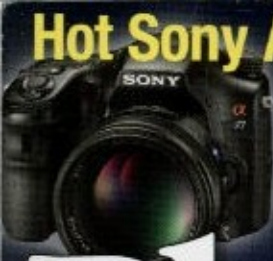


Hot Sony A77: Next-Gen "Translucent" DSLR



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Our Guide To MIRRORLESS Cameras

Combining compact size with the interchangeable lenses of a DSLR, mirrorless cameras offer the outdoor photographer a capable, lightweight option



Outdoor photography—landscape, wildlife, close-up, travel and sports—covers a lot of territory and demands cameras that deliver excellent image quality and a wide range of focal lengths.

The two most popular types of digital cameras are DSLRs and compact point-and-shoots. For *OP* readers—nature photographers—DSLRs are far and away the most popular for several reasons. DSLRs produce excellent image quality and are very quick, and interchangeable lenses make them highly versatile. Overall, DSLRs give you performance that a point-and-shoot can't come close to achieving. The main disadvantages of DSLRs are that they're

relatively bulky, complex and costly. Although overall point-and-shoot cameras don't have the performance of a DSLR, they have definite advantages. They're very convenient and simple to use, and most will fit in a pocket. The main drawbacks are that they contain tiny image sensors whose image quality can't match that of the DSLRs, they're quite slow compared to DSLRs in both shooting speed and AF performance, and they limit you to the focal range provided by the camera's built-in lens.

In 2008, a new camera type appeared: the mirrorless, interchangeable-lens camera. Sometimes referred to as EVIL (Electronic Viewfinder Interchangeable Lens, although not all have electronic

viewfinders), the mirrorless models have become popular with some photographers over the last couple of years. The promise of this new category is the combination of DSLR image quality and interchangeable-lens versatility with compact camera portability.

For nature photographers, the early mirrorless models weren't perfect. Three years later, and the technologies involved have advanced to the point where the viewfinders are better, sensors and processors have improved, and AF systems are faster and more accurate. In light of these advancements, we decided this is a good time to take an in-depth look to see if your next primary camera will be mirrorless.

How Do They Make Them So Small?

An SLR camera contains an SLR mirror positioned at a 45° angle to the incoming light from the lens. In this position, it reflects the light up to a focusing screen, then onto a pentaprism or pentamirror and finally to an eye-level viewfinder, which presents the image right-side-up and laterally correct to the eye for composing and focusing. When you press the shutter button to take a shot, the mirror flips up and out of the light path so the light can reach the film or image sensor. The viewfinder image blacks out briefly as the exposure is made because the mirror can't send the image to the viewfinder when it's in the "up" exposing position. Once the exposure has been made, the mirror automatically drops back down into the viewing position, and you can see through the viewfinder again.

Mirrorless, interchangeable-lens cameras are smaller, lighter and less complicated because they eliminate the reflex components of a single-lens-reflex camera: the mirror, mirror box, focusing screen and prism viewfinder. With these parts gone, camera designers can move the lens mount closer to the image plane, which means they can design smaller, simpler lenses. You use the camera's Live View LCD monitor for composing and focusing, just as with a compact digital camera. For those who prefer eye-level operation, some mirrorless cameras have built-in, eye-level electronic viewfinders (EVFs), or accessory attachable EVFs. The mirrorless design also does away with mirror blackout and the vibrations caused by the mirror's movement.

There's still the issue of getting a big DSLR sensor into a compact body, but the camera designers figured it out, and most mirrorless bodies are closer to point-and-shoot size than DSLR size. However, a big sensor requires a big lens diameter, so the lenses for the APS-C-sensor cameras are fairly large relative to the camera body. But the mirrorless body and lens combinations are still smaller than equivalent DSLR combos.

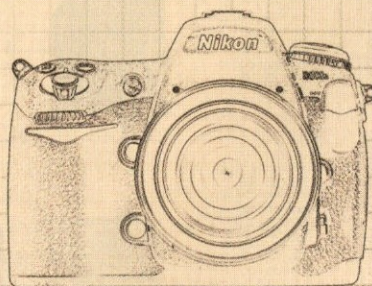
Image Quality

For nature photography, nothing is as important as image quality. Land-

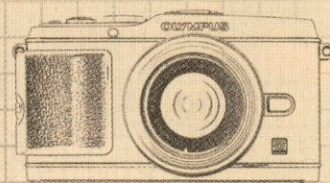
scape and macro photographers want to make big prints with great detail. Wildlife shooters want to see texture in fur and feathers. Both examples require cameras capable of producing excellent image quality. The main point of the mirrorless, interchangeable-lens cameras is to provide DSLR image quality in a compact body. Most do this by putting a DSLR sensor in that compact body.

It's not so much about pixel count. Point-and-shoot digital cameras now offer

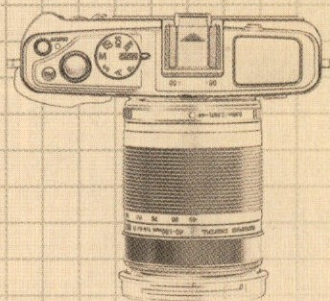
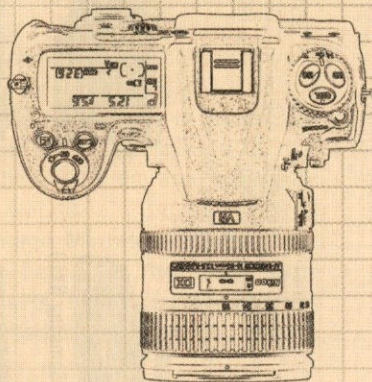
12, 14 and even 16 megapixels. But much potential detail is lost to image noise because the sensors in point-and-shoot digital cameras are very small, and the pixels are much smaller and packed closer together than those on a large DSLR sensor with the same pixel count. The combination of small sensor area and tiny pixels means point-and-shoot cameras aren't very efficient at collecting light. This results in high-noise, point-and-shoot images, especially at ISOs above 200.



Mid-sized DSLR



Micro Four Thirds



Volumetric Efficiency Of A Mirrorless Outfit

Consider, for example, a high-end, entry-level DSLR body and an 18-200mm compact zoom lens (equivalent to a 28-300mm zoom on a 35mm camera). The body measures around 5.2x4.1x3.0 inches and weighs 24.3 ounces, depending on the model. The 18-200mm zoom measures 3.0x3.8 inches and weighs 19.8 ounces. Compare that to a comparable Micro Four Thirds body and equivalent zoom (14-150mm). The body (SLR-style with built-in EVF) measures 4.5x3.3x1.8 inches and weighs 11.8 ounces; the lens measures 2.5x3.3 inches and weighs 9.9 ounces. Switch to a "flat," compact-style, mirrorless body, and the camera size drops to 4.3x2.5x1.3 inches and 7.7 ounces. The mirrorless system weighs just half as much as the equivalent APS-C DSLR system. The Olympus M.Zuiko Digital 75-300mm *f*/4.8-6.7 super-tele-zoom for M4/3 cameras (equivalent to a 150-600mm zoom on a 35mm camera) measures just 2.7x4.6 inches and weighs just 15.2 ounces! The size and weight savings are less dramatic with APS-C-sensor, mirrorless cameras because they require larger lenses to cover the larger sensors, but even so, the lenses—and entire systems—are noticeably more compact than DSLR systems.

MIRRORLESS CAMERAS



	Sensor	Format	Normal ISO Range*	Max. fps ^o	AF	Top Video	Shots per Charge**	Viewfinder	LCD	Dimensions	Weight	Street Price (body)
Olympus PEN E-P3	12.3 MP	M4/3	200-12,800	3	Contrast	1080/60i	330	EVF opt.	3.0/614K OLED	4.8x2.7x1.4 in.	11.3 oz.	\$899 [^]
Olympus PEN E-PL3	12.3 MP	M4/3	200-12,800	5	Contrast	1080/60i	300	EVF opt.	3.0/460K Tilt	4.3x2.5x1.5 in.	9.3 oz.	\$699 [^]
Olympus PEN E-PW1	12.3 MP	M4/3	200-12,800	5	Contrast	1080/60i	TBA	EVF opt.	3.0/460K	4.3x2.5x1.3 in.	7.7 oz.	TBA
Panasonic Lumix DMC-GH2	16.0 MP	M4/3	160-12,800	3 ^{oo}	Contrast	1080/60i	330	EVF	3.0/460K Tilt	4.9x3.5x3.0 in.	13.8 oz.	\$999 [^]
Panasonic Lumix DMC-G3	16.0 MP	M4/3	160-6400	3 ^{oo}	Contrast	1080/60i	270	EVF	3.0/460K Tilt	4.5x3.3x1.8 in.	11.8 oz.	\$599
Panasonic Lumix DMC-GF3	12.1 MP	M4/3	160-6400	2 ^{oo}	Contrast	1080/60i	320	None	3.0/460K	4.2x2.6x1.3 in.	7.8 oz.	\$499
Pentax Q	12.4 MP	1/2.3-in.	125-6400	5	Contrast	1080/30p	250	EVF opt.	3.0/460K	3.9x2.3x1.3 in.	6.3 oz.	\$799
Samsung NX10	14.6 MP	APS-C	100-3200	3	Contrast	720/30p		EVF	3.0/614K AMOLED	4.8x3.4x1.6 in.	12.3 oz.	\$699 ^{^^}
Samsung NX100	14.6 MP	APS-C	100-3200		Contrast	720/30p	420	EVF opt.	3.0/614K AMOLED	4.7x2.8x1.4 in.	9.9 oz.	\$549 ^{^^^}
Samsung NX200												
Sony NEX-7	24.2 MP	APS-C	100-16,000	3 ^{oo}	Contrast	1080/60p	400	EVF	3.0/921K Tilt	4.7x2.6x1.7 in.	10.3 oz.	\$1,200
Sony NEX-5N	16.1 MP	APS-C	100-25,600	3 ^{oo}	Contrast	1080/60p	430	EVF opt.	3.0/921K Tilt	4.4x2.3x1.5 in.	7.4 oz.	\$600
Sony NEX-C3	16.2 MP	APS-C	200-12,800	2.5 ^{oo}	Contrast	720/30p	400	Optical opt.	3.0/921K Tilt	4.3x2.4x1.3 in.	7.9 oz.	\$649 ^{^^}

*Standard ISO range; most cameras also provide expanded ISO settings above and sometimes below those listed here

**Approximate number of shots per full battery charge, per manufacturer

ooMaximum frame rate at full resolution, with autofocus for each shot

ooFaster frame rates available with focus fixed

^With 14-42mm kit lens

^^With 18-55mm kit lens

^^^With 20-50mm kit lens



Samsung NX10



Samsung NX100



Samsung NX200



Pentax Q



Sony NEX-7



Sony NEX-5N



Sony NEX-C3

The noise becomes more evident the bigger you print the images. The large DSLR sensors can capture more light for lower-noise images. And for a given pixel count, the DSLR pixels will be much larger, which also enhances light collection and reduces image noise. Bigger image sensors with bigger pixels result in better image quality, and the ability to use high ISO settings while maintaining image quality. Good image quality at higher ISO settings also opens up a lot of low-light photography to the larger-sensor-camera user.

Olympus and Panasonic mirrorless models use Micro Four Thirds sensors. This means they're based around the same standard 17.3x13.0mm Four Thirds System sensor used in standard Four Thirds System DSLRs, but the cameras are much smaller due to the absence of the reflex system. Micro Four Thirds sensors are smaller than the 23.6x15.6mm APS-C sensor, but still far larger than the 8.8x6.6mm and smaller sensors used in point-and-shoot digital cameras.

Samsung and Sony use APS-C sensors in their mirrorless cameras. As we go to press, Sony just introduced the mirrorless NEX-7, with the same 24.3-megapixel APS-C sensor used in its new flagship A77 translucent-mirror DSLR.

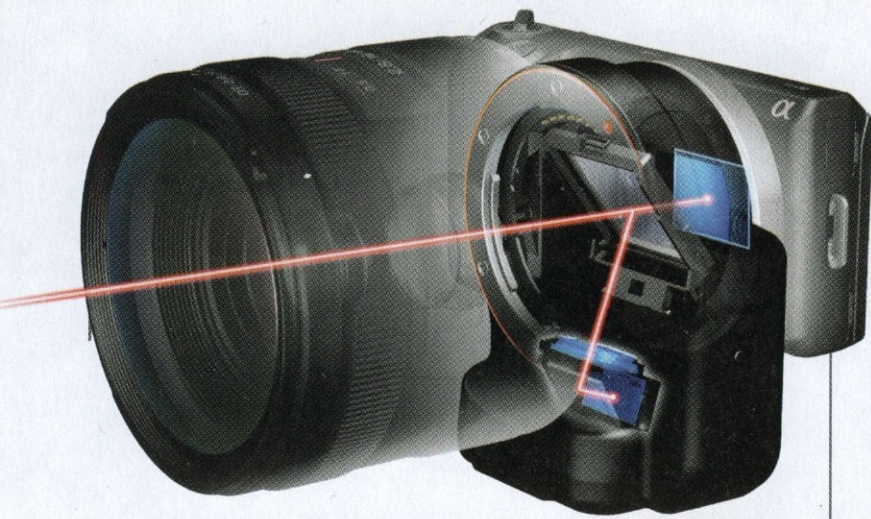
Pentax's Q is the smallest of the mirrorless, interchangeable-lens cameras, in part because it has the smallest sensor: a 1/2.3-inch (6.16x4.62mm) unit typical of the size used in compact digital cameras. We haven't had a chance to test this camera yet.

Tie: Because there's so much variability of image quality between DSLR models, we can't give either the DSLR or the mirrorless, interchangeable-lens camera a clear advantage here.

Interchangeable Lenses

Perhaps even more than image quality, interchangeable lenses are the DSLR's strong point. Whatever your outdoor need—a supertelephoto for distant wildlife, a super-wide-angle to take in a grand vista or a macro lens for life-sized shots of insects and flowers—DSLRs have it. Mirrorless cameras bring interchangeable lenses to the compact camera world.

DSLRs offer a wider range of lenses than the mirrorless cameras do—fisheyes to supertelephotos, true macro lenses, even tilt-shift lenses. Being relatively new products, there isn't such a wide range of lenses built just for mirrorless



The new Sony LA-EA2 Alpha NEX Camera Mount Adapter lets you attach Alpha A-mount lenses to a Sony E-mount camera body with continuous phase-detection AF in both still and video modes.

cameras, but through the use of adapters, you get a lot of options.

The Micro Four Thirds models from Olympus and Panasonic can use Micro Four Thirds lenses, and via adapter, regular Four Thirds System lenses, which expands the choices for those cameras considerably, although in some cases, you lose AF capability. Sony has introduced the LA-EA2 adapter for its NEX mirrorless cameras, which not only lets you mount Sony A-mount DSLR lenses and legacy Minolta Maxxum lenses on the NEX cameras, but also provides phase-detection AF with them—the adapter contains a phase-detection AF system based on the translucent-mirror technology introduced in Sony's SLT cameras—it's one of the most useful accessories we've seen in 2011.

Actually, because of their short flange-back distances—the distance between the lens mount and the image plane—mirrorless cameras can use any lens for which an adapter can be found, and indeed many users take advantage of this to mount Zeiss and Leica lenses, as well as lenses from their old SLR systems on their cameras. If you're a Canon or Nikon DSLR user, you likely can find an adapter that will let you use those lenses on your mirrorless cameras. Again, the adapters generally mean you must focus and adjust exposure manually, but you can use a wide range of lenses.

Advantage: DSLRs. Although you can get more lens options for a mirrorless, interchangeable-lens camera through the use of adapters, DSLRs still have a clear advantage here.

Portability

While few of them are really pocketable with lens attached, the mirrorless cameras are much smaller and lighter than even entry-level DSLRs. This means a mirrorless system will take up less space, which is ideal when traveling by air or even car. Smaller and lighter is especially nice when you're hiking with gear. And it's not just the camera. A mirrorless camera and lens combination is much smaller and lighter, so you're carrying a lighter system in much less space—and the more elements to your system, the greater the total savings in bulk and weight.

Advantage: Mirrorless, interchangeable-lens cameras. There are some small DSLRs, but portability belongs to the mirrorless category as a whole.

AF Performance

Wildlife photographers need an AF system that can track moving subjects accurately, and landscape and close-up shooters need an AF system that can focus precisely where desired. Many landscape and macro photographers focus manually, so their cameras must provide accurate manual focusing, as well. All of the mirrorless cameras utilize contrast-based AF rather than the phase-detection AF used in DSLRs. The contrast-based AF systems use the image sensor itself to measure contrast, focus being most accurate when contrast is at a maximum. The contrast-based systems in early mirrorless cameras were very slow, but that has changed. Today, the

(Cont'd on page 106)

MIRRORLESS CAMERAS

(Cont'd from page 89)

top mirrorless models have improved considerably. We just tested the new Olympus E-P3 and, with its touch-screen AF, found that it focused and fired immediately upon our touching the desired point on the OLED monitor. On stationary subjects, this may well be, as Olympus claims, quicker than phase-detection AF; we're eager to get a long lens to try it on action subjects.

In Live View mode, most DSLRs use contrast-based AF rather than the quicker phase-detection systems (newer Sony models excepted), and these DSLR contrast-based systems are much slower than the AF in today's mirrorless cameras. (Sony SLT cameras utilize a translucent mirror that permits using phase-detection AF in Live View mode, even for video shooting.)

The full-time Live View operation of the mirrorless cameras also provides excellent manual-focusing capability. You can zoom in on the critical part of the subject or scene on the big LCD or OLED monitor and carefully examine the enlarged area.

Advantage: DSLRs. In bright, high-contrast conditions, a contrast-detect system is very fast, but taken across the broad spectrum of lighting situations a nature photograph is likely to face, DSLR phase-detect AF wins.

Battery Life

Since the mirrorless cameras get their small size in part by doing away with an optical viewfinder system, they operate in Live View mode at all times, like point-and-shoot digital cameras. This means they're harder on batteries than DSLRs, and due to their smaller size, the mirrorless cameras must use smaller batteries than DSLRs. The result is that the mirrorless cameras get far fewer shots per battery charge than a DSLR. So you'll have to buy, charge and carry more batteries with a mirrorless camera to get the same number of shots, which is something to consider for long days in the field or when traveling.

Advantage: DSLRs. Generally, DSLRs get more shots per charge.

Stabilization

While much landscape and wildlife photography is done from a tripod, a lot is done handheld. Freeing the camera

from the tripod gives you more freedom to quickly compose and shoot those decisive moments—and save the hassle of carting around a tripod. Of course, you then lose the tripod's steadiness and risk a blurred image due to camera shake.

Some DSLRs provide in-camera, sensor-shift image stabilization, which moves the image sensor to counter the effects of camera shake. This system works with all lenses, but doesn't stabilize the viewfinder image. Other DSLRs offer some lenses with built-in stabilizers that shift lens elements to counter camera-shake-induced blur. This gives you the advantage of stabilizing both the recorded image and what you see in the finder, and can be optimized for the particular lens, but you get stabilization only with lenses that contain stabilizers.

The situation is the same with the mirrorless cameras. Olympus, Panasonic and Pentax offer sensor-shift stabilization, while Samsung and Sony offer some stabilized lenses for their mirrorless cameras. If you shoot handheld, you'll want stabilization; we've found both systems (sensor-shift and lens-shift) to be quite effective.

Tie: Because there are so many stabilization technologies involved, we can't give DSLRs or mirrorless, interchangeable-lens cameras a clear advantage here.

HD Video

All of the mirrorless, interchangeable-lens cameras can shoot high-quality video, 720 HD or 1080 full HD. Having the ability to shoot high-quality still images and HD video in a single tiny package is a wonderful thing—the video adds new ways of capturing and displaying nature and its moods and critters, with motion and sound. If your DSLR doesn't do video, you might consider a mirrorless model as an easily carried video camera that also can serve as an excellent backup to your still camera.

Tie: All things being equal, you can get excellent HD video from DSLRs or mirrorless, interchangeable-lens cameras. As a backup still camera that can shoot HD video, we give mirrorless cameras an advantage. or

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