

**URL:** <https://photorumors.com/2023/09/02/popflash-is-now-the-official-distributor-of-light-lens-lab-lll-lenses-for-leica-m-mount-in-the-us/>

**Title:** PopFlash is now the official distributor of Light Lens Lab (LLL) lenses for Leica M-mount in the US

**Text:** PopFlash is now the official distributor of Light Lens Lab (LLL) lenses for Leica M-mount in the US. Check out their website and eBay store for their current Light Lens Lab lens offerings. Additional information on LLL lenses can be found [here](#) and [here](#). If you have any questions, you can contact PopFlash directly at [support@popflash.com](mailto:support@popflash.com).

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**URL:**

<https://nikonrumors.com/2023/09/02/updated-list-of-upcoming-viltrox-lenses-for-nikon-z-mount.aspx/>

**Title:** Updated list of upcoming Viltrox lenses for Nikon Z-mount

**Text:** Here is an updated list of the upcoming Viltrox AF lenses for Nikon Z-mount: More third-party lenses for Nikon Z-mount can be found [here](#). Previous coverage of Viltrox lenses for Nikon Z-mount can be found [here](#). In the US Viltrox lenses are sold at Adorama, B&H, and Amazon. International shipping is available at Pergear and at the Viltrox online store. You can get 8% off Viltrox lenses at the official online store with code NIKONRUMORS. Via PhotoRumors

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**URL:** <https://photorumors.com/2023/09/02/additional-updated-rumored-fujifilm-gfx100-ii-specifications/>

**Title:** Additional/updated/rumored Fujifilm GFX100 II specifications

**Text:** FCC disclosure statement: this post may contain affiliate links or promotions that do not cost readers anything but help keep this website alive. As an Amazon Associate, I earn from qualifying purchases. Thanks for your support!

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**URL:** <https://nikonrumors.com/2023/09/02/the-best-nikonrumors-posts-for-august-2023.aspx/>

**Title:** The best NikonRumors posts for August 2023

**Text:** FCC disclosure statement: this post may contain affiliate links or promotions that do not cost readers anything but help keep this website alive. As an Amazon Associate, I earn from qualifying purchases. When you click on links to various merchants on this site and make a purchase, this can result in this site earning a commission. Affiliate programs and affiliations include, but are not limited to, the eBay Partner Network. Thanks for your support!

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**URL:** <https://nikonrumors.com/2023/09/02/the-new-cfexpress-memory-card-update-4-0-will-double-the-speed-to-4-gb-s-while-still-being-backward-compatible.aspx/>

**Title:** The new CFexpress memory card update 4.0 will double the speed to 4 GB/s while still being backward compatible

**Text:** The latest CFexpress memory card update 4.0 will double the speed to 4 GB/s while still being backward compatible: CompactFlash Association members: Additional information: CFexpress 4.0 delivers double the theoretical throughput of CFexpress 2.0 while maintaining the same form factor LOS GATOS, California – CompactFlash Association (CFA), the organization responsible for professional removable media specifications such as CompactFlash®, CFAST®, XQD®, and CFexpress® announces the release of the CFexpress 4.0 logical and physical specifications increasing the performance of the existing CFexpress 2.0 specifications while maintaining backward compatibility targeting the professional imaging and industrial markets requiring high-performance data capture and transfer. CFexpress 4.0 is an evolutionary specification riding on the great success of CFexpress 2.0 employing the industry standard PCI Express® (PCIe) Gen4 bus and NVM Express (NVMe) 1.4c logical interface for even higher performance and efficient NAND Flash access. With its three form factors, CFexpress 4.0 continues to support diverse performance levels to match various market requirements maintaining consistent electrical, logical, and physical interfaces while setting realistic power consumption targets for wider adoption of the CFexpress 4.0 for battery-powered applications in the imaging and industrial markets. Utilizing widely adopted open standards allow the use of established development platforms saving development time, cost, and effort. CFexpress was developed in 2016 with the charter to become a removable media standard that can span various

vertical market segments providing a stable and future-proof platform with economies of scale. Since then, the standard has been widely adopted by the imaging and industrial market segments.

**Performance** With the adoption of PCIe Gen4 in CFexpress 4.0, the media cards can theoretically achieve double the throughput performance compared to PCIe Gen3 of CFexpress 2.0 while maintaining backward compatibility. CFexpress 4.0 along with CFexpress 2.0 shall provide flexibility in the choice of performance, power, and size requirements for target host devices based on their requirements.

**Form Factor** The three card types – Type A, Type B, and Type C – support different host form-factor and performance requirements while maintaining a consistent electrical, logical, and physical interface. The mechanical dimensions of each card type are specified allowing adaptor cards for smaller card types to fit into larger card sockets. Metal lids provide physical robustness to withstand use in harsh environments while providing easier thermal management for hosts.

**Scalability** CFexpress 4.0 allows seamless migration from CFexpress 2.0 by utilizing the same underlying bus and logical interfaces of PCIe and NVMe while maintaining the exact same form factors. This allows the preservation of earlier investments made in CFexpress cards.

CFA is a standards body and trade association that works closely with its ecosystem partners in the development of new removable media standards and markets. The earlier CFexpress 2.0 Type A and Type B standards have been widely adopted by high-end imaging hosts. “Adoption of the higher performance CFexpress 4.0 for removable media storage will support current and future needs of professional photographers, videographers and cinematographers enabling higher resolution, frame rates, and color depth leveraging PCIe Gen4. CFexpress 4.0 will further cement CFexpress as a standard in the imaging industry,” said Hiroshi Noda of Canon and co-chairman of the CFA board. “With the evolutionary approach in defining the new CFexpress 4.0 specifications, end users can preserve their investments made in CFexpress 2.0 removable media cards while enjoying cutting-edge use cases with the higher performance CFexpress 4.0 cards. This is a win-win for the installed base and the growing CFexpress ecosystem,” said Nobuhiro Fujinawa of Nikon and co-chairman of the CFA board. “With its three form factors maintaining a consistent electrical, logical, and physical interface, CFexpress 4.0 will allow professional photographers, videographers, and cinematographers to scale seamlessly amongst the various use-case scenarios demanded by the host cameras. It is also a welcome approach for host manufacturers since the development cycle can be reduced significantly,” said Hiroshi Machida of Sony Corporation and CFA board member. CFA is also preparing a new specification for VPG (Video Performance Guarantee) for higher sustained video recording which shall be released in the near future. The new CFexpress 4.0 specifications are available for CFA members only. CFA invites host and media companies interested in supporting the new CFA specifications to join CFA as members. Membership of CFA also enables participation in various workgroups contributing to CFA’s technical advancements and marketing initiatives. More information can be found at <http://www.compactflash.org>.

About CompactFlash Association CompactFlash Association (CFA) is a standards body and trade association founded in 1995 that has been defining open-standard removable media solutions. Standards developed and defined by CFA are widely adopted by professional and prosumer digital cameras and camcorders as well as various industrial applications worldwide. CFA consists of over 80 member companies with a dynamic ecosystem contributing to the standardization of future removable media technologies. CompactFlash®, CFast®, XQD®, and CFexpress® are trademarks that CompactFlash Association licenses royalty free to its members. CFast® and CFexpress® are trademarks of CompactFlash Association. CompactFlash® is a trademark of SanDisk LLC. XQD® is a trademark of Sony Corporation. PCIe® is a trademark of PCI-SIG. NVMe Express® is a trademark of NVMe Express, Inc. Via PhotoRumors

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**URL:** <https://www.dpreview.com/news/0234114652/forrest-pearson-shares-how-to-capture-living-fireworks-with-the-blur-focusing-technique>

**Title:** Forrest Pearson shares how to capture 'organic' fireworks with the blur focusing technique

**Text:** Site update: Our login process has been updated, click here for more information

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**URL:** <https://mysku.club/blog/aliexpress/97308.html>



**Text:** Lefejezett emberek, kisgyerekek puskával, kommunista felvonulás, b<sup>l</sup>rkabátokban férfiak, prostituált plüssjátékkal, kerékpár az égben. Freddie Mercury képe el<sup>l</sup>tt álldogáló sörhasú kopaszodó férfiak. A világ fekete-fehér és színes lenyomatában pillanatok alatt elevenedik meg a való élet. Benk<sup>l</sup> Imre fotográfus Mai Manó Házban megnyílt kiállításán jártunk. Lassan már minden a retróról szól. A ruhák, a cip<sup>l</sup>k, a tárgyak, a zenék, és a m<sup>l</sup>vészet mind az elmúlt harminc év nosztalgikus utánérzésével van jelen a mindennapjainkban. A mai fiatalok megtalálták azt a világot, amiben a mai ötvenesek n<sup>l</sup>ttek fel, és követelik azt az életérzést, amely elhozta a szabadságot a kommunista diktatúrák bukásával. Nekik a nosztalgia a háromcsíkos poliészter anyagú, oldalt felsliccelt, csillogó, futásra használt rövidnadrágban testesül meg, vágyódnak a Tisza cip<sup>l</sup> után, és csodálják John Travolta hajviseletét. Arról már sokkal kevésbé szól a n<sup>l</sup>ta, milyen volt akkor mondjuk egy majális, és hogyan szórakoztak az emberek. Azt tudja mindenki, hogy nem volt okos a telefon, és nem volt digitális a világ, de kellene nagyon a fogódzók a korszak vizualizálásához is. Ehhez pedig a fényképnél nincsen jobb médium. A nyolcvanéves Benk<sup>l</sup> Imre hazánk jelenkori történelmének az egyik legfontosabb szemtanúja. IKONIKUS NIKON GÉPÉVEL LEFOTÓZTA AZ UTÓKORNAK MINDAZT, AMIR<sup>l</sup>L VÁROSI LEGENDAKÉNT HALLANI NÉHA A BARÁTI ÖSSZEJÖVELETEKEN. ■ nem kérdezett, csak jelen volt, némán, felt<sup>l</sup>nés nélkül beleolvadva a tömegbe, hogy ne vigyék el a karhatalom emberei és ne törjék össze a gépét, mert olyat örökölt meg, amir<sup>l</sup>l kellemetlen lett volna beszélni. ■ az autonóm riport m<sup>l</sup>fajának egyik legjelent<sup>l</sup>sebb magyar képvisel<sup>l</sup>je, leghíresebb sorozatában 1987 és 1995 között örököltette meg Özd, az Acélváros megrendít<sup>l</sup> végnapjait. A mostani kiállítás anyagának gerince a Városliget életét mutatja. Azt a felvonulási teret, ahol látunk május elsejei felvonulást a kommunista id<sup>l</sup>kb<sup>l</sup>l, melegfelvonulást a rendszerváltás után, Nemzeti Vágtát napjainkban. A kiállításon azt látjuk, hogy embereket fényképez. Hátról, fej nélkül, ferdén, nem retusálva, valóságosan ragadja meg egy békétlen világ békés pillanatait. Városliget menni Amerika A Városliget, akárcsak egy képzeletbeli komp (Ady Endre után szabadon), néha kelet, néha nyugat felé ráncigálta az embereket. Benk<sup>l</sup> Imre fotóin látjuk a május elsejei felvonulást, ahol a pártvezet<sup>l</sup>k óriási tribünön állva nézik, hogy a tömeg geometrikus alakzatokba rendez<sup>l</sup>dve ünnepli az akkori szocializmust, miközben ha szabadságot nem is, de meleg sört és hideg virsli akármekkora mennyiségben kínálni tudtak. Benk<sup>l</sup> fotóin megjelennek a melegfelvonulás képvisel<sup>l</sup>i is, amint bizonytalanul, némileg szorongva próbálják megélni a szabadságukat. Aztán azt is látjuk, ahogy a Nemzeti Vágta közönsége szembesül a magyar múlttal, bár nekik lovak helyett már csak lóer<sup>l</sup> jutott, abból is inkább a tíz évnél id<sup>l</sup>sebb és használt kategória. De azt is látjuk, hogy Benk<sup>l</sup> fényképein várakoznak az emberek. TÉTLENÜL ÁLLDOGÁLNAK, MINTHA VÁRNÁNAK VALAMIRE. CSODÁRA, MEGVÁLTÁSRA, KI TUDJA, MIRE. TALÁN ■K SE TUDJÁK. CSAK VÁRAKOZNAK. Olcsó életek lenyomatai Benk<sup>l</sup> Imre képein a kisemberek világa kel életre. Els<sup>l</sup> olvasatban olcsó életek ezek, olcsó emberek olcsó szórakozása, de ha egy kicsit tovább álldogálunk a kiállításon, képesek leszünk meglátni a fényképek mögötti csodát. Benk<sup>l</sup> a legfontosabb pillanatokot kapja lencsevégre. Látjuk például, ahogyan egy kisfiú egy alumínium ■rhájában komoly arccal ül, és a fotós elkapja azt az arckifejezését, amikor a gyerek gondolatban bejárja a világ<sup>l</sup>r legfontosabb bolygóit, miközben a valóságban éppen hogy csak döcög az a körhinta. Vagy azt is látjuk, hogy a céllövöldében egy apa büszkén néz a fiára, akik megmutatják, hogy ■k is tudnak a légpuskával l<sup>l</sup>ni, ám az egyik fiú ügyetlenül és rosszul a hóna alatt támasztja meg a puskát, miközben céloz, ami így, még az is lehet, hogy ki fog esni a kezéb<sup>l</sup>l. De az kés<sup>l</sup>bb jön, most még a várakozással teli pillanatban vagyunk. Az apa magát látja a fiaiban, azt, hogy ezekb<sup>l</sup>l a kölykökb<sup>l</sup>l is ember lesz végül, az anya pedig boldog, hogy végre nem szidni kell a lurkókat, bár némi aggodalom mindig látszik az anyák tekintetében. Egy egész család élete elevenedik meg a szemünk el<sup>l</sup>tt, történetet látunk, amely akár a sajátunk is lehetne. A célkeresztben a létezés maga Benk<sup>l</sup> el<sup>l</sup>szeretettel fényképez hátról embereket. Ilyenkor nem tud el<sup>l</sup>térbe tolni a személyiség varázsa, ilyenkor Benk<sup>l</sup> a legnehezebb témát fotózza: a létezést. Egy let<sup>l</sup>nt világ olcsó ruháiban az olcsó élet lenyomatai tárulnak elénk, amely mégsem t<sup>l</sup>nik filléresnek. Id<sup>l</sup>s pár táncol a fák alatt, egy másik képen meg ölben tartott csivava kutya óriási szemével úgy néz a kamerába, ahogyan a kisgyerekek szoktak, gazdájának fejét levágta a fényképező, így a kutya létezése tükrében látható csak az ember. A kutya szemében nem látunk se félelmet, se szomorúságot, így hajlamosak vagyunk azt gondolni, hogy jó helyen állomásozik a négylábú eb. Filmek is eszünkbe jutnak a képek láttán: néha Milos Forman Szöszi szerelmének jelenetei kísértének, néha

olyan, mintha Jim Jarmush Florida, a paradicsom képei kelnének életre. MI PEDIG WIM WENDERS BERLIN FÖLÖTT AZ ÉG SZOMORÚAN MAGÁNYOS ANGYALAKÉNT ÉSZREVÉTELNÜL JÁRHATUNK-KELHETÜNK A VÁROSLIGET SZÓRAKOZÓ KISEMBEREI KÖZT KERESVE A LÉTEZÉS IGAZSÁGAIT. Szociofotók? Igen, azok, de tele érzelemmel és emlékekkel. Ezek a fotók nyugalmat sugároznak, még akkor is, ha tudjuk, hogy nagyon törékeny és múlandó mindez. Inkább csak pillanatfelvétel. Benk■ igazi zsenialitása a fekete-fehér fotóiban bontakozik ki igazán, ahol a színek hiánya segít abban, hogy jobban figyeljünk a formákra, amelyek az ideákon túlmutató rendet tükrözik. Ferde képek, hétköznapi, nem modellalkatú emberek, klasszikus fényképészeti eljárások, sokszor el■nytelen, rendhagyó beállítások jellemzik munkáit. Mindez furcsának t■nhet a mai kor emberének, aki megszokta, hogy a közösségi oldalakon csak a szép és tökéletes pozícióban megkreált fotókat rakja ki. A kiállításon valami mást látunk egy vérbeli fotós szemével, aki nem enged az elveib■l, és m■vészetté emeli a hétköznapi valóságot. Vidám Park. Budapest, 1987 (Fotó: Benk■ Imre) Kisfo■dalatti. Budapest, 1995 (Fotó: Benk■ Imre) Majális. Városliget. Budapest, 2000 (Fotó: Benk■ Imre) Felvonula■s te■r. Budapesti Bu■csu■. 2001 (Fotó: Benk■ Imre) Melegfelvonula■s. Budapest, 2001 (Fotó: Benk■ Imre) Va■rosliget. Budapest, 2008 (Fotó: Benk■ Imre) Nemzeti Va■gta. Ho■so■k tere. Budapest, 2009 (Fotó: Benk■ Imre) Maja■lis. Va■rosliget. Budapest, 2009 (Fotó: Benk■ Imre) Majális. Városliget. Budapest, 2013 (Fotó: Benk■ Imre) Critical Mass. Városliget. Budapest, 2013 (Fotó: Benk■ Imre) Majális. Városliget. Budapest, 2018 (Fotó: Benk■ Imre) Benk■ Imre, a kortárs magyar fotóm■vész-generáció egyik legnagyobbjának fényképei a Mai Manó Házban 2023. október 1-jéig láthatók.

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**URL:** <https://www.heise.de/news/Nassplatten-und-neue-Alphas-die-Fotonews-der-Woche-35-2023-9291989.html>

**Title:** Nassplatten und neue Alphas – die Fotonews der Woche 35/2023

**Text:** Es ist IFA-Wochenende – und damit Zeit für Fernseher, Fernseher, und: noch mehr Fernseher. Und Smartphones. Das sind die Schwerpunkte der Messe in Berlin, nicht die Fotografie. Das macht aber gar nichts, denn der Fotomarkt hat seine eigenen Events, und selbst auf der IFA findet sich das ein oder andere Gadget, das auch Fotografen nutzen können. Anzeige Ein solches ist der HDR-Beamer namens "Horizon Ultra" von Xgimi. Er ist recht farbstark und auch in der Aufstellung unproblematisch, weil er Laserlicht mit LED-Beleuchtung kombiniert. Damit kann er sich selbst auf die Leinwand ausrichten, ohne großen Schärfeverlust. Wer Fotos oder Filme mobil vorführt, lernt den Nutzen solcher kleinen Beamer schnell schätzen, denn die exakt plane Aufstellung zur Leinwand entfällt. Zwar bietet der Horizon, wie die meisten DLP-Beamer, kein echtes 4K, aber eben sehr statte Farben, auch mit Dolby Vision. Zwei, statt einer neuen Alpha 7C Dafür müssen aber zuerst passende Fotos her, und dafür erscheinen außerhalb der großen Fotomessen im Frühling und Herbst neue Kameras. In dieser Woche war es mit den Nachfolgemodellen der kompakten Vollformat-Alpha von Sony so weit. Dabei gabelt sich die Produktlinie: Es gibt nach der bisherigen Alpha 7C eine Alpha 7C II und eine Alpha 7R. R steht bei Sony immer für "Resolution", also hat dieses Modell den 61-Megapixel-Sensor der Alpha 7R V. Die Mark II der bisherigen 7C kommt auf 33 statt vorher 24 Megapixel. Sony setzt konsequent auf Filmen Alle Details finden sich in einer ausführlichen Meldung, daher hier nur der Hinweis auf die Film- und Vlogging-Eigenschaften – denn die baut Sony neben den dafür ausdrücklich vorgesehenen Modellen wie der ZV-1 II auch in die größeren Kameras ein. Der Trend wird so konsequent verfolgt wie bei kaum einem anderen Hersteller. So haben beide neuen Alpha 7C ein klapp- und schwenkbares Display, und sie arbeiten per USB-C als 4K-Webcam. Allein das kann für die wachsende Zahl der Webvideo-Produzenten den Ausschlag geben: Eine kompakte Kamera für unterwegs, die auch zum Streaming dient. Dazu passt, dass auch das neu aufgelegte Weitwinkel mit 16-35 mm f/2.8 einen De-Clicking-Modus hat. Die Blende rastet dann nicht in Stufen ein, klickt also nicht, was beim Filmen stören würde. Übrigens: Im Gegensatz zu den ultrakompakten und günstigeren Modellen wie der Nikon Z30 haben die neuen Alphas auch einen Sucher, was man von vorn nicht sofort sieht, sie sind also auch zum konzentrierten Fotografieren vor dem Auge geeignet. Anzeige Tamron-Tele für Nikkon-Z Mit großen und schweren Teles arbeiten Fotografen schon aus rein haptischen Gründen meist mit dem Sucher. Unter diesen findet sich nun eine weitere recht interessante Linse, die es bisher nur für Sonys E-Mount gab, – nun auch für den Z-Mount von Nikon:

Das 35-150mm f/2.0-2.8 von Tamron. Es ist ein weiterer Beleg für die engere Zusammenarbeit zwischen der beiden Firmen, und die in den letzten Jahren oft verspottete Nikon-Steuer fällt moderat aus. Die UVP ist nur 100 Euro höher als bei der Sony-Version, was auch dem Neuheitsfaktor und der Inflation geschuldet sein kann. Trotzdem sind 2000 Euro schon eine Ansage, dafür gibt es fast das übliche Profi-Tele mit 70-200 Millimetern. Dem hat das Tamron den Normalbereich mit f/2.0 statt f/2.8 voraus, man muss eben wieder einmal wissen, was man will. Und das gilt auch, wenn man sich ein Lensbaby auf die Kamera schraubt – das sind experimentelle Objektive für Experimentierfreudige. Damit lassen sich Effekte wie ein sich drehendes Bokeh gleich in der Kamera erzeugen, nicht erst im Anschluss am PC. Um ein Motiv vor Ort in Szene zu setzen, eben mit der Bildgestaltung zu spielen, ist das immer noch viel schneller als eine mühsame Nachbearbeitung. Und mit mehreren Schärfeebenen, die sich untereinander verschieben lassen, zu arbeiten, ist mit einem einfachen Dreh am Objektiv auch viel intuitiver als mit vielen Klicks. Nassplatten und Laserprojektor Der haptische Faktor, das Gestalten mit den Händen, macht auch mit einem Hightech-Klotz in der Hand viel vom Reiz des Fotografierens aus. Und ganz Handwerk wird es, wenn man die Kamera gleich selbst baut, wie das vor Kurzem unser Autor Markus Hofstätter getan hat. Er arbeitet viel mit Großformatkameras, die man sich im Wesentlichen auch aus zwei Euroboxen und einem alten Projektionsobjektiv vom Gebrauchtmart basteln kann. Was Hofstätter sonst mit den großen Kameras für große Fotos anstellt, zeigt er am 13. Oktober im Ars Electronica Center im österreichischen Linz. Dort gibt es dann den Vortrag "Deep Space Lecture", der nichts mit Astrofotografie zu tun hat. Vielmehr ist "Deep Space" der Name einer neuen Vorführungsinstallation des Museums, die rund um einen 8K-Laserprojektor gebaut wurde. Auf 16 mal 9 Metern werden so die extrem hoch aufgelösten Porträts von Hofstätter nahezu greifbar. Er stellt sie im Nassplattenverfahren her, kombiniert also eine gut 170 Jahre alte Technik mit Laserprojektion. Der Vortrag ist kein Teil des Festivals Ars Electronica, das findet bereits vom 6. bis 10. September statt, sondern eine eigene Veranstaltung. Die Geschichte von Minolta Eher in die Mitte der Geschichte fällt unsere Empfehlung für einen Long Read zum Wochenende. Es geht um die inzwischen untergegangene Marke Minolta. Deren Reste hatte 2005 Sony aufgekauft, welche die Basis für den Erfolg der Alpha-Kameras darstellten. Heute weniger bekannt ist, dass von Minolta viele bahnbrechende Innovationen kamen wie die erste Kamera mit Autofokus und motorischem Filmtransport. Das war mit der Maxxum 7000 der Fall, die 1985 auf den Markt kam. Und schon 1958, also deutlich vor beispielsweise Leica, prägte Minolta das Design der Spiegelreflexkamera mit Pentaprisma. Da erschien die Kamera SR-2, die auch das Titelbild dieser Kolumne zeigt. Das war nur ein Jahr nach der ersten derartigen Konstruktion überhaupt, die von Pentax kam. Minolta änderte aber das Design so, dass der silberne Streifen oben über dem sonst schwarzen Body saß. Zahllose Canons, Nikons und Leicas sahen danach ähnlich elegant aus. Und in den 1960er- bis 80er-Jahren war eine Minolta für Profis wie ambitionierte Amateure oft auch die Kamera der Wahl neben den heute übrig gebliebenen großen Marken. Wie das alles kam, haben die Kollegen von Petapixel mit vielen Hintergrundinformationen und Bildern lesenswert aufgeschrieben. (cbr)

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factors, CFexpress 4.0 continues to support diverse performance levels to match various market requirements maintaining consistent electrical, logical, and physical interfaces while setting realistic power consumption targets for wider adoption of the CFexpress 4.0 for battery-powered applications in the imaging and industrial markets. Utilizing widely adopted open standards allow the use of established development platforms saving development time, cost, and effort. CFexpress was developed in 2016 with the charter to become a removable media standard that can span various vertical market segments providing a stable and future-proof platform with economies of scale. Since then, the standard has been widely adopted by the imaging and industrial market segments.

**Performance** With the adoption of PCIe Gen4 in CFexpress 4.0, the media cards can theoretically achieve double the throughput performance compared to PCIe Gen3 of CFexpress 2.0 while maintaining backward compatibility. CFexpress 4.0 along with CFexpress 2.0 shall provide flexibility in the choice of performance, power, and size requirements for target host devices based on their requirements.

**Form Factor** The three card types – Type A, Type B, and Type C – support different host form-factor and performance requirements while maintaining a consistent electrical, logical, and physical interface. The mechanical dimensions of each card type are specified allowing adaptor cards for smaller card types to fit into larger card sockets. Metal lids provide physical robustness to withstand use in harsh environments while providing easier thermal management for hosts.

**Scalability** CFexpress 4.0 allows seamless migration from CFexpress 2.0 by utilizing the same underlying bus and logical interfaces of PCIe and NVMe while maintaining the exact same form factors. This allows the preservation of earlier investments made in CFexpress cards.

CFA is a standards body and trade association that works closely with its ecosystem partners in the development of new removable media standards and markets. The earlier CFexpress 2.0 Type A and Type B standards have been widely adopted by high-end imaging hosts. “Adoption of the higher performance CFexpress 4.0 for removable media storage will support current and future needs of professional photographers, videographers and cinematographers enabling higher resolution, frame rates, and color depth leveraging PCIe Gen4. CFexpress 4.0 will further cement CFexpress as a standard in the imaging industry,” said Hiroshi Noda of Canon and co-chairman of the CFA board. “With the evolutionary approach in defining the new CFexpress 4.0 specifications, end users can preserve their investments made in CFexpress 2.0 removable media cards while enjoying cutting-edge use cases with the higher performance CFexpress 4.0 cards. This is a win-win for the installed base and the growing CFexpress ecosystem,” said Nobuhiro Fujinawa of Nikon and co-chairman of the CFA board. “With its three form factors maintaining a consistent electrical, logical, and physical interface, CFexpress 4.0 will allow professional photographers, videographers, and cinematographers to scale seamlessly amongst the various use-case scenarios demanded by the host cameras. It is also a welcome approach for host manufacturers since the development cycle can be reduced significantly,” said Hiroshi Machida of Sony Corporation and CFA board member. CFA is also preparing a new specification for VPG (Video Performance Guarantee) for higher sustained video recording which shall be released in the near future. The new CFexpress 4.0 specifications are available for CFA members only. CFA invites host and media companies interested in supporting the new CFA specifications to join CFA as members. Membership of CFA also enables participation in various workgroups contributing to CFA’s technical advancements and marketing initiatives. More information can be found at <http://www.compactflash.org>.

About CompactFlash Association CompactFlash Association (CFA) is a standards body and trade association founded in 1995 that has been defining open-standard removable media solutions. Standards developed and defined by CFA are widely adopted by professional and prosumer digital cameras and camcorders as well as various industrial applications worldwide. CFA consists of over 80 member companies with a dynamic ecosystem contributing to the standardization of future removable media technologies.

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**URL:** <https://nikonrumors.com/2023/09/01/the-nikon-f-camera-used-to-shoot-some-of-jimi-hendrixs-album-covers-is-up-for-auction-again.aspx/>

**Title:** The Nikon F camera used to shoot some of Jimi Hendrix's album covers is up for auction (again)

**Text:** Back in July I reported that the Nikon F camera used to shoot some of Jimi Hendrix's album covers was up for sale. The original auction was supposed to be back in July but for some reason, the

setup is still listed online for an upcoming auction on September 12th, 2023. Here are the details: JIMI HENDRIX – THE NIKON CAMERA KIT USED TO SHOOT THE PSYCHEDELIC LP COVERS FOR ‘ARE YOU EXPERIENCED’ AND MORE. The Nikon F camera kit in original c 1960s Halliburton carry case, used c 1967-1969 by legendary Psychedelic photographer Karl Ferris, to shoot the famed US debut psychedelic album covers, of Jimi Hendrix ‘Are You Experienced’, ‘Electric Ladyland’, ‘Axis Bold as Love’ and ‘The Jimi Hendrix Experience’, as well as Donovan’s ‘Gift From a Flower to a Garden’. ‘Wear Your Love Like Heaven’ and The Hollies ‘Evolution’. Plus poster shots of Eric Clapton’s “Cream” group. Kit includes Nikon F camera, Photomic FTN, light meter camera attachment, five Nikon lenses (50,55,35,28,105mm), a roll of original unexposed Kodak Ektachrome colour infrared 35mm film (out of production since 1977). This type of film was used by Ferris whilst shooting all of the above-mentioned album covers. Also to include three colour transparencies and three signed 12 x 12” prints of LP cover images by Ferris (Hendrix, Donovan, The Hollies). Sold with LOP/COA signed by Karl Ferris. Estimate: £10,000 – £20,000 (buyer’s premium: 28.80% inc VAT)

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**URL:** <https://tinhte.vn/thread/sigma-bo-sung-them-100-400mm-f-5-6-3-va-23mm-f-1-4-dc-dn-cho-ngam-fujifilm-x-gia-khong-doi.3711702/>

**Title:** Sigma bổ sung thêm 100-400mm f/5-6.3 và 23mm f/1.4 DC DN cho ngàm Fujifilm X, giá không đổi

**Text:** Chiếc lens này vẫn có Contemporary - Logo "C" quen thuộc cho ngòi dùng biết rằng nó hàng năm sẽ ra dòng với thiết kế gần như phân biệt với "A" (Art) là ống kính dòng cao cấp và dòng "S" (Sport) là dòng ống kính chuyên dùng cho chụp thể thao của Sigma. Ống kính, 100-400mm f/5-6.3 vẫn có chức năng quang học "Optical Stabilizer", tích hợp chức năng 5 trục ngay trên ống kính với các thiết lập trong menu khi thao tác sáng hoặc chụp ở tốc độ chậm. Với mặt cầu tiêu bên trong thì chiếc 100-400mm f/5-6.3 bao gồm 22 thấu kính và chia thành 16 nhóm gồm 1 thấu kính FLD và 4 thấu kính SLD cho khả năng giảm thiểu quang sai màu tiêu biểu. Khi chụp các ảnh siêu tốc độ f/5 đến f/23 với 9 lá khẩu. Chiếc lens này vẫn giữ mặt trước lồi nhô là 1.153gr và khoảng cách lấy nét tiêu chuẩn là 112cm (100mm) và 160cm (400mm). Chiếc ống kính tele-zoom này sẽ được bán ra vào ngày 21/9 với mức giá không đổi (so với các ngàm khác) là \$949. Hình ảnh chụp bởi Sigma 100-400mm f/5-6.3: Chiếc ống kính tele-zoom này sẽ được bán ra vào ngày 21/9 với mức giá không đổi (so với các ngàm khác) là \$949. Với mặt bên chốt cầu tiêu thì Sigma giữ nguyên như phiên bản dành cho các ngàm E hay L nên tiêu cự 100-400mm khi lắp lên các chiếc máy crop của Fujifilm sẽ tương đương khoảng 150-600mm trên Full-frame. Sigma cũng thay đổi hãm hãm khẩu năng lấy nét tiêu chuẩn liên tục là tùy tiện với và quang sai sẽ giảm đến mức tối thiểu.

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**URL:** <https://petapixel.com/2023/09/01/gpixels-new-43-megapixel-aps-sensor-can-shoot-8k-60p-video/>

**Title:** Gpixel's New 43-Megapixel APS Sensor Can Shoot 8K 60p Video

**Text:** Chinese company Gpixel has expanded its CMOS sensor portfolio with a new 43-megapixel APS-style image sensor capable of recording 8K video at up to 60 frames per second. As reported by Mirrorless Rumors, Gpixel's new GCINE3243 CMOS sensor has 43 megapixels on a 26.2 x 16.7-millimeter APS-style image sensor. While not as big of a name as Sony Semiconductors, Canon, or Samsung, Gpixel is not a new player in the image sensor space. In 2021, the company announced the development of a new global shutter Four-Thirds 10-megapixel image sensor that can shoot 4K video at up to 2,000 frames per second. Gpixel's new sensor is slightly larger than a typical APS-C sensor. A Nikon or Sony APS-C camera's sensor is around 23.5 x 15.5mm, roughly speaking. There is some variation depending on the precise camera model. Canon's APS-C sensors are slightly smaller. For example, the Canon EOS R7 has a 22.2 x 14.8mm APS-C image sensor. While slightly larger than an APS-C image sensor, Gpixel's new chip is a bit smaller than APS-H. Although a relatively rare format, an APS-H image sensor is around 28 x 18.5mm, or about 70% the size of a full-frame image sensor. Gpixel says its GCINE3243 CMOS image sensor is designed for cinematography, drones, production video, astronomy, and scientific imaging. The new sensor sports a backside-illuminated (BSI) design. Per Gpixel, the chip utilizes a wafer stacking design, enabling 8K resolution video at 60p frame rates, plus full well and high-dynamic range (HDR) modes. Alongside 8K/60p video, the sensor can also record binned 4K video at up to 120p. The sensor's pixel size is 3.2 microns. "The



state-of-the-art wafer stacking technology used in the GCINE3243 sensor allows the BSI pixel array to be designed on a separate silicon wafer than its read-out circuit, pushing optical performance and read-out speeds beyond what is possible on single chip architectures,” explains Gpixel. “By expanding the GCINE product family into smaller optical formats, we broaden the applications that can benefit from its BSI and wafer-stacked architecture and variety of HDR features,” says Wim Wuyts, Gpixel’s Chief Commercial Officer. “We plan to continue to build on the success of this platform with additional standard and customized sensors supporting the professional video market.” The Gpixel GCINE3243 is packaged in a 455-pin LGA ceramic package and will be available in color and monochrome versions. Prototype orders can be placed now, with delivery for the color sensor expected this month and the monochrome version later this year. Image credits: Gpixel

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**URL:** <https://petapixel.com/2023/09/01/viltrox-signals-its-commitment-to-pro-quality-lenses-at-affordable-prices/>

**Title:** Viltrox Signals Its Commitment to Pro-Quality Lenses at Affordable Prices

**Text:** Viltrox appears as though it strongly wants professional photographers to take its optics seriously, as it plans to release three more fast prime lenses before the end of the year. This year, Viltrox has released three lenses that marked a turning point in its focus from super-affordable lenses to optics that photography enthusiasts would be excited to buy. In February, it launched a 75mm f/1.2 lens for Fujifilm mounts that performed extremely well, far better than the \$545 asking price would lead photographers to believe it was capable. It brought that lens to Sony and Nikon mirrorless mounts in August. In May, Viltrox brought a 16mm f/1.8 autofocus lens to Sony E-mount that produced results way better than is to be expected from the \$550 asking price. In his review for PetaPixel, Ryan Mense noted that it had no business being that cheap based on how well it performed. This past month, the Chinese lens manufacturer added a 27mm f/1.2 lens for Fujifilm cameras to its lineup which yet again reviewed very well and, just as the other high-performance lenses that came before it, cost a fraction of what photographers are used to paying at \$545. What appears to be an updated roadmap published in China — spotted by Asobinet — shows that Viltrox is pushing itself to release three more lenses that would fall into the same high-quality “pro” category. The company is now committing to launching a 27mm f/1.2 for Nikon Z and Sony E, a 135mm f/1.8 for Sony E, and a 20mm f/2.8 for Nikon Z, Sony E, and Fujifilm X by the end of 2023. It should be noted that Viltrox already planned to release the 27mm and 135mm this year, which was already ambitious, and the addition of the third is not 100% confirmed by the company. However, if true, it would further underscore the company’s commitment to producing high-quality optics at an unusually low price. Viltrox has a couple of factors working against the widespread acceptance of its lenses by western professional photographers and enthusiasts. For one, its name is not well known and is still associated with very cheap, entry-level manual focus lenses. The company also does not distribute widely in the west at key photography retailers, and the low price of the lenses might actually have the opposite effect on buyers who will assume that there must be some tradeoff for it to be so affordable. Regardless, Viltrox seems committed to producing lenses that are far higher quality than is usually expected from manufacturers outside of Japan. At this rate, it might not be long before it reaches the status of Samyang and nip at the heels of Tamron and Sigma.

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**URL:** <https://www.sonyalpharumors.com/bild-expo-2023-on-september-6-7/>

**Title:** Bild Expo 2023 on September 6

**Text:** SonyAlphaRumors is participant in the Amazon Services LLC Associates Program, an affiliate advertising program designed to provide a means for us to earn fees by linking to Amazon.com and affiliated sites. SonyAlphaRumors is a participant in the Amazon EU Associates Programme, an affiliate advertising programme designed to provide a means for sites to earn advertising fees by advertising and linking to Amazon.co.uk, Amazon.de, Amazon.es, Amazon.it, Amazon.fr

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**URL:** <https://www.diyphotography.net/chinese-manufacturer-gpixel-announces-8k-60-fps-aps-c-super35-bis-cmos-image-sensor/>

**Title:** Chinese manufacturer Gpixel announces 8K 60 fps APS-C/Super35 BSI CMOS Image Sensor

**Text:** It's not often you hear about image sensor breakthroughs – of almost any size and type – except from the likes of big Japanese companies like Sony and Samsung. But Chinese manufacturer Gpixel has just announced a new 8K 60fps APS-C sensor. The Gpixel GCINE3243 is a 43-megapixel BSI CMOS sensor with a pixel resolution of 8192 x 5232 pixels, which is a hair wider than 3:2 aspect ratio. It supports 8K video at 60fps, 4K video at 120fps, with up to 14 bits of colour per channel. Unfortunately, there aren't many images with the announcement – and the ones that they did post are tiny – but they did provide quite a lot of information on its technical specifications, features and how they may be implemented in devices. Built for high performance 8K video Gpixels says that the backside-illuminated pixels in the top layer are “fully optimized” for maximum light sensitivity with as little noise as possible. The bottom CMOS wafer features an array of core cells that support high-speed 14-bit ADC and SRAM memory electronics. It has a modest but respectable dynamic range of 81dB thanks to its dual gain (dual ISO, essentially) readout. 81dB works out to a bit more than 13 stops. For comparison, the Nikon Z9 (buy here) offers a dynamic range of 14.4 stops. A solid new competitor? Gpixel has been around for a little while, but not as long as its much larger competitors like Sony. It was founded in 2012 and makes image sensors for a range of different fields, such as automation and inspection, scientific and medical imaging, and, of course, photography and video. The GCINE family is Gpixel's product family of truly innovative products for cinematography, drones, production imaging and other video applications, utilizing backside illumination to achieve high sensitivity and exceptional dynamic range. This isn't the first sensor in the company's GCINE line. It's actually the second. And if you think 8K 60fps sounds impressive, the line was launched in December 2021 with a full-frame sensor that shoots up to 8K 120fps and 18+ stops of dynamic range. While their latest sensor doesn't perform quite as well as the previous GCINE sensor, it is a much more realistic sensor in terms of performance compared to other high-end cameras on the market. Except, it's APS-C. I doubt we'll see this showing up in Sony bodies any time soon, but there is potential there for one of Sony's competitors to switch out their chip supplier. Especially companies that focus in APS-C mirrorless or Super35mm video. Price and Availability Well, there's no prices on this one. The chip is not a consumer chip. It's a chip for manufacturers of electronics products such as cameras. Although, I expect if you have the capability to interface with a sensor like this, you'd be able to get your hands on one. The company has simply said for interested parties to reach out to them about availability and their future roadmap. [via Mirrorless Rumors]

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**URL:** <https://www.globenewswire.com/news-release/2023/09/01/2736236/0/en/Non-Destructive-Testing-NDT-market-is-projected-to-grow-at-a-CAGR-of-6-3-by-2033.html>

**Title:** Non-Destructive Testing (NDT) market is projected to grow at a CAGR of 6.3% by 2033

**Text:** Visiongain has published a new report entitled Non-Destructive Testing (NDT) Market Report 2023-2033: Forecasts by Flaw Type (Surface Cracks & Flaws, Internal Flaws & Discontinuities, Lack of Bond or Lack of Fusion, Non-Metallic Inclusions (Slag, Porosity), Material Quality, Laminations & Thickness Measurement), by Material (Ferrous Forgings & Stampings, Ferrous Raw Materials & Rolled Products, Ferrous Tube & Pipe, Iron & Steel Castings, Non-Ferrous Components & Materials), by Technique (Ultrasonic Testing, Visual Testing, Radiographic Testing, Liquid Penetrant Testing, Eddy-Current Testing, Magnetic Particle Testing), by Application (Automotive & Railway Industry, Aerospace Industry, Petrochemical & Gas Industries, Pipe & Tube Manufacturing Industry, Shipbuilding Industry, Non-Ferrous Components & Materials), by End-use (Designing, Manufacturing Quality, In-service Inspection, Plant Life Extension, Other) AND Regional and Leading National Market Analysis PLUS Analysis of Leading Companies AND COVID-19 Impact and Recovery Pattern Analysis. The non-destructive testing (NDT) market was valued at US\$9,042.3 million in 2022 and is projected to grow at a CAGR of 6.3% during the forecast period 2023-2033. Use of Drones and Crawling Robots for Non-Destructive Testing (NDT) Refinery structures require constant inspection, maintenance, and safe work procedures to keep them in good working order; but, due to their vast height and bulk, accessing them is becoming increasingly difficult. Many researchers have created numerous robots for wall crawling in attempt to address this problem, but much more development is required. One of the main reasons why existing wall crawling robots haven't been employed more widely in the field is the possibility of the equipment falling out of the wall owing to operational failure caused by harsh

environmental factors such as strong winds and the unpredictability of rough surface conditions. As a result, attempted to design a wall-sticking aerial robot platform that can fly to and stick to any spot on the structure. The sensor probe is "sticked" on the ferro-magnetic surface of the structure by electro-magnetic hold/mount devices on the robot. Download Exclusive Sample of Report [https://www.visiongain.com/report/ndt-market-2023/#download\\_sample\\_div](https://www.visiongain.com/report/ndt-market-2023/#download_sample_div)

How has COVID-19 had a Significant Negative Impact on the Non-Destructive Testing (NDT) Market? The COVID-19 pandemic has had a significant negative impact on various sectors of the global economy, including the non-destructive testing (NDT) market. NDT is an essential industry that provides testing and inspection services to ensure the safety and reliability of structures, equipment, and materials without causing damage. However, the pandemic has led to several challenges and setbacks for the NDT market. Many industries experienced disruptions in their operations due to lockdowns, restrictions, and reduced demand. This led to a decrease in manufacturing, construction, and maintenance activities, resulting in a reduced demand for NDT services. The majority of industry executives and legislators are looking for effective methods and policies to redesign production patterns and match customer demand. The majority of raw materials are imported from China and other Asian developing countries, according to global supply chain perspectives. Most transportation linkages and distribution methods between suppliers, production facilities, and customers have been disrupted by the COVID-19 epidemic. As a result, in the post-COVID-19 pandemic period, it is critical to examine sustainable production and consumption patterns. How will this Report Benefit you? Visiongain's 365-page report provides 137 tables and 209 charts/graphs. Our new study is suitable for anyone requiring commercial, in-depth analyses for the non-destructive testing (NDT) market, along with detailed segment analysis in the market. Our new study will help you evaluate the overall global and regional market for non-destructive testing (NDT). Get financial analysis of the overall market and different segments including flaw type, material, technique, application, and end user and capture higher market share. We believe that there are strong opportunities in this fast-growing non-destructive testing (NDT) market. See how to use the existing and upcoming opportunities in this market to gain revenue benefits in the near future. Moreover, the report will help you to improve your strategic decision-making, allowing you to frame growth strategies, reinforce the analysis of other market players, and maximise the productivity of the company. What are the Current Market Drivers? Demand for Non-Destructive Testing (NDT) Inspection Services in The Power Generation Industry

NDT and inspection are incredibly useful techniques for evaluating and diagnosing product flaws in a timely manner. It is a critical quality control tool in the production process since it allows for the early detection of surface and subsurface faults in both finished and work-in-progress (WIP) goods. Factory buildings, platforms, bridges, railway lines, piping systems, and industrial machinery are examples of industrial assets and public infrastructures where NDT is utilised to detect flaws and structural integrity. Government regulations governing public safety and product quality, as well as ongoing advancements in electronics, automation, and robots, are driving the market's growth. Corrosion fatigue can cause steam pipelines in electric generating plants to fail. Plants' dependability and lifespan should be preserved. Up to 4 kilometres of pipe work delivering superheated steam at pressures up to 400 bars and temperatures up to 580 degrees Celsius can be found in a typical 500 megawatt electric power station (nuclear or conventional). Extreme pressures and temperatures can cause cracks in pipes, which can lead to pipe ruptures. Failure to discover cracks as soon as they appear can result in catastrophic accidents, resulting in horrific injuries and massive power outages. Pipelines are inspected with non-destructive testing procedures during scheduled outages when power plants are shut down for maintenance and repair. Under the Seventh Framework Programme (FP7), the HOTSCAN project obtained money to construct a pipeline monitoring system that would be permanently installed. The new system would be installed during a scheduled outage and would continually inspect all welds while the plant was in operation. Increasing Safety and Quality Regulations

Increasing safety and quality regulations have become a most important concern in several applications and end user industries, which is primarily aiming to enhance product reliability, minimize risks, and safeguard consumer well-being. Growing demand of major countries around the world such as U.S., Germany, China, and most countries need non-destructive testing of aircraft. Governments and regulatory bodies of each regions and countries to ensure compliance with industry standards and guidelines such as the American Society for Non-destructive

Testing, Inc. (ASNT), Aerospace Industries Association (AIA), American Society for Testing and Materials (ASTM) International, these government authorities are focusing on providing technical standards for materials, products, systems, and services. The primary goal NDT is to prevent accidents, improve product quality, and maintain public trust. Get Detailed ToC <https://www.visiongain.com/report/ndt-market-2023/> Where are the Market Opportunities? The Future of NDT With Wireless Sensors, A.I., and IoT Non-Destructive Testing (NDT) is on the brink of a transformative era, driven by the convergence of wireless sensor technology, artificial intelligence (A.I.), and the Internet of Things (IoT). This synergy promises to revolutionize the way industries ensure structural integrity, safety, and reliability. Wireless sensors are at the forefront of this evolution, enabling real-time data collection without the need for cumbersome cables or manual intervention. These sensors can be embedded in critical infrastructure including bridges, pipelines, and aircraft, continuously monitoring for signs of wear, stress, or anomalies. For instance, in the aviation industry, wireless sensors placed within aircraft engines can provide real-time information about temperature, vibration, and pressure, alerting maintenance teams to potential issues before they escalate. Also, in May 2022, VCxray announced the launch of its innovative software solutions for industrial X-ray inspection, namely "x.OS", at the Control exhibition in Stuttgart, Germany. Competitive Landscape The major players operating in the non-destructive testing (NDT) market are Acuren, Anritsu Corporation, Ashtead Technology, Inc., Eddyfi Technology, Fischer Technology Inc., FPrimeC Solutions Inc., Fujifilm Holding Corporation, GE Measurement, Intertek Group PLC, Magnaflux Corporation, Mistras group, Nikon Corporation, Olympus Corporation, SGS SA, Sonatest Ltd., and T.D. Williamson, Inc. These major players operating in this market have adopted various strategies comprising M&A, investment in R&D, collaborations, partnerships, agreement, regional business expansion, and new product launch. Recent Developments On 2 nd May 2023, Eddyfi Technologies announced the launch of its advanced "Panther 2", the ultimate solution for the fastest and most versatile industrial inspections with phased array ultrasonic testing (PAUT) and total focusing method (TFM) May 2023, Eddyfi Technologies announced the launch of its advanced "Panther 2", the ultimate solution for the fastest and most versatile industrial inspections with phased array ultrasonic testing (PAUT) and total focusing method (TFM) On 31st January 2023, Magnaflux Corporation pleased to announce the launch of its latest environmentally friendly non-destructive testing product namely "ZP-4D", in Europe, Middle East and Africa regions. The ZP-4D is a non-combustible dry powder developer for form A penetrant testing that is ideal for highly sensitive fluorescent penetrant processes To access the data contained in this document please email [contactus@visiongain.com](mailto:contactus@visiongain.com) Avoid missing out by staying informed – order our report now. To find more Visiongain research reports in the Energy sector, click on the following links: Do you have any custom requirements we can help you with? Any need for a specific country, geo region, market segment or specific company information? Contact us today, we can discuss your needs and see how we can help: [contactus@visiongain.com](mailto:contactus@visiongain.com) About Visiongain Visiongain is one of the fastest-growing and most innovative independent market intelligence providers around, the company publishes hundreds of market research reports which it adds to its extensive portfolio each year. These reports offer in-depth analysis across 18 industries worldwide. The reports, which cover 10-year forecasts, are hundreds of pages long, with in-depth market analysis and valuable competitive intelligence data. Visiongain works across a range of vertical markets with a lot of synergies. These markets include automotive, aviation, chemicals, cyber, defence, energy, food & drink, materials, packaging, pharmaceutical and utilities sectors. Our customised and syndicated market research reports offer a bespoke piece of market intelligence customised to your very own business needs. Contact Visiongain Reports Limited Telephone: +44 (0) 20 7336 6100 Email: [contactus@visiongain.com](mailto:contactus@visiongain.com) Web: [www.visiongain.com](http://www.visiongain.com)

#### URL:

<https://petapixel.com/2023/09/01/the-nikon-that-shot-jimi-hendrixs-psychedelic-1960s-lps-is-for-sale/>

**Title:** The Nikon That Shot Jimi Hendrix's 'Psychedelic' 1960s LPs is for Sale

**Text:** The original Nikon camera that photographer Karl Ferris used to take multiple Jimi Hendrix 1960s-era album covers as well as Ferris' original Halliburton case are coming to auction. Ferris is an English photographer best known as the innovator of "psychedelic photography," a look that he

employed at the behest of Jimi Hendrix and which would go on to define the look of the 1960s and influence the culture of the time around the world. Ferris would also shoot other rock bands and icons including Eric Clapton, Cream, and Donovan. As the San Francisco Art Exchange puts it, Ferris captured some of the most unforgettable photos of the 1960s including eight album covers in 1967 along with a large number of posters and magazine features. "You're doing with photography what I'm doing with music — going far out beyond the limits," Hendrix once told him. Now his 1966 Nikon F camera kit in the original Halliburton carry case has been put up for sale by Omega Auctions. This camera was specifically used to capture the famed U.S. debut psychedelic album covers for Jimi Hendrix: Are You Experienced, Electric Ladyland, Axis Bold as Love, and The Jimi Hendrix Experience. The camera was also used to shoot Donovan's Gift From a Flower to a Garden and Wear Your Love Like Heaven, plus The Hollies' Evolution. Ferris' Nikon F also captured shots for posters of Eric Clapton's band, Cream. The full kit includes the Nikon F, a Photomic FTN, a light meter attachment, five Nikon lenses (a 28mm, 35mm, 50mm, 55mm, and 105mm), and a roll of original unexposed Kodak Ektachrome color infrared 35mm film that has been out of production since 1977. "This type of film was used by Ferris whilst shooting all of the above-mentioned album covers," Omega Auctions says. The kit also includes three color transparencies and three signed 12 by 12-inch prints of the LP cover images taken by Ferris. Ferris also included a letter certifying their authenticity. The whole kit is estimated to be valued between £10,000 and £20,000, or roughly between \$12,600 and \$25,230. The auction for the kit, which is Lot 598, is to be sold on September 12, with viewing appointments to be scheduled the day before. Image credits: Omega Auctions

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**URL:** <https://www.20minutes.fr/high-tech/4051032-20230901-unistellar-taquine-cosmos-telescope-connecte-reconnait-etoiles>

**Title:** Unistellar : On a taquiné le cosmos avec le télescope connecté qui reconnaît les étoiles

**Text:** Tout l'univers. La Nuit des étoiles cet été, la Lune bleue dans la nuit du 30 au 31 août... l'actualité céleste fut riche ces dernières semaines et nous a poussés à lever plus que de coutume la tête vers le ciel. 20 Minutes a eu l'opportunité de tester durant l'été l'un des télescopes connectés, d'Unistellar, des équipements à part pour les fans d'astronomie. Dépoussiérer l'astronomie Avouons-le tout de suite. Nous n'avons observé aucun petit homme vert à l'aide du télescope « intelligent » eVscope d'Unistellar ! Mais en connectant son outil d'observation de la voûte céleste à nos smartphones, force est d'avouer que la start-up française réussit à dépoussiérer quelque peu l'astronomie. Soit un télescope connecté, fonctionnant à l'aide d'une application. L'eVscope, le télescope connecté d'Unistellar. - Unistellar Sur son robuste trépied avec un niveau à bulle, l'appareil qui pèse 9 kg a trouvé sa place sur la terrasse d'une petite maison de village au cœur de la Drôme provençale, sous un ciel parfaitement dégagé. Alors que la nuit tombe de plus en plus rapidement en ce mois d'août, nos différents essais ont débuté peu avant 22 heures. Rechargé (autonomie : jusqu'à 10 heures), l'eVscope fonctionne sur batterie. Une fois en marche, il crée son réseau Wifi auquel il suffit de s'appairer. Le tandem smartphone/télescope en fonction, ne reste plus qu'à laisser sa curiosité s'exprimer. Pas d'Etoile noire, mais des blanches, des bleues... Parmi les intérêts de cet attelage, le fait qu'il soit géolocalisé. Ainsi l'application propose-t-elle dans un vaste catalogue les planètes, étoiles, nébuleuses, galaxies, comètes et autres astéroïdes que vous allez pouvoir observer. Si, hélas, l'Etoile noire de Star Wars ne figure pas dans ce colossal catalogue, il en existe des dizaines d'autres dont, profanes que nous sommes, nous découvrons les noms... L'application Unistellar propose un vaste catalogue de planètes, étoiles... sur lesquelles il suffit de pointer. - Capture La Superba ; Elgafar... jusqu'à l'imprononçable Zubenelhakrabi ! Reste à choisir celle sur laquelle notre regard souhaite se porter, cliquer sur l'écran du smartphone pour la sélectionner, puis sur « Pointer ». Un discret bruit de moteur venant du télescope témoigne du fait que l'appareil se positionne, lentement, mais sûrement, vers sa cible pour nous la révéler. Parfois, quelques minutes sont nécessaires pour que son miroir de 114 mm de diamètre (avec focale de 450 mm) trouve son exacte position. Le temps de déguster avec modération le petit Genepi de rigueur sous nos latitudes... Pointez, et observez ! L'effet « waouh » n'est pas encore pour tout de suite. Un petit temps est parfois nécessaire pour que la mise au point la plus fine possible soit effectuée par le télescope. Dès lors, deux options : observer l'astre sur lequel on a pointé depuis l'écran de notre smartphone (intéressant, car des informations le concernant sont

indiquées, comme son élévation, son azimut, la durée durant laquelle il est visible), ou depuis le porte oculaire Nikon sur le large tube optique de l'appareil. Pour les profanes ? Pas si sûr... Bon, soyons clairs. Les images proposées ne ressemblent évidemment en rien à celle qui nous tombent du ciel et nous en mettent plein la vue grâce aux télescopes Hubble ou James Webb. Ici, des points ou taches blancs de taille plus ou moins importante, parfois bleus, des nuées... qui peuvent impressionner. Ou pas. Des jeunes d'une vingtaine d'années présents à nos côtés se sont assez vite détournés de nos observations, préférant scruter les dernières propositions de Netflix pour, à défaut d'étoiles, se faire une toile pour finir la soirée. Les observations avec le télescope connecté Unistellar permettent de décoller vers l'infini. - Capture Nous concernant, nous avons regretté que les concepteurs d'Unistellar n'aient pas pensé à proposer aux « Nuls en astronomie » dont nous faisons partie une sorte de « parcours du débutant ». Juste histoire de nous inviter à pointer leur lunette sur certaines parties du ciel, plutôt que de nous laisser décoller vers l'infini et au-delà, sans destination particulière, un peu au hasard. Sinon, c'est le concept, la simplicité d'usage du télescope d'Unistellar qui séduit. Il est disponible à partir de 2.500 euros (dix fois plus cher qu'un classique télescope d'amateur !). Impossible de le recommander à un débutant en astronomie. Mais son catalogue de galaxies, nébuleuses et autres constellations nous a conquis. La porte ouverte vers l'invisible. Le fait, aussi, d'arrêter la course du temps et de prendre celui, si rare et précieux, nécessaire pour observer. En prenant conscience de cet infini qui nous entoure.

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**URL:** <https://www.canonrumors.com/compactflash-association-announces-cfexpress-4-0-logical-and-physical-specifications/>

**Title:** CompactFlash Association Announces CFexpress® 4.0 Logical and Physical Specifications

**Text:** LOS GATOS, California – CompactFlash Association (CFA), the organization responsible for professional removable media specifications such as CompactFlash®, CFAST®, XQD®, and CFexpress® announces the release of the CFexpress 4.0 logical and physical specifications increasing the performance of the existing CFexpress 2.0 specifications while maintaining backward compatibility targeting the professional imaging and industrial markets requiring high-performance data capture and transfer. CFexpress 4.0 is an evolutionary specification riding on the great success of CFexpress 2.0 employing the industry standard PCI Express® (PCIe) Gen4 bus and NVMe Express (NVMe) 1.4c logical interface for even higher performance and efficient NAND Flash access. With its three form factors, CFexpress 4.0 continues to support diverse performance levels to match various market requirements maintaining consistent electrical, logical, and physical interfaces while setting realistic power consumption targets for wider adoption of the CFexpress 4.0 for battery-powered applications in the imaging and industrial markets. Utilizing widely adopted open standards allow the use of established development platforms saving development time, cost, and effort. CFexpress was developed in 2016 with the charter to become a removable media standard that can span various vertical market segments providing a stable and future-proof platform with economies of scale. Since then, the standard has been widely adopted by the imaging and industrial market segments. Performance With the adoption of PCIe Gen4 in CFexpress 4.0, the media cards can theoretically achieve double the throughput performance compared to PCIe Gen3 of CFexpress 2.0 while maintaining backward compatibility. CFexpress 4.0 along with CFexpress 2.0 shall provide flexibility in the choice of performance, power, and size requirements for target host devices based on their requirements. Form Factor The three card types – Type A, Type B, and Type C – support different host form-factor and performance requirements while maintaining a consistent electrical, logical, and physical interface. The mechanical dimensions of each card type are specified allowing adaptor cards for smaller card types to fit into larger card sockets. Metal lids provide physical robustness to withstand use in harsh environments while providing easier thermal management for hosts. Scalability CFexpress 4.0 allows seamless migration from CFexpress 2.0 by utilizing the same underlying bus and logical interfaces of PCIe and NVMe while maintaining the exact same form factors. This allows the preservation of earlier investments made in CFexpress cards. CFA is a standards body and trade association that works closely with its ecosystem partners in the development of new removable media standards and markets. The earlier CFexpress 2.0 Type A and Type B standards have been widely adopted by high-end imaging hosts. “Adoption of the higher performance CFexpress 4.0 for removable

media storage will support current and future needs of professional photographers, videographers and cinematographers enabling higher resolution, frame rates, and color depth leveraging PCIe Gen4. CFexpress 4.0 will further cement CFexpress as a standard in the imaging industry,” said Hiroshi Noda of Canon and co-chairman of the CFA board. “With the evolutionary approach in defining the new CFexpress 4.0 specifications, end users can preserve their investments made in CFexpress 2.0 removable media cards while enjoying cutting-edge use cases with the higher performance CFexpress 4.0 cards. This is a win-win for the installed base and the growing CFexpress ecosystem,” said Nobuhiro Fujinawa of Nikon and co-chairman of the CFA board. “With its three form factors maintaining a consistent electrical, logical, and physical interface, CFexpress 4.0 will allow professional photographers, videographers, and cinematographers to scale seamlessly amongst the various use-case scenarios demanded by the host cameras. It is also a welcome approach for host manufacturers since the development cycle can be reduced significantly,” said Hiroshi Machida of Sony Corporation and CFA board member. CFA is also preparing a new specification for VPG (Video Performance Guarantee) for higher sustained video recording which shall be released in the near future. The new CFexpress 4.0 specifications are available for CFA members only. CFA invites host and media companies interested in supporting the new CFA specifications to join CFA as members. Membership of CFA also enables participation in various workgroups contributing to CFA’s technical advancements and marketing initiatives. More information can be found at <http://www.compactflash.org>. Source: Compact Flash Association Some of our articles may include affiliate links. If you purchase through these links, we may earn an affiliate commission at no extra cost to you. Go to discussion...

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**URL:**

<https://petapixel.com/2023/09/01/what-its-like-switching-from-a-2014-dslr-to-a-2023-mirrorless-camera/>

**Title:** What It's Like Switching from a 2014 DSLR to a 2023 Mirrorless Camera

**Text:** Despite huge advancements in camera technology, plenty of photographers still use DSLRs from the 2010s — like the Canon 5D series and the Nikon D800s. And while they remain great cameras, mirrorless rules the 2020s. For a long time, I was one of those photographers. Up until very recently, I was shooting professional photo jobs on my trusty 2014 Canon 5D Mark III. But then I got my hands on a brand new, 2023 Canon R6 Mark II. What's Changed? In short, just about everything. They're both Canon cameras so I was immediately familiar with the camera's handling but, as soon as I started going through the menu I realized the R6 II is a very different beast. Focusing When flicking through the menu, I could not believe all of the options available to me. The AI servo had advanced by leaps and bounds with so many more functions. The focusing ability was important because of the test I was going to put it through — a high-octane rollerblading event in Athens, Greece. Choosing which eye to focus on has been a feature on Sony mirrorless cameras for some time, but as an “old-school” DSLR user I was blown away by this option on the R6 II. Even just the face tracking left me super impressed. And while it didn't work every time in my fast-moving environment, it worked well enough. Simply put, I was capturing shots on the R6 II that my 5D III would have absolutely no chance of getting in focus. That alone is worth its weight in gold. Shutter The R6 II can do 40 frames per second (FPS) with the electronic shutter activated. It is utterly breathtaking. Going from a 5D III that shoots six FPS to the R6 II that shoots 40 FPS is a bit like going from a horse and cart to a Lamborghini. Back when I was covering rollerblading events on the 5D, I had to wait for the perfect moment to press the shutter. On the R6 II, I'm just spraying. There's an old saying in photography: “If you have seen the shot in your viewfinder, then you have missed it.” That was true of my 5D III, but 40 FPS lays waste to that. Covering the action as I was, I got so many frames that I could choose the photo that captured exactly the right moment. As darkness fell, I was planning to move to the mechanical shutter to avoid rolling shutter. But, I wasn't really noticing it on the back of the camera and didn't want to give up the incredible speed so I just kept shooting electronically. Card Space and Battery As excited as I was — taking 50 RAW photos for every moment — unsurprisingly I filled up two 64GB SD cards in no time at all. Next time, I will have to shoot more economically to avoid taking up so much disk space on my computer. The battery drained fairly quickly and it did actually die just before the event finished. I didn't have a backup. Rookie mistake. The Photos The Canon 5D was a beautiful camera, capturing gorgeous colors. And while the R6 II was an

upgrade, it wasn't an enormous step forward like the focusing and the frame rate. As it got late, I pushed the ISO all the way up to 8,000 and noise began creeping into the photos. For some of these photos, I ran the AI-powered Denoise tool on Photoshop Camera RAW. The combination of Photoshop RAW and Canon's full-frame sensor can pull otherwise unusable photos to some level of acceptability. Conclusion I love the Canon R6 Mark II, where has it been all my life? In all seriousness, though, I speak to a lot of photographers for PetaPixel who still use the old DSLRs. And while these cameras are still excellent image-quality-wise, the technology in them is now antiquated. I remember in the mid-2010s when some of my peers started going over to Sony. They raved about the Sony a9's ability to focus on the subject's eye. I never made that jump because, in all honesty, I couldn't justify it at the time. But after my R6 II experience, I wish I would have. Everyone's situation is different, but the latest camera technology really is a must for so many photographers. Credits: A huge thank you to Nicholas Kourous, Syeahskate, and Athens Bladehouse for putting on such a good event. All photos by Matt Growcoot.

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**URL:** <https://www.dpreview.com/news/9037315370/2023-wildlife-photographer-of-the-year-sneak-peek-highly-commended-images-released>

**Title:** 2023 Wildlife Photographer of the Year sneak peek: 'Highly Commended' images released

**Text:** Site update: Our login process has been updated, click here for more information

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**URL:** <https://www.dpreview.com/news/9461454835/cfexpress-is-set-to-get-even-faster-with-the-new-cf-express-4-0-standard>

**Title:** CFexpress is set to get even faster with the new 4.0 standard

**Text:** Site update: Our login process has been updated, click here for more information

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**URL:** <https://www.komputerswiat.pl/poradniki/poradniki-zakupowe/najpopularniejsze-lornetki-w-sieci-bez-tego-sprzetu-nie-ruszaj-sie-na-urlop/gfh2j74>

**Title:** Najpopularniejsze lornetki w sieci. Bez tego sprzętu nie ruszaj się na urlop

**Text:** W tekście umieszczono linki reklamowe naszego partnera Zanim o lornetkach, krótki poradnik o opisywanych tu parametrach. Powiększenia chyba nie trzeba tłumaczyć, z kolei średnica obiektywu określa ilość światła, jakie dociera do naszego oka. Czyli im większa średnica obiektywu, tym jaśniejszy będzie obraz w lornetce i tym lepiej sprawdzi się ona przy słabym oświetleniu. Liniowe pole widzenia to z kolei szerokość obszaru oglądanego przez lornetkę, oddalonego od obserwatora o 1 km. Oznaczenie 100/1000 oznacza więc, że z odległości 1 km zobaczymy obszar o szerokości 100 m. No to co, zaczynamy! Fujinon HC 8x42 Foto: Materiały prasowe Zaczynamy od mocnego uderzenia, bo na 10 miejscu uplasowała się lornetka dla naprawdę wymagających użytkowników z 8-krotnym powiększeniem i 42-milimetrowym obiektywem. Jej kątowne pole widzenia wynosi 8 st., a liniowe aż 136/1000 metrów. W lornetce zastosowano także najwyższej jakości optykę, która przekłada się na jasne, wyraźne obrazy o wysokim kontraście z dokładnymi kolorami i ze zredukowanym widocznym drżeniem dźwięki szczególnie w warunkach słabego oświetlenia, np. o poranku. Dodajmy do tego wręcz pancerną, antypoślizgową obudowę oraz przeciwdeszczową osłonę okularu i otrzymujemy produkt typu premium, do którego możliwoci naprawdę trudno się przyczepić. Nikon Prostaff P3 8x42 Foto: Materiały prasowe Na dziewiątej pozycji uplasowała się lornetka znanej firmy Nikon o 8-krotnym powiększeniu i 42-milimetrowym obiektywie. Kątowne pole widzenia tej kompaktowej lornetki wynosi 7,2 st., a liniowe 126/1000 metrów. Nikon proponuje to urządzenie dla podróżników, zachwala też jego niski ciężar i ostry obraz dzięki pryzmatom korzystającym z wielowarstwowych, antyodblaskowych powłok. Lornetka Fujinon KF 10x42 H-R II Foto: Materiały prasowe Ten model to lornetka o 10-krotnym powiększeniu i 42-milimetrowym obiektywie, a także 6-stopniowym kątowym polu widzenia i liniowym polu widzenia 105/1000 metrów. Ten model idealnie nada się np. do obserwacji ptaków czy wydarzeń sportowych, jest też wodoodporny oraz posiada regulację dioptrii, która umożliwia dostosowanie lornetki do wzroku użytkownika. Urządzenie waży zaledwie 670 gr. Lornetka Celestron UpClose G2 10x50 Foto: Materiały prasowe Celestron UpClose G2 10x50 to świetnie oceniana i przystępna cenowo lornetka o 10-krotnym powiększeniu i obiektywie o sporej 50-milimetrowej średnicy. Kątowne pole widzenia



wynosi tu 6,8 st., a liniowe 118/1000 metrów. Sprzęt będzie doskonałym towarzyszem przy obserwacjach zwierząt, a wysoki poziom kontrastu i wielowarstwowa powłoka zapewni wyraźny obraz. Lornetka noktowizyjna Levenhuk Halo 13x Plus Foto: Materiały prasowe Ta elektroniczna lornetka to model dla osób szukających urządzenia do dziennych, jak i nocnych obserwacji. Ów poręczny noktowizor dysponuje 13-krotnym powiększeniem, obiektywem o średnicy 35 mm oraz kątowym polem widzenia na poziomie 10,3 mm i liniowym na poziomie aż 180/1000 metrów. Lornetka posiada również regulowane, 7-stopniowe podświetlenie IR, może generować obraz kolorowy, czarno-biały, jasnozielony lub obraz z efektem filmu kolorowego, a także robi zdjęcia w rozdzielczości 2048x1536 oraz filmy w rozdzielczości Full HD. Urządzenie jest też wodoszczelne (IP 54) i pracuje na baterii nawet do 18 godz. Lornetka Nikon Action EX 12x50 CF Foto: Materiały prasowe Kolejny produkt Nikona w tym zestawieniu to lornetka o 12-krotnym powiększeniu i 50-milimetrowym obiektywie, dzięki czemu jest niezłym pomysłem nawet na obserwację kosmicznych obiektów na niebie. Model ten dysponuje kątowym polem widzenia rzędu 5,5 st. oraz liniowym na poziomie 96/1000 metrów. Lornetka jest też wodoszczelna (można zanurzyć ją na głębokości jednego metra na 5 minut), w jej środku nie tworzy się para wodna, albowiem powietrze zastępuje tu azotem. Sprzęt wyróżnia się również bardzo dużym odsunięciem tarczy, dzięki czemu mogą z niego korzystać osoby, które na co dzień noszą okulary. Lornetka noktowizyjna Levenhuk Halo 13x Wi-Fi Foto: Materiały prasowe Na czwartym miejscu uplasowała się kolejna lornetka z funkcją noktowizora ze sporym, 13-krotnym powiększeniem optycznym lub 4-krotnym powiększeniem cyfrowym oraz 33,5-milimetrową średnicą obiektywu. Lornetkę można sterować z poziomu smartfona czy tabletu, a w nocy dostrzeżemy nią obiekty z odległości maksymalnie 300 m. Mamy też do wyboru siedem poziomów jasności. Lornetkę zrobimy też zdjęcia lub nagramy film w rozdzielczości 1280x960 i 30 kl./sek., a wszystkie dane są przechowywane na karcie pamięci. Lornetkę można zasilać też zwykłymi bateriami, a jedno naładowanie wystarczy na 4-10 godz. pracy. Lornetka Olympus 10x50 S Foto: Materiały prasowe Olympus 10x50 S to uniwersalna lornetka otwierająca podium naszego zestawienia. Jest to sprzęt o 10-krotnym powiększeniu i 50-milimetrowym obiektywie z kątowym polem widzenia na poziomie 6,5 st. oraz liniowym 111/1000 metrów. Dzięki dużemu obiektywowi lornetka sprawdzi się przy gorszym oświetleniu, a gumowana obudowa zapewni pewny chwyt. Z kolei asferyczne soczewki oraz powłoki na soczewkach i pryzmatach zapewniają najwyższy poziom wydajności optycznej, redukując zniekształcenia obrazu i aberracje chromatyczne. Lornetka Nikon Aculon A211 12x50 Foto: Materiały prasowe Drugie miejsce przypadło kolejnemu produktowi Nikona, tym razem o 12-krotnym powiększeniu oraz 50-milimetrowym obiektywie. Kątowe pole widzenia lornetki wynosi 5,2 st., a liniowe 91/1000 metrów. Nikon zachwala to urządzenie jako wszechstronne lornetkę doskonałą do obserwacji nocnego nieba, jak i przyrody (np. ptaków), w czym pomagają warstwy przeciwodblaskowe, asferyczne soczewki korygujące zniekształcenia obrazu oraz możliwość zamontowania lornetki na statywie. Całości dopełniają gumowe elementy korpusu zwiększające jego wytrzymałość. Lornetka Celestron SkyMaster 25x70 Foto: Materiały prasowe Na pierwszym miejscu uplasowała się lornetka o potężnym, 25-krotnym powiększeniu oraz aż 70-milimetrowym obiektywie. Została to okupione mniejszym widocznością kątową na poziomie 2,7 st. i liniową z wynikiem 47/1000 metrów. Te parametry oznaczają, że lornetka dobrze sprawdzi się np. przy obserwacji nocnego nieba lub mniejszego obszaru — ale za to przy naprawdę dużym powiększeniu. Znajdziemy tu także wielowarstwową powłokę na obiektywie, w zestawie znajduje się też adapter pozwalający na montaż lornetki na statywie. Warto jednocześnie dodać, że jest to dosyć ciężkie urządzenie o wadze ok. 1,5 kg. >> Zobacz także: Kup domowy teleskop i odkrywaj tajemnice kosmosu z domu [RANKING]

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**URL:** <https://www.globenewswire.com/news-release/2023/09/01/2735915/32656/en/Hunting-Binocular-Market-Poised-for-Growth-Predicted-to-Cross-US-152-3-Million-by-2031-with-a-Strong-CAGR-of-3-6-Transparency-Market-Research-Inc.html>

**Title:** Hunting Binocular Market Poised for Growth, Predicted to Cross US\$ 152.3 Million by 2031, with a Strong CAGR of 3.6%: Transparency Market Research, Inc

**Text:** Wilmington, Delaware, United States, Sept. 01, 2023 (GLOBE NEWSWIRE) -- The global market for hunting binoculars was estimated to have acquired US\$ 107.1 million in 2022. It is anticipated to advance with a 3.6% CAGR from 2023 to 2031 and by 2031, the market is likely to gain US\$ 152.3 million. Hunting is becoming more popular in Europe, North America, and nations in Africa, such as South Africa. Spending on leisure and outdoor activities has increased in these areas. The increased use of hunting binoculars by nature lovers and wildlife photographers is accelerating market growth. Binoculars for hunting are used to locate a target from a distance. Hunting is becoming more and more well-liked as a pastime. Global demand for hunting binoculars is being driven by this. In a nutshell, the Transparency Market Research Report is essential reading for startups, individuals in the industry, investors, researchers, consultants, business strategists, and anyone seeking to gain insight into this particular sector. Take a brief look at it:

<https://www.transparencymarketresearch.com/hunting-binocular-market.html> Market Snapshot: Report Coverage Details Market Revenue US\$ 107.1 Mn Estimated Value US\$ 152.3 Mn Growth Rate - CAGR 3.6% Forecast Period 2023-2031 No. of Pages 170 Pages Market Segmentation Type, Maximum Magnification, Objective Lens Diameter, Focus Type, Size, Price, Distribution Channel Regions Covered North America, Europe, Asia Pacific, Middle East & Africa, South America Companies Covered Burris Company, Inc., Canon U.S.A., Inc., Leupold & Stevens, Inc., Maven Outdoor Equipment Company, Meopta U.S.A., Inc., Nikon Corporation, Polaris Inc., Swarovski International Holding AG, Vortex Optics, Zeiss International Key Findings of the Market Report The governments of various nations have passed strict hunting regulations to conserve wildlife, which is a significant market restraint during the projection period. Hunting binocular producers prioritize creating cutting-edge goods using premium components. They provide their consumers with items that are personalized. Companies are taking part in mergers and acquisitions to broaden their customer base and improve the exposure of their products. Market Trends for Hunting Binocular Hunting binoculars featuring 8x to 12x magnification have grown in popularity in recent years. Binoculars with the aforementioned magnification offer the right amount of balance and stability. These compact binoculars provide an excellent view of the object. They are being employed for hunting purposes more and more. An additional common option among users for long-distance viewing is magnification more than 12x. Those with such magnification are bulkier and heavier, compared to 8x to 12x binoculars. It is predicted that the roof prism type segment would have a sizable market share during the projected period. The roof prism binoculars are more likely to be preferred by consumers due to their sophisticated features and small form. The development of cutting-edge goods built on cutting-edge technologies is the main emphasis of hunting binocular manufacturers. Market growth is being driven by an increase in research and development efforts to examine cutting-edge features in hunting binoculars. One of these binoculars' innovative characteristics, high light transmission, contributes to the game's ease and interest. Manufacturers are broadening their product portfolios and appealing to new clients by introducing novel items. Manufacturers now have attractive prospects thanks to the growth of e-commerce. Global customer demand for online shopping is increasing, which is boosting the industry. Soar above the competition with our exclusive industry insights – grab a sample copy now - [https://www.transparencymarketresearch.com/sample/sample.php?flag=S&rep\\_id=59160](https://www.transparencymarketresearch.com/sample/sample.php?flag=S&rep_id=59160) Hunting Binocular Market Regional Outlook Various reasons are propelling the growth of the Hunting Binocular market in different regions. These are: In 2022, North America represented a large portion of the global landscape. The region is expected to dominate the global market throughout the forecast period. Europe and Asia Pacific are most likely to follow it, in terms of market revenue. According to a market research study on hunting binoculars, hunting is becoming more and more popular in North America. The region's growing market for hunting binoculars is being driven by an increase in demand for effective hunting equipment. Global Hunting Binocular Market: Key Players The global industry is extremely fragmented, with several local and international firms present. To grow their market share for hunting binoculars, major companies are implementing a variety of marketing methods, including research and development, new product development, as well as mergers and acquisitions. The following companies are well-known participants in the global Hunting Binocular market: Burris Company, Inc. Canon U.S.A., Inc. Leupold & Stevens, Inc. Maven Outdoor Equipment Company Meopta U.S.A., Inc. Nikon Corporation Polaris Inc. Swarovski International Holding AG Vortex Optics



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**Text:** TO CONSIDER what lies outside a world under political or economic duress is to reject the illusion that an unchanging existence is equivalent to harmonious stability. The artist Sung Neung Kyung understood this especially well. Between the mid-1970s and the late '80s, his considerations of reading, looking, marking, and grouping afforded viewers space for reflecting on the fraught years of authoritarian rule in South Korea and, later, on the flawed promises of democracy. Avoiding the absorption of culture into the hegemonic enterprise of nation-building that seemed interminable by the time South Korean president Park Chung-hee declared martial law in 1972, each of Sung's works outlined a realm that distinguished communication from content creation, urging viewers to ask how things mean. Yet Sung was equally critical of the self-regard that reduced art and life to squalid contests of power. Through performance, Sung contended that shaping a political imagination requires not only physical stamina and a high level of tedium tolerance but also a firm refusal of self-affirmation as the primary filter through which to process sensory experience. The world is, as he suggests, always about you but never about only you. Sung participated in his first exhibition in 1964, shortly before fellow students at Hongik University unveiled the earliest known example of performance art in Korea. But it was not until 1973, after he completed a mandatory three-year tour of duty in the South Korean military, that he began his artistic career in earnest.<sup>1</sup> Following a brief dalliance with displays of stones reminiscent of those by Lee Ufan,<sup>2</sup> Sung turned to the newspaper to wage new battles.<sup>3</sup> Then the most popular mode of spreading information in South Korea, newspapers were both weapons and casualties in the escalating conflict between the state and its critics. For one week at the National Museum of Modern Art in Deoksugung Palace in Seoul, Sung hung four sheets of the daily *Dong-a Ilbo*, then well known for its critical stance toward the government. Using a razor, the artist selectively removed articles, leaving only a few pictures and advertisements. Each day, the previous edition of the newspaper would be neatly laid to rest on the gallery floor in an acrylic container that resembled a ballot box yet whose transparency only emphasized the opacity of the electoral process at that time. Antonio Dias, *The Illustration of Art/Dazibao/The Shape of Power*, 1972, silk screen and acrylic on canvas, 3' 11 5/8" x 10' 4 3/4". As a source of knowledge ordinary citizens could convert into forms of political participation—from voting to street protest—the newspaper became Sung's preferred means of exploring the political legibility of daily life. Begun at home two months before Sung performed the work in public, *Newspaper*: from June 1, 1974, on, reads as an attempt at resocialization following the artist's long years of conscription. The mandatory draft reminded citizens of the nation's perpetual war with its neighbor to the north, while "peacetime" in civilian life under martial law meant compulsory silence. Sung recounts how the "idea of peace was really about keeping one's mouth shut. It doesn't promise harmony; rather, it only guarantees the erasure of dissent."<sup>4</sup> He broke down the viewing experience into four distinct modes: viewers reading the artwork from a distance, in the nominal privacy of their homes versus reading in public; the artist reading the paper out loud as he excises images and text; the silent and oral habits of reading by an unnamed populace that accessed newspapers through household subscriptions; and those same habits of reading, belonging this time to the impromptu assemblies absorbing the daily papers displayed in front of newspaper offices. Sung transformed passive viewing into active reading, insisting that one look for absence even before apprehending what is printed on the page. Presaging Sarah Charlesworth's "Modern History" series of prints in the late

'70s, which also stripped newspapers of text, *Newspaper*: from June 1, 1974, on implores viewers to read newspapers not for content but for how their very form shapes the production of knowledge. Functioning like real-time quotes, Sung's newspaper works belong to an international fellowship of like-minded engagements in the majority of the world then struggling under nondemocratic rule, including Antonio Dias's silk-screen takes on the *dazibao*, the large-scale posters dominating public communication during the Cultural Revolution, and Antonio Manuel's reconfigured flans, paper matrices used to create lead molds in newspaper printing. Made in Brazil under a military regime similar to that governing South Korea, the works by Manuel and Dias—together with those by Charlesworth, Sung, and others—lay bare a world defined less by ideological, social, or economic divides than by what UNESCO director-general Amadou-Mahtar M'Bow described as "one of the greatest forms of inequality in the contemporary world": uneven access to information.<sup>5</sup> Sung Neung Kyung with *Newspaper*: from June 1, 1974, on, National Museum of Modern and Contemporary Art, Seoul, 1974. Photo: Lee Kyeong-seok. Most of Sung's early works were made in discussion with his friends and colleagues in S.T., the loose assembly of Seoul-based artists active from 1969 to 1981 that included Chang Sukwon, Choi Hyojoo, Kim Yongmin, Lee Kunyong, and Yoon Jin Sup. Dissatisfied with existing pedagogical structures, the self-funded S.T. hosted seminars during which members discussed a highly eclectic variety of writings by Hans Haacke, Heidegger, Joseph Kosuth, Laozi, Wittgenstein, Nakahara Yusuke, and Zhangzi, even if the Korean translations were, according to Sung, "not terribly reliable."<sup>6</sup> Among his S.T. colleagues, Sung was unique in distancing himself from what he considered the apathy of an art world that sometimes appeared too insistent on segregating itself from the politics of a state that controlled everything, from which artists could travel abroad to the supply of imported oil paint and film. *Location*, 1976, addressed the orientation of the artist vis-à-vis interpretation. Sung had himself photographed with a copy of the June 1976 issue of *Space*, a cultural journal founded in 1966 by de facto state architect Kim Swoogeun that was then South Korea's primary outlet for art writing. In one image Sung stands still, holding the publication in his mouth like an obedient dog; another depicts him clasping the issue between hands held as if in prayer. For some of his contemporaries, performance was a way to resist excessive state oversight such as the 1973 Minor Offenses Act, which regulated choices of attire and hair length. But Sung considered performance as something more: a space for speculating on what he described as "condition of living."<sup>7</sup> As he remarked years later, "Art is not a placard."<sup>8</sup> Sung came of age amid the utopian promise of April 19, 1960, which saw the overthrow of Syngman Rhee, South Korea's first democratically elected president as well as its first postwar dictator, and he knew too well the limits of direct protest. In the decade that followed, the revolutionary dreams of April 19 devolved into the ironically named Restoration (Yusin) era, with youthful hopes crushed by a state that appealed to an older generation scarred by the privations of war and desperate for a standard of living beyond mere subsistence levels. Sung Neung Kyung, *Location*, 1976, nine gelatin silver prints, each 18 5/8 x 10 1/2". *Contraction and expansion*, 1976, is a compelling thematization of self-control, following Sung's body as he moves from an upright position to a fetal curl, then finally extends his arms and legs while balanced on his stomach. The work's title suggests that during the mid-'70s, freedom of thought diminished commensurate to the spread of authoritarian politics.<sup>9</sup> *Contraction and expansion* asks how the rules and instructions central to Conceptual art can disclose how easily rules can become laws operating as pretexts for domination enforced by the threat of punishment. But it also implies that the execution of Conceptual art can play a more active role in highlighting how and when personal action can undo the rules applied to contain bodies within structures governed by a select few. One of the few vices permitted in Yusin Korea was smoking, and Sung made this the subject of a brief but pithy performance. In pictures, he exudes a relaxed air as he smokes a cigarette until it is reduced to a precarious column of ash. His attitude reads as a small but significant triumph over the deadening pragmatism used to justify the expendability of personal lives—which persisted long after Park Chung-hee's assassination and the end of Yusin in 1979. The quick smoke break—once an indispensable staple of the workday—is stretched out over nine stages in seventeen photographs, commemorating the concept of rest so devalued throughout Korean society. Sung Neung Kyung, *Smoking* (detail), 1976, seventeen gelatin silver prints, each 10 x 8". Many of Sung's works implicitly problematize how postwar citizenship was filtered through state demands for total obedience. Dying for one's country may have sufficed during the Korean War, but in the second age of Korean national

sacrifice, the state required nothing less than unquestioned conformity to impossible and arbitrary standards. In *Counting money*, 1976, the artist threw small amounts of Korean currency onto a low white plinth while reciting the sums out loud. At the time, small proprieties exuded the force of law among the unacknowledged bourgeoisie, and such an act, even in the context of an exhibition, would have been regarded as almost unforgivably crude, particularly as it so vividly foregrounded a value system that encouraged calibrating human worth to quantifiable metrics.<sup>10</sup> One must not “be satisfied with the falsehood of frequency,” as he wrote years later in his mock curriculum vitae under the heading “Solo Exhibitions.”<sup>11</sup> Sourced from the artist’s own personal collection, the fifteen chronologically arranged photographs of Mr. S’s half way career, 1977, insist on a time line indifferent to world events, rational chronological systems ordered in regular increments, and linear thinking reinforced by the idea of a future compromised by the imminence of armed conflict. Always in search of perspective, Mr. S’s half way career shows Sung taking stock at age thirty-three, which was then considered the midpoint of the life span of the average South Korean male. Visualizing his autobiography as a record of personal relationships, the installation consists of photographs from childhood on. Faces of family, friends, and artist colleagues peer out, with the last image showing Sung standing in front of documentation of *Apple*, 1977, another of his sequential performances. There is little in the way of sentiment. Family and group portraits address an unexamined history of colonial social order, reinforced by Japanese ethnographers who reduced Korean lives into regional, biological, and occupational types. Enlarged well beyond the dimensions of a typical snapshot, published newspaper photograph, or yearbook picture, each image bridges the gap between artist and viewer by inviting us to project our own life trajectories onto the work. Sung Neung Kyung, *Counting money*, 1976. Performance view, Seoul Gallery, 1976. Mr. S’s half way career rehearses some of the aims contained in *Here*, 1975, Sung’s first sustained work with a camera. After asking his father to buy him a Nikon F2 in 1974, the artist began photographing ephemeral works by his S.T. colleagues. Noting how cameras were veritable luxury goods in ’70s Korea, art historian Kim Mikyung points out the then-nascent class divide between artists who could have their works photographed and those who could not.<sup>12</sup> Such privilege underwrites *Here*, which depicts Sung photographing himself in a mirror placed at a three-way intersection in an alley outside his home in Seoul, rotated to show eighteen different backgrounds. However, the artist seems to disappear from Mr. S’s half way career, displaced by a slew of grainy images. Reflecting his belief that much could be “learned from that which was third rate,” Sung’s deliberately “low quality” images snap to attention as foot soldiers marching against the tide of pictures carefully manage to crowd out even the possibility of other descriptions of a given theme or subject.<sup>13</sup> The brilliantly titled series “No relationship to a particular person,” begun in 1977, pivots around a history of photography imbricated in a parallel history of internal violation via gross infringements of privacy in the name of public interest, condoned by the very institution entrusted with safeguarding personal and national security. Sung initiated this series by mining newspapers for pictures of faces and rephotographing and silk-screening approximately 110 of them, which he obscured with thin yellow strips across the eyes, the action recalling attempts to ensure the anonymity of victims and criminals. A perverse isonomy emerges, in which public and private figures are rendered equally anonymous in the context of harm that recognizes people only as insitgators or recipients. The strips flattens faces once belonging to bodies in the round while also shrouding preexisting connections a viewer might have with the depicted subjects. Many of Sung’s works implicitly problematize how postwar citizenship was filtered through state demands for total obedience. Sung Neung Kyung, *Mr. S’s half way career*, 1977, fifteen gelatin silver prints. Installation view, National Museum of Modern and Contemporary Art, Seoul, 2016. Photo: Netijae. Shown at the second Daegu Contemporary Art Festival in 1974, a major experimental-art exhibition in Korea, *An upside down map of world challenges* cartographic authority. A large world map is divided into rectangular sections, which are then re-presented as a gridded display next to the dissected original. Sung is sharply attuned to language in a manner echoing that of his cousin the poet Sung Chankyung, and the work’s Korean title (“Segye ch■ndo”) carries several loaded meanings. The words literally translate to “complete map of the world,” but ch■ndo is also a homonym for “guidance,” “transmit,” and “evangelize.” By weaponizing its facture, the work retools Yves Lacoste’s watershed critique of the map’s susceptibility to political machinations. Whatever instructional force the map once possessed is literally cut into pieces and—in later iterations of the work where sections are assembled

flat on a horizontal plinth—brought back to earth. An upside down map of world was for Sung a “scenario” foreshadowing one of his longest-running series, “Venue.” Begun in 1979, each entry in the series (forty-two exist to date) begins with Sung identifying newspaper photographs bearing editorial markings, usually broken dashes encircling damage or small arrows and crosses marking the scene of an accident, crime, or construction, which the artist describes as “internalized daily violence.”<sup>14</sup> The pictures are then rephotographed, with Sung painting his own notations directly on negatives with white ink so that they will appear more prominent than the original markings. Printed and enlarged to the dimensions of standard office paper, the images are arranged in patterns on a wall. Sung Neung Kyung, *Here* (details), 1975, eighteen gelatin silver prints, each 3 1/4 x 4 1/2". “Venue” challenges the claim that media publications can mint truths, a point Sung underscored when he described “information as mere taxidermy and the truth as a living, breathing creature.”<sup>15</sup> Comically large arrows studding *Venue 3*, 1980, attempt to “invalidate the editorial gesture” unilaterally instructing readers what to see while also refusing a space for response.<sup>16</sup> Stripped of their original captions, the images bait viewers into asking when disclosure in the name of public interest becomes a pretext for illicit surveillance. With every distortion, manipulation, and degradation of published images, Sung emphasized the gap between a fourth estate convinced of its own authority to legitimate representation as truth and a public for whom the politics of representation entailed much more than accepting reported accounts as fact. *Venue 6*, 1981, puts into concrete form what the artist imagined as the trail North Korean spies followed while infiltrating the South. “I wanted to convey something of the anxiety those spies must have felt, knowing that as soon as they crossed the border, they were forever excluded from any chance at belonging to a home, a family, or a nation.”<sup>17</sup> Rather than arrows, Sung used dashes to track footsteps moving into enemy territory while visually stitching together the work so that the entire installation appears to crawl across the wall. As if to distance “Venue” from potential demands for experimental art to champion liberal democracy, Sung made versions that cast doubt on the spectacularization of electoral politics using press images of the 1985 Korean national-legislature elections. Unsurprisingly, “Venue” appealed to artists associated with the stridently pro-democracy Minjung movement, but Sung’s commitments remained firmly aligned with bracketing what tried to pass as legitimate information rather than with staging clear-cut confrontation.<sup>18</sup> Indeed, Sung’s works appear especially suited to audiences as skeptical of collective unity as they are of libertarian detachment; the tacit, but nevertheless palpable, critique Sung makes of representational politics in all forms may explain the general absence of his post-1980 work from supposedly progressive histories of Korean art. Sung Neung Kyung, *An upside down map of world*, 1974, world map, panel. Installation view, Seoul Museum of Art, 2017. Photo: Netjjae. Of the series, it is *Venue 22*, 1985, that most immediately manifests what Sung intended by the title “Hy■njang,” whose Korean meaning is sometimes translated into English as “field” but which the artist explains is a compound of “the time called ‘now’ and the place called ‘here.’”<sup>19</sup> For that work, eight hundred photographs papered the wall of the Kwanhoon Gallery in Seoul, while the floor teemed with loosely piled images, an anarchic overload of information. Exhibited on the eve of Korea’s reemergence as a full-fledged democracy, *Venue 22* signaled a new contest of survival, in which keeping one’s head above the oceanic torrent of information amounted to a critical life skill. If Sung’s early works have only gained potency since their debut, it is because the questions they ask of representation and its politics remain as prescient as ever. Sung Neung Kyung, *No relationship to a particular person 1*, 1977, silk screen on 110 gelatin silver prints, each 10 x 8". From the series “No relationship to a particular person,” 1977–. Sung Neung Kyung’s work appears in “Only the Young: Experimental Art in Korea, 1960s–1970s” on view at the Solomon R. Guggenheim Museum, New York, September 1, 2023–January 7, 2024. The show, curated by Kyung An and Kang Soojung and co-organized with the National Museum of Modern and Contemporary Art, Korea, travels to the Hammer Museum, Los Angeles, February 11–May 12, 2024. Joan Kee is a professor in the history of art at the University of Michigan and a contributing editor of *Artforum*. She is a coeditor of *Primary Documents Korea* (Museum of Modern Art, New York).

NOTES

1. Partly based on his interest in the Austrian artist Friedensreich Hundertwasser, whose work he encountered in the pages of the Japanese art magazine *Bijutsu Tech■*, Sung’s early art included abstract paintings, which he later disowned after having “intense shame for feeling as if he copied foreign artists.” Sung, “Pijuryu ■i kaeny■m misulga, S■ng n■nggy■ng ■i ‘mangch’in’ mod■nij■m,”



interview by Cho Soo Jin, in *Chungsim kwa chubyun ni misulsarun nimulsa*: 'chiyuk misul' ni yuksa, chaengjilm, hyun (Seoul: Hanguk kŏnhyŏndae misulsahakhoe, 2022), 33. 2. Beginning with his July 1969 article on contemporary Japanese art for the influential journal *Space*, Lee had a significant impact on a small but critical group of younger Korean artists. 3. Sung realized that, as a "three-dimensional artist," he would never be more "than a second or third-rate." Sung, "Pijuryu ni kaenyŏm misulga, Sung nŏnggyŏng ni 'mangch'in' modŏnijŏm," 34. 4. Sung, conversation with the author, March 28, 2023. 5. Amadou-Mahtar M'Bow, quoted in Tran Van Dinh, "Non-Alignment and Cultural Imperialism," *Black Scholar* 8, no. 3 (December 1976): 45. 6. Sung, conversation, March 28, 2023. 7. Sung, conversation with the author, September 1, 2022. 8. Sung, quoted in "OB dŏl ni suda," in 1970–1980 *nyŏndae hanguk ni yuksajŏk kaenyŏm misul* (Seoul: Noonbit Press, 2011), 307. 9. Sung, conversation, September 1, 2022. 10. Sung recalls that during the performance at the Seoul Gallery in 1976, fellow experimental artist Chung Chan-seung screamed, "Wow you have a lot of money! Drinks on you!" Sadly, Chung died of liver cancer in 1994. Sung, conversation, September 1, 2022. 11. Sung Neung Kyung, "Career sibilgyemyŏng" [Eleven commandments for a career] (1991), reprinted in *Tangsinŏn na ni t'aeyang: tongsidae han'guk misurŏl wihan sŏngch'aljŏk not'ŏl* (Seoul: Total Museum of Art, 2005), n.p. 12. Kim Mikyung, "OB dŏl ni suda," 285. 13. Ibid. 14. Ibid. 15. Sung, conversation, March 28, 2023. 16. Sung, conversation, December 27, 2022. 17. Sung, conversation, September 1, 2022. 18. Venue 29a-1 and Venue 29b-w were included in the 1987 group exhibition curated by Um Hyuk, "Min Joong Art: New Movement of Political Art from Korea." It was the first North American presentation of Minjung art at A-Space in Toronto and at Minor Injury, run by the artist formerly known as Bahc Mo (Bahc Yiso), in New York. 19. Sung Neung Kyung, "Hyŏnjang" [Venue] (August 8, 1986), reprinted in *Tangsinŏn na ni t'aeyang: tongsidae han'guk misurŏl wihan sŏngch'aljŏk not'ŏl*, n.p.

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**URL:** <https://nikonrumors.com/2023/08/31/update-the-10-lens-nikon-lens-discount-is-available-in-most-all-european-countries.aspx/>

**Title:** Update: the 10% lens Nikon lens discount is available in most (all?) European countries

**Text:** A quick update on my previous post – the 10% discount on selected Nikon lenses is available in most (all?) European countries (not only in Germany): Check your local Nikon website for the details. Nikon USA will announce new rebates next week – expect them on September 4th since the current offers expire on September 3rd. Stay tuned!

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**URL:** <https://petapixel.com/2023/08/31/canon-and-reuters-develop-new-photo-authentication-technology/>

**Title:** Canon and Reuters Develop New Photo Authentication Technology

**Text:** Media conglomerate Thomson Reuters and Canon Inc. have announced a new proof of concept pilot program to certify digital images, addressing concerns about content's legitimacy. Alongside Starling Lab, an academic research lab based at Stanford University and the University of Southern California, Thomson Reuters and Canon have developed an end-to-end method for embedding information into an image at the time of capture that is preserved through the entire editing and publication process. Utilizing the latest cryptographic methods and decentralized web protocols, Reuters, Canon, and Starling Lab suggest that the pilot program can "ease concerns about content's legitimacy." The proof-of-concept technology demonstrates the preservation of an image's metadata throughout the chain. Reuters successfully integrated Starling Lab's authentication framework into its picture desk workflow. "One of the first practical news-gathering applications of the technology, this pilot comes at a time when consumers are increasingly worried about their ability to distinguish between real and fake news on the internet, and recent advancements in generative AI technologies which are making it easier for anyone to create visuals to deceive or misinform viewers," Canon explains. "Trust in news is critical. However, recent technological advancements in image generation and manipulation are causing more people to question what is real, and what is not. Reuters continues to explore new technologies to guarantee that the content we deliver to the world be factual and trusted," says Rickey Rogers, Global Editor, Reuters Pictures. Rogers continues, "Our collaboration with Canon demonstrates the potential for new technology in image verification to increase consumers'

confidence that what they see is genuine. We look forward to sharing the encouraging findings from the project with our customers and applying them to protect our photojournalism. Our goal is to remain one of the most trusted global news sources.” Reuters photojournalist Violeta Santos Moura captured photos using a prototype Canon camera during the pilot program. The prototype camera digitally assigns each image with unique identification and includes time, date, and capture location data. Similar technology has been seen with camera-level provenance features in Nikon and Leica cameras. The two companies are part of the Content Authenticity Initiative. The unique values are cryptographically signed to establish authenticity, and each photo is registered into a public blockchain. After each modification by the Reuters pictures desk, the blockchain is updated. The updating process continues until the photo is distributed, complete with preserved metadata, edit history, and blockchain registration embedded in the photograph using the C2PA standard. “Many photojournalists rely on Canon technologies. We understand the role that images play in society and recognize the importance of preserving image authenticity,” says Richard Shepherd, Product Marketing and Marketing Strategy Senior Manager, Canon Europe Ltd. “Working as part of the Content Authenticity Initiative (CAI), Canon wants to take meaningful measures to protect image outputs that serve the news community worldwide.”

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**URL:** <https://fstoppers.com/reviews/still-not-taking-aps-c-seriously-review-sony-a6700-639399>

**Title:** Still Not Taking APS-C Seriously? We Review the Sony a6700

**Text:** Sony has recently released a successor to a fan-favorite a6600 fittingly called the a6700. Don't get me wrong, in those few days I had it it performed well, but there are some features that would elevate it to a different level. First things first though, what did Sony do well with the a6700? Let's Get the Specs Out of the Way First The a6700 is the latest mirrorless camera released by Sony set to sit on top of their APS-C lineup. And many features would suggest so. The relatively compact body is powered by the decently performing 26-megapixel BSI CMOS sensor we've already had a taste of in the recently released FX30 camera. The sensor is capable of ISO values between 100 and 32,000 with decent low-light performance up until ISO 6,400. 12,800 starts to introduce color artifacts and the noise gets distracting. The images are still usable though. The top plate is flush and flat. Perfect for small camera bags. The maximum available framerate has stayed the same up to 11 raw files per second using the mechanical shutter. The viewfinder has unfortunately also stayed the exact same with 2.39 million pixels. It is the same resolution as its competition like the Fujifilm X-S20, or the Nikon Z fc, but I still find the viewfinder in both mentioned superior to the Sony. It's not just about resolution but about the optics and the UI projected. The rear LCD size is the same at 3", but the resolution has been improved to 1.040k dots and the up/down tilt mechanism has been swapped for a fully articulating one we've already seen in the a7 IV. This makes vertical shooting more comfortable and allows us to hide the screen when not in use. I'm not going to call this an upgrade or a downgrade. Everyone has a different preference and that is fine. Fully articulating LCD. Some love it, some hate it. Can't deny the options it gives us though. It Handles Well Enough The ergonomics of the camera have been slightly improved with the inclusion of the front roller. Now we finally get three to be able to quickly adjust any aspect of the exposure on the go. The grip is large, and deep, and offers a solid hold. I can see some people not enjoying the low height of the camera having to have their pinky awkwardly underneath the body, but I personally never really found that an issue. I did not mind carrying the camera for hours and hours with no strap. It is a comfortable body to have. That being said there are some downsides to the size. The first one is the exclusion of a focus point joystick. As a left-eye shooter, I immediately disable touchscreen controls on any camera as I do not want to move my focus point using my nose on the screen. That meant I had very limited options to move my focus point. Granted the AF system with the tracking point is reliable enough for me to trust it, but there were occasions when I'd prefer to move the point to a desired location instead of tracking and recomposing. Well, at least the AF button on the back of the body is large and easy to use. The mode dial with the stills, video, and S&Q; switch. Who Is It For? The next gripe I have with the body is the viewfinder size. I understand that to keep the dimensions at this level, there is not much room for a larger EVF. But I was honestly hoping for a top viewfinder with more resolution and a larger magnification similar to the a7 IV. I guess I was hoping Sony would release something like an a7000 lineup. Professional features and body with a smaller and

cheaper APS-C sensor. Instead, we just got an updated a6600 which was already a great camera. It is nice of Sony to keep the camera weather-sealed, which expands the shooting options tremendously for many photographers. But the inclusion of a single card slot is too scary for anyone shooting either a paid gig or an important piece of work you cannot afford to lose. SD cards fail. I've had that happen to me multiple times and the thought of not having a backup is just too unsettling. Good connectivity, only a single card slot though. I applaud the use of actual hinged doors instead of loose flaps. Just a Buzzword or Does AI Truly Help? The Sony a6700 has adopted the same AI processor we have seen introduced in the recently released a7R V promising much more accurate performance when detecting all kinds of different subjects like animals, insects, vehicles, birds, and, of course, humans. It can nicely figure out not just where the eyes are and follow them, but when your subject turns around it keeps the head in focus until the eyes are visible again. All of this works well at most times but it certainly is not flawless. Just like with the a7R V, the a7 IV, Canon's R6 Mark II, Fujifilm's X-T5, or OM System's OM-1, these AF systems work brilliantly when they do, but when they lose the subject too far into the bokeh it has a hard time refocusing to find the subject once again. And once again, unless the AF system is accompanied by a fast enough motor within the lens it cannot keep up with the subject. I used the Sony FE 55mm f/1.8 Zeiss and the FE 28mm f/2 and while I would not classify these lenses as slow if the subject was moving fast towards me I often got out-of-focus clicks when tracking. Don't get me wrong, the AF system is truly advanced. One of the best on the market. But it is not the all-saving, all-knowing, and all-seeing AI miracle Sony claims it to be. Don't give into the marketing hoping to not have any more blurry clicks. Learn to work with it and it will deliver. Rely on it too much and you'll end up disappointed. Made for smaller lenses. The a6700 handles really well and offers decent ergonomics. What I Liked The deep and ergonomic grip Compact size Weather-sealing Fast autofocus when in many scenarios Decent image quality Good exposure controls Large battery USB-C charging Easy vertical shooting with the swiveling screen What I Didn't Like Single SD card slot Small viewfinder with low resolution and magnification Loud shutter noise Lack of a joystick It's Good, Just Not Great If you're an a6600 owner and do not plan on shooting video, there really is not a huge reason to upgrade. The a6700 is a big step up from the likes of a6100 or a6400, but it is still being held behind by some features lacking. Unless you are a hobbyist who is not afraid of losing files to a card failure. It would, however, be nice to see Sony take APS-C slightly more seriously if they came out with a more fleshed-out body. Adding a second card slot, making the viewfinder larger and sharper, and making the shutter sound less obnoxious would make the body a serious machine. For now, it is just a spec-bump to tell us "Look, we haven't forgotten about APS-C!" Samples

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**URL:** <https://nikonrumors.com/2023/08/31/the-new-and-improved-meyer-optik-gorlitz-biotar-75-f-1-5-ii-lens-for-nikon-z-and-f-mount-is-now-available.aspx/>

**Title:** The new and improved Meyer Optik Görlitz Biotar 75 f/1.5 II lens for Nikon Z and F mount is now available

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**URL:** <https://petapixel.com/minolta-history/>

**Title:** Minolta: Tales of a Forgotten Camera Maker

**Text:** Today, most of the consumer-grade camera landscape is dominated by less than half a dozen brands. Canon, Sony, and Nikon take the lion's share in terms of sales and public recognition, while almost all the gaps are filled by smaller companies like Fujifilm and Pentax. It was not always this way. In fact, for most of photography's history, there used to be an immense wealth of camera makers competing with one another on the market. Out of literally hundreds, if not thousands of such brands that existed around the eve of World War Two, very few survived. One of these, to the dismay of many shutterbugs, is Minolta. You might not have heard of Minolta before, especially if you got into the hobby during the digital era, but you will be surprised to know just how intimately their story is intertwined with

that of photographic technology and history. Let's take a look back and explore the annals of a camera brand that never deserved to fade from memory! Beginnings Minolta traces its origins back to the year 1928. Its founder Kazuo Tashima concentrated his initial business efforts around importing foreign – largely German – camera designs and re-branding them for the domestic Japanese market. In fact, for much of this very early period, soon-to-be Minolta would use the trade name Nichi-Doku Shashinki Shoten, which translates to “Japanese-German Camera Manufacturer”. Initially, Nichi-Doku sold a range of cameras under the “Nifca” brand (e.g. Nifcurette, Nifcasport, and Nifcaklapp), all slightly altered designs originally penned by the German group Neumann & Heilemann. These were folding cameras shooting on medium-format plates. Eventually, following a series of labor disputes and heavy strikes around the turn of the 30s, Neumann & Heilemann grew disillusioned with the way the Japanese company was run. They decided to break the partnership to pursue their own ventures at home under greater corporate and creative control. As a result, Nichi-Doku reorganized as “Chiyoda Kogaku Seiko K.K.”. The First “True” Minolta Cameras In 1933, Chiyoda revealed their design for the first camera produced in-house since the split, the Minolta. The name stood for Mechanisms, Instruments, Optics, and Lenses by Tashima, highlighting the fact that Tashima was now getting serious about the “Made in Japan” qualities of his machines. The original Minolta would form the basis for a series of folding cameras all designed and built by Tashima. Over the years, these would progressively deviate more and more from the original European cameras that inspired them. Take, for instance, the seminal Minolta Vest of 1934. The so-called vest pocket camera, introduced by Kodak – a roll film camera that was cheap to buy, easy to use, and could fold completely flat to fit in a large pocket – was a real hit during the 20s and 30s, and Minolta sought to not just capitalize on that market, but provide real innovation. The Minolta Vest used the same “Vest Pocket Film”, that is 127 format, as its main competitors from the United States, France, and the UK. However, instead of flimsy and often cheaply-made leather or fabric bellows, the Minolta Vest folded by means of a unique sliding box mechanism. Imagine, if you will, a set of Chinese boxes, made out of bakelite – and attached on one side to a lens board with a shutter, and on the other to a camera body. That, more or less, is how the Minolta Vest folds and maintains its compact dimensions while being much more resilient and sturdier than its contemporaries. Entering the Chiyoda Era In 1937, while the Minolta Vest and its sister models were nearing the end of their production, Tashima once again restructured. Entering into a new partnership, this time with a Japanese company called Asanuma Shokai, they rebranded to Chiyoda Kogaku Seiko. To show that they were going for a complete reinvention of their brand identity, Chiyoda Kogaku presented a slew of new Minolta camera models that year, all targeting the high-end market that had been all but ignored by the prior Nifca lineup. Among these, quite a few ended up becoming milestones of Japanese camera development. The Auto Semi Minolta, for instance, was one of the earliest cameras to use a coincidence-type rangefinder, where the rangefinder image was projected into the viewfinder eyepiece instead of being relegated to a separate window. The Auto Press Minolta meanwhile tried, as the name implies, to establish the Minolta name as a major player in the field of Japanese press cameras. An evolutionary update on the original Minolta from 1934, it made major waves as the first made-in-Japan machine marketed towards journalists that could synchronize with flash. The Quiet Birth of Rokkor Optics While Chiyoda's new fleet of top-of-the-line cameras did meet expectations in terms of sales, their success was soon cut short by Japan's entry into World War II. As with most other large industrial corporations, Chiyoda Kogaku joined the war effort by producing optics and equipment for the Imperial Japanese Navy and Air Force. During this period, they completely ceased selling their cameras to civilian customers to focus exclusively on military research and development. Unbeknownst to the general public, it was during these grim years that one of the names most intimately associated with the Minolta name would be born – Rokkor. The moniker, designating the highest-spec lenses and optics designed and made by Chiyoda, was initially only used for military hardware, like binoculars and gunsights. That also included optics for aerial cameras used by the Imperial Japanese Air Force. However, after 1945 it would go on to become one of the most well-respected brands in the world of photographic lenses, finding success far beyond Japan's borders. The Early Postwar Years Initially, the postwar business went ahead only slowly for Minolta. Large-scale destruction and the tumultuous nature of the late-40s Japanese economy made it just about impossible to come up with fresh, exciting ideas or radical designs. The pro-grade press cameras and

sophisticated rangefinders they had offered in the 30s had to be entirely scrapped during this period to cut down on costs. This meant that a large portion of the new-for-1946 Minolta camera lineup were actually leftover designs dating back to the 30s. However, the company did try to give their aging folders a do-over by equipping them with all-new lenses. Namely, those shiny Rokkors that Minolta had developed for wartime use. Among the first coated lenses put on a consumer-grade camera, they of course came with a higher price tag compared to much of the competition. Not that there was much demand for cameras in Japan at all in the immediate postwar era. In fact, sales were relatively abysmal during this time. Still, the inclusion of Rokkor optics, at first intended as a stopgap due to the lack of supply of third-party lenses, set a symbolic precedent. A Bold Fresh Start: The Minolta SR-2 Chiyoda's fortunes would not change dramatically until 1958. That year, the company decided to embark on their biggest experiment yet – the release of their first interchangeable-lens system camera for 35mm film, the SR-2. This was a pentaprism SLR with an eye-level viewfinder and instant-return mirror, only the second camera to combine all of these features after the original Asahi Pentax. The SR-2 also employed some conveniences thought of as particularly luxurious for the late 50s, such as a frame counter that automatically reset to zero when reloading, a rapid-wind lever, and a secure bayonet lens mount that had a provision for automatic aperture control. Released with a full complement of Rokkor lenses in tow, the Minolta SR-2 came as a big surprise and wowed the photographic press. Acknowledged for its robust build quality and stunning optics, it immediately put Chiyoda Kogaku on the map as a major Japanese camera maker of high quality. Only one extremely coveted feature of late-50s professional system cameras was missing on the SR-2: a light meter. Chiyoda tried to fix this almost immediately with the follow-up SR-1 and SR-3, which added a small mount that an external meter could be clipped onto. However, this was a clunky solution, and barely two years later the revised SR-7 appeared on the market with a CdS meter embedded into a window on the side of the camera body. More reliable and accurate than the more common selenium meters of the period, CdS meters ran on batteries and were generally reserved for high-end gear. Chiyoda was gunning for the top end of the market with the SR-7, and it showed. Without a doubt, the SR-7 was the company's most advanced and most expensive camera yet. To their great fortune, it also became by far their most successful. So great was the upswing provided by the SR-7 and its siblings that Chiyoda decided in 1962 to formally change their name to Minolta Camera Co. With that, a new era of Japanese camera design had begun. Going Into Space With the Minolta Hi-Matic Before the successor to the SR line was ready, Minolta quietly released a nifty little 35mm rangefinder packed with the latest and greatest in early 1960s camera technology: aperture-priority auto exposure. This new camera was dubbed the Hi-Matic and became one of Minolta's greatest financial successes lasting well into the 80s. The combination of simple semi-automatic operation and high build quality didn't just fare well among amateur photographers, though. One very lucky Hi-Matic, rebranded by American importer Ansco, was taken up to near-Earth orbit on John Glenn's maiden voyage into space in 1962. Though the idea was considered highly unorthodox at the time, Soviet cosmonaut Gherman Titov beat Glenn to the distinction of recording manually from space by a few months – but he used a professional movie camera to do so. That makes John Glenn's little Hi-Matic the first conventional stills camera to take a picture from space in human hands! Minolta's Worldwide Success: The SR-T Minolta soon realized that the SLR market was on a huge upswing, spearheading the proliferation of both amateur and professional photography that was on the horizon at the dawn of the 60s. In order to meet the demand that trend was creating, the company was very quick to announce an official successor to the SR series, the SR-T 101. Released in 1966, the SR-T 101 was based on a modified SR-7 body with the same lens mount and some similar exterior parts. However, much of the SR-T was also redesigned from the ground up, including its radical new light meter. On the outgoing SR cameras, you either had to rely on an external meter or use the SR-7's built-in CdS meter. Either of these options lacked something in accuracy, as the meter read light values from a window to the side of the camera's viewfinder. That didn't just introduce parallax error. The lack of any linkage or coupling between meter and aperture also meant that proper metering was a multi-step process that required the photographer to first set the meter, then read the light value, and then transfer the readings from the meter to the lens in a total of three steps. Minolta wished to iron out all these inconveniences with the SR-T 101, and they succeeded. Dubbing their solution CLC, Contrast-Light Compensation, this groundbreaking tech

allowed the SR-T to read light straight through the lens just like its prime competitor, the Pentax Spotmatic. However, Minolta went a step further than that. Instead of copying the Pentax design – which could only read light from one spot in the center of the frame, and only with the lens stopped down – they managed to create a pseudo-matrix metering system that would assess the lighting conditions of the entire frame at once, no stopping down necessary. That made the SR-T 101 the first SLR and the first system camera in the world that allowed for near-instantaneous metering: just peer into the viewfinder, watch the metering needle move, and select the appropriate shutter and lens aperture settings to compensate. The Minolta SR-T 101 was not just a smash hit in terms of sales. It was a defining cornerstone of reflex camera development, solidifying the importance of easy-to-use light metering in camera design. Increasingly marketed across a dizzying range of sub-models, variants, and trim levels, the SR-T series would keep expanding and receiving incremental updates for more than a decade. The last SR-T, the 201, would finish production only as late as 1981. That makes it one of the longest-running camera designs in uninterrupted production ever made, whether you consider the SR series to be distinct from the SR-T or not. Challenging the Leaders of the Pack: The Minolta XK Fueled by the enthusiasm for their incredibly well-received SR-T cameras, Minolta immediately went to the drawing board on a follow-up camera that would be even more ambitious. Especially as the years went by, it became apparent that the SR-T's natural position in the SLR market was solidly in the middle of the pack. It was too sophisticated and its Rokkor lens selection too pricey to compete in the budget segment, where the Hi-Matic felt more at home. At the same time, it lacked a certain sense of brute toughness and modularity to appeal to the high-end, pro-journalist market that was crucial during the 60s and 70s. Thus, the logical goal Minolta set for themselves was clear. They had to sell a camera that would be able to go head-to-head with the top-of-the-line professional SLRs of the era, with no expenses spared. The result of this enthusiastic drive to perfection was the Minolta XK, also marketed as the X-1 and XM in some countries. Released in 1973 to immense fanfare, it would open up a new chapter for Minolta and the camera industry at large. Taking the CLC metering system from the SR-T and improving upon it drastically to give the camera full-on aperture priority auto exposure capability, the XK was loaded with the hottest technology money could buy in the early 70s. Thanks to its SR mount, the XK had compatibility with all previous Rokkor lenses, giving it an immediately significant lens selection upon launch. It also featured interchangeable viewfinders and focusing screens, with the standard viewfinder prism head including the aforementioned aperture-priority auto exposure system. In an era where the established rule of camera design was to create mechanically simple, yet refined modular bodies with next to no electronics save for add-on equipment, the XK stunned the press with its inclusion of several groundbreaking high-tech features. Nobody could compete with what the XK offered in 1973. The Nikon F and F2 both had exchangeable prisms with light meters built-in, some of them even being TTL-capable, but none featured matrix metering like Minolta's CLC or automatic exposure of any kind. Perhaps this was the reason why Minolta boldly chose to price the XK much higher than its competition. At \$790 for a basic kit including a lens, it was more than \$100 beyond a comparable Nikon or Canon camera. That's a difference of \$650 for a total price of approximately \$6,000 in today's terms! Ultimately, it is this high price that probably kept the XK from being the great financial success and trendsetter that Minolta had hoped it would become. Another gripe commonly cited as a sales barrier was the lack of available motor drives for the XK system. In the 70s, basically no "pro camera" accessory was as highly prized as a motorized winding grip or back, and the XK could only be ordered with an optional motor permanently attached to the body. That lack of modularity drove many members of the press away from the system and gave it a reputation of being both overpriced and undercooked. The German-Japanese Connection The failure of the XK system was a harsh slap in the face for Minolta's ambitions. Still, the company's SR-Ts and Hi-Matics continued chugging along just as before, giving the company at least a stable financial foundation to work with. By the mid-70s however, both of these designs were over ten years old, and Minolta was facing a slump. To both generate worthy successors to the SR-T and to continue innovating as they had done before, Minolta decided to enter into a partnership with a foreign company to encourage mutual research and development. This goal was being actively pursued well before the XK was even ready for production – a sort of fail-safe, if you will. The decision fell on a German camera maker. Germany had been the center of camera development for much of the 20th century. But in the

years following the war, stalwarts such as Zeiss-Ikon and Voigtländer were displaced by the onslaught of Japanese SLRs, chiefly Nikon, with whom the outdated German designs could never compete. Minolta hoped that by entering into an agreement with one of these struggling German companies, they could help save the reputation and financial performance of both. After all, Minolta themselves started out as the “Japanese-German Camera Manufacturer”, remember? In the end, the decision fell, and an agreement was signed with none other than Leica. It might sound silly today, but the 70s were a really tough decade for the Wetzlar company. Their M5, which tried to reinvent the classic 35mm rangefinder formula with through-the-lens metering and a geometric design, failed miserably. The photographic press was quick to spell doom for the entire brand. Hence, it was perhaps not unreasonable at all for Leica to jump at the opportunity of a collaboration with up-and-coming Minolta. The Japanese promised fresh ideas and more economical mass-production techniques, whereas the Germans promised decades of experience in craftsmanship and construction. The Leitz-Minolta CL Soon, the first fruit of this unlikely marriage arrived on the scene. In 1973, only a few months after the release of the XK, Leica presented a radical new rangefinder called the CL. Instead of the horizontal focal-plane shutter of the classic Leica series, this new model used a vertically running pair of shutter curtains, designed and produced by Minolta. In fact, the bulk of the CL, which was also sold as the “Leitz-Minolta” CL, came out of Minolta’s factory in Japan, despite the fact it carries a Leica M-mount! Intended as a more compact, faster, and lighter alternative to the unpopular M5, the CL offered lots of convenience features like projected framelines for many focal lengths, a TTL meter, and compatibility with all M-mount lenses. A few CL-specific lenses were actually Minolta Rokkors, but the majority were still designed in-house at Wetzlar. While the CL didn’t prove to be a gigantic success, it sent the message that Leica had hoped for: We’re back, and we’re not afraid of experimenting a bit! The Minolta XE and Leica R3 In 1974, Minolta unveiled the XE. Featuring a much sleeker, more handsome, and more streamlined body and aperture priority AE, this was another high-tech camera for professionals with deep pockets. Compared to the XK though, there is no denying the XE was many times more elegant. Where it completely lacked motor drive compatibility and interchangeable viewfinder prisms, it scored in sophistication, ease of use, and bombproof construction. A majority-Minolta design, the main element of Leica cooperation in the XE’s specs was the shutter. A vertically-traveling, electronically-timed high-speed design, it was created by Leica in collaboration with another legendary Japanese company, Copal. Seeking to expand into the SLR market, which was only growing without a hint of slowing down, Leica decided to use the XE as a base to replace its relatively unsuccessful Leicaflex SLR cameras. The result was dubbed the R3 – and surprisingly, very little apart from the Leica-exclusive lens mount and the metering system differed from its XE sibling. Cream of the Crop: The XD and Leica R4 The late 70s proved to be a period of transformation for the camera industry. Where the start of the decade was all about sophisticated metering in large, heavy-duty modular bodies, the latter end of the decade followed a trend of downsizing. Compact cameras, especially compact SLRs, were the status symbol to beat, largely thanks to the Olympus OM system which was breaking sales records. No longer did camera manufacturers have to compete for the very top end of the market in order to justify a flagship product – something Minolta appreciated more than anyone. In 1977, Minolta unveiled a new top-of-the-line camera, inspired by the XE but expanding on it in significant ways. Bearing the name XD (also sold as the XD-7 and XD-11 in some parts of the world), the new camera was both more expensive, smaller, lighter, and even more pleasing to the eye than the outgoing model. The Leitz-Copal shutter made a return from the XE, more refined and even quieter than before. The integrated TTL meter was upgraded from CdS cells to silicon diodes. The XD also expanded on the XE by introducing shutter priority mode, making it the first camera ever to have both aperture and shutter priority as well as manual exposure. The XD was also loaded with countless detail enhancements. For example, windows in the viewfinder displayed both selected shutter speed and aperture as well as intended values given by the meter, simplifying readout and reducing the necessity to take your gaze off the eyepiece. Instead of having an on-off switch like most cameras of the era, the meter simply self-activates and deactivates automatically by sensing the pressure of your finger resting on the shutter release. These and other refinements made the Minolta XD a byword for elegance and build quality among those who have had the pleasure of using it. Finally, the top-of-the-line Minolta would also receive its own matching (and removable) motor winder accessor, the Auto Winder D. As before,

Leica made use of the special bilateral agreement to produce a series of cameras using the XD body shell, named R4 through R7. While niche products by any measure, they further demonstrated Wetzlar's ability to innovate and design cameras in tune with the modern tastes of the 70s and 80s. Last Great Hurrah: The X-700 In 1981, Minolta added a new "X" body to its existing lineup to seal the gap left behind the last SR-Ts. This new camera, labeled X-700, advanced many of the trends started in the late 70s: automation, compact proportions, and a dizzying race towards efficiency. Instead of a selection between manual, aperture priority, or shutter priority exposure, the X-700 offered the former two in addition to a new fully automated Program mode. Program automation was the must-have feature in consumer SLRs at the dawn of the 80s, and Minolta was playing ball. What programmed automation did to the camera industry was open the floodgates to huge swathes of inexperienced photographers who were previously intimidated by manual exposure. Minolta understood that this would comprise the bulk of future X-700 customers and designed the camera to be cheap and efficient to produce in large numbers. Gone were the Leica touches such as the silky film advance, ultra-silent shutter, and the luxurious metal body. Instead, the X-700 was built using the same high-impact plastic and generous use of electronic components as contemporary offerings by Canon and others. While the X-700 did inherit many of the XE and XD's innovative features, a lot of them were watered down. The viewfinder information windows lost some detail, the meter was a lowlier center-weighted unit, and the shutter now ran horizontally, with silk curtains instead of metal blades. What all these downgrades amounted to, of course, was a huge reduction in weight and price. That, and its award-winning Program mode, made the X-700 a runaway hit, becoming the best-selling of all manual-focus Minolta SLRs. Little did buyers in 1981 know that it would also be the company's last. Minolta, the Autofocus Era's Greatest Innovator The new megaproject of the 1980s that all the major camera manufacturers were heavily researching was automatic focusing. It made sense: the 80s were very much the decade of tech and automation in photography, and having automated and downsized just about everything else about the pre-Reagan era SLR, focus was next. Both Nikon and Pentax presented first attempts, the F3AF and the ME-F. But these were extremely clunky cameras based on existing manual-focus bodies that required special motorized lenses. Heavy, very expensive, and unsightly, they did not garner much appeal. It was Minolta that in 1985 first presented a 35mm SLR that not only could automatically focus but also automatically advance film thanks to an internal motor drive. This camera, called the Minolta Maxxum 7000, was the first to break with the SR lens mount which had been in consistent use on all of Minolta's cameras since the very first SR-2 from 1958. It also broke with established camera styling, courtesy of all that new technology. With neither a manual wind lever nor a rewind crank anywhere in sight, the Maxxum was a sleek, black beast with lots of buttons in place of knobs and levers. All Maxxum lenses could automatically focus because the Maxxum's focus motor was not built into the lens barrel but rather the camera body. This would be the de facto standard for generations of autofocus cameras to come. Sudden Crisis Minolta intended for the Maxxum 7000 to make a splash and quickly prepared follow-up models to counter the competition. The Maxxum brand grew substantially throughout the 80s and 90s, spanning dozens of models and birthing a huge lens lineup. The capstone of the series would be the Maxxum 9, a real professional camera body featuring high-speed burst shooting, an unreal 1/12000th of a second top shutter speed, and too many electronic gadgets and features to list. There was just one big problem. People weren't buying them. For all its innovations, Minolta lacked the brand recognition to go head-to-head with Canon and Nikon in the autofocus market. Worse, the arrival of AF-compatible cameras basically obliterated sales for all of the older manual focus designs. Minolta couldn't rely on their last-generation holdovers to keep the business afloat while they embarked on risky experiments, as they had successfully done before with the SR-T and Hi-Matic. Instead, the autofocus era became a time of crisis for Minolta, despite the integral role that the brand played in ushering it in to begin with. To try and overcome that struggle, Minolta ended up agreeing to a merger with fellow flagging Japanese camera manufacturer, Konica. The Konica Minolta business survives to this day, but its camera division would not endure for long. The End of Minolta and the Rise of Sony Desperate attempts to save both Konica and Minolta cameras were rendered a lost cause around the turn of the millennium. The prospect of the digital revolution required an RnD investment that the shaky conglomerate could not justify as its existing cameras remained poor sellers, so Konica Minolta decided circa 2005 to sell off its camera business entirely and



focus on more lucrative endeavors, like printers and copying machines. The company that ended up buying the remnants of what used to be Minolta was none other than Sony. Having made its name in a wide range of home electronics fields, it was natural for Sony to want to leverage their brand name to try and break into the booming digital camera world. That they did – and not without Minolta's help, as all of Sony's early Alpha-series cameras utilized the so-called Minolta-Sony A-mount. This was in fact little more than the exact same mount Minolta had given its Maxxum cameras. Many of Sony's early digital designs would also be informed by the late '90s Maxxum bodies and their technology. While the Sony Alpha brand nowadays concentrates mostly on its mirrorless cameras built around the E-mount, the first 10 years of Sony's meteoric rise to digital camera dominance could have never happened without the A-mount system and its Alpha SLT cameras, all built using Minolta DNA. In that somewhat abstract sense, Minolta should be happy to count itself among one of the very few camera makers in history that managed to excel not only during the film era but also after the switch to digital photography.

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**URL:** <https://photorumors.com/2023/08/31/meyer-optik-gorlitz-biotar-75-f-1-5-ii-lens-released-ef-rf-f-z-e-l-m-x-k-mft-mount/>

**Title:** Meyer Optik Görlitz Biotar 75 f/1.5 II lens released (EF/RF/F/Z/E/L/M/X/K/MFT mount)

**Text:** The previously reported new and improved Meyer Optik Görlitz Biotar 75 f/1.5 II lens for Canon EF/RF, Nikon F/Z, Sony E, Leica L/M, Fujifilm X, MFT, and Pentax K cameras is now officially released. Pre-orders are now open at B&H; Photo (Meyer Optik Görlitz lenses are also sold at Adorama).

Delivery time: approximately 2 weeks Focal Length & Aperture: 75mm / f1.5 – f16 Image circle diameter: 60mm angle of view: 32° Aperture blades: 15 Filter diameter: 62mm Optical construction: 6 elements in 4 groups Minimum object distance: 0.75m Housing: Aluminum / natural anodized Rangefinder coupling (Leica): no (LiveView required) Sample photos: The original Biotar 75 f/1.5 lens from the 1930s: "In the 1930s, design genius Willi Merté created the original Biotar 75 f1.5. In no time at all, the lens gained a legendary reputation and achieved great success. Due to the Second World War and the high production costs for that time, the production of the popular Biotar 75 was discontinued very quickly. Its great popularity and the small number of well-preserved specimens at the same time make the Biotar 75 an extremely rare lens." Additional information: Meyer Optik Görlitz – Biotar 75 f1.5 II available Bad Kreuznach, Germany – August 31st, 2023 – Meyer Optik Görlitz releases the Biotar 75 f1.5 II, a new edition of the world-famous lens that has been announced for some time and expands its existing portfolio of high-quality character lenses with one of the most sought-after bokeh lenses in the world. The Biotar 75 II is available now and can be purchased directly from the manufacturer & from well-stocked photo retailers. "We are very excited to be able to bring this wonderful lens to market, after some unforeseen circumstances that have caused several delays," said Marco Pfeiffer, Managing Director Meyer Optik / OPC Optics. "Already the start of the Biotar series with the 58mm f1.5 II was very successful, and we expect our Biotar 75 f1.5 II to exceed this success by far again." About the Biotar 75 In the 1930s, ingenious designer Willi Merté developed the original Biotar 75 f1.5, and in no time at all the lens gained a legendary reputation and achieved great success. However, due to World War II and the high production costs for that time, the production of the popular Biotar 75 was discontinued quite soon. Its great popularity and the simultaneous small number of well-preserved units, make the Biotar 75 an extremely rare lens. A look at the optical construction of the new Biotar 75 f1.5 II reveals directly that it is again a Double-Gauss-lens with 6 lenses in 4 groups. What does the Biotar 75 f1.5 II stand for? The high image sharpness in the center, coupled with a strong swirly bokeh at open aperture, are the legendary imaging characteristics of the Biotar 75 f1.5 II. In swirly bokeh, highlights in the background are rendered circular and appear as if they are being pulled into a vortex. The sharpness in the center of the image and the wonderfully drawn bokeh in the blur give the subject a slightly three-dimensional feel. At the same time, the overall image appears somewhat delicate, which can create a great contrast in available light situations with clear shadows and highlights in the background. Capturing the historic imaging capabilities of the original Biotar 75 while optimizing the lens using the latest technologies was the main goal in redesigning our Biotar 75 f1.5 II. Thus, after intensive analysis and development, as well as several prototype tests, the best optical glass, a special AR coating and high-precision manufactured mechanical components are used. A sharpness & contrast monster when

stopped down Even minimally stopped down (from f2.0), the Biotar 75 f1.5 II shows even more contrast, and between f/5.6 and f/8, the Biotar 75 f1.5 II reaches its maximum sharpness. In this respect, it makes many comparatively 'young' lenses look very old. Likewise, the color reproduction of the lens is very harmonious and balanced. Due to its almost apochromatic construction, there are no lateral chromatic aberrations, for example. Many photographers rave about the Biotar 75 f1.5 II and its capabilities that, going beyond portrait photography, can also be used perfectly in landscape and nature photography. Likewise, many wonderful fashion, sport, wedding, architecture and even macro shots are created with the Biotar 75 f1.5 II. Top level mechanical design The mechanical construction, which is based on the same principle as the previous new editions from Meyer Optik, offers an extremely pleasant feel, the value of which is immediately noticeable at first touch. The mechanical quality at the very highest level makes the Biotar 75 II, like its historical prototype, a lens for the ages. Compared to its various historical models (there were 3 different Biotar 75), the stepless & silent diaphragm is now composed of 15 steel blades and contributes to a particularly beautiful bokeh. Of course, as with all Meyer lenses, the mechanics of this lens series were sourced from established German precision engineering companies. The color scheme already introduced on the Biotar 58 II (natural anodized with black anodized accents), has of course been retained on the Biotar 75 II. Like all Meyer lenses, the Biotar 75 f1.5 II is assembled in the company's own factory in the heart of Hamburg, using the most precise handwork.

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**URL:** <https://fstoppers.com/gear/why-one-photographer-left-leica-after-four-years-639594>

**Title:** Why One Photographer Wants to Leave Leica After Four Years

**Text:** Leica is arguably the most polarizing photography brand out there, though its users tend to be fiercely loyal to the brand, which is why it is always interesting to hear why when one leaves them for another system. This insightful video essay features a photographer discussing why he might leave Leica after four years with the brand and switch to Nikon. Coming to you from Evan Ranft, this interesting video essay discusses why he may leave Leica for Nikon after four years with the system. No doubt, there are a lot of good things about Leica: they offer some truly stunning image quality, strong construction, and an experience like none other. On the other hand, they are very expensive, which is something worth considering if you are running a business and need to minimize expenses. In addition, because of the rangefinder mechanism, you will always be stuck to using a fairly narrow range of focal lengths, ruling them out for anyone who needs particularly long focal lengths. While they arguably offer the purest photography experience, there may be some better options out there for professionals who need certain features and capabilities. Check out the video above for Ranft's full thoughts on the matter.

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**URL:** <https://petapixel.com/2023/08/31/photographer-captures-rare-fish-that-walks-on-its-hands/>

**Title:** Photographer Captures Rare Fish That Walks on its Hands

**Text:** A photographer captured one of the rarest animals in the world — a fish that can walk on its hands. It is believed there are less than 3,000 spotted handfish left in the wild, and the only place you can see them is in Tasmania, Australia which is where underwater photographer Nicolas Remy traveled to. “I took these handfish photographs in July 2022, diving the Derwent River near Hobart (Tasmania),” Remy tells PetaPixel. “I found most of the handfish on a relatively shallow site (less than 10 meters depth), where the water was 11 to 12 degrees Celsius in temperature, courtesy of the Tasmanian Winter. “While depth wasn’t an issue, the water was very murky, with a visibility of about two meters, which would drop even lower if I had the unfortunate idea to touch the silty river floor. “I spent a total of nine hours diving this place, diving for two to three hours at a time, and I have been fortunate to find up to seven handfish over one long dive. “They are a challenge to spot though, as they lay still on the bottom, among bits of algae, shells, and sea stars.” Handfish have hand-shaped pectoral fins which they use to walk on the seafloor. It is very different from most fish who can swim freely — the handfish is stuck to the seabed. Sadly, the spotted handfish used to be common in the southern Australian state but the rare fish is being wiped out thanks to an introduced invasive species; the North Pacific seastar which feeds on the sponges where handfish would normally lay its eggs. It also faces challenges because of human activity. “An aggravating factor is that handfish aren’t very resilient,” adds Remy. “Their young hatch and start living exactly where their parents bred, and being only able to walk, they won’t cover long distances. “What that means is if a handfish population can easily get wiped out from a location, and won’t come back unless re-introduced.” Photographing a Handfish Remy, who is based in Sydney, Australia, was using a Nikon D810 enclosed within Nauticam underwater housing. The D810 had a 105mm macro lens attached but Remy brought something extra with him too. “I also wanted to create some close-up images with a wide-angle feel, and for that, I used the Nauticam EMWL wet lens,” he says. “It’s a bug-eye lens, similar concept to the Laowa probe lens, but optimized optically for use in the water. “I am so glad I brought the EMWL over because I found the spotted handfish was a little skittish and would flee unless I was extra careful with my approach. They surely wouldn’t have tolerated a bulky fisheye lens and dome port up close, but the one-inch front optic of the EMWL was tiny enough for them.” Lighting underwater is difficult enough, but on a gloomy riverbed the situation is dire and although Remy brought with him a Retra Flash Pro strobe he still had to use a modifier to get the desired results. “In murky waters, strobes tend to light up an awful lot of floating particles (backscatter), so I had to set up my lighting to cover the handfish while minimizing the amount of particles lit up,” he says. “For this, I used Retra LSD snoots, which are essentially optical tubes, which I attached in front of the strobes to narrow down their light beams. “Having such controllable lighting also made it possible to produce these rich black backgrounds during daytime.” Passionate Underwater Photographer “I think from the outside underwater photography is perceived as a niche, but we actually have many smaller niches in the liquid world!” Says Remy. “Macro, super macro, wide-angle, close-focus wide-angle, portraits, behavior, wrecks, models...I find all these interesting, and shoot and teach all these genres of underwater photography.” Remy has been shooting underwater since 2008 and in 2021 he decided to leave his corporate IT job to dedicate himself full-time to photography. He launched The Underwater Club, an online underwater photography school with lots of tutorials. “It’s also an online photo club, with private forums where we offer constructive photo critique and monthly get-together events,” says Remy. “I also do private coaching and occasionally lead workshops, but my main focus is being available for our club members.” Remy’s photo courses can be found here. His underwater photo work can be seen on his website, Instagram, and Facebook. Image credits: All photos by Nicholas Remy.

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**URL:** <https://petapixel.com/2023/08/31/the-meyer-optic-gorlitz-biotar-75mm-f-1-5-ii-promises-sought-after-bokeh/>

**Title:** The Meyer Optic Görlitz Biotar 75mm f/1.5 II Promises ‘Sought-After’ Bokeh

**Text:** Meyer Optik Görlitz has announced that the Biotar 75mm f/1.5 II is now available. This is a new edition of what the company says was a world-famous lens that delivered one of “the most sought-after bokeh” in the world. The original Biotar 75mm f/1.5 was developed in the 1930s by Willi Merté and Meyer Optik Görlitz says that it took almost no time at all for that lens to gain a positive reputation and commercial success. However, due to World War II and associated high production costs, the company

had to cease production of the lens very soon after it came to market. The high-quality optics and popularity combined with the relative scarcity made it an extremely rare and sought-after optic. Now, Meyer Optik Görlitz has recreated that lens in the modern era, down to the optical construction that creates a double-gauss lens made up of six elements arranged into four groups. The company says that it was finally able to bring version two of the lens to market after what it describes as several “unforeseen circumstances that have caused several delays.” The company’s most recent previous release was the 58mm f/1.5 II that came out last fall. Before that, it was a 32mm f/2.8 II that reviewed relatively favorably. This new Biotar 75mm f/1.5 II promises a high level of sharpness in the center that is surrounded by what the company describes as “strong swirly bokeh” at open apertures. That swirly bokeh is rendered in a circular pattern that is reminiscent of a vortex and is what made the original version of the lens so popular. “The sharpness in the center of the image and the wonderfully drawn bokeh in the blur give the subject a slightly three-dimensional feel,” Meyer Optik Görlitz claims. “At the same time, the overall image appears somewhat delicate, which can create a great contrast in available light situations with clear shadows and highlights in the background.” The company says that its goal was to capture the historic imaging capabilities of the original lens while also optimizing it with modern technology (such as high-end glass, special coatings, and high-precision manufacturing) to pair with the cameras of today. “Even minimally stopped down (from f/2.0), the Biotar 75mm f/1.5 II shows even more contrast, and between f/5.6 and f/8, the Biotar 75 f1.5 II reaches its maximum sharpness,” Meyer Optik Görlitz says. “In this respect, it makes many comparatively ‘young’ lenses look very old.” The lens is fully manual and features a stepless, silent aperture diaphragm composed of 15 blades — far more than is typical in modern lenses. Below are a couple of example photos taken with the lens. More are available to view on Meyer Optik’s website. The Meyer Optik Görlitz Biotar 75mm f/1.5 II is available starting today for €1,399 (about \$1,517) directly from the company’s website. It is available in 10 mounts: Canon EF, Canon RF, Nikon F, Nikon Z, Sony E, Leica L, Fujifilm X, Leica M, Micro Four Thirds, and Pentax K. Image credits: Meyer Optik Görlitz

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**URL:** <https://www.prnewswire.com/news-releases/robust-growth-projected-for-global-blood-culture-tests-market-to-2028-fueled-by-increasing-sepsis-cases-and-high-demand-for-rapid-diagnostics-301914739.html>

**Title:** Robust Growth Projected for Global Blood Culture Tests Market to 2028, Fueled by Increasing Sepsis Cases and High Demand for Rapid Diagnostics

**Text:** DUBLIN, Aug. 31, 2023 /PRNewswire/ -- The "Global Blood Culture Tests Market by Method (Conventional, Automated), Product (Consumables, Instruments), Technology (Culture, Molecular, Proteomics), Application (Bacteremia, Fungemia), End User (Hospitals, Reference Labs) & Region - Forecast to 2028" report has been added to ResearchAndMarkets.com's offering. The global blood culture tests market is projected to witness remarkable growth, reaching USD 7.6 billion by 2028 from USD 5.2 billion in 2023, at a robust CAGR of 8.0% during the forecast period. Market Dynamics: Drivers: Increasing Number of Sepsis Patients and Rising Cost of Treatment Rapid Growth in Geriatric Population with Chronic Diseases High Incidence of Nosocomial Bloodstream Infections Growing Demand for Rapid Diagnostic Techniques with Faster Turnaround Times High Prevalence of Infectious Diseases Globally Restraints: High Cost of Automated Blood Culture Instruments Lack of Trained Laboratory Technicians Opportunities: Growth Opportunities in Emerging Economies Increased Need to Identify Antibiotic-Resistant Microorganisms Challenges: Market Cannibalization for Conventional Products Difficulty in Survival of New Entrants Premium Insights: Growing Incidence of Sepsis Cases and High Cost of Treatment to Drive Market Consumables Segment to Register Highest Growth During Forecast Period Conventional/Manual Blood Culture Segment Accounted for Largest Share of Asia-Pacific Blood Culture Tests Market in 2022 China to Register Highest Growth Rate During Study Period to Register Highest Growth Rate During Study Period Emerging Economies to Register Higher Growth Rate During Forecast Period Segmentation Analysis: Method: Automated Blood Culture Method Conventional/Manual Blood Culture Method (divided into segments for automated blood culture method and conventional/manual blood culture method) Product: Instruments Consumables (largest share due to repeated purchase of media) Software and Services Technology: Proteomics Culture-Based Technologies Molecular Technologies (microarray segment is fastest growing)

Applications: Mycobacterial Detection Bacteremia (largest share due to increasing number of bloodstream infections) Fungemia End Users: Academic Research Laboratories Hospital Laboratories Reference Laboratories (projected to grow at the highest rate) Other Laboratories (independent research, pathology, bacteriological, physician office laboratories) Regional Insights: Europe accounted for the second-largest share of the market due to rising sepsis cases, high healthcare expenditure, growing geriatric population, regulatory approvals, and government support. Key Companies Mentioned: Anaerobe Systems, Inc. Autobio Diagnostics Co., Ltd. Axiom Laboratories Becton, Dickinson and Company Binder GmbH Biobase Biotech ( Jinan ) Co., Ltd. ) Co., Ltd. Biomerieux Bruker Bulldog Bio Carl Zeiss Ag Danaher Hardy Diagnostics Himedia Laboratories Pvt. Ltd. Iridica Labotronics Ltd. Luminex Corporation Mediatech Technologies India Private Limited Mikrosan Technologies, Inc. Nikon Corporation Opgen, Inc. Roche Diagnostics Scenker Biological Technology Co., Ltd. T2 Biosystems, Inc. Terumo Corporation Thermo Fisher Scientific Inc. Key Attributes: Report Attribute Details No. of Pages 272 Forecast Period 2023 - 2028 Estimated Market Value (USD) in 2023 \$5.2 Billion Forecasted Market Value (USD) by 2028 \$7.6 Billion Compound Annual Growth Rate 8.0 % Regions Covered Global For more information about this report visit <https://www.researchandmarkets.com/r/23idbi> About ResearchAndMarkets.com ResearchAndMarkets.com is the world's leading source for international market research reports and market data. We provide you with the latest data on international and regional markets, key industries, the top companies, new products and the latest trends. Media Contact: Research and Markets Laura Wood, Senior Manager [email protected] For E.S.T Office Hours Call +1-917-300-0470 For U.S./CAN Toll Free Call +1-800-526-8630 For GMT Office Hours Call +353-1-416-8900 U.S. Fax: 646-607-1907 Fax (outside U.S.): +353-1-481-1716 Logo: [https://mma.prnewswire.com/media/539438/Research\\_and\\_Markets\\_Logo.jpg](https://mma.prnewswire.com/media/539438/Research_and_Markets_Logo.jpg) SOURCE Research and Markets

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**URL:** <https://froknowsphoto.com/photo-news-fix-8-31-2023/>

**Title:** SONY STRIKES BACK?! NEW Canon Rumors!!!

**Text:** SONY STRIKES BACK?! NEW Canon Rumors!!! This FIX is brought to you by B+H and their inaugural BILD Expo taking place September 6th and 7th in New York City. I will be speaking on the 6th at 4pm and it's FREE to join. Head on over to <http://bit.ly/frobild> for more info and to get signed up. FROPACK4 is HERE with 14 all-new custom Lightroom presets!!! Check it out <https://froknowsphoto.com/fropack4/> (40% OFF) This week we have stories about Tamron releasing the 35-150 f2-2.8 for Nikon Z Mounts. Canon Rumors is saying 8-10 new lenses are on their way for the RF mount. And Sony announced the a7C II and a7C R at the same time. This is YOUR Photo News Fix. Listen to RAWtalk, the FroKnowsPhoto Podcast wherever you listen to your podcasts. Or head on over to <http://froknowsphoto.com/podcast> This video was filmed with the Canon EOS R5 and RF Canon Lenses <https://Canon.us/r5fro>

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**URL:**

<https://ask.metafilter.com/375023/Is-it-possible-to-set-up-a-one-person-camera-crew-for-an-event>

**Title:** Is it possible to set up a one-person camera crew for an event?

**Text:** What kind of device do I need to capture the sound of the author's speaking? Would I need one of those huge long microphones that a camera crew holds over their heads? Or is it possible to buy a distance listening capture kind of device? Is there anything else I need? I will be using a Nikon Z 30 with a tripod set-up. I am all new to this, so I have no idea what I need, or if I need another crew member, as I am new to all of this. Would I need an extra camera or two for different angles and backup? I am also a university student on a bit of a budget as well. I am starting an arts YouTube Channel, and I want to film a few reading events at The Toronto International Festival of Authors (given permission to do so). However, is it possible to set up a one-person camera crew set up to film the author's talk? Or would I need to hire a few people?

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**URL:** <https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002277>

**Title:** Auditory cortex ensembles jointly encode sound and locomotion speed to support sound perception during movement

**Text:** The ability to process and act upon incoming sounds during locomotion is critical for survival and adaptive behavior. Despite the established role that the auditory cortex (AC) plays in behavior- and context-dependent sound processing, previous studies have found that auditory cortical activity is on average suppressed during locomotion as compared to immobility. While suppression of auditory cortical responses to self-generated sounds results from corollary discharge, which weakens responses to predictable sounds, the functional role of weaker responses to unpredictable external sounds during locomotion remains unclear. In particular, whether suppression of external sound-evoked responses during locomotion reflects reduced involvement of the AC in sound processing or whether it results from masking by an alternative neural computation in this state remains unresolved. Here, we tested the hypothesis that rather than simple inhibition, reduced sound-evoked responses during locomotion reflect a tradeoff with the emergence of explicit and reliable coding of locomotion velocity. To test this hypothesis, we first used neural inactivation in behaving mice and found that the AC plays a critical role in sound-guided behavior during locomotion. To investigate the nature of this processing, we used two-photon calcium imaging of local excitatory auditory cortical neural populations in awake mice. We found that locomotion had diverse influences on activity of different neurons, with a net suppression of baseline-subtracted sound-evoked responses and neural stimulus detection, consistent with previous studies. Importantly, we found that the net inhibitory effect of locomotion on baseline-subtracted sound-evoked responses was strongly shaped by elevated ongoing activity that compressed the response dynamic range, and that rather than reflecting enhanced “noise,” this ongoing activity reliably encoded the animal’s locomotion speed. Decoding analyses revealed that locomotion speed and sound are robustly co-encoded by auditory cortical ensemble activity. Finally, we found consistent patterns of joint coding of sound and locomotion speed in electrophysiologically recorded activity in freely moving rats. Together, our data suggest that rather than being suppressed by locomotion, auditory cortical ensembles explicitly encode it alongside sound information to support sound perception during locomotion. The auditory cortex (AC) is a key candidate brain region for processing incoming sounds during locomotion due to its well-established role in context-, behavior-, and decision-making-dependent sound processing [ 22 – 34 ]. Intriguingly, previous studies have found that locomotion has a generally suppressive effect on sound-evoked responses in the AC [ 35 – 39 ]. Attenuation of responses to self-generated sounds produced during locomotion is well explained by corollary discharge, which acts to suppress responses to predictable sounds and enhance sensitivity to unpredictable sounds [ 38 , 40 – 43 ] (though see [ 44 – 46 ]). However, the functional benefit of the observed attenuation of AC responses to unpredictable external sounds during locomotion has remained elusive. A proposed explanation, supported by the finding that responses in the primary visual cortex are generally enhanced during locomotion [ 47 – 49 ], is that locomotion reflects a neural resource allocation shift from audition to vision [ 35 , 36 ]. According to this model, reduced sound responses during locomotion reflect a functional attenuation of AC, possibly involving reliance on subcortical regions for sound processing in this state. However, the evolutionary and functional benefit of this suggestion remains debated [ 37 ]. Alternatively, it has been suggested that, rather than a resource allocation shift from the auditory to visual modality, locomotion may induce a shift towards spatial information processing across modalities [ 37 ]. According to this hypothesis, the AC may play a critical role in sound processing during locomotion, but that it may include encoding of locomotion-related non-acoustic information, which, if unaccounted for, could appear as simple suppression. This hypothesis is supported by robust encoding of locomotion-related signals and their integration with cue-evoked responses in other sensory cortical regions [ 50 – 54 ]. However, this hypothesis has yet to be directly tested in the AC. Here, we combined AC inactivation in mice performing sound-guided reward-predictive behavior during locomotion, two-photon calcium imaging in head-fixed mice, and electrophysiological recordings in freely moving rats to test the hypothesis that auditory cortical ensembles are not simply suppressed during locomotion but rather explicitly encode it and incorporate it with sound information into an integrated audiomotor neural code. Continuous processing of incoming sensory information is critical for survival and adaptive behavior. While the neural mechanisms of sensory processing have traditionally been studied in immobile subjects, some

of the most critical behaviors in humans and other animal species, such as foraging for food, seeking a mate, and navigating to safety, occur during locomotion. To gain a coherent perception of the environment during locomotion and be able to rapidly trigger appropriate behavior, the brain must encode incoming external cues and integrate them with one's own motion. For example, humans integrate incoming sounds with locomotion during simple walking, as manifested by the modification of walking pace based on auditory feedback [ 1 – 6 ]. Moreover, auditory feedback has been shown to improve walking in aged patients and those with neurodegenerative disorders [ 7 – 9 ]. Integration of sounds with self-motion has also been studied in the context of other behaviors such as dance [ 10 , 11 ] and sound-guided finger tapping [ 12 – 15 ]. In nonhumans, perhaps the best known example is bat echolocation [ 16 – 18 ], yet various forms of audiomotor integration have been studied in diverse animal species, including praying mantids [ 19 ], dholes [ 20 ], and mice [ 21 ]. Thus, the ability to process incoming sounds during locomotion and integrate them with the locomotive state to guide appropriate behavior is fundamental in both humans and other animal species. To test whether increased ongoing activity during locomotion encodes locomotion speed in the freely moving rat, we examined correlations between continuous spiking activity and locomotion speed. We found similar results to the head-fixed mouse data, with the spiking activity of some neurons reliably tracking locomotion speed ( Fig 6F ). Across the population of putative excitatory neurons, the distribution of correlations between ongoing activity and locomotion speed was skewed to the right and highly similar to the distribution of the head-fixed data ( Fig 6G ). The spiking-speed correlation distribution of putative fast-spiking interneurons was significantly higher, though it is possible that this effect was at least partly due to their higher firing rates ( S6D Fig ). To further investigate the temporal relationship between locomotion speed and neural activity, we calculated the cross-correlation between these signals. We found that neural activity-speed cross correlation peaked at 0 second lag and decayed substantially even with a shift of 1 s, indicating that AC neural activity tracks locomotion speed with a rapid time constant ( S7 Fig ). Consistently, despite having a substantially lower number of simultaneously recorded putative excitatory neurons as compared to the imaging data (mean  $\pm$  SEM electro:  $4.5 \pm 0.39$ , imaging:  $29.3 \pm 4.6$ ), ensemble-level spiking activity could reliably predict locomotion speed ( Fig 6H ). Indeed, the number of neurons within an ensemble positively correlated with speed prediction performance ( S8 Fig ). Finally, we carried out a similar decoding analysis to that implemented on the imaging data and found that despite the low number of neurons per ensemble, many ensembles jointly coded for locomotion speed and sound in locomotion ( Fig 6I ). Interestingly, sound detection in locomotion showed a small but significant increase across days of training on this task while speed prediction did not significantly change across days ( S9 Fig ). Together, these findings suggest that encoding of locomotion speed and its integration with sound information is a robust feature of AC ensembles in the freely moving rat as well. (A) Illustration of the experimental setup for electrophysiological recordings in freely moving rats. (B) Sound-triggered PSTHs from 4 example neurons. Sound presentation trials in which the animal was immobile (red) and running (green) were grouped separately. Neurons showed diverse patterns of modulation of sound-evoked responses during locomotion. (C) Left: Sound-evoked responses in immobility and locomotion across all target-sound responsive neurons. Red and green circles denote neurons that individually exhibited a significantly stronger and weaker response during immobility, respectively. Blue circles denote neurons that did not exhibit a significant difference. Right: The per-neuron difference in sound-evoked response between locomotion and immobility across all responsive neurons was significantly lower than 0 ( $P = 3.4 \times 10^{-5}$ , two-sided Wilcoxon signed-rank). For this and subsequent whisker plots, the central mark indicates the median, the bottom and top edges of the box indicate the 25th and 75th percentiles, respectively, and the whiskers extend to the most extreme data points not considered outliers. (D) Population-level PSTH across all target-sound responsive neurons during immobility (red) and locomotion (green). Solid lines and shaded areas indicate mean  $\pm$  SEM. (E) Locomotion increased ongoing activity of sound-responsive neurons (left,  $P = 0.0144$ , two-sided Wilcoxon signed-rank test). Locomotion did not significantly modulate evoked activity (second from left,  $P = 0.2687$ , two-sided Wilcoxon signed-rank test). Locomotion influence on ongoing and evoked activity was correlated across neurons (second from right). The locomotion influence on evoked activity was significantly lower than that of ongoing activity, resulting in a net reduction in baseline-subtracted sound-evoked

responses (right,  $P = 3.4 \times 10^{-5}$ , two-sided Wilcoxon signed-rank test). (F) Top: Z-scored spiking of an example neuron (black trace) overlaid on the Z-scored locomotion speed of the rat (green trace) during an example session. This neuron exhibited a correlation of  $R = 0.44$  with locomotion speed across the session. Bottom: An example from a different neuron, showing a negative correlation with locomotion speed of  $R = -0.4$ . (G) Distribution of spiking-locomotion speed correlation values (orange). The parallel distribution from the imaging data ( Fig 4D ) is shown in light blue in the background as comparison. (H) Speed prediction performance, measured as the correlation values between the predicted and real locomotion speeds across ensembles. Shuffled values were derived by randomly shuffling the predicted speed values. (I) Stimulus detection in locomotion against speed prediction performance across ensembles. The data underlying this figure can be found in Fig 6 data at <https://doi.org/10.6084/m9.figshare.23736831>. PSTH, peri-stimulus time histogram. We thus sought to test whether this locomotion-related decrease in baseline-subtracted sound-evoked responses could in part be due to increased baseline firing during locomotion as our imaging data in mouse indicated. Indeed, we found that ongoing activity, measured as the spike rate preceding stimuli presentations, was significantly higher during locomotion as compared to immobility across sound-responsive putative excitatory neurons ( Fig 6D and 6E , left panel). Locomotion had no significant overall effect on spiking activity during the sound-evoked time window ( Fig 6E , second panel), which differed from the elevation observed in the imaging data, likely due to differences in the targeted cortical layers across these datasets. Nevertheless, as in the imaging data, we observed a larger increase in ongoing activity than evoked activity, resulting in a net reduction in baseline-subtracted sound-evoked responses during locomotion ( Fig 6E ). These data demonstrate that, consistent with our head-fixed mouse data, increased ongoing activity during locomotion contributes to weaker sound-evoked responses in the freely moving rat as well. Finally, we wished to test whether our findings of joint coding of locomotion speed and sound in head-fixed animals generalize to freely moving animals. To this end, we analyzed electrophysiological recordings from freely moving rats that were implanted with tetrodes in the AC [ 81 ]. Recordings were carried out as rats traversed a Y-shaped track for food reward delivered at reward wells ( Fig 6A ). In a pseudorandom approximately 25% of trials, following nose-poking in the home well rats were presented with series of chirp-pair sounds, which signaled that subsequent reward is delivered in the Sound well. Rats trained on this task for up to 15 days and reached good performance within 5 to 6 days [ 81 ]. We identified putative excitatory and fast-spiking interneurons based on spike waveform and firing rates ( S6A and S6B Fig ). We recorded a total of 248 putative excitatory neurons that had a sufficient number of responses in both immobility and locomotion to allow comparison. Of these, 21% (51/248) were significantly responsive to the target sound during immobility. (A) Schematic illustration of the measures used for stimulus detection in locomotion and state discrimination. (B) Performance of stimulus detection in locomotion against state discrimination in an example ensemble. (C) Performance of stimulus detection in locomotion against state discrimination across ensembles and single cells. (D) Histogram of average state and stim discrimination for single cells (gray) and ensembles (red). (E) Comparison of discrimination performance of ensembles and their best-predictive neuron (per attribute), for State (left,  $P = 0.21$ ), Stim (middle,  $P = 0.687$ ), and State-stim average (right,  $P = 0.0004$ ), signed-rank test. (F) Stimulus detection in immobility against speed prediction performance across ensembles. Black cross shows mean  $\pm$  STD of the 2 measures. (G) Stimulus detection in locomotion against speed prediction performance across ensembles. The data underlying this figure can be found in Fig 5 data at <https://doi.org/10.6084/m9.figshare.23736831>. AC, auditory cortex. To test this, we first quantified whether the activity of individual neurons and local ensembles could predict both locomotion state (immobility/locomotion) and sound occurrence during locomotion ( $n = 19$  ensembles). To this end, we implemented cross-validated support vector machine (SVM) analyses on each neuron's or ensemble's activity patterns and quantified the predictive power that it provided to discriminate between immobility and locomotion and between sound occurrence and no sound during locomotion ( Fig 5A ). We found that while individual neurons typically showed moderate prediction, with high prediction of at most one of these attributes, local ensembles could display high prediction of both locomotion state and stimulus occurrence ( Fig 5B–5D ). Indeed, while discrimination performance of ensembles was not better than that of their best-predicting individual neuron for sound or state, sound-state discrimination average was significantly higher at the ensemble level than the best neuron,



demonstrating sound-state integration at the ensemble level ( Fig 5E ). Furthermore, we found that local neuronal ensembles consisting of a few dozen neurons could exhibit both high-fidelity speed coding and stimulus detection in both immobility ( Fig 5F ) and locomotion ( Fig 5G ). Together, these data suggest that neuronal ensembles in L2/3 of the AC robustly co-encode locomotion speed alongside sound information during movement. To further quantify the degree of information that auditory cortical ensembles convey about locomotion speed, we implemented a cross-validated generalized linear model (GLM) to test if locomotion speed can be decoded from ongoing ensemble activity. For each imaging session of a single neuronal ensemble, a GLM was trained on a random half of the imaging session data and tested on the other half, and this procedure was repeated 200 times for robust estimation. In the test phase, the GLM model that was constructed in the training phase predicted locomotion speed based on ensemble patterns of neural activity of the test set. We found that in many cases, the predictions of the model were highly correlated with the actual speeds ( Fig 4G ). The correlations between the predicted speed and real speed were large and highly significant, even when excluding all immobility periods ( Fig 4H ). These findings suggest that ongoing locomotion speed is reliably encoded by the activity of local neuronal ensembles in the AC. (A) Z-scored  $\Delta F/F$  of an example neuron (black trace) overlaid on the Z-scored locomotion speed of the mouse (green trace) during an example imaging session. This neuron exhibited a correlation of  $R = 0.76$  with locomotion speed across the session. (B) An example from a different neuron, showing a negative correlation with locomotion speed of  $R = -0.35$ . (C) Proportions of AC L2/3 neurons showing significant positive, significant negative, and nonsignificant correlation with locomotion speed. (D) The distribution of  $\Delta F/F$ -locomotion speed correlations across the population. (E) An illustration of all neurons in an example imaging session, color coded according to each neuron's  $\Delta F/F$ -locomotion speed correlation value. Local ensembles exhibited a high degree of heterogeneity in correlation with locomotion speed. (F) The ensemble-level range in  $\Delta F/F$ -locomotion speed correlation values across ensembles. (G) The predicted log (speeds) of an example test set against the real log(speeds) of that test set, showing a correlation of 0.88. (H) Speed prediction performance, measured as the correlation values between the predicted and real locomotion speeds across ensembles. Shuffled values were derived by randomly shuffling the predicted speed values. Left: all data included ( $P = 3 \times 10^{-9}$ ), right: movement-only ( $P = 1.9 \times 10^{-8}$ ). The data underlying this figure can be found in Fig 4 data at <https://doi.org/10.6084/m9.figshare.23736831>. AC, auditory cortex. During locomotion, a key behavioral parameter that can shape how to process and act upon incoming sensory stimuli is locomotion speed [ 52 ]. In particular, robust speed coding in the hippocampus and medial entorhinal cortex are believed to be critical for cue-guided navigation [ 67 – 71 ]. Moreover, hippocampal coding of space and locomotion is coordinated with the primary visual cortex [ 54 , 72 ], where locomotion speed is robustly encoded and integrated with cue-evoked responses [ 50 , 53 ]. We therefore tested the hypothesis that the enhanced ongoing activity that we observed during locomotion encodes movement speed. To test this hypothesis, we first asked whether neural activity of individual neurons is significantly correlated with locomotion speed. We calculated the correlations between the continuous relative change in fluorescence of each neuron and the running speed of the mouse, utilizing a large subset of our imaged neurons (647/985) that were imaged while the continuous running speed of the animal was acquired. We found that activity of auditory cortical neurons could exhibit surprisingly high positive correlations with locomotion speed ( Fig 4A ), and in fewer cases significant negative correlations with locomotion speed ( Fig 4B ). Across the population, ongoing activity of 52% of neurons (335/647) showed significant positive correlation with locomotion speed, 24% of neurons (155/647) exhibited significant negative correlation with locomotion speed, and 24% (157/647) showed no significant correlation with locomotion speed ( Fig 4C ). The distribution of correlations between neural activity and locomotion speed was skewed to the right ( Fig 4D , skewness = 0.84), consistent with our finding of a population-level enhancement in baseline activity during locomotion. (A) Population-level PSTH across all BBN-responsive neurons during immobility (red) and locomotion (green). Solid lines and shaded areas indicate mean  $\pm$  SEM. (B) Locomotion increased ongoing activity of sound-responsive neurons (left,  $P = 2.9 \times 10^{-23}$ , two-sided Wilcoxon signed-rank test), as well as of evoked activity (right,  $P = 8 \times 10^{-13}$ , two-sided Wilcoxon signed-rank test). (C) Locomotion influence on ongoing and evoked activity across neurons were significantly correlated. (D) The per-neuron

difference between the locomotion influence on evoked and ongoing activity. The locomotion influence on evoked activity was significantly lower than that of ongoing activity, resulting in a net reduction in baseline-subtracted sound-evoked responses ( $P = 0.0094$ , two-sided Wilcoxon signed-rank test). The data underlying this figure can be found in Fig 3 data at <https://doi.org/10.6084/m9.figshare.23736831>. BBN, broadband noise; PSTH, peri-stimulus time histogram. We sought to further investigate the source of the net reduction in baseline-subtracted sound-evoked responses and noticed that many neurons exhibited increased ongoing activity during locomotion, which manifested as increased activity before stimulus onset ( Fig 2D ). Increased baseline activity during locomotion could contribute to reduced sound responses by increasing the subtrahend in the baseline-subtracted sound-evoked response calculation. To test this possibility, we calculated the average sound-triggered peri-stimulus time histogram (PSTH) across the population of BBN-responsive neurons and found that it exhibits a significant elevation in ongoing, pre-stimulus activity during locomotion as compared to immobility ( Fig 3A , orange arrow, Fig 3B , left panel). Increased ongoing activity during locomotion was also observed in the presence of a constant masking sound, suggesting it is at least partly independent of self-generated sounds ( S4 Fig ). Locomotion also produced a significant increase in evoked activity during the stimulus time window ( Fig 3A , blue arrow, Fig 3B , right panel), and the locomotion influences on ongoing and evoked activity were positively correlated across neurons ( Fig 3C ). However, the locomotion-induced increase in activity in the evoked window was significantly smaller than the increase in ongoing activity, likely reflecting a saturation effect, resulting in a net negative influence of locomotion on baseline-subtracted sound-evoked activity ( Fig 3D ). This suggests that increased ongoing activity during locomotion compresses the dynamic range of the baseline-subtracted response. When including sound-unresponsive cells, locomotion increased activity during the ongoing and sound time windows, but did not induce a significant reduction in baseline-subtracted sound-evoked responses, as expected ( S5 Fig ). Given our observation that sound-evoked responses of individual neurons showed heterogeneous modulation by locomotion, and that across animals the location of the imaging field within AC may slightly vary, we wondered whether some local groups of neurons were preferentially dedicated to sound processing during locomotion and others to sound processing in immobility. To test this, we used cross-validated classification models to quantify ensemble-level stimulus detection in immobility and locomotion (separately) for each ensemble. We posited that if sound detection in immobility and locomotion is supported by distinct ensembles, stimulus detection performance in immobility and locomotion would be negatively correlated across ensembles. Instead, we found that stimulus detection performance in locomotion and immobility were significantly positively correlated ( Fig 2F ). Furthermore, this analysis showed that across ensembles, stimulus detection performance was mildly but significantly lower in locomotion as compared to immobility, consistent with the average weaker sound-evoked responses in locomotion ( Fig 2E ). Thus, overlapping AC L2/3 ensembles encode sounds during immobility and locomotion, with a net weaker sound detection performance during locomotion. (A) Illustration of the experimental setup. (B) Two-photon average micrograph of an example local neuronal ensemble in L2/3 of the AC. Scale bar: 10  $\mu\text{m}$ . (C) Relative change in fluorescence ( $\Delta F/F$ ) of 22 neurons from the micrograph in “B” during an imaging session. Periods of locomotion are marked in green. (D) Sound-triggered PSTHs from 6 example neurons. Sound presentation trials in which the animal was immobile (red) and running (green) were grouped separately. Locomotion had diverse effects on sound-evoked responses of different neurons, including invariance (neurons 1+2), reduction (neurons 3+4), and enhancement (neurons 5+6). (E) Left: Sound-evoked responses in immobility and locomotion across all BBN-responsive neurons. Red and green dots represent neurons that individually exhibited a significantly stronger and weaker response during immobility, respectively. Blue dots represent neurons that did not exhibit a significant difference. Right: Box plot describing sound-evoked responses in locomotion minus immobility across all BBN-responsive neurons. The distribution was significantly lower than 0 ( $P = 0.009$ , two-sided Wilcoxon signed-rank). For this and subsequent whisker plots, the central mark indicates the median, the bottom and top edges of the box indicate the 25th and 75th percentiles, respectively, and the whiskers extend to the most extreme data points not considered outliers. (F) Ensemble-level neural stimulus detection performance in immobility and locomotion. Detection performance in immobility and locomotion was significantly correlated across ensembles ( $P =$

0.012, Pearson correlation). Detection in immobility was significantly higher than in locomotion ( $P = 0.036$ , signed-rank test). The data underlying this figure can be found in Fig 2 data at <https://doi.org/10.6084/m9.figshare.23736831>. AC, auditory cortex; BBN, broadband noise. To study the nature of information processing by local groups of L2/3 excitatory neurons (“neuronal ensembles”) of the AC during locomotion, we carried out two-photon calcium imaging in head-fixed Thy1-GCaMP6f mice that were free to stand or run at will on a rotatable plate ( Fig 2A–2C ). We first examined how locomotion modulates the responses of neurons to broadband noise (BBN) bursts in 985 AC neurons from 7 mice, of which 612 neurons had a sufficient number of responses in both immobility and locomotion to allow for comparison. In keeping with most previous studies, we started with examining baseline-subtracted responses, which are defined as the difference between the activity evoked by the sound and the activity immediately preceding the sound. Locomotion had a diverse influence on sound-evoked responses of individual neurons, including invariance, suppression, and enhancement ( Fig 2D ). Across all neurons that exhibited significant BBN-evoked responses in immobility (194/612, 31.7%, of which sound-evoked response magnitudes of 23/194, 34/194, and 137/194 were individually significantly enhanced, suppressed, and not showing a significant difference, respectively), the population-average responses were significantly reduced during locomotion ( Fig 2E ), consistent with previous studies [ 35 – 37 ]. To test whether these findings were unique to responses to BBN, we examined how locomotion modulates responses to pure tones and complex sounds. These experiments revealed a similar influence of locomotion on sound-evoked responses, namely a net population-average decrease that coexists with heterogeneous influences at the single-cell level ( S3 Fig ). (A) Top: Illustration of the behavioral setup for sound-guided predictive licking in locomotion. Bottom: Peri-sound lick histograms of an example behavioral session from a trained animal performing the task. Licking in the pink shaded area following sound termination represents prediction of upcoming reward (delivered at 2 s). Licks following reward delivery are shaded as they do not require sound processing or reward prediction (B) Peri-sound lick histogram across animals performing the task when the AC was infused with either PBS or muscimol. Solid lines denote the mean and the shaded area represents SEM across animals. Predictive licking is reduced following AC inactivation using muscimol. (C) There was a significant reduction in predictive lick index following infusion of MUS ( $P = 0.0156$ , signed-rank test). Error bars represent mean  $\pm$  SEM across animals. Lines connecting gray circles represent data from the same animal in the different conditions. The data underlying this figure can be found in Fig 1 data at <https://doi.org/10.6084/m9.figshare.23736831>. AC, auditory cortex; MUS, muscimol; PBS, phosphate buffer solution. Previous studies have shown that during immobility, the AC is not necessary for simple tone detection or discrimination, but is required for more demanding tasks such as discrimination of complex sounds and sound source localization [ 55 – 64 ] (though see [ 65 ]). To determine whether AC activity is required for sound-guided behavior during locomotion, we measured the influence of AC inactivation on sound-guided reward-predictive licking during locomotion in mice. Male and female mice were first implanted with bilateral cannula into the AC for subsequent drug delivery and allowed to recover for at least 5 days. Mice were then put on water restriction and were trained on an appetitive trace conditioning task during head fixation while standing on a rotatable plate that allowed the animals to stand or run at will. Using a closed-loop system that received the output of a rotary encoder at the base of the plate, training trials were selectively initiated during locomotion and consisted of the presentation of an 8 kHz tone followed by a drop of water reward, delivered 1 s after sound termination. Mice ( $n = 8$ ) were trained until they learned the sound-reward association as evidenced by an increase in lick rate following the sound and before reward delivery (“predictive licking,” Fig 1A ). To test whether AC activity is necessary for this behavior, we measured the influence of AC inactivation on sound-triggered reward-predictive licking. To this end, we measured behavioral performance in trained mice following infusion of the GABAA receptor agonist muscimol (MUS), or inert phosphate buffer solution (PBS) as a control, into the AC, in a within-subject design ( Fig 1B ). We found that inactivation of the AC induced a significant and near-complete reduction in sound-triggered predictive licking during locomotion ( Fig 1B and 1C ). Furthermore, while following PBS delivery mice exhibited sound-triggered reduction of running speed leading to the time of reward delivery, this effect was significantly weaker following MUS delivery ( S1 Fig ). In a version of this task performed during immobility, AC inactivation induced a trend of an impairment, but it did not reach

significance (S2 Fig), consistent with previous studies [55, 57–59, 66].

**Discussion** In this study, we tested the hypothesis that the AC plays a key role in auditory processing during locomotion and investigated the neural computation that it performs in this state. Using AC inactivation in behaving mice, we found that AC activity is required for sound-guided behavior during locomotion. Using two-photon calcium imaging in L2/3 of AC of head-fixed mice, we found that locomotion had a diverse but overall inhibitory influence on sound-evoked responses of individual neurons, which resulted in a mild but significant reduction in ensemble-level stimulus detection. Across ensembles, stimulus detection in immobility and locomotion were positively correlated, suggesting that sound processing across these states is supported by shared local neural populations in L2/3 of AC. Furthermore, we found that the net reduction in sound-evoked responses during locomotion are at least partly a result of increased ongoing neural activity, and importantly, that this ongoing activity robustly encoded the animal's running speed. Thus, lower sound-evoked responses during locomotion reflected a tradeoff with the emergence of locomotion speed coding. Decoding analyses revealed that local neuronal ensembles of a few dozen neurons could jointly code locomotion speed and sound with high fidelity. Finally, we found consistent patterns of co-encoding of sound and locomotion speed in electrophysiologically recorded freely moving rats. Previous studies have found that AC sound-evoked responses are on average weaker during locomotion as compared to immobility [35–39], a finding we have replicated here in both head-fixed mice and freely moving rats. Attenuation of responses to locomotion-associated self-generated sounds is well explained by corollary discharge, which acts to suppress responses to predictable sounds and enhance sensitivity to unpredictable sounds [38,40–43] (though see [44–46]). However, the functional benefit of the observed attenuation of AC responses to unpredictable external sounds during locomotion has remained elusive. This finding is particularly enigmatic given the critical need to be able to efficiently process external sounds and their associated meaning during locomotion for survival and the well-established role that AC plays in behavior- and context-dependent sound processing [22–34]. A proposed explanation for this finding is that during locomotion, neural computational resources shift from auditory to visual processing [35,36]. According to this proposal, weaker AC responses during locomotion reflect a reduced involvement of AC in sound processing in this state, in parallel to an enhancement of visual processing supported by increased responses in the visual cortex [47–49]. According to this model, reduced sound responses during locomotion reflect a functional attenuation of AC, possibly suggesting reliance on subcortical regions for sound processing in this state. However, the evolutionary and functional logic of this finding remains debated [37]. Our data strongly points at an alternative role of the AC in processing external sounds during locomotion. First, in contrast to the processing of simple sounds in immobility [55–63], our inactivation experiments show that sound processing during locomotion is strongly dependent on the AC (Figs 1, S1 and S2), arguing against a reduction of AC involvement in sound processing during locomotion. Second, both our imaging and electrophysiological data show that the locomotion-associated reduction in baseline-subtracted sound-evoked responses is at least partly a result of increased ongoing activity, which compresses the response dynamic range, rather than being a result of simple reduction in evoked firing rates (Figs 3 and 6E). Critically, rather than reflecting enhanced “noise,” the locomotion-associated elevated ongoing activity robustly encodes locomotion speed (Figs 4, 6G and 6H). While individual neurons showed heterogeneous locomotion-associated modulation of sound responses and ongoing activity, AC ensembles robustly jointly coded and integrated locomotion and sound (Figs 5 and 6I). Thus, we propose that rather than being inhibited during locomotion, AC ensembles explicitly encode it, alongside sound information, to provide a sound-in-motion signal. Why is locomotion speed encoded in the AC? For both humans and other animals, the same sound can carry different meanings and appropriate motor responses depending on the precise locomotive state, requiring ongoing integration between sound and motion. For example, a person hearing a train passing a few feet in front of them may not show a behavioral response if the person is standing still, may slow down if they are walking slowly, or may jolt backwards if they are running. Similar audiomotor integration is required in rodents, for example, when fleeing a predator or hunting prey using sound. While one possibility is that in these scenarios, the auditory pathway would only represent sound and the integration with action would occur at a downstream integrative brain region, our data suggest that the AC itself may be that region. Moreover, recent findings suggest that

robust representation of motor action and its integration with sensory information may be a common functional principle across sensory cortices. Specifically, although V1 responses are on average enhanced during locomotion, a number of studies have found that the influence of locomotion on visual cortical processing is better explained by sensory-motor integration than a general increase in gain. For example, one study found that locomotion modulates visual spatial integration by preferentially enhancing responses to larger visual objects [50]. An additional study found that V1 neurons are tuned to weighted combinations of locomotion speed and the speed of the incoming visual stimulus, giving rise to multimodal locomotion-visual representations in V1 [53]. Based on these and additional studies [54,82,83], it has been suggested that beyond simple modulation of response magnitude, a key function of V1 is to integrate visual and locomotion information in ways that inform action and navigation [84]. Although the influence of locomotion on the magnitude of stimulus-evoked responses in the visual and auditory cortices appear distinct, our findings suggest that the neural coding scheme reflecting joint representation and integration of locomotion and sensory cues is dominant in the AC as well and may reflect a general cortical functional principle. In both our head-fixed mouse and freely moving rat data, locomotion speed coding emerged from individual neurons showing diverse but largely positive correlations between ongoing activity and locomotion speed (Fig 4A–4E). This finding differs from some previous studies, which found that ongoing activity in AC was suppressed during (and even just before) locomotion, due to input from the motor cortex and activity of local interneurons [35,36], a finding that would result in an overall negative correlation between neural activity and locomotion speed. However, our findings are consistent with other studies that observed an overall increase in ongoing activity during locomotion [33,37,39]. The discrepancy between these findings may be due to experimental differences that may result in targeting of functionally different neuronal subpopulations. Locomotion is a complex behavior that is a result of coordinated motor activity, but it also involves changes in other factors such as arousal, motivation, attention, and effort. This raises the question of whether the findings described here—a reduction in magnitude of sound-evoked responses in parallel to the emergence of speed coding—are specific to locomotion or may be an indirect consequence of one of these factors. A reduction in the magnitude of AC sound-evoked responses is not unique to locomotion, and has also been observed, for example, as a result of increased behavioral engagement in the absence of locomotion [40,85], although the mechanisms may differ. However, we believe that locomotion speed coding by ongoing activity is unlikely to be a result of alternative factors. Our data shows that the spontaneous activity of many neurons tracks ongoing locomotion speed with high reliability even when excluding periods of immobility (Figs 4H and 6H) and that neural activity tracks locomotion speed with a rapid time constant (S7 Fig). In contrast, while arousal level, attention, and motivation can all influence spontaneous activity in the AC [33,86–88] and typically increase in the transition from immobility to locomotion, there is no evidence that they rapidly track ongoing changes in locomotion speed. Specifically, previous studies that recorded pupil size as an indicator of arousal found that pupil size is larger during periods of locomotion relative to immobility, but it does not fluctuate rapidly enough to track locomotion speed [33,48,86,89,90]. Furthermore, ongoing firing rates were found to be higher during locomotion than during immobility for the same level of pupil-measured arousal [91]. Moreover, the similarity in our findings of locomotion speed coding in the mouse imaging data and the rat electrophysiology data, as well as the similarity in speed coding across the rat training days (S9C Fig), despite substantial differences in the motivational and attentional demands across these conditions, further reduce the likelihood that these factors substantially contribute to the findings. Finally, studies in other cortical areas also suggest distinct contributions of arousal and locomotion on cortical activity [48,90]. The contribution of physical effort is harder to dissociate from locomotion speed, as these behavioral attributes are strongly linked. To do this, future studies could use elevated surfaces or treadmills with varying degrees of resistance. An additional alternative is that the encoding of locomotion speed is linked to coding of sound source location [92–97]. As an animal runs faster through its environment, it experiences an increased level of change in sound source locations relative to itself, and this could be reflected in ongoing activity. In our mouse imaging data, animals were head fixed and thus sound source locations did not actually move relative to the animal, arguing against this possibility. However, we cannot fully rule out a contribution from secondary factors related to spatial hearing, such as increased spatial attention effort. To test this possibility, future studies could modulate

the relationship between running speed and attended sound source location, for example, with an auditory virtual reality system [98]. Finally, the degree of stimulus specificity of the apparent response suppression during locomotion remains to be further explored. Indeed, locomotion-related attenuation of self-generated sounds is stimulus- and prediction-dependent [38,40–43]. In our imaging experiments, we found that responses to BBN, pure tones, and complex sounds were similarly suppressed during locomotion, though neither of these sounds carried immediate behavioral meaning to the animal and were presented at the same sound intensity. In our electrophysiological data, in which the target sound gained reward-location-predictive meaning across training, we found that locomotion-related responses strengthened (or were less attenuated) across days of training (S9 Fig). This suggests that locomotion-related attenuation of sound responses in the AC may be salience dependent. Moreover, sound intensity may strongly shape locomotion-related response modulation, with larger suppression of near-threshold sounds and lower suppression of louder sounds. Indeed, studies in humans have found that sound intensity and meaning influence the interaction between motor action and sound perception [99]. Future studies are required to further determine how locomotion modulates AC responses to sounds of varying attributes, such as intensity, behavioral relevance, valence, and sound source location.

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**URL:** <https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1011566>

**Title:** Function and regulation of a steroidogenic CYP450 enzyme in the mitochondrion of *Toxoplasma gondii*

**Text:** As an obligate intracellular parasite, *Toxoplasma gondii* must import essential nutrients from the host cell into the parasitophorous vacuole. We previously reported that the parasite scavenges cholesterol from host endocytic organelles for incorporation into membranes and storage as cholesteryl esters in lipid droplets. In this study, we have investigated whether *Toxoplasma* utilizes cholesterol as a precursor for the synthesis of metabolites, such as steroids. In mammalian cells, steroidogenesis occurs in mitochondria and involves membrane-bound type I cytochrome P450 oxidases that are activated through interaction with heme-binding proteins containing a cytochrome b5 domain, such as members of the membrane-associated progesterone receptor (MAPR) family. Our LC-MS targeted lipidomics detect selective classes of hormone steroids in *Toxoplasma*, with a predominance for anti-inflammatory hydroxypregnenolone species, deoxycorticosterone and dehydroepiandrosterone. The genome of *Toxoplasma* contains homologs encoding a single type I CYP450 enzyme (we named TgCYP450mt) and a single MAPR (we named TgMAPR). We showed that TgMAPR is a hemoprotein with conserved residues in a heme-binding cytochrome b5 domain. Both TgCYP450 and TgMAPR localize to the mitochondrion and show interactions in in situ proximity ligation assays. Genetic ablation of *cyp450mt* is not tolerated by *Toxoplasma*; we therefore engineered a conditional knockout strain and showed that  $\Delta$ TgCYP450mt parasites exhibit growth impairment in cultured cells. Parasite strains deficient for *mapr* could be generated; however,  $\Delta$ TgMAPR parasites suffer from poor global fitness, loss of plasma membrane integrity, aberrant mitochondrial cristae, and an abnormally long S-phase in their cell cycle. Compared to wild-type parasites,  $\Delta$ TgCYP450mt and  $\Delta$ TgMAPR lost virulence in mice and metabolomics studies reveal that both mutants have reduced levels of steroids. These observations point to a steroidogenic pathway operational in the mitochondrion of a protozoan that involves an evolutionary conserved TgCYP450mt enzyme and its binding partner TgMAPR. In addition to controlling membrane fluidity, cholesterol serves as a substrate for the synthesis of important biomolecules, in particular steroid hormones. Steroidogenesis involves mitochondrial cholesterol-metabolizing cytochrome P450s activated by membrane-associated progesterone receptor (MAPR) hemoproteins. The intravacuolar parasite *Toxoplasma* scavenges cholesterol from the host and our targeted lipidomics reveal the presence of pregnenolone and selected steroid hormones in the parasite. We investigated a potential steroidogenic pathway in *Toxoplasma* by characterizing the single CYP450 (TgCYP450mt) and the MAPR homolog (TgMAPR) in *Toxoplasma*. Both TgCYP450mt and TgMAPR are expressed in the mitochondrion and interact with each other. Parasites lacking *mapr* are viable in vitro unlike  $\Delta$ TgCYP450mt parasites. Conditional TgCYP450mt knock-out parasites and  $\Delta$ TgMAPR suffer from developmental defects, are poorly virulent and have reduced levels of steroids compared to WT parasites. These data suggest that *Toxoplasma* has the ability to synthesize some

steroids in the mitochondrion, using a cholesterol-metabolizing cytochrome P450 and reveal that steroidogenesis is an ancient pathway, conserved in eukaryotic lineages. In this study, we have investigated the physiological roles of mitochondrial CYP450 enzyme and MAPR homolog of *T. gondii* to examine whether the parasite has steroidogenic potential. Our targeted lipidomics analysis detects the presence of selected hormone steroids in *T. gondii*. Functional characterization of the CYP450 and MAPR homologs reveals their dynamic interaction in the parasite mitochondrion, and decreased expression of each of these proteins correlates with reduced steroid amounts in *Toxoplasma*. Steroidogenesis entails enzymatic steps by which cholesterol is converted to biologically active steroid hormones. Steroidogenic enzymes fall into two groups: cytochrome P450 enzymes (type 1 in mitochondria and type 2 in the ER) and hydroxysteroid dehydrogenases [ 23 ]. The initial step in steroidogenesis is the conversion of cholesterol to pregnenolone by the cytochrome P450 side-chain cleavage enzyme in mitochondria [ 24 ]. A search of the genomic database of *T. gondii* ( [www.toxoDB.org](http://www.toxoDB.org) ) reveals that the parasite genome contains one single gene coding for a type 1 CYP450 enzyme (TGME49\_315770) and one single gene encoding a mitochondrial MAPR homolog (TGME49\_276990). *Toxoplasma* has also several genes encoding for zinc finger HIT domain-containing proteins known to interact with nuclear hormone receptors (e.g., TGME49\_212810 in the nucleolus) [ 25 ], and genes coding for enzymes with potential activities in steroid transformations, such as 3-oxo-5- $\alpha$ -steroid 4-dehydrogenase that converts testosterone into 5- $\alpha$ -dihydrotestosterone and progesterone or corticosterone into their corresponding 5- $\alpha$ -3-oxosteroids (TGME49\_272180; TGME49\_285240 and TGME49\_304480). Finally, the parasite genome contains 3 genes for non-mitochondrial (microsomal or nuclear) cytochrome b5 family heme/steroid binding domain-containing proteins (TGME49\_240770; TGME49\_276110 and TGME49\_313580). In mammalian cells, the synthesis of cholesterol-derived metabolites involves the activities of the cytochrome P450 family of oxidases (CYP450s) [ 14 ]. The activation of cholesterol-metabolizing CYP450s often requires the donation of electrons from hemoproteins, such as the NADPH-dependent cytochrome P450 reductase (CPR) in the ER, which shuttles electrons from NADPH through the FAD and FMN-coenzymes into the iron of the prosthetic heme-group of the CYP450. In some cases, activation of cholesterol-metabolizing CYP450s occurs through interaction with heme-binding proteins containing a cytochrome b5 (cytb5) domain. Among them are the members of the membrane-associated progesterone receptor (MAPR) family including progesterone receptor membrane component-like proteins (PGRMC1 and PGRMC2), neudesin (NENF) and neufericin (NEUFC) [ 15 – 17 ]. In mammalian cells, PGRMC1 proteins localize to the plasma membrane, endoplasmic reticulum (ER), endosomes, nucleus and extracellular environment, and fulfill a broad range of functions related to cell survival, including cholesterol synthesis and homeostasis, steroid hormone production and signaling, and resistance to DNA damage-induced stress [ 18 ]. PGRMC1 is overexpressed in malignant cancer cells and localizes to mitochondria [ 19 , 20 ]. In *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*, the PGRMC1 homologue named damage-associated protein 1 (Dap1), localizes to the ER and endosomes and is involved in ergosterol synthesis and resistance to DNA damage-induced toxicity due to hypoxia and drug exposure [ 21 , 22 ]. In vertebrates, steroid hormones belong to five major classes: testosterone, estradiol, progesterone, cortisol/corticosterone (glucocorticoid), and aldosterone (mineralocorticoids), and they play important reproductive and developmental roles. Invertebrates synthesize many steroid molecules such as ecdysteroids that have hormonal roles involved in the regulation of ecdysis and development [ 12 ]. Steroids are also integral components of plants where they are synthesized de novo from phytosterols. Plant steroids including progesterone, testosterone, androstadienedione, androstenedione and estrogens act as chemical messengers for cell-cell communication and are required for the regulation of plant growth, development, and reproduction [ 13 ]. Apart from these studies informing on the source, trafficking and storage of cholesterol in *Toxoplasma*, nothing is known about the utilization of cholesterol by the parasite. In eukaryotic cells, cholesterol contributes to the structural integrity and fluidity of the bilayer, and thus to the function of transmembrane proteins. In addition, cholesterol fulfills critical metabolic functions, serving as a precursor for the synthesis of steroid hormones, oxysterols, bile acids and vitamin D. Like any eukaryotic organism, *Toxoplasma* incorporates cholesterol into its membranes for bilayer organization but whether *Toxoplasma* has enzymes for the break down and

consumption of cholesterol, or utilizes this lipid as building blocks for the production of cholesterol-derived metabolites such as steroids, remains to be elucidated. *Toxoplasma gondii* is an obligate intracellular parasite that multiplies in mammalian cells within a self-made membrane-bound compartment, the parasitophorous vacuole (PV) that protects against host cytosolic destructive pathways. Inherent in the adaptation of intracellular microbes to the nutrient-filled host cell interior, *T. gondii* lost many genes involved in the de novo syntheses of essential metabolites and thus must salvage and store nutrients from its host to survive. We previously reported that *T. gondii*, unable to synthesize cholesterol, is auxotrophic for plasma LDL-cholesterol internalized into the host cell [ 1 , 2 ]. The parasite diverts LDL-loaded endocytic organelles to the PV to encroach them into PV membrane (PVM) invaginations, then trap them to the vacuolar space to retrieve their cholesterol content [ 3 , 4 ]. *Toxoplasma* expresses an ATP-binding cassette (ABC) G family transporter localized at its plasma membrane that acts as a cholesterol importer [ 5 ]. Within the parasite, a bifunctional protein containing two sterol-carrier protein-2 domains promotes the circulation of cholesterol (in addition to phospholipids and fatty acids) between organelles and the plasma membrane [ 6 ]. Host-derived cholesterol is inserted in the parasite plasma membrane and organelles, with special enrichment in the secretory organelle rhoptries [ 1 , 7 , 8 ], involved in PVM formation [ 9 ]. When LDL are provided in excess in the culture medium, the parasite salvages large amounts of cholesterol from LDL and esterifies this lipid using acyl-CoA:cholesterol acyltransferase (ACAT) enzymes for storage as cholesteryl esters in lipid droplets [ 6 , 10 , 11 ]. Results *Toxoplasma* contains selective classes of steroid hormones In mammalian cells, steroidogenesis is a multi-enzymatic process initiated by the translocation of cholesterol from intracellular stores into mitochondria to generate pregnenolone. Pregnenolone enters the endoplasmic reticulum (ER) where further enzymatic reactions occur to form steroids that return to the mitochondria to be transformed into major steroid hormones. To examine whether *Toxoplasma* contains steroids, we conducted LC-MS steroid content analysis of purified extracellular parasites, using steroid standards. Among 24 steroids analyzed, 14 were detected in *Toxoplasma* and quantitative measurement revealed their presence at various amounts, with the highest concentrations for hydroxylated pregnenolone, dehydroepiandrosterone (DHEA) and deoxycorticosterone (DOC) (Table 1 and S1 Fig). No steroids were detected in host fibroblast debris and culture medium. PPT PowerPoint slide PNG larger image TIFF original image Download: Table 1. Detection of selective steroids in *Toxoplasma*. <https://doi.org/10.1371/journal.ppat.1011566.t001> *Toxoplasma* contains a single mitochondrial TgCYP450 homolog with a conserved heme iron-binding domain PGRMC1/Dap1 proteins activate many cholesterol-metabolizing CYP450s and steroidogenic enzymes, including CYP11A1 (involved in the conversion of cholesterol to pregnenolone, the precursor of all steroid hormones), CYP21A2 (involved in biosynthesis of aldosterone and cortisol), CYP17 (a bifunctional enzyme with 17 $\alpha$ -hydroxylase and 17,20-lyase activities, implicated in the conversion of pregnenolone to 17OH-pregnenolone and progesterone for androgen and glucocorticoid syntheses), CYP19 (involved in estrogen biosynthesis), CYP51A1 and CYP61A1 (two lanosterol-14-demethylases) [30,31]. The genome of *T. gondii* contains a gene (TGME49\_315770; [www.toxoDB.org](http://www.toxoDB.org)) encoding a protein (predicted molecular weight: 62.2 kDa) that carries hallmark features of cytochrome P450 enzymes. with sequence similarity ranging from 26–40% with human cytochrome P450s (S2A Fig). The protein has a conserved heme iron-binding domain [FGFGTRKCLG] (consensus pattern: [FW]-[SGNH]-x-[GD]-{F}-[RKHPT]-{P}-C-[LIVMFAP]-[GAD]), a transmembrane domain and a predicted mitochondrial localization based on hyperLOPIT ([www.ToxoDB.org](http://www.ToxoDB.org)). However, the highest similarity of the *T. gondii* CYP450 (TgCYP450) is with the sequence of microsomal CYP26B1 involved in the biosynthesis of retinoic acid. TgCYP450 shares sequence similarity with six mitochondrial CYP450 involved in steroidogenesis in mammalian cells: CYP27B1 (involved in the conversion of vitamin D to its active form, 1,25-dihydroxyvitamin D3); CYP11B1 (involved in the conversion of 11-deoxycortisol to cortisol); CYP21A2 (involved in the conversion of progesterone and 17-hydroxyprogesterone to 11-deoxycorticosterone and 11-deoxycortisol); CYP17A1 (an 17 $\alpha$ -hydroxylase involved in the synthesis of progestogens: 17OH-pregnenolone, 17OH-progesterone, dehydroepiandrosterone, androstenedione, 16OH-progesterone); CYP11A1 (also named CYP450 side chain cleavage (scc) enzyme, involved in the conversion of cholesterol to pregnenolone); and CYP11B2 (also named aldosterone synthase, involved in 3 sequential reactions to produce aldosterone via the conversion of



11-deoxycorticosterone to corticosterone, to 18-hydroxycorticosterone, then to aldosterone). TgCYP450 shares high sequence identity with CYP450 homologs present in fellow members of the Sarcocystidae family: 97% with *Hammondia hammondi*, 80% with *Neospora caninum*, 72% for *Besnoitia besnoiti*, 63% for *Cystoisospora suis* and 57% for *Sarcocystis neurona* (S2B Fig). These CYP450 homologs have a C-terminal region harboring a helix K domain to stabilize the protein core, and a heme-binding loop to position the iron atom in the heme. TgCYP450 localizes to the parasite mitochondrion. We analyzed the localization of TgCYP450 in intracellular *Toxoplasma*. Using the CRISPR/Cas9 system, we engineered a *Toxoplasma* cell line for endogenous tagging of the CYP450 gene in fusion with HA (S3A Fig). IFA on intracellular TgCYP450-HA-expressing *Toxoplasma* using anti-HA antibody illustrated a tubular fluorescent pattern that overlapped with the Mito-Tracker signal (Fig 1A). A double IFA using an antibody against HA and the mitochondrial marker HSP70 [32] was performed on PV of different sizes containing TgCYP450-HA-expressing *Toxoplasma*, and data showed colocalization, confirming the distribution of TgCYP450 in the mitochondrion of *Toxoplasma* (Fig 1B). Measurements of the Pearson's correlation coefficients (PCC) and Mander's overlap coefficients (MOC) show a strong positive correlation between the HA and HSP70 signals regardless of the PV size. We therefore named this protein, TgCYP450mt. PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 1. Localization of TgCYP450 in *Toxoplasma* and phenotypic analysis of CYP450 conditional KO ( $\Delta$ TgCYP450) parasites. (A) IFA on TgCYP450-HA-expressing *Toxoplasma* using anti-HA antibody showing colocalization with Mito-Tracker. (B) Double IFA on TgCYP450-HA-expressing *Toxoplasma* using anti-HA and anti-HSP70 antibodies showing colocalization. Values of PCC and MOC are shown. (C-D) Plaque assays using parental and  $\Delta$ TgCYP450 parasites on HFF monolayers to monitor invasion in C: intracellular parental and  $\Delta$ TgCYP450 tachyzoites were exposed for 3 days to 1  $\mu$ g/ml ATc (or solvent for  $\Delta$ TgCYP450 control). Egressed parasites were collected from these cultures and 1,500 parasites were used for plaque assays before counting of the plaques after 4 days. Plaque assays using parental or  $\Delta$ TgCYP450 parasites on HFF monolayers to assess growth in D: monolayers infected with 125 parental or  $\Delta$ TgCYP450 parasites for 8 days in medium containing 1  $\mu$ g/ml ATc (or solvent). (E) Virulence assays: i.p. injection of 125  $\Delta$ TgCYP450 or  $\Delta$ TgCYP450 parasites pre-exposed to ATc or solvent in vitro, or PBS in Swiss-Webster mice (6 per group). One group of mice (blue line) was given drinking water with ATc. The mortality of mice was monitored daily until Day 22. \*,  $p = 0.0001$  (Log-rank Mantel-Cox test). <https://doi.org/10.1371/journal.ppat.1011566.g001> An induced conditional KO for TgCYP450mt has severe growth defects in vitro and is poorly virulent. To investigate the physiological relevance of TgCYP450mt for *Toxoplasma* development and pathogenicity, we attempted to engineer a parasite cell line lacking the CYP450 gene by double recombination; however, the parasites lacking TgCYP450 could not be propagated in culture, suggesting that the CYP450 gene is essential. We therefore created a conditional knockout (cKO) of the *cyp450* gene through the displacement of the endogenous promoter with an inducible promoter under the control of anhydrous tetracycline. Promotor replacement was performed in the C-terminally 3xHA-tagged parasite line (S3A Fig) for stable expression of an ATc-responsive transactivator protein in a TATi  $\Delta$ Ku80 background strain (S3B Fig). Conditional expression of TgCYP450mt upon ATc addition for 24 h or 48 h was verified on Western blots using anti-HA antibody. Plaque assays were performed to assess the ability of the CYP450cKO (or  $\Delta$ TgCYP450) parasites under ATc to invade (based on plaque numbers) and to grow (based on plaque size). Compared to parental parasites exposed to ATc and  $\Delta$ TgCYP450 without ATc added,  $\Delta$ TgCYP450 parasites treated with ATc showed no invasion defects (Fig 1C) but their growth was impaired by ~90% (Fig 1D). Virulence assays were performed by intraperitoneal infection of outbred mice. Data showed that 80% of mice infected with  $\Delta$ TgCYP450 parasites exposed to ATc remained alive at Day 22, as opposed to all mice infected with  $\Delta$ TgCYP450 parasites without ATc that died (Fig 1E). These observations indicate that TgCYP450mt contributes to parasite development in vitro and survival in mice. *Toxoplasma* contains one TgMAPR homolog with conserved residues in a heme-binding cytochrome b5 domain. Members of the MAPR family are functional partners of many members of the CYP450 system to influence the enzymatic CYP function [33]. These proteins are widespread in eukaryotes, evolutionarily conserved and distant homologs of the hemoprotein cytochrome b5 reductase (CYP5) [16,34]. MAPR have in common a non-covalent heme-binding

domain made of five-coordinated heme iron involving a tyrosine, as opposed to the six-coordinated heme with two axial histidines in CYB5 [35–37], allowing for the formation of homodimers through hydrophobic heme-heme stacking interactions. These proteins have no homology with steroid receptors and are not directly involved in progesterone binding, instead exerting their function at a non-genomic level (i.e., not involving changes in gene expression), in pathways related to steroid hormone production and resistance to DNA damage [16,18]. Phylogenetic analyses of MAPR-related proteins in eukaryotes reveal that genes encoding these proteins are absent in many parasitic protists [18], perhaps related to selective parameters associated with a parasitic mode of life. Among the phylum of apicomplexan parasites, only some members of the Sarcocystidae family (*Toxoplasma*, *Neospora*, *Hammondia*, *Besnoitia*) possess an ancestral MAPR gene with a C-terminal cytochrome b5 family heme/steroid binding domain (S4A Fig). Compared to the human PGRMC1, the archetypal MAPR member, and to yeast Dap1, the MAPR sequence in *T. gondii* (TGME49\_276990; [www.toxoDB.org](http://www.toxoDB.org)) shows 31% and 34% identity, respectively. The parasite sequence has a predicted mitochondrial localization based on hyperLOPIT [38] and harbors one predicted transmembrane domain at the N-terminus (<https://cctop.ttk.hu/>) with conserved residues (Y151, Y157 and D164 corresponding to Y107, Y113 and D120 in PGRMC1) required for heme binding (S4B Fig) [18,39,40]. The parasite sequence contains additional conserved residues with PGRMC1. For example, the T74 and T101 phosphorylation sites of human PGRMC1, which exhibit deep phylogenetic conservation, are present in the *T. gondii* sequence at T75 and T142. The *T. gondii* sequence contains the phosphate acceptors (Y229 and S230) of the predicted Src homology 2 (SH2) domain target motifs (Y180 and S181 in PGRMC1), thought to mediate inducible protein interactions with SH2 domain-containing proteins. A phylogenetic study reported that the signaling phosphorylated tyrosine Y180 adjacent to a D/E region (DE182-183) and a tandem positive charge (RK192-193) motif present in the human PGRMC1 sequence and conserved among PGRMC-like proteins, may have appeared with the emergence of the eumetazoan common ancestor (the Urmetazoan) [17]. Intriguingly, the *Toxoplasma* sequence contains a tyrosine (Y229) close to an EE region (EE231-232) that is adjacent to an arginine and lysine (RK192-193). However, the Y229 phosphorylation required for the activation of signaling pathways, needs to be verified before inferring the evolutionary origin of PGRMC1 homologs within the protist lineage. A putative SH3 domain binding motif is also present in the parasite sequence but not the CK2 motif. Finally, while PGRMC proteins possess the prominent residues F106, P109 and P112 (as in PGRMC1) around the heme-binding pocket for heme binding, only 2 of the 3 are detected in the *Toxoplasma* sequence (F150 and P156). Based on these phylogenetic analyses, we therefore named this *Toxoplasma* protein TgMAPR. The TgMAPR sequence shares 93%, 72% and 62% identity with homologous sequences in *H. hammondi*, *N. caninum* and *B. besnoiti*, respectively; only, the *N. caninum* MAPR contains the 3 conserved residues around the heme-binding pocket (F153, P156 and P159) present in all other PGRMC proteins. TgMAPR is a membrane-associated hemoprotein. The primary sequence of TgMAPR has a predicted molecular weight of 26.2-kDa, a transmembrane domain and the cytochrome b5 family heme-binding domain found in all MAPR family members. It has been reported that in the presence of heme, PGRMC1 forms a dimeric structure largely through hydrophobic interactions between the heme moieties of two monomers [37]. We analyzed the expression of TgMAPR in *Toxoplasma* and its physical properties. We generated a recombinant TgMAPR peptide in *E. coli* (6xHis-TgMAPR) for anti-TgMAPR antibody production in mice. Western blotting on freeze-thaw lysates of WT parasites using anti-TgMAPR antibody showed a major band of 27-kDa, corresponding to the mass of TgMAPR, in addition to a weaker upper band at 52.5-kDa, likely corresponding to a TgMAPR dimer (Fig 2A). To assess if TgMAPR is a transmembrane protein, we extracted the parasite proteins with either the detergent Triton X-100 or sodium carbonate at pH 11.5. The protein was detected in the soluble fraction in Triton X-100 extraction but in the membrane fraction upon Na<sub>2</sub>CO<sub>3</sub> extraction, similarly to the integral membrane protein TgABCG [5] and distinctly from the soluble GRA1 protein (Fig 2B). We conclude that TgMAPR is a membrane protein as predicted in the sequence.

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Download: Fig 2. Membrane-association, heme binding properties and localization of TgMAPR. (A) Western blots on freeze-thaw lysates from WT parasites using anti-TgMAPR antibody revealing 2 bands corresponding to monomeric and dimeric forms of TgMAPR. (B) Western blotting analysis of WT parasites with proteins extracted by 1% Triton

X-100 (TX-100) or sodium carbonate ( $\text{Na}_2\text{CO}_3$ ) showing TgMAPR partitioning into the pellet phase of the  $\text{Na}_2\text{CO}_3$  extraction fraction, like the integral ER transporter TgABCG and unlike soluble GRA1 detected in the supernatant (Sup.) phase of the carbonate extract. (C) Absorption spectra of recombinant TgMAPR, showing the spectra of reduced and oxidized form after the addition of KFeCN. (D) In-gel heme assay on recombinant TgMAPR and hemoglobin (Hb) as positive control detected by ECL solution. (E) Coomassie blue and anti-6xHis western blot of purified 6xHis-TgMAPR plus a photo of the recombinant protein eluted from the purification column showing the recombinant 6xHis-TgMAPR protein colored brown due to presence of the heme moiety, in contrast to purified peptide 6xHis-TgABCG 2-53 eluted from a  $\text{Ni}^{2+}$  resin column as a white suspension. (F) IFA using anti-TgMAPR antibody and Mito-Tracker (Mito-T) labeling of WT showing overlap in the parasite mitochondrion. <https://doi.org/10.1371/journal.ppat.1011566.g002>

We next analyzed the heme-binding properties of TgMAPR using three approaches. First, heme-reconstituted recombinant TgMAPR was subjected to a whole spectrum absorbance scan from 350 to 600 nm, before and after addition of the oxidizing agent potassium ferricyanide. Data in Fig 2C showed a major peak at 440 nm that shifted to 425 nm after oxidation, a hallmark of heme-containing proteins [35]. Second, chemiluminescence is a very sensitive method for detecting heme-containing proteins in electrophoretic gels [41] and TgMAPR heme-binding was further examined in an in-gel heme assay by visualization of the intrinsic peroxidase activity of the heme group [42]. Recombinant TgMAPR was run on an SDS-PAGE gel and stained by enhanced chemiluminescence prior to exposure to X-ray film; the 26-kDa band of recombinant TgMAPR gave a positive signal (Fig 2D). Third, we observed that purified recombinant TgMAPR bound to the purification column, was tinged with brown (Fig 2E), which is a characteristic of 5-coordinate hemoproteins like PGRMC1, in contrast to the red color of 6-coordinate cytochrome b5 heme proteins like CYP5 [42] and white color for not hemoprotein (shown here with TgABCG). These data establish that TgMAPR is associated with parasite membranes either as monomers or dimers, and binds heme. TgMAPR localizes to the mitochondrion MAPR family members have various subcellular localizations, according to their functions. We next analyzed the distribution of TgMAPR in intracellular Toxoplasma by IFA using anti-TgMAPR antibody. We observed a fluorescent lasso-shape signal around the parasite nucleus (Fig 2F) that is reminiscent of the shape of the mitochondrial network in the parasite. Parasites were then co-stained with Mito-tracker and anti-TgMAPR antibody, and the two fluorescent signals largely colocalize. In parallel, we examined the distribution of TgMAPR expressed in HeLa cells upon transfection with a plasmid containing TgMAPR-HA, and IFA using anti-HA antibody showed the fluorescent signal in mitochondria identified with Mito-Tracker (S5A Fig). To confirm the localization of TgMAPR in the mitochondrion, we engineered a parasite stable line expressing TgMAPR-HA; western blotting analysis showed expression of TgMAPR-HA as a monomer at 27.5-kDa and dimer at 53-kDa (S5B Fig) as observed for WT parasites (Fig 2A). Double IFA of TgMAPR-HA-expressing parasites using anti-HA and anti-MAPR antibodies showed colocalization for signal specificity (S5C Fig) and immunoEM gold staining using anti-HA antibody detected gold particles on mitochondrial membranes (S5D Fig). Finally, we performed double IFA on this parasite strain using anti-HA and anti-HSP70 antibodies, and data show colocalization, with positive values ( $> 0.5$ ) for PCC and MOC (S5E Fig). In few parasites (~5%) some area of the mitochondrion appeared more enriched in TgMAPR than in HSP70 (S5F Fig). TgMAPR functionally complements *S. pombe* *dap1* $\Delta$  mutant We next wanted to functionally validate TgMAPR as a canonical MAPR family member. In fission yeast, SpDap1 plays a role in ergosterol biosynthesis and yeast survival under hypoxia conditions through interaction with the sterol-synthesizing cytochrome P450 protein Erg11p/Cyp51p; SpDap1 expression is stimulated by low oxygen/sterol concentrations [21,43]. As TgMAPR and Dap1 share conserved residues including the Cytb5 domain (S4B Fig), we analyzed the functional equivalence of TgMAPR and Dap1. We expressed TgMAPR in *S. pombe* lacking Dap1 to examine the potential ability of TgMAPR to restore Dap1 activities in mutant yeast, related to resistance to hypoxia and sterol production. Transformation of SpDap1 $\Delta$  with TgMAPR with a myc tag at the C-terminus resulted in heterologous expression of TgMAPR in yeast (S6A Fig, panel i). Parental, SpDap1 $\Delta$  and complemented strain with HA-SpDap1 or TgMAPR were exposed to  $\text{CoCl}_2$ , which mimics hypoxic conditions by activating the hypoxia-inducible factor 1 $\alpha$  (HIF1 $\alpha$ ) [44]. We observed growth rescue in two independent clones of mutant yeast expressing TgMAPR to the same extent as for parental yeast and SpDap1 $\Delta$  complemented with

HA-SpDap1 (S6A Fig, panel ii). This suggests that TgMAPR and SpDap1 similarly protect yeast from hypoxic damage. In yeast, Dap1 contributes to ergosterol synthesis, indeed compared to WT *S. pombe*, SpDap1 $\Delta$  has reduced amounts of ergosterol and elevated amounts of the ergosterol biosynthetic intermediates: 24-methylene lanosterol, ergosta-5,7,24(28)-trienol, and ergosta-5,7-dienol, consistent with defects at the Erg11 and Erg5 enzymatic steps (see pathway in S6B Fig) [21,43]. Heterologous expression of TgMAPR in Spdap1 $\Delta$  resulted in the rescue of ergosterol synthesis to a similar extent as SpDap1 $\Delta$  complemented with HA-SpDap1 (S6B Fig). These data indicate that TgMAPR can analogously replace Dap1 in yeast for hypoxia protection and ergosterol synthesis, however, they do not imply similar functions of TgMAPR in *Toxoplasma* more especially since this parasite has no sterol biosynthetic machinery. TgMAPR-deficient *Toxoplasma* propagate poorly in vitro and suffer from a fitness loss PGRMC1/Dap1 is associated with increased cell survival, more especially under stress conditions [21,43,45]. To investigate the physiological importance of TgMAPR, we disrupted the *mapr* gene via replacement with a DHFR resistance marker in the *T. gondii*  $\Delta$ Ku80/RH strain (S3C Fig). Few viable KO clones could be obtained and they exhibited very slow growth. We quantified the growth rate of  $\Delta$ TgMAPR in cultured cells by plaque assays for 7 days allowing several cycles of parasite invasion requiring motility, replication and egress. Measurement of plaque area showed significant differences between the KO and parental parasites with  $\sim$ 7-times smaller plaques formed by the mutant (Fig 3A). Next, we examined which steps in the parasite lifecycle could be affected upon TgMAPR deficiency. For host cell invasion, *Toxoplasma* employs a form of gliding motility that depends on its actomyosin system [46]. The motility of the parasites can be visualized by trails of surface proteins (e.g., SAG1) deposited on a coated surface and revealed by IFA. We performed trail deposition assays allowing  $\Delta$ TgMAPR and parental parasites to glide for 30 min with IFA using anti-SAG1 antibody. Circular SAG1-containing trails were observed for both strains with no difference in their length (Fig 3B). To assess the ability of  $\Delta$ TgMAPR to invade mammalian cells, we used the red/green invasion assay to discriminate between parasite solely attached to the host cells versus fully internalized [47]. Data illustrate significant defects in invasion for the mutant with an almost 2-fold reduction of host cell penetration events compared to parental parasites, with 5-times more mutants still attached to the host cell surface (Fig 3C). Quantification of replication rates of  $\Delta$ TgMAPR using [ $^3$ H]uracil incorporation assays revealed  $\sim$ 20% less radioactivity associated with the mutant compared to parental parasites (Fig 3D). Next, we examined the ability of  $\Delta$ TgMAPR parasites to exit from their host cells. A rise in calcium concentration is associated with the secretion of proteins involved in rapid egress of *Toxoplasma* from the host cell [48]. Parasite egress was chemically induced by the calcium ionophore A23187 and visualized by time-lapse microscopy to record time until egress for  $\Delta$ TgMAPR and parental parasites. At 100 sec post-induction, many PV containing  $\Delta$ TgMAPR parasites were still intact, in contrast to PV for the parental strain that were all lysed (Fig 3E); data showed a  $\sim$ 3-fold egress delay for the mutant. Jointly, these observations indicate poor fitness of  $\Delta$ TgMAPR parasites at various steps in their developmental cycle in vitro.

PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 3. Phenotypic analysis of  $\Delta$ TgMAPR parasites. (A) Plaque assays. Analysis of parasite growth for 7 days after fibroblast infection with 150 parasites from the parental and  $\Delta$ TgMAPR strains showing representative images and quantification of lysed area from 3 independent experiments. Data are means  $\pm$  SD. (B) Gliding assays. Freshly lysed  $\Delta$ TgMAPR1 and parental parasites were allowed to glide on FBS-coated glass slides for 30 min before fixation and staining with anti-SAG1 antibody under non-permeabilized conditions. Representative images are shown. Measurement of gliding trails by dot plots, showing means  $\pm$  SD of 3 independent experiments. (C) Invasion assays. Quantification of invasion of parental and  $\Delta$ TgMAPR parasites using the red/green invasion assay. Red histograms represent external, attached parasites while green histograms represent internal, penetrated parasites. Data are means  $\pm$  SEM of 4 independent experiments. (D) [ $^3$ H]uracil incorporation assays for replication. HFF were infected with parental and  $\Delta$ TgMAPR parasites for 24 h prior to incubation with tritiated uracil. Data are means  $\pm$  SD of 3 independent experiments. (E) Induced egress assays. HFF were infected with parental and  $\Delta$ TgMAPR parasites for 24 h prior to exposure to 2  $\mu$ M A23187 for time-lapse microscopy views, showing rapid egress for parental parasites that were largely extracellular upon treatment and slower response for the treated mutant (arrows). Quantification of egress time with means in seconds for 3 treated monolayers infected

with parental or  $\Delta$ TgMAPR parasites. <https://doi.org/10.1371/journal.ppat.1011566.g003>  $\Delta$ TgMAPR parasites exhibit severe endodyogeny defects, with an abnormally long S-phase in the cell cycle. Toxoplasma parasites divide by a process of endodyogeny during which two daughter cells are synchronously assembled within the mother cell every 7–8 hours, resulting in geometric expansion of clonal progeny until host cell lysis ~48 h [49]. The significant growth defects observed for  $\Delta$ TgMAPR parasites may be associated with severe cytopathies in the ultrastructural organization of these mutants.  $\Delta$ TgMAPR parasites were cultivated for 24 h in fibroblasts for EM inspection. A striking feature was the accumulation of dense granular material within all PV in which  $\Delta$ TgMAPR parasites seemed embedded (Fig 4A). On some sections, the parasites exhibited a 'gaping hole' at the basal end as a sign of defective membrane sealing during the formation of the daughter cells (Fig 4A, arrow in panel i), suggesting discharge of parasite material into the PV. The PV of WT tachyzoites contains an Intravacuolar Network (IVN) of membranous tubules that is initially secreted by the parasite [50], then expanded through the uptake of host lipid uptake [51]. One function of the IVN is trapping host cytosolic proteins and host organelles as sources of nutrient [4,52]; strikingly, no IVN was observed in the  $\Delta$ TgMAPR PV lumen. WT intracellular tachyzoites usually contain 1 to 3 lipid droplets [6,10]. In contrast, several large lipid droplets were observed in  $\Delta$ TgMAPR parasites, up to 4 per section (Fig 4A, panels i to iii), suggesting important storage activities of cholesteryl esters and triglycerides or impairment in using these neutral lipids for metabolic functions. Amylopectin granules are energy reserves that fuel the transition from proliferative tachyzoites to slow-growing bradyzoite cysts [53]; however, in  $\Delta$ TgMAPR tachyzoites, abundant amylopectin granules were visible, up to 15 per parasite section (Fig 4A, panels ii and iv), as a sign of metabolic stress. The morphology of several organelles was also unusual, such as the mitochondrion, that was enlarged with disorganized cristae (Fig 4A, panel iv and inset) and rhoptries showing a high electron-density, suggesting the accumulation of osmiophilic material (e.g., lipids). While some replication profiles with nascent daughters were observed with 2 or 4 individual parasites per PV (Fig 4A, panel iii and iv), more often a mass of poorly differentiated parasites intertwined with each other was noticed (Fig 4A, panel v). Like WT parasites,  $\Delta$ TgMAPR parasites were able to recruit host mitochondria at the PV (Fig 4A), indicating functional secretory activities to export the mitochondrial association factor 1 (MAF1) from dense granules to the PV membrane [54]. PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 4. Ultrastructure and cell cycle properties of  $\Delta$ TgMAPR parasites. (A) EM of intracellular  $\Delta$ TgMAPR parasites 24 h p.i. Panels i to v illustrate parasites at different stages of replication in a PV matrix filled with granular material (asterisk in panel i with arrow showing an 'opening' at the basal end). The mutant contains many lipid droplets (LD) and amylopectin granules (AG), abnormal mitochondrion (mt) and rhoptries (rh). Inset in panel iv shows another example of an aberrant, enlarged mitochondrion. Host mitochondria (hmt) are recruited at the PV membrane. Scale bars, 250 nm. (B) Fluorescence microscopy on parental and  $\Delta$ TgMAPR parasites using TRITC-lectin, showing a stronger signal on 97% mutant PV. n = 39–51 PV observed for each strain. (C) Flow cytometry-based DNA content measurements for cell cycle analysis of  $\Delta$ TgMAPR and parental strains. The gating strategy is shown in S6A Fig. Fibroblasts were infected for 15 h before parasite isolation, ethanol-fixation and staining with the DNA-intercalating fluorescent dye propidium iodide to reveal DNA distribution patterns in the major phases of the cell cycle. The pseudo-color plot graphs show the population of parasites at 1N DNA phase (light green peak) and at 2N DNA phase (light blue peak), with very few WT parasites transitioning between 1N DNA and 2N DNA (PLVAC peak). In contrast, the khaki peak is more prominent in  $\Delta$ TgMAPR<7wks parasites, indicating dysregulated cell cycle, with an abnormally long S phase. Representative images are shown from 4 independent assays. <https://doi.org/10.1371/journal.ppat.1011566.g004> Cyst forms of Toxoplasma are characterized by a thick glycosylated cyst wall derived from the PV membrane detectable in a Dolichos biflorus Agglutinin (DBA) lectin fluorescence binding assay [55]. Due to the slow replication rate of  $\Delta$ TgMAPR parasites, we performed the DBA assay to determine whether these mutants were converting to cyst forms. At 40 h p.i., we detected a strong DBA signal all around most (97%)  $\Delta$ TgMAPR PV, in contrast to parental PV with either no or a weaker lectin staining in only 6% of PV (Fig 4B). However, IFA using antibody against the protein bradyzoite marker BAG1/HSP30 or the cyst wall protein CST1 did not reveal any fluorescence signal (not shown). In addition, our RNA-Seq analysis of  $\Delta$ TgMAPR parasites did not

show any downregulated tachyzoite or upregulated bradyzoite transcripts (see below S8 Fig). This indicates that deletion of the *mapr* gene does not induce the differentiation of tachyzoites to bradyzoites, but just results in major stress and poor fitness of the mutant. *Toxoplasma* tachyzoite replication differs from the classic animal cell cycle as it is characterized by an interwoven relationship between mitosis and cytokinesis driven by the internal budding process of daughter cells. The tachyzoite cell cycle has a bimodal distribution, with a major 1 N DNA peak (= G1 phase for ~60% of the parasite population) and a major 2 N DNA peak (encompassing S, G2 phase and mitosis for ~30% of the parasite population; in between, there is an early-mid S phase (1–1.6 N for ~10% of the parasite population) [56]. We next conducted flow cytometry analyses on  $\Delta$ TgMAPR parasites isolated from VERO cells to examine their cell cycle profiles, in comparison with parental parasites. Data show that  $\Delta$ TgMAPR parasites had an increased S-phase compared to parental parasites (Figs 4C and S7A), compatible with slow daughter cell budding (Fig 4A). Based on three independent preparations of parasites, the percentages of control parasites were  $63.7 \pm 3.4\%$  in G1 interphase and  $32.0 \pm 1.9\%$  in S/G2/M phases while the percentages of  $\Delta$ TgMAPR parasites were  $31.5 \pm 4.2\%$  in G1 interphase and  $67.9 \pm 3.6\%$  (\*,  $p < 0.005$ ) in abnormal phases corresponding to very long S phase and G2/mitosis phases.  $\Delta$ TgMAPR parasites are able to overcome their growth defects overtime Intriguingly, we observed that  $\Delta$ TgMAPR parasites maintained in vitro for several weeks lysed their host cells more rapidly than initially, reflecting growth rate acceleration; this phenomenon appeared beyond 7 weeks of culture. We quantified this phenotype by plaque assays comparing the growth of ‘young’ clones  $\Delta$ TgMAPR parasites (less than 7 weeks of culture; TgMAPR<7wks) with culture-adapted mutant parasites ( $\Delta$ TgMAPRad) and controls including parental and complemented parasites. To engineer the complemented strain, the *Tgmapr* gene with C-terminal HA tag has been integrated into the UPRT site of  $\Delta$ TgMAPR parasites via homologous recombination; TgMAPR-HA expressed under the control of the tubulin promotor localized to the parasite mitochondrion as expected (S3D Fig). Lysed plaque area generated by TgMAPRad were ~5-times larger than those from TgMAPR<7wks; no statistical difference was observed between plaque area formed by  $\Delta$ TgMAPRad, parental and complemented parasites (Fig 5A). We monitored the ability of  $\Delta$ TgMAPRad parasites to invade mammalian cells, and invasion assays show no difference in number of mutant parasites either attached or internalized into cells, compared to parental parasites (Fig 5B). Uracil incorporation assays showed no statistical difference in the replication rate between  $\Delta$ TgMAPRad, parental and complemented parasites (Fig 5C). Time of egress upon A23187 induction revealed only a minor 1.1-fold delay for  $\Delta$ TgMAPRad compared to control parasites (Fig 5D). Finally, flow cytometry analyses conducted on  $\Delta$ TgMAPRad parasites revealed that their cycle had returned to normal, with the G1 interphase and S/G2/mitosis phases corresponding to  $59.9 \pm 6.5\%$  and  $38.1 \pm 5.3\%$ , respectively (Figs 5E and S7B). PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 5. Recovery of  $\Delta$ TgMAPR adapted in culture and virulence. See Fig 3 for legend description of the assays used. (A) Growth plaque assays for parental, complemented,  $\Delta$ TgMAPR<7wks and  $\Delta$ TgMAPRad strains. (B) Red/green invasion assays. (C) Uracil incorporation assays. (D) Time-lapse microscopy egress assays. (E) Flow cytometry-based DNA content measurements for cell cycle analysis of  $\Delta$ TgMAPRad, parental and complemented strains. The gating strategy is shown in S6B Fig. Representative images are shown from 4 independent assays, revealing culture-adapted mutant with S phase recovery. (F) Acute virulence assays of  $\Delta$ TgMAPR before and after adaptation in a murine model. Swiss-Webster were intravenously inoculated with 150 parental, complemented,  $\Delta$ TgMAPR<7wks or  $\Delta$ TgMAPRad parasites, with 8 mice for each strain to monitor mice mortality daily until Day18. \*,  $p = 0.0024$  (Log-rank Mantel-Cox test).

<https://doi.org/10.1371/journal.ppat.1011566.g005> We performed RNA-Seq analysis on  $\Delta$ TgMAPRad versus  $\Delta$ TgMAPR<7wks parasites to possibly identify genes with modified transcription levels, in relation to fitness recovery of the mutant. Eighteen genes were significantly differently expressed in  $\Delta$ TgMAPRad parasites, with 11 genes up-regulated and 7 genes down-regulated (S8 Fig). In searches of the *Toxoplasma* database ([www.toxoDB.org](http://www.toxoDB.org)) and SWISS-PROT database, the majority of the genes had either no known homologue or only an identifiable protein domain. Among the few genes for which a function could be attributed, at least one up-regulated gene (with a log 2 fold change 4.4) putatively encodes a DNA primase, an enzyme involved in the DNA replication fork, which may correlate with the growth recovery of the cultured-adapted mutant. These observations illustrate that  $\Delta$ TgMAPR parasites

have adapted to the loss of the *mapr* gene by some compensatory mechanisms allowing normal growth to resume, at least in vitro.  $\Delta$ TgMAPR have reduced virulence regardless of culture adaptation. We next assessed the virulence of  $\Delta$ TgMAPR<7wks and  $\Delta$ TgMAPRad, compared to parental and complemented strains, in outbred mice. Survival curves of mice infected with control parasites (parental or complemented) show 100% mortality 11–12 days after infection (Fig 5F), similarly to WT parasites. By contrast, all mice infected with  $\Delta$ TgMAPR died after 17–18 days regardless of their time in culture, indicating loss of virulence for the mutant. The similar reduction in virulence between  $\Delta$ TgMAPR<7wks and  $\Delta$ TgMAPRad suggests that the *mapr* gene, although largely dispensable in vitro, contributes in part to the survival of *Toxoplasma* in mice. TgMAPR and TgCYP450mt colocalize in the mitochondrion. We next investigated to which extent TgCYP450mt codistributes with TgMAPR in the parasite mitochondrion. Double IFA on TgCYP450-HA-expressing parasites using anti-HA and anti-TgMAPR antibodies illustrated a significant colocalization between the 2 signals in the mitochondrion identifiable by Mito-Tracker in parasites in small and large PV (Fig 7). Interestingly, the signal for TgMAPR seems to extend beyond the signal for Mito-Tracker and TgCYP450mt (Fig 7; arrows). TgCYP450mt and TgMAPR form dynamic in situ interaction in the mitochondrion. To assess whether TgCYP450mt and TgMAPR interact with each other in the parasite mitochondrion, we performed in situ proximity ligation assays (PLA) in TgCYP450-HA-expressing parasites. No PLA signals were detected when both primary antibodies (anti-HA or anti-TgMAPR) were omitted or when only one of the primary antibodies was used (Fig 8A). When the primary antibodies anti-HA and anti-TgMAPR were incubated for 2 h at 37°C on fixed parasites, a robust PLA signal was detected within the parasite, suggestive of the presence of TgCYP450mt:TgMAPR complexes (Fig 8B). PLA analysis on small and large PV revealed in all instances bright fluorescent dots within the parasite, sometimes aligned in a configuration reminiscent of the shape of the mitochondrion. The mitochondrial-localized HSP70 strongly colocalizes with TgCYP450mt (Fig 1B) and TgMAPR (S5E–S5F Fig). An additional control consisted of PLA in the presence of anti-HA (in TgCYP450-HA-expressing parasites or in TgMAPR-HA-expressing parasites) and anti-HSP70, and data showed no fluorescent signals in these parasites, indicating no interaction between HSP70 and TgCYP450mt or TgMAPR (S9 Fig). These observations indicate that TgCYP450mt and TgMAPR are proximal to each other, suggesting interactions of TgCYP450mt and TgMAPR in the parasite mitochondrion. PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 8. In situ interaction between TgCYP450mt and TgMAPR. (A) Fluorescence microscopy of TgCYP450-HA-expressing *Toxoplasma* using a proximity ligation assay (PLA) showing punctate fluorescent signal in red upon TgCYP450mt:TgMAPR interaction. No signal for TgCYP450mt:TgMAPR interaction was observed when both or either one of the primary protein antibodies was omitted during the PLA process. Interaction of both proteins is visible by PLA only when both primary antibodies for TgCYP450mt (anti-HA) and TgMAPR were included. Nuclei staining by DAPI. (B) PLA on various PV sizes of TgCYP450-HA-expressing *Toxoplasma* using anti-HA and anti-TgMAPR antibodies showing specific signal delineating mitochondrial profiles. <https://doi.org/10.1371/journal.ppat.1011566.g008>

**URL:** <https://olhardigital.com.br/2023/08/31/ciencia-e-espaco/veja-a-superlua-e-saturno-juntos-em-imagens-impressionantes/>

**Title:** Veja a Superlua e Saturno juntos em imagens impressionantes

**Text:** Conforme noticiado pelo Olhar Digital, a Lua encerrou a “turnê mensal” de agosto pelos planetas do Sistema Solar na quarta-feira (30), quando voltou a visitar Saturno, de quem já esteve juntinho no dia 3. Só que, desta vez, o momento foi ainda mais especial, já que aconteceu durante a maior lua cheia de 2023, a Superlua Azul. De acordo com o site In-The-Sky.org, isso aconteceu às 15h07, quando a Lua passou a pouco mais de 2° ao sul do gigante dos anéis. (Todos os horários mencionados têm como referência o fuso de Brasília). Pouco mais de 1h30 depois houve o chamado *appulse*, termo que se refere à separação mínima aparente entre dois corpos no céu, de acordo com o guia de astronomia Starwalk Space. publicidade O que diferencia as duas expressões é que, embora o termo “conjunção” também seja utilizado popularmente para representar uma aproximação aparente entre dois astros, tecnicamente, a conjunção astronômica só ocorre no momento em que os dois objetos compartilham a mesma ascensão reta (coordenada astronômica equivalente à longitude terrestre). Configuração do céu no momento da conjunção entre a Superlua Azul e Saturno nesta

quarta-feira (30). Crédito: SolarSystemScope No entanto, devido à posição dos astros abaixo da linha do horizonte, eles não puderam ser observados em nenhum desses dois momentos. Do ponto de vista de um observador baseado em São Paulo, por exemplo, a dupla só começou a estar visível a partir das 17h29, permanecendo acessível até às 06h17 desta quinta-feira (31). De qualquer forma, mesmo já não estando mais efetivamente em conjunção, Lua e Saturno ainda puderam ser vistos muito próximos um do outro ao longo da noite (não o suficiente para caberem dentro do campo de visão de um telescópio, mas facilmente observáveis a olho nu ou através de um par de binóculos). Encontro da Superlua com Saturno se deu no melhor momento de observação do planeta Esse “encontro celeste” foi registrado por alguns observadores, que compartilharam suas visões incríveis na internet. A captura acima foi feita com a câmera Coolpix P950 da Nikon, de acordo com a descrição do canal ZoomX. Não há informações quanto ao local de origem da observação. O vídeo abaixo, compartilhado na rede social Reddit, pelo usuário @Anime-kungfu, também mostra uma visão expansiva e intimamente detalhada da Lua, meticulosamente capturada através da lente de um telescópio. Primeiro, vemos a grande protagonista da noite. Então, o foco da câmera muda para revelar Saturno e seus anéis radiantes brilhando intensamente. A legenda que acompanha as imagens diz: “Eu gravei este vídeo com um iPhone 14 Pro montado em um telescópio Dobsonian de 12 polegadas. É um pouco longo no final, enquanto eu estava tentando ajustar a exposição e focar em Saturno. Mas tem vistas deslumbrantes da superfície da Lua e dos anéis de Saturno”. O criador do vídeo também afirmou que algumas das mais de 100 luas do planeta dos anéis também foram capturadas na última parte da gravação. Vale destacar que, recentemente, Saturno passou pela oposição, que é quando um objeto atinge o lado exatamente oposto do Sol em relação à Terra (que fica entre os dois corpos celestes), chegando o mais próximo possível do nosso planeta (ponto de sua órbita chamado de perigeu), o que o faz parecer mais brilhante e maior no céu. (entenda aqui). Embora isso tenha acontecido no domingo (27), ele continua em seu melhor momento de observação, já que a distância entre os planetas praticamente não se altera nos dias próximos à oposição. Leia mais: Por último, um registro compartilhado pelo meteorologista chefe dos canais Fox News e KAMR Local News, de Amarillo, no estado norte-americano do Texas, John Harris. Late night viewing of the “Super Blue Moon” and Saturn

■ This photo is the merging of two images from my Dobsonian telescope at 1 o'clock this morning. Publicado por Chief Meteorologist John Harris em Quarta-feira, 30 de agosto de 2023 “Visualização tardia da noite da Superlua Azul e Saturno. Esta foto é a fusão de duas imagens do meu telescópio Dobsoniano à 1h desta manhã”, diz Harris na legenda (lembrando que, conforme dito anteriormente, os dois objetos não estariam próximos o suficiente para caberem dentro do campo de visão de um telescópio, por isso, a fusão das imagens). Já assistiu aos novos vídeos no YouTube do Olhar Digital? Inscreva-se no canal!

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**URL:** <https://whyevolutionistrue.com/2023/08/31/readers-wildlife-photos-1939/>

**Title:** Readers' wildlife photos

**Text:** Today we have the life of a butterfly, with photos by Mary Rasmussen. Mary's captions are indented, and you can enlarge the photos by clicking on them. The Red Admiral Butterfly I always leave a few Stinging Nettle (*Urtica dioica*) plants in my garden here in the Upper Peninsula of Michigan. The Nettles are popular with the Red Admiral Butterfly (*Vanessa atalanta*) but also feed a variety of other moth and butterfly caterpillars. Like many Monarch butterflies, Red Admirals are migratory. Most northern Red Admirals are thought to migrate south each fall, but some may overwinter. Red Admirals do not survive the coldest winters and most of North America is re-populated by southern butterflies migrating north in the spring. They are a very welcome sight here in mid-spring: Female laying an egg. The butterfly's reproductive organs are located near the lower tip of the abdomen. You can see the tiny green egg that she will deposit on a Nettle leaf. The egg's surface has a glue that will hold it on the leaf: Macro shot of a Red Admiral egg on a Stinging Nettle leaf. You can see the hollow stinging hairs of the Nettle leaf. I've learned that I can grasp the plant while moving my hand upwards and not suffer any consequences. Moving your hand down along the plant is definitely not recommended. Caterpillars feed primarily on plants in the Nettle family (*Urticaceae*). They sew a leaf closed around them to make a protective nest and then eat their way out. They do this several times while they are maturing: The caterpillar hangs down and forms a “J” shape, signalling that it will soon pupate. The chrysalis: The



newly emerged butterflies have brilliant coloration. Their underwings are particularly beautiful: I use a Nikon D500 camera with Nikon VR 105mm f/2.8G macro lens. For the butterfly egg I used a Laowa 25mm f/2.8 2.5-5X Ultra Macro lens with extension tubes. Recommended reading: Caterpillars of Eastern North America, Princeton Field Guides, by David L. Wagner This guide has an index of the caterpillars and most useful is the index of food plants. Many times I have been able to identify a caterpillar by looking up the plant it is munching.

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**URL:** <https://www.dpreview.com/samples/2139518695/small-camera-big-resolution-sony-a7cr-sample-gallery>

**Title:** Small camera, big resolution: Sony a7CR sample gallery

**Text:** Site update: Our login process has been updated, click here for more information

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**URL:** <https://www.livescience.com/technology/nikon-z8-review>

**Title:** Nikon Z8 review

**Text:** With all the power and performance of the flagship Z9, but in a smaller and cheaper body, the Nikon Z8 is a market-leading mirrorless camera. Why you can trust Live Science Our expert reviewers spend hours testing and comparing products and services so you can choose the best ones for you. Find out more about how we test. Key specifications Type: Mirrorless Sensor: 45.7MP full frame Lens mount: Nikon Z ISO range: 64-25,600 (exp 32-102,400) Viewfinder: Electronic, 3.69m dots Video capability: 8K 60p / 4K 120p Weight: 2lbs 0.1oz Size: 56.7 x 46.5 x 32.7 inches Memory card: 2x CFexpress B The Nikon Z8 is referred to by Nikon as both "a baby Z9" and "the true successor to the Nikon D850". That's high praise indeed, with the Z9 being the company's cutting-edge, flagship mirrorless camera, and the D850 being widely regarded as the finest DSLR ever made. Both labels are wholly accurate, though, as the Nikon Z8 lives up to every inch of the hype. With 45.7MP resolution, 8K 60p video and up to 120fps burst shooting, this can handle almost anything you throw at it; its continuous shooting speed and ferocious autofocus obviously make it one of the best wildlife cameras on the market, but it's also an absolute powerhouse for anything from astrophotography to portraiture. In fact, the Z8 is so good that it threatens to make the pricier, bulkier Z9 redundant. Unless you really need the vertical grip and beefier battery power (both of which are actually available to the Z8, if you buy an additional grip), there really isn't much to justify the extra grand or so that the flagship will cost you. There are asterisks next to a couple of features, such as the fact that the 120fps bursts are limited to 11MP JPEGs, but all in all the Z8 can tackle any task – and it's probably the best all-purpose camera that Nikon has ever made. (Image credit: James Artaius) Nikon Z8: Design When Nikon calls this a "baby Z9", it isn't kidding: while it packs the exact same technology as its big brother, the Z8 eschews the integrated vertical grip to deliver a camera body that's a similar size to the Nikon Z6 and Z7. Taking a cue from Sony, this is the first flagship from Nikon (or Canon, for that matter) to offer a pro body without the vertical grip – in turn, making it appealing to a much broader market. Sure, if you're going to be using it with big bulky primes or long telephoto lenses, the Z9 balances better. But for everyday and all-purpose shooting, I'm a much bigger fan of this smaller footprint. Mirrorless is supposed to be smaller and lighter than DSLRs, after all! As you'd expect from a Nikon, the ergonomics are sublime; the Big N really knows how to make a camera that fits your hand like a glove. The controls feel premium and are positioned just where your fingers and thumbs expect them, and shooting with the Z8 is a dream. It also features a great in-body image stabilization system that delivers up to 5.5 stops of compensation (6 stops with specific lenses). My only complaint here is that the camera doesn't feature a fully articulating touchscreen, instead opting for a curious four-way tilting option. This certainly gives more flexibility than a standard tilt-only screen, but not being able to flip the screen all the way round is a sore point when shooting video – and extra baffling, given what a video powerhouse the Z8 is. (Image credit: James Artaius) The tilting screen is fantastically bright and detailed with good color reproduction even when comparing it to our 99% Adobe RGB color monitor in the studio but it's the restrictions of its tilting function which frustrate us a little. Tilting the screen to the right and upwards from a normal shooting position we get around 180 degrees and about 200 degrees of movement respectively which is great for composing scenes with awkward shooting angles (such as framing foreground elements when capturing astrophotographs). However, the left and down tilt give little more than 30 or 45

degrees respectively. We're presuming that Nikon's thinking here is that it's more awkward to hold a camera in those latter positions and trigger the shutter release button, but it's a little confusing as to why they didn't opt for a fully rotating vari-angle style screen that competitor models like the Canon EOS R5 have as default. Image 1 of 2 (Image credit: Jase Parnell-Brookes) (Image credit: Jase Parnell-Brookes) Nikon Z8: Functionality Additional kit Kit lens: Nikkor Z 24-120mm f/4 S Best wide lens: Nikkor Z 14-24mm f/2.8 S Best zoom lens: Nikkor Z 100-400mm f/4.5-5.6 VR S Spare battery type: Nikon EN-EL15a, b or c In short, there is nothing the Z8 can't do – it has been designed to conquer any and every shooting situation. The 45.7MP image sensor offers an incredible amount of resolution, and it's back-side illuminated to offer greater light-gathering capability and cleaner performance. However, this is also a stacked sensor – meaning that it boasts lightning-fast readout speeds, delivering incredible results for stills and video. For the former, it gives you the ability to shoot at previously impossible continuous burst speeds of up to 120fps – though this comes with a few caveats. When shooting at 120fps, the Z8 can only capture 11MP JPEGs. However, it can still shoot full-fat 45.7MP JPEGs at 30fps, or RAW files at 20fps – all with autofocus and autoexposure. Thanks to its cutting-edge image processor, the camera can record more than 1,000 RAW images at 20fps before any buffering kicks in – which is frankly astonishing! The quick-as-a-hiccup readout speed of the stacked sensor also means that the rolling shutter phenomenon is virtually eliminated when shooting stills and video. Indeed, it's such a non-issue that Nikon hasn't even bothered to include a mechanical shutter in the Z8. It's electronic-only, boasts a blistering 1/32000 sec maximum shutter speed (which is 4 times faster than most high-end cameras!). The camera also boasts the same flagship autofocus system found in the Z9, with subject detection algorithms for everything from humans and animals to all manner of vehicles (in fact, it even beats its big brother by incorporating a new "aircraft" mode on top of the standard "airplane" tracking). And last but not least, the Nikon Z8 is one of the most capable cameras on the market when it comes to video, able to produce crystal clear 8K 60p as well as 4K 120p footage – all without the overheating issues and recording limits found in its rival, the Canon EOS R5. (Image credit: James Artaius) One exciting feature for astrophotographers is the night vision mode. Gone are the days of using a red flashlights and shutting our eyes every time a car goes past just to have the camera menu or image preview blast hot-white light into our eyes and ruining our night vision. Head into the custom shooting menu and navigate to d10 and we're met with Warm display color. Within it are two programmable modes to keep specific color balance settings on the rear screen and electronic viewfinder which are, by default, both set to red and to keep the screen dim. "But now we can't see whether the color balance is true while shooting, everything is red!" we hear you say. Yes, but there are two caveats to this: one is that we should be shooting in RAW format anyway, so we can adjust this when image editing, and two, generally you'll only be checking the rear screen when setting up a composition. This would involve checking things like aperture, shutter speed and ISO, as well as monitoring the histogram to avoid dark clipping on the graph. Plus, you can just turn it off again if you truly want to check the color or brightness of the image. Nikon Z8: Performance The Z8 is an absolute home run for Nikon in just about every department. The 45.7MP files it produces are stunning, dripping with detail to use straight out of camera and packed with plenty of data if you prefer doing post-production. The RAW files in particular reveal just how clean the images are, coming off the new sensor; even when you abuse the ISO, you're still getting beautiful images. The 120fps continuous shooting is hilarious to the point of Schwarzenegger-like overkill. I can't fault it, but there's no reality in which I'm ever going to use it; the 11MP JPEGs are absolutely fine, but I'm not using a 45.7MP camera to take low-res photos! I'm also not going to sit flicking through thousands more images looking for another 100 versions of the decisive moment – the 20fps RAW shooting is more than enough. However, the slightly lower resolution, super-fast burst speeds are honed for specific photographic disciplines. This includes action photojournalism and sports journalism where the camera would be rigged up to the internet to download a constant stream of images to a team of editors. These editors are then ready to make the perfect selection to publish online or in print, where every second counts when it comes to reader traffic and print deadlines. Where things get a little bit tricky is with the autofocus. Now, compared to just about any other camera, the Z8's AF is phenomenal. It finds, follows and focuses on subjects with spooky degrees of accuracy... 98% of the time. When I took this out to shoot wildlife, there were occasions where it faltered – and any other camera would have faltered on

those same occasions. Except for the Canon EOS R5. (Image credit: James Artaius) I have yet to point the R5 at a single animal, whether the AF has an algorithm for it or not, that it hasn't been able to focus on. That was not the case with the Z8, which struggled to find focus on some wild animals – and also completely failed to find a couple who were slightly obscured by foliage (in a way that the Canon doesn't struggle). It was also less than true for me when photographing sports, as the AF is slightly twitchy and apt to jump from player to player rather than sticking on the subject you want it to. Still, we really are comparing LeBron James to Michael Jordan here – coming second is more a reflection of how good the GOAT is, rather than a failing on the part of the Z8. The tables are turned when it comes to video, an area where the R5 has a few caveats. That's not the case with the Nikon Z8; capable of 8- or 10-bit H.265, 10-bit Apple ProRes 4:2:2 HQ and 12-bit in-camera ProRes RAW HQ, video here is of the finest quality at all resolutions (unlike the uninspiring standard 4K of the Canon). You can also capture 120 minutes of 4K 60p footage, or 90 minutes of 8K 30p – again, a far cry from the limitations of the R5. The same AF limitations apply to video shooting, and again the lack of an articulating screen is a big misfire, but otherwise this is as much a monster when it comes to videography as it is to stills. (Image credit: James Artaius) In low light photography we are all aware of just how much camera autofocus systems struggle. As soon as twilight comes around, or when shooting in a dimly lit church or other low light venue, we boost up the ISO, slow the shutter speed and whack open the aperture just to have the autofocus hunt, whirring back and forth before giving up. While mirrorless cameras on the whole are improving their low light AF, with some cameras dropping down to -6.5EV, the Z8 walks away with the prize offering a -9EV autofocus detection lower limit. To utilize this though, we have to turn on Starlight view (photo Lv) in d9 of the custom shooting menu. Once engaged it works both on the rear LCD screen and in the electronic viewfinder and it appears to ramp up the brightness of the screen to aid with composition in dark scenes as well. Image 1 of 3 (Image credit: Jase Parnell-Brookes) (Image credit: Jase Parnell-Brookes) (Image credit: Jase Parnell-Brookes) Should you buy the Nikon Z8? Do you want flagship level performance without flagship price or bulk? Do you want Nikon's finest ever camera technology? Do you need high-res 45MP stills or 8K video? Then the Nikon Z8 is an absolutely fantastic option. Is it the best option, though? For my money, I would actually recommend the Canon EOS R5 unless you genuinely need 120fps stills, 8K 60p video or the ability to shoot more than 20 minutes of 8K in one go. The Z8 is a technological marvel and an unprecedented powerhouse. Were it not for a couple of gripes – namely the twitchy autofocus and the non-articulating screen – it might be the best camera I've ever used. It's cheaper than rival flagships and outpunches them in almost every category; you won't find this much power at this price anywhere else. However, beginners and even most intermediates probably won't be able to take full advantage of this camera. Sure, if they have deep pockets this camera will last them for years to come and is a worthy purchase. But there will be so many features and settings paid for and not used by beginners or intermediate photographers that a cheaper alternative will yield results that are just as good. (Image credit: James Artaius) If this isn't for you The direct rival to the Z8 is the Canon EOS R5, which offers very similar specs – 45MP resolution, 20fps RAW + JPEG burst shooting, 8K 30p video – and combines them with the best autofocus system in the business. While the Z8 is its successor, there's still plenty to love about the Nikon D850. It's a DSLR rather than mirrorless, but boasts the same full-frame 45.7MP resolution along with fantastic ISO performance at a lower price. If you're interested in the affordability and advantages of APS-C, the Canon EOS 90D is a great option. Its 32.5MP sensor is still packed with pixels, it's pretty speedy at 10fps, and its 1.6x crop factor increases the effective focal length of your lenses – perfect for gaining extra reach when shooting things like wildlife!

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**URL:** <https://www.techspot.com/news/99980-compactflash-association-doubles-transfer-speed-cfexpress-40-cards.html>

**Title:** CompactFlash doubles transfer speed with CFexpress 4.0 cards

**Text:** In context: CompactFlash Association (CFA) created the CFexpress standard in 2016 to leverage the PCI Express interface and NVM Express protocol for removable storage in the professional imaging industry. A recently announced upgrade to the technology pushes CFexpress card performance to SSD-class levels. CFA has just introduced the CFexpress 4.0 standard, with new logical and physical specifications designed to greatly increase the theoretical performance of existing CFexpress 2.0

cards. CFexpress 4.0 removable media will retain backward compatibility with existing devices so that customers can preserve their earlier investments in the CFexpress ecosystem. CFexpress 2.0 adopted PCIe Gen3 to reach a top full-duplex speed of 4 gigabytes per second. CFexpress 4.0 can "theoretically" double such performance thanks to the PCIe Gen4 interface, with a top throughput performance of 8 GB/s. CFA says that CFexpress 2.0 cards will still be available for purchase, providing enough "flexibility" in user choice when it comes to performance, power and size requirements - and money. CFexpress 4.0 cards will also retain the same form factors adopted for the previous generation, with three different card types (Type A, Type B, Type C) featuring different sizes, number of PCIe Gen4 lanes supported, and speed & power requirements. Type A cards will offer a data throughput of 2 GB/s, while Type-C cards will go up 8GB/s by exploiting 4 PCIe Gen4 lanes. As usual, smaller cards can fit in larger card sockets with an adapter. According to co-chairman of the CFA board Hiroshi Noda, the higher performance of CFexpress 4.0 removable media storage will support "current and future" needs of photographers, videographers and cinematographers. Professionals have standards, and they will now have access to higher resolutions, faster frame rates and richer color depths thanks to the faster PCIe Gen4 interface. The three form factors offered by CFexpress 4.0 retain a "consistent" electrical, logical, and physical interface, CFA board member Hiroshi Machida remarked. Professionals can easily adapt the new standard in their devices, while host manufacturers can "significantly" reduce the development cycle. CFexpress 4.0 specifications are available for CFA members only, with Canon, Sony, Nikon, Lexar, and other big corporations already on board. The CFA is also preparing a new VPG (Video Performance Guarantee) specification for higher sustained video recording applications, but such technology will be released at a later date.

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**URL:** <https://www.amazon.de/-/en/Backpack-Waterproof-Professional-Compartment-Compatible-Black/dp/B0BN5VZYT4>

**Title:** Amazon.de

**Text:**

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**URL:** <https://ask.metafilter.com/375014/I-would-like-to-re-purpose-a-dSLR-camera-into-a-very-basic-photo-booth>

**Title:** I would like to re-purpose a dSLR camera into a very basic photo booth

**Text:** (While it would be ideal to show the subject their just-taken photos—like in a four-up grid on a dirt-cheap generic tablet—this might be getting too ahead of myself) (The Canon does seem to have a self-timer option that, when the shutter button is pressed, counts down ten seconds and then takes 2 photos, in quick succession (maybe a-half second between the two photos), but not a way to modify that to something like "take 4 photos over 20 seconds".) (All of the various photo booth iOS apps that I've seen seem to all have monthly subscriptions and seem aimed at people making money by renting photo booths for events—me, I just want to do this as a fun thing for others) \* if I am able to get a working setup completed, it would be nice if there was a simple drag-and-drop app/script I could use that would make these "strips" automatically from selected images. The photos would of course be saved to the camera's SD card. I would later assemble\* the photos into a vertical "strip", and when I had enough "strips", I would walk the files to the photo shop and have them printed up (fitting two 2" X 6" strips on a 4" X 6" print, which I would then scissor in half) Now a simple cord with a button is easy if you just want to take a single photo, one per button-press... I was wondering if there was perhaps a little box or something that could sit between the cord and the camera (or a fancy "extra options" cord) that would tell the camera "when the button on the cord is clicked, take [4] photos, taking 1 photo every [5] seconds" I have an old Canon Rebel T1i dSLR (which I would prefer to use. (I also have a Nikon d3300 (which I could use, but still get use out of and would rather use as my backup "walk around" camera) Also, if there is a free or simple "buy once" app that would work with a cheap \$50 Android tablet (that I would hook my dSLR to)—where the user has a photo booth interface (shows the countdown and resulting shots)—I'd be delighted with that as well. I do also have an old Intel MacBook Air that I would be happy to throw at the project if there is some simple, cheap/free way to have the Mac send the instructions between a USB corded button and the camera. Ideas?

**URL:** <https://nikonrumors.com/2023/08/31/new-10-off-on-almost-all-nikkor-lenses-in-germany-nikon-z-and-f-mount.aspx/>

**Title:** New: 10% off on almost all Nikkor lenses in Germany (Nikon Z and F mount)

**Text:** Nikon started a new discount offer in Germany: 10% off on almost all Nikkor lenses (Nikon Z and F mount). This offer is valid from August 31 until September 18 (PayPal 0% financing applies). Update: Nikon Germany made a mistake and the Nikon Nikkor Z 180-600mm f/5.6-6.3 VR lens is not on sale as previously reported. Check also the Nikon combo discount in Germany: The latest Nikon US rebates can be found here:

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**URL:**

<https://petapixel.com/2023/08/30/the-paul-c-buff-celestial-delivers-a-new-level-of-creative-freedom/>

**Title:** The Paul C. Buff 'Celestial' Delivers a New Level of Creative Freedom

**Text:** The heavily anticipated Paul C. Buff Celestial Light has given photographers who shoot on location and on the move a compact, reliable, and affordable lighting solution for their work. Most photographers who have been in the industry for a while are familiar with the Paul C. Buff line of lights. For years, they have been a staple for budget-friendly beginners and professionals alike with the Alien Bee and Einstein systems being found in the gear closet of almost any creative you meet. While the company has made portable power packs (Vagabond Mini), and even the Link with optional battery usage to help users take their kits on the road, it wasn't until the launch of the Celestial that the brand offered something fully battery-powered that is truly competitive in both the power, portability, and price. What Does The Celestial Bring To The Table? Paul C. Buff has been steadily adding to its light offerings with Digi-Bee and optionally-battery-powered Link systems, but now with the 500-watt second Celestial strobe the company has added its first fully battery-powered light that can put out more light than a Godox AD600Pro while coming in about two pounds lighter than both the aforementioned AD600Pro and the Elinchrom FIVE. This may not sound like much, but when you start adding multiple lights to your kits, every single ounce saved can make a huge difference. The Celestial is an incredibly diverse entry to the Paul C. Buff lineup currently available for creatives looking for powerful tools with a very consumer-friendly budget. The light can be used on location with about 200 full power flashes (this quantity will vary with modeling lamp use), available from a fully charged battery, (additional batteries are available for just \$119.95) or in the studio on the same battery power and even plugged in to charge while in use. The portable light also offers 12-stops of power variability giving users an extreme amount of flexibility when adjusting their settings to blend well with the ambient and low-lit situations. While Buff lists the Celestial's full power recycle at 1.5 seconds for the sake of consistency, in my testing it proved to be much faster on a full battery and can even hit around 0.8 seconds. Regardless of the location the light is being used, the Celestial offers users access to high-speed sync, TTL, action, or color mode that offers incredible color consistency between shots. What's even more interesting is the action mode available on the Celestial which gives users the ability to compress the flash into a shorter duration, making it easier to stop/freeze motion without experiencing motion blurs that can happen when capturing action using strobes. The Celestial is also significantly more affordable than many of its competitors, making it an ideal solution for photographers who are frequently on the move. Especially if you need multiple lights for your setups. Creatives can get up to four Celestial lights for about the cost of a single Profoto B10X Plus, freeing up their wallets to capture much more dynamic lighting scenarios. In addition to all the above features, Paul C. Buff offers its customers a level of support that many other manufacturers can only dream of, even going so far as inviting locals to quite literally pop by and visit their showroom and see them in person. The Paul C. Buff Celestial: Compact & Durable The Celestial may feel like it has a familiar body design to some of the other lights in its family when looking at it from the front. As you'll notice, the new system uses an LED modeling lamp system to keep it from getting too hot while in use (should you leave the modeling lights on), and to make it easier to get creative by adding or removing the magnetic creative color control gels and diffusion domes. Something else noticeable on this light is the addition of a large handle located on the back side of the device. This grip/handle will make it much easier for users to make precise adjustments to their light positioning. Users may also notice that the celestial still supports every one of the triggers previously used by Paul C. Buff (including some Pocket Wizards) and also has the sensor along the top to operate

as a slave unit without any issues. Both sides of the light have a latch for quick release of the speed ring for light modifier attachments like softboxes and optical snoots, and users will also find an LED screen with a large dial with several buttons for system setting changes, navigation, and power control. While users can control and adjust everything they'd need from this interface, taking advantage of the new HUB and Buff Mobile App for iPhone and Android devices will give them much faster, easier, and frankly, more creative control over the system. Creative Colors Made Easy Paul C. Buff has taken the quick gel application game a step further with its magnetic color gel dome system. The Gel Domes, designed to work on both the Link and Celestial lights, give creatives the ability to very quickly and easily add a touch of color (or even color correction) to their lighting setups. In only seconds, users can quickly add or swap out the rubber color gel domes thanks to the tiny magnetic pins that snap right onto the face plates of the Link and Celestial lights. They are designed in such a way that they can be used with any Paul C Buff reflector, softbox, PLM umbrella, stripbox, beauty dish, or octabox without being in the way or obstructed by the modifier. The \$64.95 Color Gel Dome kit comes with a one-year warranty and eight gels including Yellow, Orange, Magenta, Blue, Teal, Green, Purple, and Red. The \$24.95 Color Correcting Gel Domes come with the same one-year warranty and includes a Full CTO gel as well as a Full Plus Green gel. The Buff HUB And Mobile App Brings It All Together There is no shortage of triggers available to work with Paul C. Buff lighting solutions, however, the HUB gives users something a little different that allows for a little more creative freedom. The hub features a hot-shoe mount on top of the remote that gives users the ability to connect their speed lights to be used in tandem with the Celestial light system, also giving full TTL high-speed sync functionality. The Hub itself gives users access to some limited settings it can change including enabling/disabling of Bluetooth for Smartphone connectivity, Center Pin Triggering, the screen brightness of the hub (lower to save battery life), enabling TTL or Manual flash modes, and setting the frequency and channel for the Hub from 1 to 16 respectively. Why so many of each? It might be a tad bit of overkill, but through the Paul C. Buff Celestial system, you could theoretically have 16 photographers, each with up to 16 lights, all shooting simultaneously with HUB's and apps without interfering with any other photographers setup. Currently, the HUB system natively supports Canon and Nikon, with Sony and Fujifilm support anticipated to arrive this coming fall 2023. To access the full range of settings and details available through the Celestial light, you'll need to take advantage of the Buff mobile app (Available on Android and iPhone devices) where users can access every single detail of the light ranging from the settings and intensity of the modeling lamp, shoot modes (Action/TTL/HSS), enabling/disabling the slave cell, setting up light configurations, and even accessing the full library of support videos and product details through the Paul C. Buff website direct links built into the app. Diving into the "Setups" a little further, using this mode within the Buff app, creatives can label and pre-program their light setups for fast and easy changes. For instance, as a headshot photographer, once you've positioned your lights and got the right power levels for each one, through the Setups section of the app you can save the lights power settings so that the next time you use them you can easily just re-load that setup and be ready to go in an instant. Basically, if you have a collection of lights, you can have them clearly labeled physically and within the app so you can easily load pre-set levels for each light based on your goto looks, making it an incredibly steam-lined workflow, saving you a ton of time on set. Why Is This A Big Deal? As mentioned above, the Celestial system from Paul C. Buff offers users a fully portable and incredibly powerful 500W light system at a significantly lower cost and lower weight than its competition. For about the price of a single Profoto B10x Plus, Paul C. Buff users can get four battery-powered lights to create some incredible and complex images. Throw in the added bonus of an incredibly fast color correction and creative color gel system and you've got yourself something incredibly special for beginners and working pros alike. For photographers who like to add creative colors to their work, the new magnetic color domes from Paul C. Buff just make things incredibly fast and easy to deal with both on set, and especially on location. Using traditional gel sheets with gaff tape or adapters which get in the way of additional modifiers can get very very messy and even frustratingly slow sometimes to deal with, especially when the other lights get too hot and makes the tape fall off, or even worse, melts the gels directly. Not only would this ruin the pace of your shoot, it could even bring it to a crashing halt if you happen to actually destroy the color gels you needed to get the right look and vibe of the project. Plus you'd be left with a ton of sticky residue over all of your modifiers and light. Leveraging the

magnetic gel system will allow users to quickly change the colors on the lights as well as changing or adjusting the modifiers without having to completely untape and retape up the gels to a new setup. During our usage of these lights, we were able to swap out the colors (and modifiers) in just a few seconds as we didn't have to struggle with physical light domes that some other light brands have. Below are a few other photos I shot using the Celestial: Where Can You Find Them? The \$649 Celestial Light and Accessories are available now from the official Paul C. Buff store as well as Amazon, Pixel Connection stores, and other third-party retail spaces coming soon. The Light includes a magnetic diffusion dome, the shipping cover, the battery, charger, and flash tube/light itself. In addition to each unit coming with a 2-year factory warranty and a 30-day Absolute Satisfaction Guarantee, the company says that thanks to the growing success of the Celestial and substantial customer feedback, it will provide free shipping on orders of \$200 or more. Welcome to a PetaPixel Showcase, in which our staff gives you a hands-on with unique and interesting products from across the photography landscape. The Showcase format affords manufacturers the opportunity to sponsor hands-on time with their products and our staff, and it lets them highlight what features they think are worth noting, but the opinions expressed from PetaPixel staff are genuine. Showcases should not be considered an endorsement by PetaPixel.

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**URL:** <https://photographylife.com/how-to-photograph-moon>

**Title:** How to Photograph the Moon and Supermoon: The Complete Guide

**Text:** Current Moon Age: 15.7 Days Current Moon Phase: Full Moon Current Moon Distance: 364858 km Next Full Moon: Sep 29, 2023 at 9:58 AM GMT Photographing the Moon is one of the great joys of modern photography. Sometimes, you might want to capture the Moon when it is full and beautiful, while other times you might want to capture an interesting event like a supermoon or Lunar Eclipse. Either way, the process of photographing the Moon starts with your choice of camera gear – although shooting technique and post-processing are just as important. In this article, we explain everything you need to know about Moon photography, from start to finish. Waning Gibbous Moon Moon Photography Challenges If you have previously attempted to capture the Moon and it came out very small or looked like a white blob, don't be frustrated. Many photographers go through similar pains the first time they try it out. Moon photography can be difficult and frustrating, which is why we wrote this guide for you. Despite all the challenges, photographing the Moon is a great learning experience, especially if you are willing to experiment a little. You will learn all sorts of techniques along the way: reducing camera shake in low-light conditions, dealing with wind and atmospheric distortion, manually setting your camera, and even incorporating the moon into photos alongside additional subjects! Moon photography is exciting, because you can do it in so many different ways. You can take a picture of the Moon by itself with a telephoto lens and capture its details, including its dramatic craters. You can take landscape photos where the moon is a small, but important element. You can even create a composite image, combining a previously captured image of the Moon with a cool-looking subject, as can be seen in the example below: This image of a vampire drinking blood during the Full Moon is a composite – the Moon was added to the image to create drama. Moon Phases Explained Before we talk about how you can photograph the Moon, it is important to understand the basics of Moon phases. As you already know, the Moon goes through different phases throughout the month. When the Moon is between the Earth and Sun, we get a "New Moon" because no sunlight falls on the side of the moon facing us. When the opposite is true – the Earth is between the Moon and Sun – the side of the moon facing us is lit up, and we get a Full Moon. This cycle repeats itself every 29.53 days, which is called its "synodic period." Here is a diagram of different Moon phases: Moon Phases As the New Moon grows illuminated, it passes through a Crescent, then a Quarter, followed by Gibbous stage. Lastly, it reaches the Full Moon, and then the shadow starts creeping in on the other side. The cycle repeats in reverse – Gibbous, Quarter, Crescent – until we get a New Moon again. The Moon is "Waxing" when it is growing more illuminated and "Waning" when it is growing less illuminated. A Waxing and Waning Crescent have the same shape, but they appear on opposite sides of the Moon. It is important to point out that your location while observing the Moon from Earth is very important. The diagram above is for the Northern Hemisphere, where the moon Waxes on the right and Wanes on the left. The reverse is true in the Southern Hemisphere due to the moon appearing "upside down" by comparison. Once you understand

these basics, it will be very easy for you to tell how soon a Full Moon is to be expected! For example, if I'm in the Northern Hemisphere, and I see a Crescent Moon illuminated on the right, I know that I'm about 10 days away from the Full Moon. But if I see a Crescent Moon illuminated on the left, it will be about two and a half weeks before the next Full Moon. Of course, that's just a quick way to get an estimate. You can always use excellent apps to not only calculate the exact Moon phase on a given day, but also determine its position in the sky at different times of the day in your location! We will go through the most useful apps that I personally use further down in this article. Here are some other useful points of information about how the Moon looks at different times: The Moon is tidally locked to Earth, meaning that we only ever see one side of the moon, no matter the time of day, time of year, or your location on Earth. The distance from Earth to Moon varies throughout the year. When the Moon is closest to Earth, it is often referred to as the "Supermoon". When the moon is is the furthest away from the Earth, it is referred to as "Micromoon". More on the Supermoon below. If there is more than one Full Moon in a month, it is referred to as the "Blue Moon". When the Sun, Earth and Moon line up, an eclipse occurs. It's a Solar Eclipse when the Moon is blocking out the Sun (this is the more famous type of eclipse), while it's a Lunar Eclipse when the Earth's shadow falls on the Moon. The Moon during a Lunar Eclipse is often referred to as the "Blood Moon" due to its red appearance. In the Northern Hemisphere, the Moon's illumination moves from right to left. In the Southern Hemisphere, the illumination moves from left to right. If you stand in the equator, the illumination will vary depending on the time of the day, as explained here. If you want to find out the current moon phase, take a look at this page, courtesy of TimeandDate.com, where you can find out what phase the moon is currently in. You can also calculate what it will be by picking the date from the bottom of the page. Other apps can do this as well, which we will go over later in this article. What is a Supermoon? A Supermoon is a name given to a somewhat rare event – when the Full Moon is physically near its closest point to our planet. The term "Supermoon" can also refer to the New Moon as well, although that is not as common to see in popular media. As the Moon rotates in its elliptical orbit around Earth, there are two points that astronomers marked with names. "Lunar Perigee," which is the the point of the closest distance of the Moon to our planet at 363,104 kilometers, and "Lunar Apogee", which is the point of the farthest distance of the Moon from our planet at 405,696 kilometers. So, when Lunar Perigee coincides with the Full Moon (which normally happens several times a year), the "Supermoon" is born. It can appear up to 14% larger in diameter than a Full Moon at the Lunar Apogee, as well as having a 30% brighter illuminance. NASA's illustration below demonstrates the appearance of a Supermoon: Supermoon vs Micromoon Illustration by NASA, Public Domain Although the Supermoon can be seen several times a year, only one of those is usually the most "super" – in other words, the largest and closest of them all. What is a Lunar Eclipse? A Lunar Eclipse occurs when the Sun, the Earth and the Moon are closely aligned and the Moon falls into the Earth's shadow. A Lunar Eclipse can only take place at night, and only when the Moon is Full. It can occur between two and five times a year across the world, so it is considered to be a somewhat rare astronomical event. Total Lunar Eclipse Due to sunlight passing through the Earth's atmosphere and reaching the Moon, the Lunar Eclipse generally has a red or copper color. The amount of redness depends on the amount of dust and clouds in the Earth's atmosphere. More atmospheric particles means a darker shade of red for the moon. Because of this reddish color, many refer to Lunar Eclipses as the "Blood Moon" or "Blood-Red Moon." You can read our full article on photographing the lunar eclipse here. Full Moon Names The Full Moon has different names depending on the month, given by Native Americans (some sources indicate the Full Moon names also originating from Anglo-Saxon and Germanic roots). Below are the names of the Full Moon by month, taken from this source: January: Wolf Moon February: Snow Moon March: Worm Moon April: Pink Moon May: Flower Moon June: Strawberry Moon July: Buck Moon August: Sturgeon Moon September: Harvest or Corn Moon October: Harvest or Hunter's Moon November: Beaver Moon December: Cold Moon Pop science media often goes crazy with these names. For example, the Full Moon that occurred on January 20th, 2019 was dubbed "Super Wolf Blood Moon." The word "super" indicated the Moon's proximity to Earth, as explained above. The word "wolf" simply indicated the month of January. And finally, the word "blood" described the Lunar Eclipse. Now how would you describe a click-bait title for a Lunar Eclipse that takes place in December? It would be a "Cold Blood Moon". If the Moon is closer to the Earth, add the word "Super" in front to make it sound even more



dramatic! Unfortunately, such crazy titles are now common to see in science media... Moon Photography Basics

Now that we have gone through the Moon Phases and the different names of the Moon, it is time to take a look at some of the basics of how to photograph the Moon. Below is a quick summary of all the important points:

**Decide on Close-up vs with Foreground** – First of all, you should decide whether you want to photograph a close-up of the Moon with all of its details, or perhaps just include it as a smaller part of your overall composition. The latter is relatively easy and does not require any special equipment. However, photographing close-ups of the Moon requires more advanced gear and camera technique. We cover all that later in this article.

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**Consider Moon Phases** – You will need to decide which phase of the Moon you want to capture. The Moon looks very different across its phases, casting deeper shadows on the surface and making different parts of the Moon appear more prominent. A full Moon is quite popular among photographers, but as I demonstrate further down in this article, it is not always an ideal phase to photograph due to its “flat” appearance.

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**Plan** – Without a doubt, planning is one of the most important steps in moon photography. If you plan it all right, you will end up with stunning images of the Moon. Proper planning is especially important for rare lunar events, because you do not want to miss the opportunity! Things like moon phases, weather conditions, location of the moon relative to your subject, camera gear, and camera settings are all important. You should take the time to assess each variable beforehand.

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**Assess Camera Gear** – You will need carefully assess your camera gear and see what type of moon photography you can do with it. Camera gear is important for moon photography, which is why we will cover it extensively in this article.

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**Choose Proper Camera Settings** – It is important to know which camera settings work best for moon photography, especially when using long super telephoto lenses and telescopes. Long shutter speeds and camera shake can be huge sources of problems, making the Moon and its details appear blurry.

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**Take Time to Post-Process** – The Moon might appear very flat without any post-processing, especially when shooting in RAW format, so basic post-processing is often needed. To be able to showcase all the details of the Moon and make it look sharp, you might need to use different blending, stacking and sharpening techniques in post-processing as well.

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**Be Careful When Doing Composites** – If you decide to give an image some artistic freedom and create a composite image from completely different sets of images, try to avoid making your images look fake. If you shot a landscape with a wide-angle lens and copy-pasted a huge version of the Moon, it will look very fake and unrealistic. The same goes for the shadows. The dark side of the Moon should always match the brightness and the color of the sky, in both daylight and night-time conditions. So if you copy-paste the image of the Moon with its shadow looking black into a blue sky, it will obviously look fake. Let's go through each of the above in more detail. How to

**Photograph the Moon (with foreground)** If you want to take a picture of the Moon with foreground as part of your composition, you can do that very easily without any special equipment in daylight conditions. In fact, you can even capture such images even with a smartphone! Capturing the Moon in Daylight Conditions Capturing the Moon in broad daylight is easy, because both the Moon and the surrounding environment are equally bright, so you can capture the two in a single exposure. No special settings are needed either – just shoot in any mode hand-held, and you should have great results! When capturing the above image of the moonrise at Death Valley National Park, I had to zoom in on the Moon and adjust my composition to make it appear larger. It is important to point out that when using wide-angle lenses, the Moon will appear tiny in the frame. If you want to make the Moon appear larger, you will need to use the lens' optical zoom. However, this will also affect the rest of the frame, since everything else will also get bigger. In such situations, you might need to find a different composition to make it work, as I have done with the image above. While some photographers resort to copy-pasting a larger version of the moon to their wide-angle shots, I recommend against such practices. That's because such shots often end up looking fake and unnatural. Capturing the Moon in Low-Light Conditions What about photographing the Moon in low-light conditions? That's when things get a bit more challenging. The main reason is differences in exposure. The Moon gets quite bright, especially when it is full, while the rest of the scene is too dark. If you expose for the Moon, you will be able to see all the features of it, but the landscape will look too dark. If you expose for the foreground, the landscape will appear too dark and the Moon will be very overexposed. The solution is to take two or more images, exposing separately for the Moon and the foreground, then merge the two in post-processing, as I have done in the image below: To make this photograph, I exposed differently for the Moon and the foreground, then used Photoshop to merge the two together into a single image. Sony A7R II + 70-200mm f/4G OSS @ 200mm, ISO 800, 0.6 sec, f/8 If your goal is to capture the Moon with the night sky, things could get a bit more challenging, since the exposure time for the sky is vastly different compared to the Moon. If the Moon is not full and appears relatively small in size compared to the rest of the landscape (when using an ultra-wide angle lens), you could end up getting a shot like this: However, attempting to shoot and then blend such images can be quite difficult in post, since the Moon can do all sorts of damage to your photograph – from visible signs of ghosting and flare, to huge parts of the sky appearing too bright. If the Moon is full or near full, you might not even be able to capture most of the stars, especially if there is dust, moisture, or other particles in the atmosphere.

**Photographing Close-Up of the Moon** Taking a detailed close-up picture of the Moon can be difficult, depending on how big you want it to appear and how much detail you want to showcase. An extreme close-up of the Moon requires a long super telephoto lens, or a telescope attached to a high-resolution digital camera, as discussed below. In addition, you will need to do proper weather and location planning for photographing a close-up of the moon. Your best option might be to get out of town and travel to a remote location with very little light and air pollution, preferably at a higher elevation. Weather planning is especially very important, as discussed in the next section. You do not want to deal with atmospheric haze due to dust, smoke and moisture in the air, and you certainly do not want to deal with any heat waves either. These things destroy the structure of the moon, making it very difficult to preserve any details. Basically, the less the distance and substance between you and the Moon, the better the results. In this article and further steps, we will mostly focus on photographing the Moon close-up.

**Moon Phase Considerations** While most photographers strive to capture the Moon when it is full, keep in mind that when the Moon is fully illuminated by the Sun from our perspective, its surface features disappear due to lack of shadows. This results in the Moon looking very "flat", as you have probably seen in many pictures like this before: Full Moon often looks flat due to even front illumination by the Sun NIKON D7000 + 400mm f/2.8 + 1.7x @ 680mm, ISO 100, 1/400, f/4.8 If you have never photographed the Moon before, I would certainly suggest to take a picture of it when it is full. You will learn quite a bit in the process and you will have a picture of the Full Moon that you can reuse in other images. However, once you capture the Full Moon, I would recommend to try shooting it during other phases. You will see just much difference there is in surface-level detail between different phases and you will notice things you might have never seen before. Craters and mountains of the Moon appear differently during different phases, making the images look more interesting. Once you pick the Moon phase, the next step is to properly plan the shot.

**How to Plan for Photographing the Moon Proper**

planning is very important if you want to end up with a beautiful image of the Moon. If there is a rare event, such as a Supermoon, a Lunar Eclipse, or a combination of different lunar events, you might need to take a bit more time to organize and plan. As we explain in the article, the process of photographing a Lunar Eclipse is very different, requiring a lot more technical skill to obtain a solid image, which is why proper planning and prior testing are necessary. An ultra-rare event such as a Solar Eclipse is even more demanding, and if you are not careful, you could end up damaging your camera gear and even your own eyesight! Check Weather Forecasts It goes without saying that you should be watching weather forecasts to make sure that the part of the sky where the Moon will appear is going to be clear. While photographing the Moon with some clouds could be fun when doing a wide-angle shot, you certainly do not want to deal with heavy clouds, haze or moisture in the atmosphere when shooting extreme close-ups. High levels of haze and moisture in the atmosphere can be particularly damaging, as they can blur the details of the moon and make it appear blurry. Also, if you live in a large city, air pollution can be a big problem, especially on hot summer days. Heat waves are a definite problem when shooting at long focal lengths, as can be seen from the image crops below: Both of these images of the Moon's surface were captured on a hot summer day. One can clearly see the damaging effects of heat waves on the left image. The heat waves not only diminished the details of the lunar surface, but also changed the relative size and shapes of the craters. I personally find colder nights to be ideal for close-up moon photography for this reason. However, cold temperatures make it difficult to stand for prolonged periods of time outside and drain camera batteries faster. Use Apps and Websites for Planning Take advantage of useful apps and websites to figure out when the targeted Moon phase occurs, when the Moon rises and sets and where you can photograph it from. Some apps even have a "Night Augmented Reality Mode" that overlay the moon on your landscape / subject to calculate the precise time and location. Here are some useful online resources I personally use for moon photography: TimeAndDate.com Moon Phases – a great resource to find the current moon phase, as well as other upcoming lunar events. Dark Sky Finder – I use the Dark Sky Finder map to find the best spots in my area with the least amount of air pollution. When it comes to apps, there are many to choose from, but these are the two I personally recommend over others: The Photographer's Ephemeris 3D – a solid app that shows a lot of useful information for moon photography. The 3D view is very helpful for planning. Photo Pills – my personal favorite. I use Photo Pills all the time to look up Moon phases. I am particularly a big fan of the Augmented Reality (AR) mode. On location, make sure to use apps similar to the above to figure out exactly where the Moon will appear relative to your foreground / subject if you are planning to incorporate it to your images to improve your composition. Screenshots of the Photo Pills app for iOS, showing Moon Phases and Augmented Reality The Augmented Reality feature on the Photo Pills app, in particular, is very useful for proper planning. You can stand in the exact location where you want to take a photo, then move the timer to the date and time the Moon will be in the phase you want, and it will show you how the Moon will move relative to the landscape you see through your device's camera. Work on Composition If your plan is to photograph the Moon with an interesting foreground or a subject in the scene, then you must pay close attention to your composition. The type of composition you use will depend on the size of the Moon relative to the foreground. When shooting a scene with a wide-angle lens, the Moon is going to take a very small portion of the scene. In such cases, the Moon is often going to take on the role of a filler element that adds something interesting to the image. Moon above the Artist's Palette, Death Valley NP iPhone XS Max @ 6mm, ISO 16, 1/1150, f/2.4 However, if you use a telephoto lens to make the Moon appear much larger, it will often become the primary or the secondary subject in the frame. In such cases, the Moon is the highlight and the rest of the scene is there to help show the essence and the beauty of the Moon. Prepare Camera Gear and Test Once you scout the location, find out exactly where the moon will rise and set, you can prepare your camera gear and test it out (the camera gear and all the camera settings are going to be covered next). Once you get it all ready to go, make sure to test the camera gear and the settings beforehand. Make sure to prepare all necessary camera gear – from cameras and lenses, to memory cards and chargers. If you are photographing just the Moon without any special lunar events, then you can test your setup any time, since you will have plenty of it. However, if you are anticipating an event like a Lunar Eclipse, you should prepare in advance and read this article in detail. Extremely rare events such as the Solar Eclipse require much more planning. See my article on How to

Photograph a Solar Eclipse for detailed information. Best Camera Equipment for Moon Photography

Not all cameras and lenses are ideal for all types of moon photography. If you have a smartphone or a basic digital camera with a wide-angle lens, you will be limited to photographing the Moon as part of your composition. Those equipped with compact cameras with high-power zoom lenses, interchangeable lens cameras with super telephoto lenses, or digital cameras mounted to advanced telescopes will be able to capture the Moon in its full glory, with a lot of close-up detail. Others might even take advantage of equatorial trackers that can automatically track the Moon across the sky, yielding maximum image quality while providing convenience in the field.

**Camera and Lens** There are many different types of cameras, lenses, telescopes and mounts available out there and we cannot go over them all. However, below is a list of basic camera gear that you will need to photograph a close-up of the Moon: An interchangeable lens camera with a 300mm+ telephoto lens (in full-frame / 35mm equivalent), or a point-and-shoot camera with a high-magnification optical zoom lens. A stable tripod. Remote camera release (optional). If you do not have one, a timer in your camera should also work. If you want to enlarge the moon and show the details of its surface, a high-quality telephoto lens with a focal length of 300mm+ is needed. The longer the lens, the better. If your lens can be coupled with teleconverters, I highly recommend adding one to increase the overall focal length. For example, a 1.4x teleconverter will increase the focal length of a 300mm lens by 40% or to 420mm total, while a 2.0x teleconverter will increase the focal length of the same lens to 600mm. The only thing to keep in mind, is that teleconverters negatively impact lens sharpness and decrease its maximum aperture. For example, if you mount a 1.4x teleconverter to the Nikon 300mm f/4 PF lens, it will essentially become a 420mm f/5.6 lens. Due to significant loss of sharpness when using 2.0x teleconverters, I recommend against their use for moon photography. Nikon's 800mm, 600mm and 500mm super telephoto lenses

Since super telephoto prime lenses are typically very costly, I would recommend to use good quality zoom lenses instead. Lens manufacturers like Sigma and Tamron offer zoom lenses in the 150-600mm range that are excellent candidates for photographing the moon. Nikon's 200-500mm f/5.6E VR is also a great choice, giving you plenty of reach at 500mm. Speaking of "reach", a smaller-sensor camera is often more preferable than a full-frame camera. This is due to smaller sensors having smaller pixels and lots of resolution, allowing for more magnification of the subject. For example, if you were to compare the Nikon D3500 to the Nikon D750, both have similar 24 MP resolution. However, the former is a DX camera with an APS-C sensor, while the latter is an FX camera with a full-frame sensor (see FX vs DX). This means that the D3500 is going to have a 1.5x more magnification and a much smaller pixel pitch, making the Moon appear larger in the frame. So in this particular case, the D3500 is going to be more preferable than the D750 to get a close-up of the Moon. Keep this in mind when evaluating cameras for moon photography. A cheaper, smaller sensor camera might be a better choice at the end of the day! If an interchangeable lens camera with a telephoto lens is out of your budget, consider getting a point-and-shoot camera with a high magnification zoom lens such as the Nikon P900. Thanks to its insane 24-2000mm full-frame equivalent lens, the Nikon P900 is one of the best cameras on the market for moon photography today. With its price tag of \$600, it gives expensive super telephoto lenses a run for its money! Now if you want the best setup for photographing the Moon, consider getting a high-quality telescope with a digital camera mount. While a basic telescope with a small digital camera might end up costing you less than a high quality telephoto lens on a DSLR or a mirrorless camera, an advanced telescope with an equatorial mount coupled with a properly cooled CCD sensor camera will cost a fortune. Dedicated astrophotographers who like taking pictures of deep sky objects use such gear and they can photograph extreme details of the lunar surface. Unless you know what you are doing, I would recommend against building a telescope rig, as it can get complex to set up and shoot.

**Tripod and Accessories** When using long focal length lenses, camera shake becomes a big problem. As long focal lengths go beyond 300mm, even a slight move can mess up and blur the picture. That's why if you are using a telephoto lens, a stable tripod is required to be able to produce a sharp image of the moon. If you shoot with a very long lens, you should totally read my advanced article on how to stabilize your tripod. Trust me, you will need every tool in your arsenal to make a blur-free image of the moon at focal lengths above 300mm, especially if you have a shaky tripod or unstable tripod head. In addition to the tripod, you will need a solid tripod head that makes it easy to readjust the camera position when the Moon moves. Keep in mind that the Moon moves a lot, especially at higher

magnifications, so you will be constantly adjusting your camera to keep the moon centered. Despite my typical recommendation to use a solid ball head, I recommend against using one for photographing the Moon. Instead, use a geared 3-way Pan-and-Tilt head, as it will be easier to adjust it to a precise position. The heavy-duty geared head I recommend is the Manfrotto 405, but if you are using a lightweight setup, the Manfrotto 410 is significantly cheaper. Manfrotto 405 Geared Head Having a remote camera trigger also helps reduce the camera shake. If you shoot with a DSLR, you can use the Mirror Lock Up (MLU) feature together with a remote camera trigger to reduce mirror vibrations.

**Equatorial Tracker** You don't really need an equatorial tracker for photographing the Moon, because it is bright enough to use fast shutter speeds and low camera ISO values. **Equatorial Tracker Still**, if you use long lenses and you do not want to deal with having to constantly adjust the tripod, an equatorial tracker can come quite handy. If you want to buy one for your astrophotography needs, I would recommend to go with the iOptron SkyGuider Pro. It is a very solid tracker that is easy to use. Once you align the unit with the North Star, the rest is a breeze!

**Best Camera Settings for Photographing the Moon** To photograph just the moon by itself, without any objects in the foreground, you will need a long telephoto lens like explained above to magnify the moon and try to fill as much of the frame as possible. With your telephoto lens mounted on your camera, secure the two on your tripod and point at the moon. When it comes to camera settings, including shutter speed, aperture and ISO, here is what I recommend for general use:

- Image Format** : If your camera can shoot in RAW image format, choose RAW instead of JPEG. This way, you do not have to worry about your camera settings affecting your images, including White Balance.
- Image Format** : If your camera can shoot in RAW image format, choose RAW instead of JPEG. This way, you do not have to worry about your camera settings affecting your images, including White Balance.
- Camera Mode** : Set your camera mode to full manual mode .
- ISO** : Set your ISO to your camera's base ISO, which is typically ISO 100 on most cameras . If you have a point and shoot camera, see if you can find a menu setting to set your ISO to 100. Make sure "Auto ISO" is turned Off.
- ISO** : Set your ISO to your camera's . If you have a point and shoot camera, see if you can find a menu setting to set your ISO to 100. Make sure "Auto ISO" is turned Off.
- Aperture** : Set your aperture to f/11 .
- Aperture** : Set your aperture to .
- Shutter Speed** : Set your shutter speed to 1/100 .
- Shutter Speed** : Set your shutter speed to .
- White Balance** : Set it to "Daylight", although it does not matter if you shoot in RAW – you will be able to change it in post-processing.
- White Balance** : Set it to "Daylight", although it does not matter if you shoot in RAW – you will be able to change it in post-processing.
- Lens Focus** : Use the rear LCD screen of your camera to zoom in and focus on the moon. Once focus is acquired and the Moon appears sharp, make sure to set your lens to manual focus to prevent your camera from refocusing.
- Lens Focus** : Use the rear LCD screen of your camera to zoom in and focus on the moon. Once focus is acquired and the Moon appears sharp, make sure to set your lens to to prevent your camera from refocusing.
- Image Stabilization** : Turn it off, since you are shooting from a tripod.
- Image Stabilization** : Turn it off, since you are shooting from a tripod.
- Camera Shake**: To reduce vibrations from the mirror mechanism on a DSLR, make sure to use Mirror Up mode. To reduce vibrations from the shutter mechanism (both DSLR and mirrorless cameras), make sure to turn Electronic Front Curtain Shutter on. The above aperture and shutter speeds are derived from the Looney 11 rule, which is not necessarily very accurate for moon photography, as I explain further down below. I recommend starting with the above settings and adjusting the shutter speed based on the brightness of the moon. If it is too bright, set your shutter speed to a faster value like 1/200. If it is too dim, set a longer shutter speed like 1/50 second. You can also use a wider aperture value to capture more light, such as f/8 or f/5.6, or increase the ISO to something like ISO 200 or 400. Remember, the moon moves pretty fast, so you definitely do not want to be photographing it with too long of a shutter speed, especially when using a telephoto lens. Conditions like a lunar eclipse (which is much darker than an ordinary moon) make this even more important if you don't want your photo to be too dark. Another thing I recommend is to bracket your shots. When taking pictures of the Moon, you might notice that some parts of the moon come out overexposed, while other parts are quite underexposed. To prevent such issues, you can bracket your shots full stop apart – I would recommend at least three exposures to be on the safe side. You can then use post-processing techniques like HDR to merge these images into a single one.

Sultanahmet (The Blue Mosque) with the Full Moon in the background. I had to bracket the shot to get the Moon to look good without blowing out the highlights. Fuji X-Pro2 + XF56mmF1.2 R APD @ 56mm, ISO 200, 1/8,

f/5.6 Modern DSLRs and mirrorless cameras come with a feature called “Electronic Front Curtain Shutter”, which can completely eliminate shutter shock. If you have this feature on your camera, make sure to enable it from the camera settings, as shown below: If you do not have a remote shutter release cable or device, set your camera to a timer. The idea is to eliminate camera shake caused by your hands and the mirror slap before the exposure. If you shoot with a telephoto lens longer than 300mm, it is best to enable Exposure Delay mode in combination with the timer. If you have a remote shutter release cable or device, then a timer is not necessary, but I would still turn Exposure Delay on to prevent mirror slap from potentially causing camera shake. Lastly, set your camera's metering mode to spot, keep the focus point on the Moon and watch your metering indicators. If you see over-exposure or under-exposure on the moon, adjust your camera settings accordingly.

How to Focus on the Moon If you are using a DSLR camera, it is best to use the “live view” feature to bring the image from the image sensor to the back LCD. Once in live view, the next step is to zoom in to the Moon as tight as possible, then use your camera's autofocus system to acquire focus. Most DSLR cameras will be able to autofocus on the moon this way. If autofocus does not work, try to put the focus point on the edge of the Moon and give it another shot. If your camera is still struggling, you might need to turn off autofocus and move the focus ring manually until the Moon looks sharp. It is important to point out that some DSLR cameras will show the Moon as a white blob in live view. If you see this problem, the first step is to adjust your shutter speed until you start seeing the features of the Moon. If adjusting the shutter speed does not do anything and you still see a white blob, it most likely means that your camera is boosting the exposure automatically. In such cases, you will need to check out your camera's manual in order to turn this auto boosting mode off. On Nikon DSLRs, it could be as simple as pressing the OK button. If you use a mirrorless or a point-and-shoot camera, you do not have to go into live view mode, because the camera is already mirroring what is on the image sensor to the rear LCD. Simply zoom in to the Moon with the LCD as much as possible, then use the camera's autofocus system to focus on the Moon, or its edges. Once the Moon looks sharp on your camera's LCD, make sure to turn autofocus off. You can do that either through a switch on the lens, a switch on the camera, or sometimes through a camera setting. You do not want your camera to try to re-focus each time you take a shot, which is why it is a good idea to turn it off completely.

Looney 11 and Exposure Issues What is the correct exposure for the Moon? Remember, the Moon is illuminated by the Sun and its brightness varies by a number of different factors, such as weather conditions (air cleanliness, mist, haze, etc), phase of the Moon and its location in the sky. If we assume that the sky is completely clear and the Moon is located high in the sky, we can use the basic “Looney 11” rule, which states that you can use the aperture of f/11, and shutter speed to the reciprocal value of ISO to get a good exposure of the Moon. For example, if you use ISO 100, the shutter speed would be roughly 1/100th of a second at f/11, while with ISO 200, it would be 1/200th of a second at the same aperture. While you can use this math as a baseline, it does not work well in practice. The reason for that are the two variables of exposure: aperture and shutter speed. The aperture of f/11 is diffraction-limited, which means that stopping down to such a small aperture is going to hurt the sharpness of your Moon photos, especially when using cameras with smaller sensors. The shutter speed of 1/100 at ISO 100 can also be too slow when using long super telephoto lenses, because of potential camera, tripod, wind and other vibrations that could make images look blurry. In some cases, you might need to push ISO to higher values to get acceptable shutter speeds for your setup. Alternatively, a better approach is to start with a larger aperture like f/5.6, which gets you started with a sharper image. This should triple the starting shutter speed as well (when compared to f/11), resulting in less potential for camera shake. Some configurations of telephoto lenses with teleconverters require stopping down to get acceptable sharpness, so you might need to shoot in the f/8-f/11 range anyway. However, if you are not using a teleconverter with a super telephoto lens, there is little reason to stop down beyond the maximum aperture. Keep all this in mind when photographing the Moon. Looney 11 might sound like a good starting point, but it does not really fit modern digital camera and lens standards...

How to Photograph the Supermoon As I have already pointed out, a Supermoon occurs when the Moon is new or full, and it is at its closest proximity to our planet. If the skies are clear and you are lucky to see the Supermoon, why not photograph it? The process of photographing the Supermoon is identical to photographing regular Moon. In fact, since the Moon is a bit larger and brighter than usual, it should be easier to

photograph. For the above photograph, I used the shutter speed of 1/250th of a second at ISO 200, which was fast enough to yield a reasonably sharp image of the Moon (there was no wind that day). I used the Nikon 500mm f/4G VR super telephoto lens with a 2x teleconverter, which resulted in a 1000mm f/8 setup. Since the lens sharpness suffered greatly due to use of a 2x teleconverter, I had to stop the lens down to f/13 to improve sharpness.

### How to Capture "Earthshine"

The dark side of the Moon that is dimly illuminated by the sunlight reflected from Earth is referred to as "earthshine". It can be photographed with your camera, provided that you expose for the shadow part of the Moon. This will severely over-expose the bright side of the moon, while showing the details of the dark side. However, if you are dealing with a very thin crescent moon, the dark side might become visible as you use a slow shutter speed, as can be seen from the image below: In most other cases, trying to bring out Earthshine will result in the other part of the Moon appearing very overexposed. Keep in mind that such slow shutter speeds are problematic to use due to Moon's constant movement, especially when using long lenses.

### Photographing the Moon with a Phone

It is certainly possible to photograph the Moon with a smartphone or a tablet that is equipped with a camera, but you need to be aware of the limitations. The biggest issues with using a smartphone or a tablet are precise focus and exposure control, as well as inability to zoom in tight enough to get a close-up shot of the Moon. Smartphones and tablets are typically designed with a single wide-angle lens, which is not particularly suitable for moon photography, as explained below.

### How to Photograph the Moon with Your iPhone

If you have an iPhone with a single camera, you will be limited to photographing the Moon as part of your composition. That's because iPhones with one camera are very wide in their field of view. Shooting during the day will be easy and the composition recommendations from this article will work. However, if you attempt to capture the Moon at night with that wide-angle lens, you will end up with a small white blob. That's because the camera will meter off your whole scene and the Moon is just way too small of a subject. In such cases, it might be best to skip trying to include the Moon in your shot. If your iPhone is equipped with a dual camera, such as the iPhone 7 Plus, iPhone 8 Plus, iPhone X, iPhone XS, etc., then you can use the telephoto lens to capture descent photos of the Moon. First, zoom in to the Moon as much as you can. You will see that the Moon will appear like a white blob. Next, touch the screen to focus on the Moon, then once the yellow box with a slider appears, slide down with your finger to reduce the Moon's brightness: Once zoomed in, pull the brightness slider down to properly expose the Moon. You should see the features of the Moon start to appear as you do that. Take a picture once the Moon looks good. Keep in mind that the Moon photo will look nothing like the pictures you see in this article. That's because even with a telephoto lens and high zoom ratio, you will end up with a Moon that looks quite small.

### How to Photograph the Moon with an Android Phone

Those who use Android-powered devices will have very similar challenges as iPhone users. However, typical camera apps for Android devices have more options and more precise exposure control, which makes it easier to photograph the Moon. If your Android phone or tablet has a telephoto lens, your best bet is to use that one instead of the wide-angle lens to focus on the Moon. Use your camera's built-in camera app to adjust the shutter speed until the Moon looks properly exposed. Make sure to reduce ISO to the lowest level and if your device has aperture control, make sure to open up the lens aperture as wide as possible. Now if you have a telescope or a pair of binoculars that you can hold steady while pointing at the Moon, you can technically capture the Moon with any smartphone or a tablet. However, don't expect the resulting image to look great – you will most likely see heavy amounts of chromatic aberration, as well as damaging distortions. You might also struggle with keeping the Moon in focus. Lastly, keep in mind that there might be special accessories for smartphones that provide better zoom capabilities. Such accessories might be useful for moon photography, but don't expect them to provide amazing results...

### Exposure Differences – Case Study

Let's now move on to how you can take a picture of the moon together with a foreground object – whether it's a tree, a house or a large rock. As explained earlier, the moon will always look overexposed after sunset in comparison to everything else. The only way to capture the scene with the moon properly exposed, is to take two separate shots of the scene – one with the foreground properly exposed and the moon overexposed and one with the moon properly exposed and the foreground objects heavily underexposed. Take a look at the following two shots: As you can see, I shot the above two images in two separate exposures – one with foreground properly exposed, one with the moon. Here is the combined shot that I did in Photoshop in just 2 minutes: The

above example is not the best one in terms of subject and composition, but it gets the message across – you will need to combine two exposures to create a single image. The toughest part is to properly mask out the Moon and to transparently merge the darker edges of the moon with the blue sky, which should not be a problem if you know how to use the right tools within Photoshop. If the sky is equally dark in both frames, then the amount of time spent in Photoshop is minimal – all you would need to do is copy-paste the Moon and you are set! Fireworks with the Full Moon Post-Processing Your Moon Photos No matter how good your image comes out of the camera, I still recommend doing some post-processing to enhance the look of your Moon image. Take a look at this photo of the Moon, straight out of the camera: Image straight out of the camera Now, take a look at this image that I enhanced in Photoshop: After the image was post-processed How did I do it? It was a simple, two step process: Image -> Adjustment -> Curves and selected “Medium Contrast” Preset from the drop-down menu and clicked “OK”. Filter -> Sharpen -> Unsharp Mask and added 150% in the “Amount” field while keeping the “Radius” on 1.0 pixels and “Threshold” on 0 levels. Very simple and quick! If you are a Lightroom user, you can achieve great results with even less total clicks. Here are some basic Lightroom adjustments I recommend: Start off with the right Camera Profile. I personally find “Camera Landscape” profile for my Nikon DSLR and mirrorless cameras to work the best for the Moon. Adjust White Balance. Start with Daylight white balance and if the Moon is too orange, move the Temperature slider left. Adjust Contrast between 10-20. Don’t reduce Highlights too much, or the features of the Moon might start to disappear and the image will turn too dark. My recommendation is to stay under -15. The same with the Shadows – don’t increase it too much, or you will start making the image look too flat. To boost contrast even further, add between +20 to +40 to the Whites slider, then between -20 to -30 to Blacks. To increase surface level detail, bump up the Texture slider to +10 and add between +5 and +10 to both Clarity and Dehaze sliders. Make sure to visit the Lens Corrections tab and check “Remove Chromatic Aberration”. It might also be a good idea to enable Lens Corrections. Here is how the Lightroom Basic tab looks for one of my Moon photos in this article: Lightroom Sliders in Basic Sub-Module Lastly, don’t forget to add a bit of sharpening in the “Detail” sub-module. I bumped up Radius to 2.0 while keeping “Detail” at 50 and “Amount” at 40. Make sure to use Masking to only apply sharpening to the edges, so that you don’t end up with a bunch of noise in your images. Moon Photography FAQ Why Photograph the Moon? So, why would one want to photograph the Moon? I was asked this question several times before and my answer is simple – because we only have one Moon and it is beautiful, so why not? The Moon makes the otherwise boring night sky look more interesting. While photographing the Moon by itself might be somewhat boring, including the Moon as an element of composition can yield great results. In addition, there are Moon phases (crescent to full) that give even more opportunities for various compositions. And lastly, why not experiment with something new and learn how to photograph bright objects at night? Why Does the Moon Look Smaller in Pictures? I’m sure if you have already attempted to take a picture of the Moon, you probably ran into a problem where the Moon looks tiny in comparison to what you saw while taking the picture. Why does the Moon get photographed so much smaller? The simple answer is – you are probably taking a picture of the Moon with a wide-angle lens. Keep in mind that your eyes are like a 50mm fixed lens and if you are taking a picture with a lens that is wider in angle of view than 50mm, the Moon will be captured in smaller size! So, if you want to capture an object like a big tree or a house with the Moon, you will need to stand further away and photograph the scene at least with a 50mm to try to match what you saw with your eyes. And even at 50mm, the Moon might look small, especially if it was near the horizon when you took a picture of it. This also happens because of a phenomenon called “Moon Illusion”, where the Moon appears bigger to your eyes, when in fact it is not. Why Do I See the Moon as a White Blob? If you have taken a picture of the Moon after sunset and it looked in like a white circular object rather than the Moon, it is because it was overexposed. When you take a picture of the Moon with other objects in the scene, your camera by default will calculate the exposure based on everything but the Moon. Take a look at the below image as an example. This happens because the Moon is too small in comparison to the objects around it and a single spot of light typically does not affect the light meter of your camera. This is not a problem during the day, because the moon’s brightness more or less matches the brightness of the sky. So, why do our eyes see everything normally, while a digital camera cannot? That’s because our eyes and our brain can see a much broader range of light. In photography terms,



this is known as “dynamic range”. Which Camera Gear is Best for Moon Photography? You can photograph the Moon with any camera. However, if you want to photograph a close-up of the moon, you will need to use either a telescope coupled with a digital camera or a compact camera with a super-telephoto lens, such as the Nikon P900. An interchangeable lens camera coupled with a super-telephoto lens is another option, although it might be the least cost-effective way to photograph the Moon. How Do I Take Sharp Pictures of the Moon? If you want to get a sharp photo of the Moon, you should first make sure to stabilize your setup to avoid any sort of camera shake. Next, you should use a lens aperture that yields the best sharpness for your setup. Ideally, you should take many photos and then stack them in software to reduce the impact of elements in the atmosphere. Summary of Steps to Photograph the Moon

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**URL:** <https://nikonrumors.com/2023/08/30/the-new-nikon-nikkor-z-180-600mm-f-5-6-6-3-vr-lens-is-now-shipping.aspx/>

**Title:** The new Nikon Nikkor Z 180-600mm f/5.6-6.3 VR lens is now shipping

**Text:** FCC disclosure statement: this post may contain affiliate links or promotions that do not cost readers anything but help keep this website alive. As an Amazon Associate, I earn from qualifying purchases. When you click on links to various merchants on this site and make a purchase, this can result in this site earning a commission. Affiliate programs and affiliations include, but are not limited to, the eBay Partner Network. Thanks for your support!

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**URL:** <https://nikonrumors.com/2023/08/30/dxo-nik-collection-version-6-3-released-with-many-new-features-new-optics-modules-added-with-support-for-the-latest-z-mount-lenses.aspx/>

**Title:** DxO Nik Collection version 6.3 released with many new features, new Optics Modules added with support for the latest Z-mount lenses

**Text:** FCC disclosure statement: this post may contain affiliate links or promotions that do not cost readers anything but help keep this website alive. As an Amazon Associate, I earn from qualifying purchases. When you click on links to various merchants on this site and make a purchase, this can result in this site earning a commission. Affiliate programs and affiliations include, but are not limited to, the eBay Partner Network. Thanks for your support!

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**URL:** <https://photorumors.com/2023/08/30/dxo-releases-1574-new-optics-modules/>

**Title:** DxO releases 1574 new Optics Modules

**Text:** In addition to the new Nik Collection version 6.3, DxO also released 1574 new Optics Modules adding support for the latest cameras including support for the new Canon EOS R100 Sony ZV-1 II. In addition, there's support for the latest lenses, including the Sony FE 50mm f/1.4 GM, the Nikon Z 400mm f/4.5 VR S, and fast primes from Sigma for both Nikon Z DX and Sony FE cameras: Cameras Canon EOS R100 Sony ZV-1 II Lenses Leica APO Vario-Elmarit-SL 90-280mm F2.8-4 (L-mount) Leica Vario-Elmar-SL 100-400mm F5-6.3 (L-mount) Nikkor Z 400mm F4.5 VR S Nikkor Z 400mm F4.5 VR S with Z TC 1.4x Nikkor Z 400mm F4.5 VR S with Z TC 2x Nikkor Z DX 24mm F1.7 Panasonic Leica DG Vario-Elmarit 12-35mm F2.8 ASPH (Micro Four Thirds) HD Pentax-FA 50mm F1.4 Pentax smc FA 50mm F1.4 Classic HD Pentax-FA 35mm F2 Sigma 16-28mm F2.8 DG DN | C (L-mount) Sigma 24mm F3.5 DG DN | C (Sony FE) Sigma 50mm F1.4 DG DN | A (Sony FE) Sigma 50mm F2 DG DN | C (Sony FE) Sigma 90mm F2.8 DG DN (Sony FE) Sigma 23mm F1.4 DC DN | C (Sony FE) Sigma 16mm F1.4 DC DN C (Nikon Z DX) Sigma 30mm F1.4 DC DN C (Nikon Z DX) Sigma 56mm F1.4 DC DN C (Nikon Z DX) Sony FE 50mm F1.4 GM Viltrox 13mm F1.4 (Nikon Z DX) Viltrox 13mm F1.4 (Sony FE) Viltrox 13mm F1.4 XF (Fujifilm X) Viltrox 20mm F1.8 Z (Nikon Z DX) Viltrox 35mm F1.8 FE (Sony FE) Viltrox 35mm F1.8 Z (Nikon Z) Viltrox 50mm F1.8 Z (Nikon Z DX) Viltrox AF 24mm F1.8 Z (Nikon Z DX) Voigtlander APO-Lanthar 35mm F2 Asph (Nikon Z DX) Voigtlander APO-Lanthar 50mm F2 (Nikon Z DX) Voigtlander Nokton 23mm F1.2 X (Fujifilm X) Voigtlander APO-Lanthar 50mm F2 Asph (Sony E) Voigtlander Nokton D23mm F1.2 Asph (Nikon Z DX) The performance of supported lenses/cameras can be boosted by processing RAW files with the latest DxO software:

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**URL:** <https://fstoppers.com/landscapes/four-tips-getting-started-landscape-photographer-638710>

**Title:** Four Tips for Getting Started as a Landscape Photographer

**Text:** If you're looking to shoot landscapes or to grow your current landscape portfolio, here are some pointers for every photographer. I am so inspired by a beautiful landscape. I think that's why I was so drawn to California, not to mention the beautiful light here. When shooting a subject, I do feel like there should be some meaning behind it or a story of some sort. What do you want to say or want people to feel? Of course, everyone is going to have their own interpretation and feeling, but you should have some intention behind it. Set out to tell a story that will serve as motivation for you and hopefully evoke a feeling in the viewer. The below image was taken in Maui on a photography trip I took last year. I wanted to capture the vibe and culture of the Hawaiian people. Every morning from my balcony, I could see these canoes coasting by at top speed. It has been part of the Hawaiian culture dating back centuries, so this was inspiration that came to me while on location in Maui. I'm always exploring and trying to find something new and interesting and a way to tell a story. Early Maui morning shot of Hawaiian canoes getting ready to be launched into the water. Inspiration What and where do you want to shoot? What inspires you, and what story do you want to tell? Yes, you can tell a story with landscape photography, and you should. What is the subject you want to photograph? A beach in Hawaii or a mountain in Japan? Create a mood board, Pinterest board or just create a folder on your computer with images you like. Ask yourself why you like those images. What about them inspires you? Is it the colors, the mood, the time of day, is it black and white, is it the low angle from which the subject was photographed? From there, you have to decide what time of day and what time of year you want to shoot; this all plays into the look of the photos. The time of year will change the light and seasons, so if you want bright, direct light coming from high above, then shoot during the summer. If you want a moodier, overcast, and cold vibe, then shoot during the fall and winter. I did a series of ocean landscapes in Malibu, all shot in early morning in the winter, so I could get a misty, cloudy, blown-out look; that's the vibe I wanted for these photos. I also have plenty of photos taken on a bright summer day, giving the sky a beautiful, bright blue color, with the subject fully lit by the sun. I captured this surfer on an early winter morning in Malibu. Equipment There are some basic tools that you will need such as a wide angle lens, tripod and a good camera bag. But also, work with what you have; there's no need to break the bank in the beginning. I use a Nikon 16-35mm lens, and you will also want a lens to get closer to the subject. I use my Nikon 50mm, and I usually have my 85mm just in case I want to get even closer to a subject. But typically, you use a wide angle lens to capture the vastness of a landscape. A tripod is important so that you can get a straight horizon line and to avoid camera shake if you're taking long exposure shots. I am very guilty of shooting without a tripod on a lot of my landscape photos, but I turn the shutter speed up to help with camera shake. With that said, I suggest using a tripod and probably a travel tripod; they are more compact and lighter. A good camera bag is important as well, preferably water-repellent, like this one I purchased. I had learned this lesson on my trip to Maui. I was using a great backpack, but it was most effective for street photography or quick jobs that don't involve hiking or wet climates, like the bamboo forest I was hiking though. I suggest a backpack to save the pain of a shoulder bag. I learned this a long time ago, and my back is still out of alignment from using a shoulder bag for years. You want enough room for all your lenses, and a tripod holder is key, so you don't have to hold it. I bring a small flashlight, so when it gets dark, I can find my way back to my car, like the lesson I learned in Joshua Tree, which is a desert, and if you don't know, you can get lost in the desert really easily as there are no land markers and everything looks the same, especially in the dark. So, have pockets for a small flashlight, your phone, and a water bottle holder. This is important: bring water. I shot this in Joshua Tree national park on a beautiful, 117-degree day. Location Where do you want to go? Is the location in your own city, your own state, or out of the country? You need to create a detailed plan. Traveling is a great way to capture landscapes that most people can't get to or have only dreamed of. It's also a great way to challenge yourself and grow as a photographer. As I mentioned, I recently traveled to Maui, a place I have never been, so I didn't know the island. I did research online before I went, so I knew the places I wanted to go. There is plenty of information on the internet that will tell you the best places to shoot. I use this information as guides, then from there, I find what inspires me. I will also walk or drive around, exploring new places that I find interesting enough to shoot. It's important to get outside of your comfort zone and explore! I create a shot list in a Word document before each trip that I print. It's just easier for me to have a hard copy on me, especially if I'm doing a lot

of driving. The shot list has a day-to-day list so that I can keep on track and make sure I shoot everything I had planned. I list the day, time I want to shoot the location, and address, as well as what the significant landmark is, a tree or rock formation, etc. I will also note how I want to shoot it: sunrise, bright daylight, overcast for a moody look. or sunset to create interesting shadows. You can't control the weather conditions, but you can get an idea of what it may be like depending on the time of year and time of day. Shot at the top of Maui at Haleakala. Post-Production Retouching is a very important part of any landscape photo and can transform the image from good to incredible. I always shoot in raw so that I have total control of the image. Retouching is a personal choice; some people like an HDR look or an oversaturated, deep color palette, and some people leave the image pretty close to the way it was shot. There are plenty of presets out there that you can purchase or use directly in Lightroom. Post-production is all part of the creative process, so play around and create your own style. There are so many variables, but it comes down to the look and feeling you want to evoke. Example of creating a mood in post-production. Once you have your images retouched, it's time to share them with the world! Get a professional website like Squarespace, or if you plan on selling them, I would suggest Shopify. I use both, but for selling, Shopify is the best. Share your images on social media; this will help you gauge what people like and maybe what they don't like as much. It's really just for learning. Don't read too much into social media and people's opinions. You should always shoot for you and the things that inspire you.

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**URL:** <https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3002263>

**Title:** TOR complex 1 negatively regulates NDR kinase Cbk1 to control cell separation in budding yeast

**Text:** The target of rapamycin (TOR) signalling pathway plays a key role in the coordination between cellular growth and the cell cycle machinery in eukaryotes. The underlying molecular mechanisms by which TOR might regulate events after anaphase remain unknown. We show for the first time that one of the 2 TOR complexes in budding yeast, TORC1, blocks the separation of cells following cytokinesis by phosphorylation of a member of the NDR (nuclear Dbf2-related) protein-kinase family, the protein Cbk1. We observe that TORC1 alters the phosphorylation pattern of Cbk1 and we identify a residue within Cbk1 activation loop, T574, for which a phosphomimetic substitution makes Cbk1 catalytically inactive and, indeed, reproduces TORC1 control over cell separation. In addition, we identify the exocyst component Sec3 as a key substrate of Cbk1, since Sec3 activates the SNARE complex to promote membrane fusion. TORC1 activity ultimately compromises the interaction between Sec3 and a t-SNARE component. Our data indicate that TORC1 negatively regulates cell separation in budding yeast by participating in Cbk1 phosphorylation, which in turn controls the fusion of secretory vesicles transporting hydrolase at the site of division. Funding: The Agencia Estatal de Investigación (AEI) of Ministerio de Ciencia e Innovación (MCIN) funded this work. Grants PID2019-106745GB-I00 funded by MCIN/AEI/10.13039/501100011033 to ASD, PID2019-109027GB-I00 funded by MCIN/AEI/10.13039/501100011033 to EQ. Moreover, ASD acknowledges a grant from the Consejería de Universidades, Investigación, Medio Ambiente y Política Social del Gobierno de Cantabria, and another grant from Sociedad para el Desarrollo de Cantabria (SODERCAN). EQ was funded by Generalitat Valenciana (CIDEAGENT2020/41). ML acknowledges research support by grant RTI2018-097801-B-I00 funded by MCIN/AEI/ 10.13039/501100011033 and by "ERDF A way of making Europe" and grant PID2021-122611NB-100 funded by MCIN/AEI/ 10.13039/501100011033 and by "ESF Investing in your future". The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. Here, we describe analysis of post-anaphase functions of the rapamycin-sensitive TORC1 kinase complex, one of the 2 TOR complexes in *Saccharomyces cerevisiae*. We found a previously unappreciated mechanism in which the MEN kinase Cdc15 and TORC1 play opposing roles in control of cell separation. TORC1 regulates and participates in the phosphorylation of the RAM network kinase Cbk1 to ultimately control cell separation. By mass spectrometry, we found that TORC1 modifies the phosphorylation pattern of Cbk1. In addition, we identified a specific threonine in Cbk1 activation loop that its phosphomimetic version is catalytically inactive and reproduces TORC1 control over cell separation. We identified that TORC1 regulation of Cbk1 may achieve control of cell separation by modulating membrane fusion of secretory vesicles delivering hydrolytic enzymes to the site of division. Finally, we determined that Cbk1 binds and

contributes to the phosphorylation of the exocyst component Sec3, which would explain defects in cell separation as Sec3 activates the SNARE complex to promote vesicle-plasma membrane fusion. Successful mitotic separation of chromosomes by elongation of the anaphase spindle allows activation of the budding yeast mitotic exit network (MEN). This signalling cascade promotes transition from M phase to G1 and initiates cytokinesis [ 14 , 15 ], in which actomyosin ring contraction and plasma membrane constriction are intimately linked and coordinated with the formation a special layer of chitin-rich extracellular matrix named septum [ 16 , 17 ]. After these processes are complete, mother and daughter cells remain linked to each other by the septum, which is immediately severed by daughter cell specific secretion of hydrolytic enzymes, allowing the 2 cells to dissociate [ 4 ]. In budding yeast, a signalling pathway called the “regulation of Ace2 and morphogenesis” (RAM) network promotes this final cell separation at the end of the cell cycle. Interestingly, the MEN and RAM pathways are functionally distinct “Hippo” signalling system that has similar components and organisation [ 4 ]. These networks, known as Mst/hippo or NDR/LATS signalling after mammalian and Drosophila kinases, participate in the control of cell growth, proliferation, and morphogenesis in an immense range of eukaryotes [ 4 ]. The budding yeast nuclear Dbf2-related (NDR) kinase Cbk1 is the central regulatory component of the RAM network; previous studies have not identified a role of Cbk1 in the coordination of growth and cell cycle. Cell division is linked to growth and metabolism, although the molecular details are currently incompletely understood. The highly conserved target of rapamycin (TOR) signalling pathway has well-documented roles in regulation of cell growth, nucleotide biosynthesis, lipogenesis, glycolysis, autophagy, and aspects of cell cycle progression [ 6 – 8 ], and thus may provide a key link between cell growth and the cell cycle machinery [ 9 – 12 ]. Indeed, TOR signalling induces stabilisation of the mRNA of a mitotic cyclin, which binds to cyclin-dependent kinase to promote mitosis [ 13 ]. However, a specific role for TORC1 in the regulation of cytokinesis and cell separation remains unknown. Cells need to control the timing and sequence of different steps during the cell cycle [ 1 – 3 ]. In particular, cell cycle regulatory machinery ensures that events of cytokinesis and cell separation occur in precise order only after cells have segregated sister chromatids towards the opposite poles of the cell [ 4 ]. In budding yeast, a recently described checkpoint named “enforcement of cytokinesis order” (ECO) ensures that late processes of cell separation do not occur when early cytokinetic processes are delayed or defective [ 5 ]. To understand further the underlying molecular mechanism by which TORC1 regulates cell separation, we investigated whether interactions between the exocyst Sec3 and the SNARE components varied in our experimental system. Sec3 binds to t-SNARE Sso2, releases Sso2 from autoinhibition closed conformation to an open conformation, allowing Sso2 to interact with t-SNARE Sec9, which finally promote secretory vesicle fusion into the plasma membrane [ 55 ] ( Fig 7E(i) ). We grew SEC3-TAP *cdc15-2* cells, arrested them at 37 °C and subsequently released them at 24 °C for 45 min in the presence or absence of rapamycin to follow Sec3 interaction with SNARE components ( Fig 7E(ii) ). We immunoprecipitated Sec3 and determined that Sec3-TAP was able to bind to Sso1/Sso2 independently whether TORC1 was active (- rapamycin) or inactive (+ rapamycin) ( Fig 7E(ii) ). However, Sec3 interaction with the SNARE component Sec9 was clearly compromised when TORC1 was active ( Fig 7E(ii) ,—rapamycin), which is precisely when *cdc15-2* cells showed a cell separation defect ( Fig 2A ). Taken all together, our data would suggest that TORC1 might ultimately block the formation of functional SNARE complex that would promote the fusion of secretory vesicle transporting hydrolases to the plasma membrane. TORC1 might prevent exocyst Sec3 to release Sso from its autoinhibitory conformation and provoke a cell separation failure. As cell separation defect in *cdc15-2* cells seemed to be in membrane fusion at the site of division ( Fig 6 ), we focused our attention to find proteins involved in such cellular process. Interestingly, it has been reported that the orthologue of Cbk1 in fission yeast, the protein Orb6, positively regulates exocytosis phosphorylating the orthologue of Sec3 (budding and fission yeast share the same name for this protein) [ 54 ]. The exocyst complex mediates the tethering of secretory vesicles to the plasma membrane and activates the SNARE complex to promote membrane fusion [ 51 , 52 ]. Target SNAREs (t-SNARE) are located on the target plasma membrane and interact with v-SNARE situated on the secretory vesicle membrane, which promotes membrane fusion [ 55 ]. Therefore, we searched for exocyst components in the immunoprecipitated material from the experiment initially described above for Tables 1 and S1 . We found that the spectral count average for Sec3 was higher than for any other

exocyst proteins ( Fig 7B and S3 Table ). This interaction was confirmed subsequently by immunoprecipitation and immunoblotting of anaphase-arrested cells in the absence or presence of rapamycin ( Fig 7C ). Mass spectrometry analysis was unable to find Cbk1 interacting with SNARE components that promote fusion of secretory vesicle at the plasma membrane ( S3 Table ). Therefore, our findings would suggest that Sec3 might be a novel substrate of Cbk1 in budding yeast. Scanning Sec3 protein sequence, we located 3 fully conserved NDR/LATS consensus sites at its N-terminus (S18, S32, and S66) and 1 site (S43) only conserved in *Saccharomyces* species ( S9A Fig ). There are evidences of in vivo phosphorylation for S18, S32, and S43 in phosphoproteomic analysis [ 56 ] and, interestingly, sites S32 and S43 have been described to be rapamycin sensitive ( <https://thebiogrid.org/36739/summary/saccharomyces-cerevisiae/sec3.html> ) [ 44 , 45 ]. Then, we investigated whether Cbk1 was able to phosphorylate Sec3 ( Fig 7D ) as we described above ( Fig 7A ). We found that immunoprecipitated Cbk1 from anaphase-arrested *cdc15-2* cells in the presence of rapamycin phosphorylated the N-terminus of Sec3. We showed that catalytically inactive Cbk1-D475A and Cbk1-T574E, which mimicked TORC1 phosphorylation, were unable to phosphorylate Sec3 ( Fig 7D(i) and 7D(ii) ). These findings would indicate that Cbk1 controls Sec3 by phosphorylation of its N-terminus, precisely the same end of Sec3 protein that has been described to interact and regulate t-SNARE protein Sso2 to induce membrane fusion [ 57 , 58 ]. The exocyst component Sec3 binds to the t-SNARE protein Sso2 to release it from its autoinhibition conformation and promotes the interaction of Sso2 with the t-SNARE protein Sec9 to induce membrane fusion [ 57 , 58 ]. TORC1, via regulating Cbk1 phosphorylation, might block that step, precisely, to prevent cell separation before mitosis. To identify key proteins that could explain the cell separation defect, we analysed the immunoprecipitated material associated with Cbk1-GFP in the experiment described above for Tables 1 and S1 . Most of known interactions were maintained similarly in all 3 conditions, independently of TORC1 activity (see S8A Fig and its legend for more details and S2 Table ). Interestingly, mass spectrometry analysis found that the number of spectral counts for some members of TORC1 was higher than in the untagged control, especially in *cdc15-2* cells in the absence of rapamycin (see Lst8, Tor1, and Kog1 in S8C Fig and S3 Table ).

(A) Protein extracts were prepared for CBK1-5FLAG *cbk1-aid cdc15-2* (YMF4113), *cbk1-D475A-5FLAG cbk1-aid cdc15-2* (YMF4180), and *cbk1-T574E-5FLAG cbk1-aid cdc15-2* strains (YMF4115). Cells were arrested in late anaphase after having grown at 37 °C. To block TORC1 activity, rapamycin was added for 20 min as indicated. Cbk1-5FLAG was purified by immunoprecipitation using the M2 anti-FLAG monoclonal antibody. The kinase activity of immunopurified Cbk1 was measured as described in Materials and methods. Kinase assay is shown in (i). Measurement of the 32 P-Ace2-44-247 signal was performed (ii). Quantification of the specific Cbk1 activity was done by normalising the phosphorylation signal to the amount of recombinant Ace2 (iii) and immunopurified Cbk1 (iv). Three experimental replicates were performed.

(B) Sec3 peptides were found in mass spectrometry of immunoprecipitation of Cbk1-GFP on ChromoTek GFP-Trap Magnetic beads. Spectral counts for Sec3 were higher than for any other exocyst proteins. Spectral average for 3 different conditions is shown (see S3 Table for more details).

(C) CBK1-TAP SEC3-5FLAG *cdc15-2* (YMF4238) and control cells (YMF4240) were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C, before the addition of rapamycin for 20 min when indicated. Subsequently, protein extracts were prepared and immunoprecipitation of Cbk1 on IgG beads was performed before the detection of the indicated proteins by immunoblotting.

(D) CBK1-5FLAG *cbk1-aid cdc15-2* (YMF4113), *cbk1-D475A-5FLAG cbk1-aid cdc15-2* (YMF4180), and *cbk1-T574E-5FLAG cbk1-aid cdc15-2* cells (YMF4115) were grown as described in A. M2 anti-FLAG monoclonal antibody was used to immunoprecipitated Cbk1-5FLAG. A kinase assay (i) was performed with immunopurified Cbk1 from yeast cell extract (iv) and bacterial-expressed and purified His6-MBP-Sec3-1-320 as substrate (iii). Quantification of the specific Cbk1 activity (ii) was done by normalising the phosphorylation signal to the amount of recombinant Sec3 (iii) and immunopurified Cbk1 (iv). Three experimental replicates were performed.

(E) Schematic representation of how Sec3 induces conformational change for Sso (autoinhibitory closed conformation to open), allowing the interaction between Sso and Sec9 (i). (ii) SEC3-TAP *cdc15-2* (YMF4221) and control cells (YMF3546) were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C. Rapamycin was added 20 min before release (+), and 45 min after release, protein extracts were prepared and

immunoprecipitation of Sec3 on TAP beads was performed. Detection of the indicated proteins was carried out by immunoblotting using specifically raised sera. Underlying data for all the graphs can be found in S1 Data file. Raw data for blots can be found in supporting information ( S5 Raw Images ). TOR, target of rapamycin. To understand further the underlying molecular mechanism by which TORC1 regulates cell separation, we studied whether TORC1 controls Cbk1 kinase activity. We performed an in vitro kinase assay using immunoprecipitated Cbk1 ( Fig 7A(iv) ) from anaphase-arrested *cbk1-aid cdc15-2* cells in the presence of rapamycin expressing, under its own promoter, either Cbk1 (wt), the catalytically inactive Cbk1-D475A (kd, kinase dead [ 39 ]) and Cbk1-T574E mutant that is able to reproduce the cell separation defect associated with TORC1 activity as we described above ( Fig 7A(i) and 7A(ii) ). A truncated version of Ace2 (Ace2-44-247) was expressed, purified and used as substrate ( Fig 7A(iii) ). Interestingly, Cbk1-T574E had kinase activity levels similar to the catalytically inactive Cbk1-D475A ( Fig 7A(i) and 7A(ii) ), suggesting that TORC1 might promote inactivation of Cbk1 kinase activity. (A) *sso1-1 sso2Δ* (H1239) (i), *sso1Δ sso2-1* (H603) (ii), and *sso1-1 sso2-1* cells (H1269) (iii) were grown in YPD medium asynchronously at 24 °C before raising the temperature to 37 °C. Samples were taken at the specified times and fixed with 70% ethanol before analysing them by flow cytometry to follow cell-cycle progression. (B) CTS1-GFPEnvy *sso1-1 sso2Δ cdc15-2* (YMF4218) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C. Rapamycin was added to half of the culture as indicated and cells were released at 24 °C in the absence (i) or presence (ii) of rapamycin. Using fluorescence microscopy, we studied the proportion of cells with Cts1 at the site of division site in the absence (iii) or presence (iv) of rapamycin. Examples of cells are shown at 90 min after the release at 24 °C in the absence (v) or presence (vi) of rapamycin. Red arrows denote the original division site and new buds are marked with white asterisks. Scale bar indicates 2 μm. (C) CTS1-GFPEnvy *cbk1-T574E cbk1-aid cdc15-2* (YMF4250) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of NAA and IAA auxins. Next, cells were incubated with DMSO or rapamycin for 20 min before they were released in the absence or presence of rapamycin (NAA and IAA auxins were present in medium until the end of the experiment for both conditions). Samples were taken at the indicated times to be analysed by fluorescence microscopy and determine the proportion of cells with Cts1 at the site of division in the absence (i) or presence (ii) of rapamycin. Examples of cells are shown at 90 min after the release at 24 °C in the absence (iii) or presence (iv) of rapamycin. The asterisks indicate new buds and red arrows show the original division site. Scale bar indicates 2 μm. Underlying data for all the graphs can be found in S1 Data file. FACS graphs can be found in the supplementary FACS file ( S1 File ). SNARE complex promotes vesicle-plasma membrane fusion at the site of division. To determine whether cell separation defect in *cdc15-2* cells is due to a problem in membrane fusion ( Fig 5A(iii) ), we used SNARE mutants. Indeed, it has been reported that budding yeast t-SNARE *sso1* and *sso2* mutant cells have a defect in cell separation, suggesting a failure in the delivery of the enzymes that promote separation between mother and daughter cells [ 53 ]. We grew previously described mutants, *sso1-1 sso2Δ*, *sso1Δ sso2-1*, and *sso1-1 sso2-1* [ 53 ], to find out if any of them might have a defect consistent with cell separation failure at the restrictive temperature ( Fig 6A ). Only *sso1-1 sso2Δ* cells accumulated with 2C DNA content, and a small proportion of the population with 4C DNA content too ( Fig 6A(i) ). Subsequently, to study whether inactivation of TORC1 was able to rescue cell separation defect after anaphase arrest and release in *cdc15-2* cells, we grew CTS1-GFP *sso1-1 sso2Δ cdc15-2* cells as previously described ( Fig 2A ). We showed that there were cells still defective, as part of them accumulated with 2C DNA content, after the addition of rapamycin ( Fig 6B(ii) ). This is different from what occurred in *cdc15-2* cells with functional membrane fusion system ( Fig 2A(ii) ). Furthermore, in the presence of rapamycin cell separation is defective despite Cts1-GFP accumulation at the site of division ( Fig 6B(iv) and 6B(vi) ), unlike what rapamycin promoted in *cdc15-2* cells: Cts1-GFP localization at the site of division and successful cell separation (compare Figs 5F(ii) and 6B(iv) ). Absence of rapamycin treatment in *sso1-1 sso2Δ cdc15-2* cells prompted sustained Cts1-GFP localization at the site of division and cell separation defect for cells that were able to continue their cell cycles and re-bud again, like we observed for *cdc15-2* cells if rapamycin was not added (compare Figs 5F(i), 5F(iii), 5F(v) ), 6B(iii) and 6B(v) ). Therefore, compromising fusion of secretory vesicles into plasma membrane blocks the rescue of cell separation defect. Finally, cells expressing the

phosphomimetic Cbk1-T574E, which reproduces negative effect of TORC1 control over cell separation, accumulated Cts1-GFP at the site of division after the release from anaphase block, followed by rapamycin addition, in a similar manner to *sso1-1 sso2Δ cdc15-2* cells (compare Fig 6C(ii) and 6C(iv) with Fig 6B(iv) and 6B(vi) ). These cells were defective in cell separation although they were able to transport Cts1 to the site of division. Taken together, these findings would suggest that the cell separation defect associated with *cdc15-2* cells after anaphase block and release is due to a failure in membrane fusion at the site of division and Cbk1 plays a key role in that process. As control, we grew *cdc14-1 iHA-CTS1* cells and found that, as for *cdc15-2*, those cells contained Cts1 after the anaphase arrest and release ( S7B Fig ). Rapamycin was unable to rescue defect in Cts1 localization at the site of division in *cdc14-1* cells ( S7C Fig ), which showed that Cts1 is unable to be secreted to the site of division in *cdc14-1* cells. Taken together, *cdc15-2* cells are able to transport Cts1, unlike *cdc14-1* cells, but they might have a problem in the fusion of Cts1 containing vesicles into the plasma membrane, which could explain the cell separation defect associated with *cdc15-2* cells. Next, since secretory vesicle transport was functional and to confirm that Cts1 localised at the site of division at the end of the cell cycle ( Fig 5A(ii) ), we grew CTS1-GFP *cdc15-2* and found that Cts1 accumulated in cells that had failed cell separation and were able to form new buds in the absence of rapamycin ( Fig 5F(i), 5F(iii) and 5F(v) ), unlike what happened when TORC1 activity was inhibited by the addition of rapamycin, which promoted the localization of Cts1 with similar dynamics as previously described ( Fig 5F (ii) and 5F (iv) ). Therefore, despite the presence of Cts1 at the site of division ( Fig 5F(i), 5F(iii) and 5F(v) ), cell separation failed in the absence of rapamycin, which would suggest that a late step in secretory vesicle transport might be defective. At the end of the cell cycle, Cts1 is transported and localises at the site of division in large-budded cells that have not completed cell separation [ 17 , 36 ]. Transport of secretory vesicles to the site of division requires the octameric protein complex named exocyst [ 51 , 52 ]. Some exocyst components, Sec8 among them, travel with secretory vesicles, whereas others as Sec3 interact with the plasma membrane via its amino-terminal pleckstrin homology (PH) domain. The rest of the exocyst members interact with Sec3 to form the fully assembled exocyst at the plasma membrane. We confirmed that both exocyst components, Sec8 and Sec3, localised at the site of division after *cdc15-2* anaphase arrest and release, independently of the absence or presence of rapamycin ( Fig 5D and 5E ), which would suggest that secretory vesicle transport is not defective in *cdc15-2* cells after release. Cbk1 interacts with and phosphorylates the transcription factor Ace2 at its nuclear export sequence, which retains Ace2 in the daughter nucleus [ 47 , 48 ]. Ace2 is required to activate a daughter-specific transcription program that express proteins such as Cts1 and Dse4, whose role is promoting cell separation via the degradation of the septum that joins mother and daughter cells [ 36 ] ( Fig 3B ). Cts1 is an endochitinase that degrades chitin located in the primary septum [ 49 , 50 ], whereas Dse4 is a glucanase that contributes to septum dissolution after cytokinesis [ 36 , 37 ]. We hypothesised that Cbk1 activity might be compromised in anaphase-arrested *cdc15-2* cells and therefore transcription of Ace2-regulated genes could be defective, which would explain defects associated with *cdc15-2* cells ( Fig 5A(i) ). First, to determine the expression of cell separation enzymes Cts1 and Dse4 in our experimental system, we grew iHA-CTS1 *cdc15-2* and DSE4-6HA *cdc15-2* cells as described for Fig 1A . Surprisingly, Cts1 and Dse4 were detected at the end of the anaphase arrest and for the next 60 min, independently of rapamycin (Figs 5B and S7A ). To investigate whether the presence of Cts1 before the release at 24 °C was independent of Cbk1 and Ace2 function, iHA-CTS1 *cbk1-aid cdc15-2* and iHA-CTS1 *ace2-aid cdc15-2* cells were grown asynchronously at 24 °C and temperature was raised to 37 °C to inactivate Cdc15. Subsequently, either Cbk1 or Ace2 were depleted after the addition of auxins. Protein samples were taken to show that Cts1 is stable as it accumulated despite the lack of Cbk1 and Ace2 in anaphase-arrested cells ( Fig 5C ). Therefore, detection of Cts1 and Dse4 indicated that cell separation defect in *cdc15-2* cells is not due to a failure in the expression of hydrolases. Then, the defective cellular process must be either secretory vesicle traffic towards the site of division and/or the fusion of those vesicles to the plasma membrane. Interestingly, it has been recently described, although no molecular mechanism was detailed, that Cbk1 induces Cts1 secretion independently of Cbk1 role in promoting Cts1 expression, which would suggest a role for Cbk1 in vesicle transport and/or membrane fusion [ 5 ] ( Fig 5A(ii) and 5A(iii) ). (A) Three different hypotheses for what cellular process was affected in *cdc15-2* cells to explain their cell separation defect. (B)

iHA-CTS1 *cdc15-2* (YMF3845) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of DMSO (–) or rapamycin (+) for 20 min. Subsequently, cells were released from the anaphase arrest in the absence (–) or presence (+) of rapamycin before protein extracts were prepared from shown time points and analysed by immunoblotting. Raw data for blot can be found in supporting information ( S4B Raw Images ). (C) iHA-CTS1 *cbk1-aid cdc15-2* (YMF3991) and iHA-CTS1 *ace2-aid cdc15-2* (YMF3969) cells were grown in YPD asynchronously and culture was shifted to 37 °C to allow late-anaphase arrest after inactivation of Cdc15 function. Subsequently, Cbk1-aid and Ace2-aid proteins were depleted. To study iHA-Cts1, protein extracts were collected at the indicated time points, followed by immunoblotting. Raw data for blot can be found in Supporting information ( S4C Raw Images ). (D) SEC8-GFP *cdc15-2* (YMF4002) and (E) SEC3-GFP *cdc15-2* (YMF4003) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of rapamycin to half of the culture for 20 min. Cells were released to allow progression through the cell cycle in the absence (–) or presence (+) of rapamycin. Samples were taken at the indicated times. Using fluorescence microscopy, the proportion of cells with Sec8 (D) or Sec3 (E) at the site of division in the absence (i) or presence (ii) of rapamycin was determined. Examples of cells with Sec8-GFP (D) or Sec3-GFP (E) at the site of division after 45 min from the release at 24 °C are shown in the absence (iii) or presence (iv) of rapamycin. Scale bars indicate 5 µm. (F) CTS1-GFPEnvy *cdc15-2* cells (YMF4145) were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of DMSO or rapamycin for 20 min. Subsequently, cells were released in the absence (i) or presence (ii) of rapamycin to allow progression through the cell cycle. Samples were taken at the indicated times to establish the proportion of cells with Cts1 at the site of division site in the absence (i) or the presence (ii) of rapamycin. Examples of cells with Cts1-GFP at the bud neck are shown for the 60 min time point after the release at 24 °C in the absence (iii) or the presence (iv) of rapamycin, scale bars indicate 5 µm. Example of cell that have initiated a new cell cycle at 90 min from the release, which can be determined as mother and daughter cells are rebudding, and maintained Cts1-GFP at the site of division (v). Scale bars indicate 2 µm. Underlying data for all the graphs can be found in S1 Data file. (A) Schematic illustration of *cbk1-6E* mutant in which phosphosites containing serines or threonines followed by prolines were changed to glutamic acid to mimic phosphorylations [ 42 ]. “α-Mob” denotes interacting domain with Cbk1 regulatory subunit Mob2. The kinase domain and activation loop (T-loop) are highlighted (i). *cbk1-6E cbk1-aid cdc15-2* (YMF4019) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of NAA and IAA auxins. Subsequently, cells were incubated with DMSO (ii) or rapamycin (iii) for 20 min while still arrested in anaphase. Cells were released in the absence (ii) or presence (iii) of rapamycin and with the NAA and IAA auxins present in the medium throughout the rest of the experiment. Samples were taken at the indicated times to investigate cell-cycle progression by flow cytometry (ii and iii) and cell morphology by light microscopy in the absence (iv) or in the presence (v) of rapamycin at 120 min after the release from late anaphase arrest. Scale bars indicate 5 µm. (B) 3GFP-RAS2 *cbk1-6E cbk1-aid cdc15-2* (YMF4079) cells were grown as described in A and samples were taken at 120 min after the late anaphase release. Examples of cells are shown in the absence of rapamycin (i) or in the presence (ii) of rapamycin. Red arrows show mother and daughter cells that have separated their cytoplasm. Scale bars indicate 5 µm. (C) *cbk1-5E-E574T cbk1-aid cdc15-2* (YMF3997) cells were grown as described in A. Samples were taken at the specified times to determine DNA content in the absence (i) or presence (ii) of rapamycin. Schematic illustration of *cbk1-5E-E574T* mutant in which mutated glutamic acid in position 574 was reverted to threonine and the rest of the glutamic acids in Cbk1-6E were maintained (ii). Examples of cells in the absence (iv) or in the presence (v) of rapamycin at the 120 min time point after the release from late anaphase arrest. Scale bars indicate 5 µm. (D) Schematic representation of *cbk1-T574E* mutant in which DNA sequence that encodes for threonine 574 was mutated to be translated as a glutamic acid (i). *cbk1-T574E cbk1-aid cdc15-2* (YMF3944) cells were grown as described in A. DNA content analysis and microscopy were performed as described above. Scale bars indicate 5 µm. (E) 3GFP-RAS2 *cbk1-T574E cbk1-aid cdc15-2* (YMF4021) cells were grown as described in A and samples were taken at 120 min after the late anaphase release. Examples of cells in the absence (i) or in the presence (ii) of rapamycin. Red arrows show cells where examination of each z-level at the bud neck showed separated cytoplasm.



Scale bars indicate 5  $\mu$ m. FACS graphs can be found in the supplementary FACS file ( S1 File ). TOR, target of rapamycin. Like other NDR/LATS kinases, Cbk1 is positively regulated by autophosphorylation of its activation loop (T-loop) and by Mst/hippo kinase phosphorylation of a C-terminal hydrophobic motif (HM) [ 4 , 39 , 42 ]. Cbk1 is the downstream-most component of the RAM network, and all other known elements of the cascade (Kic1, Hym1, Tao3, and Sog2) are required for phosphorylation of threonine 743 located on Cbk1 HM [ 4 ] ( Fig 3B ). To determine if constitutive activation of Cbk1 HM site avoided TORC1 inhibition of cell separation, we expressed a version of Cbk1 in which threonine at position 743 was replaced by glutamic acid (CBK1-T743E) to mimic phosphorylation of the HM site [ 42 ]. We grew *cdc15-2* cells with CBK1-T743E as the only copy of Cbk1 in the same conditions as described for Fig 2A . We showed that CBK1-T743E was unable to rescue cell separation defects while TORC1 was active ( S3A(i) Fig ), which would indicate that TORC1 control over Cbk1 might not be only via regulating phosphorylation of HM site. On the other hand, Lre1 and Fir1 proteins have been described to negatively control the activity of Cbk1. Lre1 interacts with Cbk1 and its regulating factor, Mob2, to directly inhibits Cbk1 kinase activity [ 43 ] and Fir1 blocks cell separation via its ability to bind Cbk1 [ 5 ]. To investigate whether TORC1 inhibition of cell separation was signalled through Lre1 or Fir1, *lre1 $\Delta$  cdc15-2* and *fir1 $\Delta$  cdc15-2* yeast strains were cultured as for Fig 2A . We found that the lack of Lre1 or Fir1 is not enough to prevent a defect in cell separation when TORC1 is active in the absence of rapamycin ( S3B(i) and S3C(i) Fig ). These findings suggested that TORC1 control over Cbk1 could be independent of the described mechanisms that regulate Cbk1 function. We aimed to understand the biological consequences of TORC1 inactivation in *cdc15-2* cells after TORC1 had been inhibited and cells were released from anaphase arrest. Firstly, we focused on the study of Cbk1 localization at the site of division. Cbk1 concentrates at the division site following anaphase [ 36 , 40 , 41 ]. We found dynamics of GFP-tagged Cbk1 were similar in the experimental conditions described in Fig 2A , independently of the addition of rapamycin ( Fig 3C ). As TORC1 is a kinase, we hypothesised TORC1 could bind and phosphorylate Cbk1. To investigate whether Cbk1 was able to physically interact with TORC1, we synchronised CBK1-5FLAG HA3-TOR1 *cdc15-2* cells in late anaphase at 37  $^{\circ}$ C and added rapamycin to half of the culture for another 20 min. Subsequently, we pulled down the protein Cbk1-5FLAG and we found that Tor1 interacted with Cbk1 even if TORC1 had been inhibited ( Fig 3D ). These data would indicate that TORC1 and Cbk1 interact independently of whether TORC1 is active. To determine if Cbk1 protein mobility on SDS-PAGE was altered when TORC1 was inhibited by the addition of rapamycin in *cdc15-2* cells arrested in anaphase at 37  $^{\circ}$ C, we grew CBK1-5FLAG *cdc15-2* strain at 24  $^{\circ}$ C and later synchronised cells in late anaphase by raising the temperature to 37  $^{\circ}$ C as described for Fig 1B . We divided the culture in 2 and rapamycin was added to one half of the culture for 20 min. We found that blocking the ability of TORC1 to phosphorylate its substrates promoted a clear change in the electrophoretic mobility of Cbk1 while cells are arrested in anaphase at 37  $^{\circ}$ C ( Fig 3E , compare TOR1—rapamycin and + rapamycin). To confirm that the serine/threonine kinase activity of TOR1 was responsible for that shift, TOR1-1 CBK1-5FLAG *cdc15-2* strain was grown in the same fashion. We found that there was no mobility shift in rapamycin-resistant TOR1-1 *cdc15-2* cells, compare with *cdc15-2* control cells, despite the presence of rapamycin ( Fig 3E , compare TOR1 and TOR1-1 both + rapamycin). Furthermore, to determine that Cbk1 mobility shift corresponded to phosphorylation, Cbk1-5FLAG was immunoprecipitated from *cdc15-2* arrested in late anaphase by raising the temperature to 37  $^{\circ}$ C. Then, addition of Antarctic Phosphatase (AnP) to the Cbk1 IP promoted Cbk1 bands to collapse ( Fig 3F ). This band collapse exhibits similarity to Cbk1's electrophoretic mobility in the presence of rapamycin while cells are still arrested in late anaphase (compare Fig 2E and 2F ). To investigate whether Cbk1 mobility shift varied, depending on TORC1 activity, after late anaphase release, samples were taken every 30 min for 2 h at 24  $^{\circ}$ C in the presence of the absence of rapamycin ( Fig 3G ). We found Cbk1 mobility was the same independently of the presence of rapamycin once cells were released. At 24  $^{\circ}$ C, Cdc15 is active which promotes MEN-triggered Cdc14 phosphatase and leads to dephosphorylation of Cbk1 ( Fig 3G ). Finally, we arrested *cdc15-2* cells in G1 at 24  $^{\circ}$ C, then released cells at the same temperature and found that Cbk1 mobility at 90 min ( Fig 3H(i) ), precisely the time at which cells had initiated anaphase ( Fig 3H(ii) ), was similar as in anaphase-blocked *cdc15-2* cells at 37  $^{\circ}$ C after addition of rapamycin ( Fig 3G , see 37 $^{\circ}$ C + Rapa). Therefore, mobility changes for Cbk1 and Gln3 both might occur at the onset of

anaphase (compare Figs 1D and 3H ). Overall, these data indicated that TORC1 interacts with Cbk1, regulates and participates in the phosphorylation of Cbk1. Interestingly, phosphorylation in anaphase blocks the following cell separation in budding yeast, independently if Cbk1 is dephosphorylated after anaphase. Furthermore, Cbk1 mobility shifted at 90 min after G1 release, when our data suggested that TORC1 might be inactivated during mitosis too. (A) 3GFP-RAS2 *cdc15-2* (CC6298) cells were grown as described in Fig 1A and samples were taken at the shown times after the late anaphase release to determine the percentage of the cells with divided cytoplasm (i). Examples of 3GFP-Ras2 tagged cells in the absence of rapamycin are shown for the indicated time points (ii). White arrows indicate undivided cytoplasm, red arrows denote cells where examination of each z-level at the bud neck showed divided cytoplasm, blue arrows correspond to new bud neck with undivided cytoplasm, and new buds are marked with white asterisks. Scale bars indicate 5  $\mu$ m. (B) Schematic illustration of the RAM network and negative regulators of Cbk1 (Lre1 and Fir1). Upstream factors of the RAM cascade are required to phosphorylate Cbk1 HM on residue 743, which is essential for Cbk1 to turn active. Cbk1 positively regulates the transcription factor Ace by phosphorylation, which promotes the expression of hydrolases Cts1 and Dse4 to finally induce cell separation [ 4 ]. (C) CBK1-GFP *cdc15-2* (YMF3513) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of rapamycin to half of the culture. Subsequently, to allow progression through the cell cycle, cells were released in the absence (–) or presence (+) of rapamycin. Samples were taken at the indicated times. Using fluorescence microscopy, the proportion of cells with Cbk1 at the site of division in the absence (i) or presence (ii) of rapamycin was determined. Examples of cells with Cbk1-GFP at the bud neck 30 min after the release at 24 °C are shown in the absence (iii) or presence (iv) of rapamycin. Scale bars indicate 5  $\mu$ m. (D) CBK1-5FLAG HA3-TOR1 *cdc15-2* (YMF3608) and control cells (YMF3606) were grown at 24 °C in YPD medium and arrested in late anaphase. Rapamycin was added to half of the culture for 20 min. Protein extracts were prepared from cells arrested in anaphase in the absence or presence of rapamycin (YMF3608) or only in the absence of rapamycin (control cells) before immunoprecipitation of Cbk1 on FLAG-beads and detection of the indicated proteins by immunoblotting. (E) CBK1-5FLAG *cdc15-2* (YMF3302) and CBK1-5FLAG TOR1-1 *cdc15-2* (YMF3300) cells were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C; rapamycin was added (+) to half of each culture. Protein extracts were prepared from cells arrested in anaphase in the absence (–) or the presence (+) of rapamycin and subsequently analysed by immunoblotting. (F) CBK1-5FLAG *cdc15-2* (YMF3546) cells were grown in YPD and arrested in late anaphase at 37 °C before the immunoprecipitation of Cbk1 and incubation with AnP or phosphatase together with PIs before the detection of Cbk1 by immunoblotting. (G) CBK1-5FLAG *cdc15-2* cells (YMF3302) were grown as in (E). Then, cells were released at 24 °C in the absence (–) or presence (+) of rapamycin. Samples were taken at the indicated times and protein extracts were prepared and analysed by immunoblotting. (H) CBK1-5FLAG *cdc15-2* cells (YMF3302) were grown at 24 °C in YPD medium and synchronised in the G1 phase with mating pheromone before the cells were released from the G1 block to allow progression through the cell cycle at 24 °C. Samples were taken at the indicated times to prepare protein extracts before the detection of Cbk1 by immunoblotting (i) and to count the proportion of binucleate cells as cells were progressing through the cell cycle at 24 °C. Underlying data for all the graphs can be found in S1 Data file. Raw data for blots can be found in supporting information ( S3 Raw Images ). AnP, Antarctic Phosphatase; HM, hydrophobic motif; PI, phosphatase inhibitor; RAM, regulation of Ace2 and morphogenesis; TOR, target of rapamycin. We aimed to determine whether *cdc15-2* cells were defective in cytokinesis and/or cell separation. First, we investigated whether *cdc15-2* cells performed cytokinesis in the same experimental conditions as described above ( Fig 1A ). To study actomyosin ring formation and contraction, we used fluorescence microscopy of a GFP-tagged form of the protein Inn1, a component of the actomyosin ring [ 34 ] ( S1E Fig ). We found that Inn1 dynamics were similar in the absence or presence of rapamycin, indicating that cytokinetic machinery itself is not sensitive to the status of TORC1 activity ( S1E Fig ). To analyse the division of cytoplasm, we monitored plasma membrane dynamics in *cdc15-2* cells expressing, under its own promoter, the small G-protein Ras2 fused to 3 copies of GFP ( Fig 3A ). We grew 3GFP-RAS2 *cdc15-2* cells as in prior experiments ( Fig 2A ). Live cells were examined over the course of 2 h after the anaphase block and release in the absence or presence of rapamycin ( Fig 3A ). Cytoplasmic division

occurred with similar kinetics after anaphase release in almost all cells, regardless of rapamycin treatment ( Fig 3A ). We also examined 3GFP-RAS2 *cdc14-1* cells to confirm that cells performed cytokinesis but not cell separation after mitotic release, independently of rapamycin addition ( S1F Fig ). This again showed that TORC1 inactivation rescued cell division defect in *cdc15-2* cells but not in *cdc14-1* cells following release from late anaphase block. Taken together, these experiments indicate that cell division defect observed after the release of *cdc15-2* cells, while TORC1 is functioning, is not due to a cytokinesis failure, but to a cell separation defect, which prompted us to investigate the molecular mechanism. To investigate whether the MEN kinase Cdc15 shares a role in that control, we examined cells expressing, under the regulatable GAL promoter, the activator of anaphase-promoting complex/cyclosome (APC/C), the protein Cdc20. APC/C Cdc20 ubiquitinates securin (Pds1 in budding yeast) and marks it for degradation, allowing sister chromatid separation and progression to anaphase [ 31 ]. We grew GAL-CDC20 cells, in which Cdc15 protein was fully functional, asynchronously at 30 °C to subsequently deplete Cdc20 for 3 h, prompting a synchronous metaphase-like mitotic arrest [ 32 ] (more than 90% of cells became large-budded cells; Fig 2C ). The culture was split evenly in 2 and rapamycin was added for another 20 min to one half to study the result of inhibiting TORC1 activity. Cdc20 expression was resumed at 30 °C in fresh medium containing galactose, inducing the release from metaphase arrest, with or without rapamycin ( Fig 2C(i) and 2C(ii) ). We found that TORC1 function is unable to block cell division if the Cdc15 kinase was active throughout the experiment ( Fig 2C(iii) and 2C(v) ), unlike what we had observed in *cdc15-2* cells when Cdc15 had been inactivated ( Fig 2A(i) and 2A(iii) ). (A) *cdc15-2* cells (CC2274) were grown in YPD and arrested in late anaphase by shifting the temperature to 37 °C before the addition of rapamycin to half of the culture (ii). Then, cells were released at 24 °C in the absence (i) or presence (ii) of rapamycin. Samples were taken at the indicated times to determine DNA content by FACS analysis. Using light microscopy, we studied cell morphology in the absence (iii) or presence (iv) of rapamycin at the 120 min time point after the release from late anaphase arrest. Scale bars indicate 5  $\mu$ m. (B) TOR1-1 *cdc15-2* (YMF3240) cells were grown as in A and samples were taken at shown times to determine DNA content ((i) and (ii)) and cell morphology in the absence (iii) or presence (iv) of rapamycin at 120 min after the release from late anaphase arrest. Scale bars indicate 5  $\mu$ m. (C) Schematic representation of experimental set-up in which GAL-CDC20 cells (CC5909) were grown in YP raffinose + galactose medium at 30 °C before cells were arrested in metaphase by resuspending in YP raffinose + 0.01% glucose medium and incubated for 3 h. Approximately 20 min before the end of the block, rapamycin was added to half of the culture (ii). Cells were released at 30 °C by the addition of galactose in the absence (i) or presence (ii) of rapamycin. Samples were taken at the indicated times to study DNA content by flow cytometry. FACS profiles and cells pictures are shown in the absence ((iii) and (v)) or presence ((iv) and (vi)) of rapamycin. Scale bars indicate 5  $\mu$ m. (D) Schematic representation of 2 alternatives for Cdc15 function in our experimental conditions, either independent (i) or dependent of its role in the MEN pathway to release special phosphatase Cdc14, whose role in late mitosis, cytokinesis, and cell separation have been described. (E) *cdc14-1* (YMF3375) cells were grown as in A and samples were taken at the specified times to study cell cycle progression by FACS analysis ((i) and (ii)) and cell morphology in the absence (iii) or presence (iv) of rapamycin at 120 min after the release from late anaphase arrest. Scale bars indicate 5  $\mu$ m. (F) GLN3-9MYC *cdc14-1* cells (YMF4298) (i) and GLN3-9MYC TOR1-1 *cdc14-1* cells (YMF4456) were arrested at end of anaphase by shifting the temperature at which cells were growing to 37 °C. Subsequently, rapamycin was added and protein extracts were prepared and analysed by immunoblotting at the indicated times while cells were still arrested in late anaphase. FACS graphs can be found in the supplementary FACS file ( S1 File ). Raw data for blots can be found in supporting information ( S2F Raw Images ). MEN, mitotic exit network; TOR, target of rapamycin. In a normal cell cycle, down-regulation of kinase activity associated to Clb2/CDK complexes depends on Clb2 degradation, as seen in Fig 1D , and Sic1 inhibition. To determine whether inactivation of CDK activity was able to induce a change in Gln3 mobility, we expressed a stable form of Sic1 (Sic1 $\Delta$ NT) while cells were blocked in G2-M by the presence of nocodazole in the culture ( S1A Fig ). We found a slight change in Gln3 mobility, which would indicate that inactivation of CDK was unable to drive Gln3 dephosphorylation ( S1A(i) Fig ). Whereas addition of rapamycin, while cells were arrested in G2-M and CDK was down-regulated, rapidly promoted Gln3 dephosphorylation, which suggest that TORC1 was

mainly responsible for Gln3 dephosphorylation ( S1A(ii) Fig ). Taken together, these experiments suggest that TORC1 might be inactivated during mitosis as it has been described in human cells [ 29 ].

(A) Schematic representation of experimental set-up in which *cdc15-2* cells were arrested at 37 °C in late anaphase, and 20 min before the end of the block, rapamycin was added to half of the culture (ii). Subsequently, cells were released in the absence (i) or the presence of rapamycin (ii). (B) GLN3-9MYC *cdc15-2* cells (YMF3178) (i) were grown as in the experimental set-up shown in A until the end of the late anaphase arrest. Rapamycin was added and protein extracts were prepared and analysed by immunoblotting at the indicated times while cells were still arrested in late anaphase. In addition, SCH9-6HA *cdc15-2* cells (YMF3782) (ii) and ATG13-5FLAG *cdc15-2* cells (YMF4500) (iii) were grown and protein levels were analysed in the same way as for (i). (C) GLN3-9MYC *cdc15-2* cells (YMF3178) (i) and TOR1-1 GLN3-9MYC *cdc15-2* cells (YMF3260) (ii) were grown and analysed as in B using a phospho specific antibody that recognises phosphorylation on residues Ser235 and Ser236 of the TORC1 target Rps6. (D) GLN3-9MYC (YMF3154) and CLB2-9MYC cells (YMF3262) were grown at 24 °C in YPD medium and synchronised in G1 phase with mating pheromone before cells were released from the G1 block to allow progression through the cell cycle at 24 °C. Samples were taken at the specified times to prepare protein extracts before the detection of Clb2 and Gln3 by immunoblotting (i). Ratio of hypophosphorylated Gln3 and hyperphosphorylated Gln3 at each time point is depicted (Hypo-P Gln3/Hyper-P Gln3) (ii). Mean of 3 biological replicates and SEM are shown in the graph. In addition, cells were taken to count the proportion of binucleates as cells were progressing through the cell cycle at 24 °C (ii). (E) GLN3-9MYC (YMF3154) and CLB2-9MYC cells (YMF3262) were grown as in D, but rapamycin was added 45 min after G1 release. Analysis was carried out in the same way as in D. Underlying data for all the graphs can be found in S1 Data file. Raw data for blots can be found in Supporting information ( S1 Raw Images ). TOR, target of rapamycin. Rapamycin treatment specifically blocks the activity of TORC1 and promotes an arrest in the G1 phase of the cell cycle [ 18 – 20 ] and may also delay or inhibit other cell cycle phases [ 13 , 21 , 22 ]. We sought to determine if TORC1 has specific roles in cell division following anaphase. An asynchronous culture of cells harbouring a temperature sensitive mutation in the *CDC15* gene, *cdc15-2*, was grown at 24 °C. *CDC15* encodes for a kinase, member of the MEN pathway, which plays an essential role allowing cells to exit mitosis [ 4 , 23 ]. We synchronised *cdc15-2* cells in late anaphase by raising the temperature at 37 °C for 2.5 h. More than 90% of cells accumulated as large-budded cells. The culture was split evenly in 2 ( Fig 1A(i) and 1A(ii) ), and rapamycin was added to one half of the culture to inactivate TORC1 for another 20 min while cells were maintained at 37 °C before release at the permissive temperature of 24 °C ( Fig 1A(ii) ). Cells readily re-enter the M to G1 transition upon shift to permissive temperature. We confirmed that the TORC1 target protein Gln3, a transcription activator responsible for expression of Nitrogen Catabolite Repression-sensitive genes, was rapidly dephosphorylated after rapamycin addition ( Fig 1B(i) ) as previously described [ 24 ]. In addition, we found that inactivation of TORC1 activity promoted rapid dephosphorylation of other known TORC1 substrates too, like Sch9 and Atg13 ( Fig 1B(ii) and 1(iii) ), as previously reported [ 25 ]. Furthermore, phosphorylation of the ribosomal protein S6 (Rps6) has been shown to monitor activation of TORC1 in budding yeast [ 26 ]. Using a highly specific antibody [ 26 ], we showed that Rps6 is rapidly dephosphorylated in anaphase-arrested *cdc15-2* cells after rapamycin addition ( Fig 1C ). In budding yeast, TORC1 contains one of 2 kinases, Tor1 or Tor2, responsible for the phosphorylation of its targets [ 27 ]. In addition, subunits Lst8 and Kog1 form part of the complex [ 27 ]. To confirm that detection of Rps6 phosphorylation was dependent on the activity of kinase Tor1, we used the mutant TOR1-1, which is resistant to rapamycin [ 28 ]. We arrested TOR1-1 *cdc15-2* cells in late anaphase by shifting cells at 37 °C, and we found that Rps6 phosphorylation was maintained despite the presence of rapamycin ( Fig 1C(ii) ). Therefore, these experimental data showed that TORC1 was specifically inactivated in *cdc15-2* cells that were blocked in late anaphase after the addition of rapamycin as depicted in Fig 1A(ii) . Finally, to determine whether TORC1 inactivation might occur in a normal cell cycle, we released GLN3-9MYC cells from a G1 block and study the mitotic cyclin Clb2, which accumulated as cells approaching mitosis and is inactivated in late anaphase ( Fig 1D(i) 120'). After finishing the first cycle, cells lost synchrony and Clb2 accumulated quickly ( Fig 1D(i) 150'). Using 3 biological replicates, we found that dephosphorylation of Gln3 increased when the number of binucleated cells peaked after G1 release ( Fig 1D , 90'), which would

indicate that TORC1 is inactivated in anaphase, before Clb2 inactivation was started ( Fig 1D(i) , 120). As control, we showed that hypophosphorylated form of Gln3 accumulated when rapamycin was added 45 min after G1 release ( Fig 1E ).

**Discussion** Our data highlight a novel role for the TOR signalling pathway to negatively regulate cell separation in budding yeast that is counteracted by the kinase Cdc15, which is a Mst/hippo like kinase (Fig 8A). In addition to the role of TORC1 in cell growth, it has been shown that TORC1 promotes early steps in the cell cycle like G1 progression and transition into S-phase [59–61]. Later in the cell cycle, TORC1 drives mitosis progression by stabilising mRNA of mitotic cyclin Clb2 [13]. Besides, TORC1 controls other aspects of mitosis in budding yeast as it regulates nuclear localization and activation of the polo-kinase Cdc5, structure and function of microtubules, and mitotic spindle assembly [21,22,62].

**PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 8. Proposed model for how TORC1 regulates Cbk1 activity.** (A) Mitotic kinase Cdc15 promotes cell separation while TORC1 negatively controls cell separation. (B) Interplay between Cdc15 and TORC1 regulates kinase activity associated with Cbk1. TORC1 is active until anaphase, which promotes cell growth and inhibits cell separation. Cdc15 becomes active in anaphase and releases Cbk1 from TORC1-driven inhibition. At this point, Cbk1 turns catalytically active and would eventually regulate phosphorylation of key substrates that promote membrane fusion at the site of division. One of those substrates is Sec3 that induces the interaction between t-SNARE components Sso1/2 and Sec9 to drive the fusion of secretory vesicles into the plasma membrane. Finally, hydrolases contained in secretory vesicles are released to promote cell separation. (C) Proposed model for how the conserved NDR kinase Cbk1 is controlled by TORC1 and Cdc15 during mitosis in budding yeast. (i) Metaphase cells are able to delay mitosis if they are shifted from rich to poor carbon sources causes, whereas anaphase cells seem to be insensitive to that change in carbon sources [63]. (ii) Kinase activity associated with TORC1 negatively regulates Cbk1, while Cdc15, FEAR Cdc14, and the RAM pathway promote Cbk1 activity. Cdc15 and Cdc14 are components of the MEN pathway that is essential for cell to exit mitosis. Cdc14 is the most downstream factor of MEN. The role of Cdc15 to control cell separation is different from its function at the anaphase to telophase transition. (iii) Gln3 (a TORC1 substrate) and Mitotic cyclin (Clb2) are included to depicted timing of events during mitosis: dephosphorylation of Gln3 occurred when percentage of anaphase cells peaked, whereas down-regulation of mitotic cyclins (Clb2) drives the transition between anaphase to telophase and takes place slightly later (experimental data for Gln3 and Clb2 are included in Fig 1D). MEN, mitotic exit network; NDR, nuclear Dbf2-related; RAM, regulation of Ace2 and morphogenesis; TOR, target of rapamycin. <https://doi.org/10.1371/journal.pbio.3002263.g008>

We described a novel mechanism by which TORC1 blocks cell separation between mother and daughter cells (Fig 8A and 8B). The mitotic kinase Cdc15 prevents that inhibition and allows cells to separate and start a new cell cycle apart from each other (Fig 8), which explains why inactivation of TORC1, by the addition of rapamycin, rescues unexpectedly cell separation defect in *cdc15-2* cells (S10 Fig). Besides, it explains why cells do not show a cell separation defect if Cdc15 is active after metaphase block and release (Fig 2C). Critical cell cycle transitions are prolonged depending on cell size, which is regulated in response to environmental cues [64]. Shift from rich to poor carbon sources causes prolonged metaphase delay, whereas anaphase cells seem to be insensitive as they are unable to delay mitosis [63] (Fig 8C(i)). Interestingly, we found that dephosphorylation of a TORC1 substrate, Gln3, occurs in anaphase before cells down-regulate mitotic cyclin Clb2 at the anaphase to telophase transition (Figs 1D and 8C(iii)). In addition, inactivation of TORC1 in G2-M arrested cells drove Gln3 dephosphorylation (S1A(ii) Fig), which shows again that Gln3 dephosphorylation we observed before Clb2 depletion depends on TORC1 down-regulation (Figs 1D and 8C(iii)). Therefore, anaphase cells might inactivate the mechanism by which cells coordinate cell growth and cell cycle progression, which would agree with our findings. Functional connections between mTOR and Hippo pathways have been described in mammalian cells in different context other than cell separation [65–68]. Future work will need to determine whether Cdc15 might phosphorylate cell separation substrates that would counteract TORC1 inhibitory phosphorylation (Fig 8B and 8C). This novel function of Cdc15 is different from its well-described role in MEN pathway to release Cdc14 from the nucleolus and drive exit from mitosis as it occurred at 2 distinct moments at the end of the cell cycle (Fig 8C). TORC1 binds to the NDR kinase Cbk1, controlling and participating in its phosphorylation (Figs 3 and 8). Our data would suggest that

TORC1 blocks Cbk1 activity before the onset of anaphase and cells are unable to initiate cell separation (Fig 8B and 8C). At anaphase, FEAR release of Cdc14 dephosphorylates and activates Cdc15 (Fig 8C(ii)), stimulating its ability to promote mitotic exit too [30,69]. Before the end of anaphase, activated Cdc15 would release Cbk1 from TORC1-induced inhibition (Fig 8B and 8C(iii)). Interestingly, Cdc15 has been described to phosphorylate 2 key regulatory phosphorylation sites on the NDR kinase Dbf2, the most downstream kinase in MEN pathway [70]. Mammalian NDR kinases also contain 2 key residues that are required to be phosphorylated [71]. Dbf2 shares structural similarities with Cbk1 and those 2 important residues are conserved [72]. The RAM cascade is required to phosphorylate one of those residues located at the C-terminal HM of Cbk1 (T743), whereas autophosphorylation of the other residue located at the activation loop (S570) is important for Cbk1's kinase activity [39]. Future experiments should determine how Cdc15 might contribute to Cbk1 activation to counteract TORC1 negative control. On the other hand, FEAR Cdc14 promotes precisely the phosphorylation of Cbk1's C-terminal HM by RAM pathway (Fig 8C(ii)). Both Cdc15-driven release of TORC1 block and RAM phosphorylation on HM would activate Cbk1 kinase activity in anaphase, which would promote the following cell separation (Fig 8C(ii)). This is a novel mechanism by which cells order the sequence of different cell-cycle steps and coordinate cell cycle with cell growth. In anaphase-arrested cells, the phosphorylation profile of Cbk1 varies depending on TORC1 kinase activity (Figs 3E and S10 and Table 1). TORC1-regulated phosphorylation on Cbk1 must inhibit Cbk1 function in anaphase, which blocks the following cell separation, even though Cbk1 could be dephosphorylated after anaphase. Therefore, Cbk1-dependent phosphorylation of key substrates must occur in anaphase (Fig 8). Strikingly, a single mutation on a conserved residue of Cbk1 activation loop, T574E, is enough to reproduce the cell separation defect in the presence of rapamycin (Fig 4D). It is likely that our mass spectrometry analysis was unable to identify residue T574 as a phosphosite (Tables 1 and S1) since the corresponding peptide generated using trypsin digestion was too large. We found that Cbk1-T574E is catalytically inactive, suggesting that is precisely how TORC1 might negatively control cell separation: inactivation of Cbk1 kinase activity. An alanine substitution on T574 was unable to rescue cell separation defect in the absence of rapamycin, which suggests that TORC1 must participate in the phosphorylation of other residues within Cbk1 or other proteins. In fact, mass spectrometry found changes in the phosphorylation pattern of some key Cbk1 regulators (Fir1, Lre1, Mob2, or Tao3) and some Cbk1 substrates (Ace2 and Ssd1). Indeed, TORC1 and Ssd1 have been described to collaborate to maintain cellular integrity [73]. We managed to find mutants that reproduced TORC1 block on cell separation. However, the generation of non-phosphorylatable mutants that would be able to avoid TORC1 control has turned out challenging as we would have needed to identify all residues regulated by TORC1 within Cbk1 and other proteins. Since our findings suggested that the cell separation defect associated with *cdc15-2* cells was due to a block in secretory vesicle fusion into the plasma membrane (Fig 8B and 8C(ii)), we searched for proteins involved in that cellular process to understand the molecular mechanism behind TORC1 control. Interestingly, it has been recently suggested a role for Cbk1 in vesicle transport and/or membrane fusion [5]. We determined that Cbk1 binds, controls, and participates in the phosphorylation of the exocyst component Sec3 (Fig 7), as in the fission yeast *Schizosaccharomyces pombe* [54]. Cbk1 phosphorylation consensus sequences were described in Sec3 [48], whose phosphorylation has been described to be rapamycin sensitive [44,45]. Our data would suggest that Cbk1 phosphorylation on Sec3 must occur in anaphase as discussed above and, if TORC1 blocks Cbk1 kinase activity, Sec3 phosphorylation would be defective and mother and daughter cells would be unable to separate (Figs 8 and S10). Sec3 is essential for the tethering of secretory vesicles at the site of division [51,52]. In addition, Sec3 binds to t-SNARE Sso2, releasing Sso2 from an autoinhibition conformation to subsequently induce Sso2 to interact with t-SNARE Sec9 and finally induce membrane fusion [57,58] (Fig 7E(i)). Actually, the exocyst promotes the assembly of SNARE complex and subsequently vesicle fusion (<https://doi.org/10.1101/2022.01.16.476540>). Cbk1 phosphorylation on Sec3 (Fig 7D) might regulate Sso2 function and its ability to induce membrane fusion via Sec9. In fact, we found that Sec3 interaction with Sec9 was compromised in *cdc15-2* cells in which TORC1 was active after late anaphase block and release (Fig 7E(ii)). We showed that TORC1 regulates and participates in the phosphorylation of Cbk1, which would become catalytically inactive. In turn, Sec3 phosphorylation would be defective, which would alter the function of the t-SNARE complex

and prevent membrane fusion, at the site of division, of secretory vesicle transporting hydrolases like Cts1. We generated a phosphomimetic version of Sec3 (Sec3-4E; S18E, S32E, S43E, and S66E), but we were unable to test it as sec3-aid ADH-TIR1 cells were able to grow under restrictive conditions at 24 °C, which showed that Sec3 depletion was not completely effective (S9B Fig). This prevented us from the use of sec3-aid mutant, in combination with cdc15-2, to inactivate Cdc15 function at 37 °C and test whether Sec3-4E was able to rescue cell separation defects associated to cdc15-2 cells. Furthermore, deletion of the first 146 amino acids of Sso1 released the protein from its autoinhibition conformation. Therefore, we tried to investigate whether such deletion might rescue cell separation defects in cdc15-2 cells. Unfortunately, adding 5xFLAG to the N-terminal end of Sso1 makes the protein unfunctional as sso2Δ cells carrying that form of Sso1 are dead (S9C Fig). Interestingly, Cbk1 binds to paralogs serine/threonine kinases Kin1 and Kin2 (S8A Fig and S2 Table) [74,75], Kin2 is phosphorylated when TORC1 is inactive (Table 1) and, presumably, Cbk1 is active, consistent with our data. Both budding yeast Kin1 and Kin2 kinases regulate late stages of exocytosis via phosphorylation of t-SNARE Sec9 [76,77], suggesting that Cbk1 role in the regulation of membrane fusion might also target Sec9 via Kin1 and Kin2. In addition, the fission yeast ortholog of Cbk1, the protein Orb6, was found also to bind to the kinase Ppk25 whose kinase domain is most similar to Kin1 and Kin2 [54]. Cell cycle machinery guarantees the temporal control of the different steps during the cell cycle. CDK activity drives progression throughout the cell cycle until the end of mitosis and, at the same time, blocks late events during the cell cycle to assure the orderly sequence of events [1–3]. Mitotic CDK blocks cell separation by direct phosphorylation of Ace2 and Cbk1, inhibiting Ace2 nuclear localization. Consequently, key hydrolases involved in cell separation are not expressed. To allow cells to end the cell cycle and start a new one, cells need to inactivate kinase activity associated with CDK, for which MEN signalling pathway plays a key role, especially the phosphatase Cdc14 as the downstream factor of MEN [33,78,79] (Fig 8C). Cdc14 is required to dephosphorylate both Ace2 and Cbk1 and promote cell separation [4]. However, our experimental system allowed us to study specifically TORC1 control over cell separation. This is independent of CDK function over Ace2 and Cbk1, since late anaphase-arrested cdc15-2 cells accumulated hydrolases like Cts1 and Dse4, even when Ace2 and Cbk1 were depleted (Fig 5B and 5C) and kinase activity associated with CDK is still high in late anaphase. Therefore, Cbk1 induces Cts1 secretion independently of Cbk1 role in promoting Cts1 expression. Our data suggested a role for Cbk1 in membrane fusion at the site of division by regulating the function of exocyst Sec3 and t-SNARE components (Fig 8). The strategy by which NDR/LATS kinases control vesicle transport and membrane fusion is likely conserved in *S. cerevisiae* and *S. pombe*, as both yeast cells share the phosphorylation of Sec3 as a target (Fig 7 and [54]). Interestingly, fission yeast exocyst mutants show cell separation defects [80], the fission yeast ortholog of Cbk1, Orb6, regulates exocytosis and it has been proposed that phosphorylation of Sec3 by Orb6, together with exocyst component Exo70, promotes exocytosis to induce cell separation [54]. Furthermore, mammalian NDR1/2 kinases also control vesicle-mediated trafficking and exocytosis [81,82], indicating a universal mechanism for NDR/LATS kinases to regulate cell polarity and exocytosis. In addition, Cbk1 binds and phosphorylates Sec2, essential for post-Golgi vesicle transport [83], although we do not detect any defect in vesicle transport to the site of division as Cts1 is able to localise when Cbk1 activity is compromised (Figs 5F and 6C). TORC1 plays a key role in the regulation of different steps of the cell cycle among eukaryotes, which suggest a universal mechanism too. Fission yeast cells couple the cell cycle with the nutritional environment [84]. In mammalian cells, TORC1 controls different aspects of the cell cycle, including mitosis [85,86]. Interestingly, it has been reported very recently that in mouse and human cells mTORC1 substrate, S6 Kinase 1, phosphorylates Cdk1, inducing a G2/M cell-cycle arrest to promote DNA repair [87]. TOR activity, Mst/hippo signalling pathways, exocyst, and SNARE complexes are highly conserved in eukaryotes. Defects in the molecular mechanisms they are involved have been described in a variety of human diseases, such as cancer and diabetes. The elucidation of the mechanisms and their coordination will be important to understand human pathology.

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**URL:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0289140>

**Title:** More than urns: A multi-method pipeline for analyzing cremation burials

**Text:** Burial rites of archaeological populations are frequently interpreted based on cremated remains of the human body and the urn they were deposited in. In comparison to inhumations, information about the deceased is much more limited and dependent on fragmentation, selection of body regions, taphonomic processes, and excavation techniques. So far, little attention has been paid to the context in which urns are buried. In this study, we combined archaeological techniques with anthropology, computed tomography, archaeobotany, zooarchaeology, geochemistry and isotopic approaches and conducted a detailed analysis on a case study of two Late Bronze Age urns from St. Pölten, Austria (c. 1430 and 1260 cal. BCE). The urns were recovered en-bloc and CT-scanned before the micro-excavation. Osteological and strontium isotope analysis revealed that the cremated remains comprised a young adult female and a child that died at the age of 10–12 years. Both individuals had been subject to physiological stress and were likely local. Animal bones burnt at different temperatures suggested different depositional pathways into the urn and pit as part of the pyre, food offerings, and unintentional settlement debris. Eight wild plant and five crop plant species appeared as part of the local landscape, as food offerings and fire accelerants. Sediment chemistry suggests that pyre remains were deposited around the urns during burial. Multi-element geochemistry, archaeobotany, and zooarchaeology provide insights into the Late Bronze Age environment, the process of cremation, the gathering of bones and final funerary deposition. Funding: This study was funded by the Austrian Science Fund (FWF) in the framework of the project 'Unlocking the secrets of cremated human remains' (grant number P-33533) awarded to KRS. This study is also supported by the ERC Starting Grant LUMIERE (Landscape Use and Mobility In EuRope –Bridging the gap between cremation and inhumation), funded by European Union's Horizon 2020 research and innovation programme (grant number 948913), awarded to CS. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. Copyright: © 2023 Waltenberger et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. This article presents the results of a multi- and interdisciplinary approach to the analysis of urn burials. Large cemeteries containing several hundreds of urns of the Late Bronze and Early Iron Ages (c. 1300–600 BCE) gave rise to the name 'Urnfield Culture' for the Late Bronze Age in Central Europe. The dead were cremated and usually buried in individual urns, although multiple individuals cremated and buried together are not uncommon [ 8 , 16 , 17 ]. Combining archaeology with osteology, computed tomography, archaeobotany, zooarchaeology, geochemistry and isotopic approaches allows insights into the lives of the buried persons as well as a detailed reconstruction of funerary rituals of the Late Bronze Age, the latter of which is only possible with large samples. As an example, we applied these methods to a case study of two Late Bronze Age urns to present the power of this multimethod approach. Cremated human remains provide unique analytical and interpretative challenges. Exposure to fire, the subsequent selection of skeletal elements for burial, taphonomic processes, and excavation techniques cause bones to fracture into smaller elements [ 9 , 10 ] and reduce the amount of morphological information obtained about the deceased. Moreover, ancient proteins and DNA disintegrate above a certain temperature [ 11 ]. Further, cremated human individuals are often found commingled with the remains of others, especially when a communal pyre place is preferred, as well as with burnt animal bone fragments resulting from meat offerings cremated together with the dead [ 12 – 15 ]. Archaeological museum collections in Europe house large numbers of vessels that were used as containers for cremated human remains during the Late Bronze Age. Urns from antiquarian excavations, on which such collections were built, were treated as collectible items interesting for their artistic and cultural-historical value [ 1 ]. Little attention was paid to the remains of the people within the urns and to the contextual information in the soil surrounding the urn. This has recently changed, with research focusing on the analysis of cremated human remains [e.g. 2 – 8 ]. This study expands on this trend in funerary archaeology of cremations with a multi-method approach. Soil samples were taken from inside and outside both urns for geochemical analysis. 23.5 liters of soil were used for archaeobotanical analysis. All recovered bone fragments were washed in water and dried for the osteological analysis. One completely calcined diaphyseal fragment of each urn, which had not been treated with Paraloid was taken for radiocarbon dating and strontium isotope analysis. For each present individual, two dental roots were submitted to tooth cementum annulation analysis. Animal



bones were separated from human bones during the osteological analysis based on the morphology of the bone fragments (size, thickness and cross-section of shaft diameter [ 29 , 30 ]), and subsequent zooarchaeological analysis was carried out using a comparative zooarchaeological reference collection to determine taxa. a) Urn 1 after en-bloc recovery. b) Urn 1 after removing the plaster and placing it upside down. Please note a part of a second vessel at the top of the block. c) Urn 2 after en-bloc recovery. d) Urn 2 after removing the plaster. Scale length is 1 cm. Still in plaster, the urns were CT-scanned at the University Clinic of Dentistry of the Medical University of Vienna. After digital reconstruction of the content of the urns, they were micro-excavated at the Austrian Archaeological Institute ( Fig 3 ). We used two different excavation techniques for each urn for comparison: Urn 1 was turned upside down; the ceramic sherds were removed, and the urn content was micro-excavated from the base to the upper surface. This reverse technique was chosen to avoid uncontrolled damage to the block and for ease of access. Urn 2 was excavated from the top to the bottom in 1 cm thick arbitrary layers. After the removal of the plaster, the first calcined bone fragments were already visible at the top of Urn 1. Urn 1 was excavated in 20 mm arbitrary layers. All layers were further divided into four quadrants based on cardinal points (NE, SE, SW, NW) to further analyze the vertical and horizontal distribution of the recovered bones. Layers were regularly compared to the CT scans to evaluate discrepancies between the digital and physical excavation. Diagnostic elements that were essential for the anthropological analysis of the cremated remains were documented in situ before recovery. Bone fragments in Urn 1 were additionally consolidated in situ with an 8% Paraloid TM B72 acetone solution to avoid breakage during recovery. Paraloid B72 is commonly used as a consolidant for bones or ceramics in archaeological conservation [ 24 – 26 ]. Paraloid may affect chemical analysis [ 27 , 28 ]. Consequently, untreated bone fragments have been chosen for isotope analysis. Furthermore, all bone fragments that were treated with Paraloid were packed separately from the other bones to highlight their consolidation to future researchers. As a comparison, bone fragments from Urn 2 were left untreated. Urn 1 (SE3605) was found disturbed and damaged at the top, whereas the rim of Urn 2 (SE3602) was complete and discovered about 8 m towards the north-west of Urn 1. The grave pits were not visible in the light brown, silty clay soil during the excavation ( Fig 2 ). Both urns were surrounded with plaster on site and recovered en-bloc. A third urn found in the vicinity (SE3632) was poorly preserved and is not included in this study. The two Bronze Age urns in this study were found in the course of rescue excavations in the historical city center of St. Pölten, Fuhrmannsgasse 3–7, in 2021, amongst other prehistoric, Roman, medieval and modern findings. St. Pölten is situated in the valley of the Traisen river, a tributary to the Danube approximately 50 km west of Vienna in Lower Austria ( Fig 1 ). Large cemeteries such as Early Bronze Age Franzhausen and Gemeinlebarn [ 18 , 19 ], as well as Late Bronze Age Franzhausen-Kokoron and Inzersdorf [ 20 , 21 ], are also part of this rich archaeological landscape [ 22 , 23 ]. Methods and results CT scans CT scans of urns containing cremated remains have been common in the last decades (e.g. [31, 32]). However, based on the site, the soil quality and the CT scanner used, the quality of the scans was highly variable suggesting that CT scanning is a beneficial and time-saving method, but their potential for anthropological analysis is limited [32, 33]. Consequently, Harvig et al. 2012 [10] suggested using CT scanning as a method to support micro-excavation and that it is best suited to gain an overview of the urn content. In our study, urns were CT scanned using a Siemens SOMATOM Definition AS CT scanner at the University Clinic of Dentistry of the Medical University of Vienna. The best scanning quality was obtained using a scanning protocol with 140 kV, 420 eff. mAs, a voxel size of 0.6 mm, and a slice thickness of 0.5mm. The CT scanning data were semi-automatically segmented after the protocols of Spoor, Zonneveld [34] in the software Amira v6.7 [35]. For this, average Hounsfield units were calculated for different materials and bone fragments of different thicknesses to handle the partial volume effect. Based on these thresholds, the materials were automatically segmented in Amira. Because of irregularities in the scan quality due to artifacts and noise, the segmentation was manually corrected in areas where the automatic segmentation failed. 3D models of the urn, artifacts, identified bone fragments, and general bone fragments were exported in an STL format (.stl) to obtain a first impression of the condition of the urn content. The urn was divided into a series of axial 1 cm thick layers based on the planned excavation layers and the images were post-processed using the Maximum Intensity Projection (MIP) method. Photogrammetric models (.obj) were obtained of the uncovered urns and during several

excavation steps using a Nikon DSLR-camera D5300 equipped with an AF-S Nikkor DX 18–105 mm/3.5–5.6G ED VR lens and the software Autodesk ReCap Photo v21.1.3.41. The CT scans of Urn 1 showed a lower image quality than Urn 2, which was compromised by noise and some cone beam hardening artifacts in the scans. The recovered block was much larger (Urn 1: approx. 460 × 380 mm, Urn 2: 300 × 310 mm) and the soil was very rich in pebbles, which absorbed X-rays during the CT scanning. Moreover, both urns contained metal objects, grave or pyre goods, that were clearly visible on the CT scans. The density of Urn 1 appeared similar to the surrounding soil in the CT scans, which required manual segmentation of the urn. In areas where the soil was very compact, the shape of the urn vessel was only recognizable as a shadow. The base of Urn 1, for instance, was completely invisible. In other areas, a small air gap developed between the urn and the soil as water evaporated after recovery, which made it easier to distinguish the urn from the surrounding soil. One large ceramic sherd (c. 180 × 140 mm) was visible under the base of Urn 1, which did not belong to the urn based on shape. Urn 1 contained an inhomogeneous layer of cremated bones that sloped up at the western side, whereas the eastern side only contained a thin layer of bones and some bone fragments in the soil above this layer. Since the urn had been placed horizontally in the burial pit, this suggests that after the cremation, the bones were gathered predominantly into one side of the urn; alternatively, the urn could have been held and carried in a tilted way shortly before it was buried. Two large diaphyseal fragments with concentric heat fractures, a distal femur fragment of 120 mm and a humerus fragment of 68 mm, as well as a proximal femoral end were clearly identifiable in the CT scans. In the CT scans of Urn 2, the urn was easy to distinguish from the surrounding soil, which made the segmentation process straight forward (Fig 4). The scans revealed a layer of cremated bone fragments within Urn 2 that filled approximately one-third of the urn. In comparison to Urn 1, the bone fragments appeared more gracile and had smaller epiphyses. Tibia, femur, humerus, and cranial fragments were identifiable based on the shape of the bone fragments (Fig 5). In addition, one isolated humerus head was present, but the open epiphysis was not explicitly recognized due to insufficient scanning resolution. PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 4. 3D surface construction of the findings of Urn 2. Green: ceramic of Urn 2, purple: ceramic sherds of another vessel next to Urn 2; blue: general bone fragments; other colors: identifiable bone fragments. Scale length is 6 cm.

<https://doi.org/10.1371/journal.pone.0289140.g004> PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 5. a) mid-sagittal section of Urn 1 with arbitrary excavation layers, b) MIP-projection of layer 80, c) photo of layer 80 during excavation, d) mid-sagittal section of Urn 2 with arbitrary layers, e) MIP-projection of layer 150, f) photo of layer 150 during excavation. The numbers represent identifiable structures in b) and c) or e) and f): 1) lumbar vertebra, 2) femoral head, 3) humerus diaphysis, 4) bronze wire and pendant, 5) cranial fragment, 6) humerus head, 7) bronze spirals, 8) bronze sheet, 9) cranial fragment, 10) tibial fragment. Scale length is 5 cm.

<https://doi.org/10.1371/journal.pone.0289140.g005> Micro-stratigraphy During the micro-excavation, we recovered several white to dark grey layers containing ash, some diaphyseal and rib fragments measuring up to 30 mm, calcined bone fragments smaller than 1 mm, small bronze spiral fragments and charcoal under the base of Urn 1. These layers were always observed close to large, old cracks in the urn, indicating that water had washed these fragments out over time. After removing the sherds of the urn, the Urn 1 content was micro-excavated in seven 2 cm arbitrary layers. Several well-preserved elements were identified that were not visible in the CT scans, for example a mandibular body with premolar and molar roots still in the dental sockets, an acetabulum, several complete vertebral bodies, several metacarpal bones, and both proximal femoral ends, that are rarely preserved intact in prehistoric cremated remains. All elements which would fracture into non-recognizable fragments after recovery were stabilized using Paraloid (Fig 6). Before the application of Paraloid, the bone surface was carefully cleaned with water and cotton swabs to allow a better impregnation of the bones with the consolidant. After the water evaporated, the 8% solution was applied with a pipette. For 5 minutes, the bone was dried until the surface was not sticky anymore. The bone was recovered and extra Paraloid and soil particles sticking to the bone surface were carefully wiped off using cotton swabs and acetone. PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 6. Consolidated bones from Urn 1. a) prox. femoral end, b) humerus diaphysis, c) 4th metacarpal bone. Scale length is 10 cm.

<https://doi.org/10.1371/journal.pone.0289140.g006> Urn 2 was completely intact except for a partially

fragmented rim and a crack that split the urn in half along the sagittal axis. During the removal of the soil surrounding Urn 2, a base fragment of a thin-walled ceramic vessel was recovered towards the north side. The vessel was only visible as a weak shadow in the CT scans and would have been easily overlooked. To avoid breakage during micro-excavation of the urn content, the urn was wrapped in cling film and excavated in nine 1 cm layers. The upper two thirds of the urn were filled with homogenous soil containing only a few pebbles. Diaphyseal fragments, tooth roots and several cranial fragments were present, which could not be easily recognized on the CT scans. We did not stabilize the bones of Urn 2 prior to removal to test differences in the recovery of bone fragments which were consolidated or remained untreated, but documented bone elements in situ (Fig 7). PPT PowerPoint slide PNG larger image TIFF original image Download: Fig 7. Cranial fragment from Urn 2. a) in situ fragmented cranial bone and still in the original shape, b) after removal, the bone fragments fell apart which affects the anthropological analysis. Scale length is 4 cm.

<https://doi.org/10.1371/journal.pone.0289140.g007> Bio-anthropological analysis Following the guidelines by Brickley and McKinley [36] and Jaskulska [37], fragments were washed and sieved into 10 mm, 5 mm, 2 mm and <2 mm fractions and separated into the body regions (cranium, axial skeleton, upper, and lower limbs) based on morphological features. The bone distribution in quadrants and arbitrary layers were analyzed using the Kruskal-Wallis test with Monte-Carlo correction and Dunn-Bonferroni test for post-hoc pairwise testing. Significant p-values were adjusted using the Bonferroni correction. For each body region, the largest fragment size was measured. General bone fragments were further divided into diaphyses, epiphyses, autopodia, and rest. The type of visible heat cracks and the coloration of the bone fragments were recorded separately for each body area. The burning temperature was estimated based on Wahl [38]. Dentition was evaluated based on the FDI system following the coding system of Harbeck [39]. Sex was estimated using morphological methods for cranium and pelvis [40, 41], and metric measurements were taken for the postcranial skeleton [42]. Age at death was estimated based on epiphyseal closure [43], tooth eruption [44], the iliac auricular surface [45, 46], cranial suture closure [47], and tooth cementum analysis (adapted from Wittwer-Backofen et al. 2004, Naji et al. 2016). Enthesopathies were scored based on Mariotti et al. [48]. Urn 1 contained 1149.56 g of calcined human bone fragments and 20.49 g burnt animal remains. The degree of fragmentation was low with nearly 60% of all fragments measuring over 10 mm and only 15.7% of all fragments measuring less than 5 mm in length. The largest fragment is 111 mm long. The osteological examination revealed that bones from all body areas were present in the cremated remains. Nearly three quarters of all bone fragments were identified and assigned to a body region based on morphological features (Table 1). PPT PowerPoint slide PNG larger image TIFF original image Download: Table 1. Weight of body regions and sieve fractions of the cremated remains recovered from Urn 1. <https://doi.org/10.1371/journal.pone.0289140.t001> A detailed analysis of the vertical and horizontal distribution of body areas was not possible. A quantitative comparison of the four quadrants revealed that the bones were not evenly distributed in the urn, with the fewest bone fragments in the northern and eastern quadrants and a gradual increase from north-east (294 g) to south-west (749 g) within the urn (see S1 Fig), which was already visible in the CT scans. The remains in Urn 1 were predominantly well burnt with the white color of completely calcined bones dominating over bones presenting grey or black areas (burning stage V after Wahl [38]). Additionally, the burning condition was also analyzed using a Fourier Transform Infrared Spectroscopy (FTIR) following the protocols of Stamatakis et al. [49]. No organic matter was visible in the infrared spectra and the infrared splitting factors (IRSF) which provides information on the bone apatite crystallinity which measured 4.5 in urn 1, indicating the sample was completely calcified. Typical heat fractures such as warping, delamination, longitudinal, transverse, and parabolic fractures were visible. This is consistent with burning temperatures over 800°C. Green staining was observed on the sacrum and several rib and arm fragments, which is often associated with bronze artifacts close to these bone elements. Overall, many body areas were well represented in the cremated remains from Urn 1. The neurocranium was well preserved with the most important morphological structures present. Several dentin fragments and tooth roots were recovered, of which only a few premolars and molars could be further identified. There were no tooth crowns present. Several sternal and vertebral rib ends, vertebral bodies from all over the spine, the sacrum and the ilium including the greater sciatic notch and one auricular facet were

identifiable from the axial skeleton. The upper limbs were represented by a humerus head, further fragments from humerus, ulna and radius, and several hand bones including carpals, metacarpals, and hand phalanges. Identified elements of the lower limbs included left and right proximal femoral ends, fragments of femur, tibia and fibula, the right talus, one first metatarsal bone, and further foot bones. The sex of the deceased individual was estimated as female based on morphological features of cranium and coxa and a metric evaluation of the mandibular condyle, radial head, and femoral head (prob female = 0.96). Age at death of 23–32 years was estimated based on the iliac auricular surface and the transitional analysis using both cranial structures and the iliac auricular surface (mean = 29 years, age category: adult), and a tooth cementum analysis (26.6 years;  $\pm$  5 years). Cribra cranii is visible at the external surface of the cranial vault. At the ilium, the preauricular sulcus is present. Overall, the skeleton is gracile and muscle attachments are weakly developed, except for the attachment side of the deltoid muscle (R3). A few cremated remains recovered from Urn 1 clearly did not belong to the individual described above, namely two fully erupted premolars of an individual older than 15 (FDI 24 and 34 were present twice), and a second dens axis. The premolars were also cremated and only the roots were present. Urn 2 totaled 696.37 g of burnt human remains. 40% of all bone fragments measured between 5 and 10 mm and 38% of all bone fragments were unidentifiable. The longest fragment measures 65 mm. Bone fragments from all body regions were recovered (Table 2). The horizontal and vertical distribution of bones within the urn did not reveal any trends (S2 Fig). The cremated remains were predominantly calcined and showed heat fracturing such as warping, delamination, longitudinal, transvers, and parabolic fractures. Bone fragments rarely exhibited grey or charcoaled areas (burning stage V after Wahl [38]). Similar to the FTIR results of Urn 1, the analyzed fragment of Urn 2 was also completely calcined with a IRFS value of 4.6. This again suggests a burning temperature over 800°C. Green staining from bronze pyre goods was observed on arm fragments and one cranial fragment. PPT PowerPoint slide PNG larger image TIFF original image Download: Table 2. Weight of body regions and sieve fractions of the cremated remains recovered from Urn 2. <https://doi.org/10.1371/journal.pone.0289140.t002> The cremated remains from Urn 2 were more fragmented than those of Urn 1. Nevertheless, several fragments from the neurocranium, viscerocranium, and the mandible were recognized (frontal bone, temporal bone, occipital bone, maxilla, zygomatic bone). Several roots of incisors and one partially erupted lower premolar were identified amongst other tooth fragments present in the urn. Two deciduous molar root fragments were also present. Fragments from vertebrae, ilium, diaphyses from the upper and lower limbs, a sternal rib end, one first metatarsal bone, and three hand phalanges were recognized from the postcranial skeleton. An age at death of 8.5–14.5 years (mean = 11 years, age category: infans II) was estimated based on tooth eruption and epiphyseal closure. Tooth cementum analysis suggested an age-at-death of 15.0 years ( $\pm$  5 years). Due to the young age, a sex estimation was not attempted. Active cribra orbitalia, stage 3 after Steckel et al. [50], was observed at the orbital portion of the frontal bone. Cribra cranii affected the occipital bone, and an area of periosteal new bone formation was identified at a diaphyseal fragment of the humerus. Further details on the age at death estimation and sex determination of both individuals can be found in S1 Appendix. The raw data is available in S1 Dataset.

**Sr-isotopes** Following the recent demonstration that calcined bone provides a reliable substrate for strontium isotope analyses [51, 52], strontium isotope ratios ( $^{87}\text{Sr}/^{86}\text{Sr}$ ) of cremated bone samples were pre-treated following Snoeck et al. [52]. Strontium was extracted from the samples and purified following the protocol described in Snoeck et al. [52] and measured on a Nu Plasma 3 MC-ICP Mass Spectrometer (PD017 from Nu Instruments, Wrexham, UK) at the Vrije Universiteit Brussel (VUB). During this study, repeated measurements of the NBS987 standard yielded  $^{87}\text{Sr}/^{86}\text{Sr} = 0.710240 \pm 24$  (2SD for 60 analyses), which is consistent with the mean value of  $0.710252 \pm 13$  (2SD for analyses) obtained by TIMS (Thermal Ionization Mass Spectrometry) instrumentation [53]. All the sample measurements were normalised using a standard bracketing method with the recommended value of  $^{87}\text{Sr}/^{86}\text{Sr} = 0.710248$  [53]. Procedural blanks were considered negligible (total Sr (V) of max 0.02 versus 9–10 V for analyses, i.e.  $\approx$  0.2%). For each sample the  $^{87}\text{Sr}/^{86}\text{Sr}$  value was reported with a 2SE error (absolute error value of the individual sample analysis–internal error). The strontium isotope ratios of the cremated human bones (Table 3) fall in the local range of the river valley of the Traisen [54]. The thresholds of local Sr ratios were assessed based on plant samples collected in different

geological zones. There is nothing to suggest other than local origin, although a life in the same geological substratum elsewhere is possible. PPT PowerPoint slide PNG larger image TIFF original image Download: Table 3. Strontium isotope ratios and C14 dating of the cremated individuals from Urn 1 and 2. <https://doi.org/10.1371/journal.pone.0289140.t003> Artifacts Ceramic and bronze artifacts were recovered with the cremated human remains (see S2 Appendix). The ceramic vessel Urn 1.1 served to contain the cremation. The large storage vessel with comb-stroke decoration was fragmented and deformed, with impact from the western side, and only the bottom part was found. The urn was placed on the fire-affected sherd of another large vessel decorated with wide cannellure (1.2). A solid cast bronze ring of c. 30 mm diameter (1.3) with oval cross-section and protruding thorn found in the urn was most likely a dress fitting. Comparable rings have been found at Inzersdorf and Franzhausen-Kokoron [14, 60]. A coil Noppenring (1.4) made of oval bronze wire was found with 2.5 remaining coils and partly smelted by the fire in the urn. It may have been used as temple, hair or finger ring, and represents a characteristic, long-lived Bronze Age form [e.g. 19, 61]. The fire deformation and the thick, flaky, grey corrosion layer on both artifacts suggest an exposure to temperatures between 700 and 900°C on the pyre [62]. Further bronze wire fragments (1.5–1.7) were found both inside and outside the urn. Tiny molten bronze drops and their remnants (1.8–1.13) were found interspersed with the cremated remains inside and outside the urn. The bi-conical shape with a distinct profile and sharp bend in the lower part of Urn 2.1 belongs to the early Urnfield Culture phase Bronze Age D [16, 55]. The fragmented remains of a small, fire-affected fine vessel, probably a cup or bowl, were found north of the urn and are most visible in the CT scan (2.2). Further small pottery fragments were recovered as part of the fill within and outside the urn (2.3–2.5). A fragment of a twisted bronze wire found at the bottom of the urn was probably part of an arm ring (2.6), with a shape typical for southern Germany and Austria from the Middle Bronze Age to the Urnfield Period [63]. The grey, slate-like corrosion layer suggests the object was worn on or near the body during cremation [64]. A conical object made of folded sheet bronze (2.7) with signs of deformation caused by the funerary fire might represent a clasp used to cover the ends of cords or textiles [21, 65]. Fragments of two different types of beads made of bronze wire coils were recovered among the human remains in different locations within the urn (2.8–2.10). A bronze drop (2.11) from an artifact molten on the pyre was found at the western base part of the urn. The catalogue of finds is published as S2 Appendix. Zooarchaeological analysis Urn 2 did not contain any animal remains. In total, 56 animal bone fragments were uncovered from Urn 1, varying in size from 4 to 62 mm (Table 4). The bones showed various taphonomic signatures suggesting several depositional pathways into the urn itself and its context such as meat offerings, bones as fuel, or animal bones as garbage. In addition, a series of natural terrestrial mollusks were recovered from both the sediment inside and outside the urn. About thirty dental fragments including those of an incisor, a canine and a lower premolar of a young adult wild boar (*Sus scrofa*) probably represents a single partial mandible. These fragments show extensive burning damage congruent with the human osteological material. Further, a red deer (*Cervus elaphus*) metapodial fragment and a mammalian rib fragment were completely calcined and like the wild boar mandible were probably part of the pyre. An additional distal scapula fragment of a sheep or goat was only superficially charred on the ventral part of the neck and onset of the blade, probably originating from a meat offering. Several unburnt bones from the grave fill around the urn include a probably naturally shed upper left deciduous third premolar showing root resorption and a fragment of a left humerus of wild boar. These unburned bones show extensive cortical weathering including root etching and pitting and appear to be domestic waste within the sediment used to cover the urn. PPT PowerPoint slide PNG larger image TIFF original image Download: Table 4. Inventory of the recovered animal bones from Urn 1. <https://doi.org/10.1371/journal.pone.0289140.t004>

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**Title:** CompactFlash-organisatie kondigt CFexpress 4.0 met hogere snelheid van 8GB/s aan

**Text:** De CompactFlash Association heeft CFexpress 4.0 aangekondigd, opslagkaarten voor professionele foto- en videocamera's. De nieuwe kaarten gebruiken nieuwere PCIe- en NVMe-versies, waardoor de theoretische doorvoersnelheid is verdubbeld. De CFexpress 4.0-kaarten ondersteunen

PCIe Gen 4 en NVMe 1.4c. Bij de voorganger, de CFexpress 2.0-standaard, was dit PCIe Gen 3 en NVMe 1.3. Daardoor ondersteunt het grootste Type C-kaartje een theoretische maximale doorvoersnelheid van 8GB/s. Voorheen was dit 4GB/s. Overigens hebben de kleinere kaartjes minder PCIe-lanes, waardoor de theoretische maximale snelheid bij deze kaarten lager ligt. Net als de 2.0-standaard heeft de nieuwe versie drie formfactoren. Deze zijn hetzelfde als voorheen. De 4.0-standaard gebruikt ook dezelfde fysieke interface als bij 2.0, waardoor de standaard backwardscompatible is. Dit betekent ook dat bedrijven sneller over zouden kunnen stappen naar de nieuwe standaard, aldus de CFA. Door de hogere snelheden kunnen fotografen en videomakers hogere resoluties, framerates en kleurdiepte gebruiken, stelt de CFA. Het is niet duidelijk wanneer de eerste CFexpress 4.0-producten op de markt zullen verschijnen. Aan CFA doen ruim tachtig bedrijven mee. De eerdere 2.0-standaard verscheen in 2019. Onder meer Sony, Canon en Nikon gebruiken de standaard in hun producten. De bedrijven gebruikten tot nu toe alleen de Type A- en Type B-formfactoren; de grotere Type C-formfactor met de hoogste theoretische snelheden is tot nu toe niet gebruikt.

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**URL:** <https://photorumors.com/2023/08/30/dxo-announces-nik-collection-version-6-3/>

**Title:** DxO announces Nik Collection version 6.3 with several new features

**Text:** DxO just announced Nik Collection version 6.3 with several new features: NEW Control Point diffusion lets you regulate the strength and style of adjustments more easily NEW Control Points and Control Lines can now be inverted, giving you huge flexibility specific colors and tones in an image NEW Color Selectivity sliders allow Control Point and Control Line editing to be tied to adjustments can now be saved as Presets, giving you quick access to frequently used sharpening or HDR recipes. NEW Turn your edits into a Smart Object at any stage from within the plugin, giving you fully non-destructive editing in Photoshop NEW Call on any of your last 15 Nik Collection edits and apply them with a single click NEW Presets can now be searched for by name, so you can instantly find your favorite edits NEW Hi DPI & Multiscreen support lets you work with all screen configurations NEW Affinity Photo is now automatically detected as part of installation. Additional information: DxO Announces Nik Collection Version 6.3 Paris (France): DxO Labs, creator of pioneering photo-editing software for over 20 years, is proud to present Nik Collection version 6.3, bringing greater stability, speed, and a refined editing experience. Version 6.3 features significant updates to Nik Sharpener and Nik HDR Efex. Nik Collection Completely Redesigned by DxO Labs In October 2017 DxO Labs acquired the Nik Collection from Google. Six years later, the huge task of re-authoring is complete, with every line of code rewritten for the latest technology. The release of Nik Collection 6.3, the suite is fully compatible with Windows, MacOS, and Apple Silicon, it works harmoniously within Adobe Photoshop, Photoshop Elements, Lightroom Classic, DxO PhotoLab, and Affinity Photo, and is faster and more reliable than ever before. "We are hugely proud of this achievement. With this work complete, we can now focus solely on adding exciting new features and technology. Our talented engineers are committed to making Nik Collection the indispensable creative companion to every passionate photographer's workflow." (Jérôme Ménière, CEO of DxO Labs) New for 6.3: Improved Sharpener and HDR Efex The new editions of Nik Sharpener and Nik HDR Efex include a host of updates making them more powerful and easier to use. Both feature a new interface with a clearer, cleaner look that matches the other Nik Collection plugins. Also, you can now choose where sliders for local adjustments appear on-screen: controls can be either kept in a sidebar to tidy the image area, or overlaid in traditional style. Price and Availability Nik Collection 6.3 is available now as a free upgrade for existing Nik Collection 6 users. New customers can download Windows and macOS versions exclusively from the DxO website at the prices listed below, a 30-day free trial is also available.

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**URL:** <https://www.diyphotography.net/nik-collection-6-3-the-end-of-a-six-year-journey-to-rewrite-google-s-code/>

**Title:** Nik Collection 6.3 – The end of a six-year journey to rewrite Google's code

**Text:** It's a milestone version release of the Nik Collection for DxO software today. They acquired Nik Collection from Google in 2017 and immediately set about making it their own. Six years later, that task has been completed, with every line of code rewritten. The new Nik Collection 6.3 (buy here) release

also brings some great new features, including an improved sharpener, HDR Efex, and searchable presets. It also now adds support for high DPI displays and multiple monitor setups. Nik Collection 6.3 – Nik Rewritten Since acquiring the Nik Collection from Google in 2017, DxO has been on a mission to update it to the latest technology and make the code 100% their own. The release of Nik Collection 6.3 marks the completion of that mission. In October 2017 DxO Labs acquired the Nik Collection from Google. Six years later, the huge task of reauthoring is complete, with every line of code rewritten for the latest technology. The release of Nik Collection 6.3, the suite is fully compatible with Windows, MacOS, and Apple Silicon, it works harmoniously within Adobe Photoshop, Photoshop Elements, Lightroom Classic, DxO PhotoLab, and Affinity Photo, and is faster and more reliable than ever before. We are hugely proud of this achievement. With this work complete, we can now focus solely on adding exciting new features and technology. Our talented engineers are committed to making Nik Collection the indispensable creative companion to every passionate photographer's workflow. Jérôme Ménière, DxO Labs CEO The completion of the rewrite means that DxO has a mammoth task out of the way. This should let them focus on being able to add completely new features to Nik Collection instead of having to update the old ones to the new spec. Nik Collection 6.3 – What's new? DxO says the latest editions of Nik Sharpener and HDR Efex Pro include a host of updates to make them "more powerful and easier to use". They have a new interface to match the rest of the Nik Collection plugins, with positional controls for sliders to optimise your workflow. New features include: Control Lines add flexibility when making broad adjustments, letting you harness the power of Control Points Control Point diffusion lets you regulate the strength and style of adjustments more easily Control Points and Control Lines can now be inverted, giving you huge flexibility Color Selectivity sliders allow Control Point and Control Line editing to be tied to specific colors and tones in an image Re-namable Local Adjustments let you stay on top of complex edits, and local adjustments can now be saved as Presets, giving you quick access to frequently used sharpening or HDR recipes. The update also adds new workflow improvements, including: Turn your edits into a Smart Object at any stage from within the plugin, giving you fully non-destructive editing in Photoshop Call on any of your last 15 Nik Collection edits and apply them with a single click Presets can now be searched for by name, so you can instantly find your favorite edits Hi DPI & Multiscreen support lets you work with all screen configurations Affinity Photo is now automatically detected as part of installation. 1,574 new DxO Optics Modules The new Nik Collection 6.3 release also brings with it some new Optics Modules. 1,574 of them to be precise. These new optics modules cover the recently released Canon EOS R100 (buy here) and Sony ZV-1 II (buy here). It also adds a lot of new lenses to the list: Leica APO Vario-Elmarit-SL 90-280mm F2.8-4 (L-mount) Leica Vario-Elmar-SL 100-400mm F5-6.3 (L-mount) Nikkor Z 400mm F4.5 VR S Nikkor Z 400mm F4.5 VR S with Z TC 1.4x Nikkor Z 400mm F4.5 VR S with Z TC 2x Nikkor Z DX 24mm F1.7 Panasonic Leica DG Vario-Elmarit 12-35mm F2.8 ASPH (Micro Four Thirds) HD Pentax-FA 50mm F1.4 Pentax smc FA 50mm F1.4 Classic HD Pentax-FA 35mm F2 Sigma 16-28mm F2.8 DG DN | C (L-mount) Sigma 24mm F3.5 DG DN | C (Sony FE) Sigma 50mm F1.4 DG DN | A (Sony FE) Sigma 50mm F2 DG DN | C (Sony FE) Sigma 90mm F2.8 DG DN (Sony FE) Sigma 23mm F1.4 DC DN | C (Sony FE) Sigma 16mm F1.4 DC DN C (Nikon Z DX) Sigma 30mm F1.4 DC DN C (Nikon Z DX) Sigma 56mm F1.4 DC DN C (Nikon Z DX) Sony FE 50mm F1.4 GM Viltrox 13mm F1.4 (Nikon Z DX) Viltrox 13mm F1.4 (Sony FE) Viltrox 13mm F1.4 XF (Fujifilm X) Viltrox 20mm F1.8 Z (Nikon Z DX) Viltrox 35mm F1.8 FE (Sony FE) Viltrox 35mm F1.8 Z (Nikon Z) Viltrox 50mm F1.8 Z (Nikon Z DX) Viltrox AF 24mm F1.8 Z (Nikon Z DX) Voigtlander APO-Lanthar 35mm F2 Asph (Nikon Z DX) Voigtlander APO-Lanthar 50mm F2 (Nikon Z DX) Voigtlander Nokton 23mm F1.2 X (Fujifilm X) Voigtlander APO-Lanthar 50mm F2 Asph (Sony E) Voigtlander Nokton D23mm F1.2 Asph (Nikon Z DX) This brings the total number of DxO optics modules up to over 86,000. So, you can be sure they've probably got your camera and lens combo in there somewhere! Price and Availability The Nik Collection 6 is available to buy now for \$149. Owners of Nik Collection 4 or 5 can upgrade to Nik Collection 6 for the price of \$79. Existing Nik 4 and 5 owners should log into their DxO account and do the upgrade from there. Nik Collection 6 does not require a subscription and can be installed on up to three computers.

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**URL:** <https://answersingenesis.org/blogs/danny-faulkner/2023/08/30/moon-transparent-object/>

**Title:** Is the Moon a Transparent Object?

**Text:** I have never seen stars through the moon, even though I probably have spent far more time looking at the moon than any flat-earthier has looked at the moon. Flat-earthiers sometimes claim that the moon is transparent rather than a solid, opaque object. As evidence of this, flat-earthiers claim that stars may be seen shining through the moon. Sure enough, there are videos out there in which one can see what appear to be stars shining through the moon. I have never seen stars through the moon, even though I probably have spent far more time looking at the moon than any flat-earthier has. What are the “stars” in these videos? My best guess is that they are hot pixels in the cameras used to make these videos. An excellent way to check the claim that the moon is transparent is to observe a lunar occultation of a bright star, which doesn’t happen very often. An occultation is when a larger-appearing body (such as the moon) passes in front of a smaller-appearing body (such as a star). If flat-earthiers are correct about the moon being transparent, then stars should not disappear as the moon passes in front of them. There are a few bright stars that the moon occults. These can be predicted years in advance, so people can view these occultations, and with modern technology, it is relatively easy to photograph or record videos of them. I did the former six years ago when Aldebaran, among the 20 brightest stars in the sky, was occulted by the moon. Being in the first quarter phase, Aldebaran disappeared on the darkened limb (edge) of the moon, so if the moon were transparent, one would have readily seen Aldebaran through the dark part of the moon after the occultation began. I reported my results on this blog. In this test, I used my Nikon D3200 SLR camera with a zoom lens. In a photograph I took just before the occultation, Aldebaran is clearly visible, but in the second photograph, taken just after the occultation began, Aldebaran is not visible. It took a fraction of a second for Aldebaran to disappear. If one of the 20 brightest stars is not visible through the moon, then no stars will be visible through the moon. On the evening of August 24, 2023, I had the opportunity to test this flat-earthier claim further when, once again, the first quarter moon occulted a bright star. This time the star was Antares, the brightest star in the constellation Scorpius. Aldebaran and Antares vary slightly in brightness, but on average, they are respectively the 14th and 15th brightest-appearing stars, so these two stars are virtually the same brightness. This time, I was better prepared. I removed the lens from the same camera I used to photograph the occultation of Aldebaran and attached the camera to a 3.5-inch Questar telescope, making the telescope the lens of the camera. Flat-earthiers like to use their Nikon P-900 and P-1000 bridge cameras to take zoomed images of things, including the moon and stars (though flat-earthiers can’t seem to figure out how to focus their cameras on stars—perhaps I’ll blog about that sometime). The Questar’s 1,300 mm focal length is more than twice that of either of those bridge cameras, and the optical quality of the Questar is superior to the lenses of those two cameras. I set up the telescope and camera on my driveway in Northern Kentucky more than a half hour before the occultation. I took a few photographs and did two brief test videos to make sure that I would be able to video this event rather than just take photographs of it. I began recording the occultation about 2 ½ minutes before the occultation was scheduled to begin and stopped the video 25 seconds after the occultation began. As you can see in the video, Antares abruptly disappeared 2 minutes and 34 seconds into the video. Once Antares disappeared, it was not visible through the moon. Flat-earthiers may object that we don’t see the moon’s limb in this video and ask how we know it was the moon that has blocked Antares from view. When the moon is at first quarter phase on earth, from the moon’s surface, the earth appears as a third quarter phase. So, from the surfaces of either body, the other body is a mirror image. Except that because of its larger size and greater reflectivity, from the moon, the earth is about a hundred times brighter than the moon appears on earth. Therefore, the landscape of the dark part of the moon is not entirely dark, but rather, it is flooded with reflected light from the earth. This earthshine is visible in the moon’s crescent phases, when from the lunar surface, the earth appears nearly full. At quarter and gibbous phases, earthshine is not visible, but a long exposure photograph can reveal earthshine, though it will overexpose the lit portion of the moon. I took the first photograph about nine minutes before the occultation. The ISO setting was 1600, and the



exposure time was 1/20 second. The moon is a little overexposed, but its features are easy enough to see. This photograph matches well the view in the video. I took the second photograph as soon as possible after the first photograph. The only thing I changed was the exposure time, which was 10 seconds—200 times longer than the first photograph. Because it was a longer exposure, Antares is a bit overexposed, and the lit part of the moon is greatly overexposed. In this photograph, you can see the dimly lit dark portion of the moon. The moon's orbital motion carries the moon from upper right to lower left, along a line perpendicular to the moon's terminator (the division between light and dark on the moon). With knowledge of the direction of lunar motion, one can see in this second photograph that the moon's dark limb will soon block out Aldebaran. Also, notice the much fainter star to the lower left that was too faint to be recorded in the first photograph. Shortly after the occultation ended, I stopped the recording, and I repeated the sequence of the two photographs with the same ISO setting and exposure times as before (below). The third photograph is the 1/20 second exposure. Notice that it looks very similar to the first photograph, except that Antares is not visible. The fourth photograph is the 10-second post-occultation photograph. Notice that the fourth photograph looks similar to the second photograph, along with the star to the lower left, but Antares is not visible. I printed the two 10-second photographs with the same scale. I measured the distance between the star on the lower left and Antares on the pre-occultation photograph. The distance was 150 mm. When I placed the ruler on the post-occultation photograph with the same orientation as in the pre-occultation photograph, the 150 mm point from the star on the lower left, where Antares would be, was 2–3 mm inside the dark part of the moon. Hence, we can be sure that the moon is in front of Antares in the post-occultation set of photographs. Since Antares is one of the brightest stars in the sky, and it cannot be seen through the moon, this is definitive proof that stars cannot be seen through the moon. Since Antares is one of the brightest stars in the sky, and it cannot be seen through the moon, this is definitive proof that stars cannot be seen through the moon. Will this change the minds of many flat-earthers? I doubt that it will change the minds of any flat-earthers. In my experience, they are a stubborn bunch, and they will not let go of a notion even when confronted with overwhelming evidence that what they have chosen to believe is false. It's not as if what I presented here is evidence that the earth is spherical and not flat. Flat-earthers could easily give up this false claim about the moon being transparent and still maintain that the earth is flat. That is an irrational response. This is cultlike behavior, something that I have commented on before. As I've discussed elsewhere, the flat-earth movement is a threat to Christianity, which is why I remain vigilant in monitoring this movement.

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**URL:** <https://www.hdblog.it/fotografia/articoli/n573051/sony-alpha-7c-ii-r-mirrorless-full-frame-prezzo/>  
**Title:** Sony Alpha 7C II e 7C R: mirrorless full frame super compatte  
**Text:** Sony gioca costantemente al rialzo con i creatori di contenuti. Con il lancio di Alpha 7C II e Alpha 7C R offriamo ai creator di video e fotografie un nuovo strumento per immagini di alta qualità con fotocamere mirrorless con obiettivo intercambiabile - Yann Salmon-Legagneur, Head of Imaging Products & Solutions Marketing di Sony Europe Sony porta sul mercato Alpha 7C II e Alpha 7C R , inedite fotocamere mirrorless compatte full-frame della serie α7C. 33MP la prima, 61MP la seconda ( stesso sensore di Alpha 7R V ), condividono la medesima unità di elaborazione basata sull'intelligenza artificiale , i processori BIONZ XR , AF avanzato, lo stabilizzatore d'immagine a 5 assi e la possibilità di registrare video 4:2:2 a 10 bit fino a 4K60p. Due modelli diversi che però hanno tanto in comune. A partire dalle dimensioni - 12,4x7x6,4cm - e dal peso - 513g per Alpha 7C II, 515g per Alpha 7C R. Le due mirrorless possono contare sul nuovissimo zoom grandangolare SEL-1635GM2 fresco di presentazione: sono più di 70 gli obiettivi compatibili con attacco E. Altre caratteristiche che troviamo su entrambi i modelli sono:

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**URL:** <https://www.gazzetta.it/turismo-sportivo/30-08-2023/lagazuoi-photo-award-new-talents-2023-dat-e-giuria-tutte-le-info.shtml>  
**Title:** Le fotografie di tre giovani talenti dell'obbiettivo in mostra al Lagazuoi EXPO Dolomiti  
**Text:** Lagazuoi Photo Award New Talents 2023 al Lagazuoi EXPO Dolomiti a settembre e ottobre: date, immagini esposte, curiosità e tutte le informazioni utili. Tre studenti - dell'Accademia di Belle Arti di Bergamo, dell'Istituto Italiano di Fotografia di Milano e delle Officine Fotografiche di Roma - hanno

frequentato la residenza d'artista organizzata da Lagazuoi EXPO Dolomiti lo scorso mese di luglio, producendo foto e video per catturare in modo artistico l'essenza delle Dolomiti . Per cinque giorni i ragazzi, affiancati da altrettanti tutor, tre fotografi professionisti del team #NikonCreators, si sono mossi lungo i sentieri del Lagazuoi giocando con ottiche e cavalletti per cogliere quello che a volte sfugge all'occhio umano con una naturale freschezza. Tre progetti molto diversi tra loro Dal lavoro sul campo sono scaturiti tre progetti ben distinti che raccontano l'alta montagna e il territorio tramite una visione differente e creativa. Già a luglio sui social si erano visti contenuti dei partecipanti in un fluire continuo e ricco di spunti di ogni genere, ma pur sempre parziali. La presentazione dei progetti completi è in programma per sabato 2 settembre quando sarà premiato il vincitore, selezionato dalla giuria composta da Elisabetta Illy, fotografa, Ceo e Founder di Picture of Change, Roberto Bachis, responsabile Nikon School e Training Specialist, e Stefano Illing, ideatore di Lagazuoi EXPO Dolomiti. "Con questo progetto puntiamo a restituire al pubblico l'emozione di una riscoperta estetica della montagna, lontana dal cliché visivi imperanti" racconta Stefano Illing. "In questo modo vogliamo stimolare una cultura della montagna capace di guardare avanti, e in primis alle nuove generazioni".

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**URL:** <https://scottkelby.com/guest-blog-lightpainting-photographer-dave-black/>

**Title:** Guest Blog: Lightpainting Photographer Dave Black

**Text:** Editor's Note: Dave has long been one of my favorite photographers, and just one of my favorite people in general. Here's his fantastic guest post from 2015 on Lightpainting! Let There Be Light  
Humanity is drawn to light. It is in our DNA. We can't help but look towards the brightest part of a picture. As a photographer it is my responsibility to help guide the viewer to the subject in the picture, and I can do so with light. But sometimes a flash or strobe just isn't graceful enough. That's when I turn off the studio lights and delve into the most creative lighting technique of all. Lightpainting: it's the perfect combination of photography and artistic expression. The word photography in the Greek means "light writing." Simply said, Lightpainting is the revealing of the subject from darkness with light. In general, Lightpaintings make use of long exposure times like 3 seconds, 10 seconds, 30 seconds, 2 minutes, or more. Let's begin with some basics and Lightpaint a Table-Top Still Life. I will need a dark environment for my little subject, the Yellow Tail Fly. I will use a Manual Exposure of which I have a basic starting exposure that I begin many of my Lightpaintings with: ISO500, 30 seconds at f/8. During the 30 seconds exposure time I will use a mobile light source to illuminate the subjects in the scene and reveal them from the dark with Lightpainting. For my Table-Top still life and live model Lightpaintings I use a small Stylus penlight with a single LED bulb made by Streamlight. First I arrange my subject and composing the scene. Then, like with all Lightpaintings, I secure the camera on a sturdy tripod. With the studio lights turned on, I use Auto Focus on the subject and then turn off the auto focus. This is so the auto focus does not activate or "search" in the dark when you turn off the lights, open the shutter, and begin to Lightpaint. I use the Auto Focus (AF) back button. By simply releasing your thumb from the AF button on the back of the camera it stops activation of the Auto Focus operation. Or you can also simply turn OFF the AF switch on the barrel of the lens or camera. I also use a Manual WB of 10,000 Kelvin when Lightpainting with any LED flashlight. This setting helps add a warm color tone to the overall picture. And I will also activate the Long Exposure Noise Reduction mode in the camera. This prevents any noise speckles from appearing due to the long exposure time that generates heat inside the camera. I'm now ready to turn OFF the room lights and make my first TEST SHOT without adding any Lightpainting to the subjects, just to see if there is any unwanted ambient light creeping in from a window or the door. With a dark or blank image on the LCD screen, now I'm ready to add some Lightpainting. I like to apply the light from off camera angles to create a dramatic lighting effect. In this image titled Yellow Tail Fly, the light from my Stylus is coming into the scene from the upper right corner of the frame. Yellow Tail Fly: Nikon D7000, ISO400, 30 seconds exposure at f/32, Nikon 28-300mm VR II zoom lens at 300mm, WB 6700K, Manfrotto Tripod with 410 Gear Head, Stylus penlight, SanDisk 32GB Extreme Pro Flash Card. The closer the light source is to the subject, the brighter the subject becomes. Also said, the longer time I spend illuminating my subject the brighter the subject becomes. Too much light or too much time spent applying light can overexpose portions of the image, and vice versa. I try to keep the light source (Stylus) moving while applying the light, usually in a swirling or brushing motion. This helps soften the transitional edges between light and shadow, which is

key in creating a painterly quality to the picture. You are in effect "painting with light. My basic Manual Exposure setting of ISO 500, 30 seconds at f/8 is a good way to begin, but it can vary depending on intensity of your flashlight and the distance from flashlight to subject, and also how large your subject is. Don't give up, I sometimes make 10-15 Lightpaintings before I get one that I like. The Red Violin: Nikon D800, ISO100, 1 minute at f/6.3, Nikon 105mm MACRO lens, WB 10,000K, Manfrotto Tripod with 410 Gear Head, Stylus penlight, SanDisk 32GB Extreme Pro Flash Card. Here is another Table-Top Still Life, but it has 2 variations from the Yellow Tail Fly. I used a lower ISO of only 100 and I increased the exposure time to 1 minute. Why? Because I felt I would need 1 entire minute to precisely apply Lightpainting from only a few inches away, and from multiple Off Camera angles. Lightpainting so close to the subject using ISO500 would result in way overexposing the subject. The Red Violin: Nikon D800, ISO100, 1 minute at f/6.3, Nikon 105mm MACRO lens, WB 10,000K, Manfrotto Tripod with 410 Gear Head, Stylus penlight, SanDisk 32GB Extreme Pro Flash Card. Lightpainting people is a lot of fun, as long as the model remains perfectly still during the long exposure time of 30 seconds. My advice is to find a very patient subject. For this image I increased the ISO to 1000 but still used just a single Stylus penlight for this Lightpainting of a Ballerina. I only Lightpaint the model's face for 2 seconds and about 3 feet away. Any longer or closer and they will blink. Because there is no light on me, I can actually be inside the picture, but not be seen. This enables me to Lightpaint the costume artistically from only 2 feet away. The brush strokes of Lightpainting on the Romantica costume really look interesting. Lakota Portrait: Nikon D800, ISO1600, 30 seconds at f/14, Nikon 24-70mm lens, WB 10,000K, Manfrotto Tripod with 410 Gear Head, Stylus penlight, SanDisk 32GB Extreme Pro Flash Card. I still used the same Stylus penlight to Lightpaint my two distinguished Native American subjects, but also used a larger 125 Lumen LED flashlight with a Full CTO (orange) warming gel taped over the front to Lightpaint the background. And I incorporated a NEW technique that I simply call Soft Focus. I used only 15 seconds of the 30 seconds exposure time to Lightpaint my subjects in focus. Then I purposely unfocused the lens by manually turning or "throwing" the focus ring to infinity, and resumed Lightpainting the outer edges of the scene and the background for the remaining 10 seconds. The results is unique, as my subjects are in perfect focus, while my background and outer edges of the scene are out of focus. This Soft Focus technique has become my favorite stylization addition to many of my Lightpaintings. Adding Gaussian Blur in post doesn't look the same Soft Focus Lightpainting is truly unique. Tufa Twilight Reflection: Nikon D4s, ISO500, 30 seconds at f/8, Nikon 24-70mm lens, WB 4000K, Manfrotto Tripod with 410 Gear Head, Brinkmann Max Million II (2 million candle powered rechargeable spotlight), SanDisk 32GB Extreme Pro Flash Card. Twilight is my favorite time to Lightpaint outdoor landscapes. The big gear difference is my light source: I use the Max Million II rechargeable 2 million candle spotlight by Brinkmann. These 2 images illustrate a Before and After comparison. At twilight the Tufa formation becomes a silhouette, which is the perfect time for me to reveal it with Lightpainting. The WB of 4000K makes the twilight sky a beautiful pastel blue. I add the warm Golden Hour light from my Brinkmann Max Million II spotlight from an Off Camera location to the left of the Tufa. I'm standing on the shore about 300 feet from the Tufa. Stairway to Heaven: Nikon D200, ISO100, 13 seconds at f/8, Nikon 24-70mm lens, WB 3030K, Manfrotto Tripod with 410 Gear Head, Brinkmann Max Million II (2 million candle powered rechargeable spotlight), PocketWizard Multi MAX Transceiver, SanDisk 16GB Extreme Pro Flash Card. This image of international Ice Climber, Chris Alstrin, was one of my favorite career projects. Even though this section of the Ice Gorge in Ouray, Colorado is huge, it only required 13 seconds to shower Lightpainting down on Chris from my location on the rim of the gorge using the Brinkmann Max Million II spotlight. Shot at twilight Chris remained perfectly still while he examined his climbing route during the 13 seconds exposure time. I triggered my camera, located across the Ouray Ice Gorge, remotely using a PocketWizard Multi MAX Transceiver. Twilight Gas Station: Nikon D800, ISO800, 30 seconds at f/8, Nikon 24-70mm lens, WB 4000K, Manfrotto Tripod with 410 Gear Head, Brinkmann Max Million II (2 million candle powered rechargeable spotlight), SanDisk 32GB Extreme Pro Flash Card. This Lightpainting was made in Nelson, Nevada in November last year. Despite its complexity to make, it still follows the basics for Lightpainting. All my Lightpaintings whether it's a small still life, a model, or a landscape, are a single RAW file with no separate layers assembled in post. But for this lesson I have broken down the final Lightpainting into separate images below showing how I applied the Lightpainting during the 30

seconds exposure time. As is my basic to begin all Lightpaintings, this image is my TEST SHOT to see what the ambient light is doing with the Manual Exposure settings of: ISO800, 30 seconds at f8. There is a half-moon high in the night sky, thus, the ground has a slight illumination. But the scene is mostly a silhouette of the garage, car, and gas pump against the starry sky. I have placed a head lamp with a blue gel on the driver's seat. It remained turned on during the entire 30 seconds exposure, and as you can see it illuminated the interior of the car with blue light. I placed a Stylus penlight with a Red LED inside the gas pump. It remained turned on during the entire 30 seconds exposure, it illuminated the inside of the gas pump with a red glow. I have placed a head lamp with a yellow gel on floor of the garage near the front window. It remained turned on during the entire 30 seconds exposure and illuminated the inside half of the garage yellow. With all these small lights set in place and turned on for the entire 30 seconds exposure time, I'm now ready to press the shutter button and begin my Lightpainting. I stood outside the scene to the left and used my Brinkmann Max Million II to add about 5 seconds of Lightpainting through the left side window of the garage. This illuminated the interior back wall of the garage and the Sinclair sign. I then walked in front of the car and popped 1 second of Light from the Brinkmann into each headlight. Now the car looks alive with headlights mysteriously glowing. Finally, I step out of the picture to the left and Lightpainted the garage exterior for about 10 seconds. Then I skipped a little Lightpainting along the ground and the gas pump for about 5 seconds. CLICK! The 30 seconds exposure is done, and the shutter closes. The Lightpainting is completed in 1 RAW file, as is my style for all of my Lightpaintings: as mentioned earlier, I do not layer multiple images in post. All this was done in 30 seconds??? Yes. If the exposure time was any longer the star movement would be recorded. I used every second of the exposure time to walk around (Ok, I run around like crazy) and completed the Lightpainting in a single RAW file capture. Balanced Universe: Nikon D800, ISO4000, 25 seconds at f/2.8, Nikon 14-24mm lens, WB 4000K, Manfrotto Tripod with 410 Gear Head, Brinkmann Max Million II (2 million candle powered rechargeable spotlight), SanDisk 32GB Extreme Pro Flash Card. Balanced Universe breaks the mold of basic Lightpainting with its unusual exposure settings of ISO4000, 25 seconds at f/2.8. The extremely high ISO and wide open aperture enable the Milky Way and cosmos to be seen over Arches National Park. I used the exposure time of 25 seconds to Lightpaint the iconic Balanced Rock formation from my OFF Camera location with my Brinkmann Max Million II spotlight. While my WB of 4000K kept the Universe a deep blue, I used a Red Gel over the front of the Max Million II to Lightpaint the Balanced Rock and removed the red gel to Lightpaint the bushes and scrub oak. Well, I hope you have enjoyed this step-by-step article teaching how to Lightpaint. Adios, Dave You can see more of Dave's work at DaveBlackPhotography.com, follow him on Instagram, and check out his classes on KelbyOne.

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**URL:** <https://phototrend.fr/2023/08/lectures-de-portfolio-nikon-prix-bayeux-2023/>

**Title:** Prix Bayeux 2023 : candidater aux lectures de portfolio

**Text:** Le Prix Bayeux des correspondants de guerre arrive à grand pas. Du 9 au 15 octobre prochain, la ville de Bayeux accueillera de nombreux grands reporters et photojournalistes. A cette occasion, Nikon, partenaire de l'événement, propose des lectures de portfolio le 13 octobre 2023. Lectures de portfolio : présentez vos photoreportages Depuis 15 ans, Nikon est partenaire du Prix Bayeux et soutient le travail des photojournalistes, avec notamment la remise du Prix Nikon (catégorie photo), d'une grande exposition organisée dans les rues de Bayeux ainsi que des lectures de portfolio. « Ce partenariat revêt une importance symbolique pour Nikon dont l'histoire prend racine à la fin de la Première Guerre mondiale, alors que l'entreprise fournissait principalement du matériel militaire. Au fil du temps, Nikon a ainsi permis à de nombreux photographes de couvrir des reportages de guerre partout dans le monde », explique le constructeur. Cette année, les lectures de portfolio se déroulent la journée du 13 octobre 2023, de 13h30 à 16h30. Ces dernières s'adressent aussi bien aux amateurs qu'aux photographes professionnels, à condition de présenter des photoreportages en lien avec l'actualité ou liés à des zones à risques (zones de conflits, manifestations ou autres faits sociétaux). Ludovic Drean, directeur du service Pro Nikon, lors de la remise du Prix Nikon en 2018 Pour cette édition, de grands professionnels de l'image et du photoreportage réaliseront les lectures de portfolio. Parmi eux, Dimitri Beck, directeur de la photo de Polka ainsi qu'Olga Kravets, réalisatrice et photographe de l'agence NOOR Images. Comment candidater ? Ces lectures de portfolio sont

gratuites. En raison de places limitées pour ces lectures de portfolio, vous devez envoyer une lettre de motivation accompagnée de 20 photos issues d'un ou plusieurs photoreportages sur une thématique précise. Votre dossier doit être transmis à l'adresse [email protected] avant le 3 septembre 2023. Le programme complet de cette 30e édition sera dévoilé le 4 septembre prochain sur le site du Prix Bayeux.

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**URL:** <https://technews.tw/2023/08/30/smics-5nm-process-breakthrough-foundry-huawei-kirin-9000s/>

**Title:** ■■■■ 5 ■■■■ 9000S ■■■■

**Text:** ■■■■ 4G ■■■■ 5G ■■■■ 9000S ■■■■ 29 ■■■■ Mate 60 Pro

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**URL:** <https://www.disneytouristblog.com/baby-girl-sarah-tom-bricker/>

**Title:** Baby Bricker is a Girl!

**Text:**

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**URL:** <https://www.bild.de/digital/2023/digital/goldener-computer-das-ist-die-beste-technik-des-jahres-85213296.bild.html>

**Title:** Goldener Computer: Das ist die beste Technik des Jahres!

**Text:** Das ist die beste Technik des Jahres! In insgesamt 13 Kategorien stimmten die COMPUTER-BILD-Leser über die beste Technik des Jahres ab Von: Thomas Porwol Es ist einer der größten Technik-Preise Deutschlands: der Goldene Computer, jährlich verliehen von COMPUTER BILD. Bereits zum 26. Mal wurde am Dienstag die beste Technik des Jahres ausgezeichnet. Nicht von einer Fachjury, sondern von den Lesern der COMPUTER BILD. Über 50 000 von ihnen stimmten ab und wählten in 13 Kategorien ihre Geräte und Software des Jahres. Zusätzlich verlieh die Chefredaktion einen Preis für die beste Innovation. Eine Überraschung des Abends: In der Kategorie „New Mobility“ gewann nicht etwa ein Autohersteller, sondern das Deutschland-Ticket. Es sammelte mehr als doppelt so viele Stimmen wie BMW oder Volkswagen. Ob Sie also gerade Ausschau nach einem neuen Smartphone, Fernseher oder Kopfhörern halten – das ist die beste Technik des Jahres: Bestes Smartphone: Samsung S23 Ultra (Preis: 1069 Euro). Haarscharfer Sieg: Nur 321 Stimmen trennen das S23 Ultra vom zweitplatzierten iPhone 14 Pro Max. In diesem Jahr konnte Samsung für die Leser der COMPUTER BILD das Smartphone-Rennen für sich entscheiden. Die Hauptkamera des S23 Ultra löst mit beeindruckenden 200 Megapixel auf Bester Fernseher: Samsung S95C (Preis: 2849 Euro). Überraschende Bild-Qualität, praktische Anschluss-Box, die Kabelsalat verhindert, und überraschend guter Ton: Der 4K-Fernseher von Samsung konnte sich gegen die Konkurrenz von LG

und Philips durchsetzen. Barbara Schöneberger kritisiert Politik „Haben bei der Digitalisierung echt gepennt“ 01:25 Bester Computer: Samsung Galaxy Book3 Ultra (Preis: 2049 Euro). Die Verarbeitung? 1A. Das Display? Ein Traum. Das Tempo? Sehr hoch! So das Fazit der Tester der COMPUTER BILD. Das sahen die Leser ähnlich und wählten das Samsung-Notebook vor dem Lenovo Tab P12 Pro und dem Acer Swift 3 auf den ersten Platz. Für die Leser der COMPUTER BILD das perfekte Arbeits-Notebook: das Galaxy Book Ultra von Samsung Bestes Computer-Zubehör: Epson EcoTank ET-8500 (Preis: 529 Euro). Der Epson ist teuer, druckt aber günstig. Und das dank sechs verschiedener Tinten in besonders hoher Fotoqualität. Damit konnte Epson die Konkurrenz von Canon abhängen. Beste Sicherheits-Software: Avira Secure Browser (kostenlos). Der sichere Browser von Avira konnte sich für die Leser der COMPUTER BILD knapp gegen Norton 360 Advanced durchsetzen. Bestes Smarthome-Gerät: Fritz!Smart Gateway (Preis: 75 Euro). Das kleine Gerät von AVM kann als Smartphone-Zentrale dienen und zwischen verschiedenen Systemen vermitteln. So kann man sein schlaues Zuhause unabhängiger von einzelnen Herstellern gestalten. Kinderleichte Einrichtung, bequeme Steuerung: Das Fritz!Smart Gateway gewinnt in der Kategorie „Smarthome“ New Mobility: Deutschland-Ticket (Preis: 49 Euro). Nicht BMW, nicht VW, überhaupt kein Autohersteller konnte die COMPUTER-BILD-Leser dieses Jahr überzeugen. Stattdessen: das Deutschland-Ticket. Beste Software, Apps & Services: Buhl WISO Steuer 2023 (Preis: 35,99 Euro pro Jahr). Kein Windows 11, kein ChatGPT, sondern eine Steuer-Software! WISO Steuer 2023 fuhr in diesem Jahr die höchste Stimmenanzahl ein, die jemals bei der Leserwahl erreicht wurde. Bester Sound: Sennheiser Momentum 4 Wireless (Preis: 279 Euro). Dezent und sehr sauberer Klang, eine Akkulaufzeit von fast 53 Stunden und eine einfache Bedienung. Die Kopfhörer von Sennheiser überzeugten die Leser der COMPUTER BILD – noch vor Modellen von Bose oder Teufel. Beste Kamera: Canon EOS R50 (Preis: 799 Euro). Mini-Kamera – Maxi-Leistung! Die kompakte Systemkamera von Canon dominiert dieses Jahr in der Kategorie „Foto“ und lässt die Nikon Z8 und Panasonic Lumix S5 II hinter sich. Die Canon EOS R50 zeigt: Systemkameras laufen der Spiegelreflexkonkurrenz auch bei Einsteiger-Modellen immer mehr den Rang ab Finanzen & Fintech: buhl:Berater (Preis: ab 99 Euro). Steuerberatung per Browser. Das Angebot einer günstigen, digitalen Steuerberatung, bei der echte Steuerberater die Arbeit übernehmen, hat die COMPUTER-BILD-Leser überzeugt. Erster Platz noch vor Trade Republic und Deutsche Bank Zinsmarkt. New Energy: GreenAkku Matilda (Preis: 999 Euro). Sauberen Strom mit Blumenkraft! Das Solarkraftwerk GreenAkku Matilda braucht kein Dach oder einen Balkon zur Befestigung, denn es steht auf eigenen Füßen und fungiert gleichzeitig als Blumenkasten und Sichtschutz. Diese Innovation honorierten die COMPUTER-BILD-Leser mit dem ersten Platz in der Kategorie „New Energy“. Die GreenAkku Matilda ermöglicht das Produzieren von Sonnenstrom, ohne das eigene Dach anzurühren Bestes Entertainment: MagentaTV (Preis: ab 10 Euro pro Monat). In der neuen Kategorie „Entertainment“ sichert sich die Telekom mit MagentaTV den ersten Platz. Innovationspreis (Preis der Chefredaktion): Shokz OpenFit (Preis: 199 Euro). Diese Kopfhörer übertragen den Schall nicht über den Gehörgang, sondern liegen am Kopf auf und liefern Sound per Knochenschall. Für die Chefredaktion der COMPUTER BILD die Innovation des Jahres.

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**URL:** <https://me.pcmag.com/en/lenses/19033/canon-rf-28mm-f28-stm>

**Title:** Canon RF 28mm F2.8 STM

**Text:** The Canon RF 28mm F2.8 STM (\$299.99) is a fine example of one of the most beloved concepts in photography: the pancake lens. There's no maple syrup involved, of course, just a slim, lightweight optic that works well with both full-frame and crop-sensor cameras. The moderately wide-angle RF 28mm snaps sharp photos, has fast enough optics to capture soft backgrounds, and comes in at an attractive price for both photo enthusiasts and beginners who want to try a prime lens. All those qualities make the RF 28mm an Editors' Choice winner and an easy recommendation for most Canon photographers. So, So Small Although the RF 28mm's tiny frame is far from its only compelling feature, it is the most obvious characteristic. It's not an unheard of concept—Canon had a couple of slim primes in its SLR lens catalog, and rival Nikon sells the similar Nikkor Z 26mm F2.8—but pancake lenses aren't the norm. At just 1.0 by 2.7 inches (HD) and 4.2 ounces, the lens doesn't add much volume or weight to your camera. Despite its size, it works with full-frame cameras like the EOS R6 Mark II to capture a view that's just a little narrower than the RF 24-105mm F4-7.1 IS STM zoom at its widest. It

pairs well with crop-sensor cameras too, including the tiny EOS R100 and the mid-sized EOS R7. I especially like using the 28mm with the R100, since the combination easily slides into a coat pocket or small bag. On a full-frame camera, the 28mm angle is best for portraits that include some of the world around your subject, group photos, landscapes, and street photography. It's a similar use case to your smartphone's main lens. The 45mm equivalent angle on crop-sensor cameras makes it easier to isolate subjects and induce background blur. It's still a standard focal length though, so it's not suitable for far-off subjects. In testing, the lens worked well for capturing a lounging cat on a street corner and glimmering rocks in a nearby stream. Canon doesn't include a lens hood, but it does sell an overpriced add-on for \$45. I wouldn't bother with it, since the exposed front element is small enough to minimize off-angle light by itself. If you want to protect the front element, consider adding a multicoated 55mm filter. The lens is not weather-sealed, but it does include a metal bayonet mount rather than a plastic one like some other low-cost entries such as the Canon RF 24-50mm zoom. Just one other prime lens in Canon's library has a similar focal length, the RF 24mm F1.8 Macro IS STM (\$499). It's a bit larger, but still relatively compact at 2.9 by 2.5 inches, and 9.5 ounces. I haven't tested it yet, but its technical advantages are pretty clear: It can blur backgrounds more readily thanks to its brighter aperture and macro capabilities, and includes optical stabilization (which is missing from the RF 28mm). Third-party alternatives are nonexistent. Canon doesn't let others make autofocus lenses for RF at this time, so off-brand options are limited to manual-focus, cinema, and other special-use glass. EOS R6 Mark II, f/2.8, 1/1,000-second, ISO 100

Is There Any Room for Control? Bigger lenses typically pack lots of buttons, toggle switches, and control rings, but there's no room for all that on the RF 28mm's 1-inch barrel. That said, it does offer a multifunction control ring and a toggle switch to set its behavior between Autofocus (AF), Control, and Manual Focus (MF) modes. The ring does nothing in AF mode, changes the ISO, EV value, or another custom setting in Control mode, and sets focus in MF mode. The Control ring is narrow, but still easy enough to find by touch thanks to its position at the front of the barrel and diamond-knurled texture. It turns with a pleasing amount of resistance, thus giving you precise control over aperture, EV, or whatever function you assign it. I like the manual focus experience. The ring's dampened feel is a benefit, while the nonlinear response makes it easy to shift focus dramatically with a quick twist or more deliberately with a slow turn. Although the nonlinear response is an advantage for locking in focus for still photos, it's less desirable for serious video work. A linear response is better for the latter because it lets a camera operator repeat the same focus shift across multiple takes of a scene. I don't think any Hollywood Directors of Photography (DPs) or indie filmmakers will pick this lens, though, because it shows a huge amount of focus breathing. The lens shifts its entire optical group to set focus and makes no effort to correct for changes in the angle of view. At close focus distances, the lens shows a noticeably narrower frame than at infinity. EOS R5, f/8, 1/80-second, ISO 220

I tested the autofocus speed with the snappiest full-frame camera I had on hand, the EOS R6 Mark II. The camera's tracking system quickly locks onto subjects and the lens does a fine job of keeping them in focus if they are moving toward or away from the camera. You might notice a delay when you move from a near subject to a far one or vice versa, however, since the lens takes a split second to drive its focus across the range. Lenses that use internal focus elements are universally faster, but I don't consider the slower response a practical limitation of the 28mm given its wide angle of view. The lens focuses to 9.1 inches for a meager 1:5.8 macro rating. It's good enough to get decent close-ups of traditional macro subjects like flowers, but you won't be able to hone in on small details like you can with a true macro lens. The RF 24mm F1.8 IS STM Macro and RF 35mm F1.8 IS STM Macro both focus closer for half-size (1:2) magnification. EOS R7, f/18, 1/5-second, ISO 100

Canon leaves off optical stabilization for the lens, something to remember if your camera also lacks the feature. The EOS R7, R6, R5, and R3 series all have in-body image stabilization (IBIS), but more affordable options like the R8, RP, R10, R50, and R100 don't. Keep your shutter speed at 1/30-second or shorter to get sharp results without the benefit of IBIS. With a stabilized camera, I got crisp handheld results at up to 1/2-second. Canon RF 28mm STM: In the Lab

I used the RF 28mm with a few different cameras out in the real world, but I reached for Canon's highest-resolution full-frame body, the 45MP EOS R5, for lab tests. The lens delivers very good contrast (3,900 lines) for the 45MP chip at f/2.8 and crosses over to the excellent range at f/4-f/8 (4,100-4,300 lines). EOS R5, f/2.8, 1/1,600-second, ISO 100

Photos are a little softer at f/11 due to diffraction (3,700 lines), but still in the very good range for the R5. Images

show less detail at f/16 (3,100 lines) and f/22 (2,300 lines). You can get sun stars at these settings, but they look only average, with long lines that spread out into streaks. If you're looking for crisp, pointy sunstars, the RF 15-35mm F2.8 L IS USM is (pardon the pun) a stellar, but expensive alternative. Like nearly every made-for-mirrorless lens, the RF 28mm F2.8 STM relies on digital correction to compensate for barrel distortion and a natural vignette. If you set your camera to snap JPGs, you won't ever notice the issue as both pictures and the preview in the viewfinder are corrected. And if you use the Raw format, photo editing software like Adobe Lightroom and Capture One includes a correction profile. Just note that turning off distortion correction for photos without distracting barrel distortion gets you a slightly wider angle of view. EOS R5, f/2.8, 1/1,000-second, ISO 200 The somewhat wide angle of view from the lens means you won't see bokeh in every picture, but it's still capable of softening backgrounds in the right situations. Defocused highlights look busier than from an F1.8 optic for sure, but they show generally soft edges and no signs of the ugly onion skin effect. The lens does a fine job of suppressing false color (LoCa) in backgrounds. An Affordable, Sharp, and Small Prime The RF 28mm F2.8 STM is a little gem of a lens. Its small size makes it enjoyable to carry around, while its moderately wide angle is suitable for walks around town, environmental portraits, and snapshots. Simply put, its price, performance, and pancake design make it special enough to warrant our Editors' Choice award. If you need a slightly more premium optic, the RF 24mm F1.8 Macro IS STM is close in focal length and seems like a worthwhile value given its brighter aperture, macro capabilities, and optical stabilization, though it's not nearly as compact as the 28mm.

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Like nearly every made-for-mirrorless lens, the RF 28mm F2.8 STM relies on digital correction to compensate for barrel distortion and a natural vignette. If you set your camera to snap JPGs, you won't ever notice the issue as both pictures and the preview in the viewfinder are corrected. And if you use the Raw format, photo editing software like Adobe Lightroom and Capture One includes a correction profile. Just note that turning off distortion correction for photos without distracting barrel distortion gets you a slightly wider angle of view. EOS R5, f/2.8, 1/1,000-second, ISO 200 The somewhat wide angle of view from the lens means you won't see bokeh in every picture, but it's still capable of softening backgrounds in the right situations. Defocused highlights look busier than from an F1.8 optic for sure, but they show generally soft edges and no signs of the ugly onion skin effect. The lens does a fine job of suppressing false color (LoCa) in backgrounds. 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**URL:**

<https://www.computerbild.de/artikel/cb-News-Internet-Der-Goldene-Computer-2023-36492633.html>

**Title:** Der Goldene Computer 2023: Die Sieger der großen Leserwahl

**Text:** Die Preisträger strahlten um die Wette, als sie den Goldenen Computer 2023 in Empfang nahmen. Geschäftsführer Frank Mahlberg und Dirk General-Kuchel, Chefredakteur der COMPUTER BILD-Gruppe, hatten zur Verleihung des begehrten Branchenpreises eingeladen. Rund 130 Gäste aus der Welt der Technik ließen sich die glanzvolle Verleihung im Berliner Verlagsgebäude der Axel Springer SE nicht entgehen. Und natürlich war sie wieder mit von der Partie und führte charmant wie immer durch das Programm: Barbara Schöneberger. Künstliche Intelligenz und Besuch aus der Politik Im Gespräch mit COMPUTER BILD-Chefredakteur Dirk General-Kuchel unterstrich Daniela Kluckert MdB (FDP) die zukünftige Bedeutung von KI. Foto: Pascal Rohé Zum Start stand Daniela Kluckert MdB (FDP), Parlamentarische Staatssekretärin beim Bundesminister für Digitales und Verkehr, zum Thema "generative KI (Künstliche Intelligenz)" Rede und Antwort. "Eine sich schnell entwickelnde Technologie wie Künstliche Intelligenz in den starren Rahmen eines Gesetzes zu zwingen, ist nicht der beste Weg, um Europas mangelnde Wettbewerbsfähigkeit zu stärken. Schlanke, praxistaugliche Regeln, die eine vertrauensvolle Nutzung ermöglichen, ohne Innovationen zu blockieren – dafür setzen wir uns im Bundesministerium für Digitales und Verkehr ein", so Kluckert. Galerie 25 Bilder Der Goldene Computer 2023: Das sind die Preisträger Foto: Shokz Einen praktischen Einblick in die Einsatzmöglichkeiten von KI erhielten Gäste und Preisträger im Laufe der Verleihung, die von einer KI-reproduzierten Stimme von Verlagsgründer Axel Springer eröffnet wurde. Den Einsatz von KI im Haushalt demonstrierte die Redaktion anhand des Saug- und Wischroboters ecovacs deebot x2 omni, der KI zur Raumerkennung nutzt. Ein weiteres Highlight des Abends war außerdem die Face Recognition Technologie des Genesis GV60, die das Öffnen des eleganten Elektro-SUV ohne Schlüssel ermöglicht. Eine Demonstration auf der Bühne und den Erhalt des Innovations-Awards verdankt der Kopfhörer OpenFit von Shokz seiner mit KI-operierenden Geräuschunterdrückung. Dieses tolle Feature war der COMPUTER BILD-Redaktion eine Auszeichnung wert. Zwei Mehrfach-Sieger Charmant wie immer führte Barbara Schöneberger durch den Abend. Foto: Pascal Rohé Sechs Wochen hatten die Leserinnen und Leser die Möglichkeit, auf computerbild.de aus 104 Nominierten in 13 Kategorien ihre Favoriten zu wählen und damit zu entscheiden, wer am Ende ganz oben auf dem Treppchen landen sollte. Den Sprung dorthin schaffte Samsung gleich dreimal: In der Kategorie "TV" gelang dem Samsung S95C ein klarer Sieg gegen LG und Philips. Genauso eindeutig ging es in der Kategorie "Computer" zu: Hier setzte sich das Samsung Galaxy Book3 Ultra gegen Lenovo Tab P12 Pro auf Platz 2 und Acer Swift 3 auf Platz 3 durch. Ein extrem knappes Rennen lieferte sich der südkoreanische Hersteller in der Kategorie "Smartphone (powered by O2)" mit der Konkurrenz: Nur 321 Stimmen trennten das erstplatzierte Samsung S23 Ultra vom Apple iPhone 14 Pro Max (Platz 2). Das Xiaomi 13 Ultra belegte einen respektablen dritten Platz. Der überraschende Doppelschlag des Abends gelang Buhl: Den Sieg bei "Software, Apps & Services" sicherte sich WISO Steuer 2023 mit der höchsten Stimmanzahl, die jemals bei der Leserwahl erreicht wurde. Die Firma aus Neunkirchen (Siegerland) verwies große Namen wie OpenAI/ChatGPT und Windows 11 auf die Plätze. In der Kategorie "Finanzen & Fintech" holte sich Buhl mit dem buhl:Berater den zweiten Sieg. Trade Republic und Deutsche Bank Zinsmarkt belegten Platz 2 und 3. Der Sennheiser Momentum 4 Wireless sicherte sich den obersten Platz auf dem Treppchen in der Kategorie "Sound". Dahinter reihten sich der Bose Quietcomfort Earbuds II sowie der Teufel Motiv Go Voice ein. Seriensieger und eine Überraschung Canon war auch dieses Jahr in der Kategorie "Foto" nicht zu toppen: Die EOS R50 belegte klar Platz 1, auf sie folgten die Nikon Z8 sowie die Panasonic Lumix S5 II. Ebenso beeindruckend war der erneute Triumph von AVM, diesmal mit dem FRITZ!Smart Gateway in der Kategorie "Smarthome". Trotz starker Aufholjagd in den letzten Tagen der Abstimmung landete Tado mit dem Heizkörperthermostat V3+ auf Platz 2, dicht gefolgt vom Bosch SmartHome. Für eine Überraschung sorgte das Deutschland-Ticket, das mehr als doppelt so viele Stimmen einsammelte wie die Automarken BMW und Volkswagen. In seiner Dankesrede, die vorab als Videobotschaft aufgezeichnet wurde, unterstrich Oliver Krischer (Bündnis 90/Die Grünen), Vorsitzender der Verkehrsministerkonferenz und Minister für Umwelt, Naturschutz und Verkehr des Landes NRW, dass die Auszeichnung für das Deutschland-Ticket ihm

deswegen besonders wichtig sei, weil keine Fachjury so entschieden hätte, sondern die Bürgerinnen und Bürger. Er hoffe und erwarte, dass dieses überwältigende Votum der Menschen die professionellen Akteure bei den Verkehrsunternehmen und Verbänden, in Verwaltung und Politik ermutigen, dieses wegweisende und bahnbrechende Projekt auch in Zukunft fortzuführen. Galerie 46 Bilder Der Goldene Computer 2023: Impressionen vom roten Teppich Foto: Dominik Tryba / Introduce Neue Kategorien und interne Konkurrenz In der neuen Kategorie "Computer-Zubehör" hängte der Epson EcoTank ET-8500 den Canon Maxify GX7050 ab – zwei Multifunktionsgeräte auf dem Treppchen sind eine Neuheit. Die Telekom stand mit MagentaTV in der Gunst der Leserinnen und Leser ganz oben und belegte einen starken ersten Platz in der neuen Kategorie "Entertainment". Ein innovatives Produkt, das GreenAkku Matilda, setzte sich gegen alle anderen nominierten Produkte bei "New Energy" durch. Die Gäste der Gala konnten sich selbst ein Bild vom Solarkraftwerk machen, denn es stand auf der Bühne. Den Award im Bereich "Security (powered by Genesis)" gewann in diesem Jahr überraschend der Avira Secure Browser nach einem starken Endspurt vor Norton 360 Advanced. Hier fiel die Entscheidung erst wenige Stunden vor Abstimmungsende. Beide Sicherheitslösungen gehören zum Mutterkonzern Gen Digital. Im Laufe des Septembers erfahren sie, ob auch Sie zu den Gewinnern gehören. Wenn sie Ihre Stimme abgegeben haben, erhalten Sie mit etwas Glück schon bald einen der großartigen Preise.

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**URL:** <https://www.computerbild.de/artikel/cb-News-Internet-Der-Goldene-Computer-2023-Die-Sieger-der-er-grossen-Leserwahl-36492633.html>

**Title:** Der Goldene Computer 2023: Die Sieger der großen Leserwahl

**Text:** Die Preisträger strahlten um die Wette, als sie den Goldenen Computer 2023 in Empfang nahmen. Geschäftsführer Frank Mahlberg und Dirk General-Kuchel, Chefredakteur der COMPUTER BILD-Gruppe, hatten zur Verleihung des begehrten Branchenpreises eingeladen. Rund 130 Gäste aus der Welt der Technik ließen sich die glanzvolle Verleihung im Berliner Verlagsgebäude der Axel Springer SE nicht entgehen. Und natürlich war sie wieder mit von der Partie und führte charmant wie immer durch das Programm: Barbara Schöneberger. Künstliche Intelligenz und Besuch aus der Politik Im Gespräch mit COMPUTER BILD-Chefredakteur Dirk General-Kuchel unterstrich Daniela Kluckert MdB (FDP) die zukünftige Bedeutung von KI. Foto: Pascal Rohé Zum Start stand Daniela Kluckert MdB (FDP), Parlamentarische Staatssekretärin beim Bundesminister für Digitales und Verkehr, zum Thema "generative KI (Künstliche Intelligenz)" Rede und Antwort. "Eine sich schnell entwickelnde Technologie wie Künstliche Intelligenz in den starren Rahmen eines Gesetzes zu zwingen, ist nicht der beste Weg, um Europas mangelnde Wettbewerbsfähigkeit zu stärken. Schlanke, praxistaugliche Regeln, die eine vertrauensvolle Nutzung ermöglichen, ohne Innovationen zu blockieren – dafür setzen wir uns im Bundesministerium für Digitales und Verkehr ein", so Kluckert. Galerie 25 Bilder Der Goldene Computer 2023: Das sind die Preisträger Foto: Shokz Einen praktischen Einblick in die Einsatzmöglichkeiten von KI erhielten Gäste und Preisträger im Laufe der Verleihung, die von einer KI-reproduzierten Stimme von Verlagsgründer Axel Springer eröffnet wurde. Den Einsatz von KI im Haushalt demonstrierte die Redaktion anhand des Saug- und Wischroboters ecovacs deebot x2 omni, der KI zur Raumerkennung nutzt. Ein weiteres Highlight des Abends war außerdem die Face Recognition Technologie des Genesis GV60, die das Öffnen des eleganten Elektro-SUV ohne Schlüssel ermöglicht. Eine Demonstration auf der Bühne und den Erhalt des Innovations-Awards verdankt der Kopfhörer OpenFit von Shokz seiner mit KI-operierenden Geräuschunterdrückung. Dieses tolle Feature war der COMPUTER BILD-Redaktion eine Auszeichnung wert. Zwei Mehrfach-Sieger Charmant wie immer führte Barbara Schöneberger durch den Abend. Foto: Pascal Rohé Sechs Wochen hatten die Leserinnen und Leser die Möglichkeit, auf computerbild.de aus 104 Nominierten in 13 Kategorien ihre Favoriten zu wählen und damit zu entscheiden, wer am Ende ganz oben auf dem Treppchen landen sollte. Den Sprung dorthin schaffte Samsung gleich dreimal: In der Kategorie "TV" gelang dem Samsung S95C ein klarer Sieg gegen LG und Philips. Genauso eindeutig ging es in der Kategorie "Computer" zu: Hier setzte sich das Samsung Galaxy Book3 Ultra gegen Lenovo Tab P12 Pro auf Platz 2 und Acer Swift 3 auf Platz 3 durch. Ein extrem knappes Rennen lieferte sich der südkoreanische Hersteller in der Kategorie "Smartphone (powered by O2)" mit der Konkurrenz: Nur 321 Stimmen trennten das erstplatzierte Samsung S23 Ultra vom Apple iPhone 14 Pro Max (Platz 2).

Das Xiaomi 13 Ultra belegte einen respektablen dritten Platz. Der überraschende Doppelschlag des Abends gelang Buhl: Den Sieg bei "Software, Apps & Services" sicherte sich WISO Steuer 2023 mit der höchsten Stimmanzahl, die jemals bei der Leserwahl erreicht wurde. Die Firma aus Neunkirchen (Siegerland) verwies große Namen wie OpenAI/ChatGPT und Windows 11 auf die Plätze. In der Kategorie "Finanzen & Fintech" holte sich Buhl mit dem buhl:Berater den zweiten Sieg. Trade Republic und Deutsche Bank Zinsmarkt belegten Platz 2 und 3. Der Sennheiser Momentum 4 Wireless sicherte sich den obersten Platz auf dem Treppchen in der Kategorie "Sound". Dahinter reihten sich der Bose Quietcomfort Earbuds II sowie der Teufel Motiv Go Voice ein. Seriensieger und eine Überraschung Canon war auch dieses Jahr in der Kategorie "Foto" nicht zu toppen: Die EOS R50 belegte klar Platz 1, auf sie folgten die Nikon Z8 sowie die Panasonic Lumix S5 II. Ebenso beeindruckend war der erneute Triumph von AVM, diesmal mit dem FRITZ!Smart Gateway in der Kategorie "Smarthome". Trotz starker Aufholjagd in den letzten Tagen der Abstimmung landete Tado mit dem Heizkörperthermostat V3+ auf Platz 2, dicht gefolgt vom Bosch SmartHome. Für eine Überraschung sorgte das Deutschland-Ticket, das mehr als doppelt so viele Stimmen einsammelte wie die Automarken BMW und Volkswagen. In seiner Dankesrede, die vorab als Videobotschaft aufgezeichnet wurde, unterstrich Oliver Krischer (Bündnis 90/Die Grünen), Vorsitzender der Verkehrsministerkonferenz und Minister für Umwelt, Naturschutz und Verkehr des Landes NRW, dass die Auszeichnung für das Deutschland-Ticket ihm deswegen besonders wichtig sei, weil keine Fachjury so entschieden hätte, sondern die Bürgerinnen und Bürger. Er hoffe und erwarte, dass dieses überwältigende Votum der Menschen die professionellen Akteure bei den Verkehrsunternehmen und Verbänden, in Verwaltung und Politik ermutigen, dieses wegweisende und bahnbrechende Projekt auch in Zukunft fortzuführen. Galerie 46 Bilder Der Goldene Computer 2023: Impressionen vom roten Teppich Foto: Dominik Tryba / Introduce Neue Kategorien und interne Konkurrenz In der neuen Kategorie "Computer-Zubehör" hängte der Epson EcoTank ET-8500 den Canon Maxify GX7050 ab – zwei Multifunktionsgeräte auf dem Treppchen sind eine Neuheit. Die Telekom stand mit MagentaTV in der Gunst der Leserinnen und Leser ganz oben und belegte einen starken ersten Platz in der neuen Kategorie "Entertainment". Ein innovatives Produkt, das GreenAkku Matilda, setzte sich gegen alle anderen nominierten Produkte bei "New Energy" durch. Die Gäste der Gala konnten sich selbst ein Bild vom Solarkraftwerk machen, denn es stand auf der Bühne. Den Award im Bereich "Security (powered by Genesis)" gewann in diesem Jahr überraschend der Avira Secure Browser nach einem starken Endspurt vor Norton 360 Advanced. Hier fiel die Entscheidung erst wenige Stunden vor Abstimmungsende. Beide Sicherheitslösungen gehören zum Mutterkonzern Gen Digital. Im Laufe des Septembers erfahren sie, ob auch Sie zu den Gewinnern gehören. Wenn sie Ihre Stimme abgegeben haben, erhalten Sie mit etwas Glück schon bald einen der großartigen Preise.

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**URL:** <https://petapixel.com/2023/08/29/laowa-expands-most-compact-series-with-65mm-80mm-nanomorph-primers/>

**Title:** Laowa Expands Its 'Most Compact' Anamorphic Lens Series

**Text:** Venus Optics has launched a pair of new compact Laowa Nanomorph anamorphic lenses on Indiegogo. Following the company's successful crowdfunding campaign for the Nanomorph 27mm T2.8, 35mm T2.4, and 50mm T2.4 lenses last year, the new 65mm T2.4 and 80mm T2.4 anamorphic lenses extend the series' focal length options. Like their predecessors, the two new Nanomorph lenses are designed for Super35+ sensor coverage and deliver a constant 1.5x squeeze ratio. The lenses also come in amber, silver, and blue flare options. Anamorphic lenses are well-known and desirable for their characteristic lens flare. The flare appears as horizontal streaks rather than circular shapes with anamorphic lenses. While in many cases, photographers and videographers want less flare, with anamorphic lenses, the flare is part of the appeal. Venus Optics teased the new crowdfunding campaign earlier this month, and at that time shared news of a brand-new 1.33x anamorphic adapter. The 1.33x front anamorphic adapter is compatible with all lenses in the Nanomorph series, not just the two new ones, and turns any Nanomorph lens into a 3x anamorphic. The 1.33x anamorphic adapter can also be used on standard spherical lenses, including Laowa's Ranger Cine Zoom full-frame lenses. Venus Optics promises a minimal loss in aperture stops and image quality when using the adapter thanks to its "special design." Returning to the new Nanomorph primes, they are available in a wide

range of lens mounts, including Canon RF, Sony E, Micro Four Thirds, Nikon Z, DJI DL, L-mount, and Fuji X. Although physically longer than the 27mm, 35mm, and 50mm Nanomorph lenses, the 65mm and 80mm lenses share a unified gear position with their predecessors, ensuring that users can swap between all five lenses without requiring different focus gears. Concerning focus, the manual focus lenses include a built-in back focus adjustment, eschewing the need for shims. The aperture and focus rings utilize standard 0.8 mod gear designs, and the focus ring has 270 degrees of throw. Pricing and Availability The pair of new Laowa Nanomorph lenses are available in a two-lens bundle for \$1,630 on Indiegogo, a 20% discount relative to the retail price. Each lens can be purchased separately for \$1,064, a 5% discount. The mirrorless versions of the Nanomorph lenses include an interchangeable lens mount, adding to their versatility. However, the EF/PL version cannot be swapped to become mirrorless. The new 1.33x front adapter is available as an add-on for just over \$700. The new Laowa Nanomorph lenses and 1.33x adapter are expected to ship in September. The complete details of the new products and all backer options are available on Indiegogo. Disclaimer: Make sure you do your own research into any crowdfunding project you're considering backing. While we aim to only share legitimate and trustworthy campaigns, there's always a real chance that you can lose your money when backing any crowdfunded project. Image credits: Venus Optics

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**URL:** <https://www.diyphotography.net/laowas-65mm-and-80mm-nanamorph-are-now-available-to-buy-through-indiegogo/>

**Title:** Laowa's 65mm and 80mm Nanamorph are now available to buy through Indiegogo

**Text:** Laowa's range of compact Nanamorph series is an intriguing set of anamorphic lenses. Until earlier this year, it comprised three lenses of 27mm T2.8, 35mm T2.4 and 50mm T2.4. In April, two new 65mm T2.4 and 80mm T2.4 lenses were announced. DIYP had the opportunity to see the new 65mm and 80mm lenses while at NAB 2023 this year and they are quite nice. Now, the lenses are finally available for sale. Except, you can't just buy them. It's an Indiegogo campaign. Laowa Nanomorph 65mm & 80mm T2.4 Above is the latest promotional video for the two new lenses, highlighting their specs, features and capabilities, along with some sample footage. Here's a little more sample footage from the initial launch announcement earlier this month. The two new lenses have the same maximum T2.4 aperture as their older 35mm and 50mm siblings. They offer a consistent 1.5x squeeze ratio throughout the focus distance range, so things won't change shape when you rack focus. They also come in three different flare options (blue, amber and neutral silver) A compact unified lens series All of the lenses in the Nanomorph range are designed to complement each other. They all have unified gear positions, letting you quickly and easily swap from one lens to another without having to adjust your follow focus and aperture motors. The lenses are different sizes, though, so you may need to adjust matte boxes or rebalance gimbals when swapping. The Nanomorph lenses are also compact enough that Laowa even suggests that they'd be suitable for drone use. The lenses only cover the Super 35mm format, so you won't be able to use them on full-frame, but they are available in Sony E / Fuji X / Canon RF / Nikon Z / MFT / DJI DL / L mount options for mirrorless cameras, as well as PL and EF mount. Laowa Nanomorph 65mm & 80mm T2.4 Specs Nanomorph 65mm T2.4 1.5X Cine Nanomorph 80mm T2.4 1.5X Cine Focal Length 65mm 80mm Format Super 35mm Super 35mm Aperture Range T2.4-T16 T2.4-T16 Optics 15 elements in 13 groups 14 elements in 13 groups Diaphragm Blades 13 blades 13 blades Min Focus 70cm 70cm Mirrorless Mount versions Front Diameter 67mm 67mm Filter Diameter 62mm 62mm Dimensions 67 x 132mm 67 x 142mm Weight 690g 710g Mounts Canon RF, Sony E, Micro Four Thirds, DJI DL, Nikon Z, Leica L, Fuji X PL/EF Mount versions Front Diameter 80mm 80mm Filter Thread 77mm 77mm Dimensions 84 x 95mm 84 x 110mm Weight 820g 830g Mounts Canon EF/ARRI PL Laowa 1.33x Front Adapter Laowa has also announced the new Laowa 1.33x Front Adapter. This brings the squeeze ratio of the entire Nanomorph set up to 2x for some ultra-wide aspect ratio anamorphic shooting. You can also use the 1.33x adapter on regular lenses (up to 77mm thread diameter) to turn any of them into a 1.33x anamorphic lens. There are limits on what lenses you can use with the adapter. Laowa says it's compatible with full frame lenses, including their range of Ranger Cine Zoom lenses. It adds anamorphic capability with very little light loss. Laowa does say, however, that it's optimal in a 48-100mm focal length range. Price and Availability As mentioned, the lenses are currently on Indiegogo. At present, the Laowa 1.33x Anamorphic adapter is listed for

\$713. The Laowa Nanomorph 65mm T2.4 and 80mm T2.4 have pledges starting at \$1,064 for mirrorless or \$1,452 for EF/PL mount. You can get the 2-lens 65/80mm Nanomorph set for \$1,834 for mirrorless or \$2,568 for EF/PL. The complete set of all five Nanomorph lenses, including the 27mm, 35mm, 50mm, 65mm and 80mm lenses, is also listed for \$3,986 for mirrorless and \$5,849 for EF/PL. All items are scheduled to ship in September 2023. Disclaimer: We only share crowdfunded projects we believe are legitimate. However, most of those projects are not in a delivery state. Make sure you look into the project and make an informed purchasing decision. While some projects may offer amazing rewards, others unfortunately may not deliver on their promises.

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**URL:** <https://www.featureshoot.com/2023/08/the-best-mpb-used-cameras-for-street-photography/>

**Title:** The Best MPB Used Cameras for Street Photography (Sponsored)

**Text:** The Best MPB Used Cameras for Street Photography (Sponsored) MPB used cameras, Mirrorless cameras MPB used cameras and MPB used lenses, Canon EOS R When it comes to street photography, you can't do better than a portable mirrorless camera (or even a compact). In this guide, we're sharing some of the best MPB used cameras for stealthy photographers on the go. Shop MPB's full range of cameras, lenses, accessories, and more here. Over the course of nearly a decade of interviewing street photographers, I've learned two things. First, they bring their cameras everywhere, and second, they walk—a lot. Steve Reeves, for example, has wandered for hours through the stalls of Chapel Street Market in London, stopping to create portraits of interesting faces along the way. Gustavo Minas has explored every nook and cranny of Brasília's bustling Central Station. Markus Andersen has spent countless summer days under the hot sun in Cabramatta, Australia, inhaling the scent of fresh fruit as he walks past open-air vendors. To be able to do this kind of work, the parameters are clear: you need a small, lightweight, discreet, and durable camera that won't strain your neck if you wear it all day, every day. While creating this guide to MPB used cameras and MPB lenses for street photography, I reached out to some of the best in the genre to see what tools they use for their urban adventures. Whether they're navigating rough cobblestone streets or climbing up hills searching for the perfect vantage point, this is the gear they rely on to get the job done. Please note: Prices are as of this writing. MPB used cameras, Fujifilm X-T20 Weighing in at just 383 grams, this camera is a go-to for the fine art street photographer Moises Levy. Aside from the size itself, Levy also appreciates how this cropped sensor camera handles highlights, even in tricky backlit scenarios. "I also like that all the controls are physical, so I don't need to enter any menu to adjust the setup for shooting," Levy says. He takes a unique approach to this camera, pairing it with manual focus-only lenses, such as the Zeiss 21mm and the Voigtlander 15mm, using an adapter. Explore this MPB used camera starting at \$229. MPB used camera, Sony Alpha A6400 Neil Kramer uses this mirrorless camera with a classic 35mm lens. "Sony mirrorless cameras are superfast, and they pretty much revolutionized the industry with their face-detection focusing," he reflects. "This means I can lift my camera and be confident that a face will be sharp. "On the other hand, Sony also allows me to turn off all these fancy gizmos if I want to be more creative. The camera is small, and I can carry it around in a small camera bag or in my winter coat pocket. I usually shoot in manual, but Sony's Auto ISO gives me the freedom to go in and out of shadows without missing the shot." Browse MPB used cameras starting at \$534. MPB used cameras, Canon EOS R Nicola Fioravanti, a street photographer who recently embarked on an extraordinary journey through the bustling cities and tucked-away villages of Morocco, almost always uses this camera with a 35mm lens. "Canon's R line offers access to RF optics, which are truly sensational," he says. "Although it is not one of the newest cameras, the Canon EOS R is still a very good option. It is a lightweight camera with accurate autofocus and excellent image quality with outstanding color rendering." Shop all Canon R mirrorless cameras starting at \$594. MPB used cameras, Ricoh GR III This compact camera is a favorite of the award-winning, Seoul-based artist Argus Paul Estabrook. While he loves the wide-angle lens (28mm equivalent, f2.8) and spectacular sensor, the real selling point is its size. "It's a little powerhouse that I can slip into my pocket, take anywhere, and never worry about missing a shot," the photographer says. "People don't take notice of it when it's in hand, which makes getting candid shots so much easier. It is also super quiet, which is another reason it doesn't draw attention." Shop all Ricoh compact cameras starting at \$824. MPB used cameras, Fuji XT-4 Vincenzo Barone, an Italian artist based in France, considers this one of his essential street

photography cameras for a few reasons. “The XT-4 feels great in the hand because of its old-school design, metal body, and dedicated single-purpose dials,” he tells me. “The IBIS (in-body image stabilization) is also a huge help in situations where you need to shoot with a slow shutter speed.” When hitting the streets, he prefers a wide-angle lens, such as a 23mm. Explore MPB used cameras starting at \$1,079. MPB used cameras, Fuji X100F This is just one of several Fuji X-Series cameras to make our roundup, but it’s worth singling out because of its fixed prime lens and rangefinder-like feel. “My favorite of all of the X-Series cameras is this one,” Steve Reeves explains. “It’s so small that I take it everywhere with me. At the same time, just because it’s small doesn’t mean it’s not powerful. It has a fast lens and a brilliant sensor. Some of my recent shots were used on posters and blown up big. Even close-up, the detail is there.” Browse MPB used cameras starting at \$1,239. MPB used cameras, Fujifilm X-Pro 3 Gustavo Minas likes a tilt-screen for street shooting, so he opts for this cropped sensor workhorse from Fujifilm, pairing it with this 27mm pancake lens. “It’s small and light, and if I use the electronic shutter, it makes no noise at all,” he says. Get this MPB used camera starting at \$1,749. MPB used cameras, Nikon Z7 II When switching from his old DSLR system (a Nikon D850) to a lightweight mirrorless setup, Benny Bulke opted for this Nikon camera. Known for his graphic, high-contrast scenes, he credits the camera’s dynamic range with preserving the details in both the highlights and shadows of his images. Plus, the high resolution (45.7 MP) empowers him to notice fine details he might have missed otherwise. “After using this camera, I would never want to go back to a camera without a tilting screen,” Bulke explains. “This screen is very fast to use with the touch/shutter command, so it makes a great cam for stealthy belly shots!” Explore MPB used cameras starting at \$1,869. MPB used cameras, Leica SL Three years ago, Daniel Featherstone traded his old gear on MPB and upgraded to a Leica SL. He’s used it ever since. “It’s the first digital camera I’ve really connected with,” he admits. “Being very minimalist in its design, there are no complicated menu systems, and it has a very premium feel. The shutter sound is very quiet for stealthy situations, and the EVF (electronic viewfinder) is bright and feels lifelike.” Get this MPB used camera starting at \$1,889. MPB used cameras, Leica Q2 This stunning Leica camera features a 47.3 megapixel full frame sensor, electronic viewfinder, and 28mm f/1.7 lens. “This camera is small yet extremely solidly made,” Markus Andersen explains. “It allows me to strip the technology back to pure simplicity: only aperture, shutter speed, and ISO, without extraneous and distracting features. In addition, I find the manual focus on this camera to far exceed other mirrorless cameras I have used in terms of sensitivity and speed.” Explore MPB used cameras starting at \$4,129. MPB used cameras, Leica Q2 Monochrom The black and white version of the Q2 was made for purists of the genre, offering the same low-light capabilities as its color counterpart. “The fixed 28mm focal length allows me to know what my frame covers (most of the time), and since I have to work quickly to get the shot, I can pretty much count on getting the subject in the frame,” Claude R. Beller tells us. “The electronic viewfinder and quick auto focus function are also invaluable in getting the shot off.” Get this MPB used camera starting at \$4,789. Further reading: • Photography on a Budget: How to Build Your Kit with Used Gear • The Top 10 Best Used Cameras for Landscape Photography • Sustainable Photography Means Not Buying New Gear Discover More

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**URL:** <https://nikonrumors.com/2023/08/29/new-leofoto-nf-06-replacement-foot-for-nikkor-z-800mm-f-6-3-400-f-2-8-and-600mm-f-4-mirrorless-lenses.aspx/>

**Title:** New: Leofoto NF-06 replacement foot for Nikkor Z 800mm f/6.3, 400 f/2.8, and 600mm f/4 mirrorless lenses

**Text:** FCC disclosure statement: this post may contain affiliate links or promotions that do not cost readers anything but help keep this website alive. As an Amazon Associate, I earn from qualifying purchases. When you click on links to various merchants on this site and make a purchase, this can result in this site earning a commission. Affiliate programs and affiliations include, but are not limited to, the eBay Partner Network. Thanks for your support!

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**URL:** <https://www.pophoto.com/news/tamron-17-50mm-sony-e-mount-lens-specs-details/>

**Title:** Tamron announces development of a 17-50mm lens for Sony cameras

**Text:** Tamron has been busy lately, with consistent lens announcements over the past few months. It’s keeping the ball rolling with two separate announcements. Sony users will soon be getting an extremely

versatile lens in the form of what Tamron says is the world's first 17-50mm lens for full-frame mirrorless cameras. This lens is just in the development phase, so there are still lots of unknowns, but Tamron did supply some enticing details. For Nikon users, the wait for a new third-party lens is nearly over. Tamron has provided a purchase date and new details for the recently announced 35-150mm f/2-2.8 lens for Nikon Z mount. Keep reading to find out more. Tamron What is the Tamron 17-50mm f/4 Di III VXD? Options for wide-angle and ultra-wide-angle zoom lenses can be a bit limiting. Many top out at 35mm or even less, or they don't offer an ultra-wide perspective. As a result, you've traditionally had to choose from two options. You could opt for something not quite so wide in order to reach the normal focal length range. Or you could be okay with purchasing two lenses and swapping back and forth when you want both ultra-wide-angle and normal perspectives. Tamron is aiming to offer a solution with its 17-50mm f/4 Di III VXD for Sony E-mount cameras. Having an ultra-wide perspective and normal perspective in one lens is ideal, as it prevents as many lens switches. It would be an ideal choice for travel, as you could get sweeping views and closer details or portraits, all with the same lens. Tamron explains that this is "the ideal 'walk around' lens," and as long as the performance is up to snuff, we'd have to agree. Tamron Tamron 17-50mm f/4 Di III VXD details The Tamron 17-50mm will offer a constant f/4 aperture. That isn't all that wide, but is reasonable for the zoom range and likely means that the price will also be reasonable. The lens will feature the company's VXD (Voice-coil eXtreme-torque Drive) linear motor focus mechanism, which should result in fast, quiet, and precise autofocus. Tamron is building the lens with internal zoom, meaning the lens won't change length at all when you zoom in or out. That's an ideal feature for videographers who use a gimbal, as you won't need to rebalance the stabilizer if you change the focal length. Adding to the versatility of the lens is its close focusing abilities. Tamron says that it will offer a minimum object distance (MOD) of just 7.5 inches at the wide end and 11.8 inches at 50mm. That means you'll be able to get some nice detail shots with this lens. The lens will feature a moisture-resistant construction and fluorine coating and utilize a 67mm filter thread. Tamron is promising excellent image quality throughout the zoom range. We look forward to testing it out this fall when it is expected to be available. The Tamron 35-150mm F/2-2.8 Di III VXD for Nikon Z mount is available for pre-order Announced only a month ago, Tamron has now provided additional details and a shipping date for its second Nikon Z mount lens. This versatile lens will feature Tamron's VXD linear motor focus mechanism, a maximum aperture of f/2 to f/2.8, and a maximum magnification ratio of 1:5.7 at the wide end. It weighs 2.6 pounds and is 6.3 inches long. It also will provide access to the Tamron Lens Utility app. In the app, you can update firmware and also utilize features that support focusing operations for photo and video applications. The Tamron 35-150mm f/2-2.8 Di III VXD for Nikon Z is available for pre-order now for \$1,999. It will begin shipping on September 21.

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**URL:** <https://www.newsshooter.com/2023/08/29/laowa-65mm-80mm-1-5x-t2-4-nanomorph-1-33x-front-anamorphic-adapter/>

**Title:** Laowa 65mm & 80mm 1.5x T2.4 Nanomorph & 1.33X FRONT Anamorphic Adapter

**Text:** Laowa has added two more focal lengths to its Nanomorph 1.5X Anamorphic Series, a 65mm T2.4 and an 80mm T2.4. The new 65mm and 80mm lenses join the existing 27mm, 35mm and 50mm focal lengths in the series. Both lenses offer the same amber, blue, and silver cinematic flare options as with the other focal lengths in the series, and they also share a very close-focusing distance of 2'3" / 70cm. Additionally, Laowa is also releasing its new 1.33X Front Anamorphic Adapter, which can be used with the existing Nanomorph to achieve a constant 2X squeeze ratio or to pair with spherical lenses. The minimum focus distance for the adapter is 2'4" / 73cm. It comes with step-up rings from 55mm, 62mm and 77mm for adaptation on the Nanomorph mirrorless and PL/EF versions or other spherical lenses. The Nanomorph series is designed for use with Super35(APS-C) and Micro Four Thirds cameras. The 65mm and 80mm can cover 4K resolution 16:9 UHD on cameras such as the Sony FX3, A7S3, and FX6, with only slight vignetting due to their larger image circle. To avoid squeeze ratio variations across different focus distances, Laowa developed a patented anamorphic design, to give the lenses mumps-free characteristics with claimed excellent optical performance. This design also keeps the lenses very compact. The Nanomorphs feature a 1.5X squeeze ratio to achieve a good balance between the lens size, the desired anamorphic look, and the use of the sensor image.



De-squeezing the footage shot with these lenses produces a 2.66:1 ratio on a 16:9 sensor. Laowa currently offers two versions of the Nanomorph lens: Mirrorless version with Sony E, Canon RF, Nikon Z, L mount, Fuji X mount, DL, and MFT. All mounts are interchangeable and can be purchased separately for \$50 USD each. The PL/EF version with both bayonets is included in the package. The mounts can be changed by the user. However, due to the lens design, PL/EF version cannot be interchanged with mirrorless bayonets. 1.33X Front Anamorphic Adapter The new 1.33X Front Anamorphic Adapter allows the Laowa Nanomorph to achieve a constant 2X squeeze ratio. The adapter will work well with 4:3 or 6:5 sensors for creating 2.66:1 or 2.4:1 aspect ratio footage after de-squeeze. When paired with the new Nanomorph 65/80mm, it can cover full-frame sensors, 50/65/80mm for S35, and 27mm for MFT format. The adapter has a minimum focusing distance of 2'4" (73cm) and a  $\varnothing$ 86mm filter thread to apply filters for creative uses. It comes with step-up rings for 77mm, 62mm, and 55mm threads. The new 1.33X adapter was specially designed to ensure minimal loss of aperture stops and image quality, and it is also compatible with the Ranger Cine Zoom lenses across a focal range of 48mm to 100mm. Pricing & Availability The new 65mm and 80mm are available for ordering on Indiegogo. The normal retail price for the single mirrorless version of the 65 or 80mm is priced at \$1099 USD (Mirrorless version) and \$1,499 USD (EF/PL version). There is also a 5-lens bundle, including the previous 27/35/50mm Nanomorph available for USD \$4599 USD (Mirrorless version) and \$6749 USD (EF/PL version). Additionally, the 1.33X Front Anamorphic Adapter can be purchased for USD \$699 USD. All of the items are expected to ship in September. Laowa's Indiegogo Nanomorph crowdfunding page has an array of 18 perks. These perks are divided into four categories: "single lens", "2-lens set", "5-lens set", and "add-ons". Laowa is also reintroducing the \$1 deal, allowing backers to acquire a Nanomorph lens in PL/EF or mirrorless version at a discount of 99.9%. There is also a "Laowa Supporter's Edition", which provides 5 quotas each for an exclusive engraving on the Nanomorph 5-lens set in both PL/EF and mirrorless versions for early backers. These backers will have the opportunity to add personalized laser-engraved text to their lenses.

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**URL:** <https://www.techradar.com/cameras/mirrorless-cameras/sony-a7c-ii-review>

**Title:** Sony A7C II review: Minor updates on the outside, big improvements inside

**Text:** With the latest Sony processing systems, including real-time AI recognition and video features previously reserved for the top-of-the-range Sony Alpha cameras, the travel-friendly A7C II becomes a serious alternative to the larger A7 IV. The jump to 33 million-pixel resolution takes it further away from the ZV-E1, which has a similar rangefinder-style design but a much lower-resolution 12 million-pixel sensor, as it's primarily designed for video use. The A7C II is a powerful, lightweight full-frame camera, and unlike its predecessor there's little compromise; you're getting all the good stuff Sony currently offers in a small full-frame camera. My only criticism would be that the electronic viewfinder could still be larger, and a full-size HDMI port would be excellent. However, both of those additions would impact the camera's size, which is one of its key selling points. Why you can trust TechRadar We spend hours testing every product or service we review, so you can be sure you're buying the best. Find out more about how we test. Sony A7C II: Two-minute review Even as a decent travel camera, it would be fair to say that the original Sony A7C didn't set the world on fire, and while the A7C II may look like more of the same, the changes are anything but. The body has received several minor improvements, which together make something more significant than the sum of their parts. The most notable difference is the addition of a second control dial, which significantly helps the handling, making it much more familiar to more traditional SLR-style A7 users. A new custom button has been added, as well as some redesign of the rear controls to make them easier to press and identify by touch alone. A lot of thought has gone into several small changes found on the camera. However, it's inside the camera where the more significant changes have taken place. The A7C II is a Sony A7 IV – which is the best mirrorless camera for most people – with the same 33 million-pixel sensor and Bionz XR processing system. However, it also brings features from more recent Sony cameras, such as the new menu and touchscreen system from the ZV-E1. The jewel in the crown is the real-time AI subject recognition, which is shared with the Sony Alpha 7R V. This takes Sony's excellent AF system and makes it even better by using AI to recognize a subject and keep it in focus, even when it can't see an eye in the shot. The fact that this feature works in real-time in video will make this the preferable camera to the Sony A7

IV, especially with the ability to load LUTs into the camera to use with S-Log picture profiles. Without being able to make a direct side-by-side comparison, the autofocus system's speed, accuracy, and intelligence seem as fast as on other new Sony cameras when shooting both stills and video. (Image credit: Future) This is an impressive array of features for video shooters, with the 4K 30p footage taken from the full-resolution 7K readout of the sensor, which is then downsampled without line-skipping or pixel binning. The A7C II can also shoot at 4K at 60fps, although only in a cropped Super35/APS-C mode. Full HD is available at up to 120fps, and there are mic and headphone sockets and micro HDMI. The camera can also be powered via a USB-C power delivery battery or mains power for shooting video. Regarding image quality, we're dealing with a known quantity because the sensor is the same as the one used in the Sony A7 IV, one of the most popular mirrorless cameras on the market. I'd be happy to shoot at all but the highest sensitivity settings of ISO 51,200 and 102,400, though obviously, the best results are found under ISO 6400. If anything, image quality may be slightly better than the A7 IV, with the new AI processing helping to improve white balance and color in shadow areas. The colors have also been enhanced to produce more natural skin tones. (Image credit: Future) While the original Sony A7C may have been quite uninspiring in terms of some of its features, the A7C Mark II is filled with some of the latest and greatest tech of the Sony Alpha line-up, and it's crammed into a small and lightweight body, which makes it an ideal travel companion. I would love to pair it with the Sony FE 24mm f/2.8 G and FE 40mm f/2.5 G lenses to create a great travel camera setup for shooting stills and video. With such a setup, the A7C II or its sibling, the A7CR, could be a much sought-after replacement for a Sony RX1 Mark II. It won't be a camera for everyone, and some will still favor a more SLR-style camera with a centered viewfinder. This is especially true as while the electronic viewfinder of the A7C Mark II has been improved, it is still on the small side. However, for those who mainly use a screen to compose their images, the A7C II is a powerhouse of a small camera. (Image credit: Future) \$2,200 / £2,100 / AU\$3,499 Pre-order from 29th August. Shipping mid-September The Sony A7C II was announced on August 29, 2023, and will land on store shelves in the middle of September, priced at \$2,200 / £2,100 / AU\$3,499 body-only or \$2,450 / £2,350 with the FE 28-60mm F4-5.6 lens (Australia pricing TBC). There isn't too much close competition in terms of full-frame rangefinder-style cameras. The logical choice would be the Leica M10R, but it's a very different type of camera in terms of operation and features, and is 3x the price. The Sigma fp is the smallest and lightest full-frame camera, costing \$1,899 / £1,599 / AU\$2,899. It has a 24MP backside illuminated CMOS sensor and 4K video, but lacks in-camera sensor stabilization, and the AF speed and features of the A7C II. Switching away from the rangefinder-style cameras, the most obvious comparison is Sony's own A7 IV, which features the same 33MP sensor and is priced similarly. The Nikon Z6 II is our other comparison choice, as it comes at a comparable price. (Image credit: Future) Arriving alongside the camera is a partner camera, the A7CR. This is essentially the same camera as the A7C II, but is fitted with the 61MP sensor of the A7R V. It will cost \$3,000 / £3,200 / AU\$4,999 and will also be available from mid-September. The A7CR will come with an accessory grip, and this will also be available separately so that it can also be used with the A7C II. We're awaiting price confirmation for the grip. The original A7C is not being discontinued, and will remain in the Sony lineup for the immediate future. Price score: 4.5/5 Sony A7C II: Specs Swipe to scroll horizontally Header Cell - Column 0 Sony A7C II Sensor 33MP BSI CMOS full-frame Video: 4K 60p AF points: 759-point array hybrid phase / contrast detection LCD: 3.0-inch vari-angle touchscreen, 1.03m-dot Viewfinder: 2.36m-dot, 0.39-inch OLED EVF Memory cards: Single UHS-II Connectivity: Wi-Fi / Bluetooth Max burst: 10fps mechanical shutter (C-AF) Size: 124 x 71.1 x 63.4mm Weight: 525g (18.5 oz) Sony A7C II: Design Small and light full-frame mirrorless camera with in-camera stabilization Front and rear Control Dials Front-facing articulated screen for selfies and vlogging When the original A7C was released it was the smallest and largest full-frame mirrorless camera with in-camera sensor stabilization. That final caveat is needed, as the Sigma fp is the smallest and lightest full-frame mirrorless camera, but has electronic stabilization for video shooting. The new A7C II retains the smallest and lightest title, measuring 124 x 71.1 x 63.4mm and weighing 525g. At a glance, the A7C II is identical to the original version of the camera. However, there are some small but significant changes to the camera's body. The most obvious of the changes is the addition of a front dial; previously, there was only a dial on the rear. I found this particularly annoying on the original camera, as I'm used to using a front dial for aperture and a back dial for shutter speed. Having both

dials brings the camera in line with the other A7 cameras, and from a handling perspective, this small addition should make it a lot more attractive to many Sony users. Image 1 of 3 (Image credit: Future) (Image credit: Future) (Image credit: Future) The second notable change is an omission. The markings on the top dial, which was previously the exposure compensation dial, have been removed, allowing it to be used for other exposure features. With just a rear dial on the previous camera, I can see the need to have a 'blank' secondary dial, but with the new front dial, the need is a little redundant, and I left it set to exposure compensation. Another addition is a new 'C1' custom button next to the menu button above the rear screen. Also, there's now a switch on the exposure mode dial to switch quickly between photo, video, and Slow and Quick movie mode. Some more minor changes are that the rear buttons are now more pronounced and slightly different - for example, the delete button is concave, making it easy to identify by touch with your camera held to your eye. Similarly, the shutter button is also now more prominent. The USB-C port and mic socket have been moved to the top of the side of the camera rather than the bottom. This means it sits above the screen, so trailing cables don't obstruct the screen when it is flipped to be front-facing. Finally, there is a new texture to the grip on the camera with a leatherette-type finish. (Image credit: Future) A new addition is the optional extension grip accessory. This adds a little more to the camera grip on the bottom, making it somewhere to rest your little finger. It has no additional buttons or dials, and is a physical extension that screws on the bottom of the camera while still allowing access to the battery compartment. Speaking of the battery, it's the now standard Sony NP-FZ100 battery, which Sony quotes as good for 540 shots. The number of images is reduced by around 100-200 from its predecessor, resulting from the higher-resolution sensor and new processing systems in the camera. However, in real terms, I didn't notice an impact on my day-to-day camera use. I didn't feel like the battery was running down any more than I would expect. These days, it's easy to top up the battery on the go. If you're shooting video, which is particularly power-hungry, you'll be pleased to know that the A7C II can take advantage of USB-C charging and power delivery when you have a lot of video to shoot. One of the main criticisms of the original A7C was the size of the viewfinder, which was usable but could have been better. While the size of the electronic viewfinder remains at 0.39 type size, the magnification has increased from 0.59x to 0.7x, while the resolution remains the same at 2.35 million dots. It's a slight improvement in specification, but it makes the viewfinder much more comfortable to use. I would still like it to be larger, but that would impact the camera's size. (Image credit: Future) While external operations have been improved, so have the internal ones. The A7C II features the latest generation of Sony's menu system, which has more straightforward color coding and is easier to navigate. The menu is now fully compatible with the camera's touchscreen, so you can touch and swipe to navigate, as we're all used to doing on a smartphone. The new additions to the camera certainly add up. Where the A7C had the feeling of being something aimed solely at those starting out and vloggers, it now feels more in line with the rangefinder-style body that many hoped the original camera would be. It feels more 'grown-up' and a camera part of the rest of the A7 lineup as opposed to being simply a 'Big A6700'. Design score: 4/5

Sony A7C II: Features & performance 10 frames per second with 1,000 shot buffer Real-Time AI subject recognition 7-EV 5-axis image stabilization Internally, there have been some significant upgrades compared to the original A7C. Previously, the sensor was the 24.2-million-pixel full-frame CMOS Exmor R sensor, and the new camera now uses the same sensor as the A7 IV, which is 33 million pixels. Although the A7C II may seem like an A7 IV in a different form factor, there are some areas where it's better. For example, the 5-axis sensor-based stabilization is now quoted as being suitable for seven stops, as opposed to the 5.5 stops of the A7 IV. It also features an AI processing engine, which is the same as that found in the Sony A7R V. This leads to advances in subject recognition, which mainly helps the autofocus prioritize what subject to focus on, and by detecting the subject, it can adjust exposure and white balance accordingly. When we're so used to impressive 20-30fps continuous shooting modes, the A7C II's 10fps seems moderate, but this is still a great number for most photographers. The maximum 10fps shooting rate can be used with both the electronic and mechanical shutter, and autofocus and exposure are also tracked and adjusted between each shot. All those images are set to the camera's new buffer before being saved to the card, and over 1,000 JPEG images can be saved in a burst. This drops significantly to just 44 raw images or 20 raw and JPEG images, but again, for the target user of this camera, that should be more than enough

images. For those who want to find a nice balance between raw and JPEG images, HEIF files are also available, which I used instead of JPEG images for my review. I found that the images are more detailed, with greater color depth than the JPEGs. Sadly, I couldn't check out the raw images when writing the review as there was a lack of software, which will change with the camera launch. Image 1 of 3 (Image credit: Future) (Image credit: Future) (Image credit: Future) Filmmakers will also be much more interested in the A7C Mark II compared to the original version. The more contemporary processing systems allow for the same resolution and shooting rates at the A7 IV. The highlight is the 4K 30p footage, taken from the full-frame 7K output and downsampled with no pixel binning. This basically should increase detail resolution and color. There's also 4K 60p shooting (in Super35/APS-C mode) and Full HD up to 120fps. All this is with 10-bit 4:2:2 internal recording, S-Log3, Cinetone Picture Profile, Active SteadyShot stabilization, and the recent Focus Breathing compensation feature. Unlike the A7 IV, the A7C adds some features from the ZV-E1, including Auto Framing, which reframes your shot by cropping in to help frame/track a particular subject within the frame. Also added is log recording with LUTs. This allows you to shoot in S-Log3 Picture Profile and preview what a LUT would look like, or even burn it directly onto the footage so you have to add it in post-production. There's also a headphone socket and micro HDMI socket, and when you add all of the features up, the Sony A7C Mark II is a great camera for filmmakers; it may be the best option within the Sony lineup for more casual vloggers or content creators. During my time with the A7C Mark II, I shot a few short video clips, including a brief 'to-camera' handheld vlog, and I was impressed with how easy it was to get good results. The focusing is flawless thanks to the eye-detection autofocus tracking, which stays locked. I also filmed some cranes with the camera and found that the real-time tracking for birds was excellent, with the AI recognizing when the bird turned its head and focusing instead on the bird's head when an eye wasn't visible in the frame. It was reassuring and impressive to see the camera adjust the focus area in real time on the camera screen while recording 4K video. The in-camera stabilization worked well when trying to stay still and shoot a static subject, creating a nice 'floaty' effect when there was slight movement. The Active SteadyShot sacrificed a small area of the image, and shooting a static subject is almost like using a tripod. When walking, the Active SteadyShot is significantly smoother, although the movements are less smooth when it does have to move, which is simply the nature of the digital stabilization. Overall, video footage is what we have come to expect from Sony; it is clear and crisp, and with the option to use LUTs, there are now so many different options for getting the perfect look straight out of the camera. Features and performance score: 5/5 Sony A7C II: Image and video quality 33MP full-frame sensor 4K 30p (7K oversampled)/4K 60p (crop)/FullHD 120p recording 5-axis, 7EV in-camera stabilization I was surprised when I heard that the A7C II was moving from a 24.2MP sensor to having the same 33MP sensor found in the Sony A7 IV. This changes the camera's perception, which was previously seen as an entry-level point into the full frame Sony lineup, a step-up for those coming from cameras such as the recent A6700. Now, the sensor is on par with the excellent Sony A7 IV and serves almost as an alternative model. In many ways, the latest processing algorithms and the addition of AI make the A7C II the preferable camera. As an aside, this may also signal the end of the 24MP full-frame sensor standard we have seen for the last decade or so. Not including the specialist video-orientated cameras of the ZV-E1 and FX3, it leaves the three-year-old Sony A9 II as the only latest-generation camera to feature a 24.2MP sensor. The sensor can shoot images at sensitivities between ISO 100-51200, which can be extended to ISO 50-102,400 when shooting still images. Image quality is as you would expect from the current generation of Sony cameras in terms of detail. I shot many images with the new FE 16-35mm f/2.8 G Master II lens, and the resolution of the images was more than enough to produce large, detailed landscape shots. Even when you use the APS-C crop mode, you're still getting 14 million pixel images, which is plenty enough for moderate-size prints. Image 1 of 3 (Image credit: Future) (Image credit: Future) (Image credit: Future) During my test, I shot raw and HEIF images. This allowed me to see how good the HEIF images were, especially as I could not look at the raw images due to a lack of software support during testing. I was impressed with the dynamic range of images shot with lower sensitivities between ISO 100 and 400, with plenty of detail in highlight and shadow areas of HEIF images. I was happy with how the images coped with being pulled around in Adobe Camera Raw. Obviously, the raw files will be the better option, but as a lightweight format editing images quickly for social media, I was satisfied with how they could be edited.

In terms of color, all of Sony's usual Creative Styles and Picture Profiles are present. In the last few years, it has been working on its color renditions, and the A7C II looks as good as other recent Sony cameras. I largely used the standard Creative Style to get a feel for the baseline of the camera, and it produced images with natural color and level of contrast. This style worked particularly well when shooting birds at a nature reserve, with the greens looking particularly good. I also enjoyed using the Vivid style, which produced a more Instagram-ready image with punchy color and slightly greater contrast without looking over the top. Image 1 of 3 (Image credit: Future) (Image credit: Future) (Image credit: Future) My only slight complaint is that I found that in multi-metering mode to be a little dark for my taste, and I would often use the exposure compensation dial to add around 0.3EV to add a touch more brightness to shadow areas. This was easily done without sacrificing much, if any, highlight detail. For video, the A7C II comes packed with features. Still, I tried to use it more as a vlogger or casual 'content-creator' would - shooting a few short clips of myself talking to the camera and some random footage to test how the autofocus worked with Bird tracking. Overall, I was impressed with the quality of the video, and it's in line with the color and detail we've seen with other Sony cameras. Particularly good is the 4K footage, which is oversampled from the full 7K readout of the sensor. The A7C II lacks advanced raw shooting modes that you would expect from a more video-focused camera. Still, it includes the ability to use LUTs with its s-log3 footage and to record the footage in 10-bit, making it a great choice for those who want to spend more time shooting and less time color grading in post-production. Image and video quality score: 4.5/5 Should you buy the Sony A7C II? (Image credit: Chris Rowlands) Buy it if... You want a full-frame camera for travel photography This is the smallest, lightest, full-frame mirrorless camera with an impressive 5-axis, in-camera stabilization system. Paired with a few small lenses, it's a great travel companion. You want to shoot video without spending loads of time working on color There are many reasons why videographers will be interested in the A7C II, but the ability to load LUTs so that you can preview or embed color has to be one of the most important. It saves time, and allows exposure to be previewed and adjusted perfectly. You want the latest autofocus features Although the 10fps continuous shooting rate doesn't demand the very fastest autofocus speeds, the real-time AI subject recognition and tracking make the A7C II one of the best cameras for when you need autofocus tracking that you can rely on. Don't buy it if... You shoot sports or wildlife A top speed of 10fps may be fast enough for some sports, but the rangefinder-style body isn't the best for balancing larger, heavier lenses, particularly when shooting handheld. You shoot more with a viewfinder than a rear screen Although improved on the original camera version, it is still small compared to the 0.9x magnification EVF of the Sony a7R V. Swipe to scroll horizontally Sony A7C II Attributes Notes Rating Price Not cheap, but it still represents good value when you consider it inherits the AI features in the Sony A7R V. 4.5 / 5 Design Familiar Sony handling in a small body 4 / 5 Performance Packed with signature features from the Alpha range. 5 / 5 Image quality Great performance from a tried and tested sensor 4.5 / 5 Sony A7C II: Also consider If our Sony A7C II has inspired you to think about other options, here are two more cameras to consider... Sigma fp If you really want the smallest and lightest full-frame mirrorless camera for stills and video, then look no further than the Sigma fp. Sigma is perhaps better known for making excellent lenses, but the Sigma fp is a truly pocketable camera with a 24.6 MP full-frame sensor. It can shoot between a sensitivity range of 100-102,400 and, with an electronic shutter, an impressive 18fps. The camera can shoot 4K CinemaDNG or H.264 footage at up to 30fps, and costs 25% less. However, it lacks many features that set the Sony A7C II apart, such as 5-axis stabilization and AI subject recognition. The Sigma fp also uses contrast-detection AF, which isn't as fast or reliable as the phase detection AF, which is now used in most other mirrorless cameras. That said, for street photography and travel, it may be a great pocket camera when paired with a small Sigma prime lens. Read our full Sigma fp review Nikon Z6 II Existing Sony users may want to look at the Sony A7 IV, which uses the same sensor with a central SLR-style body. Then there is the recent Sony A6700, which has a smaller 26MP APS-C size sensor but has much of the same technology, including AI subject recognition. Stepping outside of the Sony Alpha range, the Nikon Z6 II is priced at around \$1,695 / £2,099 / AU\$3,499 and has superb features for photographers and videographers. It uses a 24.5MP BSI CMOS sensor with a shooting rate of up to 14fps and a 273-point AF array. 4K video can be shot at up to 60fps, although it lacks the AI features of the A7C II and some more advanced video features, such as auto framing. The main catch is the big

sacrifice in size and weight, with the Nikon Z6 II, which measures 134 x 100.5 x 69.5 mm and weighs 705g, including the battery. Read our full Nikon Z6 II review How I tested the Sony A7C II I tested the Sony A7C II by keeping it with me in a shoulder bag for several days out. Usually, I accompanied it with the FE 16-35mm f/2.8 G Master II lens, which was released at the same time as the new camera. I also used it with the much older FE 70-200mm f/4 G lens, which I used to photograph birds at a nature reserve. During my few days shooting with the camera, I tested it mainly as a travel companion, using it for casual shots of scenery, family, boats, and birds. This allowed me to test the AI recognition for both stills and video, particularly when photographing the birds; their different shapes and sizes put the AI recognition to the test with the variety they offered. Finally, I used the video to shoot some short clips of scenery and birds, allowing me to test the camera's autofocus capabilities alongside the in-camera image stabilization. First reviewed August 2023

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**URL:** [https://www.photographyblog.com/reviews/sony\\_a7c\\_ii\\_review](https://www.photographyblog.com/reviews/sony_a7c_ii_review)

**Title:** Sony A7C II Review

**Text:** Introduction The A7C II is the second-generation attempt to bridge the gap between Sony's A6000-series and A7-series cameras by squeezing the larger full-frame sensor of the latter into the smaller, lighter body of the former. Sony have decided that it's time for the next concept of 35mm full-frame Alpha cameras, and so the A7C Mark II is born, with the "C" in the product name standing for "Compact". The A7C II sits alongside the popular A7 IV in terms of both specification and price and above the previous A7C model, which continues in the range for the time being. Sony have principally added a new sensor and processor, more advanced video recording and auto-focusing, and a more refined design to the 2023 version of the A7C. Aimed at a younger generation than usual, there are two colour versions of the Sony A7C II, a black and silver design (which Sony sent us for review), and a more sombre all-black version. The Sony A7C II will be available from September 2023 priced at around £2100 / €2400 body only or £2400 / €2700 with the FE 28-60mm F4-5.6 kit lens. It is made in China. Ease of Use The new Sony A7C II essentially combines the sensor, processor and key specifications of the popular A7 IV model with the smaller, lighter body of the A6700 APS-C camera. At the heart of the Sony A7C II, we find a Backside Illuminated Exmor R CMOS 35mm full-frame sensor, which is exactly the same higher-resolution 33 megapixel one that first made its debut in 2021's Sony A7 IV camera. The original A7C had a 24.2 megapixel Backside Illuminated Exmor R CMOS sensor that delivered great stills image quality and 4K video. The move to the 33mp sensor gives the Mark II the edge in resolution over the previous A7C by 27%, allowing you to apply more aggressive crops or make bigger prints. The A7C II offers a native ISO range of 100-51,200 which can be expanded to ISO 102,400 and dropped down to ISO 50 if required (only when shooting stills, though, not video). Thanks to the very latest BIONZ XR processor, as also found in the A7 IV camera, the A7C II offers up to an impressive 15-stops of dynamic range when shooting in Raw mode. The new processor also offers 8x more processing power than the BIONZ X processor found in the original A7C, which was itself no slouch. Impressively the larger 35mm full-frame sensor is housed inside a camera body that's roughly halfway in size between the full-frame A7 IV and the APS-C A6700. It measures 124mm (W) x 71.1mm (H) x 63.4mm (D), compared to 120.0 x 66.9 x 69.3mm for the A6700 and 129 x 97 x 81 mm for the A7 IV, making it slightly larger in volume than the A6700 and much smaller than the A7 IV. The aluminium bodied Sony A7C II weighs 525g without a lens, battery and memory card fitted, amazingly just 22g more than the A6700 (503g) and a whopping 134g less than the A7 IV (659g). It utilizes a tough magnesium alloy body shell that incorporates full weather sealing for extra peace of mind in more inclement conditions. Sony have employed a monocoque construction for the A7C II, which is more commonly used in the car and aircraft industries, predominantly to help achieve the size and weight reduction. The A7C II has an even larger, more prominent grip than the one on the A7C, which we preferred after using the camera for a couple of weeks. It has an indent for your right middle-finger to naturally sit in. Combined with the large rear thumb rest it helps to make the camera feel secure enough when shooting either one- or two-handed. If you still think that the camera is too small, there's also a new, optional Extension Grip available which further improves the handling. The Sony A7C II features an in-body 5-axis image stabilization system to help prevent unwanted camera shake in low-light. It automatically corrects for pitch and yaw movement, plus horizontal shift, vertical shift and

rotary motion (rolling) for both still images and movies. This was rated for up to 5 stops of compensation on the previous A7C model, but thanks to a newly redesigned stabilisation unit, the new A7C II now offers up to 7 stops of in-body stabilisation, making it one of the more capable Alpha camera in this regard. The A7C II also benefits from having a special Active Mode that increases stabilization for hand-held movie shooting by using the BIONZ XR processors. Furthermore, the use of an in-body system, rather than a lens-based system, ensures that the Alpha A7C II can stabilize all kinds of lenses, not just those with the FE designation. This includes E-mount lenses without Optical SteadyShot (OSS), A-mount lenses and even third party lenses mounted via the popular Sigma MC-11 or Metabones adapters. Note that lenses without any electronic contacts only benefit from three axes of compensation, and you also need to manually input which focal length you're using to ensure that the stabilization works properly. The electro-magnetic drive shutter unit is officially rated for 200,000 releases before it needs to be replaced, which is very impressive for a supposedly "entry-level" camera. The Sony A7C II uses exactly the same large capacity NP-FZ100 battery as the previous A7C model, the A7 IV and the A6700. The older A7C had a CIPA-rated battery life of around 740 shots when using the LCD screen and 680 when using the viewfinder, whereas the newer, more power-hungry A7C II only offers 540 shots when using the LCD screen and 510 when using the viewfinder. The A7C II can also be powered and charged via a USB connection, which is useful if you're without your charger but can access a computer, and thankfully it uses the latest USB-C standard. The new A7C II has a very similar 0.39", 2.36million-dot XGA OLED electronic viewfinder to the one used by the A7C, which is good, but certainly not class-leading. It features 100% scene coverage and a 120fps high frame rate setting to help track moving subjects more smoothly with virtually no lag. Crucially, though, it offers a higher magnification of 0.70x, versus 0.59x magnification on the original A7C. The eyepoint is also different - 23mm on the A7C II but only 20mm on the A7C. The A7C II has a slightly higher-resolution 3-inch, 3:2 ratio LCD screen than the A7C - 1.03 million versus 922,000 dots - but we'd have expected to see a much higher resolution screen on a new camera released in 2023. A larger, higher resolution screen, perhaps even in the 16:9 ratio rather than 3:2, would have made the A7C II more competitive with its main rivals. It does have a fully articulating vari-angle design which means that you can flip out the screen to the side, rotate it forwards for easier operation when pointing the camera at yourself, and fold it flat against the back of the camera to stop it from getting scratched when not in use.. Sony have also implemented touch sensitivity on the A7C II's LCD screen. This makes functions like focus point selection much easier and more intuitive, especially given the regrettable lack of a dedicated AF joystick on the rear. It even works while looking through the electronic viewfinder, a feature that we've seen on several other high-end mirrorless cameras recently. There are also a greater number of touch controls, including the ability to operate the menu system and swipe up to open the Function menu, something that was sorely lacking on the previous model. These are also joined by a new array of handy onscreen touch icons that are specific to the stills and movie modes. With its fully-articulating screen and super-compact size, the A7C II seems to be ideal for vlogging, but there's one rather big elephant in the metaphorical room - the FE 28-60mm F4-5.6 standard kit lens. The 28mm focal length simply isn't wide enough when holding the camera at arms length and pointing it at yourself, unless you've got incredibly long arms or you're using some sort of selfie stick or extension to position the camera further away from you. Which is presumably why Nikon released a 24-50mm kit lens with their Z5 camera and why Panasonic went even further and used their 20-60mm optic as the kit lens for the Lumix S5 series. Both of the Sony A7C II's main rivals clearly have the edge here in terms of how suitable their kit lenses are for one of their key target markets, namely vloggers. If you're buying the A7C II primarily for vlogging, we'd recommend the FE 20mm F1.8 prime lens instead of the 28-60mm kit lens, or if you afford it the recently introduced FE 20-70mm F4 G zoom, both of which will provide better framing and greater depth of field. The Sony A7C II's primary external controls are very similar to those on the A6700. Sony have made a significant number of ergonomic improvements to the new Mark II version of the A7C when comparing it to the original model. There is now a second command dial at the top of the A7C II's handgrip which makes it even easier to change the key exposure settings in conjunction with the rear command dial and the secondary rear-panel scroll wheel that doubles up as the 4-way navigation buttons. It also has two Custom function buttons rather than one, which many people like. Also the dedicated exposure compensation dial on the A7C has been

changed to a customisable unmarked dial on the A7C II. We still wish Sony had made the now unmarked EV dial lockable, as its position on the corner of the camera meant that it's often inadvertently knocked into a different (unwanted) position when stored in a camera bag. The handy Still/Movie/S&Q; switch from the A7 full-frame series has made its way onto the A7C II. The rear control layout of the A7C II hasn't really changed when comparing it to the A7C, other than the addition of the C1 button. There's a prominent AF-On button that can be used for back-button focusing, and to magnify an image during composition or playback. This button makes it a snip to back-button focus using your thumb rather than half-pressing the shutter button, a method that many photographers swear by. Sadly this means that there's still no room for an auto-exposure lock (AEL) button, a rather annoying omission. You also have to delve into the menu system to switch between AF and MF modes, or use the dedicated button on the lens (if there is one). The Sony A7C II is a very customisable camera. The AF-On button can be reconfigured to AE-Lock if you wish, just one of 27 different options that can be assigned to it. The rear Fn function button displays a quick-access menu of frequently used shooting settings, and you can choose which items appear on this menu. The Delete / C2 button on the rear can also be assigned one of the 27 frequently used functions for direct access. The operation of the left, right, down and centre rear panel navigation buttons can also be customized, as well as the Fn button's role in playback mode (it's set to Send to Smartphone by default). You also have the ability to assign a set of video-specific functions to these same buttons when you're shooting in the movie mode, which makes perfect sense for a camera that is as much about video as stills. In terms of the available shooting modes, there are three Memory modes marked 1, 2 and 3 on the shooting mode dial. These allow you to store three frequently used shooting set-ups for quick access, and within each Memory mode is a further four customisable sub-mode pre-sets which can be saved in-camera. There are also the usual auto, semi auto and manual modes, plus a dedicated Movie mode that works in conjunction with the video record button. This is logically located to the right of the camera's top-panel. Note that there's no Scene Selection position on the A7C II, perhaps reflecting the more serious nature of this particular model. The Slow and Quick (S&Q;) mode is now located on the new Still/Movie/S&Q; switch that has made its way from the A7 full-frame series. As the name suggests this accesses the camera's slow- and quick- motion video options (various frame rates ranging from 1fps to 100fps), as selected in the Movie1 tab / S&Q; Settings option in the main menu system. There is a Multi Interface Shoe / flash hotshoe on top of the A7C II for connecting an external flashgun or a compatible accessory such as the ECM-B1M digital shotgun microphone, but as with the A6700, this new camera does not feature a built-in pop-up flash. Thankfully the much clearer, although still lengthy, main menu system from the ZV-E1 camera has now been included on the A7C II, which is a very welcome improvement. There is a handy My Menu tab that, as the name suggests, allows you to construct your own custom menu for easier access to your favourite camera settings. Perhaps unsurprisingly given its compact size, the A7C II only has a single memory card slot. It supports the faster SD UHS-II memory card standard inside a dedicated memory card port that's hidden behind a lockable door on the left-hand side of the camera. The memory card slot and the various connectivity ports on the left-hand flank of the A7C II have also been specially placed to not block the LCD screen when it's twisted out to the side. The new A7C II has the same hybrid autofocus system with phase detection and contrast detection points as the A7C, but with more phase-detection points and, most importantly, greatly expanded subject recognition. On the A7C there are 693 phase-detection points and 425 contrast detection points that cover 93% of the frame, with the system working all the way down to -3EV low-light. On the A7C II there are 759 phase-detection points and 25 contrast points that cover 94% of the frame, with the system working all the way down to -4EV low-light. By far the biggest difference between the two models in terms of their auto-focusing performance is subject recognition. Sony has added an AI deep learning processing unit to the newer camera which enables it to recognise far more subjects than the previous model, and also greatly improves the detection of humans and animals/birds. The A7C can only recognise the eye and face of a human, and the eye of an animal or bird. The A7C II can recognise a human via its pose as well as its eye and face. So if the person's head is turned away from the camera, the A7C II will still accurately detect the subject as human based on its AI deep learning. Animal and bird detection has been expanded from just being able to recognise the eye on the A7C to the eye, head and body on the A7C II. As well as humans and animals, the A7C II also has the ability to



recognise airplanes, cars, trains and insects. The A7C cannot recognise any of these subjects. In the real-world the A7C II rarely if ever missed the moment because of an issue with the auto-focusing. It proved adept at both locking onto and tracking a moving subject, and excelled at portraits thanks to the dedicated Eye AF mode, which instantly recognises, locks onto and tracks a human or animal eye in both the AF-S and AF-C focusing modes. The AF experience on the A7C II is still somewhat diminished by the continued lack of a thumb-operated joystick to set the AF point, something that both the A7 IV and several rival cameras offer. This is a much more intuitive method than having to use either the Set button and the rear navigation pad or the touchscreen, so it's a shame not to see it featured on the A7C II. The Sony A7C II offers 10fps burst shooting with Full AF/AE tracking using either the mechanical or silent electronic shutter, exactly the same as the original model. The A7C II has a much larger buffer than the A7C, at least when it comes to JPEGs, being able to shoot at 10fps for over 1000 Fine JPEGs. It actually has a smaller buffer for RAW files, though, taking 44 RAW images or 20 RAW and JPEGs in one high-speed burst versus 115 compressed RAW images on the A7C. The Sony A7C II supports both wi-fi and Bluetooth connectivity, including the fastest 5Ghz wi-fi standard. It also offers location data acquisition via a low-power Bluetooth connection to a compatible mobile device, effectively allowing you to geo-tag your images. The A7C II offers more advanced video recording specs and performance than the older A7C. The first-generation A7C supported 4K/30p video recording in the XAVC-S format at 4:2:0 color depth in 8-bit to the inserted memory card or 4:2:2 in 8-bit over HDMI to compatible third party recorders. It supported the HLG, S-Log3 and S-Log2 profiles and could record Full 1080 HD at up to 120fps, with the dedicated Slow and Quick motion mode offering frame rates ranging from 1fps to 120fps at 1080p quality. There was no 4K 60p or 10-bit recording on the original A7C camera. The A7C II can capture oversampled 4K/30p video from 7K full-frame and also 4K/60p in Super 35mm mode at 10-bit 4:2:2 or 4:2:0 quality and in either H.265 and H.264 AVC file formats. It additionally supports M-LUT and Log recording with LUTs and can record Full 1080 HD at up to 120fps, with the dedicated Slow and Quick motion mode offering frame rates ranging from 1fps to 120fps at 1080p quality. The newer A7C II also offers the clever Auto Framing feature which uses the camera's AI-based subject recognition technology to automatically crop the frame to keep the subject in a prominent position when shooting movies, even when the camera is mounted on a tripod. Image Quality All of the sample images in this review were taken using the 33 megapixel Extra Fine JPEG setting, which produces an average image size of around 16.5Mb. The Sony A7C II produced images of outstanding quality during the review period. The A7C II has an extensive and very usable ISO range of 50-102400. ISO 50-6400 is essentially noise-free, while ISO 12800 and 25600 produce more than acceptable results, and even ISO 51200 is OK for emergency use, although we'd hesitate to use the fastest setting of ISO 102800. The RAW samples illustrate just how much processing the camera does by default, though, as they're noisier at the higher ISO values than their JPEG counterparts, with more unwanted colour artifacts. The effective Dynamic Range Optimizer function extracts more detail from the shadow and highlight areas in an image, without introducing any unwanted noise or other artifacts. Sony's colour profiles are split into 'creative looks' and 'picture profiles', with the former most suitable for stills and the latter for video, although either can be applied to both stills and video. The night photograph was excellent, with the maximum shutter speed of 30 seconds and the Bulb mode offering lots of scope for creative night photography. Noise There are 12 ISO settings available on the Sony A7C II. Here are some 100% crops which show the noise levels for each ISO setting for both JPEG and RAW file formats. JPEG RAW ISO 50 (100% Crop) ISO 50 (100% Crop) ISO 100 (100% Crop) ISO 100 (100% Crop) ISO 200 (100% Crop) ISO 200 (100% Crop) ISO 400 (100% Crop) ISO 400 (100% Crop) ISO 800 (100% Crop) ISO 800 (100% Crop) ISO 1600 (100% Crop) ISO 1600 (100% Crop) ISO 3200 (100% Crop) ISO 3200 (100% Crop) ISO 6400 (100% Crop) ISO 6400 (100% Crop) ISO 12800 (100% Crop) ISO 12800 (100% Crop) ISO 25600 (100% Crop) ISO 25600 (100% Crop) ISO 51200 (100% Crop) ISO 51200 (100% Crop) ISO 102400 (100% Crop) ISO 102400 (100% Crop) File Quality The Sony A7C II has 4 different JPEG image quality settings available, with Extra Fine being the highest quality option. The A7C II also supports the HEIF file format with 2 options available. There are 3 different Raw compression settings, with Uncompressed being the highest quality option. Thanks to a higher compression efficiency, HEIF files are smaller than JPEGs even though they contain significantly more data. How much more? Well, HEIF files are 10-bit whereas JPEG files are 8-bit. It's a

heck of a lot more tonal detail and wider colour gamut. In the A7C II both HEIF and JPEG formats are available, although you can't select both at the same time. Whichever format option you select can then be captured independently or simultaneously with RAW. Here are some 100% crops which show the quality of the various options, with the actual file size shown in brackets. Extra Fine (16.8Mb) (100% Crop) Fine (6.7Mb) (100% Crop) Standard (4.3Mb) (100% Crop) Light (2.9Mb) (100% Crop) HEIF 4:2:2 (5.8Mb) (100% Crop) HEIF 4:2:0 (6.5Mb) (100% Crop) RAW Uncompressed (68.6Mb) (100% Crop) RAW Lossless Compressed (39.3Mb) (100% Crop) RAW Compressed (35.6Mb) (100% Crop) Night

The Sony A7C II's maximum shutter speed is 30 seconds and there's also a Bulb mode for even longer exposures, which is excellent news if you're seriously interested in night photography. The shot below was taken using a shutter speed of 30 seconds at ISO 100.

Dynamic Range Optimizer D-Range Optimiser (DRO) is Sony's solution to improve shadow detail in photos taken in contrasty light. There are 5 different levels and an Auto option. Auto Level 1 Level 2 Level 3 Level 4 Level 5 Creative Looks

There are 10 Creative Look preset effects that you can use to change the look of your images which are available when shooting JPEG and/or Raw files. There are ten creative look presets for JPEG pictures and an additional six 'custom' presets can be manually stored for quick access. The presets are Standard ('ST'), Portrait ('PT'), Neutral ('NT'), Vivid ('VV'), 'VV2', 'FL', 'IN', 'SH', Black & White ('BW') and Sepia ('SE'). ST PT NT VV VV2 FL IN SH BW SE

Picture Profiles The Sony A7C II offers a range of 11 Picture Profiles which are available when shooting JPEG and/or Raw files. In addition to the creative looks, there are picture profile primarily designed for video use. By default, the ten parameters (PP1-PP11) are set to cover the following in-camera gamma profiles; Movie, still, Cine1-4, ITU709, ITU 709 (800%), S-Log-2, S-Log3 and HLG1-3), with manual control over numerous parameters including black level, colour mode and saturation. PP1 PP2 PP3 PP4 PP5 PP6 PP7 PP8 PP9 PP10 PP11

Sample Images This is a selection of sample images from the Sony A7C II camera, which were all taken using the 33 megapixel Extra Fine JPEG setting. The thumbnails below link to the full-sized versions, which have not been altered in any way.

Sample RAW Images The Sony A7C II enables users to capture RAW and JPEG format files. We've provided some Sony RAW (ARW) samples for you to download (thumbnail images shown below are not 100% representative)."

Sample Movies & Video

Product Images

Conclusion The new A7C II greatly refines the blueprint of the original A7C from 2020, namely a super-compact full-frame camera that is smaller and lighter than all of its main rivals. The "C" in the product name stands for "Compact", and the A7C II is certainly that, somehow squeezing a 35mm full-frame sensor, an IBIS unit and a flip-out screen into a body that is only slightly larger than the APS-C sensor A6700 camera and weighing a mere 22g heavier. Sony have thankfully addressed almost all of our criticisms of the original A7C model, turning what was a surprisingly out-dated camera in some ways into one that is much more up-to-speed for a 2023 camera. This includes the welcome addition of a front control dial, another Custom button, much greater touchscreen functionality, and the most recent main menu system. Even better is the 33 megapixel sensor and BIONZ XR processor that have been inherited from the A7 IV, not to mention the cutting-edge AI-driven AF system and more advanced IBIS unit that provides up to 7 stops of compensation.

Choosing between the new Sony A7C II and the previous A7C (which continues in the range) is something of a no-brainer - if you can afford the newer model, then go for it, as the Mark II version out-performs its older sibling in a lot of significant ways. Choosing between the new Sony A7C II and the A7 IV really comes down to which camera format you prefer - compact rangefinder or larger DSLR - and whether you can afford the extra cash for the A7 IV. The larger A7 IV offers a better viewfinder, dual memory card slots and longer battery life. On the flip-side, the smaller, lighter A7C II offers some additional video features, more effective IBIS, bigger burst shooting buffer and longer battery life, not to mention a considerable cost-saving.

The new Sony A7C II and the APS-C sensor A6700 are outwardly very similar, so choosing between them mostly comes down to the sensor size and price, with the A7C II being larger in both regards. You should also carefully consider the lens range that is available for both cameras. While they share the same E-mount, the number of "FE" full-frame lenses from Sony and third-party manufacturers is much bigger than the range of "E" APS-C lenses, so there's more choice for the A7C II than the A6700. A price-tag of around £2100 / €2400 body only or £2400 / €2700 with the FE 28-60mm F4-5.6 kit lens makes the new Sony A7C II slightly more expensive at launch than the A7C. In summary, the new Sony A7C II builds considerably on the promise of the rather flawed original to create a camera that is

much more an equal of the popular A7 IV. Ratings (out of 5) Design 4.5 Features 4.5 Ease-of-use 4 Image quality 5 Value for money 3.5 Main Rivals Listed below are some of the rivals of the Sony A7C II. Canon EOS R8 The new Canon EOS R8 full-frame mirrorless camera integrates the image quality and autofocus from the more expensive EOS R6 Mark II with the smaller, lighter and simpler body of the cheaper EOS RP. Is the resulting camera a resounding success or a terrible mish-mash? Find out now by reading our in-depth Canon EOS R8 review... Fujifilm X-T5 The Fujifilm X-T5 is the successor to the very popular X-T4 which was released in 2020, principally adding a new 40 megapixel sensor, 160 megapixel Pixel Shift Multi-Shot mode, 6.2K video recording and better auto-focusing. Can the new XT5 improve on what was already an outstanding camera? Find out now by reading our in-depth Fujifilm X-T5 review... Nikon Z6 II The Nikon Z6 II mirrorless camera is an evolutionary upgrade of the original Z6, principally improving the autofocus, buffer and video and adding a second memory card slot. Is this enough to compete with its main rivals? Find out now by reading our in-depth Nikon Z6 II review, complete with full size sample photos and videos... OM System OM-1 The new OM-1 flagship is both the last ever Olympus camera and the first ever OM System camera. Confused? Well no need to worry, as we take an in-depth look at what this new Micro Four Thirds flagship has to offer in our OM System OM-1 review, complete with full-size sample photos and videos... Panasonic Lumix GH6 The much anticipated Panasonic GH6 is finally here! But what does this new flagship camera offer, and can it really improve on the best-selling GH5? We find out in our review of the Panasonic Lumix GH6 mirrorless camera, complete with sample photos, test shots, videos and more... Panasonic Lumix S5 II Finally! The new Lumix S5 II is the first ever Panasonic camera to have a phase hybrid detection AF system, answering the critics of its contrast-based DFD system. But does this powerful hybrid photo and video camera have what it takes to beat its main rivals? Find out now by reading our in-depth Panasonic Lumix S5 II review, complete with full-size sample photos and videos. Sony A6700 The A6700 is the new premium model in Sony's extensive range of APS-C mirrorless cameras, but can it beat both its main rivals and its cheaper siblings? Find out now by reading our in-depth Sony A6700 review, complete with full-size sample images and videos. Sony A7 IV The new Sony Alpha A7 IV is a new 33 megapixel, 4K/60p video, 10fps burst shooting, cutting-edge auto-focusing hybrid full-frame mirrorless model that pulls no punches in its bid to be the only camera that you need. Find out why we think this is one of the best all-round cameras of 2021 by reading our in-depth Sony A7 IV review... Sony A7C Sony are attempting to turn the camera world on its head by creating a new 35mm full-frame camera that's the same size and weight as one with a smaller APS-C sensor. Have they succeeded with the new Sony A7C, and is it a great camera in its own right? Find out now by reading our Sony A7C review complete with full-size sample photos and videos. Your Comments Loading comments... Please enable JavaScript to view the comments powered by Disqus.

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**URL:** <https://me.pcmag.com/en/cameras-1/19020/sony-a7c-ii>  
**Title:** Sony a7C II  
**Text:** Table of Contents A Tale of Two Compacts Are You Sure That's Full Frame? Improved Handling and Controls A Touch-Forward Menu System Displays Lag Behind Competitors Power and Connectivity Smart, Reliable Autofocus A Sized-Down a7 IV Stabilized 4K With 4:2:2 Color This Sequel Is Better Than the Original The Sony a7C II (\$2199.99, body only) is a good example of how a few thoughtful tweaks can turn a good product—in this case, the Sony a7C (\$1,799.99)—into an excellent one. The second iteration is costlier, but has a vastly improved autofocus system, better ergonomics, and upgraded video capabilities. Plus, it continues to offer the same fantastic battery life and lens support as the original. It leaves off some of the pro features from the more expensive, Editors' Choice-winning a7 IV (\$2,499.99), but the a7C II is an excellent alternative for travelers and creators who prefer a smaller, lighter full-frame camera. A Tale of Two Compacts Sony suffered from a bit of bad timing with the debut of the original a7C. Its first travel-minded full-frame camera hit the market at a time many of us were still in lockdown due to the COVID-19 pandemic. Even so, Sony must have struck

enough of a chord to merit a rather quick sequel. And it's easy to see the appeal—a slimmer top plate and corner-mounted viewfinder make the camera easier to squeeze into your carry-on than full-sized alternatives. To reinforce how much Sony believes in the small full-frame concept, it sells a second model alongside this one, the a7CR. The two look identical, but there are some internal differences. The a7C II gets a combination of the a7 IV's 33MP sensor and the a7R V's AI-trained subject recognition system, whereas the a7CR opts for both the 60MP sensor and autofocus system of the a7R V. Broadly, the a7C II makes more sense if you are a hybrid creator or value low-light image quality over outright resolution, whereas the a7CR is a better camera for scenarios in which image detail is paramount.

**Are You Sure That's Full Frame?** The a7C II is the slimmest full-frame camera with an EVF and stabilized imager I've tested. It measures 2.8 by 4.9 by 2.5 inches (HWD) and weighs 18.1 ounces without a lens. For comparison, Sony's crop-sensor a6700 is mere tenths of an inch slimmer. Thinking about the a7C II as a full-frame a6700 is entirely appropriate. Compared with more mainstream cameras, like the Sony a7 IV (3.8 by 5.2 by 3.1 inches, 1.4 pounds) or the Canon EOS R6 Mark II (3.9 by 5.4 by 3.5 inches, 1.3 pounds), the difference is more apparent. The a7C II takes up roughly half as much volume as these larger cameras. Despite its size, the a7C II doesn't give up much compared with the larger a7 IV. It boasts an integrated handgrip and electronic viewfinder, along with an articulating display. All these features are missing from the smallest full-frame cameras on the market, the Sigma fp and fp L. Those cameras are made for use with add-ons and accessories, and the need to tinker with them makes them niche options.

**FE 20-70mm F4 G, 39mm, f/8, 1/4-second, ISO 100** Sony includes weather sealing on its full-frame cameras as a rule. Although the a7C II doesn't have an IP rating, it does include dust and splash protection, as well as a magnesium alloy chassis. I didn't get a chance to try the camera in dreary weather but have found Sony's weather sealing to hold up on rainy days. The a7C II is available in black or silver (the model I got for testing). The compact FE 28-60mm F4-5.6 is the only kit lens option, and the combo sells for \$2,499.99. The 28-60mm is an appropriately small lens, though I did not receive one for testing along with the camera. Instead, I spent most of the time using a couple of mid-sized zooms, the FE 20-70mm F4 G and the FE 16-35mm F2.8 GM II. Both pair well, though I particularly liked the combination of the a7C II and the tiny Sigma 45mm F2.8 Contemporary. Any of Sony's small primes, like the 40mm F2.5 G for instance, are a good match, too. There are hundreds of compatible autofocus lenses from Sony and third-party manufacturers, so you shouldn't have an issue finding something appealing.

**Improved Handling and Controls** The a7C II offers better ergonomics than the original thanks to a new front control dial, but still falls behind the a7 IV. The larger camera leaves room for an eight-way focus controller, a useful tool for sports, wildlife, and other tough-to-follow subjects. The a7C II skips a joystick, so it's less than ideal for these disciplines. I gave Sony flak for taking the same approach in its performance-oriented a6700, but here it's less of a concern because the a7 IV is available for not much more. As a bonus, big telephoto lenses balance better with the a7 IV. The a7C II's handgrip does well with mid-sized zooms. That said, I would lean toward F4 rather than F2.8 options simply because the space between the lens mount and grip is a little tight. If you need more surface area, Sony sells a grip accessory that adds three-quarters of an inch in height. I liked using it along with the camera, but question its value at \$159.99. Creators who use Arca-Swiss tripods are better off with a baseplate grip that has dovetail cuts for direct mounting, as Sony's solution still requires you to add a quick-release plate. The add-on handgrip is shown here on the a7CR. As mentioned, there's now a control dial at the front of the grip that supplements the two rear dials. Between the three, you can easily change the aperture, shutter, and EV settings. The On/Off switch, shutter release, Record button, PASM Mode dial, and Photo/Movie/S&Q toggle round out the top plate controls. The Mode dial includes three customizable slots, along with a full Auto option. Sony squeezes a flat command dial, AF-ON, Fn, Play, and Delete/C3 buttons on the rear, along with a raised thumb rest. Menu and C1 buttons are a little further up, above the LCD. You can configure most buttons, as well as use directional presses of the rear dial to set the focus point, which partially makes up for the lack of a dedicated focus controller. The rear display works as a touchpad for focus, either as a selection monitor or a touch surface when you hold the camera to your eye. I find the latter method generally handy, but a little imprecise and wobbly to manage.

**A Touch-Forward Menu System** The a7C II swaps out the original's top-tabbed menus for a new, color-coded side-tabbed interface. In addition to shifting the orientation for more efficient navigation, the menu is now fully navigable by touch and

includes a useful home page with common settings. You can also customize a My Menu section to your preference. The long-running Fn overlay menu continues, and like the full-on menu, it now supports touch input. Tap the Fn button to bring it up on the rear screen. This menu offers 12 slots, and the default layout thoughtfully includes creative picture profile, metering, focus pattern, subject recognition, white balance, and file format settings. You can change out any of these slots, so it's flexible. You can even configure a separate menu for video with options that aren't relevant to photography, such as audio levels.

**Displays Lag Behind Competitors** The a7C II uses a vari-angle display, which has become the standard choice for a hybrid camera. It swings out to the side of the body and twists around for viewing from the front, the top, or a low angle. The 3-inch screen is visible outdoors thanks to an extra-bright Sunny Weather setting. Resolution is an underwhelming 1.04 million dots, so you should switch to the viewfinder for focus-critical work. Sony generally falls behind its peers in terms of monitor quality and this camera does nothing to change that. For reference, the larger R6 Mark II and Nikon Z 6 II both sport sharper rear displays at 1.62 and 2.1 million dots, respectively. The electronic viewfinder isn't competitive either, but it's an upgrade versus the one on the original a7C (0.59x, 2.4-million dots). With 0.70x magnification, a 2.4-million-dot resolution, and a selectable 60 or 120fps refresh rate, it presents a clear, bright image to the eye, but it's more in line with an enthusiast APS-C camera in terms of size. The Sony a7 IV (0.78x, 3.7 million dots) and Canon R6 Mark II (0.76x, 3.7 million dots) offer bigger, sharper viewfinders, for comparison.

**Power and Connectivity** The a7C II uses Sony's FPZ-100 battery, one that has proven its endurance in other cameras. Here, it should last for around 530 exposures or 165 minutes of video per charge, so you should be able to get through a full day without having to recharge or swap to a spare. Portable charging is available via USB-C. You need to provide a cable and AC adapter, however, as the camera doesn't ship with either. The box also doesn't include a wall charger. Sony's first-party charging accessories are exorbitantly expensive, but third-party options work fine. FE 16-35mm F2.8 GM II, 16mm, f/8, 1/160-second, ISO 100 I had no trouble using Apple and DJI chargers with the camera, along with a cheap Amazon Basics USB-C-to-USB-C cable. The USB port is also useful for live streaming; it supports UAC/UVC plug-and-play streaming, so you don't need extra software to use the a7C II as a webcam. The left panel houses 3.5mm headphone and mic jacks, along with a micro HDMI port that supports clean 4:2:2 output so you can connect a ProRes recorder like the Atomos Ninja V if you want. A single UHS-II SDXC slot is your sole storage option. That's a bit underwhelming, considering that both of the a7 IV's slots support faster CFexpress cards in addition to SDXC. The camera works with the Sony Creators' App (available for Android and iOS) and connects with your smartphone using Bluetooth and dual-band Wi-Fi. It's easy enough to set up a connection via the app. Once you do, you can wirelessly send media to your phone or use the app as a remote control with a live feed from the lens.

**FE 20-70mm F4 G, 49mm, f/9, 1/2-second, ISO 100** Sony includes some accessibility features in its cameras, which is somewhat rare. In the case of the a7C II, there's a screen reader to help creators with visual impairments navigate menus, as well as a text magnification option.

**Smart, Reliable Autofocus** The a7C II recycles an existing autofocus system, the same one from last year's a7R V. It's an updated version of the Real Time Tracking system from the a7 IV that now benefits from a dedicated AI processor. The use of the AI term here is likely a marketing tactic, but it doesn't detract from the fantastic performance. It does a stellar job with people, as body and motion analysis augments already fantastic face and eye detection. It also offers a healthy number of other subject recognition modes: Animals, Birds, a combined Animals/Birds mode, Insects, Cars/Trains, and Planes. There are more modes here than on the a7 IV and some work better than before. Apart from the aforementioned ability to track entire human bodies, for instance, the AI-tuned system now provides better eye detection for horses. Sigma 150-600mm Sports, 572mm, f/6.3, 1/500-second, ISO 4000 The subject recognition options work with any focus pattern, including the wide-area mode that covers nearly the entire picture area with hybrid phase and contrast detection points. I especially like using it in conjunction with Real Time Tracking, a mode in which the camera continues to follow a moving subject after initially acquiring focus. Sony's tracking system has long been the best in class in terms of accuracy and acumen, and these subject recognition features only improve it. Canon's system is a very close second, however. As I touched on already, the a7C II doesn't pair well with the big lenses necessary for sports photography, even if its focus system is up for the task. Even so, portrait photographers (of both people and pets) can still appreciate spot-on tracking and

subject recognition. Sigma 150-600mm Sports, 600mm, f/6.3, 1/500-second, ISO 1250 As good as the focus system is, the a7C II suffers a bit in tougher scenes because it's a little clumsy to manipulate the focus point. The wide area does a good job in scenes with few obstructions, but if you're trying to keep up with a specific player on the field or find a songbird hiding in branches, it's wise to switch to single-point focus. These are the situations in which a dedicated joystick control is useful and why the a7 IV wins out from an ergonomic standpoint. I'm not saying you can't get those photos with the a7C II—the D-pad and rear touchpad are decent substitutes—but it's not the best choice. The a7C II's burst rate is 10fps for JPGs or Compressed Raw but drops to a more middling 6fps if you opt for Uncompressed or Lossless Raw. The buffer is good for extended bursts; I got 24 Uncompressed, around 50 Lossless or Compressed Raw, and 125 JPGs in tests with a Sony Tough 299Mbps SDXC card. The a7 IV performs identically in terms of burst rates, but its CFexpress memory card support means you don't have to deal with buffer limitations. Meanwhile, the R6 Mark II is a better pick for action and speed because it supports 12fps with a mechanical shutter and has a 40fps e-shutter. FE 20-70mm F4 G, 70mm, f/8, 1/80-second, ISO 200 To realize the small design, Sony uses a single-curtain mechanical shutter, a choice that might concern discerning photographers. The shutter uses an electronic-first curtain, which can lead to odd shapes in defocused highlights with wide-aperture lenses. It's a minor concern overall, but you likely already know if that will bother you. More of a concern is that the shutter limits flash sync to 1/160-second, versus 1/250-second for the a7 IV. A fully electronic shutter option is available too. It sidesteps those potential bokeh quality concerns, but its readout speed isn't fast enough to sync with a flash and might introduce rolling shutter distortion for subjects in motion.

**A Sized-Down a7 IV** The a7C II's imaging engine is a bit of a mish-mash of tech, some old and some new. The 33MP BSI CMOS sensor comes over from the a7 IV but a newer-generation Bionz XR processor and an all-new image stabilization system are also onboard. The stabilizer promises up to 7 stops of compensation, better than the 5.5 stops of the a7C. I tried it for some long exposures and managed sharp photos at speeds as long as 1/2-second, but struggled to get good results at 1-second. Your results might vary, of course, depending on how steady you can hold the camera. FE 16-35mm F2.8 GM II, 16mm, f/10, 1-second, ISO 100 The sensor covers a wide ISO range, 100-51200 by default and 50-204800 if you venture into the extended settings. The camera delivers clear, clean JPG or HEIF pictures with no loss of clarity through ISO 1600. Pictures up through ISO 25600 look nearly as good, with just a slight drop in contrast. The fine lines in my ISO test scene start to run together at ISO 51200 and 102400, enough so that pictures have a waxy look. Picture quality takes a big hit at ISO 204800. Here, the aforementioned fine lines are gone entirely and there's a lot of noise, despite the best efforts of Sony's processing engine. There are a few different color profiles (or Creative Looks) to choose between in JPG or HEIF capture modes. The camera defaults to the standard (St) setting but also has portrait (Pt), natural (Nt), vivid (Vv and Vv2), sepia (Se), and black-and-white (BW) options. You also get a mode with a stylized instant film look (In), a landscape option that emphasizes greens (Fl), and a soft look (Sh). You are likely to find these profiles useful if you don't want to spend time editing and toning color. I especially like the Fl option for wooded scenes. FE 20-70mm F4 G, 70mm, f/4, 1/250-second, ISO 100 Photographers who want more control over how pictures look should set the camera to one of the many Raw modes. All of these selections save files with more data than a JPG or HEIF, so you can tone photos to show more dynamic range, adjust the exposure and color, or apply a creative edit without any loss in quality. With a JPG, colors fall apart quickly with exposure edits. There are a few different Raw options: 12-bit Compressed Raw, 14-bit Uncompressed Raw, Lossless Compressed Raw Large (33MP), Lossless Compressed Raw Medium (14MP), and Lossless Compressed Raw Small (8.2MP). I use Lossless Compressed with Sony cameras because it provides as much room to edit as the Uncompressed setting, but with more manageable file sizes. If you think that 33MP is overkill, the Medium and Small options offer the same picture quality and flexibility to edit, just at a lower resolution. FE 20-70mm F4 G, 70mm, f/5.6, 1/50-second, ISO 100 I didn't get a chance to look at the Raw images ahead of completing this review—our standard processor, Adobe Lightroom Classic, does not yet support a7C II files. That said, I expect the output to match that of the a7 IV, which delivers clean, detailed output through ISO 800, and excellent results through 12800. I see some luminance noise at ISO 25600 and 51200, but that effect does little to obscure the very fine lines in our ISO test scene. Pushing to ISO 102400 and 204800 introduces a slight green cast to photos and

increases noise to a level that devours textures and other fine details. Stabilized 4K With 4:2:2 Color The a7C II is a full-featured video camera. It records 4K30 with the full width of the sensor, offers 10-bit 4:2:2 color, and supports 4K60 with a Super35 (APS-C) crop. It extends the frame rate to 4K120, also with a crop, in S&Q; mode for anywhere from half-speed (60fps) to fifth-speed (24fps) output. The 10-bit color support puts the a7C II in the same league as the EOS R6 Mark II and Panasonic S5 II, though both of those support full-width 4K60. Sigma 150-600mm Sports, 600mm, f/6.3, 1/500-second, ISO 5000 You can use any of the Creative Look profiles for ready-to-edit footage, HLG for delivery to HDR displays, S-Cinetone for a film-like grade, or S-Log2 and S-Log3 for an editing-friendly flat look. Autofocus works in video just like it does for stills. Although Sony doesn't market the a7C II to vloggers, it still has all the automated framing assist features from the ZV-E1. This mode adds some push-ins and pans to footage, so vloggers who work as both the camera operator and on-screen talent can enjoy more dynamic footage. The video quality looks very good, generally speaking. The oversampled 4K footage looks sharp, and the stabilized sensor does a good job of smoothing out the jitters from handheld recordings. Rolling shutter is an issue, however, and can cause some wobbling in handheld shots and a rubber motion effect for subjects moving across the frame. FE 20-70mm F4 G, 20mm, f/11, 1/2-second, ISO 100 On the plus side, the a7C II supports focus breathing compensation for select Sony lenses. It also does a good job of long-form recording. I managed more than 90 minutes of continuous 100Mbps 4K60 without any heating issues. The in-camera mic does as good a job as most other cameras—which is to say it's fine for casual clips and nonprofessional use, but an omnidirectional pickup pattern and relatively compressed range restrict audio quality. The vlogging-focused Sony ZV-E1 and Nikon Z 30 both offer better audio quality, for reference. This Sequel Is Better Than the Original The Sony a7C II makes some compromises to achieve its compact design, but none are a major detriment to its performance. In fact, its AI-trained focus system is even better than what you get on the full-sized a7 IV. Excellent stills and video quality, a fully rugged build, and long battery life are additional highlights. That all aside, we continue to recommend either the a7 IV or the Canon EOS R6 Mark II more broadly to enthusiasts, as their SLR-style bodies handle better (especially with heavier lenses) and offer dual card slots. But for photogs who prefer to use slimmer lenses or who work in the travel, portrait, or photojournalism genres, the smaller a7C II makes a lot of sense.

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**URL:** <https://me.pcmag.com/en/cameras-1/19019/sony-a7cr>

**Title:** Sony a7CR

**Text:** Table of Contents A Smaller a7R V Strong Ergonomics for a Small Camera Touch to Control A Middling Monitor and Viewfinder Power, Storage, and Connectivity Autofocus With AI Assistance A Whole Bunch of Pixels A Capable Video Camera, Too Travel the World With a 60MP Camera The full-frame Sony a7CR (\$2,999.99, body only) squeezes the 60MP sensor and AI-assisted autofocus system from the bigger a7R V (\$3,899.99) into a more compact camera body that costs significantly less. It's a top option for high-resolution travel photography and studio work thanks to its excellent image quality, reliable subject detection, and effective stabilization. That said, the pricier a7R V holds onto our Editors' Choice award and remains a better option for pros thanks to its dual card slots, dedicated focus joystick, and incredible viewfinder. If you can do without those advantages and prefer a lightweight kit, however, the smaller a7CR is a top option. A Smaller a7R V The a7CR takes inspiration from the first-generation a7C and fits right in with that camera's successor, the a7C II. Sony's high-resolution R cameras are the marquee models in the a7 series and have been since its debut. For its part, the a7CR has the same sensor and processing engine as the 60MP a7R V. It drops support for 8K video and uses a smaller viewfinder, but all the photo features are here, including the 240MP multi-shot mode. Sony bills the a7CR and a7C II (the two share the same body design) as the smallest full-frame cameras with an integrated viewfinder. That caveat is necessary not just because Sony's ZV-E1 vlogging camera shaves some millimeters off here and there, but also because Sigma's fp series exists. The viewfinder-less 24MP fp and 60MP fp L are tiny, at 2.8 by 4.4 by 1.8 inches (HWD) and 15.1 ounces. Still, the a7CR isn't much larger or heavier, at 2.8 by 4.9 by 2.5 inches and 18.1 ounces. Even though the fp L offers similar picture quality to the Sony at a lower cost, I don't recommend it for most photographers because it relies on a fully electronic shutter with a slow readout; it's not good at freezing motion and is unusable for flash photography, and requires a very steady hand

if you want to work without a tripod. The a7CR uses a mechanical shutter with an electronic first curtain, so it can freeze motion at 1/4,000-second and sync with flashes at 1/160-second. The fp L is best left to folks who like to tinker, whereas the a7CR is a camera most people can pick up and use to get good results. The Leica M11 (which is also available in a Monochrom edition with a black-and-white sensor) is another slim, high-pixel, full-frame camera you might want to consider for travel. But it costs quite a lot at around \$9,000, is manual-focus only, and can't record video. Those are nonstarters for some photographers, but a subset won't mind paying for the throwback design and bright optical viewfinder. As for construction quality, the a7CR matches up with Sony's larger cameras nearly point-for-point. A magnesium alloy chassis protects the internals and makes for a long-lasting device. The a7CR does not have an IP rating, but can still resist dust and splashes. I didn't get a chance to use it under rainy skies, but would not hesitate to do so. Strong Ergonomics for a Small Camera Despite its compact dimensions, the a7CR doesn't feel cramped. The sizeable handgrip plays a role there, and I like that it now has a command dial on the front like many of Sony's other recent smaller mirrorless models. The camera is comfortable to hold overall, though there's not enough space for my pinky finger at the bottom. I don't mind adjusting my grip for small lenses, but it's not ideal for larger zooms. Sony includes a basic add-on grip for the a7CR that screws into the tripod socket and adds about three-quarters of an inch of height. The accessory makes it easier to handhold the camera and get long exposures, but I admit that it detracts from the streamlined design. And since it's a purely mechanical add-on, it doesn't add controls or extend the battery life. The body has plenty of buttons and dials for tactile control. Its top plate houses a standard PASM Mode dial with three custom setting slots and an integrated toggle to swap between still, movie, and slow-motion modes. The On/Off switch encircles the shutter release as is typical for Sony, while a Record button and a flexible command dial round out the top controls. The top dial handles EV compensation in most exposure modes, but you can customize it and many of the other controls to your preference. Controls take up most of the rear's usable surface space, but they don't feel cramped. Menu and C1 buttons, as well as a command dial run in a row at the top. The rest of the buttons squeeze in between the raised thumb rest and the LCD. The AF-ON, Fn, Play, and Delete/C4 buttons sit above and below the flat rear command dial. The dial supports four directional presses that you can use to adjust the focus point or otherwise set options. You can also set focus by touch, either by tapping on the rear monitor or using it as a touchpad when the electronic viewfinder (EVF) is at eye level. How often you need to manipulate the focus point largely depends on the type of subject matter. If you're a full-time portrait photographer you can simply rely on the face and eye detection modes. But some sports and wildlife subjects are harder to pinpoint, which is where a focus joystick becomes critical. If that's the type of photography you care about and you need a high-pixel camera, the a7R V is a better choice because of its dedicated focus control, huge viewfinder, and CFe memory support. I discuss those last two aspects in more detail later. Touch to Control Long-time Sony owners should note that the a7CR uses the company's newer menu system, a color-coded, side-tabbed interface that's fully operable by touch. The change requires a bit of an adjustment if you're upgrading from an older model with top-tabbed menus, but it's an improvement overall. To make the most of the new interface, add your most frequent options to the My Menu page. The Fn overlay menu continues from past models. Tap the Fn button to bring up that transparent array of 12 customizable icons at the bottom of the screen. Sony's always-on touch controls now cover subject recognition, drive, white balance, creative style, and focus settings. These touch icons run down two columns on the left and right of the screen; they don't get in the way too much, but if you want to make them disappear you need to turn off touch input entirely. Thankfully it's quick to toggle—in capture mode, tap the Delete/C4 button. Both the Fn and the always-on overlays are split between photo and video functions by default. Some exposure settings aren't, but it's easy enough to separate them via the menu. A Middling Monitor and Viewfinder Sony has a reputation for using lower-quality displays than its competitors and the company has not changed track with the a7CR. The 3-inch, touch-capable LCD has a resolution of 1.04 million dots, which is underwhelming for fine manual focus and image review with a 60MP sensor. The a7R V uses a 2.1-million-dot display for a good reason, as do competitors like the 45MP Canon EOS R5 and Nikon Z 7 II. The a7CR also has a significantly smaller EVF (0.7x, 2.4 million dots) than the a7R V. That's not totally surprising, as the a7R V's EVF is the largest in its class with a 0.9x magnification rating and resolution of 9.4 million dots. On the plus side, the EVF is bright, refreshes smoothly at either



60 or 120fps, and shows a larger image than the original a7C's 0.59x EVF. Size and cost are certainly factors here since the a7CR is much smaller than the a7R V and costs around \$1,000 less. Power, Storage, and Connectivity The a7CR runs on Sony's NP-FZ100 battery, one of the best in the market for endurance. Here, it should get you around 490 photos per charge with the EVF or 560 with the LCD. Video creators can expect around 155 minutes of continuous recording. Those are excellent figures for a small camera and I expect many photographers to get a full day's use out of it. If you do need to recharge, you can do so in-camera via USB-C. Just keep in mind that you need to provide a USB-C cable and charger because Sony doesn't include either in the box. The USB-C port also connects the camera to a computer for offloading files or acting as a webcam; the latter doesn't require any extra software or drivers thanks to support for the standard UAC/UVC protocol. Just pick the camera from your meeting or streaming software. The camera includes 3.5mm microphone and headphone connectors, as well as a micro HDMI port with 16-bit 4:2:2 output so you can add an external recorder for Raw or ProRes recording. A single UHS-II SDXC memory card slot handles storage. It's a shame Sony didn't work support for faster CFexpress cards into this camera like it does for the a7R V because the camera creates a lot of data in burst and multi-shot modes. The lack of a second slot might also be a concern for pros who worry about card malfunctions during events or weddings. FE 16-35mm F2.8 GM II, 16mm, f/5.6, 1/4-second, ISO 200 Bluetooth and dual-band Wi-Fi radios are on board for connectivity. The camera pairs with the free Sony Creators' App (available for Android and iOS). I used it on my iPhone to copy pictures over and as a wireless remote for the camera with a live view. Sony offers some accessibility options for users with visual impairments, something I haven't seen from competitors. Highlights include a screen reader feature that reads out menus and a screen magnification option to make menus more legible. Autofocus With AI Assistance The a7CR has the same hybrid autofocus system as the a7R V. Phase detection points cover about 79% of the frame and contrast focus points extend nearly to the edge. You can pick a focus point by yourself or select a narrower area of interest like with any other camera, but Sony's strength is in its subject recognition and tracking. The company's Real Time Tracking system is one of the most accurate, tenacious autofocus engines I've tested. FE 20-70mm F4 G, 70mm, f/4, 1/1,200-second, ISO 100 Here, Real Time Tracking gets an assist from the a7CR's processing engine, which devotes one of its CPUs to AI subject recognition and other machine-trained features. It improves subject recognition for people—the camera analyzes bodies and skeletal structures to keep focus on a model, even if they turn away from the camera—and enables dedicated modes for Animals, Birds, a combined Birds/Animals, Insects, Cars/Trains, and Airplanes. There's no auto mode to let the camera pick a subject type by itself (something the Canon EOS R6 Mark II and Nikon Z 8 can do), but it's easy enough to switch options via the always-on touch controls or the Fn menu. Generally speaking, the subject recognition works well even if you set the camera to the wide area mode. I had great success snapping photos of hummingbirds stopping in at a feeder with Bird detection active. For tougher scenes, like an animal in brush or team sports, it's worthwhile to use a smaller box to pinpoint focus. It's situations like these in which the a7R V's eight-way focus controller beats the a7CR for handling, Sigma 150-600mm Sports, 600mm, f/6.3, 1/250-second, ISO 800 I expect the a7CR to appeal more to photographers who capture landscapes, fine art, portraits, or other stationary subjects. Just keep in mind that the electronic first curtain shutter (EFCS) mechanical shutter can clip bokeh highlights in combination with a wide-aperture lens. Using the fully electronic shutter sidesteps this minor concern, but prevents flash sync and introduces the potential for rolling shutter distortion. The a7CR's sensor readout speed also means you can't freeze subjects in motion without some distortion. Sigma 150-600mm Sports, 600mm, f/6.3, 1/200-second, ISO 1000 For bursts, the a7CR does up to 8fps mechanical or 7fps electronic with tracking and exposure, so you're better off with the former. In the JPG and Compressed Raw modes, the camera can respectively fire off 55 and 40 pictures in a row. It then requires about eight seconds to clear the buffer to a Sony Tough 299Mbps SDXC card. The capture rate drops to 6fps with Lossless or Uncompressed Raw. You also get fewer pictures in a burst with these formats (15 for Uncompressed and 22 for Lossless), but the card clear time remains the same. A Whole Bunch of Pixels The a7CR is the third Sony camera to use this full-frame 60MP BSI CMOS sensor, following the a7R IV and V. The latter got a big boost in performance thanks to a newer Bionz XR image processor, which also appears in this model. There are still some differences between the two, however. For example, the a7CR uses

a sized-down image stabilizer system and I already touched on how the a7CR's EFCS shutter can influence the character of bokeh. But practically speaking, there's no downside to using the a7CR when it comes to image output. FE 20-70mm F4 G, 20mm, f/6.3, 1/2-second, ISO 100 Despite a slimmer design, the a7CR's IBIS system gets an impressive seven stops of compensation (compared with eight for the a7R V). I tried my hand at several handheld long exposures with the FE 16-35mm F2.8 GM II lens and got consistently good results at half a second and occasional hits at one second. The IBIS system also enables the camera's PixelShift multi-shot mode; it shifts the sensor with half-pixel precision to sample 16 exposures for 240MP output. PixelShift relies on the electronic shutter, so it works best for stationary scenes, such as landscapes. You need a tripod for PixelShift shots, the feature does not work for handheld photography. You also need to process these composites through Sony's Imaging Edge desktop software before you import them into Lightroom or Capture One. The a7CR supports JPG and HEIF capture for out-of-camera sharing, or Uncompressed, Lossless, or Compressed Raw for photographers who want to tone and edit photos. It offers the option for smaller JPG file sizes like most other cameras but goes further with several Lossless Raw sizes: Large (60MP), Medium (26MP), and Small (15MP). Sony includes several Creative Looks as alternatives to the standard picture profile, so you can get out-of-camera shots with natural, vivid, black-and-white, instant film, or other artistic tones. FE 85mm F1.8, f/1.8, 1/125-second, ISO 100 The sensor covers a wide ISO range, 100-32000 natively and ISO 50-1020400 if you take extended settings into account. There are compromises in picture quality at those extended options, such as less dynamic range at ISO 50 and more noise at the higher settings. In JPG or HEIF mode, the sensor delivers crisp, detailed photos through ISO 3200. I see some signs of noise at ISO 6400, which adds some blur and smudging to the fine lines in my test scene. That effect gets slightly worse through ISO 25600, the top sensible limit for most photos. The extended options show rough and grainy results, so consider them emergency options. FE 20-70mm F4 G, 20mm, f/8, 1/200-second, ISO 100 Swapping to Raw doesn't do too much to change the look of photos. I see more luminance noise and less smudging at high ISOs, but you can tune noise reduction for a cleaner image at the cost of detail when processing, or dial it back for a grainier look. Working in Raw opens up editing possibilities thanks to the incredible dynamic range the sensor captures. A Capable Video Camera, Too The a7CR drops the a7R V's high-end 8K recording feature, likely due to heat concerns. It's still a capable 4K video camera, with some caveats. For instance, its 4K60 footage comes with a 1.24x crop and isn't as sharp as that from the 4K30 mode. The 4K60 mode at least does a good job suppressing rolling shutter, there's a loss of sharpness due to subsampling footage. FE 16-35mm F2.8 GM II, 22mm, f/8, 1/30-second, ISO 125 Video is sharper in the Super35 recording mode, which uses the central portion of the image sensor to record oversampled 4K30 or 4K24 footage. The crop limits wide-angle coverage, but I see more detail and rolling shutter distortion isn't a concern because the camera takes longer to scan the sensor in this mode. The video itself has a high bit rate and uses 10-bit 4:2:2 color sampling. Various picture profiles are available, including HDR HLG, S-Log2 and S-Log3 for grading, and S-Cinetone for filmic looks out of camera. Slow-motion is also an option in S&Q; mode; here, the camera pushes 4K60 for up to a 2.5x slow-motion effect. FE 20-70mm F4 G, 20mm, f/9, 1/2-second, ISO 100 The in-camera mic works fine, but an add-on mic is a must if you are vlogging or recording professionally. Creators should appreciate the AI-powered auto-framing features that add various pans and zoom effects for more dynamic movement in scenes. Look to the ZV-E1 or a7C II if you like the body style, but don't want to deal with some of the above downsides. Travel the World With a 60MP Camera Despite the a7CR's compact, travel-friendly build, it still manages to integrate the sensor and AI-tuned autofocus system from the a7R V, one of the best high-pixel cameras available. It makes few image quality concessions, so we have no problem recommending it to photogs with an eye for landscapes, portraits, or other photo ops short of team sports and wildlife. But because it lacks the stunning EVF, dual card slots, and superior ergonomics of the full-sized a7R V, the latter remains our Editors' Choice winner for pros and most enthusiasts. Don't count out the more affordable a7C II either if you're more of a hybrid creator and can live with just a 33MP sensor.

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**URL:** <https://uk.pcmag.com/cameras-1/148406/sony-a7c-ii>

**Title:** Sony a7C II

**Text:** Table of Contents A Tale of Two Compacts Are You Sure That's Full Frame? Improved Handling and Controls A Touch-Forward Menu System Displays Lag Behind Competitors Power and Connectivity Smart, Reliable Autofocus A Sized-Down a7 IV Stabilized 4K With 4:2:2 Color This Sequel Is Better Than the Original The Sony a7C II (\$2199.99, body only) is a good example of how a few thoughtful tweaks can turn a good product—in this case, the Sony a7C (\$1,799.99)—into an excellent one. The second iteration is costlier, but has a vastly improved autofocus system, better ergonomics, and upgraded video capabilities. Plus, it continues to offer the same fantastic battery life and lens support as the original. It leaves off some of the pro features from the more expensive, Editors' Choice-winning a7 IV (\$2,499.99), but the a7C II is an excellent alternative for travelers and creators who prefer a smaller, lighter full-frame camera. A Tale of Two Compacts Sony suffered from a bit of bad timing with the debut of the original a7C. Its first travel-minded full-frame camera hit the market at a time many of us were still in lockdown due to the COVID-19 pandemic. Even so, Sony must have struck enough of a chord to merit a rather quick sequel. And it's easy to see the appeal—a slimmer top plate and corner-mounted viewfinder make the camera easier to squeeze into your carry-on than full-sized alternatives. To reinforce how much Sony believes in the small full-frame concept, it sells a second model alongside this one, the a7CR. The two look identical, but there are some internal differences. The a7C II gets a combination of the a7 IV's 33MP sensor and the a7R V's AI-trained subject recognition system, whereas the a7CR opts for both the 60MP sensor and autofocus system of the a7R V. Broadly, the a7C II makes more sense if you are a hybrid creator or value low-light image quality over outright resolution, whereas the a7CR is a better camera for scenarios in which image detail is paramount. Are You Sure That's Full Frame? The a7C II is the slimmest full-frame camera with an EVF and stabilized imager I've tested. It measures 2.8 by 4.9 by 2.5 inches (HWD) and weighs 18.1 ounces without a lens. For comparison, Sony's crop-sensor a6700 is mere tenths of an inch slimmer. Thinking about the a7C II as a full-frame a6700 is entirely appropriate. Compared with more mainstream cameras, like the Sony a7 IV (3.8 by 5.2 by 3.1 inches, 1.4 pounds) or the Canon EOS R6 Mark II (3.9 by 5.4 by 3.5 inches, 1.3 pounds), the difference is more apparent. The a7C II takes up roughly half as much volume as these larger cameras. Despite its size, the a7C II doesn't give up much compared with the larger a7 IV. It boasts an integrated handgrip and electronic viewfinder, along with an articulating display. All these features are missing from the smallest full-frame cameras on the market, the Sigma fp and fp L. Those cameras are made for use with add-ons and accessories, and the need to tinker with them makes them niche options. FE 20-70mm F4 G, 39mm, f/8, 1/4-second, ISO 100 Sony includes weather sealing on its full-frame cameras as a rule. Although the a7C II doesn't have an IP rating, it does include dust and splash protection, as well as a magnesium alloy chassis. I didn't get a chance to try the camera in dreary weather but have found Sony's weather sealing to hold up on rainy days. The a7C II is available in black or silver (the model I got for testing). The compact FE 28-60mm F4-5.6 is the only kit lens option, and the combo sells for \$2,499.99. The 28-60mm is an appropriately small lens, though I did not receive one for testing along with the camera. Instead, I spent most of the time using a couple of mid-sized zooms, the FE 20-70mm F4 G and the FE 16-35mm F2.8 GM II. Both pair well, though I particularly liked the combination of the a7C II and the tiny Sigma 45mm F2.8 Contemporary. Any of Sony's small primes, like the 40mm F2.5 G for instance, are a good match, too. There are hundreds of compatible autofocus lenses from Sony and third-party manufacturers, so you shouldn't have an issue finding something appealing. Improved Handling and Controls The a7C II offers better ergonomics than the original thanks to a new front control dial, but still falls behind the a7 IV. The larger camera leaves room for an eight-way focus controller, a useful tool for sports, wildlife, and other tough-to-follow subjects. The a7C II skips a joystick, so it's less than ideal for these disciplines. I gave Sony flak for taking the same approach in its performance-oriented a6700, but here it's less of a concern because the a7 IV is available for not much more. As a bonus, big telephoto lenses balance better with the a7 IV. The a7C II's handgrip does well with mid-sized zooms. That said, I would lean toward F4 rather than F2.8 options simply because the space between the lens mount and grip is a little tight. If you need more surface area, Sony sells a grip accessory that adds three-quarters of an inch in height. I liked using it along with the camera, but question its value at \$159.99. Creators who use Arca-Swiss tripods are better off with a baseplate grip that has dovetail cuts for direct mounting, as Sony's solution still requires you to add a quick-release plate. The add-on handgrip is shown here on

the a7CR As mentioned, there's now a control dial at the front of the grip that supplements the two rear dials. Between the three, you can easily change the aperture, shutter, and EV settings. The On/Off switch, shutter release, Record button, PASM Mode dial, and Photo/Movie/S&Q toggle round out the top plate controls. The Mode dial includes three customizable slots, along with a full Auto option. Sony squeezes a flat command dial, AF-ON, Fn, Play, and Delete/C3 buttons on the rear, along with a raised thumb rest. Menu and C1 buttons are a little further up, above the LCD. You can configure most buttons, as well as use directional presses of the rear dial to set the focus point, which partially makes up for the lack of a dedicated focus controller. The rear display works as a touchpad for focus, either as a selection monitor or a touch surface when you hold the camera to your eye. I find the latter method generally handy, but a little imprecise and wobbly to manage. A Touch-Forward Menu System The a7C II swaps out the original's top-tabbed menus for a new, color-coded side-tabbed interface. In addition to shifting the orientation for more efficient navigation, the menu is now fully navigable by touch and includes a useful home page with common settings. You can also customize a My Menu section to your preference. The long-running Fn overlay menu continues, and like the full-on menu, it now supports touch input. Tap the Fn button to bring it up on the rear screen. This menu offers 12 slots, and the default layout thoughtfully includes creative picture profile, metering, focus pattern, subject recognition, white balance, and file format settings. You can change out any of these slots, so it's flexible. You can even configure a separate menu for video with options that aren't relevant to photography, such as audio levels. Displays Lag Behind Competitors The a7C II uses a vari-angle display, which has become the standard choice for a hybrid camera. It swings out to the side of the body and twists around for viewing from the front, the top, or a low angle. The 3-inch screen is visible outdoors thanks to an extra-bright Sunny Weather setting. Resolution is an underwhelming 1.04 million dots, so you should switch to the viewfinder for focus-critical work. Sony generally falls behind its peers in terms of monitor quality and this camera does nothing to change that. For reference, the larger R6 Mark II and Nikon Z 6 II both sport sharper rear displays at 1.62 and 2.1 million dots, respectively. The electronic viewfinder isn't competitive either, but it's an upgrade versus the one on the original a7C (0.59x, 2.4-million dots). With 0.70x magnification, a 2.4-million-dot resolution, and a selectable 60 or 120fps refresh rate, it presents a clear, bright image to the eye, but it's more in line with an enthusiast APS-C camera in terms of size. The Sony a7 IV (0.78x, 3.7 million dots) and Canon R6 Mark II (0.76x, 3.7 million dots) offer bigger, sharper viewfinders, for comparison. Power and Connectivity The a7C II uses Sony's FPZ-100 battery, one that has proven its endurance in other cameras. Here, it should last for around 530 exposures or 165 minutes of video per charge, so you should be able to get through a full day without having to recharge or swap to a spare. Portable charging is available via USB-C. You need to provide a cable and AC adapter, however, as the camera doesn't ship with either. The box also doesn't include a wall charger. Sony's first-party charging accessories are exorbitantly expensive, but third-party options work fine. FE 16-35mm F2.8 GM II, 16mm, f/8, 1/160-second, ISO 100 I had no trouble using Apple and DJI chargers with the camera, along with a cheap Amazon Basics USB-C-to-USB-C cable. The USB port is also useful for live streaming; it supports UAC/UVC plug-and-play streaming, so you don't need extra software to use the a7C II as a webcam. The left panel houses 3.5mm headphone and mic jacks, along with a micro HDMI port that supports clean 4:2:2 output so you can connect a ProRes recorder like the Atomos Ninja V if you want. A single UHS-II SDXC slot is your sole storage option. That's a bit underwhelming, considering that both of the a7 IV's slots support faster CFexpress cards in addition to SDXC. The camera works with the Sony Creators' App (available for Android and iOS) and connects with your smartphone using Bluetooth and dual-band Wi-Fi. It's easy enough to set up a connection via the app. Once you do, you can wirelessly send media to your phone or use the app as a remote control with a live feed from the lens. FE 20-70mm F4 G, 49mm, f/9, 1/2-second, ISO 100 Sony includes some accessibility features in its cameras, which is somewhat rare. In the case of the a7C II, there's a screen reader to help creators with visual impairments navigate menus, as well as a text magnification option. Smart, Reliable Autofocus The a7C II recycles an existing autofocus system, the same one from last year's a7R V. It's an updated version of the Real Time Tracking system from the a7 IV that now benefits from a dedicated AI processor. The use of the AI term here is likely a marketing tactic, but it doesn't detract from the fantastic performance. It does a stellar job with people, as body and motion analysis augments already fantastic face and eye detection. It also offers a healthy number

of other subject recognition modes: Animals, Birds, a combined Animals/Birds mode, Insects, Cars/Trains, and Planes. There are more modes here than on the a7 IV and some work better than before. Apart from the aforementioned ability to track entire human bodies, for instance, the AI-tuned system now provides better eye detection for horses. Sigma 150-600mm Sports, 572mm, f/6.3, 1/500-second, ISO 4000 The subject recognition options work with any focus pattern, including the wide-area mode that covers nearly the entire picture area with hybrid phase and contrast detection points. I especially like using it in conjunction with Real Time Tracking, a mode in which the camera continues to follow a moving subject after initially acquiring focus. Sony's tracking system has long been the best in class in terms of accuracy and acumen, and these subject recognition features only improve it. Canon's system is a very close second, however. As I touched on already, the a7C II doesn't pair well with the big lenses necessary for sports photography, even if its focus system is up for the task. Even so, portrait photographers (of both people and pets) can still appreciate spot-on tracking and subject recognition. Sigma 150-600mm Sports, 600mm, f/6.3, 1/500-second, ISO 1250 As good as the focus system is, the a7C II suffers a bit in tougher scenes because it's a little clumsy to manipulate the focus point. The wide area does a good job in scenes with few obstructions, but if you're trying to keep up with a specific player on the field or find a songbird hiding in branches, it's wise to switch to single-point focus. These are the situations in which a dedicated joystick control is useful and why the a7 IV wins out from an ergonomic standpoint. I'm not saying you can't get those photos with the a7C II—the D-pad and rear touchpad are decent substitutes—but it's not the best choice. The a7C II's burst rate is 10fps for JPGs or Compressed Raw but drops to a more middling 6fps if you opt for Uncompressed or Lossless Raw. The buffer is good for extended bursts; I got 24 Uncompressed, around 50 Lossless or Compressed Raw, and 125 JPGs in tests with a Sony Tough 299Mbps SDXC card. The a7 IV performs identically in terms of burst rates, but its CFexpress memory card support means you don't have to deal with buffer limitations. Meanwhile, the R6 Mark II is a better pick for action and speed because it supports 12fps with a mechanical shutter and has a 40fps e-shutter. FE 20-70mm F4 G, 70mm, f/8, 1/80-second, ISO 200 To realize the small design, Sony uses a single-curtain mechanical shutter, a choice that might concern discerning photographers. The shutter uses an electronic-first curtain, which can lead to odd shapes in defocused highlights with wide-aperture lenses. It's a minor concern overall, but you likely already know if that will bother you. More of a concern is that the shutter limits flash sync to 1/160-second, versus 1/250-second for the a7 IV. A fully electronic shutter option is available too. It sidesteps those potential bokeh quality concerns, but its readout speed isn't fast enough to sync with a flash and might introduce rolling shutter distortion for subjects in motion.

**A Sized-Down a7 IV** The a7C II's imaging engine is a bit of a mish-mash of tech, some old and some new. The 33MP BSI CMOS sensor comes over from the a7 IV but a newer-generation Bionz XR processor and an all-new image stabilization system are also onboard. The stabilizer promises up to 7 stops of compensation, better than the 5.5 stops of the a7C. I tried it for some long exposures and managed sharp photos at speeds as long as 1/2-second, but struggled to get good results at 1-second. Your results might vary, of course, depending on how steady you can hold the camera. FE 16-35mm F2.8 GM II, 16mm, f/10, 1-second, ISO 100 The sensor covers a wide ISO range, 100-51200 by default and 50-204800 if you venture into the extended settings. The camera delivers clear, clean JPG or HEIF pictures with no loss of clarity through ISO 1600. Pictures up through ISO 25600 look nearly as good, with just a slight drop in contrast. The fine lines in my ISO test scene start to run together at ISO 51200 and 102400, enough so that pictures have a waxy look. Picture quality takes a big hit at ISO 204800. Here, the aforementioned fine lines are gone entirely and there's a lot of noise, despite the best efforts of Sony's processing engine. There are a few different color profiles (or Creative Looks) to choose between in JPG or HEIF capture modes. The camera defaults to the standard (St) setting but also has portrait (Pt), natural (Nt), vivid (Vv and Vv2), sepia (Se), and black-and-white (BW) options. You also get a mode with a stylized instant film look (In), a landscape option that emphasizes greens (Fl), and a soft look (Sh). You are likely to find these profiles useful if you don't want to spend time editing and toning color. I especially like the Fl option for wooded scenes. FE 20-70mm F4 G, 70mm, f/4, 1/250-second, ISO 100 Photographers who want more control over how pictures look should set the camera to one of the many Raw modes. All of these selections save files with more data than a JPG or HEIF, so you can tone photos to show more dynamic range, adjust the exposure and color, or apply a

creative edit without any loss in quality. With a JPG, colors fall apart quickly with exposure edits. There are a few different Raw options: 12-bit Compressed Raw, 14-bit Uncompressed Raw, Lossless Compressed Raw Large (33MP), Lossless Compressed Raw Medium (14MP), and Lossless Compressed Raw Small (8.2MP). I use Lossless Compressed with Sony cameras because it provides as much room to edit as the Uncompressed setting, but with more manageable file sizes. If you think that 33MP is overkill, the Medium and Small options offer the same picture quality and flexibility to edit, just at a lower resolution. FE 20-70mm F4 G, 70mm, f/5.6, 1/50-second, ISO 100 I didn't get a chance to look at the Raw images ahead of completing this review—our standard processor, Adobe Lightroom Classic, does not yet support a7C II files. That said, I expect the output to match that of the a7 IV, which delivers clean, detailed output through ISO 800, and excellent results through 12800. I see some luminance noise at ISO 25600 and 51200, but that effect does little to obscure the very fine lines in our ISO test scene. Pushing to ISO 102400 and 204800 introduces a slight green cast to photos and increases noise to a level that devours textures and other fine details. Stabilized 4K With 4:2:2 Color The a7C II is a full-featured video camera. It records 4K30 with the full width of the sensor, offers 10-bit 4:2:2 color, and supports 4K60 with a Super35 (APS-C) crop. It extends the frame rate to 4K120, also with a crop, in S&Q; mode for anywhere from half-speed (60fps) to fifth-speed (24fps) output. The 10-bit color support puts the a7C II in the same league as the EOS R6 Mark II and Panasonic S5 II, though both of those support full-width 4K60. Sigma 150-600mm Sports, 600mm, f/6.3, 1/500-second, ISO 5000 You can use any of the Creative Look profiles for ready-to-edit footage, HLG for delivery to HDR displays, S-Cinetone for a film-like grade, or S-Log2 and S-Log3 for an editing-friendly flat look. Autofocus works in video just like it does for stills. Although Sony doesn't market the a7C II to vloggers, it still has all the automated framing assist features from the ZV-E1. This mode adds some push-ins and pans to footage, so vloggers who work as both the camera operator and on-screen talent can enjoy more dynamic footage. The video quality looks very good, generally speaking. The oversampled 4K footage looks sharp, and the stabilized sensor does a good job of smoothing out the jitters from handheld recordings. Rolling shutter is an issue, however, and can cause some wobbling in handheld shots and a rubber motion effect for subjects moving across the frame. FE 20-70mm F4 G, 20mm, f/11, 1/2-second, ISO 100 On the plus side, the a7C II supports focus breathing compensation for select Sony lenses. It also does a good job of long-form recording. I managed more than 90 minutes of continuous 100Mbps 4K60 without any heating issues. The in-camera mic does as good a job as most other cameras—which is to say it's fine for casual clips and nonprofessional use, but an omnidirectional pickup pattern and relatively compressed range restrict audio quality. The vlogging-focused Sony ZV-E1 and Nikon Z 30 both offer better audio quality, for reference. This Sequel Is Better Than the Original The Sony a7C II makes some compromises to achieve its compact design, but none are a major detriment to its performance. In fact, its AI-trained focus system is even better than what you get on the full-sized a7 IV. Excellent stills and video quality, a fully rugged build, and long battery life are additional highlights. That all aside, we continue to recommend either the a7 IV or the Canon EOS R6 Mark II more broadly to enthusiasts, as their SLR-style bodies handle better (especially with heavier lenses) and offer dual card slots. But for photogs who prefer to use slimmer lenses or who work in the travel, portrait, or photojournalism genres, the smaller a7C II makes a lot of sense.

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**URL:**

<https://www.thephoblographer.com/2023/08/29/sony-a7cr-review-my-favorite-sony-camera-so-far/>

**Title:** Sony a7cR Review: My Favorite Sony Camera So Far

**Text:** The Sony a7cR is a camera that I didn't believe would actually be a real thing. But indeed, it is. It's actually a pretty great camera overall — however targeted at an audience that, well, I'm scratching my head about that statement. I can't really say that it's targeted at a more entry-level audience. And what you probably won't believe is that my uncertainty mainly comes from the lack of one very important feature. This feature is a very divisive one and has become even more so with the way that Sony's autofocus algorithms work. I'm talking about a joystick. Like the Leica Q3, Sony forgot to put a joystick in. As you'll read in the review, it affects how you do nearly everything with the camera when it comes to doing serious photography. The Big Picture The Sony a7cR is a camera that I'm not overwhelmed or underwhelmed by — instead, I'm just whelmed. Every modern camera can shoot great

photos, so image quality here is really a negligible issue. With a 60MP full-frame sensor, you're going to be able to make some of the best prints you've ever made with this camera's output. The colors, depth, and dynamic range are all truly fantastic. As a TIPA member, the Phoblographer has a special relationship with DXOMark, and you can see that the Sony a7r V (the camera the a7cR shares internals with) is still very highly rated. However, the Sony a7cR should be truly relegated to slower work. For photographers that have been around for a while, think of the Sony a7cR as more of the 5D Mk II instead of the D700. The higher megapixel camera body can surely perform well, but it's best relegated to slower subjects. For newer photographers, know that we're currently in a phase where things have returned to how they were in 2009. High megapixel camera bodies truly can't autofocus all that well with the exception of the Sony a1. Of course, if you wait a little bit, that barrier will be smashed. Part of this comes from the lack of a joystick and how you need to interact with the camera to get the photos you want. ■■■■ Rating: 3 out of 5. We're giving the Sony a7cR three out of five stars. We expected more — not to feel like a billion-dollar company is putting a pay gate on our creative potential. Still, though, this is my favorite Sony camera thus far because it's a rangefinder-style body — I just wish it wasn't treated like an afterthought.

**Pros** It's a nice shutter sound similar to a rangefinder camera The menu screen can be enlarged, and that's awesome The touchscreen menu's ability to navigate quickly nearly rivals Canon now. But it's still not as fast to navigate. It's nearly tied with Panasonic's and Nikon's now. Taking off setting-effect preview majorly improves autofocus. It's like it's a totally different camera. It's good enough for street photography, then. The high ISO output is pretty darned good. The image quality is beautiful. It's so compact and nice! There's a silver variant!

**Cons** Only 1/4000 shutter speed max mechanical The EVF isn't as nice as many other newer cameras. There's banding for sure at high ISOs You can miss shots in low light with exposure preview mode on. Battery life is greatly affected by the weather and how hot or cold it is. Taking off the live view setting effect also greatly improves the battery life. Not having a joystick is pretty annoying. Single card slot. Years ago, Sony said that they couldn't put two card slots into a Sony a7 model. But they figured it out. Here, I think they're just purposely holding back.

**Gear Used** We tested the loaner Sony a7cR unit with a slew of lenses that we own. We sued the Sony 55mm f1.8, 35mm f1.8, 85mm f1.8, Tamron 150-500mm (a loaner), Tamron 70-300mm, and Tamron 35-150mm. We also used it with the Profoto B10 and the Godox 685s.

**Ergonomics** The Sony a7cR feels very much like a Sony camera. That's not to say that it's a bad thing, but it feels unlike anything else on the market. When you hold it, it doesn't feel like most other cameras. Of course, the Sony a7cR is based on the a6000 series for the body and the a7 series for the internals and performance. It's lightweight and, overall, feels like a great camera to use. But it could've been far better served with a joystick.

**Build Quality** The Sony a7cR is said to have comparable build quality to something akin to the Sony a7r V. And in my tests, I didn't totally see that. I used a variety of different lenses with the camera, and only found that when I attached Tamron's lenses to the camera that it was weather resistant to the conditions that I love shooting in. When I used Sony's lenses, I would get an error on the screen that said that the attached accessory wasn't supported. But I'd still be able to intermittently shoot. When I used Tamron's lenses, however, the durability was akin to what I'd get from other brands. I was curious about this as previously, I didn't have much of this problem with these lenses in the past — especially my 35mm f1.8. But when I went back to my review, I could now see that there was indeed a problem. I've asked weather-sealing questions of Sony in the past, and they're honestly pretty awful at giving me worthwhile answers. Further, no one wants to go on record with the claims. So the bigger problem here is the lack of a rubber gasket at the back of the lens. Luckily, dust isn't a problem when you turn the camera off to change the lenses as long as you set up the shutter down when powering off function. Besides the durability issues, the Sony a7c R feels like a camera that I'd want to bring with me everywhere. But the issue of not having a joystick really makes using the camera annoying at times. Amazingly, it's well-balanced with big Tamron zoom lenses and with smaller Sony prime lenses. It could surely work well enough to be a main camera or a backup camera body.

**Ease of Use** There are a few schools of thought here. Sony's cameras can be set to auto wide-area autofocus with scene detection on. If you're doing this, then the Sony a7cR can perform quite well. But it gets annoying. For example, if you want to photograph birds, the easiest way to do this is by setting the camera's autofocus to tracking and using the center focusing point. Then you focus the camera and recompose. I found this to be a problem when photographing birds and when I wanted to

shoot a slice of pizza – when the camera otherwise wanted to focus on the person in the background. Otherwise, you can use the touchscreen in the tap-to-focus and shoot feature. However, if you want to save battery life, you won't really use the screen at all. You could also set up something like the middle button of the circle on the back to switch the focusing point. It then starts to feel like the focus setup is from the original Sony a7. Either way, it can be a bit annoying if you want to do serious work with this camera – especially as it tends to need help figuring out what to focus on in low-light events with fast-moving subjects. Many times I really just wanted to reach for my Sony a7r III instead. If you're an advanced shooter, the Sony a7cR isn't as simple to use as the higher-end Sony a7 camera models because of the lack of buttons and controls. And truly, I think that there is enough real estate space for them to add more stuff. A joystick, perhaps more than anything else, would've solved all of this. I didn't need a back-focus button, and most photographers don't, either. Why couldn't they sacrifice that? This, perhaps more than anything else, is the biggest frustration for me – enough to make me not want to purchase the camera. Additionally, my unit had a pre-production firmware issue where when I closed the LCD screen into the camera body, it wouldn't automatically activate the EVF. Instead, I'd need to autofocus to seemingly wake it up from sleep mode. I'm calling this a pre-production firmware issue because I expect better from Sony here, and hopefully, it won't be a problematic issue for customers. If you're visually impaired the way that I am, it's nice that Sony's menu system is now seemingly easier to navigate with a few taps of the screen. It's far more responsive than it used to be, and it can even be enlarged for you to read it easier. Something that I'm very happy about is the image stabilization. It's quite good, and you can make it seem not so great intentionally if you wish. Any time that we had camera blur was because of the subject moving — and it surely wasn't due to camera shake. Focusing For a major portion of this camera test, I set the camera to have the Live View setting effect activated. The way that I personally shoot negates this totally. I know that other reviewers and even working photographers love using that feature. But I've always felt that it held me back when focusing. And indeed, that was the case in a whole different way with the Sony a7cr. Can it also nail some great street photographs? Totally. Can it yield so much more when the Live View setting effect is turned off, even in Aperture priority? Oh yes. Turning this feature off made it feel like a completely different camera and made using it so much more enjoyable. Where the Sony a7cr isn't so great, though, is with continually focusing on subjects as they and you both move. To be specific here, it can get them in focus for a shot or so. But it can't keep them in focus for more than a frame when you're in low-light situations. It's better at this task if the person doesn't have heavy amounts of melanin in their skin and if there isn't a lot of one specific non-neutral light color. Some might say that that's because of the megapixels, but that's also not the case with the Sony a7r III – which I still believe to be the best camera that Sony made alongside the Sony a1. It was great back then, and even today, I have friends who are Sony Artisans that are impressed at how much faster that camera was. More importantly, the Sony a7cR is a play on the Sony a7r V. That camera uses the same sensor as its predecessor, so why can't the autofocus dramatically improve at this point? We shouldn't be making excuses for billion-dollar companies here. It should have comparable autofocus performance to a Sony a7 IV at this point with all the tech that they threw into these cameras. In low light when shooting an event, the Sony a7rC has a very good hit rate if you're photographing folks with lighter skin, but even so, it's still not what I'm used to from many other Sony cameras. And even those can't compete with Canon or the new firmware on the Nikon Z9 and Z8. Can the camera focus accurately on POCs in low light? Intermittently – if they're not moving around a whole lot, then it has an easier time vs. if they're standing in the same area. This is a problem that I've told Sony about and have written about many times on this website. In summary, turn off the exposure preview mode. It's seriously not worth it – and a part of me wishes that people just learned to read the light meter instead. The histogram is becoming less relevant with how good modern post-production software and camera sensors are. Metering Luckily for street photographers, the Sony a7cr is going to make you very happy when it comes to metering. If you're shooting in manual mode, the light meter completely checks out when you base it against a film camera and Sunny 16. In fact, this meter has to be one of the best that we've ever seen. But otherwise, in aperture priority, the Sony a7cr can be a bit odd with its metering choices on the street. Image Quality The Sony a7cr has comparable image quality to the Sony a7r V. That's to say overall that it's very good when you're looking for really detailed photos and great color or dynamic range. But I wish that Sony had made the ISO go even lower natively. JPEG



Output The JPEGs overall are pretty beautiful and can be even more so if you're using Sony's special color profiles. This helps to give character to the photos when it's really desperately needed. Tamron and Zeiss lenses can help with this. But Zeiss lenses also still have a few problems with this camera. Raw File Versatility We haven't been able to test the RAW files yet. So we'll update this section when we get a moment. High ISO Output The high ISO output from this camera is pretty good from what we're seeing. You'll get banding in the electronic shutter mode at high ISOs when shooting at a fast shutter speed, though. And we're thus far basing this assessment on the JPEG output. We'll see what the RAWs look like when they get support. Extra Image Samples From day one, The Phoblographer has been huge on transparency with our audience. Nothing from this review is sponsored. Further, lots of folks will post reviews and show lots of editing in the photos. The problem then becomes that anyone and everyone can do the same thing. They're not showing what the lens can do. So we have a section in our Extra Image Samples area to show edited and unedited photos. From this, you can make a decision for yourself. Unedited Edited Who Should Buy the Sony a7c R? This is a tough question to answer for several reasons. In some ways, I feel Sony is holding back in the same way that Canon used to. In other ways, this camera can surely make a lot of photographers very happy. If you're doing work that's slower like portraits or landscapes, get the Sony a7c R. If you're doing street photography, get this camera. But don't expect it to perform if you need super fast autofocus speed for events in low light. Tech Specs 61MP full-frame CMOS R sensor BIONZ XR processor 15+ stops of dynamic range Dedicated AI processing unit 693 autofocus points 8fps in mechanical shutter mode 16 bit RAW output All the AI of the Sony a7r V

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**URL:** <https://www.globenewswire.com/news-release/2023/08/29/2733563/0/en/European-Lens-Cleaning-Market-to-Surpass-4081-16-Million-by-2030-Drives-Due-to-Growing-Demographic-of-Spectacle-Wearers.html>

**Title:** European Lens Cleaning Market to Surpass 4081.16 Million by 2030 Drives Due to Growing Demographic of Spectacle Wearers

**Text:** Westford, USA, Aug. 29, 2023 (GLOBE NEWSWIRE) -- According to SkyQuest, the European Lens Cleaning Market is poised to undergo exponential growth, which in turn is expected to drive the expansion of the market. Vision impairment remains a prevalent issue across Europe, underscoring the significance of effective eyewear solutions. The prevalence of vision-related challenges is projected to rise even further in the coming years as the continent's population continues to age. Browse in-depth TOC on the "European Lens Cleaning Market" Pages - 265 Tables - 64 Figures – 75 The trajectory of the lens cleaning products market is poised to benefit from the emerging trend of multifunctional lens cleaning solutions, which holds promising potential for European Lens Cleaning Market expansion. Numerous companies are strategically investing in Research and Development (R&D;) initiatives to introduce novel formulations to the market. Get a sample copy of this report:

<https://www.skyquestt.com/sample-request/european-lens-cleaning-market> Prominent Players in European Lens Cleaning Market Carl Zeiss AG Essilor International SA HOYA Corporation Bausch + Lomb Johnson & Johnson Vision Care Nikon Corporation Luxottica Group S.p.A. Safilo Group S.p.A. Alcon Inc. CooperVision Inc. Novartis AG Rodenstock GmbH Seiko Optical Europe GmbH Silhouette International Schmied AG Shamir Optical Industry Ltd. Signet Armorlite, Inc. Zeiss Vision Care Marcolin S.p.A. De Rigo Vision S.p.A. Kering Eyewear S.p.A. Fluid Segment is Expected to Grow the Market Due to the Extensive Array of Products Fluid segment asserted its dominance by capturing over 47% of the market share in European Lens Cleaning Market. This segment's remarkable growth can be attributed to the extensive array of products available. Lens cleaning solutions stand out as widely accepted products for effectively cleaning lenses. The market in Germany's formidable industrial prowess and robust economic standing significantly influence the demand for high-quality lens cleaning products. The country's industrial sector is renowned for its precision engineering and meticulous attention to quality, traits that also resonate in the European Lens Cleaning Market. Browse summary of the report and Complete Table of Contents (ToC):

<https://www.skyquestt.com/report/european-lens-cleaning-market> Glass Care Segment is Expected to Dominate the Market Due to Escalating Demand for Cleaning Products Glass care segment firmly established its dominance within the European Lens Cleaning Market, commanding a significant share

exceeding 80%. This remarkable growth can be attributed to the escalating demand for cleaning products tailored for glasses across the region. The demand for specialized glass care products has surged as individuals increasingly recognize the importance of maintaining the cleanliness and clarity of their eyewear. Regional markets in the United Kingdom benefit from a diverse population and a notably high urbanization rate, which collectively contribute to a sustained and consistent demand for lens cleaning products. The UK's population encompasses various demographic segments with varying preferences and requirements, resulting in a rich tapestry of consumer needs in the European Lens Cleaning Market. A comprehensive analysis of the major players in the European Lens Cleaning Market has been recently conducted in a report. The report encompasses various aspects, including collaborations, mergers, innovative business policies, and strategies, providing valuable insights into key trends and breakthroughs in the market. Furthermore, the report scrutinizes the market share of the top segments and presents a detailed geographic analysis. Lastly, the report highlights the major players in the industry and their endeavours to develop innovative solutions to cater to the growing demand. Speak to Analyst for your custom requirements:

<https://www.skyquestt.com/speak-with-analyst/european-lens-cleaning-market> Key Developments in the European Lens Cleaning Market Volk Optical recently unveiled an innovative solution named the ClearPod, aimed at addressing the issue of mask-induced fogging during fundus examinations. This revolutionary device, developed in collaboration with Wheaton Eye Clinic, Illinois, marks a significant advancement in overcoming a common challenge medical professionals face. Key Questions Answered in European Lens Cleaning Market Report What specific growth drivers are projected to impact the market during the forecast period? List the top companies in the market and explain how they have achieved their positions of influence. In what ways do regional trends and patterns differ within the market, and how these differences shape the market's future growth? Related Reports in SkyQuest's Library: Global Pet Wearable Market Global Online Laundry Services Market Global Pest Control Services Market Global Event Management Market Global Pet Grooming Products Market About Us: SkyQuest Technology is leading growth consulting firm providing market intelligence, commercialization and technology services. It has 450+ happy clients globally. Address: 1 Apache Way, Westford, Massachusetts 01886 Phone: USA (+1) 617-230-0741 Email: [sales@skyquestt.com](mailto:sales@skyquestt.com)

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**URL:** <https://uk.pcmag.com/cameras-1/148405/sony-a7cr>

**Title:** Sony a7CR

**Text:** Table of Contents A Smaller a7R V Strong Ergonomics for a Small Camera Touch to Control A Middling Monitor and Viewfinder Power, Storage, and Connectivity Autofocus With AI Assistance A Whole Bunch of Pixels A Capable Video Camera, Too Travel the World With a 60MP Camera The full-frame Sony a7CR (\$2,999.99, body only) squeezes the 60MP sensor and AI-assisted autofocus system from the bigger a7R V (\$3,899.99) into a more compact camera body that costs significantly less. It's a top option for high-resolution travel photography and studio work thanks to its excellent image quality, reliable subject detection, and effective stabilization. That said, the pricier a7R V holds onto our Editors' Choice award and remains a better option for pros thanks to its dual card slots, dedicated focus joystick, and incredible viewfinder. If you can do without those advantages and prefer a lightweight kit, however, the smaller a7CR is a top option. A Smaller a7R V The a7CR takes inspiration from the first-generation a7C and fits right in with that camera's successor, the a7C II. Sony's high-resolution R cameras are the marquee models in the a7 series and have been since its debut. For its part, the a7CR has the same sensor and processing engine as the 60MP a7R V. It drops support for 8K video and uses a smaller viewfinder, but all the photo features are here, including the 240MP multi-shot mode. Sony bills the a7CR and a7C II (the two share the same body design) as the smallest full-frame cameras with an integrated viewfinder. That caveat is necessary not just because Sony's ZV-E1 vlogging camera shaves some millimeters off here and there, but also because Sigma's fp series exists. The viewfinder-less 24MP fp and 60MP fp L are tiny, at 2.8 by 4.4 by 1.8 inches (HWD) and 15.1 ounces. Still, the a7CR isn't much larger or heavier, at 2.8 by 4.9 by 2.5 inches and 18.1 ounces. Even though the fp L offers similar picture quality to the Sony at a lower cost, I don't recommend it for most photographers because it relies on a fully electronic shutter with a slow readout; it's not good at freezing motion and is unusable for flash photography, and requires a very steady hand

if you want to work without a tripod. The a7CR uses a mechanical shutter with an electronic first curtain, so it can freeze motion at 1/4,000-second and sync with flashes at 1/160-second. The fp L is best left to folks who like to tinker, whereas the a7CR is a camera most people can pick up and use to get good results. The Leica M11 (which is also available in a Monochrom edition with a black-and-white sensor) is another slim, high-pixel, full-frame camera you might want to consider for travel. But it costs quite a lot at around \$9,000, is manual-focus only, and can't record video. Those are nonstarters for some photographers, but a subset won't mind paying for the throwback design and bright optical viewfinder. As for construction quality, the a7CR matches up with Sony's larger cameras nearly point-for-point. A magnesium alloy chassis protects the internals and makes for a long-lasting device. The a7CR does not have an IP rating, but can still resist dust and splashes. I didn't get a chance to use it under rainy skies, but would not hesitate to do so. Strong Ergonomics for a Small Camera Despite its compact dimensions, the a7CR doesn't feel cramped. The sizeable handgrip plays a role there, and I like that it now has a command dial on the front like many of Sony's other recent smaller mirrorless models. The camera is comfortable to hold overall, though there's not enough space for my pinky finger at the bottom. I don't mind adjusting my grip for small lenses, but it's not ideal for larger zooms. Sony includes a basic add-on grip for the a7CR that screws into the tripod socket and adds about three-quarters of an inch of height. The accessory makes it easier to handhold the camera and get long exposures, but I admit that it detracts from the streamlined design. And since it's a purely mechanical add-on, it doesn't add controls or extend the battery life. The body has plenty of buttons and dials for tactile control. Its top plate houses a standard PASM Mode dial with three custom setting slots and an integrated toggle to swap between still, movie, and slow-motion modes. The On/Off switch encircles the shutter release as is typical for Sony, while a Record button and a flexible command dial round out the top controls. The top dial handles EV compensation in most exposure modes, but you can customize it and many of the other controls to your preference. Controls take up most of the rear's usable surface space, but they don't feel cramped. Menu and C1 buttons, as well as a command dial run in a row at the top. The rest of the buttons squeeze in between the raised thumb rest and the LCD. The AF-ON, Fn, Play, and Delete/C4 buttons sit above and below the flat rear command dial. The dial supports four directional presses that you can use to adjust the focus point or otherwise set options. You can also set focus by touch, either by tapping on the rear monitor or using it as a touchpad when the electronic viewfinder (EVF) is at eye level. How often you need to manipulate the focus point largely depends on the type of subject matter. If you're a full-time portrait photographer you can simply rely on the face and eye detection modes. But some sports and wildlife subjects are harder to pinpoint, which is where a focus joystick becomes critical. If that's the type of photography you care about and you need a high-pixel camera, the a7R V is a better choice because of its dedicated focus control, huge viewfinder, and CFe memory support. I discuss those last two aspects in more detail later. Touch to Control Long-time Sony owners should note that the a7CR uses the company's newer menu system, a color-coded, side-tabbed interface that's fully operable by touch. The change requires a bit of an adjustment if you're upgrading from an older model with top-tabbed menus, but it's an improvement overall. To make the most of the new interface, add your most frequent options to the My Menu page. The Fn overlay menu continues from past models. Tap the Fn button to bring up that transparent array of 12 customizable icons at the bottom of the screen. Sony's always-on touch controls now cover subject recognition, drive, white balance, creative style, and focus settings. These touch icons run down two columns on the left and right of the screen; they don't get in the way too much, but if you want to make them disappear you need to turn off touch input entirely. Thankfully it's quick to toggle—in capture mode, tap the Delete/C4 button. Both the Fn and the always-on overlays are split between photo and video functions by default. Some exposure settings aren't, but it's easy enough to separate them via the menu. A Middling Monitor and Viewfinder Sony has a reputation for using lower-quality displays than its competitors and the company has not changed track with the a7CR. The 3-inch, touch-capable LCD has a resolution of 1.04 million dots, which is underwhelming for fine manual focus and image review with a 60MP sensor. The a7R V uses a 2.1-million-dot display for a good reason, as do competitors like the 45MP Canon EOS R5 and Nikon Z 7 II. The a7CR also has a significantly smaller EVF (0.7x, 2.4 million dots) than the a7R V. That's not totally surprising, as the a7R V's EVF is the largest in its class with a 0.9x magnification rating and resolution of 9.4 million dots. On the plus side, the EVF is bright, refreshes smoothly at either

60 or 120fps, and shows a larger image than the original a7C's 0.59x EVF. Size and cost are certainly factors here since the a7CR is much smaller than the a7R V and costs around \$1,000 less. Power, Storage, and Connectivity The a7CR runs on Sony's NP-FZ100 battery, one of the best in the market for endurance. Here, it should get you around 490 photos per charge with the EVF or 560 with the LCD. Video creators can expect around 155 minutes of continuous recording. Those are excellent figures for a small camera and I expect many photographers to get a full day's use out of it. If you do need to recharge, you can do so in-camera via USB-C. Just keep in mind that you need to provide a USB-C cable and charger because Sony doesn't include either in the box. The USB-C port also connects the camera to a computer for offloading files or acting as a webcam; the latter doesn't require any extra software or drivers thanks to support for the standard UAC/UVC protocol. Just pick the camera from your meeting or streaming software. The camera includes 3.5mm microphone and headphone connectors, as well as a micro HDMI port with 16-bit 4:2:2 output so you can add an external recorder for Raw or ProRes recording. A single UHS-II SDXC memory card slot handles storage. It's a shame Sony didn't work support for faster CFexpress cards into this camera like it does for the a7R V because the camera creates a lot of data in burst and multi-shot modes. The lack of a second slot might also be a concern for pros who worry about card malfunctions during events or weddings. FE 16-35mm F2.8 GM II, 16mm, f/5.6, 1/4-second, ISO 200 Bluetooth and dual-band Wi-Fi radios are on board for connectivity. The camera pairs with the free Sony Creators' App (available for Android and iOS). I used it on my iPhone to copy pictures over and as a wireless remote for the camera with a live view. Sony offers some accessibility options for users with visual impairments, something I haven't seen from competitors. Highlights include a screen reader feature that reads out menus and a screen magnification option to make menus more legible. Autofocus With AI Assistance The a7CR has the same hybrid autofocus system as the a7R V. Phase detection points cover about 79% of the frame and contrast focus points extend nearly to the edge. You can pick a focus point by yourself or select a narrower area of interest like with any other camera, but Sony's strength is in its subject recognition and tracking. The company's Real Time Tracking system is one of the most accurate, tenacious autofocus engines I've tested. FE 20-70mm F4 G, 70mm, f/4, 1/1,200-second, ISO 100 Here, Real Time Tracking gets an assist from the a7CR's processing engine, which devotes one of its CPUs to AI subject recognition and other machine-trained features. It improves subject recognition for people—the camera analyzes bodies and skeletal structures to keep focus on a model, even if they turn away from the camera—and enables dedicated modes for Animals, Birds, a combined Birds/Animals, Insects, Cars/Trains, and Airplanes. There's no auto mode to let the camera pick a subject type by itself (something the Canon EOS R6 Mark II and Nikon Z 8 can do), but it's easy enough to switch options via the always-on touch controls or the Fn menu. Generally speaking, the subject recognition works well even if you set the camera to the wide area mode. I had great success snapping photos of hummingbirds stopping in at a feeder with Bird detection active. For tougher scenes, like an animal in brush or team sports, it's worthwhile to use a smaller box to pinpoint focus. It's situations like these in which the a7R V's eight-way focus controller beats the a7CR for handling, Sigma 150-600mm Sports, 600mm, f/6.3, 1/250-second, ISO 800 I expect the a7CR to appeal more to photographers who capture landscapes, fine art, portraits, or other stationary subjects. Just keep in mind that the electronic first curtain shutter (EFCS) mechanical shutter can clip bokeh highlights in combination with a wide-aperture lens. Using the fully electronic shutter sidesteps this minor concern, but prevents flash sync and introduces the potential for rolling shutter distortion. The a7CR's sensor readout speed also means you can't freeze subjects in motion without some distortion. Sigma 150-600mm Sports, 600mm, f/6.3, 1/200-second, ISO 1000 For bursts, the a7CR does up to 8fps mechanical or 7fps electronic with tracking and exposure, so you're better off with the former. In the JPG and Compressed Raw modes, the camera can respectively fire off 55 and 40 pictures in a row. It then requires about eight seconds to clear the buffer to a Sony Tough 299Mbps SDXC card. The capture rate drops to 6fps with Lossless or Uncompressed Raw. You also get fewer pictures in a burst with these formats (15 for Uncompressed and 22 for Lossless), but the card clear time remains the same. A Whole Bunch of Pixels The a7CR is the third Sony camera to use this full-frame 60MP BSI CMOS sensor, following the a7R IV and V. The latter got a big boost in performance thanks to a newer Bionz XR image processor, which also appears in this model. There are still some differences between the two, however. For example, the a7CR uses

a sized-down image stabilizer system and I already touched on how the a7CR's EFCS shutter can influence the character of bokeh. But practically speaking, there's no downside to using the a7CR when it comes to image output. FE 20-70mm F4 G, 20mm, f/6.3, 1/2-second, ISO 100 Despite a slimmer design, the a7CR's IBIS system gets an impressive seven stops of compensation (compared with eight for the a7R V). I tried my hand at several handheld long exposures with the FE 16-35mm F2.8 GM II lens and got consistently good results at half a second and occasional hits at one second. The IBIS system also enables the camera's PixelShift multi-shot mode; it shifts the sensor with half-pixel precision to sample 16 exposures for 240MP output. PixelShift relies on the electronic shutter, so it works best for stationary scenes, such as landscapes. You need a tripod for PixelShift shots, the feature does not work for handheld photography. You also need to process these composites through Sony's Imaging Edge desktop software before you import them into Lightroom or Capture One. The a7CR supports JPG and HEIF capture for out-of-camera sharing, or Uncompressed, Lossless, or Compressed Raw for photographers who want to tone and edit photos. It offers the option for smaller JPG file sizes like most other cameras but goes further with several Lossless Raw sizes: Large (60MP), Medium (26MP), and Small (15MP). Sony includes several Creative Looks as alternatives to the standard picture profile, so you can get out-of-camera shots with natural, vivid, black-and-white, instant film, or other artistic tones. FE 85mm F1.8, f/1.8, 1/125-second, ISO 100 The sensor covers a wide ISO range, 100-32000 natively and ISO 50-1020400 if you take extended settings into account. There are compromises in picture quality at those extended options, such as less dynamic range at ISO 50 and more noise at the higher settings. In JPG or HEIF mode, the sensor delivers crisp, detailed photos through ISO 3200. I see some signs of noise at ISO 6400, which adds some blur and smudging to the fine lines in my test scene. That effect gets slightly worse through ISO 25600, the top sensible limit for most photos. The extended options show rough and grainy results, so consider them emergency options. FE 20-70mm F4 G, 20mm, f/8, 1/200-second, ISO 100 Swapping to Raw doesn't do too much to change the look of photos. I see more luminance noise and less smudging at high ISOs, but you can tune noise reduction for a cleaner image at the cost of detail when processing, or dial it back for a grainier look. Working in Raw opens up editing possibilities thanks to the incredible dynamic range the sensor captures. A Capable Video Camera, Too The a7CR drops the a7R V's high-end 8K recording feature, likely due to heat concerns. It's still a capable 4K video camera, with some caveats. For instance, its 4K60 footage comes with a 1.24x crop and isn't as sharp as that from the 4K30 mode. The 4K60 mode at least does a good job suppressing rolling shutter, there's a loss of sharpness due to subsampling footage. FE 16-35mm F2.8 GM II, 22mm, f/8, 1/30-second, ISO 125 Video is sharper in the Super35 recording mode, which uses the central portion of the image sensor to record oversampled 4K30 or 4K24 footage. The crop limits wide-angle coverage, but I see more detail and rolling shutter distortion isn't a concern because the camera takes longer to scan the sensor in this mode. The video itself has a high bit rate and uses 10-bit 4:2:2 color sampling. Various picture profiles are available, including HDR HLG, S-Log2 and S-Log3 for grading, and S-Cinetone for filmic looks out of camera. Slow-motion is also an option in S&Q; mode; here, the camera pushes 4K60 for up to a 2.5x slow-motion effect. FE 20-70mm F4 G, 20mm, f/9, 1/2-second, ISO 100 The in-camera mic works fine, but an add-on mic is a must if you are vlogging or recording professionally. Creators should appreciate the AI-powered auto-framing features that add various pans and zoom effects for more dynamic movement in scenes. Look to the ZV-E1 or a7C II if you like the body style, but don't want to deal with some of the above downsides. Travel the World With a 60MP Camera Despite the a7CR's compact, travel-friendly build, it still manages to integrate the sensor and AI-tuned autofocus system from the a7R V, one of the best high-pixel cameras available. It makes few image quality concessions, so we have no problem recommending it to photogs with an eye for landscapes, portraits, or other photo ops short of team sports and wildlife. But because it lacks the stunning EVF, dual card slots, and superior ergonomics of the full-sized a7R V, the latter remains our Editors' Choice winner for pros and most enthusiasts. Don't count out the more affordable a7C II either if you're more of a hybrid creator and can live with just a 33MP sensor.

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**URL:** <https://www.livescience.com/technology/celestron-regal-10x42-binocular-review>

**Title:** Celestron Regal ED 10x42 binocular review

**Text:** A reliable and well-finished binocular, the Celestron Regal ED 10x42 is chock-full of high-end optical technology. Its glass quality and lens coatings are excellent and we'd happily recommend these for any generalist observer. Why you can trust Live Science Our expert reviewers spend hours testing and comparing products and services so you can choose the best ones for you. Find out more about how we test. The Celestron Regal ED 10x42 has been specifically designed with optical quality and a premium finish in mind. These binoculars also come in an 8x42 model but both binoculars feature a roof prism design which means they are both light and slim, ideal for travel. Retailing just shy of \$400 these binoculars sit right in the middle between a decent entry-level pair like the Nikon PROSTAFF P3 8x42 and more expensive image stabilized options such as the Canon 10x42L IS WP binoculars. They're a good purchase for anyone who regularly uses binoculars for wildlife watching, hunting or other general observing and require good all-round quality but don't want to drop four figures on a pair. Celestron Outland X 10x42 specs: Design: Roof prism Magnification: 10x (8x also available) Objective lens aperture: 42mm Angular field of view: 6.5 degrees Eye relief: 20.2mm (0.79-in) Weight: 27.1 oz (768g) Dimensions: 5.9 x 5.1 x 2.2-in (152mm x 130mm x 57mm) A whopping depth of eye relief makes these binoculars ideal for anyone who normally has trouble using binoculars due to wearing spectacles and their minimum interpupillary distance (the distance between the eyepieces) is adequate enough for those with narrow-set eyes or for children. This 'premiere line' of performance binoculars from Celestron impresses with BaK-4 glass and full phase and dielectric coatings, combined with the extra-low dispersion elements ensure views are expansive, sharp and bright. But are they worth the money and how do they stack up compared to the best binoculars on the market? Celestron Regal ED 10x42 binocular: Design The Regal ED 10x42 binoculars have a huge 20.2mm eye relief for eyeglasses wearers. (Image credit: Jase Parnell-Brookes) Comfortable, all-over textured rubber with thumb and finger indentations Gorgeous copper color flashings on tripod mount and focus wheel Comfortable neck strap is one of the best on any binoculars tested Even retailing at nearly \$400 all the binoculars we've tested at this price point usually have a caveat, being great in a lot of areas but with one big 'but'. However, the Regal EDs are surprisingly high-end all round. The rubber that encases the binoculars is soft and grippable but not so soft as to not feel protective. The fact there is texture all over the binoculars appeals to us with many manufacturers opting to texturize only small points of contact on the body. The front lens caps fit snugly over the lenses, as does the eyepiece caps which come together in one piece and can be threaded onto the neckstrap to avoid losing them. Entirely black save for gorgeous copper flashings that encircle the tripod mount and focus wheel, these binoculars are inconspicuous and would equally suit a hike or a few hours in a bird hide. Image 1 of 2 (Image credit: Jase Parnell-Brookes) (Image credit: Jase Parnell-Brookes) The neckstrap is likely one of the best out-of-the-box we've ever tested. At 1.57-inches (40mm) at its widest point and 0.27-inches (7mm) thick the padded neoprene strap is backed with a smooth fabric finish which feels comfortable to wear around the neck or across the body (yes, it's long enough). Something that stood out to us was the seemingly upside-down Celestron badge on the right barrel which, when you hold them up to your eyes, was upside down on our model. Bizarre, but looking at their stock images it seems an anomaly. Celestron Regal ED 10x42 binocular: Performance Celestron takes a cue from its spotting scope line to introduce field-flattening elements into the Regal ED 10x42. (Image credit: Jase Parnell-Brookes) Field flattening optics give expansive, undistorted views BaK-4 glass ensures the very best light reproduction Fully multi-coated optical elements reduce glare and prioritize light throughput The main problem binocular manufacturers face is gathering light, preventing it from spreading to create color fringes on subjects and maximizing light transmission through the glass elements to create bright views. Luckily, that's where the Regal ED binoculars excel thanks to a whole host of optical technologies combined into one product. Using the superior BaK-4 glass the Regal EDs have fully multi-coated elements throughout. This is different to just 'multi-coated' or 'fully coated' in so much as every piece of glass that is exposed to the air contains multiple coatings to prevent reflections and flares that would otherwise impede light passing through the binos. Contrasted edges are normally where color fringing occurs if it is to be noticed. We could see minimal chromatic aberration (color fringing) around subjects even when looking at dark tree branches with a bright overcast sky as the backdrop which was impressive. That's due, in part, to the extra-low dispersion elements inside the binoculars and where the Regals get their ED naming convention. Tight-fitting lens caps protect the objective and eyepiece glass elements.

(Image credit: Jase Parnell-Brookes) The views felt expansive despite these roof prisms having a pretty standard viewing angle of 6.5 degrees. That's because Celestron has taken the field-flattening technology from their spotting scope products and transferred them into the Regal EDs. Field-flattening glass elements are designed to counteract the naturally convex design of binocular glass to allow edge-to-edge sharpness across the image circle. This is evident when peering into the corners during use, with most binoculars blurring into obscurity, whereas these binoculars are still pin-sharp. Celestron Regal ED 10x42 binocular: Functionality The focus wheel works well but is a little too free for our liking. (Image credit: Jase Parnell-Brookes) Binoculars and neckstrap don't both fit in the carry case Focus wheel too free for our liking A stiff hinge means interpupillary distance is easily maintained One of the most frustrating aspects when using binoculars having settings knocked as one takes them in and out of their bag. However, the settings are maintained throughout. Due to the Regal ED's reassuringly stiff hinge, the interpupillary distance was kept in place for several days without a problem which meant we could get them out of the carry bag quickly and observe birds before they disappeared past us. The diopter on the right lens barrel was also stiff enough to resist defocusing, even when we accidentally caught it with our thumb now and again. But the focusing wasn't perfect. Personally, we thought the focus wheel was a little too free, meaning a quick graze with the fingers had subjects out of focus and a missed observation. This is quite subjective and perhaps a quirk of this specific unit we were reviewing but if you're someone who likes a little more resistance when pulling focus then it'll take some getting used to the Regal EDs. Image 1 of 2 The binoculars open to the maximum interpupillary distance. (Image credit: Jase Parnell-Brookes) The binoculars closed to the minimum interpupillary distance. (Image credit: Jase Parnell-Brookes) Overall, the Regal ED 10x42s are fantastic binoculars but it's one of the first binoculars we've had to set up the eye relief to accommodate our viewing. We don't wear eyeglasses but the eye relief had to be set at its first position in order to get a decent image circle. Now, this is probably due to the massive 20.2mm eye relief adjustment present on these binoculars and we can confirm this is definitely the pair of binoculars to get if you wear eyeglasses. But it was a departure from the 'set it and forget it' approach we have had to other binoculars where the minimum default setting was adequate. We also noticed that there is quite strong vignetting when turning our eyes during observation. Binocular users are always encouraged to move the binoculars not their eyes, but the Regal EDs were particularly strong on the vignetting when doing this, likely because of the field-flattening lens. But this shouldn't put you off buying them as it only takes a short while to get used to this. Should I buy the Celestron Regal ED 10x42 binocular? The Regal ED binoculars have a tripod mount for longer observations. (Image credit: Jase Parnell-Brookes) For a mid-priced binocular that is Celestron's premiere performance binocular, the Regal ED 10x42s we tested in this review were excellent. Good value for money and myriad adjustments for any kind of observer, whether narrow or wide-eyed or if they need to wear spectacles whilst observing, they're versatile and reliable. A well-built binocular there's little that can out-compete these binoculars at this price point save for the slightly more expensive Nikon Monarch M7 10x42. The Regal EDs are best suited to those that want to invest in a decent pair and will use them regularly but don't have thousands to spend. If this product isn't for you Of course, there are always those with tighter budgets and for that we'd recommend the Celestron Nature DX 12x56. We rated them four and a half out of five stars when we reviewed them last year but if the 12x magnification is overkill and 56mm objective lenses too large Celestron also sells the 10x42 to match the Regal EDs tested here. Sometimes you can find the Olympus 8x42 Pro binoculars on sale and slightly cheaper than the Celestron Regals. Dust-repellant and waterproof these binos can keep up with you in any weather and climate and we deem them to provide fantastic views, too. But they lack a tripod mount which isn't too much of a big deal at 8x magnification, but the Regal EDs feature this, if you're observing for long periods.

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**URL:** [https://www.photographyblog.com/reviews/sony\\_a7c\\_r\\_review](https://www.photographyblog.com/reviews/sony_a7c_r_review)

**Title:** Sony A7C R Review

**Text:** Introduction The new A7C R attempts to bridge the gap between Sony's A6000-series and A7-series cameras by squeezing the larger full-frame sensor of the latter into the smaller, lighter body of the former. Sony have decided that it's time to considerably up the ante for its latest range of 35mm full-frame Alpha cameras, with the "C" in the product name standing for "Compact" and the R

standing for "Resolution". The A7C R sits above the popular A7 IV and equally new A7C II model, and just below the A7R V in terms of both specification and price. Sony have principally added a new 61 megapixel sensor and processor, more advanced video recording and auto-focusing, and a more refined design to the high-resolution 2023 version of the A7C. There are two colour versions of the Sony A7C R, a black and silver design and a more sombre all-black version (which Sony sent us for review). The Sony A7C R will be available from September 2023 priced at around £3200 / €3700 body only. It is made in Thailand.

**Ease of Use** The new Sony A7C R essentially combines the sensor, processor and key specifications of the flagship A7R V model with the smaller, lighter body of the A6700 APS-C camera. At the heart of the Sony A7C R, we find exactly the same 61-megapixel Backside Illuminated (BSI) Exmor R CMOS sensor as the one found in the Sony A7R V and IV cameras. This sensor gives it a clear advantage in resolution over the equally new A7C II with its 33-megapixel sensor by 46%, allowing you to apply more aggressive crops or make bigger prints. The original A7C had an even lower resolution 24.2 megapixel Backside Illuminated Exmor R CMOS sensor, so the A7C R is a giant leap forwards in this regard. The A7C R offers a native ISO range of 100-32,000 which can be expanded to ISO 102,400 and dropped down to ISO 50 (only when shooting stills, though, not video). Thanks to the very latest BIONZ XR processor, as also found in the A7 IV camera, the A7C R offers up to an impressive 15-stops of dynamic range when shooting in Raw mode. The new processor also offers 8x more processing power than the BIONZ X processor found in the original A7C, which was itself no slouch. The A7C R has a special multi-shot shooting mode in which it can take 16 different images which are then combined using the Imaging Edge Desktop software to produce a single, 241-megapixel image. This new model can automatically detect and correct small movements in the 16 images, such as leaves in trees or people, greatly expanding where and when you can deploy the Pixel Shift Multi Shooting mode. Both the previous A7C and the new A7C II do not offer any form of Pixel Shift Multi Shooting. The A7C R inherits the Lossless Compressed RAW format that was recently introduced on the flagship A1, which reduces the file size by 50-80%. A great new feature for this camera series is the ability to choose 26 megapixel / Medium or 15 megapixel / Small versions of both RAW and JPEG/HEIF files. Even better is the ability to switch from 60 megapixel full-frame to 26 megapixel APS-C stills when shooting Lossless Compressed RAW or JPEG/HEIF, enabling you to instantly "zoom in" on your subject at the push of one customisable button without the need to change either focal lengths or lenses. Impressively the larger 35mm full-frame sensor is housed inside a camera body that's roughly halfway in size between the full-frame A7R V and the APS-C A6700. It measures 124mm (W) x 71.1mm (H) x 63.4mm (D), compared to 120.0 x 66.9 x 69.3mm for the A6700 and 128.9 x 96.4 x 77.5mm for the A7R V, making it slightly larger in volume than the A6700 and much smaller than the A7R V. The aluminium bodied Sony A7C R weighs 525g without a lens, battery and memory card fitted, amazingly just 22g more than the A6700 (503g) and a whopping 198g less than the A7R V (723g). It utilizes a tough magnesium alloy body shell that incorporates full weather sealing for extra peace of mind in more inclement conditions. Sony have employed a monocoque construction for the A7C R, which is more commonly used in the car and aircraft industries, predominantly to help achieve the size and weight reduction. The A7C R has an even larger, more prominent grip than the one on the A7C, which we preferred after using the camera for a couple of weeks. It has an indent for your right middle-finger to naturally sit in. Combined with the large rear thumb rest it helps to make the camera feel secure enough when shooting either one- or two-handed. If you still think that the camera is too small, there's also a new Extension Grip available which further improves the handling - this is an optional accessory for the A7C II but commendably supplied in the box with the more expensive A7C R. The Sony A7C R features an in-body 5-axis image stabilization system to help prevent unwanted camera shake in low-light. It automatically corrects for pitch and yaw movement, plus horizontal shift, vertical shift and rotary motion (rolling) for both still images and movies. This was rated for up to 5 stops of compensation on the previous A7C model, but thanks to a newly redesigned stabilisation unit, the new A7C R now offers up to 7 stops of in-body stabilisation, making it one of the more capable Alpha camera in this regard. The A7C R also benefits from having a special Active Mode that increases stabilization for hand-held movie shooting by using the BIONZ XR processors. Furthermore, the use of an in-body system, rather than a lens-based system, ensures that the Alpha A7C R can stabilize all kinds of lenses, not just those with the FE



designation. This includes E-mount lenses without Optical SteadyShot (OSS), A-mount lenses and even third party lenses mounted via the popular Sigma MC-11 or Metabones adapters. Note that lenses without any electronic contacts only benefit from three axes of compensation, and you also need to manually input which focal length you're using to ensure that the stabilization works properly. The electro-magnetic drive shutter unit is officially rated for 200,000 releases before it needs to be replaced, which is pretty impressive. The Sony A7C R uses exactly the same large capacity NP-FZ100 battery as the previous A7C model, the A7R V and the A6700. The older A7C had a CIPA-rated battery life of around 740 shots when using the LCD screen and 680 when using the viewfinder, whereas the newer, more power-hungry A7C R only offers 520 shots when using the LCD screen and 470 when using the viewfinder. The A7C R can also be powered and charged via a USB connection, which is useful if you're without your charger but can access a computer, and thankfully it uses the latest USB-C standard. The new A7C R has a very similar 0.39", 2.36million-dot XGA OLED electronic viewfinder to the one used by the A7C, which is good, but certainly not class-leading. It features 100% scene coverage and a 120fps high frame rate setting to help track moving subjects more smoothly with virtually no lag. Crucially, though, it offers a higher magnification of 0.70x, versus 0.59x magnification on the original A7C. The eyepoint is also different - 23mm on the A7C R but only 20mm on the A7C. The A7C R has a slightly higher-resolution 3-inch, 3:2 ratio LCD screen than the A7C - 1.03 million versus 922,000 dots - but we'd have expected to see a much higher resolution screen on a new camera released in 2023, especially one that some may consider to be a flagship model. A larger, higher resolution screen, perhaps even in the 16:9 ratio rather than 3:2, would have made the A7C R much more competitive with its main rivals. It does have a fully articulating vari-angle design which means that you can flip out the screen to the side, rotate it forwards for easier operation when pointing the camera at yourself, and fold it flat against the back of the camera to stop it from getting scratched when not in use.. Sony have also implemented touch sensitivity on the A7C R's LCD screen. This makes functions like focus point selection much easier and more intuitive, especially given the regrettable lack of a dedicated AF joystick on the rear. It even works while looking through the electronic viewfinder, a feature that we've seen on several other high-end mirrorless cameras recently. There are also a greater number of touch controls, including the ability to operate the menu system and swipe up to open the Function menu, something that was sorely lacking on the previous model. These are also joined by a new array of handy onscreen touch icons that are specific to the stills and movie modes. If you're buying the A7C R primarily for vlogging, we'd recommend the FE 20mm F1.8 prime lens, or if you afford it the recently introduced FE 20-70mm F4 G zoom, both of which will provide better framing and greater depth of field than a standard 28mm lens. The Sony A7C R's primary external controls are very similar to those on the A6700. Sony have made a significant number of ergonomic improvements to the new A7C R when comparing it to the original model. There is now a second command dial at the top of the A7C R's handgrip which makes it even easier to change the key exposure settings in conjunction with the rear command dial and the secondary rear-panel scroll wheel that doubles up as the 4-way navigation buttons. It also has two Custom function buttons rather than one, which many people like. Also the dedicated exposure compensation dial on the A7C has been changed to a customisable unmarked dial on the A7C R. We still wish Sony had made the now unmarked EV dial lockable, as its position on the corner of the camera meant that it's often inadvertently knocked into a different (unwanted) position when stored in a camera bag. The handy Still/Movie/S&Q switch from the A7 full-frame series has made its way onto the A7C R. The rear control layout of the A7C R hasn't really changed when comparing it to the A7C, other than the addition of the C1 button. There's a prominent AF-On button that can be used for back-button focusing, and to magnify an image during composition or playback. This button makes it a snap to back-button focus using your thumb rather than half-pressing the shutter button, a method that many photographers swear by. Sadly this means that there's still no room for an auto-exposure lock (AEL) button, a rather annoying omission. You also have to delve into the menu system to switch between AF and MF modes, or use the dedicated button on the lens (if there is one). The Sony A7C R is a very customisable camera. The AF-On button can be reconfigured to AE-Lock if you wish, just one of 27 different options that can be assigned to it. The rear Fn function button displays a quick-access menu of frequently used shooting settings, and you can choose which items appear on this menu. The Delete / C2 button on the

rear can also be assigned one of the 27 frequently used functions for direct access. The operation of the left, right, down and centre rear panel navigation buttons can also be customized, as well as the Fn button's role in playback mode (it's set to Send to Smartphone by default). You also have the ability to assign a set of video-specific functions to these same buttons when you're shooting in the movie mode, which makes perfect sense for a camera that is as much about video as stills. In terms of the available shooting modes, there are three Memory modes marked 1, 2 and 3 on the shooting mode dial. These allow you to store three frequently used shooting set-ups for quick access, and within each Memory mode is a further four customisable sub-mode pre-sets which can be saved in-camera. There are also the usual auto, semi auto and manual modes, plus a dedicated Movie mode that works in conjunction with the video record button. This is logically located to the right of the camera's top-panel. Note that there's no Scene Selection position on the A7C R, perhaps reflecting the more serious nature of this particular model. The Slow and Quick (S&Q;) mode is now located on the new Still/Movie/S&Q; switch that has made its way from the A7 full-frame series. As the name suggests this accesses the camera's slow- and quick- motion video options (various frame rates ranging from 1fps to 100fps), as selected in the Movie1 tab / S&Q; Settings option in the main menu system. There is a Multi Interface Shoe / flash hotshoe on top of the A7C R for connecting an external flashgun or a compatible accessory such as the ECM-B1M digital shotgun microphone, but as with the A6700, this new camera does not feature a built-in pop-up flash. Thankfully the much clearer, although still lengthy, main menu system from the ZV-E1 camera has now been included on the A7C R, which is a very welcome improvement. There is a handy My Menu tab that, as the name suggests, allows you to construct your own custom menu for easier access to your favourite camera settings. Perhaps unsurprisingly given its compact size, the A7C R only has a single memory card slot. The larger A7R V has dual memory card slots, and one of these slots can interchangeably use UHS-II SD-cards and even faster CFexpress Type A cards. It supports the faster SD UHS-II memory card standard inside a dedicated memory card port that's hidden behind a lockable door on the left-hand side of the camera. The memory card slot and the various connectivity ports on the left-hand flank of the A7C R have also been specially placed to not block the LCD screen when it's twisted out to the side. The new A7C R has the same hybrid autofocus system with phase detection points as the A7C, albeit with less frame coverage, but most importantly, greatly expanded subject recognition. On the A7C there are 693 phase-detection points and 425 contrast detection points that cover 93% of the frame, with the system working all the way down to -3EV low-light. On the A7C R there are 693 phase-detection points that cover 79% of the frame, with the system working all the way down to -4EV low-light. By far the biggest difference between the two models in terms of their auto-focusing performance is subject recognition. Sony has added an AI deep learning processing unit to the newer camera which enables it to recognise far more subjects than the previous model, and also greatly improves the detection of humans and animals/birds. The A7C can only recognise the eye and face of a human, and the eye of an animal or bird. The A7C R can recognise a human via its pose as well as its eye and face. So if the person's head is turned away from the camera, the A7C R will still accurately detect the subject as human based on its AI deep learning. Animal and bird detection has been expanded from just being able to recognise the eye on the A7C to the eye, head and body on the A7C R. As well as humans and animals, the A7C R also has the ability to recognise airplanes, cars, trains and insects. The A7C cannot recognise any of these subjects. In the real-world the A7C R rarely if ever missed the moment because of an issue with the auto-focusing. It proved adept at both locking onto and tracking a moving subject, and excelled at portraits thanks to the dedicated Eye AF mode, which instantly recognises, locks onto and tracks a human or animal eye in both the AF-S and AF-C focusing modes. The AF experience on the A7C R is still somewhat diminished by the continued lack of a thumb-operated joystick to set the AF point, something that both the A7R V and several rival cameras offer. This is a much more intuitive method than having to use either the Set button and the rear navigation pad or the touchscreen, so it's a shame not to see it featured on the A7C R. The Sony A7C R offers 8fps with Full AF/AE tracking using the mechanical shutter or 7fps with the silent electronic shutter., which is 2/3fps slower than the original model. Curiously, the A7R V offers faster 10fps burst shooting with Full AF/AE tracking using either the mechanical or silent electronic shutter. The Sony A7C R supports both wi-fi and Bluetooth connectivity, including the fastest 5Ghz wi-fi standard. It also offers location data acquisition via a low-power

Bluetooth connection to a compatible mobile device, effectively allowing you to geo-tag your images. The A7C R offers more advanced video recording specs and performance than the older A7C. The first-generation A7C supported 4K/30p video recording in the XAVC-S format at 4:2:0 color depth in 8-bit to the inserted memory card or 4:2:2 in 8-bit over HDMI to compatible third party recorders. It supported the HLG, S-Log3 and S-Log2 profiles and could record Full 1080 HD at up to 120fps, with the dedicated Slow and Quick motion mode offering frame rates ranging from 1fps to 120fps at 1080p quality. There was no 4K 60p or 10-bit recording on the original A7C camera. The A7C R can capture 4K/60p full-frame video with a 1.2x crop and 4K/30p oversampled from 6.2K footage in Super 35mm mode, both at 10-bit 4:2:2 or 4:2:0 quality and in either H.265 and H.264 AVC file formats. It also allows 16-bit RAW output to an external recorder via an HDMI cable. The equally new A7C II model can capture oversampled 4K/30p video from 7K full-frame and also 4K/60p in Super 35mm mode at 10-bit 4:2:2 or 4:2:0 quality and in either H.265 and H.264 AVC file formats. The more expensive A7R V can record 8K/25p and 4K/60p with a modest 1.2x crop in 10bit 4:2:2 quality. It also offers 4K/30/25/24p and 1080/120p recording with no crop. The A7C R additionally supports M-LUT and Log recording with LUTs and can record Full 1080 HD at up to 120fps, with the dedicated Slow and Quick motion mode offering frame rates ranging from 1fps to 120fps at 1080p quality. The newer A7C R also offers the clever Auto Framing feature which uses the camera's AI-based subject recognition technology to automatically crop the frame to keep the subject in a prominent position when shooting movies, even when the camera is mounted on a tripod.

**Image Quality** All of the sample images in this review were taken using the 61 megapixel Extra Fine JPEG setting, which produces an average image size of around 43Mb. The Sony A7C R produced images of outstanding quality during the review period. The A7C R has an extensive and very usable ISO range of 50-102400. ISO 50-6400 is essentially noise-free, while ISO 12800 and 25600 produce more than acceptable results, and even ISO 51200 is OK for emergency use, although we'd hesitate to use the fastest setting of ISO 102400. The RAW samples illustrate just how much processing the camera does by default, though, as they're noisier at the higher ISO values than their JPEG counterparts, with more unwanted colour artifacts. The effective Dynamic Range Optimizer function extracts more detail from the shadow and highlight areas in an image, without introducing any unwanted noise or other artifacts. Sony's colour profiles are split into 'creative looks' and 'picture profiles', with the former most suitable for stills and the latter for video, although either can be applied to both stills and video. The night photograph was excellent, with the maximum shutter speed of 30 seconds and the Bulb mode offering lots of scope for creative night photography.

**Noise** There are 12 ISO settings available on the Sony A7C R. Here are some 100% crops which show the noise levels for each ISO setting for both JPEG and RAW file formats. JPEG RAW ISO 50 (100% Crop) ISO 50 (100% Crop) ISO 100 (100% Crop) ISO 100 (100% Crop) ISO 200 (100% Crop) ISO 200 (100% Crop) ISO 400 (100% Crop) ISO 400 (100% Crop) ISO 800 (100% Crop) ISO 800 (100% Crop) ISO 1600 (100% Crop) ISO 1600 (100% Crop) ISO 3200 (100% Crop) ISO 3200 (100% Crop) ISO 6400 (100% Crop) ISO 6400 (100% Crop) ISO 12800 (100% Crop) ISO 12800 (100% Crop) ISO 25600 (100% Crop) ISO 25600 (100% Crop) ISO 51200 (100% Crop) ISO 51200 (100% Crop) ISO 102400 (100% Crop) ISO 102400 (100% Crop)

**File Quality** The Sony A7C R has 4 different JPEG image quality settings available, with Extra Fine being the highest quality option. The A7C R also supports the HEIF file format with 2 options available. There are 3 different Raw compression settings, with Uncompressed being the highest quality option. Thanks to a higher compression efficiency, HEIF files are smaller than JPEGs even though they contain significantly more data. How much more? Well, HEIF files are 10-bit whereas JPEG files are 8-bit. It's a heck of a lot more tonal detail and wider colour gamut. In the A7C R both HEIF and JPEG formats are available, although you can't select both at the same time. Whichever format option you select can then be captured independently or simultaneously with RAW. Here are some 100% crops which show the quality of the various options, with the actual file size shown in brackets. Extra Fine (38.9Mb) (100% Crop) Fine (15.5Mb) (100% Crop) Standard (10Mb) (100% Crop) Light (6.3Mb) (100% Crop) HEIF 4:2:2 (5.8Mb) (100% Crop) HEIF 4:2:0 (6.5Mb) (100% Crop) RAW Uncompressed (127.5Mb) (100% Crop) RAW Lossless Compressed (70.5Mb) (100% Crop) RAW Compressed (66.5Mb) (100% Crop)

**Night** The Sony A7C R's maximum shutter speed is 30 seconds and there's also a Bulb mode for even longer exposures, which is excellent news if you're seriously interested in night photography. The shot below was taken using a shutter speed of 30

seconds at ISO 100. Dynamic Range Optimizer D-Range Optimiser (DRO) is Sony's solution to improve shadow detail in photos taken in contrasty light. There are 5 different levels and an Auto option. Off Level 1 Level 2 Level 3 Level 4 Level 5 Creative Looks There are 10 Creative Look preset effects that you can use to change the look of your images which are available when shooting JPEG and/or Raw files. There are ten creative look presets for JPEG pictures and an additional six 'custom' presets can be manually stored for quick access. The presets are Standard ('ST'), Portrait ('PT'), Neutral ('NT'), Vivid ('VV'), 'VV2', 'FL', 'IN', 'SH', Black & White ('BW') and Sepia ('SE'). ST PT NT VV VV2 FL IN SH BW SE Picture Profiles The Sony A7C R offers a range of 11 Picture Profiles which are available when shooting JPEG and/or Raw files. In addition to the creative looks, there are picture profile primarily designed for video use. By default, the ten parameters (PP1-PP11) are set to cover the following in-camera gamma profiles; Movie, still, Cine1-4, ITU709, ITU 709 (800%), S-Log-2, S-Log3 and HLG1-3), with manual control over numerous parameters including black level, colour mode and saturation. PP1 PP2 PP3 PP4 PP5 PP6 PP7 PP8 PP9 PP10 PP11 Sample Images This is a selection of sample images from the Sony A7C R camera, which were all taken using the 61 megapixel Extra Fine JPEG setting. The thumbnails below link to the full-sized versions, which have not been altered in any way. Sample RAW Images The Sony A7C R enables users to capture RAW and JPEG format files. We've provided some Sony RAW (ARW) samples for you to download (thumbnail images shown below are not 100% representative). Sample Movies & Video Product Images Conclusion The new A7C R takes the blueprint of the original A7C from 2020 and runs away with it, creating a super-compact, super-high-resolution full-frame camera that is significantly smaller and lighter than all of its main rivals. The "C" in the product name stands for "Compact", and the A7C R is certainly that, somehow squeezing a 35mm full-frame sensor, an IBIS unit and a flip-out screen into a body that is only slightly larger than the APS-C sensor A6700 camera and weighing a mere 22g heavier. Sony have thankfully addressed almost all of our criticisms of the original A7C model, turning what was a surprisingly out-dated camera in some ways into one that is much more up-to-speed for a 2023 camera. This includes the welcome addition of a front control dial, another Custom button, much greater touchscreen functionality, and the most recent main menu system. Even better is the 61 megapixel sensor and BIONZ XR processor that have been inherited from the flagship A7R V, not to mention the cutting-edge AI-driven AF system and more advanced IBIS unit that provides up to 7 stops of compensation. Choosing between the equally new Sony A7C II and the A7C R really comes down to whether or not you want or need the much greater 61 megapixel resolution offered by the latter model, along with the other benefits of that particular sensor, such as pixel-shift multi-shooting, the multi-resolution modes and slightly better video performance. On the flip-side, the A7C II offers faster burst shooting, wider AF frame coverage and longer battery life, not to mention a significant cost-saving. Choosing between the new Sony A7C R and the A7R V really comes down to which camera format you prefer - compact rangefinder or larger DSLR - and whether you can afford the extra £\$€800 for the A7R V. The A7R V does offer a much better viewfinder and LCD screen, dual memory card slots, slightly better IBIS, faster burst shooting, and slightly more advanced video recording including 8K quality. On the flip-side, the smaller, lighter A7C R offers some additional video features and longer battery life, not to mention that significant cost-saving. If your head has ever been turned by the high resolution offered by the A7R V but you thought it was too big and bulky, then the A7C R offers most of its features and performance in a smaller, lighter package. We do think, though, that the A7C R should have a better LCD screen and electronic viewfinder given its much more expensive than the similarly-specced A7C II model. We're also not sure why it can't match the A7R V's 8K video or 10fps burst shooting performance, given that they share exactly the same sensor and processor. In summary, the new Sony A7C R builds considerably on the promise of the rather flawed original to create a camera that is a real alternative to the A7R V - if you ever wanted high resolution in an unbelievably small, lightweight package, this is the camera for you... Ratings (out of 5) Design 4.5 Features 4.5 Ease-of-use 4 Image quality 5 Value for money 3 Main Rivals Listed below are some of the rivals of the Sony A7C R. Canon EOS R5 The EOS R5 has been the hottest full-frame camera on the block ever since Canon pre-announced it back at the start of 2020, thanks to its headline grabbing twin features of a 45 megapixel sensor and 8K video recording. We've seen it a few times since then, but now we can finally bring you our final Canon R5 review, complete with full-size sample photos and videos! Nikon Z7 II The Nikon Z7 II full-frame

mirrorless camera is the 2020 update of the original Z7 model, principally improving the autofocus, buffer and video and adding a second memory card slot. Are these changes enough for it to compete with its main rivals like the Sony A7R IV and the Canon EOS R5? Find out now by reading our in-depth Nikon Z7 II review, complete with full size sample photos and videos... Nikon Z8 As the spiritual successor to the popular D850 DSLR, the new Z8 full-frame mirrorless camera could turn out to be one of the most important products that Nikon have ever released. Read our in-depth Nikon Z8 review, complete with full-size sample photos and videos, to find out more about this mirrorless marvel... Panasonic S1R Panasonic have enjoyed a lot of success with their Micro Four Thirds camera range, and now they've turned their attention to the full-frame market with the release of the exciting new Lumix S1R. This is a 47 megapixel full-frame mirrorless camera with 187 megapixel high resolution mode, class leading electronic viewfinder, 6-stop IBIS, and a robust weatherproof body. Read our in-depth Panasonic S1R review now to find out more about this impressive camera... Sony A1 The Sony Alpha 1 camera, or Sony A1 for short, is the best camera that Sony have ever released, and currently the best all-round camera on the market. It's also one of the most expensive, so read our in-depth Sony A1 review complete with full-size sample JPEG and Raw photos and movies to find out if it's truly the One for you... Sony A7C II The Sony A7C II is the second version of a 35mm full-frame camera that's amazingly almost the same size and weight as a smaller APS-C sensor camera. Find out if they've perfected the recipe by reading our Sony A7C II review, complete with full-size sample photos and videos. Sony A7R V The Sony A7R V full-frame camera is a hybrid powerhouse that in some ways outperforms even the flagship Alpha 1 model. Can this exciting camera really meet the needs of all kinds of photographers? Read our in-depth Sony A7R V review to find out... Your Comments Loading comments... Please enable JavaScript to view the comments powered by Disqus.

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**URL:** <https://phototrend.fr/2023/08/prise-en-main-sony-fe-16-35-mm-f-28-gm-ii/>

**Title:** Sony FE 16-35 mm f/2,8 GM II : prise en main du zoom ultra grand-angle de 2e génération

**Text:** Nouvel objectif ultra grand-angle premium pour les hybrides Sony plein format. Aux côtés des boîtiers A7C II et A7C R, Sony lance le zoom FE 16-35 mm f/2,8 GM II. Un objectif très attendu, qui vient enfin compléter la « trinité des zooms à f/2,8 » de 2e génération en monture E. Au menu, une formule optique entièrement revue et un gabarit réduit. Voici notre première prise en main de ce nouveau zoom ultra grand-angle – en attendant notre test complet. La 2e génération du « trio des zooms à f/2,8 » enfin au complet Un an pile après le lancement du Sony FE 24-70 mm f/2,8 GM II – et deux ans après celui du Sony FE 70-200 mm f/2,8 GM II – le constructeur japonais dévoile (enfin !) le troisième pilier de sa « nouvelle » trilogie de zooms professionnels : le Sony FE 16-35 mm f/2,8 GM II. Introducing the Sony FE 16-35mm F2.8 GM II Lens Watch this video on YouTube Il vient prendre la relève du vénérable Sony FE 16-35 mm f/2,8 GM, lancé en... 2017. Soit une éternité dans le petit monde des hybrides plein format – et qui montre l'avance prise par Sony sur certains de ses concurrents. Sans surprise, ce nouveau zoom ultra grand-angle reprend la plage focale « traditionnelle » 16-35 mm. Cette dernière offre une remarquable polyvalence, étant à l'aise en photo d'architecture / paysage (16 mm) et en reportage (35 mm). On notera aussi qu'il s'agit de la 18e optique de la prestigieuse gamme G Master. Comparé à son illustre prédécesseur, le nouveau Sony FE 16-35 mm f/2,8 GM II se distingue sur 4 points principaux : Formule optique entièrement revue afin de supporter les capteurs les plus définis afin de supporter les capteurs les plus définis Motorisation AF avec 4 moteurs linéaires XD pour une compatibilité avec les modes de détection / suivi du sujet nourris à l'IA avec pour une compatibilité avec les modes de détection / suivi du sujet nourris à l'IA Gabarit et poids réduits (547 g vs 680 g) (547 g vs 680 g) Plus adapté aux usages vidéo. Voici la liste des caractéristiques du Sony FE 16-35 mm f/2,8 GM II plage focale : 16-35 mm (équivalent 24-52,5 mm en APS-C) : 16-35 mm (équivalent 24-52,5 mm en APS-C) objectif pour capteur plein format ouverture max : f/2,8 : f/2,8 ouverture min : f/22 : f/22 angle de champ : 107° – 63° : 107° – 63° construction optique : 15 éléments répartis en 12 groupes, dont 2 lentilles ED, 1 lentille Super ED, 1 lentille

asphérique ED, 1 lentille asphérique et 3 lentilles XA (extreme aspherical) : 15 éléments répartis en 12 groupes, dont 2 lentilles ED, 1 lentille Super ED, 1 lentille asphérique ED, 1 lentille asphérique et 3 lentilles XA (extreme aspherical) diaphragme : circulaire, 11 lamelles : circulaire, 11 lamelles distance minimale de mise au point : 22 cm (sur toute la plage focale) : 22 cm (sur toute la plage focale) stabilisation d'image : non : non tropicalisation : résistant à l'eau et à la poussière : résistant à l'eau et à la poussière grossissement max : 0,32x : 0,32x mise au point : 4 moteurs linéaires XD (eXtreme Dynamic) : 4 moteurs linéaires XD (eXtreme Dynamic) diamètre du filtre : 82 mm : 82 mm dimensions :  $\varnothing$  87,8 x 111,5 mm (D x L) :  $\varnothing$  87,8 x 111,5 mm (D x L) poids : 547 g : 547 g accessoires fournis : bouchons avant et arrière, pare-soleil : bouchons avant et arrière, pare-soleil monture compatible : Sony E Le plus léger des zooms 16-35 mm f/2,8 et une ergonomie revue C'est d'abord en termes de gabarit que les deux générations du 16-35 mm f/2,8 de Sony se différencient. Comme l'indique la marque, ce nouveau 16-35 mm est 10 % plus léger que son prédécesseur, et doit offrir un meilleur équilibre. Un point que les photographes comme les vidéastes devraient apprécier. Concrètement, le Sony FE 16-35 mm f/2,8 GM II mesure 11,15 cm de long pour un diamètre maximal de 8,78 cm, avec un poids de 547 g seulement. À titre de comparaison, la 1e version était 1 cm plus long et 133 g plus lourd. Non sans une certaine fierté, Sony indique que la 2e génération de son « trio de zooms à f/2,8 » pèse un total de 2,287 kg – contre 3,046 kg pour les trois optiques de la 1e génération. Une différence de presque 800 g qui fera une certaine différence dans le sac à dos des professionnels. Le gabarit de l'objectif est également assez différent. Ainsi, la longueur minimale est atteinte à la focale 35 mm. En dézoomant, l'objectif s'allonge d'environ 2,5 cm, pour atteindre 12,5 cm à la focale 16 mm. Au passage, on notera que le Sony FE 16-35 mm f/2,8 GM II abandonne l'encombrement constant de son prédécesseur. 16 mm 35 mm Sony FE 16-35 mm f/2,8 GM II Selon le fabricant, ce point est compensé par un centre de gravité situé davantage à l'arrière de l'objectif, et qui ne varie pas en actionnant le zoom. Une manière de rassurer les vidéastes utilisant une gimbal. Peu avare en commandes manuelles, le Sony FE 16-35 mm f/2,8 GM II intègre 2 boutons personnalisables positionnés à 90° – attribués par défaut au rappel de la mise au point. Outre l'habituel commutateur AF/MF, on découvre une bague d'ouverture manuelle (dotée d'une position Auto), réglable par tiers de stop. Heureusement, la bague est « décliquable » pour la vidéo. Un point commun aux autres zooms G Master de 2e génération. Un dernier commutateur Iris Lock permet de verrouiller la bague (soit en position Auto, soit en mode manuel). En revanche, le commutateur de réglage de la dureté de la bague de mise au point est porté disparu. Mentionnons aussi le fût mêlant métal et plastique – comme sur le 24-70 mm f/2,8 G2. Un compromis optimal entre résistance et légèreté. L'objectif dispose aussi d'un grand nombre de joints d'étanchéité pour résister aux intrusions d'eau et de poussière. La lentille frontale est également traitée au fluor. Formule optique revue et qualité d'image en hausse Le Sony FE 16-35 mm f/2,8 GM II mise sur une formule optique en 15 éléments répartis en 12 groupes. Soit une lentille et un groupe de moins que la 1e version ! Une décroissance à laquelle nous sommes peu habitués. Pour autant, l'objectif fait largement la part belle aux lentilles spéciales. On dénombre ainsi 2 lentilles ED, 1 lentille Super ED, 1 lentille asphérique ED, 1 lentille asphérique et 3 lentilles XA (extreme aspherical). Le but : améliorer la résolution, accroître la qualité d'image bord à bord et minimiser les aberrations. Par ailleurs, l'objectif doit être capable de supporter les capteurs les plus définis – à l'instar des 61 Mpx des Sony A7R IV / V et A7C R. Sony indique également avoir réduit le phénomène de focus breathing, tant nativement qu'avec le système « intelligent » proposé par les hybrides Sony depuis l'A7 IV. Tombé d'en bas – Sony A7C R – Sony FE 16-35 mm f/2,8 GM II – 16 mm, f/13, 1/50s, 100 ISO Par ailleurs, la distance minimale de mise au point passe de 28 à 22 cm (sur toute la plage focale). Le facteur de grossissement passe ainsi de 0,19x à 0,32x. Les amateurs de proxiphotographie apprécieront. C# – Sony A7C R – Sony FE 16-35 mm f/2,8 GM II – 16 mm, f/2,8, 1/640s, 100 ISO 4 moteurs linéaires XD pour des performances autofocus de pointe À l'instar des zooms Sony FE 24-70 mm f/2,8 GM II et FE 70-200 mm f/2,8 GM OSS II, ce nouvel objectif hérite de 4 moteurs linéaires XD répartis en 2 groupes. À la clé, des performances AF de pointe, avec un déplacement des lentilles ultra-rapide, précis et silencieux. D'après le constructeur, cette motorisation est suffisamment vélocité pour supporter les modes avancés de détection et de suivi intelligents du sujet, y compris avec la rafale à 30 i/s proposée par le Sony A1. L'objectif fait l'impasse sur la stabilisation optique et se repose donc sur l'IBIS (In-body Image Stabilization) des boîtiers Sony Alpha. Sony FE 16-35 mm f/2,8 GM II : paré pour la vidéo À

l'instar des objectifs Sony récents, ce nouveau 16-35 mm G2 est pensé pour un usage « hybride », couplant photo et vidéo. La possibilité de décranter la bague d'ouverture et les efforts pour réduire le focus breathing en sont les 2 signes les plus tangibles. Au-delà, Sony indique avoir apporté un soin particulier à la précision de l'autofocus. L'objectif doit ainsi tirer pleinement parti des derniers algorithmes boostés au Deep Learning, déployés sur les A7R V, A7C R, ZV-E1 et A6700. D'une manière générale, le suivi du sujet doit se montrer d'une grande souplesse. De même, l'objectif est capable de tirer pleinement parti des modes de stabilisation Active / Dynamic Active en vidéo. Ainsi, les mouvements parasites du vidéaste doivent être totalement lissés – avec un crop très réduit. Prix et disponibilité du Sony FE 16-35 mm f/2,8 GM II Le nouveau zoom Sony FE 16-35 mm f/2,8 GM II est disponible en précommande au tarif de 2699 €. Les premières livraisons sont attendues courant septembre 2023. Le Sony FE 16-35 mm f/2,8 GM II est disponible chez Digit-Photo, IPLN, Miss Numérique, Photo-Univers, Fnac ainsi que dans les magasins photo spécialisés. À titre de comparaison, le Sony FE 24-70 mm f/2,8 GM II est proposé à 2399 €, tandis que le Sony FE 70-200 mm f/2,8 GM OSS II est vendu à 2999 €. Enfin, le Sony FE 16-35 mm f/2,8 GM de 1e génération reste disponible pour une durée indéterminée au tarif de 2299 €. Prise en main du Sony FE 16-35 mm f/2,8 GM II Six ans après une première version très réussie, Sony livre un nouveau zoom séduisant à plus d'un titre. D'une part, on apprécie nettement les efforts du constructeur pour réduire assez drastiquement le poids de ses objectifs. À ce titre, le Sony FE 16-35 mm f/2,8 GM II peut se targuer d'être l'objectif le plus léger de sa catégorie. À titre de comparaison, le Canon RF 15-35 mm f/2,8 L IS USM atteint 840 g. Nikon se montre plus raisonnable (647 g) mais opte pour une plage focale différente avec son Nikkor 14-24 mm f/2,8. Même chose du côté du Sigma 14-24mm F2.8 DG DN | Art et son poids de 795 g. Heureusement, la marque propose également son zoom Sigma 16-28 mm f/2,8 DG DN | Contemporary (450 g). Sans oublier son grand rival, le Tamron 17-28 mm f/2,8 Di III RXD (420 g). Seuls Panasonic et Leica sont « hors compétition », leurs objectifs ultra grand-angle ouvrant seulement à f/4 et f/3,5 (au plus grand-angle). Sur le terrain, l'objectif procure une remarquable sensation d'équilibre. À plusieurs reprises, nous l'avons utilisé avec l'hybride Sony A7C R, et la prise en main est particulièrement agréable. On apprécie notamment la douceur des « clics » de la bague d'ouverture, ainsi que la précision de la bague de mise au point. Le léger allongement de l'objectif à la focale 16 mm n'est pas particulièrement gênant, le centre de gravité étant placé assez à l'arrière. En outre, la qualité d'image semble particulièrement bonne. La sensation de piqué est déjà très élevée à f/2,8. Mais surtout, l'homogénéité est en net progrès par rapport à la 1e version de l'objectif. La restitution des bords et des coins paraît beaucoup plus soignée, les objets situés en périphérie étant restitués avec bien plus de précision. Reflets estivaux – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 28 mm, f/13, 1/30s, 250 ISO Paris secret – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 35 mm, f/11, 1/40s, 12800 ISO Rosace médiévale-contemporaine – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 16 mm, f/13, 1/125s, 100 ISO Progression – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 35 mm, f/2,8, 1/1000s, 100 ISO Ascension – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 16 mm, f/9, 1/200s, 100 ISO Ligne de Vincennes – Sony A7C R – Sony FE 16-35 mm f/2.8 GM II – 19 mm, f/2,8, 1/200s, 500 ISO © Jean-Nicolas Lehec Même chose du côté de l'autofocus. La 1e version de cette optique était déjà très rapide et précise ; cependant, cette 2e génération semble encore mieux armée pour supporter les boîtiers très rapides et/ou très définis. La détection automatique du sujet et de son œil est ultra-rapide. De même, nous n'avons rencontré aucune latence en basse lumière. Les algorithmes des derniers boîtiers Sony n'y sont sans doute pas pour rien. Reste un tarif à 2699 € particulièrement salé – bien qu'identique à la 1e version à son lancement en 2017. Et que Sony justifie par des prestations de très haute volée, qui répond pleinement aux attentes des professionnels (et des amateurs éclairés et fortunés). Rendez-vous très bientôt pour un test complet de ce nouvel objectif assurément prometteur.

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**URL:** <https://www.techpowerup.com/312972/compactflash-association-announces-cfexpress-4-0-logical-and-physical-specifications>

**Title:** CompactFlash Association Announces CFexpress 4.0 Logical and Physical Specifications

**Text:** CompactFlash Association (CFA), the organization responsible for professional removable media specifications such as CompactFlash, CFAST, XQD, and CFexpress announces the release of the CFexpress 4.0 logical and physical specifications increasing the performance of the existing CFexpress

2.0 specifications while maintaining backward compatibility targeting the professional imaging and industrial markets requiring high-performance data capture and transfer. CFexpress 4.0 is an evolutionary specification riding on the great success of CFexpress 2.0 employing the industry standard PCI Express (PCIe) Gen 4 bus and NVM Express (NVMe) 1.4c logical interface for even higher performance and efficient NAND Flash access. With its three form factors, CFexpress 4.0 continues to support diverse performance levels to match various market requirements maintaining consistent electrical, logical, and physical interfaces while setting realistic power consumption targets for wider adoption of the CFexpress 4.0 for battery-powered applications in the imaging and industrial markets. Utilizing widely adopted open standards allow the use of established development platforms saving development time, cost, and effort. CFexpress was developed in 2016 with the charter to become a removable media standard that can span various vertical market segments providing a stable and future-proof platform with economies of scale. Since then, the standard has been widely adopted by the imaging and industrial market segments. With the adoption of PCIe Gen 4 in CFexpress 4.0, the media cards can theoretically achieve double the throughput performance compared to PCIe Gen 3 of CFexpress 2.0 while maintaining backward compatibility. CFexpress 4.0 along with CFexpress 2.0 shall provide flexibility in the choice of performance, power, and size requirements for target host devices based on their requirements. The three card types - Type A, Type B, and Type C - support different host form-factor and performance requirements while maintaining a consistent electrical, logical, and physical interface. The mechanical dimensions of each card type are specified allowing adaptor cards for smaller card types to fit into larger card sockets. Metal lids provide physical robustness to withstand use in harsh environments while providing easier thermal management for hosts. CFexpress 4.0 allows seamless migration from CFexpress 2.0 by utilizing the same underlying bus and logical interfaces of PCIe and NVMe while maintaining the exact same form factors. This allows the preservation of earlier investments made in CFexpress cards. CFA is a standards body and trade association that works closely with its ecosystem partners in the development of new removable media standards and markets. The earlier CFexpress 2.0 Type A and Type B standards have been widely adopted by high-end imaging hosts. "Adoption of the higher performance CFexpress 4.0 for removable media storage will support current and future needs of professional photographers, videographers and cinematographers enabling higher resolution, frame rates, and color depth leveraging PCIe Gen 4. CFexpress 4.0 will further cement CFexpress as a standard in the imaging industry," said Hiroshi Noda of Canon and co-chairman of the CFA board. "With the evolutionary approach in defining the new CFexpress 4.0 specifications, end users can preserve their investments made in CFexpress 2.0 removable media cards while enjoying cutting-edge use cases with the higher performance CFexpress 4.0 cards. This is a win-win for the installed base and the growing CFexpress ecosystem," said Nobuhiro Fujinawa of Nikon and co-chairman of the CFA board. "With its three form factors maintaining a consistent electrical, logical, and physical interface, CFexpress 4.0 will allow professional photographers, videographers, and cinematographers to scale seamlessly amongst the various use-case scenarios demanded by the host cameras. It is also a welcome approach for host manufacturers since the development cycle can be reduced significantly," said Hiroshi Machida of Sony Corporation and CFA board member. CFA is also preparing a new specification for VPG (Video Performance Guarantee) for higher sustained video recording which shall be released in the near future. The new CFexpress 4.0 specifications are available for CFA members only. CFA invites host and media companies interested in supporting the new CFA specifications to join CFA as members. Membership of CFA also enables participation in various workgroups contributing to CFA's technical advancements and marketing initiatives.

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