it is more difficult to achieve out-of-focus backgrounds



Never miss a dive.

b.u.d

B.U.D is a universal backup dive computer using Dual Algorithm®. This unique technology allows you to adjust the B.U.D's settings to closely match those of your primary dive computer.

Select the right algorithm, adjust as needed and dive with confidence. Simple.



FREE video tutorial with product registration after purchase.

Learn more... visit us at OceanicWorldwide.com for the full story.

OCEANIC

