

X-T30

📷 the Little GIANT



The new FUJIFILM X-T30 offers the X Series' signature dial-based manual operability and is equipped with the Auto Mode Selector lever that allows you to instantaneously switch to the fully-automatic shooting mode. Ideal for professional photographers and beginners, the X-T30 delivers premium-quality pictures with ease. The compact and lightweight mirrorless camera body that weighs just 383g offers outstanding performance, thanks to the use of the latest X-Trans CMOS 4 image sensor, including 26.1 megapixel resolution and fast high-performance AF, made possible with phase detection pixels placed across the entire frame. Offering similar performance to the X-T3, the "Little Giant - X-T30" offers premium image quality in a smaller and lighter body.

FUJIFILM
X

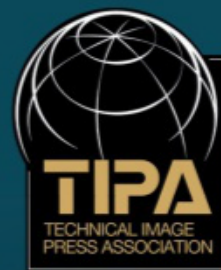
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CAPTURE TOMORROW



D780

From fast-moving action to rich 4K HDR video, the new Nikon D780 helps your vision take flight. Its unique combination of autofocus systems offers the best of two different worlds. Optical viewfinder shooting gives you fast and accurate AF, with innovations including an algorithm adapted from the flagship D5. Meanwhile, live view shooting brings all the advantages of hybrid AF using focal-plane phase-detection AF technology, including eye-detection AF and wide 273-point coverage. Combined with shutter speeds from 1/8000 s to 900 s, and advanced video and time-lapse features, the D780 embodies true versatility.

24.5 MP | ISO 100-51200 | 51-point AF | 273-point hybrid AF | 4K UHD, HDR (HLG) video



MARCH/APRIL 2020

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THE CHOSEN ONES

Like a great many around Australia during the Christmas and New Year period, I had to actually implement my bushfire action plan... and, let me tell you, there's quite a deal of difference between the plan and the action. The planning bit is fine because, in all honesty, you don't really think you'll ever have to put it into action... so you don't really think much about all the stuff you'll be leaving behind which, of course, is pretty well everything.

My wife and I basically whittled our life down to three bigish plastic storage containers, along with the cages for our two cats plus, in my case, the 'working cameras' kit... which meant all the 'play' cameras would be staying behind. This was all done before there was any real threat, so I didn't really think too much about what might be potentially lost. In fact, I was congratulating myself at having made the what-to-take decisions so easily... essentially two camera bags (still camera kit in one, video camera kit in the other) and two tripods (again one still, one video). Then, when it looked like we might have an issue with an approaching bushfire (albeit still many kilometres away), I decided to fill another plastic storage camera with a few of the more cherished classic cameras from my collection. That's when things started to get interesting... very interesting.

For starters, it's a bit like being asked to pick your favourite child. I basically collect the cameras that I like, but with an emphasis on 35mm SLRs from the 1960s and '70s. Ha! That hasn't stopped me acquiring TLRs, rangefinders, instant cameras (particularly classic Polaroids) and any compact that took my fancy... including loads of 126 format Instamatics (love the simplicity). A few cameras picked themselves – Nikon F2, Canon New F-1, Olympus OM-1, Minolta SR-T 101, Leicaflex SL, Nikkormat FT2 and the Petri FT that was my late father's. No prizes for picking why these went into the storage bin. Of course, I could have gone on with 35mm SLRs, but felt I should take something from the medium format collection, but what? One of my old workhorse Hasselblads? The truly classic and chromed Bronica S2A? The Mamiyaflex C220 or a Rolleiflex? Eventually, I decided on my Mamiya RB67 Pro S because it's just such an awesome beast from an era when we weren't afraid of big, brutish cameras, but it also meant that there wasn't a lot of room left in the storage bin. Being merely liked wasn't going to be sufficiently selective enough... whatever else I decided to take had to mean a lot more to me.

Suddenly, that made the last choices quite easy. First my Voigtlander R2M which had been such an important part of a memorable Christmas spent in Paris in 2005. It snowed and I shot B&W film which seemed very appropriate given the monochromatic lighting ... a couple of the resulting darkroom prints are still hanging on our walls. Then the Hasselblad XPan that was pretty much a constant companion on landscape shoots from 1998 to 2008 and, finally, the Fuji GS645S Professional which I used in Yosemite National Park as I followed in the footsteps of Ansel Adams (again shooting B&W film, of course) a few years ago.

Photographs may be about memories, but cameras are too, which is why we get attached to them emotionally more than any other consumer product. They're part of an often deeply personal creative process, enabling us to explore inspirations and achieve visions. It's a collaboration and, to me, it's what makes the camera something more than just a tool... we invest ourselves into them to produce an outcome and this creates a particularly special relationship. I must confess I've kept a lot more of the cameras that I've actually owned (as opposed to collected) than I've either sold or traded.

After the emergency doorknock at 3.30 a.m. as the bushfire started to get too close for comfort, camera bags and storage bin were quickly carried to one of my two classic cars (there's another story about making that choice) which I then drove to the relative safety of the middle of our village. As I started to walk back to the home I'd decided to defend, I turned around to take a look at what was essentially my whole adult life parked in the smoke and falling ash. Yes, they're only possessions, but they still have meaning and the experience gave me just a hint of the trauma those who have lost everything in the bushfires must be going through. Destructive weather seems to be the new norm, creating more of an imperative to plan for the worst outcomes... so, for instance, starting getting your photo archives in order right now.

The lesson I've learned, however, is that the plan is just the start, it's the action that's really going to matter.

Paul Burrows

Paul Burrows, Editor



OUR FRONT COVER

This issue's main cover photograph is by Norwegian photographer Audan Rikardsen and is titled Inquisitive. The location is northern Norway and the golden eagle was photographed from a hide. Audan is a finalist in the Lumix People's Choice Award component of the Wildlife Photographer Of The Year competition. Our feature on bird photography starts on page 30, and you can see all the winners in the main Wildlife Photographer Of The Year competition, starting on page 18.



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We're not done with D-SLRs yet as Canon takes the wraps off its new EOS-1D X Mark III flagship and Nikon unveils the D780 which goes head-to-head with the Z 6. And Nikon has new lenses for both its F mount and Z mount systems, including the juicy-looking AF-S AF-S Nikkor 120-300mm f2.8 telezoom. Leica has created a B&W-only version of its M10, but with an all-new 41 megapixels sensor. At the other end of the price scale, Fujifilm has a new entry-level X mount model, but the X-T200 is actually packed with higher-end features. And both Fujifilm's X and G mount mirrorless cameras are now supported by Profoto's Air-TTL system which means you can now use pro-level flash products such as the A1X and B2.

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80 CAMERA BUYER'S CHECKLISTS – D-SLRs AND MIRRORLESS CAMERAS

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FIRST LOOK

42 FIRST LOOK CANON EOS-1D X MARK III

It may be targeted at a small niche of specialised users – essentially sports and press photographers – but Canon's D-SLR flagship is packed solid with performance features, including an all-new 10-bit HEIF (High Efficiency Image Format) capture mode... think of these as 'super JPEGs'.

74 FIRST LOOK FUJIFILM X-PRO3

Fujifilm's modern classic goes even more traditional in its third-generation form so, for example, you can shoot without a monitor screen if you feel like you want an 'old school' camera experience. Mind you, on the inside, the X-PRO3 is most definitely 21st century.

ON TRIAL

56 ON TRIAL PANASONIC LUMIX S1H

The third Lumix S series camera takes the hybrid still/video concept a whole lot further. So far, in fact, that it has cinematography credentials (including a tick of approval for Netflix productions), but it's also a mighty-fine stills camera... especially when it comes to its superlative high ISO performance.

64 ON TRIAL SIGMA fp

It's the smallest and lightest full-35mm format mirrorless camera on the market – a crown it's likely to wear for quite a while – but Sigma's fp is big on both capabilities and performance for photographers and video-makers. And it's an L mount camera too, so you can fit lenses from Sigma, Leica or Panasonic.



FUJIFILM GIVES THE ENTRY-LEVEL X MOUNT CAMERA A BIG BOOST

WE'VE BEEN BIG fans of the X-T100, but its compact size and excellent affordability came with some limitations. With the new X-T200 model, it looks like Fujifilm has addressed all the gripes and thrown in a lot more as well. The X-T200 has the same 24.24 megapixels (effective) 'APS-C' size sensor as before but it now uses copper wiring – which has a lower resistance – for speedier data transfer. This, in part, contributes to an increase in the maximum shooting speed to 8.0 fps (up from 6.0 fps) and also enables 4K UHD video recording at the full-motion speeds of 25 fps (PAL) or 30 fps (NTSC), or 24 fps. What's more, the X-T200 records 4K video using the full width of the sensor so initial capture is at 6K (6032x3392 pixels) which is then downsampled, enhancing both the detailing and colour reproduction. And, of course, no cropping means no increase in the effective focal length. You can also now record Full HD video at the faster frame rates of 120 or 100 fps for slow-motion effects. There's also a new HDR movie mode and electronic image stabilisation for video – via a gyroscopic sensor – which Fujifilm is calling a 'Digital Gimbal' (although, of course, it involves some cropping).



The X-T200 has built-in stereo microphones plus both a stereo audio input and an output. The sensor's sensitivity range is equivalent to ISO 200 to 12,800 with extensions to ISO 100 and 51,200.

The new camera also gets a much bigger monitor screen – up to a massive 8.89 cm which gives a 16:9 aspect ratio – and is adjustable for both tilt and swing. The resolution is 2.76 megadots and enhanced touchscreen controls are provided (apparently similar to those of the X-A7). The EVF is a 1.0 cm OLED panel with a resolution of 2.36 megadots and a magnification of 0.62x (35mm equivalent).

The X-T200 again uses a hybrid contrast/phase detection autofocus system, but the number of PDAF pixels increases to 140,000, giving 425 focusing points (versus 91 previously) and virtually full-frame coverage. A new algorithm is claimed to give faster AF operation and the face/eye detection has been upgraded to improve reliability. Additionally, there's a 'Main Subject Recognition' mode which enables the camera to identify the main subject in the frame and subsequently track it as it moves. Low light sensitivity extends down to -2.0 EV at ISO 100.

Other key features include 11 'Film Simulation' profiles (including Classic Chrome, but not ACROS B&W or Eterna Cinema), 20 'Advanced Filter' effects, a programmable self-timer, both WiFi and Bluetooth wireless connectivity, in-camera battery recharging via USB-C and a built-in pop-up flash with a metric guide number of seven (at ISO 200). Despite the bigger monitor screen, Fujifilm has been able to make the X-T200 80 grams lighter, so the body alone now weighs only 321 grams without the battery or 370 grams complete with battery and memory card.

The Fujifilm X-T200 is available now, priced at \$1379 packaged with the XC 15-45mm f3.5-5.6 OIS power zoom. For more information visit www.fujifilm.com.au

AUTUMN YEARS... OR INDIAN SUMMER?

"ONE SWALLOW DOES not a summer make..." wrote the Greek philosopher, Aristotle; and a couple of D-SLR launches don't represent a new dawn for the reflex camera. There will always be D-SLRs – especially at the pro end of the interchangeable lens camera (ILC) market – but the future emphasis is still going to be on mirrorless systems because it now makes more sense on many levels.

The arrival of Canon's EOS-1D X Mark III and Nikon's D780 are both easily explained in the context of today's changing ILC marketplace. For starters, there are still a lot of D-SLR lenses being made by both Canon and Nikon so they need something to go on the back of them. The D780 is Nikon's answer to the EOS 90D and, similarly to the Canon model, is something of a 'hybrid' reflex/mirrorless design in its feature set with much-improved live view and video capabilities. The EOS-1D X Mark III – and the Nikon D6 when it arrives – are must-have flagships, but are quite narrowly targeted at high-speed shooters who prefer an optical viewfinder for various valid reasons. Nearly all the users of this camera are going to be sports and press photographers, and Canon has bent over backwards to make the -1D X III as fast as it can possibly be... 16 fps with the OVF and 20 fps with mirror lock-up. This is impressive for a D-SLR, but it only matches what the Sony A9 mirrorless cameras can do, but without any viewfinder black-out between frames... and in a form factor that's less than half the size and weight.

More importantly, it's most likely the technological end-of-the-road for a D-SLR (well, at 20 fps, it's actually functioning as a mirrorless camera anyway), but there's still plenty more to come from the mirrorless configuration... in both camera bodies and lenses. Mirrorless is almost as much about what's now possible with lens design – due to the shorter flange back distances – than any other aspect of ditching the mirror box and pentaprism. Yet... as we've already seen with the EOS 90D – and looks like it's also the case with the D780 – the 'hybrid' concept has some merit. The best of the optical viewfinder married with the best of the mirrorless configuration when shooting in live view via the monitor screen. Of course, there are some compromises, but these may be acceptable for many potential users. And it's only going to be feasible on higher-end cameras using sensors with PDAF, but still... if you're at this level, you've probably got a few nice lenses that you really don't want to part with yet.

How far could this whole hybrid D-SLR/mirrorless thing go then? How about interchangeable optical and electronic viewfinders so you could have 20 fps and eyelevel viewing. Hmm... the reflex mirror assembly is still a bit of an issue, but...

Hey, I think I just saw another swallow!

- Paul Burrows, Editor.



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NIKON UPDATES BEST-SELLING FULL-35MM D-SLR

HERE'S A BIT of a turnaround... Nikon's new D780 is essentially the Z6 with a reflex mirror and an optical viewfinder. As with Canon's EOS-1D X Mark III, it's the mirrorless-type features that are being heavily promoted with the D780, so the sensor-based hybrid autofocus is ahead of the conventional AF in the features list. In fact, using the optical viewfinder is now described as "viewfinder photography" ... as opposed, of course, to using live view. However, it's in live view (i.e. with the reflex mirror locked up) that the D780 does its best work. For starters, the tilt-adjustable screen is an 8.1 cm TFT LCD panel with a resolution of 2.359 megadots which means more detail when using live view (and it has touch controls). There are 11 levels of adjustment for brightness and colour balance.

As the D780 has the same 25.28 megapixels BSI-CMOS full-35mm sensor and 'Expeed 6' generation processor as the Z 6, it also gets the same on-sensor AF capabilities with hybrid phase/contrast measurement using 273 points to give around 90 percent frame coverage. It also delivers face/eye-detection AF and the same tracking capabilities... which is ahead of anything that's previously been available on a Nikon D-SLR when shooting in live view mode (and obviously this is also on tap when shooting movies). Low light AF sensitivity extends down to -7.0 EV at ISO 100 (and f1.4). Switch to the camera's sensor-based shutter and the continuous shooting speed is a handy 12 fps with the added advantage of silent shooting. This speed is available for shooting 12-bit RAW files, but drops

to 8.0 fps with the camera's 14-bit RAW file capture option.

While it's still in its 'mirrorless' configuration, the D780 has useful video capabilities – again essentially the same as the Z 6's – starting with 4K UHD recording at 24 or 25 fps (PAL), using the full sensor width and pixel read-out to optimise quality and maintain the lens focal lengths. Full HD footage can be recorded at speeds of up to 100 fps for slow-mo effects, and both N-Log recording (with 10-bit 4:2:2 colour) and the HLG (HDR) gamma profile for more convenient post-production processing. Electronic image stabilisation is available when shooting video, plus zebra patterns (for highlight warning) and time-coding. There's also provision for creating time-lapse movie sequences in-camera.

The D780 has built-in stereo microphones, manually adjustable for levels and with an attenuator and wind-cut filter. There's both a stereo audio input and an output. The Type D mini HDMI connector supports a 10-bit 4:2:2 video output in either 4K or 2K.

Back in its D-SLR guise, the D780 has 51-point phase-difference detection with a host of area mode options and Nikon's '3D Tracking'. It's claimed to deliver enhanced performance via the application of the D5's control algorithms, and operates in low light down to -4.0 EV. Exposure control is based on a 180,000 pixels RGB sensor which drives multi-zone, centre-weighted, highlight-weighted and spot measurements plus i-TTL balanced flash control. However, the D780 doesn't have a built-in flash. The sensor has a sensitivity range equivalent to ISO 100 to 51,200 with extensions down to ISO 50 and up to ISO 204,800. There's an updated shutter mechanism which has timed speeds down to 15 minutes (that's 900 seconds), a top speed of 1/8000 second and flash sync up to 1/200 second. New features include a focus stacking function (for up to 300 frames), the D850's 'Negative Digitiser' feature (for copying film negatives), and a Type C USB connection which enables in-camera battery recharging.

Additionally, the D780 has dual memory card slots for the SD format, both with UHS-II speed support. The magnesium alloy bodyshell is weather-sealed and largely unchanged in size and styling from the existing D750 model. The control layout is also pretty similar, but with a few tweaks such as the provision of a dedicated 'AF-On' button.

The Nikon D780 is available now priced at around \$3899 for the body only (estimated average street price). For more information visit www.nikon.com.au



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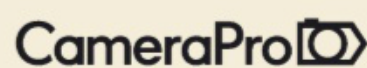
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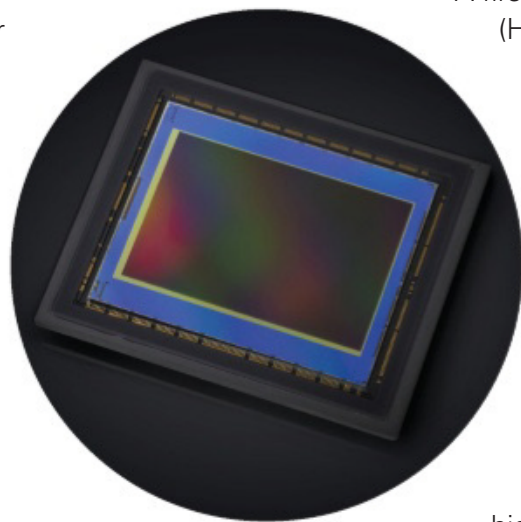


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NEW CANON FLAGSHIP D-SLR CHASES MIRRORLESS SPEEDSTERS

WHILE A PRO-LEVEL EOS R mirrorless camera is an inevitability, Canon is keeping faith with its dedicated pro D-SLR users who will no doubt be mightily pleased with the new EOS-1D X Mark III. It's targeted at high-speed shooters who still prefer to use an optical viewfinder rather than an EVF. Canon has gone all-out to make its new reflex flagship the fastest D-SLR ever, able to match the fastest mirrorless cameras... at least in terms of full resolution. The -1D X Mark III has a new FP shutter assembly and a new reflex mirror mechanism to enable faster recycling with reduced black-out periods between frames. With the optical viewfinder, it's capable of 16 fps and, with mirror lock-up, this increases to an impressive 20 fps... and both with continuous AF/AE adjustment. Adopting the latest-gen CFexpress memory cards – there are dual slots –



enables burst lengths of 1000 frames or more no matter what the capture setting. Canon has also made sure that the EOS-1D X III is also very attractive to video users, enabling 5.5K/50p (or 60p in the NTSC standard) 12-bit RAW capture or 10-bit 4K DCI/50p with Canon Log, both internally and both uncropped with full pixel read-outs with no pixel binning or line-skipping.

At the heart of the new D-SLR is the immensely powerful, latest-generation 'DiG!C X' processor which is mated with a new CMOS sensor which has a total pixel count of 21.4 million (20.1 MP effective). A new 'High Detail' optical low-pass filter is designed to minimise moiré patterns with less impact on edge sharpness.

A first is the addition of a 10-bit HEIF (High Efficiency Image Format) capture mode which essentially delivers 'real' HDR images thanks to an increased dynamic range and colour gamut. In-camera conversion to 8-bit RAW files is available as an alternative to using HDR processing which often delivers artificial-looking results.

With advances in auto-focusing performance one of the big selling points of high-end mirrorless cameras, Canon has ensured its flagship D-SLR is competitive. The conventional system employs 191 phase-difference detection AF points – of which 155 are cross-type arrays – and all can operate at a maximum lens aperture of f8.0.

In live view, Canon's 'Dual Pixel CMOS AF' gives 3869 measuring points (in 525 selectable areas), representing 100 percent frame coverage vertically and 90 percent horizontally. Sensitivity extends down to -6.0 EV at ISO 100 and all points operate at maximum lens apertures down to f11. New subject tracking algorithms use AI-based 'deep learning' for object recognition, with the availability of a 'People Priority' mode.

On the outside, the EOS-1D X Mark III is little changed from its predecessor in terms of styling and the control layout with the exception of a new 'Smart Controller' touch-type control integrated into the AF-On buttons. These are designed to enable faster AF point selection than the conventional joy-stick type controls (which the Mark III retains). The bodysell is magnesium alloy with full weather sealing and the -1D X III has a built-in GPS receiver, as well as both WiFi and Bluetooth wireless connectivity. Also new for a pro-level EOS D-SLR is the provision of touch controls in the monitor screen which is still fixed – mainly for durability reasons – and has a resolution of 2.1 megadots.

Needless to note, the EOS-1D X Mark III is equipped with everything the working photographer is likely to want or need, so there isn't much in the way of new accessories except for the WFT-E9 dual-band wireless file transmitter which enables faster transfers and has a greater range than the internal WiFi.

Canon Australia has not published a recommended retail price, but a survey of the online retailers offers suggests it's going to sell for around \$10,999 body only. For this money, you'll also get a 512 GB CFexpress memory card and reader plus the backing of a five year local warranty.

For more information visit www.canon.com.au or turn to our more detailed 'First Look' overview of all the EOS-1D X Mark III's key features.



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NEW LENSES FOR BOTH F AND Z MOUNTS FROM NIKON

WITH THE ARRIVAL of the Nikkor Z 70-200mm f2.8 VR S, there are now eight Z mount lenses in Nikon's full-35mm mirrorless system and they now pretty well cover all the essentials. The new 70-200mm f2.8 – a staple for many photographers – has internal zooming and focusing plus a built-in optical image stabiliser giving up to five stops of correction for camera shake. As the Z 6 and Z 7 cameras have in-body stabilisation, the lens's 'Vibration Reduction' optical correction works in conjunction with this system. The optical construction – comprising 21 elements in 18 groups – includes a total of ten special types, including one of Nikon's recently-developed 'SR' elements. The initials are short for "Short Wavelength Refractive" and these specialised-refractive elements are designed to provide enhanced correction for longitudinal chromatic aberrations by controlling the short-wavelength light it is usually difficult to compensate for. Also in the Z 70-200mm's optical mix are two aspherical elements, one fluorite type and six with extra-low dispersion (ED) characteristics. The lens also uses Nikon's 'Nano Crystal' and 'Arneo' multi-coatings to minimise internal reflections and reduce both ghosting and flare. The employment of two separately-driven focusing motors enables a minimum focusing distance of just 50 cm at 70mm and still only one metre at 200mm. Additionally, the focusing motors are stepper-type drives to minimise noise and ensure smoother, more linear operation. The diaphragm has nine blades to give super-smooth out-of-focus effects.

► Nikkor Z 70-200mm f2.8 VR S.

The physical construction comprises magnesium alloy barrel tubes with weather sealing and a fluorine coating on the exposed surface of the front element to help better repel moisture and grease. As with all Z mount lenses, there's a multi-function control ring which can be set for manual focusing, manual aperture setting or exposure compensation setting. It's worth noting here that, with the 70-200mm f2.8 zoom, Nikon has maintained its stated timetable of having eight Z mount lenses by first quarter of 2020.

The new AF-S Nikkor 120-300mm f2.8E FL ED SR VR telezoom is an impressive beast, particularly since it maintains a constant aperture of f2.8 across its focal range.

As you can see from all those initials at the end of the model number, it also has an 'SR' element, but this is just one of 25 which also includes one ED type and two fluorite types. 'SR' glass has been newly developed by Nikon and is designed to significantly refract short-wavelength light to provide more effective suppression of all chromatic aberrations.

The 120-300mm also uses a combination of Nikon's 'Nano Crystal' and 'Arneo' multi-coatings.

◀ AF-S Nikkor 120-300mm f2.8E FL ED SR VR.

Not surprisingly for a lens designed for sports and wildlife photography applications, the 120-300mm has a weather-sealed all-metal barrel construction with a fluorine coating on the front element. The minimum focusing distance is two metres which is maintained across the zooming range, giving a maximum reproduction ratio of 1:6.3 at 300mm. The 'VR' optical image stabilisation gives up to four stops of correction for camera shake, and has a Sport mode which enhances viewfinder stabilisation when following erratically moving subjects. Other features include a nine-blade diaphragm, focusing distance limiter switch and focus memory buttons. It's a big lens – weighing in at 3.25 kilograms – and it's got a big price tag too... expect to pay around \$15,000. The Nikkor Z 70-200mm f2.8 VR S is selling for \$3999 (average street prices).

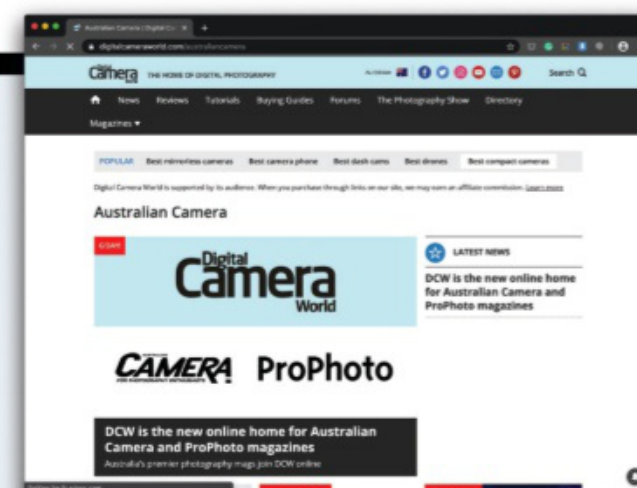
For more information about both lenses visit www.nikon.com.au

WHAT'S NEXT? THE FUTURE

IF YOU TAKE a look at our title page – assuming that you haven't already eagerly read this issue's editorial – you'll notice there's a new logo at the bottom of what we call the 'skite box' (that's the panel that lists who does what in the mag). In the time between now and the last issue, Camera magazine has been sold by previous owner, Next Media, to the UK-based company Future Publishing.

In fact, all the AV Group magazines have found a new home at Future, including sister publication ProPhoto, Australian Hi-Fi, Australian Guitar and Sound & Image. We join a growing stable of tech and photo magazines published in the UK, Canada and the USA so, as they say in business, we're a 'good fit' in terms of Future's core magazine business.

Future is aptly named as it's currently one of the world's most progressive and pro-active magazine publishers with a strong emphasis on print-based products supported by a very strong online presence. You've probably heard of TechRadar – you may even be a regular visitor – which is very close to the top in terms of popular technology news websites. Some of Camera's photo-based content will be appearing on the site in the... ahem... future. But we'll have some competition because Future already has a couple of very successful photo mags in the UK... Digital Camera and Digital Photographer plus there's PhotoPlus dedicated to Canon users and NPhoto dedicated to Nikon users (both, we should stress, completely independent of the camera-makers). Rest assured nothing will be changing at your favourite Australian photo mag – least of all our emphasis on dedicated local content – but we'll benefit greatly from being part of a much bigger global publishing operation that includes a very active camera and photography sector.



We'll be keeping an eye out for anything that they're doing which we think you might find either informative or inspirational too.

We now have a new home on the web at www.digitalcameraworld.com/australiancamera

Magazine publishing still has its challenges in the online era – although the special interest area (i.e. hobbyist titles) remains pretty buoyant – but we reckon there's a much brighter future (pun entirely intended) ahead for us here at Future Publishing. - **Paul Burrows, Editor.**

A New Perspective
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LEICA'S M10 NOW IN TASTY MONOCHROM FLAVOUR

AS EXPECTED LEICA has introduced a B&W-only version of its current M10 digital rangefinder camera. The new M10 Monochrom also gets the Leica 'stealth' treatment so there's no red-dot logo and no badging on the top panel beyond a very discreet "Monochrom" engraving which isn't painted in. While the Monochrom version has the same bodyshell as the standard M10, it has an all-new 41 megapixels CMOS sensor which Leica says has been specifically designed to achieve "...an entirely new level of quality in black-and-white photography."

The new sensor has neither an RGBG Bayer filter nor a low-pass optical filter and delivers a maximum image size of 7864x5200 pixels with RAW capture (in the Adobe DNG format) and 7840x5184 pixels for JPEGs. There are also two smaller JPEG capture sizes. The sensitivity range is equivalent to ISO 160 to 100,000, the widest offered so far on a Monochrom model.

The M10 Monochrom has a 2.0 GB buffer memory and a single memory card slot for the

SD format with support for SDXC devices up to 2.0 TB. Continuous shooting speed is at up to 4.5 fps for a burst of ten frames, either RAW or JPEG. The monitor screen is a fixed 7.62 cm TFT LCD panel with a resolution of 1.036 megadots and a scratch-resistant 'GorillaR' glass faceplate.

The rest of the Monochrom feature set is the same as that for the M10, including an optical viewfinder with automatic parallax correction and brightline picture frames, a focal plane shutter with a speed range of 16 minutes to 1/4000 second, rangefinder focusing, and exposure control via either aperture-priority auto or manual modes. The bodyshell is magnesium alloy with a brass top panel and baseplate, with a black chrome-plated finish.

The Leica M10 Monochrom is available now priced at \$13,500 for the camera body. You'll find it at the Leica Stores in Australia and authorised Leica resellers around the country. For more information visit <https://leica-store.com.au>

PROFOTO A1X NOW AVAILABLE FOR FUJIFILM MIRRORLESS CAMERAS

SWEDISH FLASH AND lighting company Profoto has announced that its A1X on-camera flash unit is now available for Fujifilm's mirrorless cameras. Profoto bills the A1X as "the world's smallest studio light"

Compatibility comes via the A1X AirTTL-F version and the Off-Camera Kit with its Profoto Connect-F wireless and buttonless remote trigger which fits to the camera hotshoe and enables fully-automatic point-and-shoot flash photography. Compatibility covers all the current Fujifilm GFX series medium format mirrorless cameras; the X-T2 and X-T3, X-Pro2, X-H1, X-T20, X-E3 and X100F. Profoto's AirTTL radio trigger operates at 2.4 GHz and has a range of up to 300 metres. In total, 20 wireless sync channels are available.



In addition to the AirTTL remote exposure control, the A1X also supports high-speed flash sync (HSS) at shutter speeds of up to 1/8000 second. The maximum flash power output is 76 joules and there's a nine-stop adjustment range for applications such as balanced fill-in. A USB-C connection is provided to enable firmware upgrades. The A1X is powered by a rechargeable lithium-ion battery pack and it's said to be good for 450 full-power flashes.

A key design element of the A1X is its round-shaped flash head which is designed to give a more uniform light pool with a more natural-looking fall-off. The zoom head is motorised with a manual override and an LED modelling lamp is built-in. A range of dedicated light-shaping tools is available, including a grid kit.

Profoto products are distributed in Australia by C.R. Kennedy & Company. For more information visit <https://profoto.com/au>

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Nicholas Hutchinson
Noosa



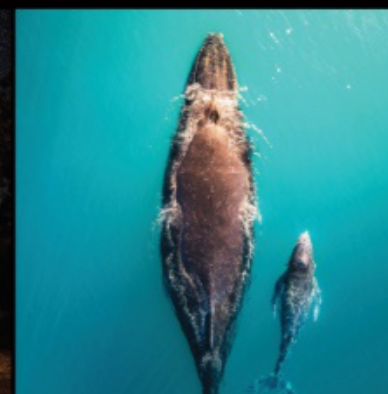
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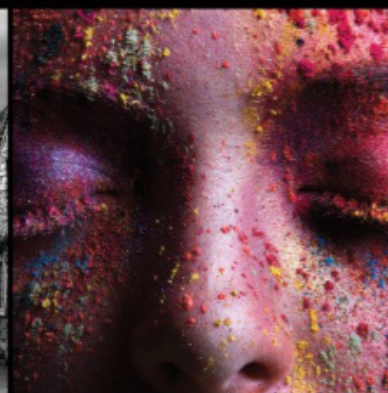
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a photography competition open to all employees of our Camera House stores

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PENTAX CELEBRATES 100 YEARS... AND 65 WITH AUSTRALIAN DISTRIBUTOR

NOVEMBER 2019 MARKED the 100th birthday of Pentax which was established in 1919 in a suburb of Tokyo to begin making lenses for spectacles (and area of optics that the company is still involved in). This led to the manufacture of lenses and then, in 1952, to the Asahiflex camera; the first Japanese-made 35mm SLR.

The name 'Pentax' was adopted in 1957 for a camera which set the basic formula for the 35mm SLR (and, of course, its digital derivative). Consequently, Pentax is generally acknowledged as the pioneer of the 35mm SLR, being the first to produce such a camera in significant numbers. Pentax further popularised the 35mm SLR with the Spotmatic series – first introduced in July 1964 – which became the camera of choice for a legion of amateurs, professionals and celebrities. At the end of the 1960s, Pentax introduced its first medium format camera – the legendary 6x7 – which adopted the same configuration as its 35mm SLRs. It did the same thing in 1978, but this time with the miniature 110 film format, creating the Auto 110; the only 110 SLR with interchangeable lenses. Another important milestone was the Zoom 70 (1986), the world's first 35mm compact with a zoom lens and another design that became the blueprint for everybody else. Pentax was prolific during the 1980s and '90s with numerous 35mm compacts and SLRs, introducing or adopting every major design trend and technologies. Like all the camera makers, it dabbled with still video in the late 1990s

before switching to digital and again producing numerous compact and D-SLR models. Today, the Pentax brand is owned by Ricoh which, not surprisingly given the heritage, continues to concentrate on D-SLRs, both 'APS-C' and full-35mm. However, Pentax was an early pioneer of mirrorless cameras with its tiny Q series models – another example of the company's lateral thinking – and the short-lived, but interesting K-01. Of course, Pentax is also known as the creator of the K-mount bayonet fitting which was introduced in 1975 and has since been used on many millions of accessory lenses.

In Australia, Pentax products have been distributed by C.R. Kennedy & Company since 1954. It was the first independent distributor appointed by the camera-maker and is now the longest-serving at 65 years. Notably, at various times over this period, Pentax has been the number one camera brand in Australia, something it has never achieved elsewhere in the world.

C.R. Kennedy & Co. recently staged a 100th birthday party for Pentax which was held in Sydney and attracted nearly 200 'Pentaxians', supporters and camera retailers. Many attendees brought along classic Pentaxes and everybody received a commemorative 'Pentax 100 Years' metal lens cap... no doubt destined to become a collectible piece of memorabilia in the future. CRK also launched a range of commemorative merchandise, including T-shirts, caps and pins. Visit <https://pentax.com.au/merchandising>



THE LEGEND CONTINUES WITH NEW FUJIFILM X100V

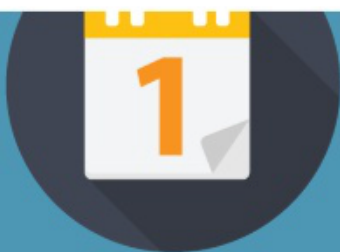
FUJIFILM'S CLASSIC X100 fixed-lens 'APS-C' format camera arrives in its fifth-generation form, embodying a myriad of updates including a new sensor and an improved electronic viewfinder.

Following the 'if it ain't broke...' principle, the basic X100 formula remains the same with a high-class all-metal bodyshell, Fujinon Super EBC 23mm f2.0 prime lens (equivalent to 35mm), hybrid optical/electronic viewfinder and traditional control layout. However, the X100V is now weather-sealed (which requires an adapter and protective filter on the lens), the sensor is the 26.1 megapixels 'XTrans CMOS 4' currently doing service on the later X mount bodies, and the EVF switches from an LCD panel to an OLED-type with a resolution of 3.69 megadots. The LCD touch screen monitor is now adjustable for tilt and has a resolution of 1.62 megadots. When flat, it sits flush with the camera back to maintain the camera's compact dimensions.

The X100V also has Fujifilm's latest-generation quad-core 'X Processor 4' which delivers a number of performance boosts, including continuous shooting at 20 fps (with the sensor shutter), faster autofocus with sensitivity extended down to -5.0 EV (at ISO 100), 4K UHD video at 24/25/30 fps (with a bit rate of 200 Mbps) and Full HD at 100/120 fps (for slow-mo effects), and a 10-bit 4:2:2 colour HDMI output.

Available in either silver or black finishes, the Fujifilm X100V is available now priced at \$2349.

For more information visit www.fujifilm.com.au



PHOTOGRAPHY EXHIBITIONS & EVENTS

Current to 29 March: Exhibition. *Petrina Hicks – Bleached Gothic*. The first major survey exhibition for the photographer, featuring her large-scale, hyperreal photographs that subvert and disrupt the photographic language of advertising and portraiture. At Level

3, NGV International, 180 St Kilda Road, Melbourne, Victoria 3000. Gallery hours are 10.00am to 5.00pm daily. Admission is free. For more information telephone (03) 8620 2222 or visit www.ngv.vic.gov.au

Current to 29 March: Exhibition. *Olympia: Photographs By Polixeni Papapetrou (1960–2018)*. Photographs of Papapetrou's daughter, Olympia, taken between 1997 and the artist's death in 2018. During this time Olympia acted as model and muse, collaborator and champion. At The Ian Potter Centre, Level 3, NGV Federation Square, corner Flinders and Swanston Streets, Melbourne, Victoria 3000.

Gallery hours are 10.00am to 5.00pm daily. Admission is free. For more information telephone (03) 8620 2222 or visit www.ngv.vic.gov.au

6 March – 10 May: Exhibition. National Photographic Portrait Prize 2020. The 48 finalists and winners from the 2020 competition on show at the National Portrait Gallery. King Edward Terrace, Parkes, Canberra, ACT 2600. Telephone (02) 6102 7000. Gallery hours are 10.00am to 5.00pm daily. This exhibition will then tour Australia; visiting Griffith (19 June – 2 August), Cowra (8 August – 27 September), Beaudesert (19 October – 11 December), Roma (6 January – 3 February 2021), and Grafton (9 April

– 30 May 2021). Visit www.portrait.gov.au for full details.

1 – 17 May: The 11th Head On Photo Festival. Exhibitions, workshops, seminars and artist talks at numerous venues across Sydney. For more information visit www.headon.com.au

27 – 30 May: Photokina 2020. The world's largest exhibition of new imaging products switches to a yearly cycle with new dates in May. Rescheduled following the cancellation of the 2019 event. At the Köln Messe, Cologne, Germany. Visit www.photokina-cologne.com for more information.



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WILDLIFE PHOTOGRAPHER OF THE YEAR

Patience, endurance and being in just the right place at the right time has resulted in a superb collection of winning images in the world's biggest annual competition for wildlife photography.



2019 WILDLIFE PHOTOGRAPHER OF THE YEAR AWARD

The Moment, photo by Yongqing Bao, China. Joint Winner of the Behaviour: Mammals category, and overall winner in the 2019 Wildlife Photographer Of The Year competition. An encounter between a Tibetan fox and a marmot in China's Qilian Mountains National Nature Reserve on the Qinghai-Tibet Plateau.



WILDLIFE PHOTOGRAPHER OF THE YEAR

Now in its 55th year, the Wildlife Photographer Of The Year competition is the premier showcase for the world's best nature and wildlife photography. The competition is run by London's Natural History Museum and this year attracted more than 48,000 entries from photographers in 100 countries.

The international judging panel managed to distil this down to a set of just 19 category winners and from these was selected the grand title winner; Chinese photographer Qinghai, Yongqing Bao. Titled *The Moment*, the winning picture captures the stand-off between a Tibetan fox and a marmot, seemingly frozen in life-or-death deliberations. A powerful frame of both humour and horror, it depicts both the drama and intensity of nature.

The chair of the judging panel, Roz Kidman Cox, comments, "Photographically, it is quite simply the perfect moment. The expressive intensity of the postures holds you transfixed, and the thread of energy between the raised paws seems to hold the protagonists in perfect balance. Images from the Qinghai-Tibet Plateau are rare enough, but to have captured such a powerful interaction between a Tibetan fox and a marmot – two species key to the ecology of this high-grassland region – is extraordinary."

The Natural History Museum's Director, Sir Michael Dixon, added, "This compelling picture captures nature's ultimate challenge – its battle for survival. The area in which this was taken – often referred to as the 'third pole' because of the enormous water reserves held by its ice fields – is under threat from dramatic temperature rises like those seen

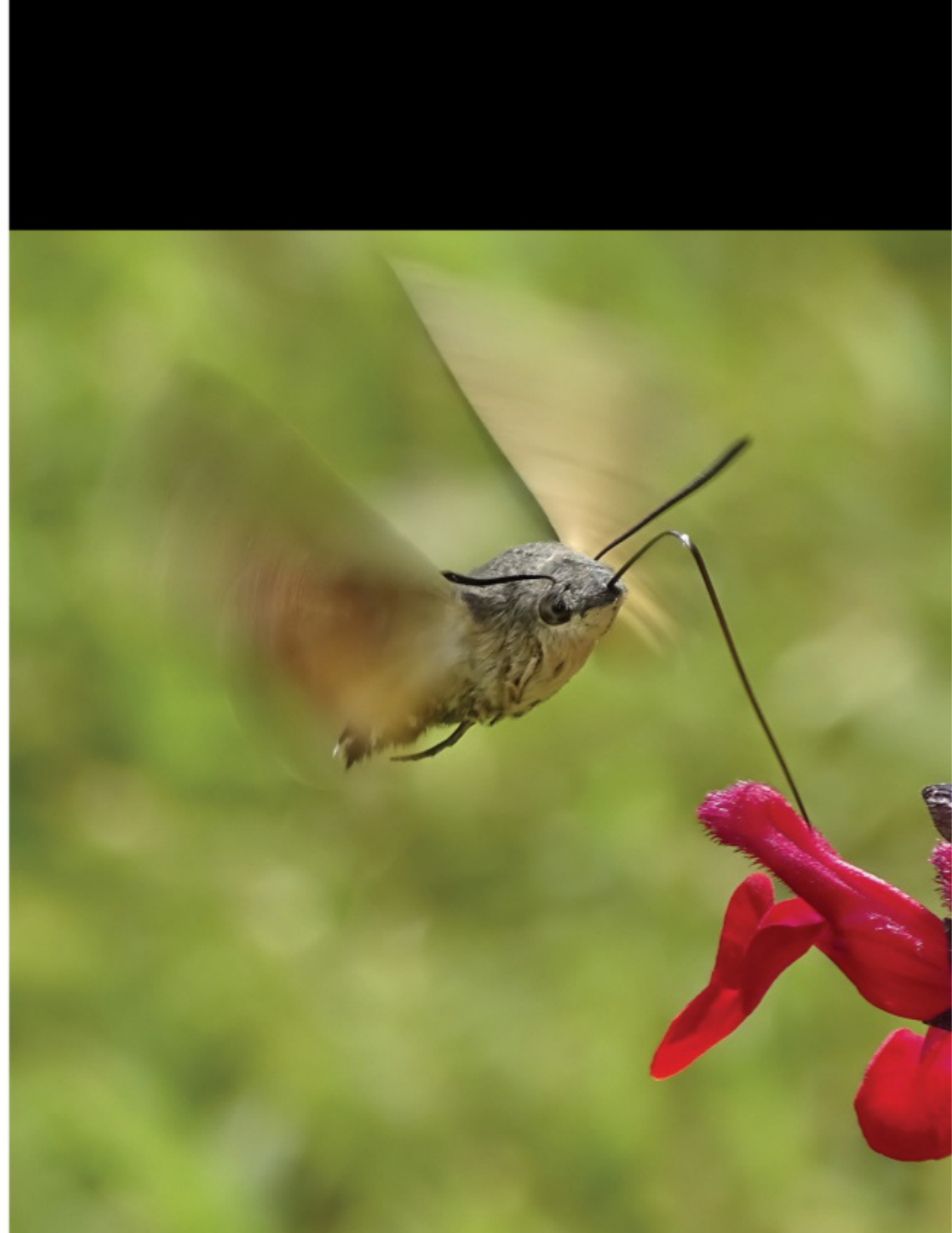
in the Arctic. At a time when precious habitats are facing increasing climate pressures, seeing these fleeting yet fascinating moments reminds us of what we need to protect."

The Wildlife Photographer Of The Year exhibition is now on at London's Natural History Museum until 31 May. It will travel to Australia later in the year and be on show at the Australian National Maritime Museum in Darling Harbour, Sydney. Dates have yet to be announced, but you can visit <https://www.sea.museum/whats-on/exhibitions/wildlife> to register for early-bird tickets.

The 2020 competition is now open for entries and the closing date is 12 December. **For more information about entering visit www.nhm.ac.uk/visit/wpy/competition**

“

At a time when precious habitats are facing increasing climate pressures, seeing these fleeting yet fascinating moments reminds us of what we need to protect.



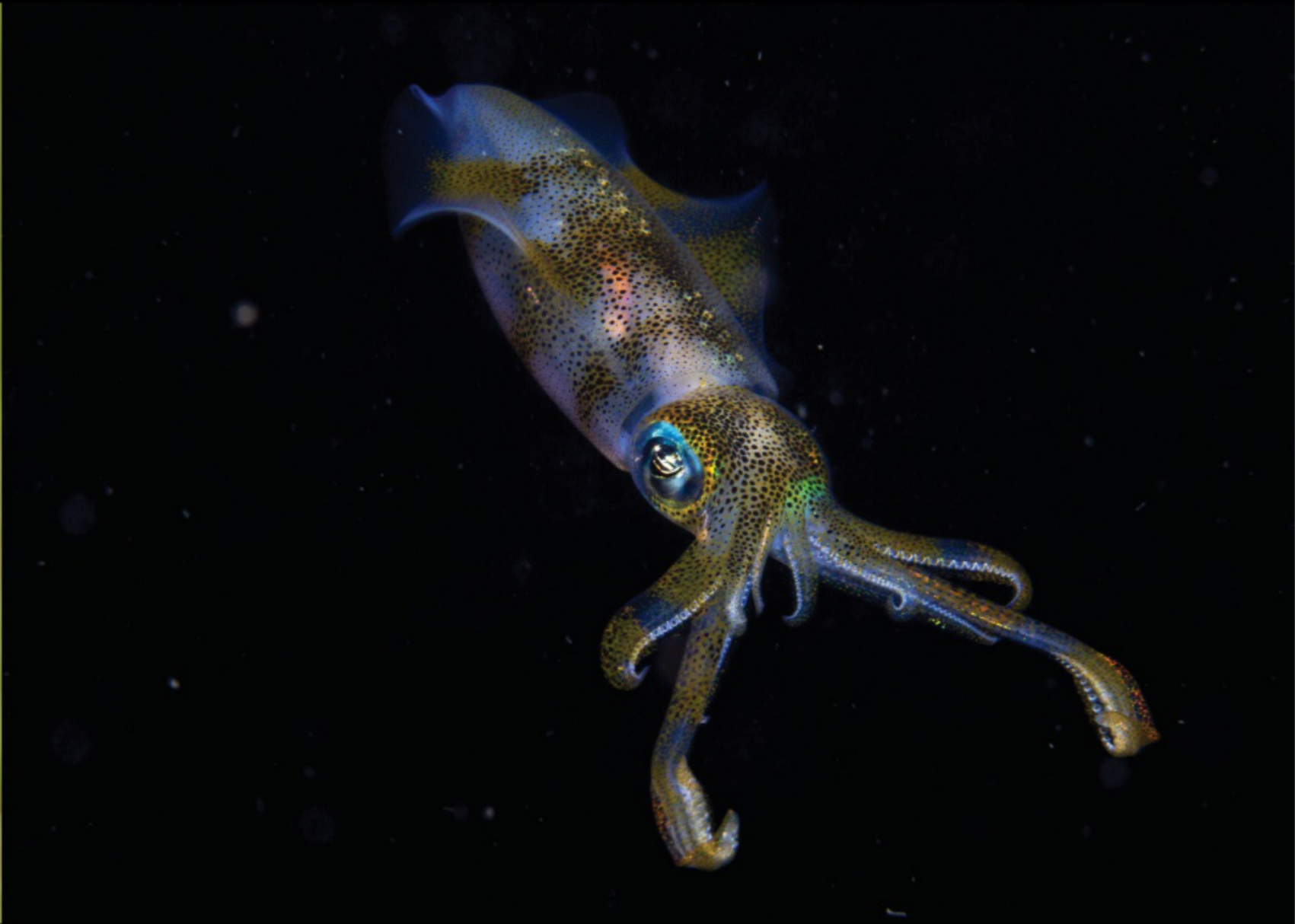
▼ *Snow Plateau Nomads*, photo by Shangzhen Fan, China. Winner of the Animals In Their Environment category. A small herd of male chiru leaves a trail of footprints on a snow-veiled slope in the Kumukuli Desert of China's Altun Shan National Nature Reserve.



2019 WILDLIFE PHOTOGRAPHER OF THE YEAR AWARD



▲ *Humming Surprise*, photo by Thomas Easterbrook, United Kingdom, Winner of the 10 Years And Under category. Hummingbird hawkmoth, hovering in front of an autumn sage, France.



▼ *Early Riser*, photo by Riccardo Marchgiani, Italy. Winner of the 15-17 Years Old category. Female gelada with a week-old infant clinging to her belly, Simien Mountains National Park, Ethiopia.



▲ *Night Glow*, photo by Cruz Erdmann, New Zealand. Winner of the 11-14 Years Old category. Bigfin reef squid in the Lembeh Strait off North Sulawesi, Indonesia.





Land Of The Eagle, photo by Audun Rikardsen, Norway. Winner of the Behaviour: Birds category. Golden eagle landing on a coastal ledge, northern Norway.



Face Of Deception, photo by Ripan Biswas, India. Winner of the Animal Portraits category. Ant-mimicking crab spider, Buxa Tiger Reserve, West Bengal, India.

Pondworld, photo by Manuel Plaickner, Italy. Winner of the Behaviour: Amphibians And Reptiles category. Common frogs spawning in a large pond at the edge of woodland, South Tyrol, Italy.



The Architectural Army, photo by Daniel Kronauer, USA. Winner of the Behaviour: Invertebrates category. Colony of nomadic army ants on the move through the rainforest near La Selva Biological Station, north-eastern Costa Rica.



The Equal Match, photo by Ingo Arndt, Germany. Joint Winner of the Behaviour: Mammals category. A female puma attacks a big male guanaco in the Torres del Paine region of Patagonia, Chile. After a brief tussle, The guanaco got away.



Tapestry Of Life, photo by Zorica Kovacevic, Serbia/USA. Winner of the Plants And Fungi category. Festooned with bulging orange velvet, trimmed with grey lace, the arms of a Monterey cypress tree weave an otherworldly canopy over Pinnacle Point, in Point Lobos State Natural Reserve, California, USA.

2019 WILDLIFE PHOTOGRAPHER OF THE YEAR AWARD



The Garden Of Eels, photo by David Doubilet, USA. Winner of the Under Water category. A colony of garden eels stretching down a steep sandy slope off Dauin, The Philippines.



The Rat Pack, photo by Charlie Hamilton James, United Kingdom. Winner of the Urban Wildlife category. Brown rats scamper between their home under a tree grille and a pile of garbage bags full of food waste on Pearl Street in New York's Lower Manhattan district, USA.

2019 WILDLIFE PHOTOGRAPHER OF THE YEAR AWARD



Creation, photo by Luis Vilariño Lopez, Spain.
Winner of the Earth's Environments category.
Red-hot lava tongues flow into the Pacific Ocean
from one of the world's most active volcanos
– Kīlauea on Hawaii's Big Island.

Snow Exposure, photo by Max Waugh, USA.
Winner of the Black And White category. A
lone American bison weathers a snow storm
in Yellowstone National Park, USA.



A photograph showing a jaguar walking behind a border fence at night. The fence consists of vertical bars, and the jaguar's spotted fur is illuminated against the dark background. The sky above is dark with some stars visible.

Another Barred Migrant, photo by Alejandro Prieto, Mexico. Winner of the Wildlife Photojournalism: Single Image category. An enormous image of a male jaguar is projected onto a section of the US-Mexico border fence, Arizona, USA. The photograph that Alejandro projected is of a Mexican jaguar, captured with camera traps he has been setting on both sides of the border and monitoring for more than two years.

A photograph showing a person's legs in a red and green plaid kilt and black socks, standing next to a monkey. The monkey is wearing a dark blue police uniform and is sitting on a chair. The background is a stylized cityscape with yellow and blue buildings.

Show Time, photo by Jasper Doest, Netherlands. Winner of the Wildlife Photojournalist Story Award (only one image from the series is reproduced here). For the past 17 years, Riku – a Japanese macaque legally captured from the wild – has performed comedy skits in front of large audiences at the Nikko Saru Gundan Theatre north of Tokyo, Japan.

2019 WILDLIFE PHOTOGRAPHER OF THE YEAR AWARD



Frozen Moment, photo by Jérémie Villet, France. Winner of the Rising Star Portfolio Award (only one image from the portfolio is reproduced here). Two male Dall's sheep in full winter-white coats stand immobile at the end of a fierce clash on a windswept snowy slope in the Yukon, north-west Canada.



The Huddle, photo by Stefan Christmann, Germany. Winner of the Wildlife Photographer Of The Year Portfolio Award 2019 (only one image from the portfolio is reproduced here). More than 5000 male emperor penguins huddle against the wind and late winter cold on the sea ice of Antarctica's Atka Bay, in front of the Ekström Ice Shelf.

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DAN WESTERGREN, Photographer

As the long time photo editor for National Geographic Traveler magazine, Dan Westergren was responsible for the magazine's photographic vision. He's been lucky to photograph amazing places for Traveler, such as the summits of Mont Blanc, the Matterhorn, and Kilimanjaro as well as the North Pole.



M JACKSON, Expert

Geographer, glaciologist, National Geographic Emerging Explorer, and TED Fellow, M Jackson studies and writes about glaciers, people, and climate change. She has worked for more than ten years across the Arctic guiding backcountry trips and has served as an Expert for National Geographic in Alaska, Iceland, and Antarctica.



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WINGING IT!

GETTING STARTED WITH BIRD PHOTOGRAPHY

Birds make great subjects for photography, but there are many challenges, especially in terms of the technical aspects. It's definitely worth the effort though, so here's what you need to know to get started.

Just about anywhere on the planet – even at sea – birds are part of everyday life and we tend to take them for granted, but if you choose to become more involved with the avian world, you'll find it's a truly fascinating place. Many people who take up bird-watching as a hobby inevitably decide that they'd like to extent their interest

to include photography. You don't necessarily have to be a 'twitcher' to take great photographs of birds, but you will get better pictures if you know your subjects in terms of behaviour and habitats. And, in most cases, after you've exhausted all the 'backyard bird' opportunities, you'll be keen to move further afield and look for other species (there's estimated to be around 10,000) which is when

you're going to need to know what you're looking for and how to find it. So, although you don't necessarily need to be a dedicated bird-watcher to be a good bird photographer, it's certainly going to help.

As with many specific fields of natural history photography, there are a lot of technical aspects to consider, but the creative elements of framing, composition and selective focusing are also very important. These make the difference between a snapshot and a photograph. Early on, you'll probably just be concentrating on the technicalities, but as you get more proficient in this area, you'll definitely start to also consider the creative aspects which, of course, adds to the challenge, but also

increases the satisfaction when everything comes together in a compelling image.

A Bird In The Hand...

To set the scene, let's have a look at what are considered the basic requirements of a 'good' bird photograph... at least in terms of getting started. In a recent newsletter, the BirdLife Photography group (which is part of BirdLife Australia), published what it considers a "basic standard of quality in terms of technical aspects".

Bear in mind that this information is essentially targeted at photographers considering entering the group's competitions, but it's very useful information for the beginner.



You won't be surprised to learn that images need to be in focus, well-exposed and accurate in colour balance... very important if you're to accurately portray a bird's colouring. We'll cover all three of these technical considerations in more detail very shortly.

Perhaps more interesting though, is the BirdLife Photography group's observations about composition, which it stresses aren't rules, but more "considerations" and, again, a good starting point from which you can then go on develop your own ideas and style. The key points to consider here are that, firstly, you need to think about what you want to portray about your subject... which could be a particular feature or behaviour or the interaction with their habitat.

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As you become more involved and develop more skills, you may find you want purchase more specialised hardware such as a supertelephoto lens.

In most cases, the image will have more impact if the bird is either facing the photographer or portrayed side-on, and it can be distracting if a small part of the subject is outside the frame which can look too much like a mistake. If you're going to crop, then opt for much more of a close-up such as a 'head-and-shoulder' portrait. And, as with human subjects, the image will be better balanced compositionally if the bird is looking into the frame rather than out, which will also work better if you leave some additional space within the image rather than framing as tightly as possible.

The final recommendation is that you "try something different" – in terms of angles and positions, the camera's point-of-view, and the context of settings – which is very good advice, but you'll only be able to do this if you first understand what "something different" might actually look like.

What Gear?

Before we delve more deeply into the technical aspects and the creative elements, let's take a look at the equipment you'll need for bird photography. It doesn't necessarily have to be expensive, but as you become more involved and develop more skills, you may find you want purchase more specialised hardware such as a supertelephoto lens.

At the entry-level there's the superzoom camera which has a fixed lens with a long focal range from wide-angle to supertelephoto... up to the equivalent of 3000mm in the case of Nikon's Coolpix P1000.

The superzoom camera is a very cost-efficient way of obtaining long telephoto focal lengths that would otherwise cost a fortune. The superzoom camera is also comparatively compact and lightweight, but as with most things in photography, there's no such thing as a free lunch... or, in this case, free supertelephoto capabilities. The superzoom camera is made possible by using a much smaller-sized sensor – typically the '1-inch' format – which allows for the compact overall dimensions and the longer *effective* focal lengths. The main drawback is that smaller sensors mean smaller pixels which have both a lower sensitivity and a lower signal-to-noise ratio. The net result is higher noise levels – which manifests itself as graininess – when shooting in low-light situations using the camera's higher sensitivity (ISO) settings. The camera can apply noise reduction processing which is designed to essentially 'soften' the grain, but this also softens the sharpness so details will be less well-defined. Given birds have a lot of fine detailing in their feathers, noise can be a real issue... and there are likely to be many situations in bird photography – not just low available light – where you'll need to shoot with a higher ISO settings just to maintain the exposure settings you want. That said, superzoom cameras do have the potential for excellent results in the right conditions, but in the end there are probably just too many limitations for the serious bird photographer.

D-SLR Versus Mirrorless

Interchangeable lens cameras (ILCs) provide the flexibility of fitting a whole range of lenses – including very long telephotos – but obviously the cost of building a system suitable for bird photography goes up considerably too. Bigger sensors place more demands on lenses in terms of the imaging, the resolving power and the correction for optical aberrations, so the longer telephotos – either primes or zooms – can be very expensive indeed.

If you're buying your first interchangeable lens camera with bird photography in mind, you'll need to decide between either the

digital single lens reflex (D-SLR) type or a mirrorless design. The essential difference is that the D-SLR has an optical viewfinder and the mirrorless camera has an electronic one. Both relay the view from the lens to the eyepiece, but the optical finder is obviously 'real world' whereas the electronic is showing a feed from the imaging sensor and is subject to any limitations of the display, such as refresh rates and dynamic range. However, EVFs are continually improving with higher resolutions, faster frame rates – important when shooting moving objects – and increases in the dynamic range and colour fidelity. D-SLRs are still popular – mainly because many photographers prefer an optical viewfinder, but mirrorless cameras are slowly starting to dominate the ILC market, especially in the entry-level and enthusiast-level categories.

The initial idea behind the mirrorless concept was to enable smaller and lighter camera bodies due to the removal of the mirror box and pentaprism-type viewfinder. This is still a key attraction of the Micro Four Thirds sensor size which is the smallest of the three main formats. The M43 sensors typically have a resolution of between 17 and 21 megapixels which provides a reasonable balance between image definition and sensitivity (and, in turn, high ISO performance). However, arguably a bigger attraction of the M43 format is its focal length magnification factor of 1.97x (referenced to the 35mm frame size) which translates into longer effective focal lengths. This isn't so good in terms of wide-angles, but great for longer telephoto focal lengths without the usual increases in lens size, weight and cost. For example, Panasonic's Leica DG Vario-Elmar 100-400mm f4.0-6.3 delivers the equivalent of 200-800mm in a lens that is just a shade over 17 centimetres in length and weighs 1.1 kilograms. Similarly, Olympus's M.Zuiko Digital ED 300mm f4.0 IS PRO is about the same size and weight as a 70-200mm f2.8 (in the full-35mm format), but is equivalent to a 600mm supertelephoto. For photographers who are going to be doing a lot of trekking while carrying a camera kit suitable for bird photography, the M43 mirrorless cameras have obvious attractions.

PHOTO GEAR FOR THE BIRDS

Micro Four Thirds Telephotos

The **Micro Four Thirds mirrorless camera format** really comes into its own with longer telephoto lenses when the 1.97x magnification factor allows for much more compact external designs without sacrificing magnifying power. Panasonic's brilliant Leica DG Vario-Elmar 100-400mm f4.0-6.3 delivers the equivalent of 200-800mm in a lens that is just a shade over 17 centimetres in length and weighs 1.1 kilograms. It's weather-proofed with a built-in optical stabiliser so you can even shoot hand-held at 800mm. If you want more lens speed, there's Panasonic's Leica DG Elmarit 200mm f2.8 Power OIS prime telephoto which has an effective focal length of 400mm yet it weighs in at 1.245 kilograms and is also just over 17 centimetres in length. What's more, Panasonic is packaging it with a dedicated 1.4x teleconverter which delivers an effective focal length of 560mm with a maximum aperture of f4.0. Olympus's M.Zuiko Digital ED 300mm f4.0 IS PRO is about the same size and weight as a 70-200mm f2.8 (in the full-35mm format), but is equivalent to a 600mm supertelephoto. It's weather-proofed too, and has an optical image stabiliser which works in conjunction with sensor-shift stabilisers in the OM-D camera bodies, increasing the scope for hand-held shooting (visit www.olympus.com.au and www.panasonic.com.au).



◀ **Olympus
M.Zuiko Digital
ED 300mm f4.0
IS PRO.**



◀ **Panasonic Leica
DG Vario-Elmar
100-400mm
f4.0-6.3 ASPH
Power OIS.**



◀ **Panasonic Leica
DG Elmarit
200mm f2.8
Power OIS.**

The 'APS-C' sensor size is bigger than M43 – the focal length magnification factor is typically 1.5x – so there's scope for higher resolutions and/or bigger pixels which improve the high ISO performance, but deliver lower noise levels overall. Tele lenses are still a little more compact and lighter than the 35mm format equivalents, but not as dramatically so as M43 lenses. For example, Fujifilm's XF100-400mm f4.5-5.6 R LM OIS WR telezoom is equivalent to a 150-600mm, but weighs in at 1375 grams and is a shade over 210 millimetres in length. That's quite manageable in terms of size and weight. Additionally, thanks to built-in optical stabilisation, all the tele lenses we've just mentioned can feasibly be used hand-held.

Mirrorless cameras using a full-35mm size sensor are starting to gain in popularity now that Canon, Nikon, Panasonic and Sigma are all offering systems, along with Sony and Leica. Some full-35mm mirrorless camera bodies are smaller and lighter than others, but compared to the D-SLR systems, there's generally little difference in the size of a lens at any given focal length, especially longer telephotos. So what are the benefits of a mirrorless camera here then? Without the reflex mirror to slow things down, a mirrorless camera is capable of faster continuous shooting speeds plus sensor-based autofocus systems give wider coverage and more sophisticated subject tracking functions. And while the lenses may not be physically any smaller, the mirrorless camera's shorter flange-back distance enables more flexibility with optical designs, enhancing key performance aspects such as the uniformity of centre-to-corner sharpness and brightness. Another potential advantage is shorter minimum focusing distances which translate into higher magnification ratios.

Long Shots

We've only mentioned telephoto lenses so far because these are an essential for bird photography primarily because, with many subjects, a lot of magnification is required to ensure that they're reproduced at reasonable size in the image. Almost equally important is that telephoto lenses enable you to shoot from further away which is an important consideration with any wildlife photography.

Many birds simply won't tolerate you getting too close, or won't come close if you're intruding on their territory. There are ways around this – such as building hides or using camouflage – but the photographic solutions are arguably a lot easier.

A telephoto zoom offers the flexibility of a focal range – for example, 70-300mm or 100-400mm – but even in this era of advanced optical constructions, zooms still have some performance limitations compared to a prime lens. Because more lens elements are employed in a zoom's optical construction, they're less efficient at transmitting light to the sensor. This results in a slower maximum aperture or, in many cases, a slower maximum aperture range as the focal length increases, say f3.5-5.6. This means you may need to use higher sensitivity settings more often in low-light situations. Some zooms have a constant maximum aperture (say f2.8 or f4.0), but these tend to be in the shorter focal range of 70-200mm or even shorter, and the optical construction is more complex which essentially means a more expensive lens. Compared to a zoom, the optical construction of a prime telephoto is simpler so aberrations such as distortion and vignetting are minimised (although chromatic aberrations – i.e. colour fringing – can still be an issue), and the image quality across the frame is more uniform. Additionally, a prime telephoto will have a larger (or 'faster') maximum aperture than a zoom which has the same maximum focal length... for example, a 400mm f2.8 prime versus a 80-400mm f4.5-5.6 zoom (both Nikon D-SLR lenses, by the way). It's probably fair to say that a fast supertelephoto prime lens (i.e. 400mm, 500mm or 600mm) is the ultimate tool for bird photography, but these are also hugely expensive and likely to be little used for any other sort of photography. The AF-S Nikkor 500mm f4.0E FL ED VR is priced at around \$13,500 while the AF-S Nikkor 80-400mm f4.5-5.6G ED VR sells for around \$3500. Long telezooms made by the independent lens manufacturers – such as Sigma, Tamron and Samyang – can also be less expensive and still deliver a good optical performance. Picking just one example at random; Tamron's SP 150-600mm f5-6.3 Di VC USD G2 is currently selling at around



\$2000 so that's a lot of lens for your money.

However, there is one other very important lens specification to consider when selecting a telephoto lens specifically for bird photography and that's the magnification ratio (or maximum magnification ratio with a zoom), also known as the reproduction ratio. The magnification ratio is dictated by the focal length, the minimum focusing distance and the sensor format (i.e. the frame size). It's important because it determines what size the subject will be reproduced in the image... and this will especially be an issue with small birds. Here's how the numbers work; a magnification ratio of, say, 1:5, means an object will be reproduced at one-fifth lifesize. If this object is 50 mm in size, it will reproduce at 10 mm which is especially big in a 24x36 mm frame, but would be bigger with the 'APS-C' and M43 sensor sizes. Given that many bird species are quite small, if you're buying a telephoto lens specifically for bird photography, then the magnification ratio is an important specification to consider.

Before we leave the subject of lenses, it's worth touching on the topic of image stabilisation which can be very helpful when using the camera hand-held to photograph birds. Many mirrorless cameras (but certainly not all) have in-body image stabilisation which is performed by shifting the sensor to counter camera shake and keep the lens's optical axis centred. In-body stabilisation has the advantage of working with virtually any lens and also providing correction across more axes. The alternative method of providing image stabilisation is lens-based

– as in the Canon and Nikon D-SLR systems – and correction is provided by a special group of elements which shift either left/right or up/down, again to keep the lens's optical axis centred on the sensor. Stabilisation allows you to shoot hand-held at slower shutter speeds than would otherwise be the case which, in turn, allows for the use of lower ISO settings and/or smaller apertures. A couple of mirrorless systems now allow for dual in-body/optical stabilisation which provides even more effective correction for camera shake – often of up to six stops or even more.

Technical And Technique

Photographing birds successfully does require some technical knowledge as there are many situations where you'll need to override the camera's automatic systems or even use full manual control. This is particularly important with apertures – which control the depth-of-field – and shutter speeds – which, depending on duration, will either freeze or blur a moving subject. If you simply leave your camera in Program mode for fully automatic exposure control, you will have no say in the combination of aperture and shutter speed that's used.

Depth-of-field – the area in front and behind the focusing points that will also be sharp – is an important control in bird photography. You may want to keep the depth-of-field very shallow so only the subject is sharp and stands out clearly from a blurred background. Wider apertures (smaller f-numbers) reduce the depth-of-field, but it also becomes inherently shallow with longer focal lengths.

Smaller apertures (larger f-numbers) give increased depth-of-field which you may want if the background or foreground add something to the image such as the context of habitat or environment. Inevitably, you also find yourself juggling the required depth-of-field with the required shutter speed and, of course, the exposure. A lot of bird photography will demand a faster shutter speed in order to freeze movement, even with subjects that are essentially sitting still (but actually are never entirely still). Birds taking off and landing or in flight will need even faster shutter speeds, possibly between 1/1000 second and 1/4000 second depending on how fast they're moving.

In terms of maintaining the right exposure, using a faster shutter speed means using a wider aperture with the inherent reduction in depth-of-field which makes precise focusing on the subject even more critical. You could, of course, opt to use a higher sensitivity setting, but as we've already seen, the higher ISOs will require more noise reduction processing to the detriment of both detailing and colour saturation. Another consideration is camera shake which becomes more of an issue as the magnification power of the lens increases... especially with long telephotos. Using a tripod is one option and image stabilisation (either in-body or optical) is another – both allowing you to use slower shutter speeds than might have otherwise been the case, although you won't be able to get around subject movement possibly becoming blurred. As you can see, it's very much a case of juggling all these various technical elements

IN PRACTICE

to suit the either the subject and situation or your creative objectives (or both). Fear not, with practice much of it becomes second nature, even if there's inevitably a bit of trial and error at the start. If in doubt, don't be afraid to use the automatic exposure bracketing function which takes a series of frames with over/under adjustments. Many mirrorless cameras also now have auto bracketing modes for white balance, aperture (i.e. depth-of-field) and even focus. Bracketing could take up a lot of frames when shooting film, but with digital capture it's a very handy tool and it's easy to discard the images you don't want.

Stay Focused

Focus is also critical with bird photography, especially as it's a key requirement to at least have the head and eye(s) sharp, but often also the feathers, which are highly detailed. Some photographers still prefer to focus manually, but this takes time and may well result in missed shots if the subject is very active or moving around a lot.

The good news is that the latest autofocus systems are very responsive and very fast, assisted by wider frame coverage (especially with mirrorless cameras) and, more recently, AI-based tracking which uses object recognition. Many systems also offer a range of AF area modes so you can pick one which best suits the subject or situation, and you may also be able to vary the size of the focusing zone for greater selectivity with smaller subjects.



Superzoom cameras do have the potential for excellent results in the right conditions, but in the end there maybe too many limitations for the serious bird photographer.

PHOTO GEAR FOR THE BIRDS

'APS-C' Telephotos

Fujifilm's XF100-400mm f4.5-5.6 R LM OIS WR telezoom (equivalent to 150-600mm) is currently the longest lens in the X mount system, but perhaps more interesting is the XF200mm f2.0 R LM OIS WR prime. Yes, that's f2.0 speed, and the effective focal length is 300mm which makes for a pretty mouth-watering lens for wildlife photography. What's more, it's packaged with a 1.4x teleconverter which gives you 420mm at f2.8. Of course, at 300mm (effective) and f1.2, the depth-of-field is going to be very shallow, but the advantages are enhanced low-light capabilities or the ability to use faster shutter speeds. The XF200mm is weather-sealed and has optical image stabilisation so it's potentially a very versatile lens.

Undoubtedly more affordable is Sony E 70-350mm f4.5-6.3 G OSS telezoom which is a recent release and equivalent to 105-525mm. Given the effective focal range, it's comparatively compact and lightweight (at just 625 grams) with built-in optical image stabilisation so hand-held shooting is entirely possible. Bear in mind too, that Sony's E mount cameras (such as the A6600 or A6400) are compact too. The 70-350mm has a weather-sealed barrel and the optical construction includes both aspherical and extra-low dispersion glass elements to correct for both distortion and aberrations. And it's priced at a shade under \$1400 so you're getting a lot of lens for your money (visit www.fujifilm.com.au and www.sony.com.au).



◀ **Fujinon
XF200mm f2.0
R LM OIS WR.**



◀ **Sony E
70-350mm
f4.5-6.3 G OSS.**

If you're planning to buy a new ILC specifically for bird photography – or to expand your capabilities in this field – it will be well worth going for the best AF system you can afford. A couple of key AF-related specs to also look out for are the low light sensitivity – the minimum light level at which the autofocus will still function reliably – and the continuous speed which maintains frame-by-frame AF adjustment. Camera makers like to quote a model's fastest continuous shooting speed, but this can often be with the AF (and exposure measurement) locked to the first frame. If you're shooting in situations where the subject may be moving around a bit or the light is continually changing, you're going to be more interested in the maximum shooting speed with the AF and AE adjusted frame-by-frame (which, typically, will be a bit slower as a result).

A final key technical consideration is colour balance which is the domain of a digital camera's white balance control. What you need to know here is that light is very rarely ever completely neutral (i.e. 'white') and aspects such as the time of day, the weather conditions and the surrounds will create a particular colour cast which affects the reproduction of all colours. If you want accurate colour reproduction – which is likely to quite often be the case with bird photography – you will need to compensate for any prevailing colour cast. Our eyes are very good at doing this so,

in many instances, you may note notice that the whites aren't actually pure white until you look more closely at your pictures. The auto white balance control is designed to correct the prevailing colour balance to reproduce white as pure white so all the other colours in the image will be right too. Auto white balance control will work well in many situations, but has a limited range which is why a selection of presets for specific lighting situations is provided. Some cameras go even further and allow you to set a specific colour temperature, but a more effective option in many situations is to make a custom white balance setting. This is now very easy to do, and it then tailors the correction specifically to the scene as you've framed it. Of course, white balance is something that can be corrected post-camera, but it's actually better to get it right in-camera along with exposure control.

Using RAW capture will provide much more scope for correcting an image post-camera; including sharpness, exposure, white balance and noise reduction (which, usefully, can be applied selectively to certain parts of an image).

A RAW image is a bit like a digital negative which you process into a final 'print', and it provides the best possible starting point for this. However, RAW files are bigger so both the camera's shooting speed and burst length may be reduced during capture, and you'll get fewer images on a memory card.

JPEGs are processed in-camera for sharpness, colour saturation, contrast and noise, but there's also plenty of scope for manually adjusting these parameters and more. Additionally, all the camera makers have been steadily improving their JPEG processing algorithms so the straight-out-of-the-camera image quality is now better than ever.

Staying Composed

Composition is a much more 'elastic' topic than the technical areas because of the creative aspects which are open to personal interpretation, but for bird photography, there are still a number of, shall we say, "guidelines".

As we noted earlier, the framing is important because cropping in tighter isn't always the best approach with birds. The immediate surrounds can often add more to the image's story in terms of habitat, feeding or behaviour... and interest. In fact, it's probably good practise to shoot a little wider and then crop in later if you think the composition can be improved. With the current generation of higher resolution sensors – especially in the full-35mm format – there's plenty of scope for cropping without unduly compromising image quality. However, take care with backgrounds as they can become distracting if there's too much happening... such as brightly-coloured blossoms, for example. Backgrounds can still be very useful in terms of setting the scene or even adding extra interest to the image, but may need to be more softly rendered rather than being in sharp focus. Depth-of-field may deal with the issue for you, but if not, you may need to take control by selecting a wider aperture. Incidentally, learn how to use your camera's depth-of-field preview facility as it will instantly show you what's in focus at a given aperture setting.

Probably the most important of the compositional ideas in photography is the rule-of-thirds, also called the golden rule or the golden mean. It's as simple as it's visually effective. The rule-of-thirds is based on dividing the frame into equal thirds both vertically and horizontally, so you end up with nine segments. These days you don't even need to imagine such a division as most D-SLRs and mirrorless cameras provide it as a

guide grid superimposed over the viewfinder or live view image. This grid gives four intersecting points at the corners of the centre segment and these are where the main subject or element should ideally be positioned. With the subject located off-centre, the idea of 'negative space' comes into play. In other words, there's nothing wrong with leaving parts of the frame 'empty' if this helps emphasise or strengthen another element of the picture.

Of course, all this assumes that you have time to deliberate before taking a shot, but with wildlife photography of any sort, you may simply have to grab what you can get before your subject flies off. Consequently, it'll pay to have the camera fully set-up beforehand in terms of the focusing, exposure and white balance modes, guided by the location and lighting conditions that you're shooting in. Again, go a little wider with the framing so you can reframe and recompose later on if need be.

You can easily get started with bird photography in your backyard or local park which is a great way to fine-tune things such as focusing, exposure, depth-of-field, framing and composition. If you're keen to keep going then you'll need to start learning about your potential subjects so, for starters, you'll know where (and when) to find them and then the best approaches for photography.

After a while, you'll be to become a lot more creative with composition, lighting (early morning for instance) and the locations where birds visit or live. If you really start to get hooked, joining a local bird-watching club could be helpful, but there are also plenty of workshops and tours specifically for bird photography.

Finally, in addition to all the technical demands and the creative possibilities, successful bird photography is dependent on two other key ingredients – patience and persistence. You'll need the patience for all the times you have to wait around for a subject to finally appear, and you'll need persistence to keep on trying until you get the result you want. You may well fluke a shot from time to time, but mostly success will come because of another 'p' – preparation. Know your subject and know your camera equipment and then you'll know exactly what to do when everything comes together. Rest assured, the rewards will make it all worth the effort. 🐦



PHOTO GEAR FOR THE BIRDS

Full-35mm Telephotos

With both Canon's and Nikon's full-35mm mirrorless camera systems still comparatively new, you have to turn to their D-SLR systems for very long lenses. In fact, Nikon has just added a new telezoom to the line-up in the shape of the AF-S Nikkor 120-300mm f2.8E FL ED SR VR. Note the constant aperture of f2.8 – so no zoom-related speed limitations here – and the 25-element optical construction includes two fluorite types and one 'SR' type. 'SR' glass has been newly developed by Nikon and is designed to significantly refract short-wavelength light to provide more effective suppression of all chromatic aberrations. Importantly, the minimum focusing distance is just two metres across the full zooming range, giving a maximum reproduction ratio of 1:6.3 at 300mm. Not long enough? What about the AF-S Nikkor 180-400mm f4.0E TC FL ED VR? It has a built-in 1.4x teleconverter that takes you to 560mm at f5.6. Both these big zooms have optical stabilisation so hand-held shooting is possible – at least for a while – but first you have to buy one of them and neither are cheap. The 120-300mm is around \$15,000 and the 180-400mm is priced in the region of \$17,600. Ouch!

If you want to go longer again, Sony's full-35mm mirrorless system now includes a 600mm f4.0 supertelephoto prime. This is a 'G Master' series lens so it packs a lot of lens tech in terms of its optical design in order to optimise image quality, and it's fully weather-sealed on the outside. If 600mm isn't long enough for you, Sony offers 1.4x and 2.0x E-mount teleconverters which give you an 840mm f5.6 and a 1200mm f8.0 respectively. How much? Take a deep breath... you're going to need a cool \$22,000 in the kitty (visit www.nikon.com.au and www.sony.com.au).



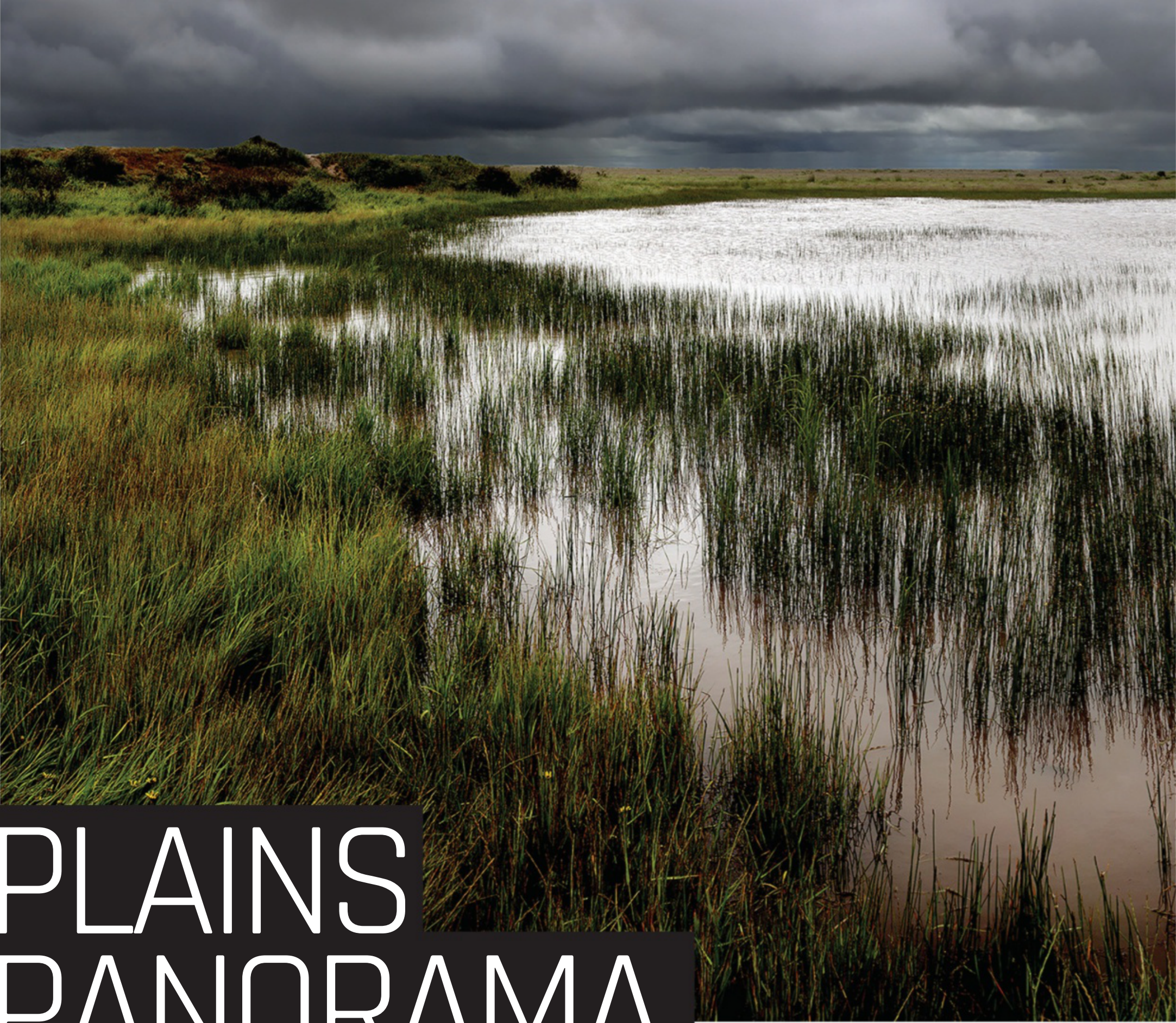
◀
AF-S Nikkor
120-300mm
f2.8E FL ED
SR VR.



◀
AF-S Nikkor
180-400mm
f4.0E TC FL
ED VR.



◀
Sony FE
600mm f4.0
GM OSS



PLAINS PANORAMA

The Picture

The Hay Plains of New South Wales usually conjures up images of vast wide-open, flat spaces with big blue skies and a near-barren dusty surface. On one crossing between Hay and Goolgowi on the Mid Western Highway, heavy rain had dramatically changed the landscape to something completely different and one that presented some great photo opportunities. Apart from the very temporary ponds, the dark skies and occasional sunshine turned the generally

dull drive into something most photographers would cherish.

The Photographer

Trevern Dawes has been a contributor to *Australian Camera* since the first issue was published in June 1979 (then titled *Camera Craft*). An avid landscape photographer (and also our digital printing guru), Trevern still travels extensively through Australia and New Zealand, taking pictures for magazines, books and his many own imaging projects.

The Equipment

Canon EOS 5D Mark II fitted with the EF 24-105mm f4.0L 'general purpose' zoom lens, which in turn, was fitted with a 77 mm ultraviolet protective filter and a lens hood. Exposure via aperture-priority auto control at f14 at 1/200 second and ISO 250. Manual focus with the lens focal length set at 40mm to create a panorama.

The Technique

Driving along the highway, looking for landscape possibilities through occasional

downpours and watchful of traffic (especially the trucks) is not the recommended way to go about camera work, but when the conditions are extraordinary, we all tend to make the effort and take extra care. We drove slowly continually looking and, when something special was spotted, the vehicle was parked safely well off the road.

How It Was Done

The scene was taken from a small bridge over a floodway with not much space for pedestrians.



A constant check was made to keep an eye on the traffic and, when a vehicle came through; it was a case of keep close to the railing and ensure the driver was aware by extending a friendly wave. Only when the coast was clear could any photographs be taken.

Tricks Of The Trade

The opportunity was always going to be a brief photo session so every effort was made to make a successful capture. A few single frame shots and then, with a visualised panoramic in mind, a set of overlapping images with the camera used

in the vertical format. Manual exposure and focus ensured uniformity for the stitching in Photoshop to be applied later. The limited space on the small bridge meant a tripod wasn't practical, so the horizon line became the guideline for the sweep of images to make up the panorama.

Degree Of Difficulty (Out of 10)

Even in a relatively remote area the need for photographer 'safety first' is imperative. Watching out for traffic and allowing adequate time to make a sequence were the critical

factors here. Wild and wet conditions in isolated places don't occur very often, so those rare opportunities need to be 'nailed' on the spot. The resulting panorama has impact and atmosphere enough to deserve a maximum score.

Can You Try This At Home?

The prospect for photographic 'pleasant surprises' on the home front may well be limited, but there will always be times and situations when some great shots can be organised. Be ready to respond and make the most of the opportunities. 📷

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CLASSICS



THE TREASURES OF THE LEICA CAMERA ARCHIVE

If you're a Leica fan then the company's expanding archive at Leitz Park in Germany is a veritable Aladdin's Cave. It's generally off-limits to visitors, but Paul Burrows was given a rare guided tour.

technical drawings, patent papers, books and magazines, promotional materials and, of course, important cameras and lenses. The archive has received a big boost with the acquisition, in early 2018, of the

Leica is thriving today, but there have been times in the company's long history when the future looked bleak. It was at these times that important pieces of the company's heritage would be sold off to eager collectors around the world – styling models, prototypes, pre-production models and all manner of memorabilia. Additionally, it wasn't unheard for retiring engineers to souvenir a few bits and pieces... such as a prototype lens that had been serving a paperweight on the desk for years,

but was actually a highly-desirable collectible.

The modern-day Leica has been actively trying to re-acquire many of these items to rebuild its camera archive, now located in a dedicated part of the company headquarters at Leitz Park, on the outskirts of historic Wetzlar in Germany. The new archive brings everything together under one roof – production records,

► Bound volumes of *Die Kinotechnik* journal from the 1930s.



◀ Part of an extensive collection of rangefinder cameras donated to Leica. Nearest is a silver IIIc built sometime in the early 1940s. The black camera behind is also a IIIc of a similar vintage. These cameras are just a tiny part of a massive collection amassed by Rolf Fricke in the USA. Fricke – who, incidentally, worked for Kodak all his life – is credited with creating the most important Leica collection in the world, and he acquired many very rare items over the decades thanks to his close connections with the Leica factories in both Germany and Canada.

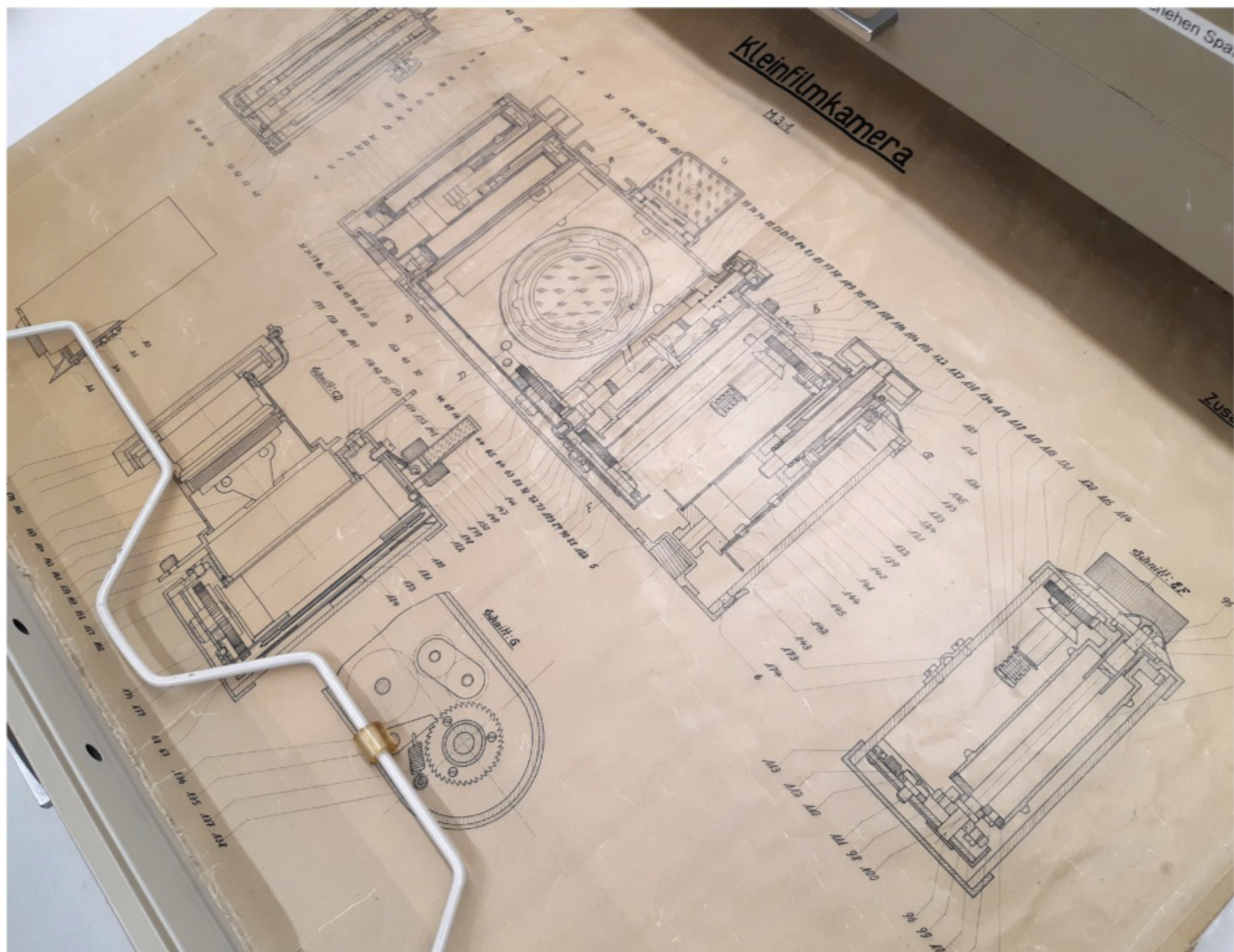


huge collection of cameras and lenses created by Leica enthusiast and historian Rolf Fricke over many decades.

Fricke – who worked for Kodak at its US headquarters in Rochester – built up a network of close contacts at the Leica factories in Germany and Canada, and was consequently offered many items that made his Leica collection second-to-none anywhere in the world. His passion for the marque has resulted in the collection now being resident at Leitz Park, with some of the most important items on display at the museum while the rest occupies a lot of shelf space in the archive.



Fricke – who worked for Kodak at its US headquarters in Rochester – built up a network of close contacts at the Leica factories in Germany and Canada.



▲ Technical drawings for a 'Kleinfilmkamera'... which translates as 'small film camera' and shows a screw mount 35mm model dated 1929. This became the first version of the Leica I with interchangeable lenses, launched in 1930.



▼ The library of Leica-related books... including a great many by famous photographers who used Leica cameras to create them.



CLASSICS



▲ The Leica III used by American press photographer Sam Shere to take the famous images of *The Hindenburg* airship exploding as it docked at Lakenhurst, New Jersey, on 6 May 1937. This camera was built in 1935. As it happens, a burnt Leica was recovered from the wreckage and is now also in the archive.



▲ One of the Leica R6 35mm SLRs Sebastião Selgado used to shoot his famous photographs of Canadian firefighters trying to seal spewing oil wells in Kuwait at the end of the first Gulf War in 1991. During the shoot, Selgado cleaned the drenching crude oil off his Leicas with petrol. The all-mechanical R6s just kept on working.



▲ The Leica SL digital mirrorless camera that saved the life of Italian freelance photojournalist Gabriele Micalizzi in Syria in February 2019. He had the camera up to his eye when an RPG exploded close-by and he was hit by shrapnel. He was still badly injured, but the SL took the brunt of the force which would otherwise have killed him. **Small:** Micalizzi's blood-spattered Leica Q.

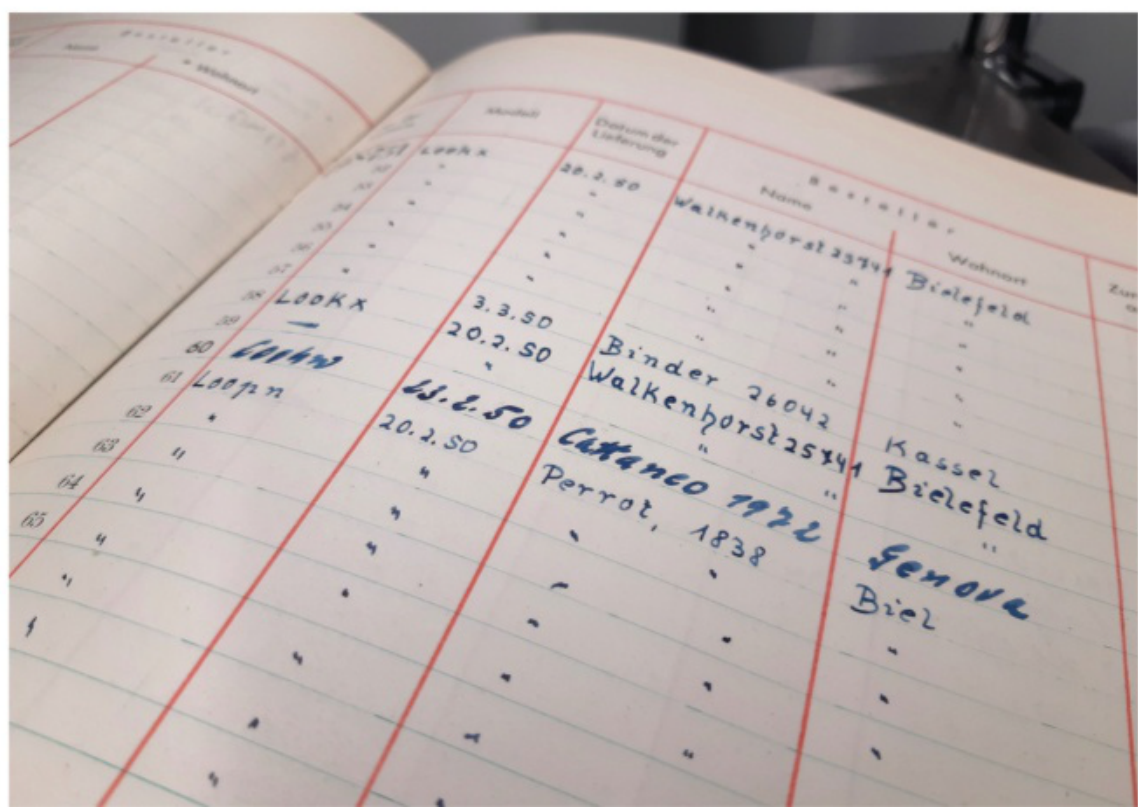


▲ Worst-for-wear M4 with a bullet hole.

▼ Meticulously maintained production records now enable owners of classic Leicas to find out exactly when their camera were built and where they were first sold.

Cameras with a history are being returned to Leica too, either via collections or the photographers who used them to document a moment in history. Among the latter are the R6 35mm SLRs used by the Brazilian photojournalist, Sebastião Selgado, to shoot his famous photographs of firefighters attempting to cap Kuwaiti oil wells deliberately damaged by retreating Iraqi soldiers at the end of the first Gulf War in 1991.

Both he and his camera gear were drenched with crude oil and he frequently cleaned off his Leicas with petrol, but the all-mechanical R6s just kept on working. They still are working, but not so the Leica SL that belonged to Italian photojournalist, Gabriele Micalizzi. He was covering the conflict in Syria in February 2019 when shrapnel from a rocket-propelled grenade (RPG) hit him in the head. He would have surely been killed but for the fact that he had the



“

He would have surely been killed but for the fact that he had the SL up to his eye at the time and it took the full force of the impact.

▼ Box of ‘red dot’ Leitz badges (they won’t miss one will they?).



▲ Artist's rendering of the R8 35mm SLR.

SL up to his eye at the time and it took the full force of the impact. The back of the camera was driven into his face causing some injuries, but he lived to tell the tale. His blood-splattered Leica Q is also in the archive.

Thanks to the build-quality and the collectability, there are



▲ Design artwork from early 1999 for an autofocus R8-style 35mm SLR by famed German industrial designer Manfred Meinzer (who designed the original R8). Note the AF/MF switch on this rendering of what would eventually be the R9 (2002) which had manual focusing only. Leica flirted with the idea of an autofocus 35mm SLR for around two decades.

probably more vintage Leicas still in circulation than would be the case with any other camera brand. The massive ledgers that contain the hand-written production records – dating back virtually to the beginning – link a camera's serial number to the date its manufacture was completed and other details such as the distributor, camera shop or customer it was sent to first.

Particularly interesting are the design drawings or styling exercises of Leica cameras which never made it into production. It's clear a lot of work was done on autofocus 35mm SLRs over a number of years dating back to the mid-1970s and the Leicaflex SL2. Renderings in the archive reveal an autofocus R8-style camera and, presumably from slightly later on, a much more compact SLR body with push-button controls and a top-panel info display. Of course, as it turned out, Leica never made an autofocus 35mm SLR, primarily

because it was always concerned about the potential compromises to lens performance. While it's always the classic cameras that get the most attention, Leica is equally famous for its lenses which are still mostly hand-built, including time-consuming processes such as polishing aspherical elements. The superfast Noctilux primes are a particular challenge and even Leica sometimes has to acknowledge the difficulties, which is why the prototype 90mm f1.0 Noctilux for the M mount is one of the archive's really rare treasures.

“It's not difficult to design the perfect lens,” we're told, “but it's very difficult to build it.”

If you're ever in the area of Wetzlar – which is about an hour north of Frankfurt by road – a visit to Leitz Park is worth the short detour. The Ernst Leitz Museum is open to the public as are the photography galleries and two excellent shops (lock up your credit card!).

For more information visit
<https://en.leica-camera.com/Leitz-Park>

◀ Production records from the mid-1950s organised according to camera serial numbers. What you see here is from 1954 and an M3 (705001) to 1956 and another M3 (840000). However, during this time Leica was also building M2s, the If, Ilf, 111f and Illg 35mm rangefinder models.



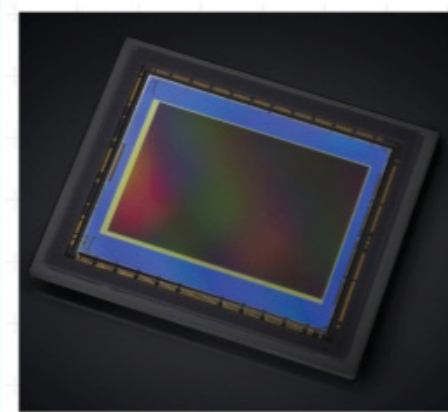
CANON

EOS-1D X MARK III



If it is the last-of-the-line in pro-level Canon EOS D-SLRs, the -1D X Mark III is a great send-off. Canon has squeezed just about all it possibly can from the D-SLR configuration with high-speed shooters the primary target audience.

CONSTRUCTION: Not surprisingly, it's very similar in size, styling and control layout to the Mark II... but is actually 90 grams lighter in weight at 1.44 kilograms. External covers are magnesium alloy with weather sealing at all junctions and insulation to enable shooting in sub-zero temperatures. Diecast magnesium alloy chassis. New 'Smart Controller' is an optical touch-type control integrated into the AF-On buttons to enable faster AF point selection than the conventional joy-stick type control (which the Mark III retains). As on the Nikon D-SLR flagship, various buttons now have built-in backlighting.



SENSOR: Newly-developed Canon CMOS with an imaging area of 24x36 mm and a total pixel count of 21.4 million. The effective pixel count is 20.1 million, giving a maximum image size of 5472x3648 pixels. New four-layer 'High Detail' optical low-pass filter accesses higher frequencies of light to enable the prevention of moiré patterns with less compromising of edge sharpness. Sensitivity range is equivalent to ISO 100 to 102,400 with extensions either side to ISO 50 or... wait for it, ISO 819,200. On-sensor PDAF via Canon's 'Dual Pixel CMOS AF' architecture.



PROCESSOR: Latest-generation 'DiG!C X' processor delivers some serious grunt and is 3.1x faster than the Mark II's engine. Essentially, there's more speed everywhere, including up to 20 fps continuous shooting although this requires mirror lock-up... so the -1D X III is technically operating as a mirrorless camera. Nevertheless, the top speed with the optical viewfinder and reflex mirror is still 16 fps, which is impressive... and the fastest we've seen from a D-SLR. Full AF/AE adjustment is maintained at both the 16 fps and 20 fps shooting speeds. Burst lengths are impressive too... over 1000 RAW+JPEG frames for starters. While the 'DiG!C X' is a single chip, autofocus duties are handled separately by a 'DiG!C 8' generation processor.

CAPTURE SETTINGS: The ever-pragmatic Canon recognises many -1D X III users shoot JPEGs so there's an all-new 10-bit HEIF (High Efficiency Image Format) capture mode which has a more efficient compression algorithm than JPEG but delivers a wider dynamic range and a wider colour gamut via the Rec.2020 colour space. Essentially, it's an HDR capture mode and twice as much information can be saved in an HEIF file as in a JPEG file of the same size. It's the still image version of the H.265 HEVC video codec and has been used by Apple in iPhones since 2017 and iOS 11. Put simply, this is a better way of obtaining HDR stills than the simulation processing of JPEGs. The Mark III offers ten levels of both HEIF and JPEG compression while RAW files are captured with 14-bit RGB colour and the option of the smaller-sized cRAW files. Both RAW+JPEG and RAW+HEIF capture are available. JPEGs can be captured at four image sizes while RAW/cRAW and HEIF capture is at 5472x3648 pixels.

AF SYSTEM: With a dedicated 'DiG!C 8' processor handling the autofocus number-crunching, there's clearly some serious fire-power here. The OVF-based system employs 191 phase-difference detection AF points of

which 155 are cross-type arrays. All points operate at maximum lens apertures of f8.0. All points are manually selectable and there's the choice of two 'Expansion' settings (four- or eight-point clusters) and two 'Zone' area settings plus face/eye detection/tracking. Sensitivity extends down to -4.0 EV at ISO 100. In live view, 'Dual Pixel CMOS AF' kicks in with 3869 measuring points (in 525 selectable areas), representing 100 percent frame coverage vertically and 90 percent horizontally. Sensitivity extends down to -6.0 EV at ISO 100. All points operate at maximum lens apertures down to f11. It's worth repeating here that continuous AF adjustment is still available at the Mark III's top shooting speed of 20 fps in live view. New subject tracking algorithms use AI-based 'deep learning' for object recognition, with the availability of a 'People Priority' mode.

EXPOSURE CONTROL: The conventional offerings of standard 'PASM' exposure control modes with an AE lock, up to +/-5.0 EV of compensation and auto bracketing (over two, three, five or seven frames). Metering is via an 'RGB+IR' sensing employing 400,000 pixels to give 384 measuring zones. Pattern options are multi-zone, selective area (6.2 percent of the



MEMORY CARD: A key element of the EOS-1D X Mark III's speed and video capabilities is its support of the faster CFexpress memory card. There are dual slots, both for CFexpress 1.0 Type B and, in light of the newness, Canon Australia is packaging the camera with a CFexpress memory card. File management options including simultaneous recording of 12-bit 5.5K RAW video to one card and 4K MP4 video (with Canon Log) to the other. However, maximum clip length is still 29 minutes and 59 seconds.



CONNECTIONS:

USB 3.1 Gen 2 (Type C), mini HDMI (Type D), 1000Base-T Ethernet, 3.5 mm audio in, 3.5 mm audio out, RJ-45, N3 remote trigger, PC flash.



VIEWFINDER: Optical, of course, which is one of the main reasons for the -1D X Mark III's existence at all. Full pentaprism design with 0.76x magnification and a 20 mm eyepoint. Built-in eyepiece shutter and strength adjustment over -3.0 to +1.0 dioptres.

frame), spot (1.5 percent of the frame), multi-spot, spot linked to the AF point, and centre-weighted average.

SHUTTER: Electronically-controlled focal-plane type with a speed range of 30-1/8000 second plus 'B' and with flash sync up to 1/250 second. New mechanism for faster recycling. Sensor-based shutter has the same speed range, but allows for silent shooting. Rated to 500,000 cycles.

MONITOR SCREEN: Fixed 8.1 cm TFT LCD panel with a resolution of 2.1 megadots and a viewing angle of up to 170 degrees. Adjustable for brightness and colour balance. However, it's not an HDR display so a 'View Assist' simulation is available when shooting in the HEIF mode. Touchscreen controls are a first on this level of Canon D-SLR.

VIDEO: Canon is undoubtedly targeting video-makers with its new D-SLR flagship or perhaps also recognises that an increasing number of stills photographers are also required to shoot video these days. A snapshot of the key video features are 12-bit RAW in-camera recording at 5.5K (5472x2886 pixels) and at 24/25/50 fps; or 4K DCI with 8-bit 4:2:2 colour and either intra- or interframe compression. There is no cropping with either of these resolutions (4K DCI is derived from the 5.5K read-out using oversampling), but very slight cropping (just to 97 percent) with the 4K UHD resolution to give

the 16:9 aspect ratio. Not surprisingly, shooting 5.5K/50p 12-bit video creates very, very large files indeed... the maximum bit rate is a hefty 2600 Mbps. The 5.5K RAW, 4K DCI and 4K UHD use full pixel read-outs with no pixel binning or line-skipping. Canon Log recording is available internally for 4K DCI with 10-bit 4:2:2 colour and H.265/HEVC compression, giving up to 12 stops of dynamic range. The Full HD options include 100 fps recording for quarter-speed slow-mo effects. Built-in stereo microphones (48 kHz, 16-bit) with both a stereo audio input and output.

HDMI VIDEO OUT: The HDMI interface supports transfer of uncompressed 4K DCI and 4K UHD with 10-bit 4:2:2 YCbCr colour, uncompressed 4K DCI and 4K UHD with 8-bit 4:2:0 YCbCr colour or uncompressed RGB at 8-bit to external recorders or displays. The interface supports the BT.2020, BT.709 or BT.601 colour spaces.

BATTERY: Canon LP-E19 rechargeable lithium-ion as per the Mark II, but with the new camera's enhanced power efficiency, the number of shots per charge increases to 610 in live view and up to 2850 when using the optical viewfinder.

EXTRAS: New reflex mirror mechanism is faster to reduce black-out times and also reduces vibrations, built-in GPS receiver, dual-delay self-timer, multiple exposure

facility, automatic flicker detection/correction, 38 custom functions, standard Canon EOS image processing functions (eight 'Picture Style' presets, three user-defined 'Picture Styles', Highlight Tone Priority, Auto Lighting Optimiser, four in-camera lens corrections, 'Digital Lens Optimiser', high ISO NR, long exposure NR), in-camera RAW image processing (to JPEG), in-camera HEIF processing (to JPEG), WiFi and Bluetooth LE connectivity.

LENSES: Canon's EF mount system is huge and covers everything you'll ever want or need from fish-eye to supertelephoto. There's even more choice when you add in the numerous EF mount lenses made by the likes of Sigma, Tamron, Tokina and Samyang.

ACCESSORIES: New WFT-E9 dual-band wireless file transmitter for faster transfers and a more extended range than the internal WiFi.

PRICE: As usual, Canon Australia hasn't published an RRP for the EOS-1D X Mark III, but at a press preview held just before Christmas 2019, we were told it will be "a \$10,000+ camera body". The US recommended selling price is US\$6499 which works out at about A\$9425 at current exchange rates. Locally, the camera is being bundled with a 512 GB CFexpress card and reader, and is backed by a five-year warranty.

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PENTAX CELEBRATES 100 YEARS

Our bulging archive of Pentax press photos provides a dramatic indication of just how prolific the camera maker was, particularly in the latter half of the 20th century. Pentax is, of course, best known for successfully commercialising the 35mm SLR – and for creating the basic design configuration which has been in use ever since – but it was a pioneer in a number of other key areas; most notably the 35mm zoom compact. While its successes in the 35mm format were numerous, Pentax was also a forward thinker in medium format photography – 6x4.5cm and 6x7cm – and in the miniature

While the future isn't quite so clear, it's been a brilliant first century for the Pentax brand, especially during the film era where it was a leader in many user categories and formats. Paul Burrows looks at the many highlights in the Pentax story.

categories too; the remarkable Auto 110 SLR system being a case in point. Not surprisingly then, Pentax was a powerful member of the 'big five' leading Japanese camera makers – along with Canon, Nikon, Minolta and Olympus – for many decades. Arguably, it was the most productive of them all and, at the peak of its powers, was involved in more categories of camera at any

one time (well, for starters, none of the others ever got involved with medium format).

In contrast, there's been much slimmer pickings under the stewardship of current owner Ricoh, but the loyalty of Pentax users appears to have remained exceptionally strong. With the possible exception of Olympus, the Pentax brand is unmatched for the unswerving dedication

(and optimism) of its followers. Let's hope there will be rewards for them ahead, as well as a strong future for one of the most significant brands in the history of photography.

It all began back in November 1919 in Tokyo when a small company was established to make high-quality glass lenses for spectacles (incidentally, a business area Pentax is still in today).



▲ Kumao Kajiwaru founded Asahi Optical in November 1919 in the Tokyo suburb of Toshima. Here's a nice piece of Pentax trivia... his brother was the famous Japanese portrait painter Takuma Kajiwaru, whose first name was subsequently used on Asahi Optical's Takumar lenses. Takuma became an American citizen in 1953 and died in New York in 1960, aged 83.



Similar to the evolutions of many Japanese camera companies, Asahi Kogaku Goshi Kaisha slowly expanded into other related areas; notably film projector lenses (1923), lenses for both still and movie cameras (1929), binoculars and telescopes.

In 1938, the company name was changed to Asahi Optical Company to reflect its widening operations. In the early 1930s, the company was making lenses for Konishiroku (which later became Konica) and Chiyoda Kōgaku Seikō (which subsequently became Minolta). During WWII, Asahi Optical produced various products for the Japanese military which resulted in the company being dissolved in 1945 by the occupying allies, although it would have been out of business for a while anyway following the destruction of its factory by aerial bombing.

Operations recommenced in 1948 and, soon after, the decision was made to begin making cameras, specifically a 35mm format single lens reflex. This was quite a gamble at the time, as the 35mm world was dominated by rangefinder designs and the rollfilm formats – chiefly 6x6cm – were still very strong thanks to the popularity of the twin lens reflex (TLR). Additionally, no other Japanese camera maker had attempted a 35mm SLR before. The Asahiflex (later known as the Asahiflex I) was launched in May 1952 and, while not especially innovative in its overall design, was one of only a handful of 35mm SLRs available at the time and, more importantly, represented a high-quality camera that was comparatively affordable. The value aspect has been key selling point of Pentax cameras ever since. The Asahiflex I had a 37 mm diameter screwthread mount, a focal plane shutter (using horizontal-run cloth curtains) with a top speed of 1/500 second, and a waist-level finder which was supplemented by a Galilean viewfinder fitted alongside on the camera's top plate.

This was because the TTL finder could be quite dark even with the lens set at its maximum aperture (which was only f3.5 then) and because it also delivered a reversed image. The latter issue was subsequently fixed with the first camera to wear the 'Pentax' name which appeared in 1957. The Asahi Pentax incorporated – via a built-in pentaprism – an eye-level viewfinder plus a Fresnel focusing screen which gave a uniformly brighter image to better assist with focusing and, of course, framing. It also introduced the 42 mm screwthread lens mount (a.k.a. the 'M42' mount), the rapid-wind film advance lever and the fold-out crank handle for faster film rewinding.

With the Asahi Pentax K (1958) came semi-automatic diaphragm control – so viewfinding could be performed irrespective of the set lens aperture – and a microprism spot rangefinder in the focusing screen. The K also stepped up to a top shutter speed of 1/1000 second and other subsequent refinements including a self-zeroing frame counter (SV, 1962)



The legendary Asahi Pentax Spotmatic was introduced in July 1964, but ironically, it didn't actually have spot metering.

and a self-timer (also introduced on the SV) and provision for fitting an external – but coupled to the shutter speed dial – CdS-type exposure meter (from the 1961 S2 model onward). The stage was set for the next big step forward... built-in TTL exposure metering.

This came, of course, with the legendary Asahi Pentax Spotmatic which was introduced in July 1964 and, ironically, didn't have spot metering, but made full-averaging measurements via two built-in CdS cells located either side of the viewfinder's eyepiece. The original plan – as far back as 1960 – had been to have a spot metering system using a measuring cell positioned on a moving arm, but this arrangement was eventually considered too complex for operation in an SLR camera (although Leica subsequently used it on both its M5 and CL 35mm rangefinder models) and Asahi Optical's engineers were prepared to wait while they devised something more workable. Consequently, the Spotmatic wasn't the first 35mm SLR with TTL metering, but it was the best implemented and subsequently became hugely popular and the first camera to sell more than one million units (actually close to 1.8 million).

The Spotmatic also established the basic formula for the modern-era 35mm SLR and development continued into the early 1970s when the Electro Spotmatic (later simply called the ES) was introduced with an electronically-controlled shutter enabling aperture-priority auto exposure control. By now too, Asahi Optical was offering versions of its Spotmatic cameras which accepted motordrives (operating

THE MILE STONES



Asahiflex (1952)

After beginning operations in 1919 in various fields of optics, Asahi Optical launched its first camera in 1952. It was also Japan's first 35mm SLR.



Asahi Pentax (1957)

The camera that changed the world by defining the design of the 35mm SLR. The basic configuration is still in use today in the D-SLR.



Pentax 6x7 (1969)

Asahi Optical adopted the configuration of a 35mm SLR for its first 6x7cm medium format model.

SPECIAL FEATURE



Pentax Spotmatic F (1973)
The Spotmatic was introduced in 1964 and was the first volume-production 35mm SLR with built-in TTL metering. Shown above is the Spotmatic F which added the convenience of full-aperture metering.



Pentax ES II (1973)
The first ES – short for Electro Spotmatic – was introduced in 1971 and was the first 35mm SLR with an electronically-controlled shutter. The ES II added a number of new features including a self-timer.



Pentax K1000 (1976)
While the rest of the K series models were short-lived, the entry-level K1000 remained in production until 1997. The K series camera introduced the K bayonet lens mount.



Pentax ME (1976)
The Pentax M series was Asahi Optical's response to the Olympus OM-1 & OM-2 (and was the main reason the K series was so short-lived). The ME was not only very compact, but was the first 35mm SLR to use pushbutton controls.

THE MILESTONES



Pentax Auto 110 (1978)
The 110 film format – introduced in 1975 – was primarily intended for point-and-shoot cameras, but Asahi Optical decided to take it up market with a miniature SLR system.



Pentax LX (1980)
Asahi Optical's first pro-level 35mm camera, the LX was the first with a weather-sealed bodyshell. It also had interchangeable viewfinders and an electro-mechanical shutter.



Pentax 645 (1984)
Another example of Asahi Optical's lateral thinking in camera design, the 645 was designed to make medium format photography more accessible to enthusiast-level shooters.



Pentax ME F (1981)
Essentially, Asahi Optical was the first with a workable autofocus 35mm SLR, years ahead of the Nikon F3 AF and Minolta 7000... the ME-F even used a passive body-based AF system when the general thinking was len-based active IR.

Feature story:

RELEASE BUTTON
Easy to find and to press. Even turns off the mercury battery in the meter when you take!

EXPOSURE DIAL
Speeds: Bulb and 1 sec. to 1/1000. ASA window is suitable for all film speeds from 20 ASA to 1600.

FINDER
Through-the-lens type with microprism for fast, bright focusing.

FILM REMINDER DIAL
"Empty", "Panchro" and "Color". With a rapid film rewinding crank. Let Pentax remember.

DEPTH OF FIELD PREVIEW LEVER
Press down and the diaphragm is automatic. Press up for manual — and for instant depth-of-field checks.

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Lightweight and compact. With all controls at your finger tips.

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at up to 3.3 fps), bulk film backs (for 250 exposures) and data imprinting backs. However, it had also reached the end of what could be achieved with the basic screwthread mount in terms of the communication between camera body and lens... a key aspect of any future developments such as programmed exposure control and autofocus.

Initially, a several existing Spotmatic models were converted to the K-bayonet mount – creating the KM, KX and K1000 (all based on the SP II) and the K2 (derived from the ES II) which were launched in 1975. However, the 35mm SLR world was now being taken by storm by Olympus's diminutive OM-1 and OM-2, and Pentax responded with its

ultra-compact M series models which were introduced in 1976. Consequently, with the exception of the all-mechanical K1000 – which went on to be very long-lived, surviving until 1997 – the other K series cameras were discontinued after only about 12 months. With the M series 35mm SLRs Pentax moved into push-button controls, LED viewfinder read-outs and, with the ME F in 1981, autofocus. AF was achieved via special motorised lenses, but significantly, the detection system was body-based and passive (using contrast difference measurements) so, when a manual focus lens was fitted, focusing assist indicators were generated in the viewfinder.

Other early AF SLR attempts used even bulkier lenses with active IR-based distance measure-

◀ Pentax Spotmatic Ad May 1970

Now Pentax has a big brother

Meet the Ideal Format 6 x 7 — the New Professional size.

This new Pentax cost \$2,000,000 to develop and it was worth every cent! The new 6 x 7 picture format is perfect for the professional. It offers the ultimate in versatility, easy handling and impeccable picture quality. With all the performance features of the Pentax 35mm SLR camera (and only slightly larger in size), it is available with a full range of Takumar lenses and 6 x 7 Pentax accessories. Handle it soon at your Pentax dealer. Without doubt it's the most advanced camera of the colour age. Check these features!

Type: 6 x 7 picture format — single-lens reflex.
 Film: 10 exposures on 120 roll film, 21 exposures, 220 roll film.
 Standard lens: Super-Takumar 6 x 7 105mm 1/2.4. Fully auto diaphragm.

Shutter: Double-curtain focal-plane, Electronically 1-1/1000 sec.
 Power Source: 6 V silver battery.
 Viewfinders: Detachable pentaprism, cross-microprism focussing screen.
 Film transport: Rapid wind lever. Self-cocking shutter.
 Reflex mirror: Swing-back-type. Instant return mirror.
 Flash synchronization: FP and X terminals Electronic flash 1/30-1 sec.
 Dimensions: 184mm width x 149mm high x 156mm deep.
 Exposure meter: Accepts TTL pentaprism housing. Coupled with shutter speeds.
 Weight: Body 1,280 g. Pentaprism housing 460 g.
 Accessories: Complete range available as with 35mm Pentax.
 Supplementary lenses: Complete range from 35mm Fish-Eye to Takumar 1000mm Super-Telephoto.

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▲ Pentax 6x7 Ad 1970

ment and Nikon's F3AF required a very bulky AF head to replace the standard viewfinder module. Plus the ME F was around five years ahead of the Minolta 7000 – now accepted as the first 35mm SLR with a properly integrated AF system – but Asahi Optical failed to capitalise on its lead and its next two generations of 35mm SLR – A series in 1983 and P series in 1985 – were both manual focus systems.

The A series introduced programmed exposure control, a built-in autowinder and a DX-code auto film speed setting. Fully integrated autofocus arrived in 1987 with the Pentax SFX which was the world's first 35mm SLR with a built-in pop-up flash giving TTL exposure control and also featured a fully motorised film transport, an external LCD display, auto exposure bracketing and a control layout comprising entirely of buttons and knobs. This was very much the modern interpretation of the

35mm SLR in the late 1980s, but it was bulky and heavy so, aided by the progressive miniaturisation of electronic components, Asahi Optical embarked on a weight loss program with the following Pentax Z series (1991) and MZ series (1995) of 35mm AF SLRs. As always, value for money was a big selling point, but somehow Asahi Optical never quite recreated the glory days of the Pentax Spotmatic. However, it was still pioneering in other areas, notably with the world's first zoom compact – the Zoom70 in 1986 – and the development of subcompact models such as the Espio 115 in 1993. And it was never far off the lead in other developments such as the Advanced Photo System (the original APS), a still video system (which, like most of them, never made it into volume production) and, in 1997, digital capture.

The first Pentax-badged digital camera was the EI-C90 which was packaged with an attachable LCD monitor module. The first Pentax production D-SLR was the *ist D announced in February 2003 (there was an earlier prototype from 2000 called the MZ-D) and largely based on the 35mm *ist which had been launched just a week or two before. Pentax was clearly hedging its bets here, but the *ist turned out to be the company's last 35mm SLR while the D-SLR line is still going in 2020 with both 'APS-C' and full-35mm models. Incidentally, in 2002, Asahi Optical officially changed the company name to Pentax Corporation and, by now, it was involved in quite a number of related business areas, including medical equipment such as endoscopes, photo-surveying



Our bulging archive of Pentax press photos provides a dramatic indication of just how prolific the camera maker was, particularly in the latter half of the 20th century.



Pentax Q (2011)

Pentax's interpretation of the mirrorless camera design brief was the ultra-compact Q system... essentially a digital-era Auto 110. It was another fine example of Pentax's lateral thinking, but ultimately the mirrorless camera market has moved towards bigger sensors.

THE MILESTONES



Pentax Zoom 70 (1986)

Another 'big bang' in camera design. The world's first 35mm zoom compact was a brick, but it created the template for the category.



Pentax EI-C90 (1996)

Asahi Optical was involved in digital cameras right from the beginning, and the EI-C90 was already exploring the idea of a camera-based monitor screen for image replay.



Pentax *ist D (2003)

Pentax's first D-SLR (the company name changed to Pentax Corporation in 2002) was also the most compact available when it launched in 2003. Shown here is the later *ist DS which was introduced in late 2004.



Pentax 645D (2010)

The first truly affordable digital medium format camera, the Pentax 645D was also the first to be accessible to non-pro photographers.

SPECIAL FEATURE



Pentax A3 (1984)



Pentax P3 (1985)



Pentax EI-2000 (2000)



Pentax PV-EM100E



Pentax SFXn (1989)



Pentax Z-1P (1995)



Pentax Z-10 (1991)



Pentax MZ-60 (2002)

equipment, industrial technologies such as lasers, as well as spectacles lenses (pioneering both distortion-free aspherical lenses and super-thin high-refraction plastic lenses), binoculars and telescopes.

Thinking Bigger... And Smaller

Among the 'big five', Pentax was the most adventurous when it came to branching into film for-

mats other than 35mm (although Minolta did have a shot at both 126 and 110 cameras). Pentax was the only one of the group to make medium format rollfilm cameras and, at the other end of the size scale, 110 models. In each format, Asahi Optical was again hugely innovative, starting with the Pentax 6x7 which was launched in 1969. Instead of using the more common box-form configuration, the 6x7 looked like a 35mm SLR on steroids. This meant more balanced handling and, consequently, the 6x7 was able to be used in situations where a big box-form camera was less convenient – such as for aerial photography – particularly when the optional handgrip was fitted.

The Pentax 6x7 has interchangeable viewfinders (including a metering prism), a focal plane shutter with a top speed of 1/1000 second and a lever-type film advance which provided the efficiency of single-stroke operation. Although the 6x7 is a fully manual camera, it requires a battery for operation.

Subsequent models were the 67 (1989) which introduced a range of ergonomic improvements, and the 67 II (1998) with a built-in handgrip and LCD info panel.

Particularly noteworthy is the extensive system of lenses which accompanied the Pentax 6x7cm cameras which included leaf-shutter types and was continually upgraded throughout the life of the system.

Pentax's first 6x4.5cm camera was launched in 1984 and was even more revolutionary, bringing all the features of a contemporary 35mm SLR to a 6x4.5cm format model, including TTL centre-weighted metering, a full set of 'PASM' exposure control modes, a built-in autowinder and an LCD info display. Again, the Pentax 645 was backed by an extensive system of lenses which are still mostly available for use on the digital 645D and 645Z models. The 645 evolved into the 645N (1997) which introduced autofocus and multi-zone metering – both firsts for medium format SLRs – and increased the autowinder's speed from 1.5 fps to 2.0 fps. The 645N II followed in 2001 and added several

“ Among the 'big five' Japanese camera-makers, Pentax was the most adventurous when it came to branching into film formats other than 35mm.

The Pentax ES II

Announcing the world's first fully-automatic Electronic Shutter 35mm SLR made even better...

Only the brand new ES II could improve on the original ES – the first fine camera ever to offer automatic, electronically determined precision shutter speeds. And the improvements are really new!

- An expanded electronic shutter-speed range now indicated in the viewfinder – from 1/1000 to a full 8 seconds.
- A self-timer interrupt function to help cope with those last-minute changes.
- A unique viewfinder blind device for even more precise exposure measurement.

And of course the new Pentax ES II has been designed for optimal use with all the revolutionary SMC Takumar lenses. These lenses are more sensitive than conventional lenses. So you're guaranteed brighter colors, sharper details and the practical elimination of ruinous ghosts and flare.

See the brand new Pentax ES II at your dealer's soon. It's the one new camera that's really new!



The world's best selling fine camera



PENTAX 100 YEARS

◀ Pentax K-r colours options

Like everybody before the smartphone killed the market stone dead, Pentax was very active with digital compact cameras. The Optio line of compacts ended up comprising more than 90 models spanning from 2000 (with the appropriately numbered EI-2000) to around 2015, and including superzoom cameras such as the Optio X-5 (2012) and XG-1 (2014).

To date, there have been 35 D-SLR models ranging from the *ist D – at the time of its launch in 2003 the most compact and lightest model on the market – to the full 35mm K-1 II which was introduced in 2018. And Pentax has had several goes at mirrorless camera systems. The pocket-sized Q was virtually a digital re-interpretation of the Auto 110 and was introduced in 2011 when the general thinking was that mirrorless was going to be all about going as small as possible to create what were essentially compact cameras with interchangeable lenses (the same thought process behind the 1 Nikon system). The original Q had a 1/2.3-inch (7.7 mm) CMOS sensor with a total resolution of 12.75 megapixels. It essentially used all the K-r D-SLR's componentry on the inside so it was pretty well featured and was initially accompanied by five lenses,

new features including a mirror lock-up. The 40 megapixels digital 645D was the most affordable digital medium format camera on the market when it was released in 2010 and was also the most workable for non-professional users, having greater automation and better specs than anything else on the market at the time. The 645Z – now with 51.4 MP on tap – remains current and sells for the same sort of money as a high-end full-35mm D-SLR body so it remains a serious proposition for anybody who wants the benefits the larger 33x44mm sensor size.

Even with the essentially point-and-shoot 110 format – introduced in 1972 by Kodak – Asahi Optical was thinking outside the square which resulted in the remarkable Pentax Auto 110. Launched in 1978, it was a miniature SLR accompanied by a set of three tiny interchangeable lenses (two more were added to the system later), an accessory autowinder and two dedicated flash units. It was a brilliant piece of engineering – at a time when such miniaturisation was still a big challenge – but was ultimately let down by the film technology of the day.

The tiny 13x17 mm frame simply didn't deliver sufficient quality for anybody who liked the idea of a serious 110 camera rather than just a snapshotter.

Digital Ups And Downs

Pentax's progress through the digital camera era so far has been, to say the least, interesting. Right now, it's arguably the most conservative of the mainstream brands with most of its current activities concentrated on D-SLRs (perhaps not so surprising given the heritage), but it's been much more progressive in the recent past.



Pentax DigiBino DB-100 (2002)



Pentax MX-IX APS SLR prototype (2006)



Pentax K-5 (2010)



Pentax K10D (2006)



Pentax K100D (2006)



Pentax K20D (2008)



Pentax K-r (2010)



Pentax K-50 (2013)

SPECIAL FEATURE



Pentax Optio RS1000 (2010)



Pentax Optio MX4 (2004)



Pentax Optio X (2004)



Pentax X-5 (2012)



Pentax K-S1 (2014)



Pentax Q10 (2012)



Pentax Q-S1 (2014)



Pentax 645Z (2014)



The Pentax Auto 110 was a brilliant piece of engineering – at a time when such a degree of miniaturisation was still a big challenge.

This was a deliberate move to accommodate the millions of K-mount lens owners around the world, but obviously it compromised the camera in terms of its size and also some capabilities that would have been derived from having a shorter flange-back distance. Additionally, the K-01's boxy styling – by none other than Australian designer Marc Newson – wasn't to everybody's taste either so this camera had a much shorter lifespan than it deserved (being discontinued by February 2013). As it is, the current custodian of the Pentax brand, Ricoh Imaging, still feels a degree of responsibility

for the K-bayonet mount given the vast reservoir of lenses still in circulation (partly because it was promoted as a universal fitting for decades during the 35mm era) which is perhaps one reason why there hasn't been a Pentax full-35mm mirrorless system yet.

As noted in the previous paragraph, Pentax has a presence in the digital medium format camera market with its 50 MP 645Z which, although introduced back in 2014, remains competitive, especially in terms of affordability. Its closest rival, Fujifilm's mirrorless GFX 50R, is more compact, but actually uses the same Sony-made sensor.

Going Pro

During the 1970s, the Pentax brand built up a strong following among professional photographers with the 6x7 which, thanks to its configuration, made the big 6x7cm format more useable in a variety of applications. With the growing popularity of the 35mm format among pros, it was logical that Asahi Optical would look at competing in this sector too. By the late '70s both Canon and Nikon were already well-established here with Minolta, Olympus, Contax, Leica and Olympus all nibbling at the edges.

including a 5-15mm f2.8-4.5 zoom (equivalent to 27.5-83.0mm). There were subsequently another three Q series bodies (Q7, Q10 and Q-S1), but the mirrorless market was heading towards bigger sensors and, as with 110 film, there were limits to what could be achieved (especially in terms of high ISO performance) with such a small imager... although, again, subsequent advances in technology have subsequently addressed these issues.

Pentax again sought to think more creatively with its K-01, introduced in 2012 and the first mirrorless digital camera with the K-bayonet lens mount.

► Pentax Q-S1 in 40 colours



Ironically, Olympus was having the most success even though it was specifically promoting the OM-1 and OM-2 to working photographers... they just liked the idea of a more compact system and the Zuiko lenses were more than up to the job.

Was there room for one more? Asahi Optical obviously thought so and the pro-grade Pentax LX was launched in 1980 (the same year as Nikon's F3). It had a comparatively compact, all-metal bodyshell with weather sealing – something not then offered by either Canon or Nikon – interchangeable viewfinders and a novel electro-mechanical shutter designed to provide some redundancy if the battery failed. Consequently, the speeds from 1/75 – the flash sync speed – up to 1/2000 second were mechanically controlled and those from 1/60 second down to two minutes were electronically timed. The horizontal-run shutter curtains were made of titanium for extra durability. The metering – which was body-based and so independent of the finders – used off-the-film (OTF) measurements, similar to the contemporary Olympus OM-2 (and, of course, the later OM-3 and OM-4 models). The LX also had TTL flash metering for auto exposure control with dedicated flash units; a feature also introduced by Nikon on the F3, but available on any Canon F-1 variant.

Of course, the LX was backed by a full system of accessories, including a 5.0 fps motordrive (fast for the time), a data back, a bulk film holder and no fewer than eight finder options (plus 12 focusing screens). Another big plus was Pentax's huge system of K-bayonet lenses which, by the start of the 1980s, spanned 15mm to 2000mm (SMC Pentax 'K' and SMC Pentax-M; the SMC Pentax-A series was launched in 1983). The LX was a steady seller – it remained in production until 2001 – but failed to make much of an impact on the steady march of Canon and Nikon toward dominance of the pro 35mm SLR business. Today, it's arguable that the LX has more of a following as a 'cult camera' and as a collectible Pentax than it did when it was in production.

Pentax tried again a few times with a higher-end 35mm SLR aimed at professionals – the Z-1P in 1994 and the MZ-S in 2001, but both were more successful with enthusiast-level shooters than anything else. In truth, with its strong presence across all the amateur camera sectors, Pentax really had no need for a pro-level 'flagship' model to help drive sales of its lower-end models. Currently, both the 645Z and the K-1 II easily have solid pro-camera credentials, but the vast majority of users would be enthusiast-level or perhaps semi-pro.

What's Next?

In October 2007, Pentax Corporation was acquired by Hoya which was mostly interested in its medical equipment business. Subsequently, the camera operation was sold in mid-2011 to Ricoh which, while also involved in imaging, was primarily a business machines company. Since the acquisition, Ricoh has seemingly gone cold on cameras, not only scaling back the Pentax activities, but also those conducted under its own brand. This has certainly tested the resolve of Pentax fans.

At the Australian celebration of Pentax's 100th anniversary, Kazunobu Saiki – who is the president of Ricoh Imaging China – was upbeat about the future for Pentax without being specific.

"The Pentax brand has a strong history so the future also should be bright," he told *Camera*, adding that Ricoh Imaging was fully committed to delivering more Pentax products in the future. "Pentax heritage is in the reflex camera so we believe there is still a future there and, besides, we want to keep supporting our D-SLR users, many of who have an assortment of K-mount lenses... and we don't want to force change on them. That said, we also believe mirrorless has a future, and we continually evaluating what part we'll play in this."

Saiki-san also stated that Ricoh Imaging is committed to staying in the digital medium format market, although no new cameras are on the immediate horizon. "After Fujifilm's arrival, the medium format camera market has been growing so we will be staying in this business. We'll also be staying in higher-end D-SLRs with Pentax-branded cameras while the Ricoh brand will be used on high-end compacts as you've seen with the GR III."

The implication is that there will be a full-35mm format mirrorless camera down the track – badged Pentax. Kazunobu Saiki declined to be any more specific, but it's an assurance that the brand remains alive and well.

To some extent, there's no great pressure on Ricoh Imaging to deliver a mirrorless camera providing it's satisfying loyal Pentax users with updated D-SLRs and new lenses. Given the continued strength of the brand – despite fairly lean times of late – it can probably take a little more time, but it now is the only major camera not participating in a category that will, sooner or later, completely overtake D-SLRs in the ILC market (and probably sooner rather than later).

The history of Pentax is truly glorious – arguably as influential as that of Leica and arguably consistently more so than any of the other Japanese brands – so it would be a great tragedy if there weren't many more chapters to come. 📷



Pentax K-01 (2012)



Pentax K-3 (2013)



Pentax XG-1 (2014)



Pentax Optio I-10 (2010)



Pentax MX-1 (2013)



Pentax Espio Mini (1994)



Pentax P50 (1986)



Pentax Sport 35 Motor (1985)



NIGHT LIGHT

OLYMPUS OM-D E-M1 MARK III

All photographs by
Denis Smith using the
Olympus OM-D E-M1 Mark III,
copyright 2020.

Photography has been credited with many positive aspects, but helping to save a life is undoubtedly one of the rarer attributes. Yet for Denis Smith, discovering photography was a key element in turning his life around, following the collapse of his business. He candidly admits he was heading for a mental breakdown and probably also a marriage breakdown.

"In 2009, I was living in New Zealand, working in a very high-pressure sales role with a large

corporate, and living the 'high life'. In the aftermath of the GFC, my mental health suffered severely. Alcohol, drugs and debt were weighing me down. Eventually it overwhelmed me. My wife, being from Australia, scooped me up and brought me to her home to heal. In the Barossa Valley I discovered the landscape and picked up a camera for the first time in my life. South Australia is so beautiful. It seemed like a sensible hobby if I was going to be around such beauty."

Photography didn't stay a hobby for Denis for very long as quickly became hooked and

then discovered the technique that has since become his visual signature... and his life.

"After mucking around with photography for a few months, I started sharing the images on Flickr. While there, I discovered the very small community interested in light painting. I gravitated to it so quickly!

Once I had started working again, it allowed me to head out at night and play. It completely blew me away and, being in its infancy as a form, I found the experimentation enlightening, rewarding and healing."

Denis has since coined the term 'Liquid Light' for his compelling images which combine fantastical light-painted shapes with carefully selected locations. However, he says; while some of his light painting images are planned ahead, others just happen spontaneously.

"In the early days the planning was intense. I used to shoot mainly around the full moon, to achieve the 'daylight' look that gripped me. I was also attracted to the Flinders Ranges initially, so the travel combined with the weather and moon always took a bit of planning. As time has moved on, I quite like the spontaneity of taking what I get. The challenge of expressing myself in an environment that is foreign."

Light painting is obviously mostly done at night to enable long-enough exposure times, but Denis is always looking for new opportunities to expand the possibilities of the technique.

"I would definitely say I am a night owl. But there is the odd occasion where the morning lends itself to some fun. As part of my Liquid Light series, the morning light near my home can be stunning! Being so new to photography I am still like a sponge. I collect photography books and tend towards landscape work as this fits with my love of taking light painting images outdoors. But I really gather most of my 'influence' from outside photography and love seeing how other genres look at light.



I have never looked back. The size and weight are the immediate benefits for me. Travelling with this gear is incredible.



I recently saw the Goya Black series in Madrid and was blown away with play of dark and light, that inspired a whole new series for me."

A New Word

Denis Smith remembers being shown an Olympus OM-D mirrorless camera for the first time about six years ago and his first reaction was to laugh. "I was on the 'bigger is better' bandwagon, but I still took it out for a play. I remember being blown away by how small, light and powerful it was. Of course, as a light painter the Live Composite feature was mind-bending, it opened up a whole new world to me. I could create works in levels of light that would have otherwise been completely out of the question."

It didn't take him very long to appreciate the advantages of the Olympus OM-D system and he says he was an "early convert" to the benefits of the mirrorless configuration and the Micro Four Thirds format.

"I have never looked back. The size and weight are the immediate benefits for me. I travel a lot – both in the outback and internationally – travelling with this gear is incredible. Importantly too, Olympus is constantly improving the equipment, listening to the market and reacting quickly. The new OM-D EM-1 Mark III is a perfect example. It's a camera that packs many of the features of the E-M1X into it.

Some of the tech is truly amazing. The E-M1 Mark III has a feature that automatically focuses and locks onto stars! For me, shooting a lot of astro, I found this incredible! This is normally a headache for night photographers... so I think this is a super powerful camera in a tiny body." Olympus has been steadily increasing the video capabilities of its OM-D cameras which are something Denis Smith also appreciates. "I shoot a huge amount of video with my Olympus cameras. I have a video production company where we use high-end cinema cameras for the majority of our shooting. There are times, though, when we want to get the camera moving, and we regularly use the Olympus E-M1X in these situations because of its outrageous image stabilisation. The footage we take from the camera seamlessly slots into the final edit; you would not even know. "I recently shot an entire documentary in Nepal, hand-held using Olympus bodies. We were in and out of cabs, cars and tuk-tuks. I was even up over the Himalaya on a paraglider and the cameras all performed faultlessly.

The smooth footage was sublime, and the fluidity of the stabilised images is second to none." As a photographer who shoots a lot at night, it's probably not surprising that the fast prime lenses in the M.Zuiko Digital system are his favourites.

"The 17mm, 25mm and 45mm primes are all so sharp, so fast to focus and lightweight for genuine f1.2 speed lenses. The M.Zuiko Digital 45mm f1.2 Pro lens is the most beautiful portrait lens I have ever used. Using these f1.2 lenses combined with the extremely useable outputs at high ISO settings results in some stunning low-light images."

Denis conceded that he's "a bit of an animal on my gear" so the durability of the OM-D equipment is another big plus for him, especially as he can often be shooting in challenging conditions. But first he actually has to get on location, and he again emphasises that not having to break his back when carrying his Olympus kit has wider benefits beyond merely the physical.

"I am free to create," he states simply. 🐾

To see more of Denis Smith's photography visit www.denissmith.com.au

For more information about the Olympus OM-D E-M1 Mark III, visit www.olympus.com.au

PANASONIC

LUMIX DC-S1H

REPORT BY PAUL BURROWS



MOVIE MOGUL

Panasonic resets the standard for a hybrid mirrorless camera and while the S1H is essentially targeting higher-end video-makers, it's a pretty capable stills camera too.

Video is, of course, the S1H's big party trick, but there are good reasons why we now have so-called hybrid cameras, especially in the mirrorless category. These days professional photographers – especially in the areas of sports and news gathering – are being called up to take both stills and

video clips. And there's still a demand for high-quality stills on video productions even if we are edging ever closer to the convergence which means a video frame grab will deliver a still image with enough resolution for most applications. As a case in point, the S1H has Panasonic's '6K Photo' high-speed capture mode which delivers a

5184x3456 pixels still from a 30 fps burst, but it also records full-frame 6K video with 10-bit colour which is going to give much the same amount of info in a still grab too. The full run-down of the S1H's immense video capabilities is over in the Making Movies panel, so this main text will concentrate on what it can do as a stills camera.

However, an important point to be made at the outset is that you are paying a lot extra for all those video capabilities so, if you don't need them or you're only going to dabble in video, then the Lumix S1 is going to be a much better buy... the same resolution and stills photography feature set, but costing a substantial \$2400 less – which is a lot of money. And, it has to be said, the S1 actually performs pretty well as a mid-range video camera if you're happy with 4K UHD res and 8-bit colour (although it can be upgraded to 10-bit V-Log for a fee). However, the S1H is high-end enough as a video camera to have cinematography applications and it takes over from the Lumix G5HS as king of the hybrid mirrorless cameras by virtue of the bigger sensor (film-makers as well as photographers love the inherently shallower depth-of-field compared

mirrorless camera to meet the production requirements set by Netflix for shows that will stream on that platform.

To set the scene more generally, the S1H is Panasonic's third L-mount full-35mm mirrorless camera body, completing the 'set' of hybrid (S1), photo (S1R) and video, as far as the prime target audiences are concerned. Yes, the S1H definitely qualifies as a hybrid too, but the emphasis is much more on video. This even results in a slightly restyled bodysell compared to the other two models, primarily because it has a built-in fan and cooling vents astern of the sensor to help dissipate temperature during long video clips (and also allow for longer recording durations).

If you think the S1 and S1R look a bit on the chunky side (and they are), the S1H possesses even more bulk because it has a bigger handgrip to enhance its suitability for 'run and gun' video shooting. Like its siblings, the S1H has dual memory card slots, but they're both for the SD format which, despite the arrival of faster devices such as XQD and CFexpress, remains the standard in the video industry and is still by far the most popular with photographers at any level. And dual slots in the same format still makes more sense in terms of functionality.

MAKING GAINS

The S1H's sensor is much the same 25.28 megapixels CMOS device that is used in the S1, but there are some key differences and, again, they're essentially dictated by the requirements of video-makers. The first is the addition of an optical low-pass filter to correct for moiré patterns and, at this pixel density, it's a wise move. Moiré can be irritating in stills, but it's downright disturbing in video footage where it can create a rippling effect – say, in fabrics – that's impossible to ignore.

The second revision is what Panasonic calls 'Dual Native ISO' technology which is a way of optimising the image quality – particularly at the higher ISO settings – via dual gain read-out modes from the sensor. Gain is just another word for amplification which is essentially what creates

THE INCREASE IN RESOLUTION OVER THE STANDARD 4K PHOTO MODES MAKES IT A SERIOUSLY USEFUL FEATURE... 18 MEGAPIXELS A POP AT 30 FPS.

noise at the higher ISO settings, so dual-gain sensors have two base or native ISOs. For the S1H these are at ISO 100 and 640 in the standard colour mode (they vary at other colour settings such as V-Log); so the low ISO circuit optimises dynamic range and the high ISO circuit optimises sensitivity (i.e. the signal level) which results in some reduction of the dynamic range (at the highlights end), but reduced noise in the shadows.

Panasonic has been using 'Dual Native ISO' technology in its pro-level VariCam video cameras and the key benefit is a significant improvement in high ISO performance as the noise profile will be the same at ISO 640 as it is at ISO 100... but perhaps more importantly, it will be the same at ISO 2560 as it is at ISO 400. In the 'HLG Photo' mode – which captures an extended dynamic range using the Hybrid Log Gamma (HLG) colour profile – the native ISOs are 400 and 2000 so it's easy to see how the high-ISO performance will be even better again. The noise profile at ISO 4000 will be the same as that at ISO 800 and so on.

HLG Photo images are captured as .HSP files (HDR Still Photo) with 10-bit RGB colour and will reproduce on an HLG-compliant 4K or 8K display, giving much better detailing in both the highlights and shadows. Consequently, HLG delivers a more natural-looking extended dynamic range (there's the potential for up to 17+ stops) than the traditional HDR processing which is actually compressing the contrast range.

The S1H allows for either full-res or 4K HLG capture in each of the four main aspect ratios that are also available for RAWs and JPEGs. Additionally, JPEGs can be captured in three image sizes with 6000x4000 pixels being the largest at the standard 3:2 aspect ratio. There's also single image size settings in the 65:24 and 2:1 aspect ratios.

QUALITY OR QUANTITY

The sensor is mated with the latest version of Panasonic's 'Venus Engine' processor which enables continuous shooting at up to 9.0 fps with the autofocus locked to the first frame or up to 6.0 fps with frame-by-frame adjustment. The quoted burst lengths extend to 999+ for best-quality JPEGs and around 60 RAW or RAW+JPEG files. As with the rest of the fleet, the S1H has in-body image stabilisation via sensor shifting which operates over five axes and gives up to six stops of correction for camera shake. When working in conjunction with an optically-stabilised lens – which Panasonic calls 'Dual IS 2' – the correction range extends a little further to 6.5 stops.



1. Bodysell is magnesium alloy with full weather sealing and insulation for operation in subzero temperatures.

2. Rear panel controls include a joystick for focus point selector and a four-way navigator/control wheel.

3. LCD monitor has a three-way tilting arrangement similar to Fujifilm's higher-end mirrorless cameras.

The system uses a combination of a gyro-sensor, the image sensor and an accelerometer to more accurately detect camera movements with a particular improvement in the area of low-frequency displacements. Sensor shifting also delivers a multi-shot 'High Resolution' capture mode which captures eight frames – with pixel shifting in between – in quick succession and then merges them in-camera. The eight shifts increase the resolution to 96 megapixels (at 3:2) and also record full RGBG colour at each pixel point so the overall image quality is significantly enhanced. High-res capture is also available with the 4:3, 16:9 and 1:1 aspect ratios. The camera needs to be mounted on a tripod and there's a shutter delay function (for up to 30 seconds) to allow any physical vibrations to die away for optimum stability, but motion blur processing is available to counter any slight subject movements. You can also opt to record a normal shot separately (it's actually the first frame in the sequence) along with the merged high-res RAW file. However, there isn't a JPEG capture option (unlike on the Olympus OM-D E-M1X), but the high-res RAW file can be converted to a JPEG in-camera.

We mentioned the 6K Photo shooting mode at the start of this review and the increase in resolution over the standard 4K Photo modes makes it a seriously useful feature... 18 megapixels a pop at 30 fps. Mind you, if you only need 4K's 8.3 megapixels – which will actually be suitable for a lot of

applications – you can have 60 fps shooting. As before, the choice of modes is Pre-Burst, Burst and Burst Start/Stop and these operate over various durations. Pre-Burst starts capturing frames when the shutter release is at the half-way position so it's handy for anticipating the action. Obviously you're going to end up with a lot of frames so searching is made easier via a slider-type control on

the touch screen or, alternatively, a 'slide view' inset browser which is again navigated by touch. Bulk saving is available and batch processing for automatic noise reduction or correction of any rolling shutter distortion (since the camera's sensor shutter has to be used at these speeds).

The Lumix S1H has pretty much the same selection of in-camera JPEG processing functions as its siblings, including 14 'Photo Style' presets (which is where you'll find the video-orientated profiles too), up to ten user-defined 'My Photo Style' presets, 22 'Filter Settings' effects (all adjustable in some way), in-camera lens corrections for vignetting and diffraction, long exposure noise reduction, 'i.Dynamic Range' processing, an intervalometer (for sequences of up to 9999 frames) and a multiple exposure facility (up to four shots combined with automatic brightness adjustment). Auto bracketing modes are available for exposure, aperture, focus, white balance and colour temperature settings. Exposure bracketing sequences can be set to three, five or seven frames, while aperture bracketing is performed over

three or five frames or 'All' which captures a shot at every one of the attached lens's full-stop settings. The focus bracketing is adjustable for the amount of shift (from one to ten steps) over sequences of up to 999 frames.

PET SUBJECTS

Panasonic is the last of the major mirrorless camera brands to stick with contrast-detection autofocus, but its 'Depth From Defocus' (DFD) system still works pretty well, particularly with the Lumix S upgrades which include sampling at 480 fps. Sensitivity extends down to -6.0 EV when shooting in low-light situations (albeit with an f1.4 speed lens) and down to -3.0 EV with low-contrast subjects.

Additionally, Panasonic has adopted AI-based 'deep learning' to drive intelligent subject recognition and tracking which is, subsequently, much more reliable than the conventional methodology. The S1H has subject modes for Face, Eye, Body or Animal Detect which is essentially designed for pets like cats and dogs, but will work when shooting wildlife too.



1. A bigger handgrip and the incorporation of a cooling fan make the S1H slightly bigger than its other Lumix S siblings. It still handles

very comfortably though.

2. Top panel info screen is larger than those on the other two Lumix S cameras and has a white-

on-black display. It switches to video-centric read-outs when the S1H is in movie mode.

3. Dedicated function buttons for white balance,

ISO and exposure compensation are handily located just behind the shutter release.

4. Main mode dial locks at each position and drive

mode selector is located at its base.

5. Top deck control layout includes a dedicated video start/stop button.



▲ Dual card slots are both for SD format devices and both have UHS Speed Class 3 and UHS-II Speed Class 90 support.

The S1H's AF system has 225 selectable measuring points arranged in a 15x15 grid and there's a host of area modes ranging from Pinpoint to Zone, the latter with the choice of vertical, horizontal, square or oval-shaped clusters of points which can be moved around as desired. Additionally, the size of the Zones can be changed so, in the case of the oval-shaped pattern for example, it can range from just five points up to 97 points.

Alternatively, a custom AF area shape can be created and up to three can be stored for future recall. The full set of 225 points is available for auto point selection, but if you opt to do it manually, there's the choice of 1-Area or 1-Area+ modes, the latter enabling automatic point switching if the subject moves.

Additionally, both the 1-Area modes can be adjusted to one of eight sizes to vary the selectivity.

STRAIGHT OUT-OF-THE-CAMERA JPEGS LOOK BEAUTIFUL WITH GOOD COLOUR ACCURACY AND NICE CONTRAST...

The touch screen allows for a range of focusing-related operations, including point/zone selection, changing the AF area size, moving the point/zone and an 'AF+AE' function which also adjusts the exposure at the selected point/zone. The 'Touch Pad AF' operation can be set to Exact or Offset; the former self-explanatory, the latter moving the AF point/zone via a drag action on the touch screen, rather than simply just tapping.

When not using the subject-based tracking, there's an 'AF Custom Setting' menu for fine-tuning tracking to suit other types of subject movement (i.e. speed, direction, etc.). It offers four scenarios with three adjustable parameters – AF Sensitivity, AF Area Switching Sensitivity and Moving Object Prediction.

Manual focusing is assisted by a magnified image, a simple distance scale or a focus peaking display which has been expanded to offer a choice of ten colours and five levels of intensity. The magnified image is shown either full-screen (up to 20x) or as a picture-in-picture inset panel (up to 6.0x) and it's also available for focus confirmation when using the autofocus. The S1H also has the same 'AF Point Scope' feature as its siblings which brings up a magnified view – again either full screen or PIP – but based on the active focusing point or

zone, rather than the centre point. Finally, AF+MF operation provides a full-time manual override along with whatever assistance method has been preselected.

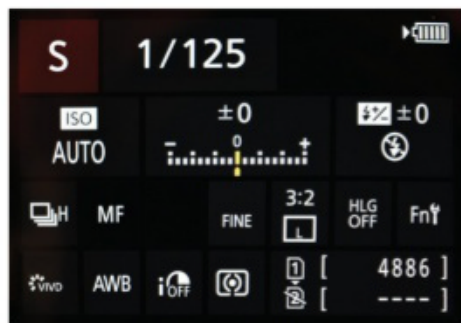
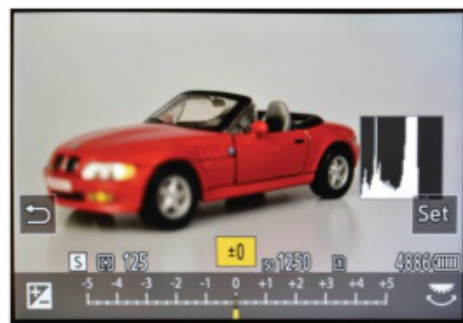
LIGHT AND COLOUR

In terms of exposure control, the S1H has the same capabilities as the rest of the Lumix S clan. The sensor-based metering has 1728 measuring points to drive multi-zone, centre-weighted average, highlight-weighted average and spot measurements. The standard set of 'PASM' exposure control modes are supplemented by a fully-automatic 'Intelligent Auto' mode which performs auto scene detection for portraits, portraits with pets, landscapes, close-ups, night portraits, night scenery, food, sunsets and low-light situations.

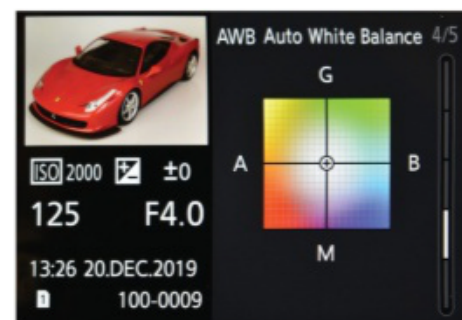
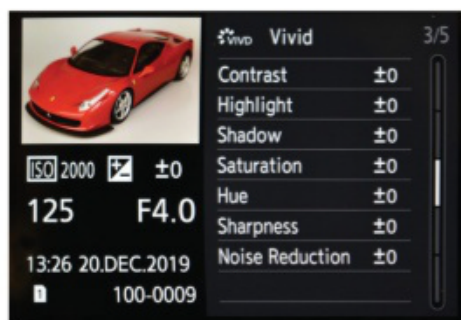
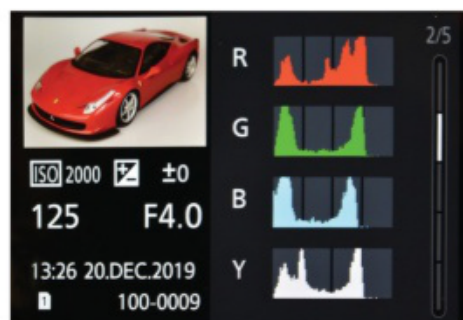
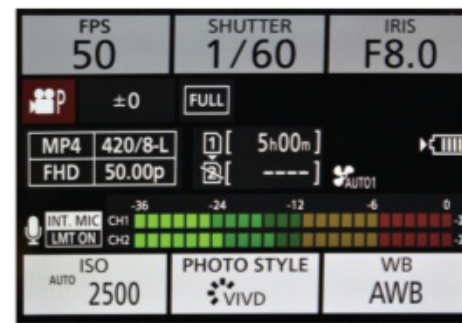
The S1H's focal plane shutter has a speed range of 60-1/8000 second with a bulb timer for up to 30 minutes.



▲ Live view screen can be configured with quite a number of elements, including the novel 'I.S. Status Scope' and a dual-axis level indicator (left), or exposure compensation scale and real-time histogram (right).



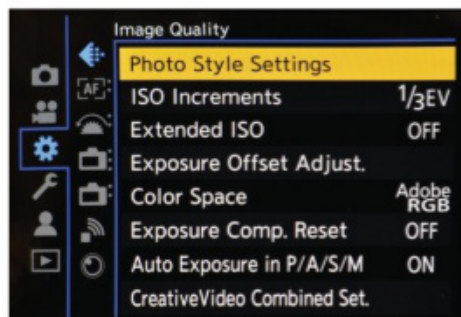
▲ Users of Panasonic's VariCam pro-level video cameras will be familiar with the design and layout of the S1H's video 'Quick Menu' screen (left). Both it and photo version (right) have touch screen operability.



▲▼ The review/replay split screen can be cycled through (from left) additional capture data, a set of RGB and brightness histograms, the 'Photo Style' parameters, the white balance mode with any fine-tuning settings, and the lens details, including the in-camera corrections.



▲ Menu page dedicated to just the audio settings gives a hint of the S1H's extensive video capabilities.



▲ Menu design uses coloured tabs for chapters and pages. Clicking progressively right delves into the sub-menus and settings.



▲ The choice of video resolutions, frame rates, compression and colour subsampling options is so extensive you can create your own list of only the settings you want to use.



The sensor-based shutter has a speed range of 60-1/8000 second and, of course, has the advantage of silent and vibration-free operation. However, to help eliminate vibrations when using the FP shutter there's a delay timer which can be set to one, two, four or eight seconds. The third shutter configuration is the hybrid 'Electronic First Curtain' which uses both shutters, starting the exposure electronically and finishing it with the FP shutter's second curtain, but the top speed is reduced to 1/2000 second. This also reduces both noise and vibration compared to when only using the FP shutter, but permits the use of electronic flash. Panasonic says the FP shutter is rated to 400,000 shutter cycles. Flash sync is at all speeds to 1/320 second and the S1H retains a PC flash terminal.

The white balance correction options comprise three auto settings called AWB, AWBc and AWBw.

The latter two either, respectively, reduce or maintain the warmer tones when shooting under incandescent lighting. The main lighting types are covered by a set of five presets, with provisions for creating up to four custom WB measurements and up to four colour temperature settings. The settable colour temperature range is 2000 to 10,000 degrees Kelvin. Fine-tuning is available for all settings and, as just noted, there's auto bracketing for both colour balance and colour temperature.

IN THE HAND

The Lumix S cameras are hefty beasts with similar dimensions to quite a number of full-35mm format D-SLRs. As noted earlier, the S1H is actually slightly bigger than the other two models thanks mainly to a more substantial handgrip which is extremely comfortable to hold. The control layout is also very D-SLR-like with a large, top panel info display (bigger than on the S1/S1R), and a main mode dial

which has the drive mode selector located at its base. There are front and rear input wheels plus an additional control dial on the rear which also serves as a four-way navigator control. It's supplemented by the now-mandatory joystick-type controller for faster selection of focus points, but which can also be used for various navigational duties.

There's a bunch of function buttons – including a handy set just behind the shutter release for white balance, ISO and exposure compensation – but as per any Lumix mirrorless camera, there's huge scope for customisation. Selected buttons are backlit along with the top panel info display, and the S1H has a dedicated video start/stop button finished in red to differentiate it from the shutter release. There are also front and rear tally lights. Three custom camera set-ups can be assigned to the C1, C2 and C3 positions on the main mode dial. A 'Night Mode' setting for both the EVF and the monitor dims the displays by

essentially applying a red filter over everything so your night vision isn't compromised.

The monitor-based 'Quick Menu' screen is extensively customisable and, of course, there's a customisable 'My Menu' plus, unique to the S1H, a 'My List' menu for downsizing the very long list of video resolutions, frame rates, compression and colour subsampling options to just what you want to use. Additionally, both the viewfinder and monitor displays are near-endlessly configurable, including a dual-axis level gauge, real-time histogram, grid guide, highlight warning, zebra patterns and a novel little feature called the 'I.S. Status Scope'. This displays two concentric circles in the middle of the screen around which a green dot jumps around, indicating just how much the camera is deviating from the lens's optical axis. It's a bit of an eye-opener to see how much the camera is still bobbing around even when you think that you're holding it rock-steady.



The S1H's extensive video

capabilities warrant an entire article to themselves so we're only going to be touching on the highlights here... and there are plenty of those alone. A key headline is the uncropped 6K recording – which represents a frame resolution of 5952x3968 pixels – in the 3:2 aspect ratio at 24 fps with 10-bit 4:2:0 colour and interframe compression which gives a bit rate of 200 Mbps. Perhaps not surprisingly, this uses the more efficient H.265/HEVC codec to avoid monstrous file sizes. At 5.9K – 5888x3312 pixels at 16:9, using the full sensor width – the additional frame rates of 25 fps and 30 fps are available, but it's still with 10-bit 4:2:0 colour and LongGOP compression (using H.265 codec again). However, step into the 4K DCI and 4K UHD resolutions and there's a myriad of frame rates,

compression options, bit rates and colour profiles to suit virtually any professional application right up to cinematography; headed by 10-bit 4:2:2 colour at 30, 25 or 24 fps with ALL-Intra compression, giving a bit rate of 400 Mbps and again using the full sensor width.

As noted in the main text, the S1H now has had the tick of approval for Netflix productions and this set-up is one of the basic requirements along with log recording – V-Log delivers the 14 stops of dynamic range that's also specified – and features such as time-code syncing (via the PC flash terminal and a supplied BNC adapter cable). Additionally, both DCI and UHD recording is possible at 50 or 60 fps with 10-bit 4:2:0 colour when using the Super 35mm format (which is essentially the same as 'APS-C'). An anamorphic mode in 3:2 aspect 6K, 3:2 5.4K and 4:3 4K is also available. The recording times are virtually unlimited with only the in-camera constraints of battery and memory card capacity, but a 10-bit 4:2:2 colour output is available via HDMI when using an external recorder and there's an

optional battery grip – the Lumix S system's DMW-BGS1 – which adds a second battery. Perhaps more importantly, longer recording durations are possible because the S1H has active cooling via a built-in fan which prevents the sensor getting too hot. Incidentally, the HDMI output is the full-size Type A connection so it's a bit more solid and secure than the smaller versions. And simultaneous 10-bit 4:2:2 4K recording internally is possible

A handy feature when shooting V-Log is the availability of an 'LUT View Assist' mode for the monitor so you can preview footage as to how it will look in terms of colour saturation and contrast. There's also an 'HLG View Assist' option, and these built-in LUTs – you can load up to four that are used in VariCams – are another example of how the S1H can be more easily integrated into a pro video production.

In video mode, the S1H switches to video-centric displays – actually similar to those on a pro-level VariCam model – which provides settings such as the shutter angle, iris, frame rate,

timecode and proper multi-coloured audio level meters. The top info panel also switches to a set of video-type read-outs. And still on the subject of video displays, the S1H has a waveform monitor (which can set to one of four sizes), zebra pattern (now adjustable for both base level and range), and a vectorscope (which measures colour information). Having migrated from Panasonic's pro VariCams, the 'Dual Native ISO' sensor technology has greater benefits when shooting video in low light than stills. With V-Log, for example, the base ISO settings are 640 and 4000; so ISO 25,600 is only two-and-a-half stops above the high base, ensuring much lower noise levels than would ordinarily be the case. With HLG shooting, the base ISO settings are 400 and 2500.

Needless to note, we didn't get close to exploring what the S1H is really capable of as a video camera, but suffice to say the image quality in the 'vanilla' 4K UHD res at 25 fps with 10-bit 4:2:2 colour was nothing short of stunning... and that's only just the start of what's potentially possible.

As on the other Lumix S cameras, the monitor screen is adjustable for tilt in both the horizontal and vertical planes (similar to Fujifilm's arrangement on various models), but the resolution is slightly increased to 2.33 megadots. The EVF is a 1.27 cm OLED-type panel with a resolution of 5.76 megadots and a magnification of 0.78x. The refresh rate is 120 fps so there's virtually no lag. Both these main displays have adjustments for brightness, contrast, colour saturation and either red or blue tinting. Both are also adjustable for luminance (or backlighting) with either auto control or manual setting over seven levels.

The review/replay displays include a split screen with a thumbnail and basic capture info on one side and a scrollable set of five additional info panels on the other. These show, sequentially; additional capture data, a set of RGB and brightness histograms, the 'Photo Style' parameters, the white balance mode with any fine-tuning settings, and the lens details, including the in-camera corrections.

The playback functions include thumbnail pages of 12 or 30 images, zooming at up to 16x, a calendar thumbnail display and a slide show with an adjustable display time. The in-camera editing functions include resizing, cropping, image titling, the RAW-to-JPEG conversion and the 4K/6K Photo file processing functions mentioned earlier.

SPEED AND PERFORMANCE

Loaded with a Panasonic 64 GB SDXC UHS-II V90 speed memory card, the S1H captured 105 JPEG/ large/fine frames in 11.333 seconds, giving a shooting speed of 9.26 fps. The camera would have gone on shooting at this speed – presumably up to the quoted burst length of around 1000 frames – and the buffer emptied virtually instantaneously. For the record, the test files averaged around 7.8 MB in size.

While the best phase-difference AF systems are undoubtedly gaining an edge in speed, Panasonic's DFD is still very fast with the S1H's upgrades and the tracking reliability is further improved with the AI-based subject recognition on the job.

The low light performance remains excellent even with moving subjects. Here, again, is another example of the reality that fewer pixels can be a good thing. With just 25-odd megapixels on a full-35mm sensor, the diodes are a decent size, meaning a higher signal-to-noise ratio which Panasonic further exploits with its 'Dual Native ISO' circuitry. Consequently, the high ISO performance – both with stills and video – is exceptional and it's not surprising that there's a potential 14 stops of dynamic range to play with. It's all about how Panasonic balances the amplification and tone curves so noise is minimised across the full sensitivity range. Consequently, even at ISO 25,600 or 51,200, the colour saturation and contrast are still exceptional.

Straight out-of-the-camera JPEGs look beautiful with good colour accuracy and nice contrast... but obviously you can play around with both and more via the 'Photo Style' profiles. And there's the option of 10-bit colour HLG if you're going straight to a 4K display (or even an 8K one) which is truly stunning to behold, particularly in terms of the dynamic range and super-smooth tonal gradations. And, while the effective pixel count may be 'only' 24.2 MP (with an OLPF in the way too), the level of detailing is still excellent with crisp renderings of textures and small patterns... and it's maintained at higher ISOs than would normally be expected. The 'Dual Native ISO' sensor circuitry means that the noise reduction processing is much less heavy-handed at the higher sensitivity settings. The inherently wide dynamic range provides plenty of exposure latitude when shooting RAW files.

While the 'Dual Native ISO' technology essentially has a much greater benefit when shooting video (especially in V-Log or HLG), it makes a difference with stills capture too, especially at the higher ISOs. In this area then, the S1H is a noticeably better performer than the S1.

THE VERDICT

It's big and it's brassy, but it backs it all up with an unmatched firepower as far as shooting video is concerned. No other mirrorless camera comes close and the same pro-level video capabilities in a



ISO 50



ISO 100



ISO 200



ISO 400



ISO 800



ISO 1600



ISO 3200



ISO 6400



ISO 12800



ISO 25600



ISO 51200



ISO 102400

▲ ISO setting test reveals the benefits of Panasonic's 'Dual Native ISO' circuitry which – in the standard colour modes – has base settings at ISO 100 and ISO 640. Consequently, noise levels are comparatively lower across the standard sensitivity range up to ISO 51,200. The extensions are ISO 50, 102,400 and 204,800.



ISO 204800

dedicated camera would cost very much more. Additionally, the Lumix S1H has size, ergonomics and useability on side... big plusses for hand-held video shooting in particular.

On the other side of the coin, for a 24 MP stills camera – albeit a very capable one – the S1H is

definitely on the pricey side which means that if you're only going to dabble in video, the S1 is the better buy. There's certainly plenty going on in the L mount world at the moment – especially in terms of new lenses from all three of the Alliance members – so the appeal of the Lumix S mirrorless

cameras continues to increase, but the three current models are quite specifically targeted even if it looks like the S1 and S1H have quite a bit in common. As purely stills cameras, they certainly do – but they're worlds apart when it comes to video with the S1H being entirely in a

league of its own. The attraction for video-makers is obvious, but if you're a photographer who can see potential in expanding your repertoire into moving pictures – possibly commercially or as part of bigger productions – then the Lumix S1H represents a very solid investment indeed. 📷

VITAL STATISTICS



PANASONIC LUMIX DC-S1H \$5999 body only

Type: Professional-level hybrid digital still/video mirrorless camera with L bayonet lens mount.

Focusing: Automatic 225-point wide-area system using 'Depth From Defocus' (DFD) processing at 480 fps. Manual and automatic switching between one-shot and continuous AF modes, the latter with auto tracking. Four 'AF Custom' settings for fine-tuning subject tracking with three parameters – AF Sensitivity, AF Area Switching Sensitivity and Moving Object Prediction. Automatic subject detection for Face, Eye, Body And Animal. Area modes for Zone (Vertical/Horizontal), Zone (Square), Zone (Oval), 1-Area, 1-Area+Supplementary, Pinpoint or Custom 1-3. Adjustable 1-Area point switching speed. Touchpad AF point/zone selection available via touchscreen monitor. AF assist via magnified image, either full image or picture-in-picture with 'AF-Point Scope Setting' for active point/zone enlargement. Sensitivity range is EV -6.0 - 18 (ISO 100, f1.4). AF assist provided by built-in illuminator. Manual focus assistance via magnification (either full image or picture-in-picture, up to 20x), distance scale and focus peaking displays (Light Blue, Dark Blue, Yellow, Orange, Light Green, Dark Green, Pink, Red, Violet, White; and five levels of intensity).

Metering: 1728-point multi-zone, centre-weighted average, highlight-weighted, spot and TTL flash. Metering range is EV 0 to 18 (ISO 100/f2.0).

Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, metered manual, TTL auto flash and TTL flash.

Shutter: Electronic, vertical travel, metal blades, 60-1/8000 second plus B (up to 30 minutes). Flash sync up to 1/320 second. Alternative sensor shutter has a speed range of 60-1/8000 second plus B (up to 60 seconds). Hybrid 'Electronic First Curtain' shutter has a speed range of 60-1/2000 second plus B (up to 30 minutes). Shutter delay timer (1, 2, 4 or 8 seconds). Exposure compensation up to +/-5.0 EV in 1/3-stop increments.

Viewfinder: 1.27 cm OLED-type EVF with 5.76 megadots resolution. Coverage = 100% vertical/horizontal. Magnification = 0.78x (50mm lens). Display speed switchable between 60 and 120 fps. Eyepiece strength adjustment built-in. Auto/manual switching between EVF and monitor screen. 8.1 cm LCD monitor (RGBW display, 2.33 megadots resolution) with three-way tilt adjustments and touch controls. Night Mode red 'filter' for both EVF and monitor.

Flash: No built-in flash. External flash units connect via hotshoe or PC terminal.

Additional Features: Magnesium alloy body sealed against dust, moisture and sub-zero temperatures; backlit controls, AE/AF lock, auto exposure bracketing (over three, five or seven frames and up to +/-1.0 EV per frame), multi-mode self-timer (2 and 10 second delays, one or three shots), switchable exposure adjust increments (0.3 or 1.0 EV), audible

signals, silent shooting mode, auto power-off, wireless remote triggering, wired remote triggering, 58 custom functions.

DIGITAL SECTION

Sensor: 25.28 million (total) pixels Live MOS with 35.6x23.8 mm imaging area and 3:2 aspect ratio. Optical low-pass filter retained. Sensitivity equivalent to ISO 100-51,200 (extendable to ISO 50 and 204,800).

Focal Length Magnification: None.

Formats/Resolution: Two JPEG compression settings, RAW output (lossless compression) and RAW+JPEG capture. Three resolution settings at 3:2 aspect ratio; 6000x4000, 4272x2848 and 3024x2016 pixels. Three resolution settings at 4:3 aspect ratio; 5328x4000, 3972x2848 and 2688x 2016 pixels. Three resolution settings at 16:9 aspect ratio; 6000x3368, 4272x2400 and 3024x1704 pixels. Three resolution settings at 1:1 aspect ratio; 4000x4000, 2848x2848 and 2016x2016 pixels. One resolution setting at 65:24 aspect ratio; 6000x2208 pixels. One resolution setting at 2:1 aspect ratio; 6000x3000 pixels. Four resolution settings with HLG Photo capture; 5984x4000 (3:2), 5312x3984 (4:3), 5888x3312 (16:9) and 4000x4000 (1:1) pixels. Three resolution settings with 'APS-C' format capture at 3:2 aspect ratio; 3888x2592, 2784x1856 and 1968x1312 pixels (4:3, 16:9 and 1:1 aspect ratios also available). 24-bit RGB colour for JPEGs, 42-bit RGB colour for RAW files, 30-bit RGB colour for HLG files.

Video Recording: MOV format (with Long GOP compression and 10-bit 4:2:0 colour) – 6K at 5952x3968 pixels, 24 fps at 3:2 aspect ratio (H.265/HEVC, maximum bit rate is 200 Mbps). 5.4K at 5376x3584 pixels; 30 and 25 fps at 3:2 aspect ratio (H.265/HEVC, maximum bit rate is 200 Mbps). Full HD at 1920x1080 pixels; 180, 120, 100 and 48 fps at 16:9 aspect ratio (H.265/HEVC, maximum bit rate is 150 Mbps). MOV format (with All-Intra compression and 10-bit 4:2:2 colour) – 4K DCI at 4096x2160 pixels; 30, 25 and 24 fps at 17:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 200 Mbps). 4K UHD at 3840x2160 pixels; 30, 25 and 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 150 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 200 Mbps). MOV format (with Long GOP compression and 10-bit 4:2:2 colour) – 4K DCI at 4096x2160 pixels; 30, 25 and 24 fps at 17:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 150 Mbps). 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 150 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps). MOV format (with Long GOP compression and 8-bit 4:2:0 colour) – 4K DCI at 4096x2160 pixels; 30, 25 and 24 fps at 17:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps). 4K UHD at 3840x2160 pixels; 30,

25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps).

MP4 format (with Long GOP compression and 10-bit 4:2:0 colour) – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (H.265/HEVC, maximum bit rate is 72 Mbps). MP4 format (with Long GOP compression and 8-bit 4:2:0 colour) – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 28 Mbps). AVCHD Progressive format (with Long GOP compression and 8-bit 4:2:0 colour) – Full HD at 1920x1080 pixels; 60, 50 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 28 Mbps). Super 35 ('APS-C') formats available in 4K DCI, 4K UHD and Full HD plus Anamorphic 4K recording.

Built-in stereo microphones with adjustable sound levels, adjustable selectivity, level limiter and wind noise filter. Stereo audio input and output. Higher quality LPCM sound recorded in MOV format.

Video Features: Centre marker, zebra patterns (adjustable for base level and range), waveform display (four size settings), vectorscope display, luminance spot meter, V-Log/V.Gamut profiles, 'Cinelike' gamma profile (for tonality, two settings), Rec. 709 profile, Hybrid Log Gamma (HLG) profile (colour or monochrome), 4K/2K video output via the HDMI connection (10-bit 4:2:2 colour, 10-bit 4:2:0 colour, 8-bit 4:2:2 colour) with simultaneous internal recording.

Recording Media: Dual slots for SD, SDHC and SDXC memory cards with UHS-I/II UHS, UHS Speed Class 3 and UHS-II Speed Class 90 support.

Continuous Shooting: Focal plane shutter – up to 999 JPEG/large/fine frames at up to 9.0 fps or 60 RAW frames with AF fixed to first frame. Up to 6.0 fps with continuous AF adjustment. Medium (5.0 fps) and low speed modes (2.0 fps) also available. Sensor shutter – up to 999 JPEG/large/fine frames at up to 9.0 fps or 60 RAW frames with AF fixed to first frame. Up to 5.0 fps with continuous AF adjustment. Medium (5.0 fps) and low speed modes (2.0 fps) also available.

White Balance: TTL measurement. Three auto modes (neutral, maintain warmer tones or reduce warmer tones), five presets and four custom settings. White balance compensation (amber-to-blue and/or green-to-magenta) in all presets, and white balance bracketing. Manual colour temperatures from 2500 to 10,000 degrees Kelvin with four custom settings.

Interfaces: USB 3.1 SuperSpeed Type C, HDMI Type A, 3.5 mm stereo audio input, 3.5 mm stereo audio output, 2.5 mm remote input.

Additional Digital Features: Sensor-based five-axis image stabilisation ('Dual IS 2' operates along with lens-based optical stabilisers), 'High Resolution' pixel-shift mode (up to 96

megapixels, with Motion Blur processing settings), Night display mode, sensor cleaning, 'Touchpad' AF zone selection, '4K Photo' and '6K Photo' modes (Pre-Burst, Burst and Burst Start/Stop), 'Post Focus' and 'Focus Stacking' functions, dual-axis electronic level display, grid guides (choice of three), digital zoom (up to 4.0x), Adobe RGB and sRGB colour spaces, 12 'Photo Style' presets (Vivid, Natural, Flat, Landscape, Portrait, Monochrome, L.Monochrome, L.Monochrome D, Cinelike D, Cinelike V, Like709, Like2100-HLG), ten user-defined 'My Photo Style' presets, in-camera adjustment of 'Photo Style' parameters (Colour = Contrast, Highlight, Shadow, Saturation, Hue, Sharpness and Noise Reduction. B&W = Contrast, Highlight, Shadow, Tone, Filter Effect, Grain Effect, Sharpness and Noise Reduction), 22 'Filter Settings' (Expressive, Retro, Old Days, High Key, Low Key, Sepia, Monochrome, Dynamic Monochrome, Rough Monochrome, Silky Monochrome, Impressive Art, High Dynamic, Cross Process, Toy Effect, Toy Pop, Bleach Bypass, Miniature Effect, Soft Focus, Fantasy, Star Filter, One Point Colour and Sunshine), adjustable filter effects, auto bracketing functions (exposure, aperture, focus – up to 999 frames – white balance and colour temperature), 'Intelligent Dynamic' processing (Off, Low, Standard, High, Auto), 'HLG Photo' mode (full or 4K resolution), intervalometer (up to 9999 frames), multiple exposure facility (up to four shots with overlay and auto exposure adjustment), intervalometer (up to 9999 frames with exposure levelling), in-camera lens corrections (Vignetting Compensation and Diffraction Compensation), flicker detection and correction, long exposure noise reduction (On/Off), real-time histogram, dual-axis level display, highlight alert, grid guides (choice of three), luminance/RGB histogram displays in review/replay, adjustable image display time, auto image rotation, slide show (with variable display times), playback zoom (up to 16x), 12 or 30 thumbnail displays, thumbnail calendar display, in-camera editing (RAW-to-JPEG processing, '4K/6K Photo' bulk saving, 4K/6K Photo' noise reduction, Light Composition, rating, title edit, face recognition edit, text stamp, video divide, resize, cropping, rotate, favourite, protect, face recognition edit), 'Clear Retouch' tool, picture sort modes, WiFi and Bluetooth (LE) connectivity, DPOF and PictBridge support.

Power: One 7.4 volt/3050 mAh rechargeable lithium-ion battery pack (DMW-BLJ31 type). In-camera recharging via USB-C is possible. Optional DMW-BGS1 battery grip accepts a second battery pack.

Dimensions (WxHxD): body only = 151.0x114.2x110.4 mm.

Weight: body only = 1052 grams (without battery pack or memory card).

Price: \$5999 body only. \$7599 with Lumix S 24-105mm f4.0 Macro OIS image stabiliser zoom lens.

Distributor: Panasonic Australia telephone 132 600 www.panasonic.com.au

SIGMA

fp



WORK IN PROGRESS

Sigma's cameras have always been a bit of an acquired taste, even its early D-SLRs. The fp is still a pretty quirky concept, but it doesn't take long to get hooked on its remarkable combination of size and capabilities.

▲ The fp's pared-down size is impressive, but comes at the cost of features such as an EVF, in-body stabilisation and a hotshoe (although a screw-on unit is supplied with the camera).

So far, all the L mount mirrorless cameras have been on the beefy side – Leica's SL and SL2, and the Lumix S trio from Panasonic. All are as big – if not bigger – than the more compact full-35mm format D-SLRs such as Nikon's D750

or the Canon EOS 6D Mark II.

So now for something completely different... Sigma's near pocket-sized fp. Sigma has gone all-out to make the fp as small and as light as possible in the true spirit of the mirrorless camera concept. Not surprisingly, it's easily the most compact

L mount camera on the market (actually, it's the most compact full-35mm mirrorless camera on the market, full stop) but it's also a good deal smaller than many 'APS-C' and Micro Four Thirds format mirrorless cameras too. But there have had to be a few concessions in order to get to its

112.6x69.9x45.3 mm (WHD) size and 370 grams base weight. No EVF, no focal plane shutter, no flash hotshoe (although a bolt-on unit is bundled with the camera), a fixed LCD monitor screen (albeit still a big one) and no handgrip. These items aside, Sigma has still managed to shoe-horn an awful lot into the fp which is what makes it so interesting. The compact design makes it very appealing for video productions – especially rig-mounted so you don't need a built-in EVF – and it's light enough to be mounted on professional-level drones (such as might be used in cinematography).

Consequently, the fp's video capabilities are on a par with the other truly hybrid mirrorless cameras such as Panasonic's GH5S and S1H, and Sony's A7S II... but it's smaller and lighter than any of them, and the basic box-like shape is, ironically, actually more versatile in these applications. You can read the fp's full video story in the Making Movies panel.

So how does it work for photography? Let's find out.

INSIDE STORY

Well, first there's the L mount. It's shared with Leica and Panasonic which means there's already some impressive glassware available for the fp... with lots more to come as the L Mount Alliance gathers momentum. And there are already quite a number of mount adaptors, including for Leica M lenses and Canon EF. Sigma, of course, adapted a bunch of its Art series D-SLR lenses to the L mount, but now it's also making dedicated mirrorless models – designated 'DG DN' – with one of these – a compact 45mm f2.8 prime – supplied with our test camera. It's the smallest L mount lens currently available.

The fp's sensor is a BSI-type CMOS with an imaging area of 23.9x35.9 mm and a total pixel count of 25.3 million, giving an effective resolution of 24.6 megapixels. To optimise the available resolution, there's no optical low-pass filter. The maximum image size is 6000x4000 pixels for both JPEG and RAW capture. RAW files are captured in the Adobe DNG format and there's also a smaller 3008x2000 pixels image size. There's also the option of either 12-bit or 14-bit RGB colour for RAW capture. JPEGs can be recorded one of three compression levels and in three image sizes with a choice of seven aspect ratios. The sensitivity range is equivalent to ISO 100-25,600, extendable all the way down to ISO 6 and up to 102,400. However, the settings below ISO 80 are multi-shot captures – essentially designed to reduce noise – so you will need to use a tripod.

Continuous shooting is possible at up to 18 fps thanks to the sensor-based shutter, but only for a burst of 12 frames at the maximum resolution so it's all over in a flash.

THE fp'S VIDEO CAPABILITIES ARE ON A PAR WITH THE OTHER TRULY HYBRID MIRRORLESS CAMERAS SUCH AS PANASONIC'S GH5S AND S1H, AND SONY'S A7S II.

The absence of a focal plane shutter has to be the main concern for photographers as it also has some major drawbacks... rolling shutter distortion with moving objects, banding when shooting under fluorescent lighting, and a maximum flash sync speed of 1/30 second (and just 1/15 second with RAW capture).

The JPEG processing options include a total of 12 'Colour Mode' presets which include the standards – Vivid, Neutral,

Portrait and Landscape – plus some exotica such as Teal & Orange which has been borrowed from the world of Hollywood cinematography. It works by creating a higher contrast between oranges – typically those in skin tones – and teals (i.e. cyan/blue) which are the complementary colours. It creates a warm tone that doesn't look overly artificial. The colour presets have adjustable parameters for sharpness, contrast and saturation, while the Monochrome setting replaces saturation with B&W contrast filters and several toning shades. There's also a tone control which works like a simplified Photoshop Curves adjustment to vary the brightness of the highlights and/or the shadows. There's two presets called Auto-Mild and Auto-Strong, but more useful is the manual control which has a +/-5.0 EV adjustment range for the highlights and/or shadows. Perhaps a quicker solution, however, is the fp's 'Fill Light' function which Sigma is providing in-camera for the first time (it was previously an element of the Sigma Photo Pro software). It's a quick way of lightening shadow areas without affecting the highlights, and there's up to +/-5.0 EV of adjustment in 0.2 EV steps for quite fine control.

You preview the adjustment by pressing the AE lock button.

The fp also has an intervalometer, multi-shot HDR capture (with auto or manual exposure difference settings) and auto bracketing modes for exposure, white balance, focus, Fill Light and Colour Mode. Focus bracketing can be set to sequences of 3, 5, 7, 9, 11, 13 or 15 frames with adjustments of up to plus/minus ten levels. You can select up to five Colour Modes to be captured in a sequence, and either three or five frames for Fill Light bracketing.

In-camera lens corrections are provided for distortion, lateral chromatic aberrations, diffraction, vignetting and colour shading... well, Sigma is primarily a lens-maker, right?

IN ALLIANCE

Interestingly, the fp is powered by a rebadged version of Panasonic's popular 7.2 volt DMW-BLC12E battery pack so spares are easy to source. But it looks like Panasonic might be involved elsewhere in the fp such as, possibly, the autofocus. It uses contrast detection measurements, but is still extremely fast when shooting stills, suggesting DFD technology might be at work.



1. Camera strap attaches via standard 1/4-inch screw-thread tripod sockets – another bit of nice industrial design – which can also serve as the mounting points for video accessories.

2. Rear control layout is logically arranged... dedicated keys for the colour modes and tone adjustment work well in the field.

3. Rear input wheel also serves as the navigator and also directly accesses the focus modes and area settings.

And it uses 49 measuring points arranged in a 7x7 array, a configuration Panasonic uses on a number of its Lumix G models.

Switching between single-shot and continuous operation is manual. There's the choice of manual or auto point selection, the latter settable to one of four zone sizes (one point, 3x3, 5x5 and 7x7) and the former with three point sizes. There also face/eye detection and subject tracking. Manual focus assist is via a magnified image (either full screen or picture-in-picture), a simple distance scale bar or a focus peaking display (available in black, yellow, white or red). The magnified image function is also available when using the autofocus, again with the full screen or PIP display options.

Exposure control uses on-sensor pixels to give 256 measuring zones with the options of centre-weighted average and spot metering patterns. There's the standard set of 'PASM' control modes with the auto overrides being an AE lock, up to +/-5.0 EV compensation and the already-mentioned auto bracketing.

The sensor shutter has a speed range of 30-1/8000 second with a bulb timer which has a time limit of 300 seconds (that's five minutes, by the way). As we also noted earlier, the sensor shutter limits the maximum flash sync speed to just 1/30 second.



1. Front input wheel is recessed into the top panel with the front rim protruding for convenient access.

2. Keeping it simple; the top panel layout comprises large switches for on/off and cine/still, a dedicated video start/stop button, a huge front input wheel and the shutter release.

3. A substantial heat sink between the back of the camera body and the LCD monitor screen provides passive cooling to enable longer video clip durations.

4. The power and cine/still switches need a good push to operate so there's no chance of accidentally operating them.

The white balance correction modes comprise two auto settings (one called 'Lighting Source Priority'), six presets and provisions for creating up to three custom measurements. Manual colour temperature setting is available over a range of 2500 to 10,000 degrees Kelvin and, as also noted earlier, there's a white balance bracketing mode.

Sigma hasn't left out anything of importance here, but

interestingly, the fp doesn't have WiFi or Bluetooth connectivity.

IN THE HAND

It may be comparatively light, but the fp feels extremely solid indeed. The bodyshell is aluminium with sealing at 42 points so it's well protected against dust and moisture, and there's a very substantial heat sink that sits between the main body and the monitor screen's frame.

This is part of the fp's video box-of-tricks and provides passive cooling for the sensor, enabling longer clip durations without overheating. The limited space available has necessitated the use of a fixed monitor screen, but Sigma says this arrangement also enhances both durability and the weather protection. There's only a single memory card slot too,

but presumably Sigma assumes video users will be recording to external media anyway. A nice little idea is that the attachment lugs for the camera strap are standard 1/4-inch tripod-mount screw fittings so, if you don't need the strap, there are two extra sockets for attaching accessories. Alternatively, there are three options for tripod mounting, two of them in the vertical orientation... a much better option when you're using a ball-type head which has limited movement in the vertical plane.

Again because space is at such a premium, there isn't much spare real estate on the fp's exterior – hence the absence of a flash hotshoe – and it's initially a little hard to know how to hold it without accidentally pressing something.



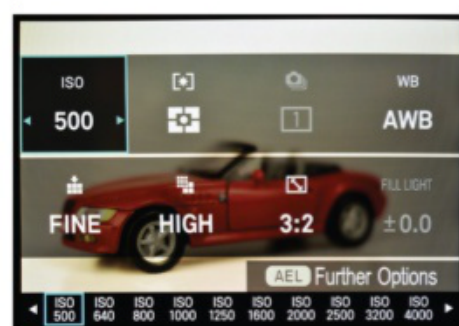
▲ Live view screens automatically switch between photo and video displays, the latter including a waveform graph (lower right).



▲ Replay screens include a thumbnail with a full set of histograms. The right-hand panel can be cycled through a number of additional info displays.



▲ The menu system is well designed and logically organised, making it easy to navigate.



▲ 'Quick Set' menu screen is customisable and automatically switches between photo and video displays.



IT MAY BE COMPARATIVELY LIGHT, BUT THE fp FEELS EXTREMELY SOLID INDEED. THE BODYSHELL IS ALUMINIUM WITH SEALING AT 42 POINTS.

The back panel is almost entirely taken up by the 8.0 cm monitor screen, so there's an array of buttons along the bottom edge and a conventional control wheel/navigator to one side with another trio of function buttons. This doesn't leave much room for your grip hand's thumb, but you do eventually settle on the best holding pattern (essentially, it's two-handed). However, there are a couple of optional handgrips – one small, one big – either of which is probably a good investment for

anybody intending to do mostly hand-held shooting.

The top panel controls comprise a pair of beefy switches – for on/off and cine/still – a dedicated video start/stop button and the shutter release which sits within a large input wheel. Actually, all the physical controls are a good size and well-spaced so the usual 'small camera' fumbles are eliminated. There's a handy 'Quick Set' menu in the monitor screen which provides direct access to eight key capture functions – and has separate displays for photo and video – but it's not operable via the fp's touch screen which is mostly limited to focus-related and image replay functions. However, it is fully customisable in terms of the eight displayed functions. The menu system is well-organised, not overly cluttered and easy to navigate, but Sigma actually assigns some key settings to dedicated buttons – namely exposure modes, the 'Colour Mode' presets and a 'Tone' adjustment – so these are easy to access on-the-fly. However, compared to most mirrorless cameras, the customisations are minimal and only concern the front and rear input wheels which

can be switched between basic exposure control duties or reversed in operational direction. An issue? Not really. Given that it's pretty sparse, the fp's control layout is still remarkably efficient... a good case of less is actually more.

The monitor screen is an 8.0 cm TFT LCD panel with a resolution of 2.1 megadots and adjustable for brightness and colour balance. There are three display

configurations which progressively add key camera settings, a 3x3 guide grid and a dual-axis level indicator. A real-time histogram is always shown. In the cine mode, it switches to showing audio levels, a waveform display and the level indicator. The playback options include a thumbnail with capture data and a set of brightness and RGB histograms with the option of cycling through



It's fair to say that Sigma is targeting the fp at video-makers ahead of photographers, even if it is actually an excellent stills camera. The form factor has clearly been designed with rig-based applications in mind as has the passive cooling via a heat sink and the provision of a 10- or 12-bit CinemaDNG RAW output to an external SSD via USB-C (and 4K or 2K with 8-bit 4:2:2 colour via HDMI). Additionally, the single card slot obviously saves a bit of space in the body, but also indicates that Sigma thinks many fp users will be using external recorders.

The passive cooling enables recording durations of up to two hours. Because of the amount of data being generated (with bit rates of up to 2500 Mbps), both 10-bit and 12-bit CinemaDNG recording can only be done to an external drive, but the fp can record 8-bit CinemaDNG 4K UHD internally or in the MOV format with either ALL-Intra or Long-GOP compression. Of course, CinemaDNG isn't the only game in town when it comes to RAW recording formats and there are now more efficient options which would allow for internal recording at greater bit depths than 8-bit. Additionally, 12-bit CinemaDNG is at 24 fps and, with MOV recording, the maximum frame rate is 25 fps for PAL, and 30 fps for NTSC. And, it's also worth noting here that Adobe's Premiere video editing software actually doesn't support its own RAW file format

so you'll have to use something else (such as Blackmagic's DaVinci Resolve). And, for now at least, Cinema DNG footage can't be replayed in camera. Additionally, there's no 4K DCI option, nor a flat Log profile or LUTs (although the Colour Modes include a Cinema preset which has a flatter colour profile, and the Neutral setting is also an option), but apparently significant upgrades are planned to address many of these issues. On the plus side, the fp has a 'Director's Viewfinder' feature which can be set to replicate the displays of quite a number of pro-level video cameras, making the most of the ultra-compact form factor. There's also a waveform display (essentially the video equivalent of a brightness histogram), zebra patterns (adjustable for threshold), time code (rec run or free run), and simultaneous external and internal recording.

It records 4K video using the full width of the sensor, but a Super 35 crop (which is close to 'APS-C') is also available.

On the audio side, the fp has built-in stereo microphones with a stereo audio input, but no audio output. The audio levels can be adjusted manually and, additionally, the left and right channels can be adjusted independently which is useful. There's also a wind-cut filter.

Despite the mixed bag of recording settings, the Sigma fp is still a pretty handy video camera and the Cinema DNG RAW option is unique for a hybrid mirrorless camera. We only sampled the internal 4K UHD 25p recording, but the footage had good detailing and dynamic range with natural-looking colour renditions. The fp is capable of much more, of course, but this is a very promising start.



Test images captured as JPEG/large/
fine frames with a Sigma 40mm f2.8 DG
DN prime lens or a Panasonic Lumix S
24-105mm f4.0 OIS zoom. Image quality
benefits from the higher signal-to-noise
ratio delivered by bigger pixels – including
a wider dynamic range – and the colour
rendition is very pleasing to the eye. Fine
details are crisply resolved and the tonal
gradations are nicely smooth.



▲ Notice how much of the front panel is taken up with the L mount. Sensor is a BSI-CMOS with a total pixel count of 25.3 million.

a couple of optional panels which show the lens correction settings and copyright info. You also get a highlight warning and an overlay of the focus point(s) used. So nothing much of importance missing here either, but is the fp ultimately too compromised to work successfully as a stills camera? On paper, it looks like this might well be the case, but in practice it's a different story. The handling is fine – even without one of the optional grips – and the ergonomics deliver surprising efficiency which is further assisted by the 'Quick Set' menu.

SPEED AND PERFORMANCE

Loaded with a Panasonic 64 GB SDXC UHS-II V90 speed memory card, the Sigma fp captured a sequence of 24 JPEG/large/fine frames in 1.449 seconds which represents a shooting speed of 16.6 fps. The test files averaged 8.4 MB in size. Given the burst length is twice what the specs say you should get with best-quality JPEG capture, we ran this test several times just to make sure... and still got bursts of 24 frames. We're not complaining, obviously, but we do wonder why there's a discrepancy.



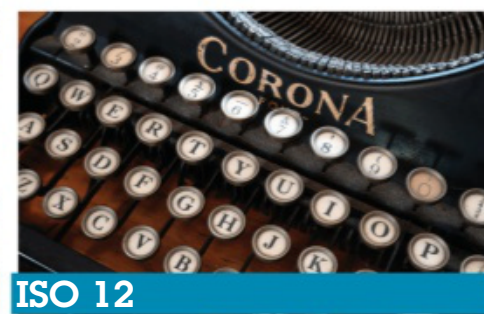
WHAT SEALS THE DEAL IN TERMS OF THE SIGMA fp AS A STILL CAMERA IS THE IMAGE QUALITY.

What seals the deal in terms of the Sigma fp as a stills camera is the image quality. There's some stiff competition in the 24 MP full-35mm format sensor class – Nikon Z 6, Nikon D750, Panasonic Lumix S1, Sony A7 III and even the Lumix S1H – but the fp is up to the challenge. We noted on a number of occasions that 24 MP res on a full-35mm sensor delivers a great balance of good detailing, a wide dynamic range and lower noise at the higher ISO settings (and not forgetting manageable file sizes). This is again the case here, but the fp's best-quality JPEGs also have a lovely depth and tonality with nicely saturated colours and very smooth gradations. The camera delivers a different look which is sharp, but with a smoothness of tonality that's very pleasing to the eye and seems largely down to how Sigma is rendering the colours. And the best word to describe it is, perhaps, "atmospheric." The dozen Colour Modes and their adjustable parameters provide plenty of scope for playing around with how images look, but the Teal & Orange setting is particularly delicious because it's actually quite subtle, despite which there's no mistaking the effect – although it also looks perfectly natural. The dynamic range is excellent (Sigma is quoting 12.5 stops), but the Fill Light function is a very practical stand-by if you need to underexpose to help hold detail in the brighter highlights.

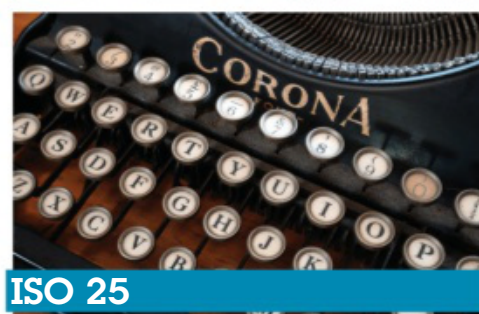
► These test images were captured as JPEG/large/fine files with aperture-priority auto exposure control and the aperture set to f11.0 and so the exposure time varied to compensate for the ISO adjustments. The settings below ISO 100 aren't actually sensitivity settings as such, but rather multi-shot captures which reduce noise by merging the images (and so require that the camera be mounted on a tripod). Noise is very well managed across the sensitivity range up to ISO 51,200 and there's only a small loss of saturation and sharpness at ISO 102,400.



ISO 6



ISO 12



ISO 25



ISO 50



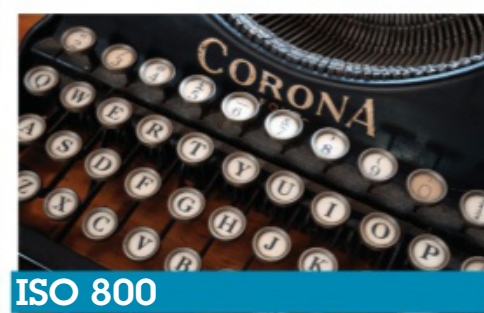
ISO 100



ISO 200



ISO 400



ISO 800



ISO 1600



ISO 3200



ISO 6400



ISO 12800



ISO 25600



ISO 51200



ISO 102400

Fill Light then boosts the shadows by up to five stops without affecting the highlights at all. It's a much easier and effective option than doing it post-camera.

The Sigma's high ISO performance is a bit of a revelation too. Noise doesn't make an appearance until ISO 25,600 and then the reduction processing is still striking a nice balance in terms of sharpness and saturation. The ISO 51,200 is still quite useable too, but the saturation drops off at ISO 102,400 and the finer details start to soften. Nevertheless, the image quality is still very good for such a high sensitivity setting and the Sigma fp definitely joins the list of other star low-light performers.

THE VERDICT

Like anything that's a bit left-field, the Sigma fp is going to polarise opinions, but if you love it – as we do – then you're going to love it truly, madly, deeply: It's that sort of camera. But it's also flawed.

► Yes, there's a Sigma fp in there somewhere, but this rig illustrates the camera's cinematographic credentials.

While we understand the desire to make it as compact and lightweight as possible, Sigma has perhaps gone a bit too far. A focal plane shutter, in-body image stabilisation and at least the provision to fit a detachable EVF would have made it absolutely irresistible. There is a clip-on viewfinder for the monitor screen (which video shooters will undoubtedly like), but it makes the fp very much bigger, bulkier and bit unwieldy for hand-held photography. However, in our estimation, the pros still outweigh the cons by quite a significant margin. The big ticks are for just how well Sigma has managed to package the fp – leaving aside the more questionable omissions – without compromising functionality, operability or the overall capabilities. Additionally, the keep-it-simple menu system and the customisable 'Quick Set' screen work very well



indeed. Consequently, the fp is a thoroughly enjoyable camera to use even if most of the existing L mount lenses tend to overwhelm it... hopefully Sigma has a few more compact DG DN series lenses in the works to join the existing 45mm f2.8. We also used it with Panasonic's Lumix S 24-

105mm zoom and that combination felt pretty comfortable and well-balanced (this lens also provides optical image stabilisation which makes hand-held shooting even easier).

An acquired taste? Maybe, but it also doesn't take long to work up quite an appetite for the Sigma fp. 🍴

VITAL STATISTICS



SIGMA fp \$2999

body only

Type: Enthusiast- and pro-level mirrorless digital camera with Leica L bayonet lens mount.

Focusing: Automatic 49-point wide-area system using contrast-detection via imaging sensor. Auto or manual point selection with adjustable frame size. Manual switching between one-shot and continuous AF modes, the latter with a subject tracking function. Face/eye detection. AF+MF and Pre-AF functions. Sensitivity range is EV -5.0 - 18 (ISO 100/f1.4). AF and manual focus assistance via distance scale, image magnification (4x/8x and either full screen or PIP) and focus peaking displays (Black, Yellow, White or Red).

Metering: 256-point multi-zone, centre-weighted average, spot and S-TTL flash. Metering range is EV -5.0 to 18 (ISO 100/f1.4).

Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, metered manual, TTL auto flash and TTL flash.

Shutter: Sensor-based shutter only, 30-1/8000 second plus B (up to 300 seconds). Flash sync up to 1/30 second. Exposure compensation up to +/-5.0 EV in 1/3-stop increments.

Viewfinder: No built-in EVF. Fixed 8.0 cm TFT LCD monitor (2.1 megadots resolution) with touch controls. Adjustable for brightness and hue.

Flash: No built-in flash. External flash units connect via PC terminal or bundled HU-11 hotshoe module.

Additional Features: Diecast aluminium bodyshell with weather sealing and heat sink, AE/AF lock, auto exposure bracketing (over three or five in EV increments), dual-delay self-timer (two and 10 seconds), audible signals, auto power-off.

DIGITAL SECTION

Sensor: 25.3 million (total) pixels BSI-CMOS with 23.9x35.9 mm imaging area and 3:2 aspect ratio. No optical low-pass filter.

Sensitivity equivalent to ISO 100-25,600 (extendable to ISO 6 and 102,400).

Focal Length Magnification: None.

Formats/Resolution: Three JPEG compression settings, RAW output (lossless compression Adobe DNG format) and RAW+JPEG capture. Three resolution settings at 3:2 aspect ratio; 6000x4000, 4240x2832 and 3008x 2000 pixels. Three resolution settings at 4:3 aspect ratio; 5344x4000, 3776x3832 and 2672x2000 pixels. Three resolution settings at 16:9 aspect ratio; 6000x3376, 4240x2392 and 3008x1688 pixels. Three resolution settings at 1:1 aspect ratio; 4000x4000, 2832x2832 and 2000 pixels. Three resolution settings at 21:9 aspect ratio; 6000x2576, 4240x1824 and 3008x1288 pixels. Three resolution settings at 7:6 aspect ratio; 4672x4000, 3312x2832 and 2366x2000 pixels. Three resolution settings at √2:1 aspect ratio; 5664x4000, 3312x2832 and 2832x2000 pixels. RAW files captured at 6000x4000 and 3008x2000 pixels. 24-bit RGB colour for JPEGs, 36-bit or 42-bit RGB colour for RAW files.

Video Recording: CinemaDNG 12-bit (external only) – 4K UHD at 3840x2160 pixels; 24 fps at 16:9 aspect ratio (maximum bit rate is 2400 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (maximum bit rate is 1530 Mbps). CinemaDNG 10-bit (external only) – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (maximum bit rate is 2500 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (maximum bit rate is 1280 Mbps). CinemaDNG 8-bit – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (maximum bit rate is 2000 Mbps). Full HD at 1920x1080 pixels; 120, 100, 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (maximum bit rate is 2050 Mbps). MOV format (with ALL-Intra compression and 8-bit 4:2:0 colour) – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 440

Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 240 Mbps). Full HD at 1920x1080 pixels; 120 or 100 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 440 Mbps). MOV format (with Long GOP compression and 8-bit 4:2:0 colour) – 4K UHD at 3840x2160 pixels; 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 120 Mbps). Full HD at 1920x1080 pixels; 60, 50, 30, 25 or 24 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 70 Mbps). Full HD at 1920x1080 pixels; 120 and 100 fps at 16:9 aspect ratio (H.264/MPEG-4, maximum bit rate is 100 Mbps). Clip length is two hours. Built-in stereo microphones with manually adjustable audio levels and wind-cut filter. Stereo audio input provided.

Video Features: Super 35 crop mode with 'APS-C' lenses, 'Director's Viewfinder' function (mimics cinema cameras), shutter angle control, waveform display, centre marker, time code (rec run or free run), electronic image stabilisation, zebra patterns (adjustable threshold and choice of colours), focus peaking display, HDMI output (UHD 4K at 30, 25 or 24 fps with 8-bit 4:2:2 colour. FHD at 120, 100, 60, 50, 30, 25 and 24 fps with 8-bit 4:2:2 colour), Atomos open protocol and Blackmagic Video Assist 4K support.

Recording Media: Single slot for SD, SDHC and SDXC memory cards with UHS-I and UHS-II speed support.

Continuous Shooting: Up to 12 JPEG/large/fine frames at up to 18.0 fps. Up to 5.0 fps with continuous AF adjustment.

White Balance: TTL measurement. Two auto modes (auto, light source priority), six presets and three custom settings. Manual colour temperature setting from 2500 to 10,000 degrees Kelvin. White balance bracketing (blue-to-amber, magenta-to-green).

Interfaces: USB 3.1 Gen1 Type C, micro HDMI

Type D, 3.5 mm stereo audio input.

Additional Digital Features: 12 Colour Modes (Standard, Vivid, Neutral, Portrait, Landscape, Cinema, Teal & Orange, Sunset Red, Forest Green, FOV Classic Blue, FOV Classic Yellow, Monochrome), adjustable Colour Mode parameters (Contrast, Sharpness, Saturation; Toning Effects/Filters for B&W), 'Tone Adjust' function (Auto Mild, Auto Strong, Manual), multi-shot HDR capture (Auto, +/-1.0, +/-2.0, +/-3.0; three frames), 'Fill Light' function (up to +/-5.0 EV), intervalometer (2-99 frames or unlimited), 'Cinemagraph' function (for creating GIFs in-camera), auto bracketing modes (Exposure, White Balance, Fill Light, Focus and Colour Mode), Adobe RGB and sRGB colour spaces, electronic image stabilization (multi-shot capture and merging), dual-axis level indicator, real-time histogram, grid guide, in-camera lens corrections (Distortion, Chromatic Aberrations, Diffraction, Vignetting and Colour Shading), luminance/RGB histogram displays, playback highlight alert, adjustable image display time, auto image rotation, slide show (with variable display time), playback zoom (up to 10x), nine thumbnail display, copyright information, in-camera RAW-to-JPEG processing (12 parameters), three custom camera set-ups. **Power:** One 7.2 volt/1200 mAh rechargeable lithium-ion battery pack (Sigma BP-51 type). In-camera recharging via USB Type C.

Dimensions (WxHxD): body only = 112.6x69.9x45.3 mm.

Weight: 370 grams body only (without battery or memory card).

Price: \$2999 body only. \$3649 with Sigma 45mm f2.8 DG DN Contemporary prime lens.

Distributor: C.R. Kennedy & Company, telephone (03) 9823 1555 or visit <https://sigma-photo.com.au>

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GR

RICOH GR III



image: Anthony Ginns

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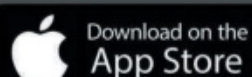


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SONY

For more information about
Sony's G Master lenses visit
sony.com.au/mirrorless



TOMORROW'S LENSES TODAY

SONY G MASTER

No other maker of digital mirrorless cameras has worked harder at building up an extensive new system of lenses than Sony. The G Master series of high-end models represents the pinnacle of optical technology and performance.

Lenses are the essence of any camera system and Sony's ever-expanding line-up of E mount lenses is a compelling reason for considering the Alpha mirrorless cameras... and the key reason why Sony is now the leader in mirrorless. Importantly, Sony is not only considering the changing creative demands of today's photographers – made possible by new technologies and

tools – but has a clear vision of future cameras, redefining lens technology with breath-taking resolution and an appealing bokeh which work together in perfect harmony.

At the heart of this vision are the G Master series interchangeable lenses which deliver ground-breaking agility, unparalleled reliability and revolutionary imaging performance. The G Master lenses represent a new era of photographic and cinematographic expression,

but already with future performance – such as the demands of increasing resolution – and creative requirements in mind.

Resolution That's Ahead Of Evolution

What are the requirements for interchangeable lenses that will remain relevant in the face of continually evolving camera body performance? As a company that is largely driving that evolution, Sony has the answers. The G Master series elevates resolution to unprecedented heights thanks to new technology specifically developed to accommodate the more exacting tolerances required. Sony has unreservedly applied the most advanced optical technology available in innovative lens elements, optical path design, simulation, testing, and calibration, achieving image detail and sharpness that reveal the essence of every scene and subject.

Spectacular Resolution Wide Open

It is not easy to achieve a spatial frequency of 50 lines pairs per millimetre at a lens's widest aperture, but this is Sony's baseline for the G Master designs.

Unprecedented resolution and other demanding design parameters yield outstanding reproduction of the most detailed subjects and

scenes with superior contrast throughout every frame. G Master lens resolution is simply the highest in its class.

XA Lenses For Eye-Opening Detail

An essential ingredient of the astonishing resolution is a new XA (which stands for extreme aspherical) lens element with a better than 0.01-micron surface precision.

Refined simulation software has also made a vital contribution, making it possible to predict and eliminate potential problems throughout the design and manufacturing processes and thereby realise the highest design standards without compromise. Lens coatings can be included in the simulation, allowing designers to accurately predict how they will affect ghosting

and colour in the final product. That in turn has made it possible to use Sony's Nano AR Coating technology in the most effective way. Industry-leading actuator technology inherited from professional Sony movie equipment contributes too, providing the focusing precision needed to fully realise each lens's resolution potential.

The Most Expressive Bokeh For Art's Sake

Sony's existing G lens series is highly valued for its expressive blend of high resolution and beautifully smooth background bokeh, adding a sense of natural depth and dimension to well-executed images. Continued pursuit of perfection has given the G Master series an even more sophisticated expressive capability,

with a newly-developed optical element, innovative new calibration techniques, and advanced optical simulation technology that elevates final quality right from the initial design stage. The resultant bokeh is simply stunning.

Balance Is The Key

Advanced simulation technology is employed to design superb bokeh into the optics right from the outset, achieving fluid, natural transitions from extremely sharp in-focus areas to luxuriously smooth, soft background bokeh without jarring lines or edges. Each lens is individually adjusted at the factory to minimise spherical aberration and optimise the balance between sharpness and bokeh. 



LENS FOCUS

SONY FE 135MM F1.8 GM

The Sony FE 135mm f1.8 G Master is a large-aperture prime telephoto lens which delivers outstanding corner-to-corner resolution – even at f1.8 – plus the exquisite bokeh that is a hallmark of the G Master series.

The advanced optical construction comprises 13 elements in ten groups, including one special XA type which employs Sony's latest bokeh simulation technologies to control spherical aberration and achieve exquisite bokeh. The optical design also includes Super ED and ED glass elements with extra-low dispersion characteristics which minimise chromatic aberrations, thereby optimising resolution. Sony's Nano AR anti-reflection coatings reduce both ghosting and flare. Dual focusing groups in a floating focus arrangement give better close-up capabilities which result in a minimum focus distance of just 70 centimetres and a maximum magnification ratio of 1:4.

The autofocus system uses four XD (extreme dynamic) direct-drive linear induction motors – two for each focusing group – increasing both speed and responsiveness as well as improving tracking reliability. This arrangement also ensures quieter, lower-vibration autofocus operation.

For enhanced reliability, the 135mm f1.8 GM lens has magnesium alloy barrel tubes with weather sealing and fluorine coatings on the exposed surfaces of the front element. The aperture ring can be switched between click-stopped and stepless operation, the latter for smoother exposure adjustment when shooting video. There is also a focus limiter switch with three distance range settings and two customisable focus hold buttons which help promote fast and efficient operation.

Overall, this is a lens that meets the most demanding requirements for control and reliability for both stills and movies.

LENS FOCUS

SONY FE 24MM F1.4 GM

Fast prime wide-angles are a favourite lens for many applications, including landscapes, interiors and street photography. Consequently, there are demands for high resolution, a natural-looking bokeh and portability... all key characteristics of the Sony FE 24mm f1.4 G Master. This lens is both compact and the lightest in its class while incorporating advanced optical technology to achieve spectacular resolution even at f1.4.

The 13-element optical construction includes two XA (extreme aspherical) elements to meet the stringent G Master requirements for consistently high resolution across the image area. Three ED (extra-low dispersion) glass elements effectively suppress chromatic aberration and this innovative optical design minimises sagittal flare so that point light sources are accurately reproduced.

It also reduces the lens's diameter and – combined with Sony's DDSSM (Direct Drive SSM) focus drive system – enables a remarkably light weight of just 445 grams.

A minimum focusing distance of 24 centimetres and maximum magnification of 0.17x give close-up capabilities that, combined with the lens's wide-angle view, produce dramatic perspectives to make good use of the deep, lush bokeh.

Additionally, an 11-blade circular aperture promotes a natural-looking bokeh aided by precise control of spherical aberration.

To enhance its on-location capabilities, the FE 24mm f1.4 GM has a dust and moisture resistant construction with a fluorine coating on the front element to better repel moisture and grease. Consequently, this is a lens that delivers an outstanding performance with a great many applications.

FUJIFILM X-PRO3



A TOUCH OF CLASSIC

Fujifilm is going even more traditional with the third-generation iteration of its Leica-esque X-Pro series of mirrorless cameras. The X-Pro3 is designed to deliver a different shooting experience... in fact, closer to that of a film camera than a digital one.

BODYSHELL: Similar styling and size to the X-Pro2, but the construction has been strengthened and given improved weather protection. The chassis is still magnesium alloy, but the top and bottom plates are now titanium. Weather sealing is enhanced via a total of 70 seals at the joins and junctions (versus 61). Insulation allows shooting at temperatures down to -10 degrees. There's the standard black-painted gloss finish as on the X-Pro2, but with the option – at an increased price – of a heavy-duty scratch-resistant surface protection for the titanium panels called 'Duratect' which utilises cold plasma technology and is extremely tough. Special 'Dura Silver' and 'Dura Black' versions of the camera are available.



1. MONITOR SCREEN: Here Fujifilm is daring to be different. To promote a more film-like camera experience, the monitor screen is essentially hidden and needs to be opened to be viewed (at either 90- or 180-degree positions). In the closed position (i.e. with the panel face-in to the camera back), there's a very small (3.25 cm), square LCD display which can show basic exposure info or, more cleverly, the 'Film Simulation' profile reproduced as the digital-era equivalent of the end of a film carton (i.e. Velvia, Provia, etc). The monitor screen itself is still 7.62 cm in size with a resolution of 1.62 megadots, but it gains touch screen controls. Of course, the 'always closed' arrangement means the panel is protected when the camera is being stored or carried.



SENSOR: The X-Pro line gets the resolution upgrade that started with the X-H1 and has since progressed through to X-T3 and X-T30. The 'X-Trans CMOS 4' sensor uses a backside-illuminated (BSI) design which frees up some space, enabling an effective resolution to 26.1 million (up from 24.3 MP), optimised by the absence of an optical low-pass filter. Sensor size is 15.6x23.5 mm. The sensitivity range is equivalent to ISO 160-12,800, with extensions either side to ISO 80 and 100, or ISO 25,600 and 51,200. 'X-Trans' sensor architecture has a 6x6 RGB filter pattern – versus the

2. EVF: Fujifilm's unique hybrid optical/electronic viewfinder is the star here, and has been further upgraded. The optical finder's scene coverage increases to 95 percent (up from 92 percent) and the magnification is now fixed at 0.52x rather than being switchable as was the case on the previous two models. The EVF now uses an 1.27 cm OLED-type panel rather than a TFT LCD and has a higher resolution of 3.69 megadots with a faster refresh rate of 100 fps and new motion blur reduction. It also has better colour reproduction – 97 percent of the sRGB colour space – and a big contrast range increase to 1:5000. The magnification increases to 0.66x.



standard Bayer's 2x2 – to minimise the occurrence of moiré effects because the subject frequency is less likely to match that of the pixels.

PROCESSOR: Fujifilm's current-generation quad-core 'X Processor 4' engine – as in the X-T3 and X-T30 – delivers quite a number of enhancements, including faster continuous shooting for stills; up to 11 fps with the focal plane shutter and up to 20 fps with the sensor-based shutter. As on the X-T3, a 1.25x crop mode allows for even faster continuous shooting at 30 fps and 16 MP.

CAPTURE SETTINGS: Maximum image size is 6240x4160 pixels with a choice of three aspect ratios – 3:2, 16:9 and 1:1. RAW files are captured with 14-bit RGB colour, and either with lossless compression or uncompressed. JPEGs captured at three compression levels and three image sizes, and there's the option of RAW+JPEG recording. In-camera RAW conversion can be to 8-bit or 16-bit TIFFs as well as JPEGs.

AF SYSTEM: The X-Pro3 also inherits the X-T3's autofocus system which employs a total of 2.16 million pixels for phase-difference detection measurements, creating 99 percent frame coverage, both vertically and horizontally. However, low light sensitivity is further extended down to -6.0 EV (PDAF at ISO 100 and f1.4). In total, 425 measuring points are user-selectable – arranged in a 25x17 pattern – but this can be reduced to 117 (in a 13x9 pattern) for more efficient selection. Zone area mode options are 3x3, 5x5 and 7x7 point clusters. Eye-detection tracking has been added to the face-detection function. Joystick-type selector for focus points (and also navigational duties). Brand new for an X mount body is a programmable AF range limiter.

FUJIFILM X-PRO3



EXPOSURE CONTROL: Based on a 256-zone metering system (from the imaging sensor) with multi-pattern, centre-weighted average, fully averaged and spot measurements. Program, aperture/shutter-priority auto and manual control modes. Up to +/-5.0 EV compensation and auto exposure bracketing over two, three, five, seven or nine frames at up to +/-3.0 EV per frame.

VIDEO: The X-Pro3 is undoubtedly primarily designed to be a stills camera, but that hasn't stopped Fujifilm giving it better video-making capabilities. Both 4K DCI and UHD recording are now available at 30, 25 or 24 fps – using the full sensor width and then downsampled – and a bit-rate of up to 200 Mbps. Full HD recording adds the 100 and 120 fps frame rates for slow-mo effects. H.264 compression codec with the MOV format and either 16:9 or wider 17:9 aspect ratios. F-Log gamma profile for a wider dynamic range (but with 8-bit 4.2.0 colour only), Eternal movie-orientated 'Film Simulation' profile, zebra patterns, a focus peaking display and 'Silent Movie Control' (via the touch screen). Clip durations are limited to 15 minutes for 4K, but 59 minutes for 2K. Stereo microphones built-in.

HDMI VIDEO OUT: Nope. There isn't one.

SHUTTER: There's a new focal plane shutter unit with a speed range of 15 minutes up to 1/8000 second in the shutter-priority auto or manual models. Otherwise, the slowest time speed is 30 seconds, but the 'bulb' timer allows for up to 60 minutes. Flash sync up to

1/250 second. Rated at up to 150,000 cycles. There's also an 'electronic first curtain' shutter to help reduce vibrations or a fully-silent sensor-based shutter which extends the top speed to 1/32,000 second and, of course, eliminates all vibrations and noise.

MEMORY CARD: Dual slots for SD, SDHC and SDXC types. Both slots support UHS-1 and UHS-II speed devices (as well as Video Speed Class V30). Maximum storage capacity supported is 512 GB for each. File management options include individual assignment to file types.

BATTERY: Fujifilm's 7.2 volt/1260 mAh NP-W126S lithium-ion battery pack is retained (as is used in the current X-T3, X-E3 and X-T30). Shot capacity is extended over the X-Pro2; to 440 frames when using the optical viewfinder and 370 frames with the EVF. In-camera charging now possible via USB-C.

CONNECTIONS: USB Type C (USB 3.1), 2.5 mm input for stereo microphone or remote trigger and a flash hotshoe. Sadly, though, the PC flash terminal is gone, but traditionalists will be pleased that the screwthread cable release socket is still there.

EXTRAS: Now a total of 17 'Film Simulation' profiles with the addition of Classic Neg and Monochromatic Colour (for tinted B&W images). Additionally, there's a new adjustable picture parameter for Clarity. Also new on the X-Pro3 is the 'Grain Effect' processing (with adjustments for roughness and grain size),

'Colour Chrome Effect' processing (with a 'Chrome Effect Blue' option), 'Dynamic Range Priority' processing, and a multi-shot HDR capture function (up to 800%). There are six auto bracketing modes (for AE, ISO, white balance, dynamic range, 'Film Simulation' and focus), a proper multiple exposure facility (up to nine shots with blending options) and both WiFi and Bluetooth LE wireless connectivity. Auto TTL flash control supported by Profoto AirTTL. RAW file workflow supported by Capture One Pro software (Capture One Express Fujifilm available as a free download).

LENSES: Fujifilm is keeping pace with Sony FE and the Micro Four Thirds systems in terms of the extent of its X mount lens systems. There are currently 33 models (plus two teleconverters) if you include the Zeiss Touit primes. Fujifilm's XF line now spans 8mm (with the 8-16mm f2.8 R LM WR zoom) to 200mm (with the 200mm f2.0 R LM OIS WR prime telephoto). That's equivalent to 12mm to 300mm.

ACCESSORIES: Dedicated accessories for the X-Pro3 at launch are the MHG-XPRO3 handgrip and BLC-XPRO3 leather half-case. Obviously, though, the camera is compatible with Fujifilm's EF line of on-camera flashes, the MIC-ST1 external stereo microphone and the RR-100 remote shutter trigger.

PRICE: The X-Pro3 is priced at \$2699 body only in basic gloss black, or \$2999 each in the special 'Dura' finishes of either matte silver or black.

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2020 FUJIFILM SHOWCASE THIRD ROUND WINNERS

WINNER

We didn't deliberately set out to have a bird photography round, but it just worked out this way, appropriately for this issue. **Ron Johnson's** superb study of a New Holland Honeyeater ticks all the boxes for sharpness, exposure and colour accuracy plus a nicely out-of-focus background. Ron used a Nikon D500 fitted with a Sigma 150-600mm f5.0-6.3 DG OS HSM telezoom lens... hand-held too.



FUJIFILM

[SHOWCASE]

Tell us how you did it! When you enter the Fujifilm Showcase, remember to explain any tips and techniques you used to achieve the result. Also, let us know the type of camera and film. You can also enter by email (see below).

1. TITLE

CAMERA

LENS

2. TITLE

CAMERA

LENS

3. TITLE

CAMERA

LENS

4. TITLE

CAMERA

LENS

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☐ Please return entries. Self-addressed postage and packaging is included.

☐ I do not want my entries returned.

Post your entry to: Fujifilm Showcase, Camera Magazine, PO Box 1077, Mount Street, North Sydney, NSW 2059 (or email to www.digitalcameraworld.com/news/acmcomps – see right for digital submission details).





HIGHLY COMMENDED

Andy Stern made good use of the tree branches to naturally frame his study of a Scrub Wren which was shot with a Fujifilm X-T1 and the Fujinon XF 100-400mm f4.5-5.6 R OIS WR telezoom set to 400mm which is the equivalent of 600mm.

FUJIFILM SHOWCASE 2020

The 2020 Fujifilm Showcase runs until 31 August 2020. Entries received after this date will be entered in the 2021 competition which will start with the November/December 2020 issue.

You can enter the Fujifilm Showcase as many times as you like during the year, submitting up to four photographs each time. Please make sure you provide all the necessary camera and film/capture details on the entry coupon (which can be copied if you don't want to cut up your magazine). All entries must be accompanied by a fully completed entry coupon.

Fujifilm Australia has been generously supplying the round prizes for quite a few years, but the company is no longer marketing memory cards so round winners now receive a complimentary

six-issue subscription to Camera magazine. If you already subscribe, your prize subscription will commence upon the expiry of your paid one.

Note that it is not a requirement that entries to the Fujifilm Showcase be taken on Fujifilm camera equipment. Read the accompanying rules carefully and get snapping.

ENTRY GUIDELINES

You can enter the Fujifilm Showcase on-line at www.digitalcameraworld.com/news/acmcomps otherwise you can send us your digital image files on a DVD or a USB drive to Australian Camera, Future Publishing Australia
PO Box 1077 Mount Street
North Sydney, NSW 2059

The requirements for submitting digital files are as follows:

- 300 dpi resolution, and at a file size which enables a reproduction of up to 20x15 cm. Please avoid submitting overly large file sizes, especially when emailing the images. Up to 4.0 MB in file size is more than sufficient.
- Digital retouching and manipulation is permitted, but the judges will continue to reward good in-camera techniques.
- Full details of the camera, lens and any retouching must be supplied with the image. Images can be titled if you wish, but this isn't essential. Please make sure your DVDs or USB drives are marked with your name and address.
- Up to four images may be permitted per entry.
- Please include a self-addressed and postage-paid envelope if you would like your disc or drive returned.

DIGITAL SLR CAMERAS BUYER'S CHECK LIST MARCH/APRIL 2020

THIS CHECKLIST is designed to allow direct comparisons between different camera models, here listed in price order within each brand. The published prices are mostly supplied by the distributors as recommended retail prices (RRPs). However, some distributors are no longer supplying RRP's to the media so it has become necessary to determine an

'estimated street price' derived from the range of prices for a model published by retailers. Where this has been necessary, the letter 'E' appears at the start of the entry.

A dot appearing in a column indicates that the feature is available on the camera model listed. Where a specification or product detail hasn't yet been published

or confirmed, the letters TBA (to be announced) or TBC (to be confirmed) are used. If a feature is irrelevant to a particular model – such as mirror lock-up for compact system cameras – then n/a (not applicable) is used. Every effort is made to ensure accuracy; please send any corrections to camera@avhub.com.au

				Sensor Size	Sensor Type	File Formats		Memory Cards						Exposure Modes						Features																	
Model		Price (Body Only Unless Noted With Asterisk*)	Megapixels (Total)	35mm	APS/DX	Four-Thirds	CCD	CMOS	Foveon	RAW	TIFF	JPEG	CF/XOD/Cfast	Memory Stick	SD/SDHC/SDXC	Continuous Shooting Speed (fps)	Burst Length (U=Unlimited) Max. Resolution	Autofocus Points	Metering Pixels/Zones	Program	Subject Programs	Aperture Priority	Shutter Priority	Manual	Shutter Speeds	Anti-Dust	Built-In Flash	FHD Video	4K Video	Anti-Shake In Body	Wireless Transmitter/WiFi	Live View	Weather Proofing	Monitor Size (cm)	Weight (Body Only)	Review Issue	
E	Canon EOS 3000D*	\$0	18.7	•			•	•	•	•		•			•	3	110	9	63	•	•	•	•	•	30-1/4000	•		•			•	•		6.8	436	Jul/Aug '18	
E	Canon EOS 1500D*	\$0	24.7	•			•	•	•	•		•			•	3	150	9	63	•	•	•	•	•	30-1/4000	•		•			•	•		7.62	475	Jul/Aug '18	
E	Canon EOS 200D*	\$0	25.8	•			•	•	•	•		•			•	5	U	9	63	•	•	•	•	•	30-1/4000	•	•	•			•	•		7.62	406		
E	Canon EOS 200D Mark II*	\$0	25.8	•			•	•	•	•		•			•	5	U	9	63	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		7.62	402		
E	Canon EOS 800D*	\$0	25.8	•			•	•	•	•		•			•	6	950	45	7560	•	•	•	•	•	30-1/4000	•	•	•			•	•		7.62	485		
E	Canon EOS 77D*	\$0	25.8	•			•	•	•	•		•			•	6	950	45	7560	•	•	•	•	•	30-1/4000	•	•	•			•	•		7.62	493	Nov/Dec '17	
E	Canon EOS 80D*	\$0	25.8	•			•	•	•	•		•			•	7	110	45	7560	•	•	•	•	•	30-1/8000	•	•	•			•	•	•	7.62	730	Sept/Oct '16	
E	Canon EOS 90D	\$0	34.4	•			•	•	•	•		•			•	10	58	45	220K	•	•	•	•	•	30-1/16,000	•	•	•	•		•	•	•	7.7	701	Nov/Dec '19	
E	Canon EOS 7D Mark II	\$0	20.9	•			•	•	•	•		•	•		•	10	U	65	252	•		•	•	•	30-1/8000	•	•	•			•	•	•	7.62	910	Jan/Feb '15	
E	Canon EOS 6D Mark II	\$0	27.1	•			•	•	•	•		•			•	6.5	110	45	7560	•	•	•	•	•	30-1/4000		•	•			•	•	•	7.62	685	Jan/Feb '18	
E	Canon EOS 5Ds	\$0	53	•			•	•	•	•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•				•	•		8.1	845	Sept/Oct '15
E	Canon EOS 5D Mark IV	\$0	31.7	•			•	•	•	•		•	•		•	7	U	61	150K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	890	Jan/Feb '17	
E	Canon EOS 5DsR	\$0	53	•			•	•	•	•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•				•	•		8.1	845	
E	Canon EOS-1DX Mark II	\$0	21.5	•			•	•	•	•		•	•			14	U	61	360K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1340		
E	Canon EOS-1DX Mark III	\$0	21.4	•			•	•	•	•		•	•			16	1000+	191	400k	•		•	•	•	30/1/8000		•	•	•		•	•	•	8.1	1440		
E	Nikon D3400*	\$0	24.72	•			•	•	•	•		•			•	5	100	11	420	•	•	•	•	•	30-1/4000	•	•	•			•	•		7.62	395		
E	Nikon D3500*	\$0	24.78	•			•	•	•	•		•			•	5	100	11	420	•	•	•	•	•	30-1/4000	•	•	•			•	•		7.62	365		
E	Nikon D5600*	\$0	24.78	•			•	•	•	•		•			•	5	100	39	2106	•	•	•	•	•	30-1/4000	•	•	•			•	•		8.1	410		
E	Nikon D7200*	\$0	24.72	•			•	•	•	•		•			•	6	33	51	2016	•	•	•	•	•	30-1/8000	•	•	•			•	•	•	8.1	675		
E	Nikon D7500	\$0	21.51	•			•	•	•	•		•			•	8	100	51	180K	•	•	•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	640		
E	Nikon D610	\$0	24.78	•			•	•	•	•		•			•	6	51	39	2016	•	•	•	•	•	30-1/8000	•	•	•				•	•		8.1	760	Mar/Apr '14
E	Nikon D750	\$0	24.93	•			•	•	•	•		•			•	6.5	87	51	91K	•	•	•	•	•	30-1/4000	•	•	•			•	•	•	8.1	750	May/Jun '15	
E	Nikon D500	\$0	21.51	•			•	•	•	•	•	•			•	10	79	153	180K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	760	Nov/Dec '16	
E	Nikon Df	\$0	16.9	•			•	•	•	•	•	•			•	5.5	100	33	2016	•		•	•	•	30-1/4000		•					•	•		8.1	710	Mar/Apr '14
E	Nikon D810	\$0	37.1	•			•	•	•	•	•	•	•		•	5	100	51	91K	•		•	•	•	30-1/8000	•	•	•			•	•	•	8.1	880	Sept/Oct '14	
E	Nikon D780	\$0	25.28	•			•	•	•	•		•			•	7	TBC	51	180k	•		•	•	•	900-1/8000		•	•	•		•	•	•	8.1	755		
E	Nikon D850	\$0	46.89	•			•	•	•	•	•	•	•		•	7	200	153	180K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	915	Nov/Dec '17	
E	Nikon D5	\$0	21.33	•			•	•	•	•	•	•				12	200	153	180K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1235	Sept/Oct '16	
	Pentax K-70	\$0	24.78	•			•	•	•	•	•	•			•	6	40	11	77	•	•	•	•	•	30-1/6000	•	•	•			•	•	•	7.62	685		
	Pentax KP	\$0	24.96	•			•	•	•	•		•			•	7	28	27	86K	•	•	•	•	•	30-1/24,000	•	•	•			•	•	•	7.62	640		
	Pentax K-1	\$0	36.77	•			•	•	•	•	•	•			•	4.4	70	33	86K	•		•	•	•	30-1/8000		•	•			•	•	•	8.1	924		
	Pentax K-1 Mark II	\$0	36.77	•			•	•	•	•	•	•			•	4.4	70	33	86K	•		•	•	•	30-1/8000		•	•			•	•	•	8.1	925		
	Sony ILCA-99 II	\$0	43.6	•			•	•	•	•	•	•		•	•	12	60	478	1200	•	•	•	•	•	30-1/8000	•	•	•		•	•	•	•	7.62	790		

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32

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PIXEL

11

FRAMES
PER SEC

45

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BUYER'S CHECK LIST MARCH/APRIL 2020

				Sensor Size	Sensor Type	File Formats	Memory Cards				Exposure Modes						Features																		
Model	Price (Body Only Unless Noted With Asterisk*)	Megapixels (Total)	35mm	APS/DX	Four Thirds	CMOS	Foveon	RAW	TIFF	JPEG	Memory Stick Compact Flash	SD/SDHC/SDXC * = microSD	Continuous Shooting Speed (fps)	Burst Length (U=Unlimited) Max. Resolution	Autofocus Points	Metering Zones	Shutter Speeds	Manual	Shutter Priority	Aperture Priority	Subject Programs	Program		Built-In Flash	Anti-Dust	FHD Video	4K Video	Anti-Shake In Body	Wireless Transmitter/WiFi	Built-In Viewfinder	Weather Proofing	Monitor Size (cm)	Weight (Body Only)	Review Issue	
E Canon EOS M100*	\$0	24.7	•			•	•	•	•			•	6.1	89	49	384	•	•	•	•	•	•	•	•	•	•	•		•			7.62	302		
E Canon EOS M50*	\$0	25.8	•			•	•	•	•	•		•	10	33	143	384	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	7.62	387	
E Canon EOS M6*	\$0	25.8	•			•	•	•	•	•		•	9	26	49	384	•		•	•	•	•	•	•	•	•		•	•			7.62	343		
E Canon EOS M5*	\$0	25.8	•			•	•	•	•	•		•	7	U	49	384	•	•	•	•	•	•	•	•	•	•		•	•	•		8.1	380	Mar/Apr '17	
Canon EOS M6 Mark II*	\$0	34.4	•			•	•	•	•	•		•	14	48	5481	384	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	7.5	408		
Canon EOS RP	\$0	27.1	•			•	•	•	•	•		•	5	U	4779	384	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	7.62	440	May/June '19	
Canon EOS R	\$0	31.7	•			•	•	•	•	•		•	8	100	5655	384	•		•	•	•	•	•	•	•	•	•	•	•	•	•	8.01	580	Jan/Feb '19	
Fujifilm X-A5*	\$0	24.24	•			•	•	•	•	•		•	6	10	91	256	•	•	•	•	•	•	•	•	•	•	•		•			7.62	311		
Fujifilm X-A7*	\$0	24.24	•			•	•	•	•	•		•	6	TBC	TBC	256	•	•	•	•	•	•	•	•	•	•	•		•			8.9	271		
Fujifilm X-T100*	\$0	24.24	•			•	•	•	•	•		•	6	26	91	256	•	•	•	•	•	•	•	•	•	•	•		•	•		7.62	399	Sept/Oct '18	
Fujifilm X-T200*	\$0	24.24	•			•	•	•	•	•		•	8	TBC	425	256	•	•	•	•	•	•	•	•	•	•	•		•	•		8.89	321		
Fujifilm X-T20*	\$0	24.24	•			•	•	•	•	•		•	14	62	325	256	•	•	•	•	•	•	•	•	•	•	•		•	•		7.62	333	Sept/Oct '17	
Fujifilm X-E3*	\$0	24.24	•			•	•	•	•	•		•	14	35	325	256	•	•	•	•	•	•	•	•	•	•	•		•	•		7.62	287	Jan/Feb '18	
Fujifilm X-T2	\$0	24.24	•			•	•	•	•	•		•	14	43	325	256	•		•	•	•	•	•	•	•	•	•		•	•	•	7.62	457	Jan/Feb '17	
Fujifilm X-T30*	\$0	26.1	•			•	•	•	•	•		•	20	32	425	256	•	•	•	•	•	•	•	•	•	•	•		•	•		7.62	333	Jul/Aug '19	
Fujifilm X-Pro2	\$0	24.3	•			•	•	•	•	•		•	8	83	273	256	•	•	•	•	•	•	•	•	•	•	•		•	•		7.62	445	May/June '16	
Fujifilm X-T3	\$0	26.1	•			•	•	•	•	•		•	20	114	425	256	•		•	•	•	•	•	•	•	•	•		•	•		7.62	489	Jan/Feb '19	
Fujifilm X-Pro3	\$0	26.1	•			•	•	•	•	•		•	11	145	325	256	•		•	•	•	•	•	•	•	•	•		•	•		7.62	447		
Fujifilm X-H1	\$0	24.3	•			•	•	•	•	•		•	11	80	325	256	•		•	•	•	•	•	•	•	•	•		•	•		7.62	623	May/June '18	
Leica TL2	\$0	24.96	•			•	•	•	•	•		•	20	29	49	TBC	•	•	•	•	•	•	•	•	•	•	•		•			9.4	355		
Leica CL	\$0	24.96	•			•	•	•	•	•		•	10	140	49	TBC	•	•	•	•	•	•	•	•	•	•	•		•			7.62	353	Jan/Feb '18	
Leica SL2	\$0	50.44	•			•	•	•	•	•		•	10	100	225	TBC	•		•	•	•	•	•	•	•	•	•		•	•		8.1	835	Jan/Feb '20	
E Nikon Z 50	\$0	21.51	•			•	•	•	•	•		•	11	TBC	209	TBC	•	•	•	•	•	•	•	•	•	•	•		•			8.1	395		
E Nikon Z 6	\$0	25.28	•			•	•	•	•	•		•	12	44	273	TBC	•		•	•	•	•	•	•	•	•	•		•	•		8.1	585	Mar/Apr '19	
E Nikon Z 7	\$0	46.89	•			•	•	•	•	•		•	12	23	493	TBC	•		•	•	•	•	•	•	•	•	•		•	•		8.1	585	Nov/Dec '18	
Olympus PEN E-PL8*	\$0	17.2			•	•	•	•	•	•		•	8.5	64	81	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	326		
Olympus OM-D E-M10 II*	\$0	17.2			•	•	•	•	•	•		•	8.5	79	81	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	350	Nov/Dec '15	
Olympus OM-D E-M10 III*	\$0	17.2			•	•	•	•	•	•		•	8.6	36	121	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	365	Nov/Dec '17	
Olympus PEN E-PL9*	\$0	17.2			•	•	•	•	•	•		•	8.6	U	121	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	332		
Olympus OM-D E-M5 II	\$0	17.2			•	•	•	•	•	•		•	10	19	81	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	417	May/June '15	
Olympus OM-D E-M5 III	\$0	21.8			•	•	•	•	•	•		•	30	150	121	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	366		
Olympus OM-D E-M1	\$0	17.2			•	•	•	•	•	•		•	10	49	81	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	350	Nov/Dec '13	
Olympus PEN-F*	\$0	21.77			•	•	•	•	•	•		•	10	45	81	324	•	•	•	•	•	•	•	•	•	•	•		•			7.62	370	May/June '16	
Olympus OM-D E-M1 II	\$0	21.8			•	•	•	•	•	•		•	15	84	242	324	•		•	•	•	•	•	•	•	•	•		•			7.62	498	Mar/Apr '17	
Olympus OM-D E-M1X	\$0	21.8			•	•	•	•	•	•		•	18	89	242	324	•		•	•	•	•	•	•	•	•	•		•			7.62	849	Mar/Apr '19	
Panasonic Lumix GX850*	\$0	16.84			•	•	•	•	•	•		•*	6	100	49	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	239		
Panasonic Lumix GX880*	\$0	16.84			•	•	•	•	•	•		•	5.8	100	49	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	240		
Panasonic Lumix G85	\$0	16.84			•	•	•	•	•	•		•	9	100	49	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	453	Jan/Feb '17	
Panasonic Lumix GX9	\$0	21.77			•	•	•	•	•	•		•	9	100	49	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	450	Jul/Aug '18	
Panasonic Lumix G95	\$0	21.77			•	•	•	•	•	•		•	9	300	49	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	484	Nov/Dec '19	
Panasonic Lumix G9	\$0	21.77			•	•	•	•	•	•		•	20	600	225	1728	•	•	•	•	•	•	•	•	•	•	•		•			7.62	579	Jan/Feb '18	
Panasonic Lumix GH5	\$0	21.77			•	•	•	•	•	•		•	12	600	225	1728	•	•	•	•	•	•	•	•	•	•	•		•			8.1	645	Jul/Aug '17	
Panasonic Lumix GH5S	\$0	11.93			•	•	•	•	•	•		•	12	600	225	1728	•	•	•	•	•	•	•	•											

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Photography: Toshiya Ogawa

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