Jon Fauer ASC www.fdtimes.com Apr 2019 Double Issue 93-94

FILM AND DIGITAL TIMES

Art, Technique and Technology in Motion Picture Production Worldwide

THE BIG PICTURE

FILM AND DIGITAL TIMES

Art, Technique and Technology

Film and Digital Times is the guide to technique and technology, tools and how-tos for Cinematographers, Photographers, Directors, Producers, Studio Executives, Camera Assistants, Camera Operators, Grips, Gaffers, Crews, Rental Houses, and Manufacturers.

It's written, edited, and published by Jon Fauer, ASC, an award-winning Cinematographer and Director. He is the author of 14 bestselling books—over 120,000 in print—famous for their user-friendly way of explaining things. With inside-the-industry "secrets-of the-pros" information, *Film and Digital Times* is delivered to you by subscription or invitation, online or on paper. We don't take ads and are supported by readers and sponsors.

subscribe
www.fdtimes.com

Subscribe online, call, mail or fax:

Direct Phone: 1-570-567-1224
Toll-Free (USA): 1-800-796-7431
Fax: 1-724-510-0172

Film and Digital Times
On Paper, Online, and On iPad

Print + Digital Subscriptions

Film and Digital Times Print + Digital subscriptions continue to include digital (PDF) access to current and all back issues online.

iPad and iPhone

Get Film and Digital Times for iPad and iPhone on the Apple Newsstand. Download our free app in the iTunes Store (search: Film and Digital Times). Get individual issues, back issues, or an annual subscription.

Digital (PDF) subscriptions

Digital (PDF) subscriptions include unlimited access to the current and all back issues. www.fdtimes.com/issues

FDTimes Customer Service

For subscription or account questions, please contact us by phone Monday–Friday, 9 am–5:30 pm EST.

Phone: 1-570-567-1224
Toll-Free (USA): 1-800-796-7431
Fax: 1-724-510-0172
Email via website: fdtimes.com/contact
Mailing address: Film and Digital Times Subscriptions
PO Box 922
Williamsport, PA 17703 USA

Editorial offices in New York City

www.fdtimes.com

On Paper, Online, and now on iPad

Subscribe

Online:
www.fdtimes.com/subscribe

Call, Mail or Fax:

Direct Phone: 1-570-567-1224
Toll-Free (USA): 1-800-796-7431
Fax: 1-724-510-0172

Film and Digital Times Subscriptions
PO Box 922
Williamsport, PA 17703
USA

☐	1 Year Print and Digital, USA	6 issues	$ 49.95
☐	1 Year Print and Digital, Canada	6 issues	$ 59.95
☐	1 Year Print and Digital, Worldwide	6 issues	$ 69.95
☐	1 Year Digital (PDF)		$ 29.95
☐	1 year iPad/iPhone App upgrade (normally 29.99) *Get FDTimes on Apple Newsstand with iPad App when you order a Print or Digital Subscription (above)*		+ $ 9.99

Total $ _____

Payment Method (please check one):

☐ VISA ☐ Mastercard ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code _____

Expiration Date _____

Signature _____

Name _____

Company _____

Title _____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code _____

Phone _____

Fax _____

Email _____

Contents: Apr 2019 Issue 93-94

The Year of Full Frame / VV / LF
Big Picture Cameras on the Cover
from top, left to right:
ARRI ALEXA 65, new ALEXA Mini LF, ALEXA LF;
RED RANGER, RED MONSTRO 8K VV, Panavision DXL-2;
Leica SL, Sony VENICE, Canon EOS C700 FF.

ARRI ALEXA Mini LF 4
Big Picture, Little Camera 5
Stephan Schenk, Managing Director 6-7
Michael Jonas and Marc Shipman-Mueller on ALEXA Mini LF 8-9
Tom Faehrmann, BVK on ALEXA Mini LF 10
Heiko Knauer on ALEXA Mini LF 11
ALEXA Mini LF vs ALEXA Mini, ALEXA Mini LF 12
ARRI ALEXA Mini LF 13
ALEXA Mini LF Configurations, Sensor Modes, Media 14-15
Victor Gómez-Hernández, Project Manager 16
Florian Lohse, Project Manager for MVF-2 Viewfinder 17
Jeanfre Fachon on ALEXA Mini LF Accessories 18
Mini LF Accessories, ARRI WVR-1s Small Video Receiver 19
ALEXA Mini LF Specs, Team Photo 20-21
ARRI 35mm and 125mm T1.8 Signature Primes at Sistina 22
cmotion Cinefade VariND 23
Seven Samurai, Sumire 24
Seven Sumire 25
Sumire in Impressionism 26
New Canon PL mount Sumire Primes 27
Canon K-35 Zoom and Primes 28
A Review of Canon Cine Lenses 29-30
And now in 2019: Canon Sumire PL Primes 31
Canon's Utsunomiya Lens Factory Tour, Lens Manufacturing 32-36
Canon Lens Design 37-40
Crafting Canon Lenses 40-42
Canon Lens Meishō & Meister 42-43
Fugu in Utsunomiya 44
Sumire Primes and Prime Burgers at Flora Bar 45
Blackmagic RAW 46
New Blackmagic URSA Mini Pro 4.6K G2 with Blackmagic RAW 47-49
LEITZ PRIME & LEITZ ZOOM Debut 50-52
Dr. Aurelian Dodoc on LEITZ PRIME Design 53-57
LEITZ PRIME lenses in LA and Charcoal Venice 58-59
LEITZ PRIME at T1.8 and at Mélisse 60-61
Shot on Cooke 62-63
Stephen Murphy Shot *Moonstone* on Cooke Mini S4/i 64
ZEISS Supreme Primes 65
Serguei Saldívar, AMC 66-68
Supreme Frames from Serguei Saldívar's *El Viaje* 69
ROMA, ARRI Prime 65 Lenses and Hasselblad/Fujinon HC Lenses 70-71
Fujinon Premista 28-100 mm T2.9 Large Format Zoom 72
Premista 80-250 mm T2.9-3.5 Large Format Zoom (under development) 73
Band Pro Optical Department 74-75
Sony VENICE Upgrade 4.0 76
BLACKWING^7 from Tribe7 77-79
AbelCine Accelerator Program 80
Fathom Camera Cage One 80-81
LEE Filters Diffusion Comparator App 82
Panasonic EVA1 Upgrade 3.0 82
Cartoni Sport 200 Tripod & Cartoni Master 25 Fluid Head 83
Litepanels Gemini 1x1 Soft RGBWW LED 84
Anton/Bauer Titon 84
SIGMA Burbank Studio 85
Don Burgess, ASC, Camera Owner 86-88
Hydra-Arm 89
Cinetech Italiana Capinera Dolly 90
Ronford-Baker Atlas 360 Rollover Rig 90
Angénieux and Cinema, from Light to Image 91
Ben Richardson on *Yellowstone* 92-94
DJI Master Wheels 95
Neo Super Baltar 96
Caldwell Chameleon Anamorphic 1.79x 96
Tokina Vista One, 50-135mm, 105mm 97
IB/E Optics Smartfinder 97
Phantom v2640 Onyx Specialty High-Speed Camera 98
MINI MIX from DMG Lumière by ROSCO 99
Wooden Camera LPL Mounts 100
New Mole-Richardson LEDs 100
Filmtools 101
Gecko-Cam Lenses, Lens Controls and FF Projectors 102
Scorpiolens 20mm T2.2 Anamorphic 103
Scorpio Stabilized V Head & Scorpio 10' Dolly 103
Tiffen Steadicam 104
Lowel TotaLED 104
Bright Tangerine Drumstix 105
RED DSMC2 Ultra-Brite LCD Monitor 105
Vocas LPL Mounts 106
Easyrig Flow 106
SmallHD FOCUS 7 Monitor 107
Teradek RT CTRL.3 107
Teradek 4K Wireless Video 108
SmallHD Cine 7 109

Special thanks to Marc Shipman-Mueller, Product Manager (above right, with Michael Jonas levitating Mini LF at left) for the countless hours, late night calls, and all his valuable help on this report. Our work together goes back to the Arriflex 535 Book and every camera system that followed. Those were the days when camera reports took a year to write. Now, it's a matter of weeks. Like Hamilton in the musical, "Write day and night like you're running out of time." And great thanks to Johannes Polta for some of the best product renders in the business.

Here's the new little camera from ARRI that shoots big pictures. It's ARRI's latest addition to their large-format camera system. This is what many cinematographers were asking for: Large Format, lighter, smaller, modular.

It's pretty much always followed this way. Arriflex cameras were not just cameras, they have long been part of a system.

As Stephan Schenk explains (on page 6), there usually was a studio style "A" camera accompanied by a hand-holdable, lighter, smaller "B" camera.

When the Arriflex 35BL came out, its lighter, smaller, faster MOS companion was the 35-3. The Arriflex 535 system was rounded out with the 435. Along with ARRICAM came my favorite handheld camera, the shoulder-resting Arriflex 235 whose magazines looked like a school of playful dolphins.

This sets the stage for the camera that comes in the days ahead of NAB, in April 2019. Its design is equally joyful. ARRI ALEXA Mini LF is quintessentially an ALEXA LF stuffed into the body of a Super35 ALEXA Mini. It uses the same size ALEV III (A2X) CMOS sensor (36.70 x 25.54 mm). To picture the engineering involved, imagine unloading the entire contents of your 22-foot long camera truck and squeezing almost everything inside a BMW X3.

The new ALEXA Mini LF is not a "B" camera. It's an entire-alphabet camera. Just as the Super35 ALEXA Mini captured the imaginations of users on all kinds of productions, the new Large Format Mini LF is equally versatile.

Which brings us back to the concept of ARRI's camera system. Camera capabilities can be defined by shooting style.

You might want an all-in-one high-speed ALEXA LF camera, most likely in a studio, that does almost everything without having to add accessories. Or you may need a modular Mini LF, either by design or because it's the only camera body the production can afford. You might choose your camera for flexible, fast-paced production. You may want the camera mounted on a gimbal for one scene, handheld the next, and then in full studio regalia with a spaghetti of cables and accessories surrounding it. In the best of all worlds, you'll have one or more of each Large Format Camera.

Big Picture, Little Camera

ALEXA Mini LF is the newest member of ARRI's Big Picture camera system: ALEXA LF, ALEXA Mini LF, Signature Primes, LPL Lens Mount, LDS-2 lens metadata, and PL-to-LPL Adapter.

Incidentally, "Big Picture" is not a random, cute name. Denny

ALEXA Mini LF

Big Picture, Little Camera

On ARRI's demo film *Café Mila,* Second Unit DP Heiko Knauer with ALEXA Mini LF and ARRI Signature Prime 75mm. First unit cinematography: Tom Faehrman BVK. Photos: Michael Trammer.

Clairmont hated when we said "Super35" because there were so many variations. "Just call it 'Big TV,'" Denny admonished. So, with a salute to Denny, "Big Picture. Little Camera."

The Mini LF shares its photosite design and color science with the ALEXA LF, and for that matter, ALEXA 65 and Super 35 ALEXAs. Other well-known and enviable attributes include extremely high dynamic range, natural skin tones, easy color correction, high sensitivity and clean images for VFX. The camera is ergonomic, rugged and reliable. It is easy to operate. Menus are intuitive. Data wrangling and management in post is fast and efficient.

What's new on ALEXA Mini LF?

ALEXA Mini LF's carbon fiber body plus LPL lens mount weighs a mere 2.6 Kg. How convenient—that's the same size and weight (about 5.7 lb) as the ubiquitous Maß (1-liter beer mug) at Oktoberfest.

The main way to tell the cameras apart is that ALEXA Mini LF has a bulge on the camera left side. This is where the recording media goes. And yes, it records ARRIRAW internally. We'll get to that.

Other new things about the ALEXA Mini LF:

- New, small, tough, affordable Codex Compact Drive 1TB media
- Motorized Large-Format FSND filter slider (Clear, ND 0.6, ND 1.2, ND 1.8)
- 3 extra connectors: 12V 2-pin, 24V RS 3-pin and SYNC IN
- New Multi Viewfinder MVF-2 with large 4" flip-out monitor that displays the image or menu
- Viewfinder works on camera left and right side
- New VF cable using easier, flexible CoaXPress (up to 10m/33ft)
- Viewfinder has a built-in eyepiece lens heater for de-fogging
- Camera works with 12V and 24V batteries (11V to 34V)
- Power draw at 24 fps with viewfinder is similar to ALEXA Mini, which is about 65 W.
- 3 more user buttons on the camera left side (6 total).
- New 6-pin AUDIO connector (2 Ch LINE IN + 12V)
- Recessed TC connector
- Easier access to recording media and Viewfinder connector
- 2 built-in microphones
- One LOCK button each for camera and viewfinder
- Additional external WiFi antenna
- ARRIRAW license included

Large Format sensor

This entire edition of FDTimes is pretty much a paean to Large Format, packed as these pages are with new Large Format products. So we probably don't need to rhapsodize further about the distinguishable aesthetic virtues, although it's difficult to resist. More natural perspective. Backgrounds appear closer but shallower depth of field separates them more than S35. Higher resolution and less noise. Higher sensitivity, higher contrast, smoother images.

For more information: *arri.com/alexaminilf*

Stephan Schenk, Managing Director

Stephan Schenk is Managing Director of ARRI Cine Technik and General Manager of the Camera Systems Business Unit.

JON FAUER: How did the concept of ALEXA Mini LF begin?

STEPHAN SCHENK: ARRI launched the ALEXA 65 in September 2014 and the ALEXA Mini in April 2015. Both developed very successfully over the following years. When we were looking into a Full Format camera, we had 2 options: an ALEXA Mini type camera or an ALEXA 65/SXT type camera. Our engineers looked into the possibilities and we went for the ALEXA LF because we wanted a camera with high-speed capabilities. This was based on customer feedback, especially in commercial productions, who wanted 120 fps and more in full image quality.

Of course, it was already clear even before the launch of ALEXA LF that we would also need a Mini style version. Since February 2018, I have said that our engineers were on it—and they were, successfully, as we know today. And that was a customer demand from day one of the ALEXA LF launch.

What was your mandate in development of the ALEXA Mini LF? In other words, what did you suggest to the designers, product and project managers?

We wanted a camera with the same form factor of the ALEXA Mini. It should record the same types of uncompressed, unencrypted ARRIRAW formats as the ALEXA LF. It should record in-camera, without an additional external unit. But, it was clear from the early evaluations that this would mean a lower maximum frame rate than with ALEXA LF.

The mandate for our teams always has been to not only develop and produce the best camera we can, but also to ensure that it integrates seamlessly into the entire ARRI camera system and that it also works with other products in the industry. The ALEXA Mini LF really is a great addition to the new ARRI large-format camera system that we launched last year.

What will be your marketing and sales strategy? In 2015, we discussed the intended market for ALEXA Mini. Most people said it would be a "B" camera. I remember daring to say it would be an "A" camera as well.

I think the days of a clear "A," "B," and "C" camera philosophy are over. The ALEXA Mini can be the companion camera for ALEXA 65 or SXT. For some, it is the main camera—the one and only camera they have on their production. And for others, it is a handheld, drone or gimbal camera. It really depends on the type of production, the budget or the shooting style of the Cinematographer.

Have shooting styles changed the way cameras are conceived?

The shooting style has changed. We see many more sequences shot handheld these days. This makes smaller cameras more attractive and is one reason for the huge success of the ALEXA Mini. Also, there are new tools like drones and gimbals or the ARRI TRINITY that enable Directors and DPs to tell their stories in different ways. These developments have also led us to come out with a number of accessories made specifically for the ALEXA Mini. Almost all of those now fit on the ALEXA Mini LF.

A tougher question, please. I'm sure you've grappled with not wanting to release this camera too soon. But competition and customer demand maybe demanded it. (What do they say—damned if you do and damned if you don't). So, how do you avoid negative publicity and criticism from rental houses? Another company comes to mind: they were pilloried

ALEXA LF ALEXA Mini LF LPL to PL Adapter Signature Primes

for bringing out a new S35 camera less than one year after launching a 2/3" camera. The ALEXA Mini LF comes a year after ALEXA LF.

We have been very honest and clear about this from day one. Ever since the launch events of ALEXA LF last year, we always got the question, "When is an ALEXA Mini LF coming?" We always replied that we were working on it, but didn't know whether we could even achieve it. And, if we could do it, what would be its capabilities and when would it be ready? As Marc and Michael will tell you, it was quite an engineering challenge to stuff a larger sensor and so many components into something so small.

It turned out that it was possible. Now that we have a number of working Mini LF prototypes, we are going public.

But, there is also a fundamental difference to your disappointed rental house comparison. To me, the ALEXA Mini LF supports the ALEXA LF instead of superseding or replacing it. It is, in fact, similar to ARRI's concept of having the Arriflex 35-3 complement the 35BL. The 435 complements the 535. The Arriflex 235 complements the ARRICAM. We have built many camera systems that consisted of a studio version and a lighter, smaller companion.

Manohla Dargis wrote in the NYTimes, "The industry is often and sometimes laughably called liberal, but its entrenched economic conservatism is often matched by its aesthetic traditionalism." Perhaps this is why Full Format/LF has taken longer to take off than expected?

We made a big leap last year, probably the biggest step since the introduction of the PL-mount about 40 years ago. With the introduction of the ARRI LF camera system, we not only launched a new camera but also a new format, a new set of primes lenses and a new lens mount.

What makes me very confident that it will become more and more popular is the fact that all the cinematographers I have spoken with, who used ALEXA LF, love it and went on to shoot their next project with it again. Just as an example, Greig Fraser captured T*he Mandalorian* Star Wars TV Series with ALEXA LF and is now shooting *Dune* with it. Also, many DPs who captured their projects with ALEXA LF went on to subsequently purchase the camera. I think the reason is that there truly is such a thing as the Large Format look. The LF images are stunning and there is a visible difference.

I hope you have a big enough assembly line to build Large Format cameras, because I see a growing demand for this format.

We have. But I would like to keep both feet on the ground. The acceptance of Large Format takes time. We need every DP, Director and Producer to try it, to have experience with the format. We also need more lens choices. But it is coming. Many companies are currently working on new LPL lenses. Also, our range of Signature Primes has significantly increased. We already have over 10 focal lengths by now and it will be 16 by the end of the year.

So, what is next and what about Super35?

At first, the ALEXA Mini LF will have the same recording formats as the ALEXA LF. However, we know that customers also want Super 35 recording formats cropped from the LF frame. We take that seriously and will look into adding such Super 35 recording formats with a future Software Update Package.

I would like to add that we at ARRI still believe in Super 35. Not everybody will shoot Full Frame/Large Format. A large number of productions, in particular in TV, will remain with Super 35 for the foreseeable future, for a variety of reasons. And I say this very openly here: we are also working on a dedicated Super 35 4K camera (not LF) that is planned to be introduced in the first half of 2020. So, the choices for cinematographers will increase again. But for now, I am really looking forward to seeing how and where the creative community will use our LF camera system — with its new member, the ALEXA Mini LF.

Michael Jonas and Marc Shipman-Mueller on ALEXA Mini LF

Michael Jonas (left) and Marc Shipman-Mueller (right), both Product Managers for Camera Systems, with ALEXA Mini LF (center).

JON FAUER: How and when did this new ALEXA Mini LF project begin?

MICHAEL JONAS (MJ): It originally started based on improvements we had planned for the ALEXA Mini. We had been looking, for some time, at how to implement all the user feedback regarding the Mini and then we figured that it might also be possible to include the LF sensor.

What was the mandate and where did it come from?

MJ: The ALEXA Mini is a huge success and basing the ALEXA Mini LF on the same concept was the logical choice.

MARC SHIPMAN-MUELLER (MSM): When we conceived the ARRI large-format camera system, we wanted to have a fully featured high speed camera first and follow up with a more lightweight model. The ALEXA LF was faster to market because we could base it on existing technology, as it is very similar to the ALEXA 65. The Mini LF took longer since we had to work out how to fit that large sensor into such a tiny body, and we did not know if that was possible at all.

The concept, the theme, the main idea?

MSM: It's basically a large-format sensor in a Mini body, with lots of improvements to the camera based on the comments we have received on the Mini.

MJ: Given that we want to achieve uncompromised image quality, the questions were: How much processing power can you stick into such a small camera, and how can it be adequately cooled? What would be the right media? And what are the maximum frame rates?

How did the team manage to squeeze everything into such a small body? What gave way?

MJ: The engineers used magic [laugh]. Fitting the sensor and the internal, motorized large-format FSND filter stage into the tiny Mini body was indeed a big challenge. We also optimized the cooling by using the space that the CFast 2.0 card slot used in the Mini for a larger internal cooling vent. This, in addition to the new media, provided us with greater options. Given how packed the ALEXA Mini already was, it is amazing that we managed to fit all this into the same package. Huge compliments to our engineering team!

How did you reduce power consumption and deal with cooling?

MJ: We had to find a good balance between features, performance and size. We did not want to compromise our core values of mechanical excellence, ruggedness and image quality. It clearly helped to stick to the existing Mini concept as we have thousands of cameras out there. That gave us a good idea of where the issues were and what areas we could focus on for improvements. The defining goal was to address usability issues. We hope that our users will appreciate the new card location, the new viewfinder connection and the additional power outputs—which were the main points of criticism on ALEXA Mini.

MSM: The power consumption of the ALEXA Mini LF is just a little bit more than the original Mini, so you can use regular 12V on-board batteries. What gave way was the number of features in comparison to the ALEXA LF. The Mini LF does not reach the 150 fps of the ALEXA LF, for example, and it does not have the three independent SDI outputs.

What were the challenges on this project?

MJ: Fitting everything into the body and keeping the basic form factor. Ensuring that all the accessories of the original Mini would fit. We achieved that except for two brackets. For rental companies and ACs, it will be an easy transition from rigging an ALEXA Mini to rigging an ALEXA Mini LF.

MSM: It was also a Herculean task in terms of the software that had to be written and ported, and our software developers did unsung heroic deeds to get it all done in time.

What are the main differences (besides sensor size) between this camera and Alexa Mini?

MJ: There are many. Improved cooling with larger fans to keep the camera quiet.

MSM: Updated electronics with more power options. We have an extra 24V and 12V power output.

MJ: New media. And the media goes into a media bay on the camera-left side for easier access.

MSM: An additional WiFi antenna for better WiFi range.

MJ: We have three more user buttons on the camera-left side.

MSM: The camera has two built-in microphones for a scratch track.

MJ: A number of connectors have been moved so you can access them more easily—for example, the VF connector and the TC connector.

MSM: And there is a new SYNC IN connector for black burst and tri-level sync.

MJ: We have a new viewfinder connector (VF), which will be the new standard for ARRI cameras going forward. It is based on the CoaXPress standard.

MSM: Increased VF cable length. The cable is less complex and more cost-effective.

MJ: New, brighter viewfinder (same image as EVF-2) and improved flip-out display.

I think the native flange focal depth is 24mm. Therefore, can you attach a Leica M mount?

MJ: Yes, the Leica M-Mount for ALEXA Mini will fit.

Would you like to mention some of the people on your team?

MSM: Victor Gómez-Hernández, the project leader, has shown great calm in the face of a tough schedule.

David Bermbach, the project lead of the original ALEXA Mini and now responsible for product development, has brought years of experience building cameras and always brings a chipper attitude to the project.

MJ: Lars Hartmann ensured R&D knew exactly what to build.

MSM: We are also thankful to David Zucker, who deals with the ALEXA 65, for all his input and feedback.

MJ: This would not have been possible without all the brilliant engineers in R&D at ARRI, who are a very enthusiastic and creative bunch of people.

I think Mini LF and ALEXA LF will happily coexist side by side. Your thoughts? Which camera do you use when?

MJ: Picking a camera depends on shooting style, workflow, budget and ultimately personal taste.

MSM: Some productions will want to be small and lean with the Mini LF, others prefer to have the fully-featured and larger ALEXA LF with 150 fps and multiple independent SDI outputs. Since they have the same sensor, they complement each other nicely for all kind of scenarios, which makes them a very flexible combination on set.

MJ: With all the hype of cameras getting smaller: some people actually like the weight and form-factor of the original ALEXA.

MSM: The Mini LF will extend the reach of the LF system to smaller productions and lighter grip packages .

MJ: The Mini LF enables the same exciting setups and applications as the ALEXA Mini on drones, gimbals and stabilized heads.

MSM: Essentially, the combination of ALEXA Mini LF, Signature Primes, TRINITY and SRH-3 will raise the bar for moving shots and enable new ways of story-telling with superb image quality. The LF system overall provides the tools for a new visual language.

ALEXA has had an 8-year or more life. What do you expect it to be for this one?

MSM: ALEXA cameras have already sold well for over 8 years, and I think they will be rented for much longer than that.

MJ: We hope we will get the same with the Mini LF, as it is really a universal tool and the image quality speaks for itself.

As with most ARRI cameras, it is really part of a system.

MSM: I think it is important to see this not just as a single new product, but to understand our system approach.

MJ: We are the only manufacturer to provide an almost complete set of tools: cameras, image science, camera accessories, lenses, lens control, lights, matteboxes, filters, TRINITY, SRH-3, you name it.

MSM: Each item is the best we can do in each category, and we make sure they all work well together. So, as a crew member, you will notice that ARRI stuff is very compatible with third party stuff, but when you use an ARRI component with another ARRI component, there is an extra level of precision and fit, there is much less stress and you get extra capabilities.

Wrap-up?

MSM: The ALEXA Mini LF is the newest part of the ARRI large-format camera system, which now consists of ARRI Signature Prime lenses, LPL lens mount, ALEXA LF and ALEXA Mini LF cameras, PL-to-LPL Adapter and Lens Data System LDS-2. Feedback from the many, many productions that have already shot with the ALEXA LF shows that there is a special large-format look that is very much sought after by cinematographers.

MJ: And the ARRI large-format camera system provides it with exceptional image quality.

MSM: Every cinematographer who has shot with the LF wants to continue shooting with the ARRI LF system on their next projects, which is high praise.

MJ: I believe the ALEXA Mini LF will be a big hit and push large format even further into the mainstream.

Tom Faehrmann, BVK on ALEXA Mini LF

"Café Mila" crew, from left to right: Rosi Rothenfusser; Frederic Merten; Tom Faehrmann BVK, Director of Photography, first unit cinematographer; Heiko Knauer, Second Unit DP; Henning Raedlein; Susi Mayer. Photos: Michael Trammer.

Tom Faehrmann BVK was one of the first cinematographers to test the ALEXA Mini LF. He and his crew shot a short film using ALEXA LF and Mini LF. Here is Tom's report.

The ALEXA Mini LF is to Large Format as Alexa Mini is to the Super35 ALEXA family. It is the easy-to-handle, lightweight sister to the ALEXA LF. It provides a similar, suberb image quality in a handy housing. This camera follows the contemporary, vivid handheld style that many cinematographers prefer to give to their digital images.

It is incredible how so much technology, with such a big sensor, can find its place in such a small, but still robust, camera body. We were shooting with the ALEXA Mini LF handheld and on a gimbal (the ARRI TRINITY System) for the ARRI short film "Cafe Mila."

The shoot with the Mini LF camera reminded me of working with a good old Hasselblad 501—just as easy to use with mainly one hand. You can concentrate on what is the most important thing in our work: creating the image.

The Mini LF provides a freedom of shooting that I only experienced when working with the DSLR cameras for additional shots on a feature film. With the Mini LF, we have all that and everything a professional needs as well: Perfect colors, high quality data files, and an easy-to-use, lightweight camera body. That is all I need as a cinematographer.

Now that I have worked with both ALEXA LF and ALEXA Mini LF, you might ask when would I use the all-in-one style of camera and when the modular approach. It is all about the project. If it were a more conventional production on a dolly, tripod or crane, I would still go for the "big boy," because I would have everything that is needed in one body (including higher frame rate). With a dolly, weight is not a big problem. The "B" camera would be, in any case, a Mini LF, to be prepared for anything.

If the story demanded a great deal of versatility and flexibility from the camera, then the Mini LF would be my first choice, even if, with all its convenient accessories, the Mini grew quite large into a serious-sized body not that much smaller than the full ALEXA LF body.

For handheld work, the Mini LF is a wonderful choice—so easy to operate. I see in my commercial work that essentially the Mini is used on a lot of jobs. As long as you do not need high-speed-shots, the Mini LF is a nice camera to have. It is very interesting that with digital sensors the same is happening that we experienced in analog photography and cinematography decades earlier: a larger image area shows more detail, more colors, more gray tones. At the end of the day it is true—size matters.

Heiko Knauer on ALEXA Mini LF

This was a first. Interview by text message. Fauer and Knauer.

JON FAUER: Heiko, can we do a follow-up about the Mini LF?

HEIKO KNAUER: I'm in Austria, late at night, up here on a mountain on a shoot. It's the Kitzsteinhorn Glacier. We're at 2700m and I can feel the altitude. Can't talk but I have my cell phone to write.

First impressions of Mini LF?

During the prep, we didn't even have a chance to get the prototype Mini LF into our hands. The next morning, when we started to shoot, was the first time I picked it up. It felt like the ALEXA Mini except the lens mount was bigger. I was absolutely impressed to be holding a large-format camera this small.

I thought about VistaVision movies that were filmed on motion picture negative and how much work it was to carry all the equipment and magazines around. Now you can fit a camera with that size sensor in a backpack and go shoot wherever you want.

Comments on the ergonomics of Mini LF?

It's comparable to the ALEXA Mini. The shape of the body is almost the same: a carbon cube, which feels super solid. The buttons respond so you get a tactile feel when you press them. Like most ARRI products, it's a camera that is built to work in every condition. And this is how it feels when you hold it in your hands.

How heavy is it and how long can you cradle it handheld?

It's easy to carry around. On the shoot I never really put the camera down. It's nice to look for the right framing with the actual camera you shoot on. I would compare it with a Maß Beer from the Oktoberfest.

Hang on, googling Maß Beer: "1-liter stein of beer, weighs 2.6 kg. Maßkrugstemmen: a Bavarian endurance contest to see who can hold a Maß beer with outstretched arm at shoulder level the longest. World record is 20 minutes and 13 seconds." And you were holding the Mini LF all day.

Comments on new viewfinder?

I already fell in love with the ALEXA Mini viewfinder. That was a big reason why I bought a Mini myself. Especially when going handheld, I prefer to have a proper, sharp viewfinder that I can dive into. The new viewfinder is a little bit bigger. And with that, you get a bigger fold-out monitor screen. Sometimes it's great to have the screen fold out, especially on documentaries where you have to go really fast. Often, you want to get a different point of view but you're not able to look through the actual viewfinder.

The colors are great. The menu layout changed and is very intuitive. There is a wheel on the back of the monitor that has a nice responsive haptic feedback. With your index and middle finger, you can easily scroll through the menu and push it to select. It is quite user-friendly, even in wet or cold situations. This is what I also love about the buttons on the camera. You feel that they're responding when you push them, no matter what the weather conditions are.

Did you have a focus-puller? Do they pull off a monitor?

Yes, my assistant Florian Schuster was on set with us. I don't want to talk for him, but he mostly pulls focus from a monitor or by eye. We had a set of Signature Primes with us which have the LDS-2 information, so you can see the focus distance, iris setting, etc. It's a great help for the focus puller and me.

Please talk about one of my favorite production stills where you are holding the camera like a pencil (above, right).

Yes, I like that. That's the greatest thing about the ergonomics and how the camera midpoint is centered and very nicely balanced. As I said earlier, I'm really used to holding the camera in my hand during the whole shoot. Especially when shooting fashion or documentaries, you have to react quickly. It's all about that little moment where the acting, light and how everything lines up comes together. I always look for various angles to find the sweet spot.

That makes the ALEXA Mini LF so great. It's a compact large-format camera that you can use in every imaginable situation: in car set-ups, small rooms, gimbals, on the TRINITY, underwater or you can put it into your backpack with a couple of lenses and hike up a mountain. So many possibilities to use a 24x36 Camera—which is absolutely insane.

ALEXA Mini LF vs ALEXA Mini

ALEXA Mini LF

- LPL Mount
- 36.70 x 25.54 mm sensor
- (Large Format)
- Wider left side for media
- 2 antennas
- Large-format FSND filter slider

LEMO 4-pin LBUS connector on lens mount for daisy-chainable lens motors

ALEXA Mini

- PL Mount
- 28.25 x 18.17 mm sensor
- (Super35)
- S35-format FSND filter slider

LEMO 4-pin LBUS connector on lens mount for daisy-chainable lens motors

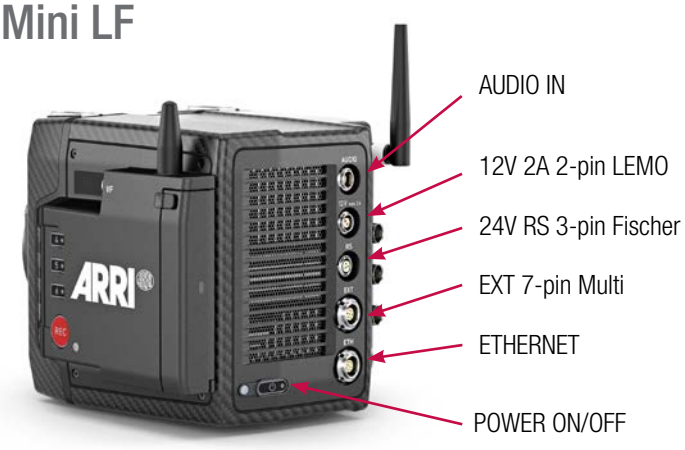
In ALEXA Mini LF, Codex Compact Drive recording media is on the camera left side.

In ALEXA Mini, data is recorded to a CFast 2.0 Card that goes into the right rear.

ALEXA Mini LF
LPL Mount
44mm FFD
62mm I.D.

ALEXA Mini
PL Mount
52mm FFD
54mm I.D.

ALEXA Mini LF



AUDIO IN

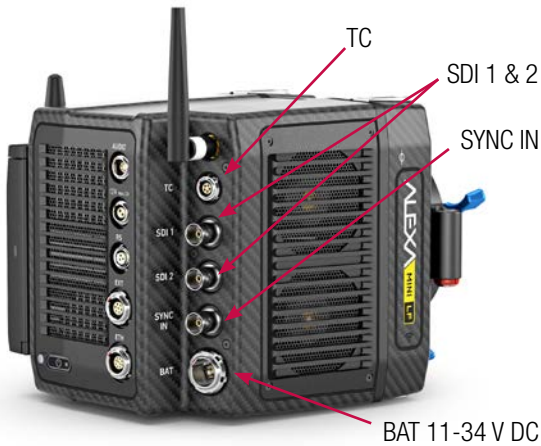
12V 2A 2-pin LEMO

24V RS 3-pin Fischer

EXT 7-pin Multi

ETHERNET

POWER ON/OFF



TC

SDI 1 & 2

SYNC IN

BAT 11-34 V DC

ARRI ALEXA Mini LF

ALEXA Mini LF Configurations

The bare essentials. Camera left. 6 User buttons. REC button. VF connector

Camera right side.

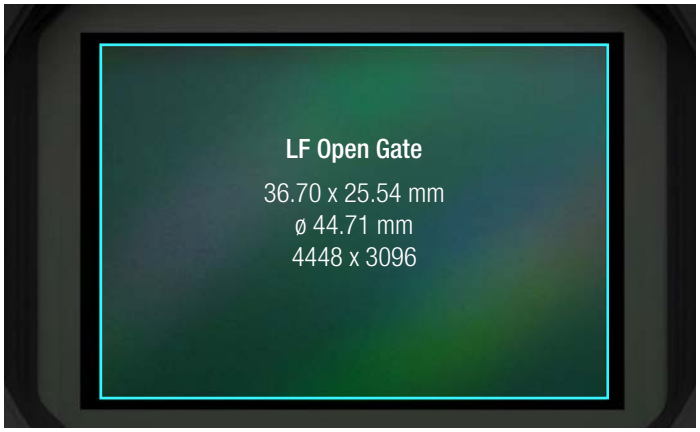
Fully rigged studio and handheld mode

Mounted in a TRiNITY Rig

Mini LF turned 90° on side for vertical portrait mode with Vertical Top Plate.

Gimbal Mode, shown with a MoVi

ALEXA Mini LF Sensor Modes



Just like big sister ALEXA LF, Mini LF has the same 3 Sensor Modes, which is how much of the entire sensor you want the camera to read out. It's similar to a hard matte installed in film camera gates. Remember: the taller the image height, the slower (lower) your maximum frames per second rate will be.

LF Open Gate provides the maximum sensor area, 36.7 by 25.54 mm, and the maximum resolution, 4448 x 3096 photosites.

LF 16:9 meets 4K UHD deliverable standards and it offers surround view. This is also an excellent choice if you want to almost "window" Super35 format lenses and crop the remaining picture area in post.

LF 2.39:1 is for spherical widescreen (non-anamorphic).

ALEXA Mini LF Media

Codex Compact Drive 1TB Media Bay

Codex Compact Drive 1TB

ALEXA Mini LF records internal MXF/Apple ProRes and uncompressed MXF/ARRIRAW. What's this? The camera now uses one wrapper, MXF, for all recorded files. This is where the industry is going; in fact, Apple is supporting MXF in Mac OS X now. Moving forward, Codex media will be more affordable and workflow should be simpler and faster. The new Codex Compact Drives are smaller and very reliable.

Compact Drive Reader (USB-C) for Mac OS or Windows, works without a driver or license. Approx. 8 Gb/s download speed.

The Compact Drive Adapter (above, with Compact Drive inserted) fits into the SXR Capture Drive Dock.

Victor Gómez-Hernández, Project Manager

Victor Gómez-Hernández, at left, is Project Manager of the ALEXA Mini LF.

Florian Lohse, at right, is Project Manager of the new MVF-2 Viewfinder (design plans below and discussed on the next page).

Victor Gómez-Hernández

What were the challenges in manufacturing ALEXA Mini LF?

VICTOR GÓMEZ-HERNÁNDEZ: In addition to what Marc and Michael mentioned (LF sensor, motorized FSND filter stage and additional power outputs), we had to retain the form factor of the original ALEXA Mini. It was important to keep the mounting points the same so that our customers could reuse most of the existing Mini accessories.

The cooling of all components (LF sensor, processor, new recording media) in such a small form factor was really challenging. We did a lot of thermal simulations and optimization of the cooling system. This was tricky, as the Mini is already a pretty good camera in that respect. The Mini LF has a larger cooling channel internally and its fan can go faster, so we have more cooling air volume.

The question of where to place the new recording media gave us a lot of headaches. The Mini is a very tightly integrated camera, there really are no empty spaces inside. Ultimately, the best place was the camera left side, similar to the way it is on an ALEXA. The media can be removed easily, even when the Mini LF is mounted on a drone, gimbal, Steadicam, crane, etc.

How many different departments were involved at ARRI?

It was a great combined effort of many teams: mechanical, electronic, optical, software, image software, image science, embedded firmware, sensor, user experience, requirement engineering, testing, quality management, series production, programmable systems, controlling and purchasing.

I am deeply thankful to work in a great environment and with an amazing team, making all this possible. It is difficult to highlight anyone special, as everyone in the teams worked very hard. A deep thank you for sure goes to my manager David Bermbach who has always supported me in all kind of situations.

Describe a day in the life of a camera project manager.

You think that you have planned all the details for anything that could happen in the project but every day you have to face new challenges and try to address them as soon as possible. In the end, we can all be very proud of the developed product and the teams.

How long have you been at ARRI and where were you before?

I started working on this project at ARRI in September 2017. So, you could say that I started just in time. Before that, I worked at BMW and in project management at Turbina, a company in the renewable energy sector.

How did you go from cars and energy to building cameras?

For me, it is extremely important to work in an innovative environment with challenging technologies. This is exactly what you can find at ARRI in camera development. I enjoy driving and managing projects.

Florian Lohse, Project Manager for MVF-2 Viewfinder

Florian Lohse

Describe the new MVF-2 Viewfinder.

FLORIAN LOHSE: The "M" stands for "Multi" Viewfinder because it has a regular viewfinder display with an eyepiece and also a flip-out monitor. The flip-out monitor can display the image or the camera control menu. It can remain closed and flat against the left side, or you can flip it out to see the image. Alternately, you can flip it fully around and rest it against the viewfinder, with the menu or image now visible to the assistant. Compared to the MVF-1, the MVF-2 has a larger flip-out monitor and a new control button concept. The eyepiece also can be removed now and it has a built-in eyepiece heater.

New monitor, new OLED

The flip-out monitor display is larger than the one on the MVF-1. The new display you see through the eyepiece has a native HD OLED display with higher resolution and higher contrast than previous viewfinders. This allows for much better judging of focus, dynamic range and color in the viewfinder. The display is precise, temperature-controlled, individually calibrated. Therefore, it is a great reference for evaluating the image. It has, by the way, the same HD OLED that's in the ALEXA LF EVF-2 viewfinder. So, when using ALEXA LF and ALEXA Mini LF on the same scene, both camera operators will see the same image in the viewfinder.

New cable

The new viewfinder cable (called the "VF cable") is more flexible than the previous model. It has industrial CoaXPress connectors that are easier to plug in and out. Since it is coaxial, it does not have a key, so it plugs in no matter how you have rotated the connector. Also, we will be able to support longer cables up to 10 meters.

Eyepiece heater

The viewfinder has an integrated heater that reduces eyepiece lens fogging in cold and damp conditions. When turned on, the internal heating elements will control the temperature of the eyepiece's front glass and heat it up if needed. While we will not get as much power through the VF cable as we get through the cable of an external eyepiece heater, it is much more efficient because the heating elements are directly on the glass. I think this will be great for most situations where you are dealing with fogging in the eyepiece. However, if you are shooting in the arctic, you may still want to also bring an external eyepiece heater, like the ALEXA heated eyepiece HE-7.

ARRICAM style eyepiece

The eyepiece has the same optical design as on the ARRICAM. At one point, we did a comparison test with all eyepieces we could get our hands on: ALEXA, AMIRA, 235, 435, ARRICAM, and more. We looked through all of them at a number of moving and still images, and we found that the ARRICAM was by far the best. It has very low optical distortion and very minimal chromatic aberrations, which results in a very clear image. It also has a very wide exit pupil, which allows the operator to move their head back and forth a bit more than with other eyepieces before losing the image.

MVF-2 works on both sides of the camera

The MVF-2 was designed to improve the synergy between camera operator and camera assistant. There are two control dials with identical functions. One is located on the backside of the viewfinder, to be used when the display is folded against the viewfinder's side. In this position, the display can be used by the assistant without getting too close to the operator's face. The second control dial is placed on the backside of the monitor display and is intended for a single operator hand-holding the camera.

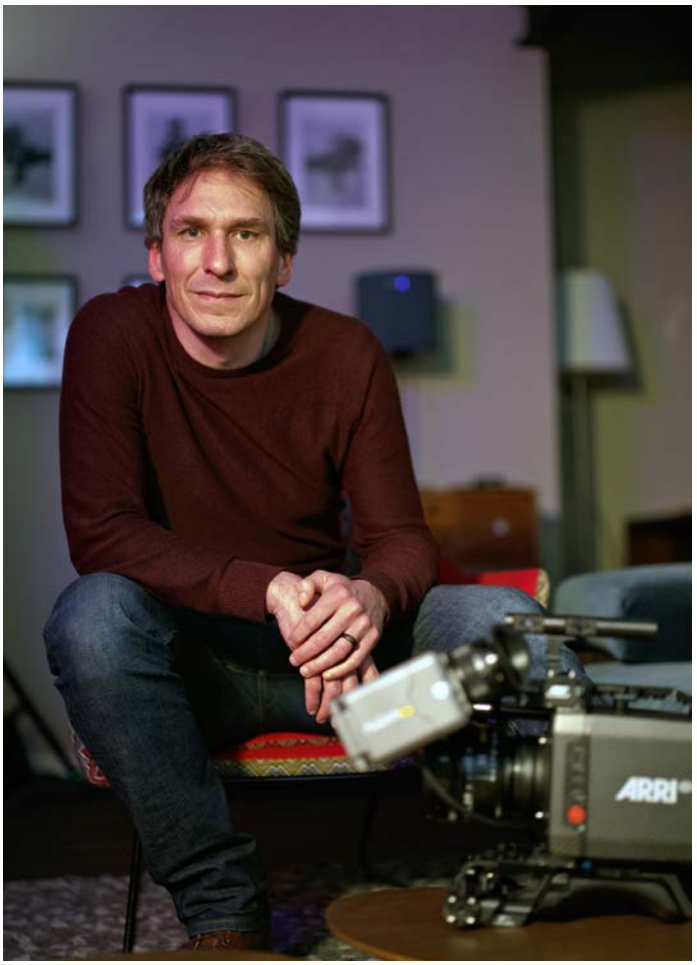
The design and manufacturing process

Viewfinders are the direct visual interface to the camera operator. We were eager to hear their comments. The manufacturing of the MVF-2 did not change from previous viewfinders: all suppliers are based in Europe and the assembly is done at our headquarters in Munich. This is a huge advantage for bringing quality to mass production, as we have daily conversations between developers, assembly and service.

Slide-In Card

The Slide-In Card is a small new feature based on direct client suggestions and field observations. We realized that many assistants and operators tend to use the free surface on MVF-1 for placing Post-it Notes with camera settings, actors' names, [lunch delivery orders] and other production specific-information. So, we added a slide-in-area hidden behind the foldable monitor to be used for that purpose.

Jeanfre Fachon on ALEXA Mini LF Accessories



Jeanfre Fachon is Product Manager of ARRI Camera Accessories

Please describe your new accessories for the new camera.

Speeding things up on set today is a major concern. Productions often use the same camera shoulder-mounted, handheld, on fluid heads, gear heads, remote heads and various stabilizers. ARRI's new accessory range for ALEXA Mini LF allows quick reconfigurations between set-ups, saving precious time in the process.

How are they different from current accessories for the Super35 format Alexa Mini?

We have optimized and updated our range of support accessories for ALEXA Mini and designed new accessories, such as the Mini Side Bracket MSB-3 and RAB-1 Clamp 2, that adapt to the updated ergonomics of the ALEXA Mini LF. We are emphasizing sturdy, quickly reconfigurable cine set-ups, while keeping available the wide-ranging catalog of support accessories we had for the ALEXA Mini from day one.

How do you go about designing these? Input from DPs and ACs? Your own experience?

We are very fortunate to be in contact with amazing camera people from all over the world. We are close to the rental houses and also to many gifted cinematographers, camera assistants, documentary filmmakers— seasoned and emerging. They share a common drive to move things forward. Their input is invaluable.

Please share with us your opinion about the difference between ALEXA Mini modular style and the SUV style of unibody, all-in-one ALEXA (Classic to SXT W)? For example, in this edition of FDTimes, we have an interview with Ben Richardson in which he says, "By the time you outfit a Mini with all its accessories,

Mini LF System & AKS Exploded View

AKS=All Kinds of Stuff

Mini LF Accessories

it's about the size of an SXT" But then he goes on to explain that a majority of the show was done on gimbals and sliders.

That is an interesting point. The ALEXA, with its larger body, offers a similar scale to traditional film cameras and happily supports many of the required camera accessories. Many disciplines from camera assistants transferred nicely from the analog world to the ALEXA. The ALEXA Mini body can be taken into very tight places, which is a fantastic asset for many filming conditions. However, achieving classic cine-style rigging requires a different approach. Often, support accessories are used as an exoskeleton to support the required devices that improve crew efficiency. Our range of camera accessories has grown and evolved continuously since the launch of the ALEXA Mini in order to address new ideas and challenges, such as when the ARRI Trinity came into the picture.

Do you offer choices of styles?

Definitely. We cannot impose a particular set-up to our users as the scope of applications is constantly broadening. Our experience with the ALEXA Mini ranges from Hollywood blockbusters to documentaries about free-climbing. We currently offer well over a hundred diverse support accessories for ALEXA Mini, most of which will happily outfit the ALEXA Mini LF. All are developed, tested and manufactured in our facilities, here in Munich.

Mini Side Bracket MSB-3

While the MSB-1 and MSB-2 still fit on the ALEXA Mini LF right side, the MSB-3 offers extended mounting options for the left side of the camera. Though it is designed around the updated ergonomics of ALEXA Mini LF, the MSB-3 is also compatible with ALEXA Mini.

Clamp 2 for RAB-1

In addition to updated mechanics and a new safety release, Clamp 2 moves battery adapters a small distance to the left in order to make room for the second row of ALEXA Mini LF connectors. Clamp 2 also works well on ALEXA Mini.

Vertical Top Plate for ALEXA Mini LF

This new top plate is part of the vertical adapter set for ALEXA Mini LF, which allows 9:16 "portrait" filming—a growing demand in the fields of commercials and visual effects. Configurations can be built to allow quick changes between classic landscape and portrait image capture.

ARRI WVR-1s Small Video Receiver

The new WVR-1s from ARRI is a smaller, lighter Wireless Video Receiver. It is the most recent addition to ARRI's WVS family of integrated (in-camera) and standalone transmitters, receivers, monitors and associated accessories. The small WVR-1s coordinates nicely when working with an ALEXA Mini LF—whether attached to the focus puller's WCU-4 and monitor, to the focus puller's big monitor on a C-stand or to the back of the director's handheld monitor.

The WVR-1s body is rugged, milled aluminum. The antennas are protected within a ribbed top cover (shown below). It pairs with ARRI's WVS transmitter. Please note, you must pair ARRI with ARRI. You cannot pair ARRI with Teradek or Teradek with Transvideo. Range is rated up to 150 meters/500 feet.

If you work with wireless video products from ARRI, Teradek, Transvideo and a few other companies, chances are that Amimon proprietary chips and circuits are inside. It's somewhat like computers having the label 'Intel Inside.' And then, in November 2018, Amimon Inc. was acquired by The Vitec Group and integrated into their Creative Solutions division.

In a joint statement recently, ARRI, Vitec Creative Solutions and Teradek confirm their continued commitment to the ARRI WVS product line, which is now being expanded with this latest addition, the ARRI WVR-1s.

ARRI WVR-1s Connectors:
Power IN (10.5-34 V DC) 2-pin Lemo
Power OUT (12 V DC, max 2.0A) 2-pin Lemo
3G-SDI OUT BNC

ALEXA Mini LF Specs

Sensor	Large Format ARRI ALEV III (A2X) CMOS sensor with Bayer pattern color filter array
Sensor Size	36.70 x 25.54 mm / 1.444 x 1.005" Ø 44.71 mm / 1.760"
Photosite Pitch	8.25 µm
Sensor Fr. Rates	0.75 - 90 fps
Exposure Latitude	14+ stops over entire sensitivity range from EI 160 to EI 3200 as measured with the ARRI Dynamic Range Test Chart
Exposure Index	Adjustable EI 160-3200 in 1/3 stops; EI 800 base sensitivity
Shutter	Electronic shutter, 5.0°- 356° or 1s - 1/8000s
Recording Formats	MXF/ARRIRAW MXF/Apple ProRes 4444 XQ MXF/Apple ProRes 4444 MXF/Apple ProRes 422 HQ
Recording Media	Codex Compact Drives
Viewfinder	Multi Viewfinder MVF-2 with 4" flip-out LCD monitor, OLED viewfinder display with 1920 x 1080 resolution; diopter adjustable from -5 to +5
Color Output	Rec 709, Rec 2020, Log C, Custom Look (ARRI ALF-2)
Look Control	Import of custom 3D LUT, ASC CDL parameters (slope, offset, power, saturation)
White Balance	Manual and auto white balance, adjustable from 2,000K to 11,000K in 10K steps Color correction adjustable range from -16 to +16 CC 1 CC = 035 Kodak CC values or 1/8 Rosco values
Filters	Built-in motorized ND filters 0.6, 1.2, 1.8 Fixed optical low pass, UV, IR filter
Image Outputs	1x proprietary signal output for MVF-2 viewfinder 2x SDI Out: 1,5G (SMPTE ST292-1), 3G (SMPTE ST425-1, ST425-3), 6G (SMPTE ST2081-10) uncompressed video with embedded audio and metadata
De-Squeeze	1.25x, 1.30x, 1.50x, 1.65x, 1.80x, 2x Anamoprhic
Focus & Aids	False Color, Zebra, Zoom, Aperture and Color Peaking
Audio Input	1x LEMO 6-pin balanced stereo line in with 12V power output, (Line input max. level +24dBu correlating to 0dBFS)"
Audio Output	SDI (embedded), 3.5mm stereo headphone jack (on MVF-2)
Audio Recording	2 channel linear PCM, 24 bit 48 kHz
Remote Control Options	Web-based remote control from phones, tablets and laptops via WiFi & Ethernet, Access Protocol via Ethernet & WiFi GPIO interface for integration with custom control interfaces WCU-4 hand-unit with control over lens motors and operational parameters via built-in white radio
Connectors	1x LEMO 5-pin LTC Timecode In/Out, 1x BNC Sync In, 1x LEMO 10-pin Ethernet for remote control and service, 1x LEMO 7-pin EXT multi purpose accessory interface with RS pin and 24V power output; 1x LEMO 4-pin LBUS (on lens mount) for lens motors, daisy chainable; 1x USB 2.0 (user setups, look files etc)
Wireless Interface	Built-in WiFi module (IEEE 802.11b/g) Built-in White Radio: ARRI lens and camera remote control
Lens Mounts	LPL mount with LBUS connector PL to LPL adapter Leica M mount from LEITZ, same as for ALEXA Mini
FFD	Flange Focal Depth: LPL mount 44 mm; PL mount 52 mm
Native Depth	24mm depth in air from intermediate mount flange to the image plane

Power Input	11-34 V DC — 1x LEMO 8-pin
Power Draw	Not yet confirmed. Slightly more than the Mini which is around 65W at 24 fps with viewfinder
Power Outputs	1x Fischer 3-pin 24V RS; 1x LEMO 2-pin 12V; 1x LEMO 7-pin EXT 24V
Size (HxWxL)	140 x 143 x 188 mm / 5.5 x 5.6 x 7.4" (body w/ LPL mount)
Weight	2.6 kg / 5.7 lb (camera body with LPL lens mount)
Operating Temperature	-20° C to +45° C / -4° F to +113° F @ 95% relative humidity max; splash and dust proof with sealed electronics
Storage Temp.	-30° C to +70° C / -22° F to +158° F
Sound Level	< 20 dB(A) at 24fps

Recording Frame Rates *(as of printing on March 22, 2019)*
- LF Open Gate ProRes 4.5K: 0.75 - 40 fps
- LF Open Gate ARRIRAW 4.5K: 0.75 - 40 fps
- LF 16:9 ProRes HD: 0.75 - 90 fps
- LF 16:9 ProRes 2K: 0.75 - 90 fps
- LF 16:9 ProRes UHD: 0.75 - 60 fps
- LF 16:9 ARRIRAW UHD: 0.75 - 60 fps
- LF 2.39:1 ProRes 4.5K: 0.75 - 60 fps
- LF 2.39:1 ARRIRAW 4.5K: 0.75 - 60 fps

Sensor Active Image Area Photosites
- LF Open Gate ProRes 4.5K: 4448 x 3096
- LF Open Gate ARRIRAW 4.5K: 4448 x 3096
- LF 16:9 ProRes HD: 3840 x 2160
- LF 16:9 ProRes 2K: 3840 x 2160
- LF 16:9 ProRes UHD: 3840 x 2160
- LF 16:9 ARRIRAW UHD: 3840 x 2160
- LF 2.39:1 ProRes 4.5K: 4448 x 1856
- LF 2.39:1 ARRIRAW 4.5K: 4448 x 1856

Sensor Active Image Area Dimensions
- LF Open Gate ProRes 4.5K: 36.70 x 25.54 mm / 1.445 x 1.006"
- LF Open Gate ARRIRAW 4.5K: 36.70 x 25.54 mm / 1.445 x 1.006"
- LF 16:9 ProRes HD: 31.68 x 17.82 mm / 1.247 x 0.702"
- LF 16:9 ProRes 2K: 31.68 x 17.82 mm / 1.247 x 0.702"
- LF 16:9 ProRes UHD: 31.68 x 17.82 mm / 1.247 x 0.702"
- LF 16:9 ARRIRAW UHD: 31.68 x 17.82 mm / 1.247 x 0.702"
- LF 2.39:1 ProRes 4.5K: 36.70 x 15.31 mm / 1.445 x 0.603"
- LF 2.39:1 ARRIRAW 4.5K: 36.70 x 15.31 mm / 1.445 x 0.603"

Recording File Container Size
- LF Open Gate ProRes 4.5K: 4480 x 3096
- LF Open Gate ARRIRAW 4.5K: 4448 x 3096
- LF 16:9 ProRes HD: 1920 x 1080
- LF 16:9 ProRes 2K: 2048 x 1152
- LF 16:9 ProRes UHD: 3840 x 2160
- LF 16:9 ARRIRAW UHD: 3840 x 2160
- LF 2.39:1 ProRes 4.5K: 4480 x 1856
- LF 2.39:1 ARRIRAW 4.5K: 4448 x 1856

Recording File Image Content
- LF Open Gate ProRes 4.5K: 4448 x 3096
- LF Open Gate ARRIRAW 4.5K: 4448 x 3096
- LF 16:9 ProRes HD: 1920 x 1080
- LF 16:9 ProRes 2K: 2048 x 1152
- LF 16:9 ProRes UHD: 3840 x 2160
- LF 16:9 ARRIRAW UHD: 3840 x 2160
- LF 2.39:1 ProRes 4.5K: 4448 x 1856
- LF 2.39:1 ARRIRAW 4.5K: 4448 x 1856

Specifications may change. For more information, visit:
www.arri.com/alexaminilf

ARRI ALEXA Mini LF

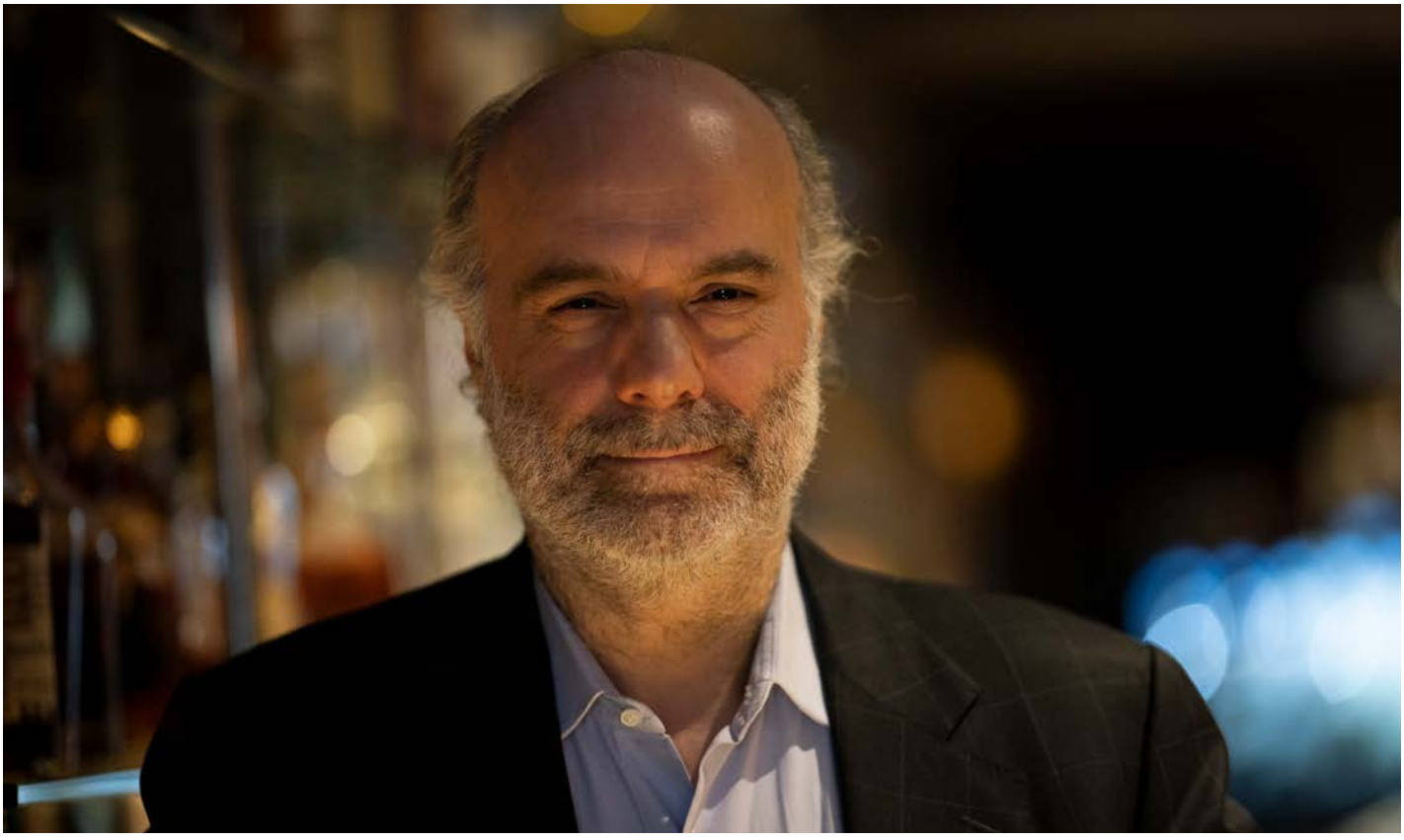
Above: the ARRI ALEXA Mini LF Development team at Tuerkenstrasse in Munich.

Recording Formats, Sensor Modes, Resolution, Maximum FPS, Sensor Photosites, Recorded Pixels

Codec	**ALEXA LF** LF SUP 4.0			**ALEXA Mini LF** Mini LF SUP 6.0		**Sensor** Photosites		**Recorded File** Pixels	
	Sensor Mode	Recording Resolution	Max. fps [1]	Recording Resolution	Max. fps [2, 3]	h	v	h	v
Apple ProRes	LF Open Gate	4.5K	60	LF Open Gate 4.5K	40	4448	3096	4448	3096
	LF 16:9	UHD	60	LF 16:9 UHD	60	3840	2160	3840	2160
	LF 16:9	2K	60	LF 16:9 2K	90	3840	2160	2048	1152
	LF 16:9	HD	60	LF 16:9 HD	90	3840	2160	1920	1080
	LF 2.39:1	4.5K	100	LF 2.39:1 4.5K	60	4448	1856	4448	1856
ARRI RAW	LF Open Gate	4.5K	90	LF Open Gate 4.5K	40	4448	3096	4448	3096
	LF 16:9	UHD	90	LF 16:9 UHD	60	3840	2160	3840	2160
	LF 2.39:1	4.5K	150	LF 2.39:1 4.5K	60	4448	1856	4448	1856

(1) Max fps is valid for all Apple ProRes flavors except LF Open Gate ProRes 4444 XQ (40 fps) and LF 2.39:1 ProRes 4444 XQ (60 fps).
(2) For ALEXA Mini LF, all Apple ProRes flavors have the same maximum frame rate.
(3) These are preliminary frame rates, specifications can change before shipping.

ARRI 35mm and 125mm T1.8 Signature Primes at Sistina



Having been immersed in the imminent arrival of ARRI Alexa LF, it was time to test the latest arrivals of large format ARRI Signature Prime lenses. Günter Nösner, Senior Technical Sales at ARRI Inc, brought a 135mm and a 35mm Signature Prime. And what better place than the low-light, iris-wide-open-with-a wrench, rich interior of Sistina, one of the best Italian Restaurants in New York? Try the risotto with porcini, zucchini flowers and truffles. The chestnut fettucine is another Sistina signature dish. As for the Signature Primes, they were smooth with silky skin tones, elegant bokeh and painterly backgrounds. This was a working lunch, so no wine today—despite Sistina's award as one of the World's 7 New Best Restaurants for Wine In 2018. Sistina is across the street from the Metropolitan Museum of Art in New York, at 24 E. 81st Street. Above: Giuseppe Bruno, Chef and Owner of Sistina, taken with a Signature Prime 125mm at T1.8. Below, with Signature Prime 35 mm at T1.8.

cmotion Cinefade VariND

"I wanted a severe depth of field shift to accentuate Liam Neeson's experience—something to isolate him from his surrounding world. Cinefade was exactly what we were looking for," said Paul Cameron, ASC. Paul accentuated a moment of intense drama in the feature *The Commuter* to convey the character's shift in emotional state as he is being fired from his job by gradually blurring the background and isolating him from the surrounding world.

A depth of field shift, for example from T11 to T1.5, obviously requires opening the lens iris. But how do you compensate for the change in exposure?

In the analog film camera days, you used a speed-aperture computer or an aperture-shutter angle control.

But now there's Cinefade. The cmotion Cinefade VariND synchronizes a motorized variable ND filter to a lens iris motor controlled by a cPRO lens control system. This automatically keeps the exposure constant while the iris opens and closes to vary the depth of field. This in-camera effect is compatible with any film or digital camera and cine lens. This is a completely new and improved system that does not require a special technician to operate it.

Previously, founder and inventor Oliver Janesh Christiansen's Cinefade was only available as a rental product through strategic partners. However, because of its popularity and demand for changing depth of field in a single shot, cmotion has introduced this brand-new, for-sale version: cmotion Cinefade VariND.

The cmotion Cinefade VariND consists of a Motorized Polarizer and a Static Polarizer that work together and are placed inside your mattebox. Using the concept of cross-polarization, they attenuate up to 5+ stops of light (ND0.4 - ND1.9). It is controlled with plug-and-play simplicity by cmotion's cPRO lens control system. The cPRO motor's built-in wireless receiver keeps the whole setup compact and lightweight.

In addition, you can also use the Cinefade as a Variable ND or RotaPola filter, precisely controlled by cmotion's cPRO. "This is a new storytelling tool and we are excited to see how filmmakers will use Cinefade and push the boundaries," Oliver said.

cmotion.eu @cinefade @cmotionlcs Visit cmotion at NAB C8336 and Camadeus at Cine Gear to try out the Cinefade VariND.

static pola filter tray

motorized pola filter tray

filter trays stacked

cmotion cPRO

cPRO motor

Seven Samurai

Toshiro Mifune in foreground as a swaggering Samurai with an oversized sword. Below: Akira Kurosawa directing *Seven Samurai* with two cameras and turrets full of primes. Photos: MovieStillsDB

Seven Samurai (Shichinin no Samurai, 1954) is the greatest foreign-language film of all time according to a BBC poll.

Akira Kurosawa directed and Toshiro Mifune starred in this sixteenth century epic of seven rōnin (masterless samurai) who help a village of poor farmers defend themselves against bandits.

If the plot sounds familiar, it is because *Seven Samurai* inspired *The Magnificent Seven*, *The Dirty Dozen, Star Wars* and countless action movies about bands of buddies assembled to do a dirty job.

Sumire

In Japanese, Sumire means "flower," "purity" or "lovely."

Sumire is a popular name. It is pronounced "Soo-mee-ray."

Sumire is also the Japanese word for violet. The nuances about this flower include "Humility", "Good Faith" and "Small Happiness".

And, Sumire is the stage name of Japanese actress, singer and fashion model Sumire Matsubara.

She is the daughter of entertainers Junichi Ishida and Chiaki Matsubara. At age seven, Sumire moved to Honolulu, Hawaii with her mother. After two years in the School of Drama at Carnegie Mellon University, Sumire returned to Tokyo to pursue a career in Japanese arts and entertainment.

Recent roles include *Hawaii Five-0* and *The Shack*. Sumire received the 2015 Rising Star Award at the Asian World Film Festival.

At right, Sumire Matsubara, Japanese actress, singer and fashion model. Photo by Gabriel Olsen at Asian World Film Festival, via Getty Images.

Seven Sumire

Introducing seven Sumire Prime lenses from Canon in PL-mount and covering Full Frame.

From the suggestion of *Seven Samurai* to summoning a set of seven Sumire, sagacious cinematographers surely will be sensitive to the sensual sibilance in the name, sounding softly, suggesting specific sensations of silky-smooth skin tones for successful scenes of superstars and spectacles.

Sumire is a splendid name.

Canon associates the new line of Sumire Prime cinema lenses "with a feeling of floral gentleness and beauty. In addition to Canon's renowned warm imagery, a unique optical design introduces a nuanced look as the lens aperture approaches its maximum setting. This subtly modifies the textural rendering of actors' close-ups. It also smooths the transition from areas that are in focus to out of focus regions of the image, with gentle fall-off and pleasing bokehs."

Sumire Prime

Focal Length		14 mm	20 mm	24 mm	35 mm	50 mm	85 mm	135 mm
Maximum T-Stop		T 3.1	T 1.5	T 1.5	T 1.5	T 1.3	T 1.3	T 2.2
Mount		PL mount						
Close Focus - meters		0.20 m	0.3 m	0.3 m	0.3 m	0.45 m	0.95 m	1.0 m
Close Focus - feet & inches		8"	12"	12"	12"	18"	3'2"	3'3"
Close Focus Actual Subject Area	1.5:1 FF [1]	25.2 x 16.8 cm	33.8 x 22.5 cm	28.8 x 19.2 cm	20.2 x 13.5 cm	25.0 x 16.7 cm	34.4 x 22.9 cm	21.1 x 14.1 cm
	1.78:1 S35 [2]	17.2 x 9.7 cm	23.1 x 13.0 cm	19.7 x 11.0 cm	13.8 x 7.7 cm	17.1 x 9.6 cm	23.5 x 13.2 cm	14.4 x 8.1 cm
Length (from front to flange)		86.0 mm	93.5 mm	93.5 mm	93.5 mm	93.5 mm	93.5 mm	107.6 mm
Maximum diameter (approx)		118.4 mm	118.4 mm	118.4 mm	118.4 mm	118.4 mm	118.4 mm	118.4 mm
Weight (approx)		1.2 kg	1.2 kg	1.2 kg	1.1 kg	1.1 kg	1.3 kg	1.4 kg
Front filter thread Ø			105 mm	105 mm	105 mm	105 mm	105 mm	105 mm
Front diameter		114 mm						
Number of iris blades		11						
Lens Gear Pitch (Module)		0.8						
Focus Gear Rotation		300°						
Iris Barrel Rotation		36°						

[1] Close Focus Coverage shown for 1.5:1 Aspect Ratio is for Full Frame Sensor Area of 36.0 x 24.0 mm.
[2] Close Focus Coverage shown for 1.78:1 Aspect Ratio is for Super35 Sensor Area of 24.6 x 13.8 mm.
Focus and Iris Scales on both sides of Lens. Focus Rings available in Imperial or Metric.
Camera Right Side of lens has phosphorescent Focus and Iris Marks for improved visibility at night and in dark locations.

Sumire in Impressionism

And what about the Japanese meaning of Sumire: purple flower, violet? Why would Canon, known for the warmth of their lenses, name Sumire Primes this way? These new lenses are slightly warm, not cool.

But violet is not always cool. It was a favorite color of Impressionists Renoir and Manet. The background of Renoir's *Madame Léon Clapisson* is an intense violet-yellow-red. His *La Grenouillère* and *Moulin de la Galette* are painted with a preponderance of dark violet. Monet's shadows are violet, not black. His water lilies in Argenteuil are violet-purple. This is not to suggest that Canon's Sumire Prime lenses, named for violet flowers, render violet images. Rather, Sumire is evocative of artistry and subtlety—a memorable name for an exciting new set of seven Full Frame cinema lenses in PL mounts.

Pierre-Auguste Renoir, 1883
Madame Léon Clapisson
Oil on canvas
81.2 × 65.3 cm (32 × 25 ¾ in.)
Art Institute Chicago

Claude Monet, 1869. *La Grenouillère*
Oil on canvas
74.6 x 99.7 cm / 29 3/8 x 39 1/4 in.
Metropolitan Museum of Art

Pierre-Auguste Renoir, 1876. *Bal du moulin de la Galette*
Oil on canvas
131 cm × 175 cm / 52 in × 69 in.
Musée d'Orsay, Paris

Above: Yasuyuki Tomita, Deputy Senior Manager and Chief Optical Designer at Canon, viewing Renoir at the Met Collection in New York.

Pierre-Auguste Renoir, 1888. *The Daughters of Catulle Mendès.*
Oil on canvas. 129.9 x 161.9 cm) / 51 1/8 x 63 3/4 in.
Metropolitan Museum of Art

New Canon PL mount Sumire Primes

Sumire Prime lenses with PL mounts arrive at NAB 2019, eight years into Canon's impressive Cinema EOS evolution. These lenses are an inevitable sequel in Canon's impressive "episodic series" of more than 140 million lenses, including EF, EF-S and Cinema EOS lenses. Canon's cine lenses have been largely centered on producing a broad range of Super 35mm zoom lenses.

The recent flurry of interest in Full Frame for cine spurred Canon to create a contemporary set of prime lenses with PL mounts and a unique, esthetically pleasing look. Some will ask why it took Canon so long to produce PL mount primes. Perhaps it seemed daunting that although PL lenses are a worldwide cine standard, they pale in comparison with the 70 million EF lenses delivered by late 2011, when Canon decided to embark wholeheartedly on cine cameras and lenses. Guesses on quantities of total PL lenses from all manufacturers range from 50,000 to 100,000 total.

These questions are best put in perspective with a quick review of Canon cinema lenses and Cinema EOS developments on the following pages.

Canon's Latest Line of Cinema EOS PL mount zooms and primes

S35 Zooms available in PL mount:

(Rear row) 30-300, 14.5-60, 15.5-47, 30-105.

(Middle row) 50-1000, 17-120.

Sumire Primes

Canon Cinema EOS EF and PL mount zooms and primes

S35 Zooms available in PL or EF mount:

(Rear row) 30-300, 14.5-60, 15.5-47, 30-105.

(Middle row) 50-1000, 17-120

S35 Zooms in EF mount only: (Middle row) 70-200, 18-80.

Sumire Primes

EF Cinema Prime lenses

Canon K-35 Zoom and Primes

From Canon's collection of historic lenses at the Utsunomiya Factory

Canon 25-120 T2.8 K-35 Macro Zoom Lens
Close Focus: 4 ft
Macro Close Focus at 25mm: 1'1"
Close Focus at 120mm: 3'1"
136mm front diameter
15 iris blades.
Weight: 11.1 lb. Length: 9"

Canon K-35 Prime lens
with BNCR mount and an ARRI mount inset.

Canon's Heritage in Cinema Optics

Canon's involvement in cinema lenses actually goes back well before the Cinema EOS era. In 1972, A Sci-Tech Award was presented to Jiro Mukai and Ryusho Hirose of Canon, Inc., and Wilton R. Holm of the AMPTP Motion Picture and Television Research Center for development of the Canon K-35 Macro Zoom Lens for motion picture photography.

Of course, cinematographers today speak poetically about Canon's legendary K-35 series of prime lenses. The K-35s were used on A*liens, American Hustle, Manchester by the Sea, and Barry Lyndon.* The set of primes consisted of 18, 24, 35, 55, 85 mm—all T1.5. The 18mm had a front diameter 110mm. The rest are 80mm. (All Full Frame except 18mm).

Kavon Elhami, President of Camtec and a passionate lens afficianado, said, "The K-35s were Canon's answer to the Zeiss Super Speeds. Fast and small, the glass elements exhibit less sharpness and contrast than most modern lenses."

P+S Technik wrote, "These cinema lenses were made by Canon in the 70's and 80's and won two Sci-Tech Academy Awards for their optical design. The high-speed optical design of the K-35 series is an excellent example of Canon's optical expertise and fine lens design. The K-35 lens is slightly softer and has less contrast compared to modern lenses. But they are sharper and provide more contrast than other vintage lenses.

Jorge Diaz-Amador of CinemaTechnic wrote, "Canon K-35 Cine Lenses were introduced in 1976 in collaboration with Ed diGiulio's Cinema Products Corp. They were originally offered with BNCR mounts: 61.47mm FFD and 68.25mm lens mount diameter. The K-35 lenses were among the first series of cine lenses to use aspheric surfaces in each focal length. Aspheric lenses allow optical designers to correct aberrations using fewer lens elements than what is possible with conventional spherical optics."

In 1976, A Sci-Tech Award was presented to Hiroshi Suzukawa of Canon and Wilton R. Holm of the AMPTP Motion Picture and Television Research Center for the design and development of super-speed lenses for motion picture photography. (Note: ZEISS Super Speeds were awarded in the same year, 1976 - introduced in 1975. They had an Arri bayonet mount.)

Denny Clairmont called in, "I know a lot about the K-35 prime lenses and the K-35 25-120 zoom lenses as Terry Clairmont bought some of the first sets. The primes were designed for still cameras but since they had floating aspheric lens elements, they were so expensive to make that Canon felt still photographers would not buy them.

Then around 1972 one of the principals of Cinema Products was in Japan and visited Canon and they loaned him a still camera with these lenses as he said he wanted to take pictures in Japan at night. When he returned to USA and had the pictures developed, he showed them Ed Di Glulio and it was decided have these lenses made for movie cameras. The 18 mm was originally T 2.8. Later Canon came out with a better T1.5 18 mm lens.

"The lenses had what we called piggy back mounts. They had BNCR lens mounts, and an Arri straight mount within. I also think some also had Arri Bayonet mounts. Terry Clairmont used the Canon K-35 zoom on a lot of commercials and with the macro feature would rack focus without having an image breathing during a focus change."

A Review of Canon Cine Lenses

Canon Chairman and CEO Fujio Mitarai presenting the EOS C300 at Paramount Studios with more motion picture products to come.

Masaya Maeda, Canon Managing Director in 2011, now President and Chief Operating Officer, at the Paramount launch of EOS C300.

Brief History of the Evolution of Cinema EOS Lenses

Canon launched Cinema EOS C300 Super35 cameras in November 2011 at Paramount Studios.

The cameras were available with EF or PL mounts.

Two new, high performance Super35 Studio Cine Zooms were also introduced. The Canon CN-E14.5–60mm T2.6 L S/SP and CN-E30–300mm T2.95–3.7 L S/SP came in EF or PL mounts. (Canon designates S for EF mount and SP for PL in the lens name.)

At the same time, Canon also introduced three cine style prime lenses. The CN-E24mm T1.5 L F, CN-E50mm T1.3 L F and CN-E85mm T1.3 L F came with EF mounts only. They covered Full Frame (36x24mm). This series of CN-E prime lenses grew to seven focal lengths in the ensuing years.

Nov. 2011: Canon EOS C300 with EF mount (left) and EOS C300 PL with PL mount (right)

2011:
14.5-60 mm T2.6 Zoom
Length: 12.52 in. / 318.0 mm
EF and PL Mount
Weight: 9.9 lb. / 4.5 kg
Front Diameter: Ø 136mm
Image circle: 29.6 mm

2011:
30-300 mm T2.95-3.7 Zoom
Length: 13.78 in. / 350.1mm
EF and PL Mount
Weight: 12.79 lb. / 5.8 kg
Front Diameter: Ø 136mm
Image circle: 29.6 mm

Nov. 2011: 24 mm T1.5, 50 mm T1.3, 85 mm T1.3 EF mount primes
Length: 4 in / 101.5mm average
Front Diameter: Ø 114mm
Weight: 2.6 lb / 1.2 kg average
Image circle: Full Frame

Set grows to 7 in the following years, adding: 14mm T3.1, 20mm T1.5, 35mm T1.5, 135mm T2.2. (CN-E14mm T3.1 L F, CN-E20mm T1.5 L F, CN-E35mm T1.5 L F, CN-E135mm T2.2)

A Review of Canon Cine Lenses, cont'd

At NAB 2012 a year later, Canon added two more Super35 Cine Zooms: CN-E15.5–47mm T2.8 L S/SP and CN-E30–105mm T2.8 L S/SP. These lightweight and compact zoom lenses were available in EF or PL mounts.

NAB 2014 brought Canon's popular CINE-SERVO 17-120mm T2.95-3.9 EF/PL zoom lens for Super35 cameras. It was wonderfully lightweight and small for a lens that could deliver such superb image quality over so much range. Its servo focus/iris/zoom handgrip detached with 3 screws. And it came in EF or PL mounts.

In October 2014, Canon introduced the remarkable CINE-SERVO 50-1000mm T5.0-8.9 (20:1) Ultra Telephoto Zoom Lens in PL or EF mount for Super35. A central design priority—dictated by the imperatives of natural history and documentary production—was to not exceed 15 lb weight and a length of 16 inches.

NAB 2016 saw yet more innovation with the debut of the new Compact Servo Zooms in EF mounts. Canon's COMPACT-SERVO 18-80mm T4.4 EF was a totally new hybrid, combining the best attributes of 3 kinds of Canon lenses: L-Series EF professional still photography lenses, Cinema Zooms with manual focus/iris/zoom barrels, and the CINE-SERVO.

Canon's Ryan Kamata said, "We saw a large gap between Cinema EOS lenses and EF Still Photography lenses, often 10 to 20 times: $40,000 cinema zooms on one end and $2,000 EF zooms on the other. It's unnatural to have so great a gap, like comparing a $40,000 sport bike to a $2,000 scooter. So we realized we needed something in between: affordable zoom lenses optimized for cine and video production."

"The concept of this new lens came after talking to users," Brent Ramsey, Technical Advisor at Canon said. "We noticed how many people were using EF mount still lenses on our Canon EOS C300, C100 and C500 cameras. They liked the fact that Canon offered more than 60 different EF still lenses. They liked the optical quality. "But they wished they could have a lens that did all that and also had the gears, smooth zoom, and manual iris of cinema lenses." Parfocal operation, minimum focus breathing, and built-in image stabilization were additional imperatives.

Almost like clockwork, a year later at NAB 2017, the Compact Servo family got a new sibling. The Canon COMPACT-SERVO 70-200mm T4.4 EF zoom covered longer focal lengths. And so, with just two lightweight, compact, affordable, high performance lenses, you could cover any angle from wide 18 mm to long 200

2012: 15.5-47 mm T2.8
Length: 8.4 in / 214 mm
EF and PL Mounts
Weight: 4.9lb / 2.2kg
Front Diameter: Ø 114 mm
Image circle: 29.6 mm

2012: 30-105 mm T2.8
Length: 8.3 in / 210 mm
EF and PL Mounts
Weight: 4.9lb / 2.2kg
Front Diameter: Ø 114 mm
Image circle: 29.6 mm

2014: 17-120 mm T2.9-3.9 Zoom
Length: 10.04 in. / 254.9 mm
EF and PL Mount
Weight: 9.9 lb. / 4.5 kg
Front Diameter: Ø 114mm
Image circle: 31.7 mm

2014: 50-1000 mm T5.0-8.9 Zoom
Length: 15.95 in. / 405.2 mm
EF and PL Mount
Weight: 14.55 lb / 6.6 kg
Front Diameter: Ø 136 mm
Image circle: 31.4 mm

2016: 18-80 T4.4 Zoom
Length: 7.2 in / 182.3 mm
EF Mount
Weight: 2.6 lb / 1.2 kg
Front Diameter: Ø 84 mm
Image circle: 31.4 mm

2017: 70-200 mm T4.4 Zoom
Length: 7.2 in / 182.3 mm
EF Mount
Weight: 2.76 lb / 1.25 kg
Front Diameter: Ø 84 mm
Image circle: 31.4 mm

And now in 2019: Canon Sumire PL Primes

2019: 14, 20, 24, 35, 50, 85, 135 mm Sumire Primes

mm. With constant aperture, this offers a cost-effective option to a set of maybe ten primes covering this total focal range.

But, as Oliver Twist said, "Please sir, we want more."

Cinematographers wanted more speed (wider apertures), more choices, more primes, and particularly PL primes.

Canon's Description of "More"

Canon's Senior Fellow Larry Thorpe explains, "It was a conscious decision at the outset for us to provide zooms with both PL and EF mounts, but to make our cine prime lenses in EF mount only. This was because there was already a substantial available inventory of PL primes from many manufacturers and we wanted to apply our resources to rapidly expanding a broad range of zoom lenses for both movie and television production.

"In the 8 years since we entered the cine arena, we learned a great deal from cinematographers as to what they wanted. We listened closely to camera crews and rental houses. We heard all of the discussions on digital resolutions as it marched to 4K and quite beyond. But, we also heard them talk about character, special personalities and unique characteristics, and of course, the vintage look.

"The recent move to Full Frame sensors has changed the landscape. And so, we figured it was time to think about what Canon might offer next with a new look in a set of prime lenses. And, with our very flexible family of S35 zoom lenses now well established we decided the time had come to offer more and marry the PL mount with new state of the art cine primes that might add a unique creativity to all of those wonderful new Full Frame digital cine cameras.

"Our new Sumire Primes are the results of those efforts.

"Although we might be considered 'the new kids on the block,' Canon does indeed have a long heritage in cinema optics and there is a great legacy of optical design for motion picture production.

Canon's Description of the Sumire "Look"

Larry Thorpe continues, "A central design priority of the Sumire Prime is to do justice to the remarkably high resolution capabilities of the Full Frame digital cine cameras presently in the marketplace. The new primes achieve the requisite sharpness in the central range of lens aperture settings. Lens resolution is bounded by diffraction as the lens aperture is stopped down and by the collective of the multiple optical aberrations as the aperture setting approaches wide open.

"Contemporary powerful computer simulation allows degrees of freedom in shaping these aberrations with a precision that allows the tailoring of different looks as the lens comes close to maximum relative aperture setting. The computer simulation facilitated exploration of the effect of this on the textural rendering of facial close-ups. That simulation further explored a range of faces that varied by age, gender, and ethnicity—ultimately allowing the optical designers to zero in on fine adjustments to the aberrations that created a gentle modulation of the lens sharpness that imparted a subtle and aesthetic nuance to a broad range of facial skins. It further imparted a smoothness to the transition between in focus and out of focus regions of a scene."

The Origins of Sumire and the "Look"

Yotaro (Jay) Sanjo, Imaging Technologies & Communications Group Professional Product Management at Canon USA said, "This is an important project for Canon. We usually don't give unique names to our products, but the Sumire Primes are different.

"I have been engaged in the optical design of Canon's cinema lenses after studying physics at university and graduate school in Japan. Utilizing the background of optical engineers who understand the optical technology that is the core at Canon and to maximize the value of Canon lenses while consolidating ideas for future Canon lens products, I came to the USA.

"Since launching Cinema EOS, we have received a lot of requests from the market asking for PL primes. Furthermore, one of our optical engineers got a good preliminary idea of the desired "look" after visiting a number of cine customers. He saw that 80% of the time, the scenes in most motion pictures and TV series involved people, faces and actors. This formed the basis of his technical understanding of how to accomplish the look. Subsequently, his team built a trial lens with the characteristic look and PL mount.

"Next, we visited many customers, showed the trial lens to various DPs and rental houses under NDA and received various opinions. While studying the cinema market, we repeatedly discussed what these lenses would be and how best to introduce them. Then, finally we were ready to announce Sumire Primes at NAB 2019.

"Canon has built trust through the technical achievements launched since Cinema EOS. On the other hand, we believe that further commitments to the market are required. Cinema users continue to have ever greater expectations and they would like to continue investing with peace of mind.

So, we would like to invite your readers to follow as you visit Utsunomiya, the base of Canon's optical technology, to show the efforts in our philosophy and the background of trust and achievement of our cinema lenses."

That tour follows on the next pages.

Canon's Utsunomiya Lens Factory

Canon's Utsunomiya Lens Factory. All photos in this article taken with an EOS R and RF 24-105mm F4 L IS USM. Below, the Sumire Prime Lens Team.

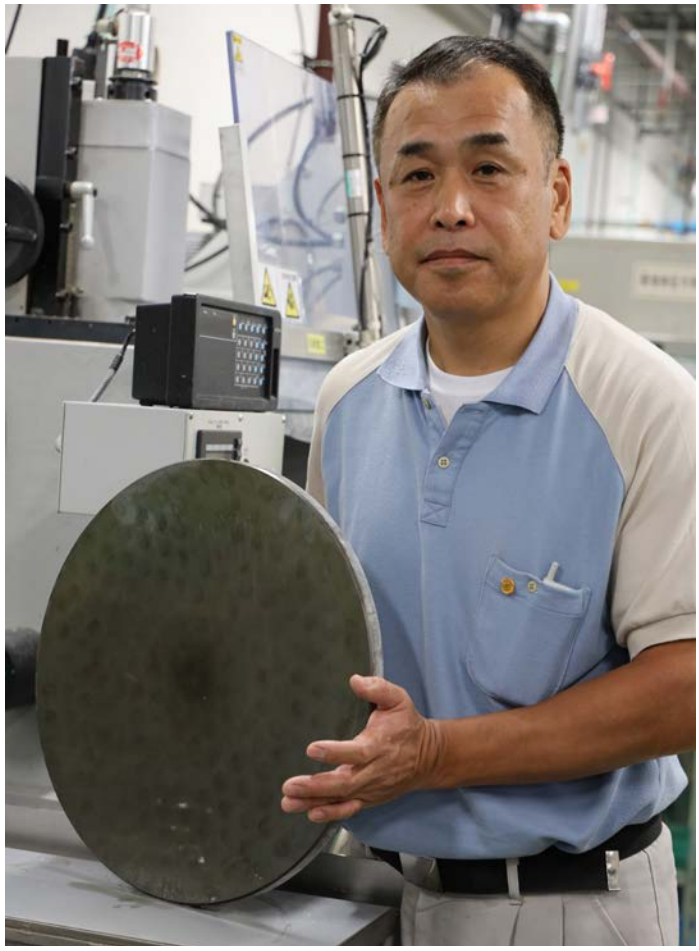
Larry Thorpe and Yotaro (Jay) Sanjo at Utsunomiya Station.

Kenichi Izuki, Utsunomiya Plant Manager

Kazuhiko Seki, Deputy Plant Manager

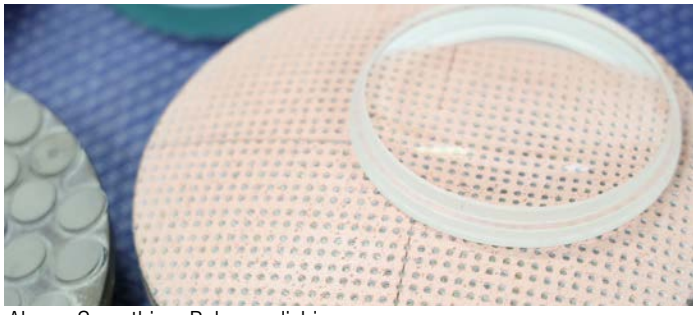
Display cases Utsunomiya Lens Factory lobby showing the stages of lens production.

The Stages of Lens Manufacturing

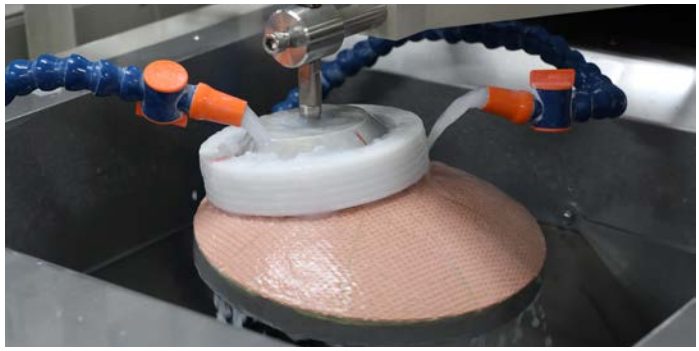


Toshio Saito, Senior Architect for Lens Polishing

If we made this lens to a diameter of 300m, the precision of the curvature would be within 30 microns.



Above: Smoothing. Below, polishing.



Toshio Saito is a senior engineer, supervisor of the grinding and polishing department, and also is responsible for teaching his team. He describes the process:

"In the lens making, we start with the raw glass material. The rough grinding begins to give the lens its shape. It looks like cloudy glass at this stage.

"The next stage is called smoothing and we fine-grind the glass to a fine and clear finish. The plate that does the grinding is made up of many diamond pellets. The plate is sprayed with a liquid slurry. Canon lens precision standards are quite strict. For example, if we made this lens to a circular diameter of 300m, which is about the size of a soccer stadium, the precision of the curvature would be within 0.03 millimeters. That is thirty microns of deviation in nine hundred feet.

"Canon cine and broadcast lenses are made to a tolerance of 13 nanometers deviation. 1 nanometer is 1 billionth of a millimeter.

"To achieve this high level of accuracy, the entire process is important: the condition of the machines, the rotation ratio, the weight of the polishing plates, the temperature of the solutions and their mixture. All those things are necessary to achieve the precision of 13 nanometers deviation.

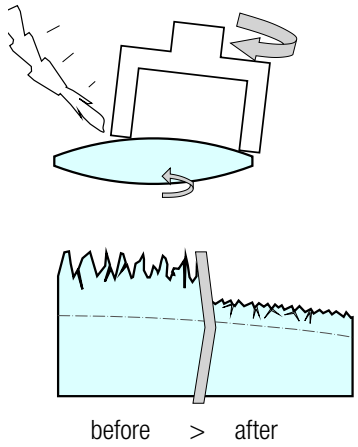
"Next comes centering. We define the optical axis of the lens. And this is one of the most difficult aspects of the process.

"After we design a new lens, the manufacturing process begins with a master lens. After the polishing has been completed, we make sure the master lens has achieved the curvature required. This is checked on the interferometer. If the lines are straight, we have high precision. If the lines are wavy, it would be out of tolerance."

Above: JF trying hand at smoothing. Below: checking with interferometer.

The 7 Steps of Lens Prep

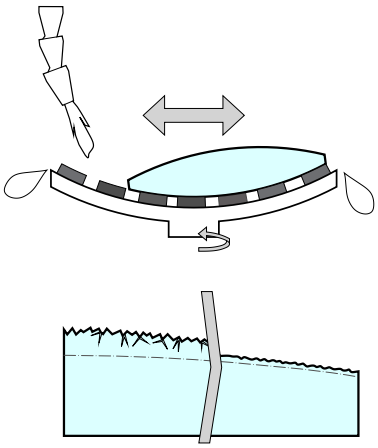
①



1. Rough Grinding.

To get the approximate shape of the lens element, raw glass material is ground with an abrasive.

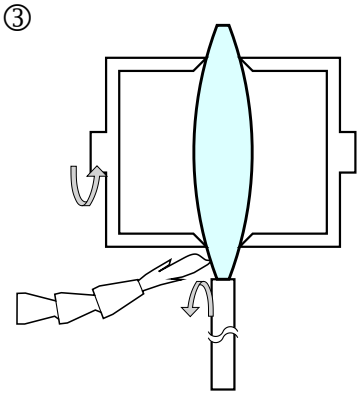
②



2. Smoothing.

The lens element is fine-ground with a diamond pellet tool and the lens takes on its final curvature shape. The lenses still look cloudy.

③

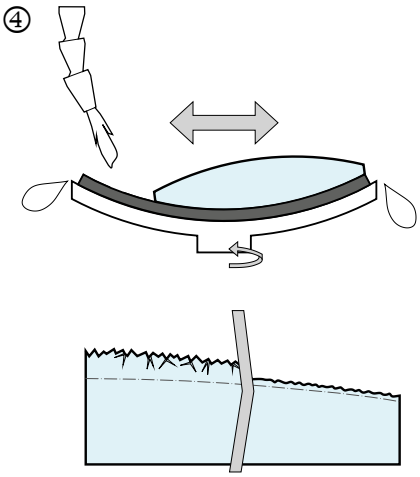


3. Centering.

The optical center of the lens is measured. Then, the optimal distance to the outer edge is calculated. Since it's a circle, every point around the circumference must be exactly the same distance to the center. And so, a precision grindstone shapes the outer edge.

Illustrations by Marlena Fauer

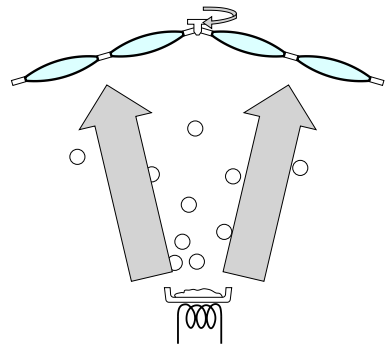
④



4. Polishing.

Lenses are polished with polyurethane pellets and an abrasive slurry until they become transparent. High performance cine lenses are polished to 1 nanometer (1 billionth of a millimeter) accuracy.

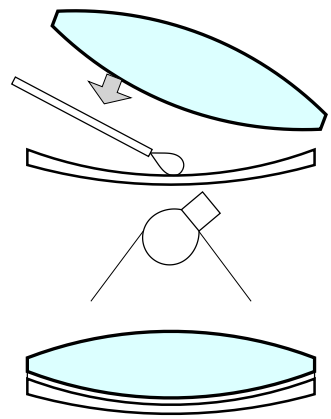
⑤



5. Coating.

Inside a vacuum chamber, a thin chemical-mineral film is evaporated and deposited onto each lens element. This reduces surface reflections and improves transmission of light.

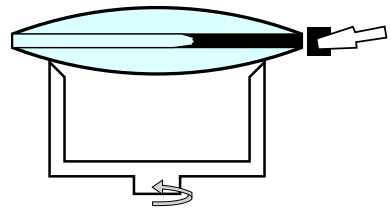
⑥



6. Cementing.

Two optical elements, often made of different kinds of glass, can be joined together with a resin adhesive. It is hardened and cured with UV light.

⑦

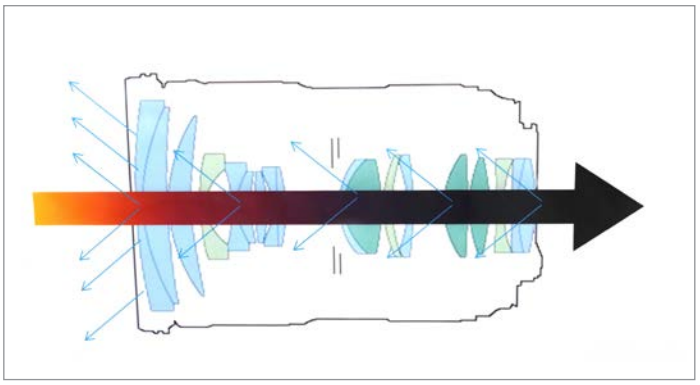


7. Edge Painting.

To eliminate reflections between the edge of the element and the lens barrel to which it's mounted, the circumference is painted by hand with a special, deep-black paint.

Coating, Cleaning, Assembly

Coating



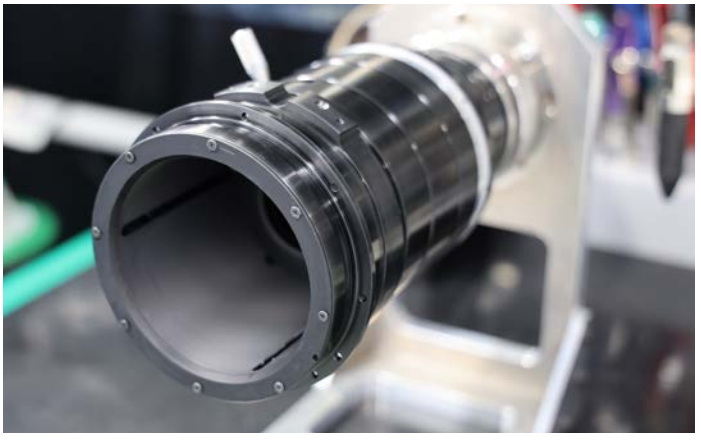
If a lens has 5 optical elements inside–that would be 10 refractive surfaces–each losing 5% of the light. A 5-element 50 mm f/2.8 lens might lose more than 50% of the light, giving you a stop of T3.8. Now, consider that many modern cine primes and zooms have 18 or more elements, as shown above.

Yasuyuki Tomita, Deputy Senior Manager (Chief Optical Designer) at a vacuum coating machine. Basically, a substance, often an exotic metal, is heated and vaporized in a vacuum chamber and the particles are deposited onto both surfaces of the optical elements.

Cleaning

Optical elements are checked under two kinds of light sources for cleanliness: a projector (parallel beams) and a table lamp (scattered light).

Lens Assembly



Hideki Tachibana, Manager of the Super-High Precision Lens Assembly Area.

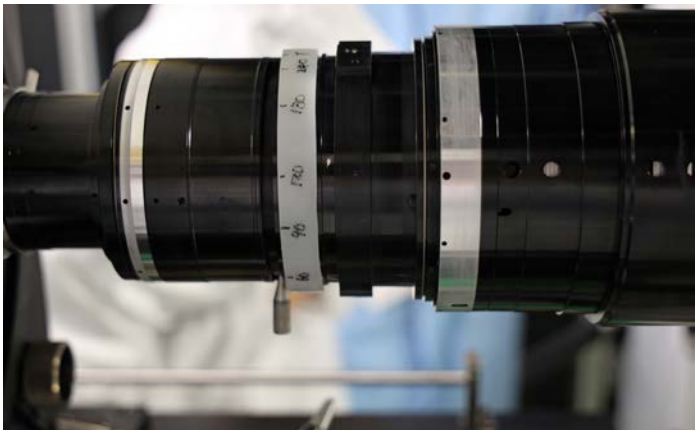
Mr. Hideki Tachibana is a section manager at Utsunomiya. Here, he is assembling a Canon 30-300mm cinema zoom lens. He explained, "Assembly is a very delicate process. We have Lens Meisters who are accredited to work at the highest level. All the team members in this department are Meisters. For example, here the 30-300mm zoom is in the process of its mid stage assembly. One person will do the whole assembly. This is the mechanical zoom section. The barrel is checked to be sure the zoom sections travel smoothly without any rough spots. Next comes optical assembly and adjustment."

Optical Assembly

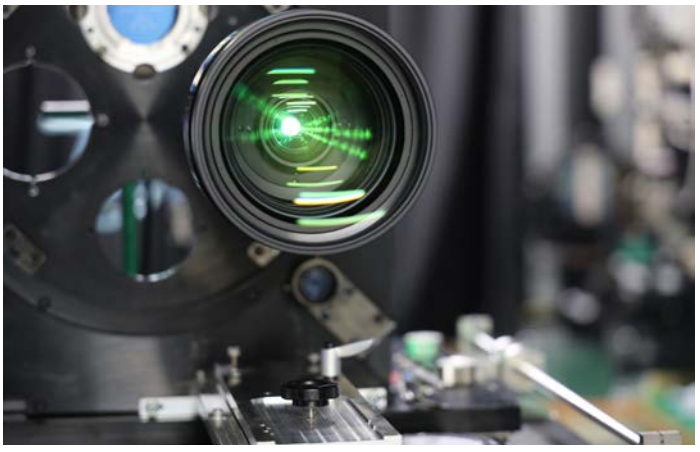
Assembling the optical elements inside the lens barrel.

Optical assembly involves mounting the lens modules inside the barrel. All the lens rings are pre-engraved: focus, iris and zoom. The infinity position is set, and all the other marks "fall into place." This is different from other companies who calibrate each lens individually or who have an assortment of barrels from which to choose. At Canon, the barrels are all the same, and any adjustments are performed accordingly.

The lens is checked on the lens test projector several times (below) and fine-tuned as needed. Adjustments include center axis, contrast, peripheral blur, etc. Aperture and T-stop settings are checked at another station. Torque of the barrels is also checked.



Testing



Testing on the lens projector. Turret with multiple reticles and lens mounts.

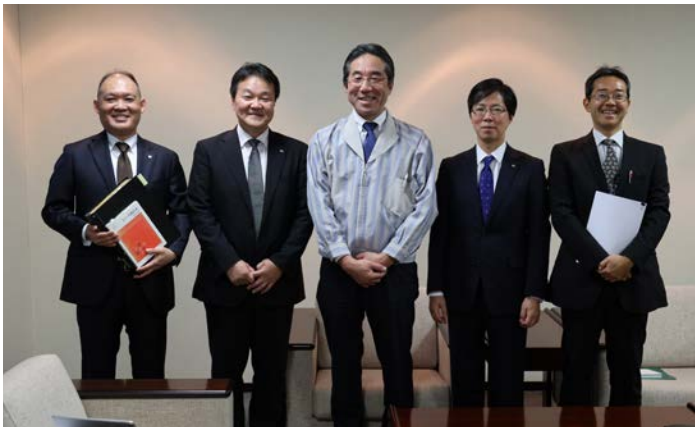
Shot with Canon EOS R and RF 24-105mm F4 L IS USM at 102,400 ISO.

Ready

Completed Sumire Primes

Over Bento Box lunch and long into the afternoon, executives and engineers at Canon's Utsunomiya Lens Plant were generous with their time and knowledge to discuss optics, lens design, look, technology, art and Sumire Primes.

Cast of Characters in the discussion that follows:
Lawrence J. Thorpe, Canon Senior Fellow (in pink shirt, above);
Yotaro (Jay) Sanjo (to the right of Larry Thorpe),
Product Manager, Cine lenses, Canon U.S.A., Inc.



Ryuji Nurishi, General Manager, Optical Design Division (above, L to R);
Kazumasa Yoshikawa, Senior General Manager, Image Solutions Business Promotion Center 21;
Tetsushi Hibi (center—the boss), Senior General Manager, Canon Optics R&D Center;
Yasuyuki Tomita, Deputy Senior General Manager (Chief Optical Designer), Canon Optics R&D Center;
Takeshi Idemura, General Manager, Mechanical Design Division.

JON FAUER: A physicist said that lens design is like searching for the solution to a problem where you don't even know if there is a solution. Would you agree or say it differently?

RYUJI NURISHI: It's a very philosophical question. There are some aspects that I don't quite agree with, if I may elaborate. As an optical designer, when you join Canon, you are given a book. We call it the bible. It is called "Lens Design Method: How To Design Lenses." When I read this book, I learned that any question you might have about lens design always has a solution. But having said that, this bible basically explains that there are different ways to address each problem. In other words, different approaches would require different questions and would end up with different outcomes. So, as an optical designer, I can understand the question. But for us, at Canon, we work under the assumption that there is a solution.

YASUYUKI TOMITA: Another way to put it is that there is usually an answer to a problem. But for me, optical design is almost like painting a picture. There's no right answer. There's no right way. Different people take different approaches as to how they might interpret a subject and how they would express themselves in creating a painting.

There are different ways to approach lens design. Certainly, if you translate it to the cine lens industry, it's about the different philosophies of the various companies. Different people have different ways of designing and creating.

JON FAUER: Would you say that lens design is more an art or more a science?

YASUYUKI TOMITA: My personal opinion, if I may? I think half and half. Half art. Half science.

RYUJI NURISHI: Both are essential: art and science in lens design. I think it's really about pursuing a level in the design and also the "Monodzukuri" (the way of making things) that can take it to a higher level. That involves the aspects of science.

It is half art, half science. Both are essential in lens design as well as "Monodzukuri," the way of making things.

High technology is required but there's also a great degree of craft, art and artisanship. It's about the nuances, the instincts that people have, and combining all those things together. You have the latest technology but are always pursuing an ideal level, if you will. So, I think that's why both sides are important.

YASUYUKI TOMITA: I said half and half because even when you try to pursue one aspect of lens design, for example the artistic side, if the DP can't interpret that possibility and use it to the maximum, then it will be useless. I think the same can be said for the technology side, the science side. Even if we pursue the best technology in a lens, if the person who uses it, the DP for example, does not appreciate it and cannot bring out the best in it, then our efforts will be meaningless. So, that's why you have to have a good balance of both.

TAKESHI IDEMURA: I think each of the elements are part of the the optical and the mechanical science. But each element, when combined, contributes to where the art comes in. How you combine them, how you bring out the best performance—are both essential. I think that truly defines the concept of our company, of Canon, and what the company stands for.

JON FAUER: Where does the idea for a new lens come from? Does it come from you and the fact that you want to introduce something? Does it come from input from the market? Does it come from the customers?

KAZUMASA YOSHIKAWA: The concept originates with the cinematographers and what they look for in their visual expressions. I don't think any single lens can satisfy all their demands.


Yasuyuki Tomita, Deputy Senior General Manager (Chief Optical Designer).


Kazumasa Yoshikawa, Senior General Manager.

Because it comes down to the discussion we were having earlier about the look. It's about what look are you seeking in a particular project. We speak to a lot of cinematographers from the US, Europe and Japan to understand what they're looking for. From those requests, we will listen and determine the requirements to create a new lens.

At the same time, ideas are always brewing inside Canon. We call them the three "C's." Canon, Concept, Create. We feed all those ideas into the mix and create the final product.

JON FAUER: How much design comes from customer requests?

TETSUSHI HIBI: It depends on the product. Some of the ideas come from the "C's," internally. The Sumire Prime cinema lens that you saw today came about because we are at NAB every year. We talked to the DPs, listened to what they were asking for, and learned about the look they were looking for. And so, we created these new Sumire Primes.

JON FAUER: But is it true that if you talk to 20 DPs, you'll get 20 different opinions? How do you balance that?

TETSUSHI HIBI: We give it to Larry Thorpe to decide [laughs].

LARRY THORPE: I would suggest that you do get 20 different answers but you can find common threads. Each cinematographer uses a different vocabulary. One will talk about the personality of a lens. Another will say another word and you try to whittle that down. And then it sometimes becomes clear that they are really talking about the same thing.

JON FAUER: Isn't it somewhat like a horse whisperer. You're the lens whisperer who translates DP speak into lens design terminology. Who does that?

RYUJI NURISHI: Mr. Jay Sanjo! Sanjo-san formerly worked for me so he can do the translations very nicely. He knows how to interpret the languages of the DPs into terms that we can understand.

JAY SANJO: I conduct lens projection tests with the Rental Houses. Also, I spend time on sets and locations with Cinematographers and Camera Crews to see the actual production situations. Then, I translate their technical or artistic words and try to summarize what kind of lenses the Cinema Market desires. That's my job.

JON FAUER: Does someone do "DP translations" here in Japan and others get feedback in Europe, the Americas and elsewhere?

TESTSUSHI HIBI: We have team members in Europe as well as in Japan who speak to the customers, to the users, to really understand what they're looking for. That information gets fed to us along with the business and development teams. Together, we have discussions to see how viable that information is and based on that, we decide what sort of lens we should be creating and then the plan comes together.

JON FAUER: Were the new Sumire Primes a result of your hearing comments from DPs?

YOSHIKAWA KAZUMASA: Yes, both Larry-san and Sanjo-san interpreted a lot of information for us. Also, I was in the US in July of last year. We spoke to a lot of DPs. Nuri-san also went to Europe last year in March. We based our designs on all that information.

JON FAUER: And what did DPs tell you that they wanted in these lenses?

RYUJI NURISHI: Creamy. Organic. Pleasing skin tones. But sharp for the eyelashes and hair. Gentle focus fall-off. Beautiful bokeh.

JON FAUER: What does it mean to a lens designer when a DP says, "I would like a vintage, old-fashioned look?"

RYUJI NURISHI: As optical designers, we always try to pursue the finest, the best and sharpest. Talking about a vintage look is a different concept. The notion of "vintage" would vary depending on the individual speaking, because we all have different interpretations of what that means. 20 DPs will have 20 different definitions of "vintage."

In the days when we used film, DPs would normally say, "If I use this film and this lens, this is the kind of look that I will get" and they had an idea of what kind of lens to use. But in this digital age, any lens would probably give you a certain level of look. And therein lies the problem. Depending on the person who is actually doing the shooting, what they're looking for in expression varies because of what they want to create. The picture varies. So, as a lens maker, we were always providing lenses that possessed the finest line pair resolution—the finite, if you will. That is what we were actually creating and putting on the market.

But depending on what brush you use, and I'm talking about

Ryuji Nurishi with the Canon Optical Design Bible: "Lens Design Method: How To Design Lenses."

Takeshi Idemura with historic blueprints of early Canon designs.

the finite, how thick is it, how big? The brush, the lens, actually changes the expression of the art and that's what the DPs are looking for: different types of expression, depending on the paintbrush that they would use.

The Sumire Prime that you saw here was designed for the purpose of creating the best way to represent, to film, a human being. That's the paint brush. The Sumire is for the human face.

JON FAUER: A set of lenses specializing in portraits is very interesting. So, if a DP asks you, "I want a lens that's sharp for the hair but creamy for the face," how do you translate that into optical formulas?

RYUJI NURISHI: To create that look, imagine creating creamy skin tones with sharp eyelash detail in all seven focal lengths that we will be launching. That's the art and science of what Canon does. The know-how.

JON FAUER: The secret sauce. In designing lenses, do you also go to the movies, take pictures, go to art museums? Does that influence you visually?

TAKESHI IDEMURA: Originally, taking family photos and pictures of children had a big influence on our work. But when we started designing the Cinema EOS lenses around 2011, I think we began to see movies differently. I see a lot more films. That changed my way of thinking.

YASUYUKI TOMITA

My parents were avid still photographers. They liked cameras to begin with, so I grew up with cameras in the house.

JON FAUER: Hopefully, Canon cameras.

YASUYUKI TOMITA: From junior high school, I started taking pictures myself. Photography was a part of my life. The reason I studied physics in university was because I wanted to learn about optical design. In other words, I always wanted to be an optical designer. I love going to art museums and I really liked your articles about Renoir. It was inspiring.

JON FAUER: Oh, thank you. The new Sumire Prime lenses seem to be different from any Canon cine lens I've seen before. Can you please tell us how and why you achieved that?

RYUJI NURISHI: I guess the greatest feature is the different approach to sharpness and contrast that we have achieved in these lenses. But it was a long road coming to these decisions and building the first prototypes. It actually takes us back 15 years ago when there was a demand for greater sharpness and contrast. This was in the early days of digital, before HD cameras, when we developed the FJ series of lenses. They had great sharpness, high resolution and high contrast. And no aberrations. But everybody hated them.

JON FAUER: Why?

RYUJI NURISHI: Because you had just one point of focus. The out of focus areas just dropped off. It was not smooth. And the color was too blue. It was not just because of the lens, but also the projector. TV was 30 frames per second and film projection was 24 fps. But when we saw the actual film being projected, it wasn't natural. That's when we realized there are different requirements for film and TV. In a cinema, people watch a large screen in a really dark place. Their ways of absorbing and interpreting information are different than viewing something in daylight. In a dark place, you interpret blue as a darker blue and don't interpret red as strongly as you would in the daylight. It is called the Purkinje effect.

When we interpret this technically, it's about the need for a warmer color balance when viewing the image in a dark place. When we started to think about what kind of lens is required in a cinema setting, that is why our EF cinema lenses have a warm color balance. That's uniquely different from our standard EF still photography lenses. Our still lenses are more neutral than cinema lenses.

JON FAUER: What happens when we are viewing a movie on a small tablet?

RYUJI NURISHI: Normally, people use their tablets in a brighter place. And you might think that you'd want a more neutral balance. But there is a certain cinematic color balance that we've become accustomed to over many years of watching films. This is the kind of color balance we expect to see in a film. It might feel more cinematic even when you watch it in the different formats or screens.

JON FAUER: When you had the idea that DPs would like something with a little more character, a little smoother, what was the next step?

TETSUSHI HIBI: We started with an overview of the project plan. We defined what kind of performance we needed to look

for, the texture, the size of the lens, the material and the cost. All those things were defined up front. Once we had that, we formed a development team consisting of all the departments that would be required. The optical people started on the design first. Then the mechanical team and the styling teams joined in.

Normally, we would go straight to the prototyping. But because the simulation technology is now quite advanced, it allows us to do the simulations before we get into to the actual creation of the prototype. We can assess what changes are required on the optical and mechanical side of things. Then we can go into the final prototype development.

JON FAUER: What simulations can you do?

RYUJI NURISHI: We can simulate ghosting, MTF, bokeh and flares. But in terms of actual skin tones and sharpness of the hair, we need to have the DPs look at our tests and discuss their impressions. In terms of being able to simulate bokeh, I would say that we might be quite advanced in that field compared to the rest of the industry. Our optical simulation software is not bought off the shelf. We actually design the optical simulation software ourselves. For example, our ghosting simulations compare very favorably to real lens tests. We also can simulate the lens being dropped.

JON FAUER: Your new Sumire Primes appear to be smaller than some other cine lenses. Is this a function of the design or did you decide in the beginning that it would have to be small?

RYUJI NURISHI: It is thanks to the Canon Lens Design Method book. That taught me. [Laugh.]

JON FAUER: It's in the book.

RYUJI NURISHI: We also keep the blueprints and archives of all our previous lenses. Some of these archives go back many years. And that's why we can always build upon this history. But we all started from this bible. And that spirit remains in us. You could buy it at a bookstore.

It was the first book that was published about systematically designing, understanding and correcting optical aberrations. A great thing is at the very end: it tells you how to work. It even explains how to officially draft a blueprint. In some ways, it can be a message for any kind of work. It's very philosophical in that regard.

JON FAUER: After you have the prototype, do you shoot real images and study them?

TAKESHI IDEMURA: We also have a team dedicated to the assessment and inspection of the prototypes. We work with them.

JON FAUER: Who decides what the bokeh should look like or is there a section in the Canon book that describes that bokeh should look a certain way?

TAKESHI IDEMURA: Basically, during the design stage, we have a certain style of bokeh that we want to have. But during the simulation stage, we look at what kind of bokeh we can achieve. The assessment team comes in afterwards and checks whether we've accomplished that or not. But, even before prototyping, during the simulation stage, we have the bosses come in to assess and say, "This is a good bokeh. This is not a good one." They have their sign off on it.

L-R: Toshio Saito; Mitsuharu Umei, Hideki Tachibana, Kenichi Izuki.
Toshio Saito, Meishō;
Mitsuharu Umei, Lens Meister;
Hideki Tachibana, Manager of Super-High Precision Lens Assembly Area;
Kenichi Izuki, Utsunomiya Plant Manger

At this point, the craftsmen who put Canon lenses together discussed their work. The designers listened and sometimes chimed in.

JON FAUER: Please explain the process of manufacturing a cine lens at the Canon Utsunomiya Factory.

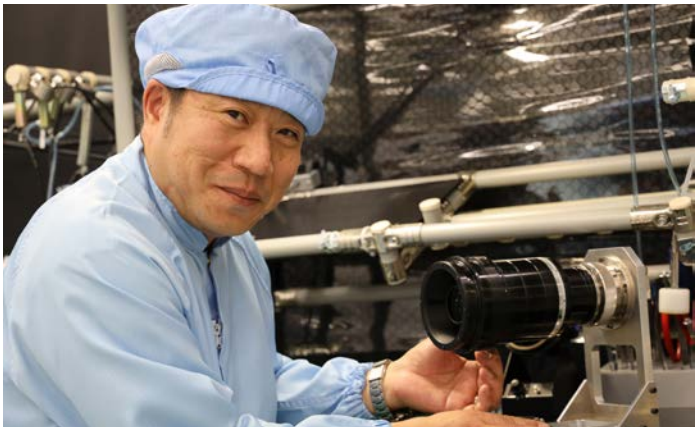
TOSHIO SAITO: We begin by purchasing the actual glass elements to start the process. After that, we go through the various stages: grinding, smoothing, centering, and polishing. Next, there's the inspection stage to make sure that we have the quality that we're looking for and once that's confirmed, we take it to the coating area. Then we do the blacking around the edges and clean the optical elements. We then put the glass elements into the mechanical, metal barrels. We use aluminum, magnesium and other materials for the housings and exterior part of the lens.

JON FAUER: How do you craft a lens barrel?

KENICHI IZUKI: Often, three or four machines are involved. We first wash the parts that we have machined. Usually it's aluminum, magnesium or other materials. Let's say we're using aluminum material this time. We would use Allumite which hardens and blackens on the outside. After that, we go through a painting stage.

HIDEKI TACHIBANA: Once we have all the parts that are created out of metal, they are delivered to our assembly section. They are delivered as units, or modules: so we have the zoom units, focus units, and we would do that assembling separately. This unit assembling stage is not a simple matter of just putting the parts together. It's about making sure all the parts function properly to the point that we can see that precision of the final product. So, we would have inspections for each step along the way. Then we create what's called a lens unit. So, in a zoom lens, we have the focus group, the variator group, the compensator group and the rear group.

We also have inspection stages for the lens assembly as well. There are specifications stated for each of the steps. Next the optical groups are docked into the mechanical lens barrel. At this point, once again, we have inspection, centering, axis correction, and so on. Next, we do the additional optical adjustments, do the final MTF inspection and QC the entire final product.



Hideki Tachibana, Manager of Super-High Precision Lens Assembly

Kenji Namiki, Director of Pro Product Business Planning, Canon USA.

JON FAUER: Which has been the most difficult cine lens to build?

HIDEKI TACHIBANA: The Canon CINE-SERVO 50-1000mm T5.0-8.9 EF 20x zoom lens..

JON FAUER: Why is it so difficult?

HIDEKI TACHIBANA: Because of the 20 times zoom ratio, all the parts have to work properly and adjust together to make sure that we can actually have the smooth zoom movement. The complexity is in assembling those parts.

JON FAUER: About how long does it take to build, from start to finish, for example, the 30-300mm zoom that we saw today?

KENICHI IZUKI: Without being too specific, about a month, including the machining of the metal parts. The actual assembly that we saw in the assembly room takes approximately 10 days.

JON FAUER: And one Lens Meister does the whole thing?

HIDEKI TACHIBANA: A Lens Meister can do the entire process, but they also train other people to make sure that they can do the assembling themselves as well. In other words, a number of people work on one lens together. It's a process developed in Japan called "Just in time" or cell-based production.

We create all the parts required and they are delivered directly to the assembly section. All the things you need are in a big wagon. Somebody rolls the wagon in with all the parts. And that's where they start to do the work. The process for cine lenses is different than for consumer lenses. That is a mass production system.

JON FAUER: What happens during the manufacturing process of a cine lens if a Lens Meister or member of the assembly team has an idea on improving the way something is done? For example, what if they think that by moving a screw, it would be a lot easier to build the lens?

KENICHI IZUKI: We actually have this thing called the "Kaizen Process," "Improvement Process." If an idea comes up, there is a form that you can fill and that gets sent to his or her senior and they can discuss it with the sections or divisions to see whether it can be adoped or not. So, there's a whole process in place.

JON FAUER: Does that happen often?

KENICHI IZUKI: Every day.

JON FAUER: Do you have a goal of how many lenses you hope to build in a given time and whether that is achieved?

KENICHI IZUKI: Yes. We have a strict production plan that outlines how many units we are going to create in a month.

JON FAUER: Please take us through the process again of how the lens is tested, adjusted, and then finally inspected?

HIDEKI TACHIBANA: There are many lens elements that we work with. When we build lenses, there are unique specifications to each group. In other words, how they work best together is what we actually first assess. Another adjustment we will do is the spacing between the elements—the air gap—to make sure that we have the correct distance between them.

JON FAUER: We talked about this earlier, but how is it that Canon is so precise, there's not that much adjustment to be done for focus and distance?

HIDEKI TACHIBANA: Initially we weren't that different from others. In other words, we did take a lot of time at that final stage of readjustment. But, realizing that we should shorten the time of actually doing those adjustments, we analyzed the process to make sure we could achieve the level precision required to save us time at the final stages of the assembly. These are improvements we have made over the years.

LARRY THORPE: It was an evolution.

KENICHI IZUKI: We did have a phase where we assembled, disassembled, assembled again, and it took much longer. Now we can do it faster and deliver more lenses on time.

JON FAUER: I noticed that a lot of your zooms have cams. And the prime lenses have helical threads. How do you decide which system to use?

YASUYUKI TOMITA: We choose to use a helical design when the travel is linear, and we use cams when it is non-linear. For example, to maintain equal distance between markings of T-Stops we use a cam because the iris is non-linear.

LARRY THORPE: I've always been puzzled that we publish the resolution of our still photography EF lenses—meridional, tangential and, sagittal. We've never published anything like that for cine lens. Nobody does, no manufacturer. But do we measure sagittal and meridional in the adjustment of the cine lenses?

YASUYUKI TOMITA: We do the measurements in-house, certainly. But that knowledge is not even shared within Canon. It's

just for the limited number of people who are part of the design teams. My take is that for consumer lenses, many users will do their own measurements anyway. By publishing the numbers, we say that we can guarantee these numbers. But with cinema lenses, those numbers are not made public.

LARRY THORPE: Interesting.

JON FAUER: Let's say you have built the prototype of a lens. Does manufacturing have input whether it's practical to build that prototype in a certain way? And who decides how to build the actual lens?

YASUYUKI TOMITA: Yes, we have a number of discussions where the manufacturing teams will come in for meetings with the designers to sit down and discuss the best way, the direction in terms of the process.

JON FAUER: Do you have a test manufacturing area where you figure out how to manufacture it?

YASUYUKI TOMITA: Yes, we have a facility dedicated to creating test runs.

JON FAUER: Do some of your cine lenses use aspheric elements? I assume those are polished here using sophisticated Magnetorheological Finishing (MRF) machines. Where and how is that done?

YASUYUKI TOMITA: We finish the aspherical lens elements here, but we actually use our own in-house machines that are unique to Canon.

LARRY THORPE: To summarize the process, the picture I have in my head is: create the design and then make a prototype. Do the design engineers make the prototype?

YASUYUKI TOMITA

There's a specialist team of designers dedicated to the process of making the prototypes.

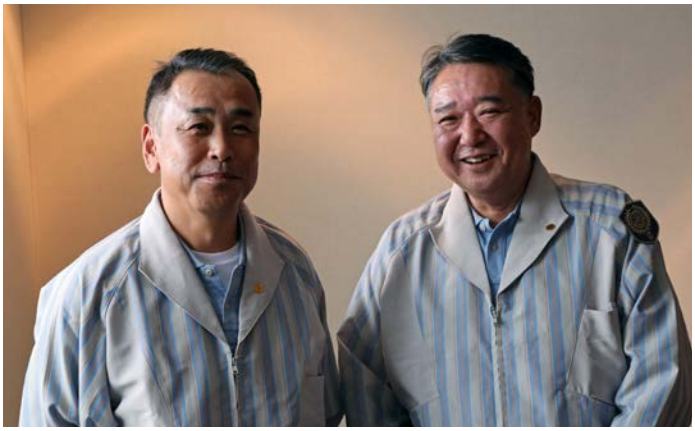
LARRY THORPE: And then, the next step is to discuss how the prototype is working and engage manufacturing about the process of building it. Step one is design, step two is prototype, step three is manufacturing.

YASUYUKI TOMITA: Actually, the manufacturing team gets involved from stage one, in the design phase. And throughout the process, all the teams are involved and provide input.

LARRY THORPE: The reason I asked the question was maybe one or two years ago, I read an interview with the manager of the design team for the Canon 50-1000 zoom. He explained that because they were pushing the state of the art in design to make this incredible 20x zoom, there was intense discussion between the manufacturing and the design teams. I just wondered if that is the way it is with all lenses and I think I hear yes.

YASUYUKI TOMITA: The manufacturing team always has their requests about what seems appropriate, but at the same time the designers will also have their own requests. The discussions usually revolved around things that did not exist before, things that used to be impossible. The questions are, "Can you actually create this? Can you actually build this?" They would have the request and then there's the challenge that the manufacturer will get and we'll try to respond to it.

Canon Lens Meishō & Meister



L-R: Toshio Saito (Meishō) and Mitsuharu Umei (Lens Meister).

JON FAUER: Because we have the privilege of talking with the two Meisters here in the room today, may I ask some additional questions?

KENJI NAMIKI: I think it would be of beneficial for all of us because at Canon it's very important that we pass along the expertise and technique from our Meisters and ensure it continues to be taught to [future] team members.

JON FAUER: Please tell us what is a "Meister" and how do you become a "Meister?"

TOSHIO SAITO: To give you a bit of my background, since joining Canon I've been involved in all sorts of lens polishing and finishing. I've had many challenges across my desk asking, "Can you create a lens to this precision?" And I've been able to respond to that. Through those years of challenges and development, the contributions I've made thankfully were acknowledged and accredited with this title of Meister (Japanese: "Meishō").

Not so much these days, but in the past I've had days where I would stay here until midnight because the polishing was just so impossible and I had this challenge in front of me, but I had to tackle it and I would spend hours and hours until I could get it to the right polishing stage.

It's about texture, instinct, what you feel when you actually touch and get the sense of the glass.

JON FAUER: It's stressful?

TOSHIO SAITO: It comes down to whether you like the job and I love it. I have a passion for polishing lenses. There is a great sense of achievement that I get when I actually achieve that level of precision and hear comments like, "Oh, you know Saito-san's lens? This is the precision I wanted. This is what we were looking for. Thank you." Those comments have motivated me over the years.

JON FAUER: How did you start? How did you learn?

TOSHIO SAITO: From the day when I joined Canon, I was in the grinding and polishing section. But, back then, my seniors, the people who were supposed to teach me, didn't have so many words to say. So, I had to learn what they were doing by watching

their technique—to learn by observing rather than by being told what to do. I spent many years doing that.

JON FAUER: And Mr. Umei?

MITSUHARU UMEI: I was actually an apprentice to Saito Meishō, and still work under his guidance. Since joining the lens department, I also learned from my seniors and tried to follow their instructions to the letter to make sure that I got the point. I tried to replicate what I was being told. I spent many years doing that and after 10 years, it came to a point where I developed my own skills. I then got involved in the mass production side. In other words, when a prototype came in, I would do the assessment to make sure that we could manufacture it to the level that was required for this prototype to go into mass production.

That's how I moved up in my divisions. Obviously difficult lenses would come in and I would have those challenges I would tackle. I've actually been accredited as a lens polishing Meister, but I actually oversee the entire four processes that we talked about earlier. But being Saito-san's apprentice, I'm literally learning from him as to what we need to be looking for, the standards that are required. He's old-school as well. He doesn't speak much. But the words he does say and the things that he tells me, I follow to the letter. Also, I have to continue to learn to make sure that I can achieve the various goals.

It's about texture, it's about instinct, it's about what you feel when you actually touch and get the sense of the glass. I'm trying to develop that within myself to the level of Saito-san, and I'm still learning.

JON FAUER: Who decides if somebody is a Meister? Is there a school or a test?

MITSUHARU UMEI: First of all, there's a national accreditation process that you have to satisfy.

That's the first stage of becoming a Meister.

Once you have this national accreditation, a license so to speak, there is a committee inside Canon. There's a company-wide committee that assesses you for a whole year. They watch what you can do and to what degree. They have discussions to make sure, and finally after that year, if you are worthy, you receive the title of a Meister.

JON FAUER: How many years did it take to become a Meister?

MITSUHARU UMEI: Too long to remember [laughs]. It's not the actual number of years that deem you qualified to become a Meister. For Saito-san, it took about 20 years. For me as well. But, you know, even though people may spend 20 years, you still need to have that instinct. You need to have the touch.

JON FAUER: True artisans. It's interesting that the word "Meister" is German. There seem to be a number of German words in the Japanese language, like "arubaito" from "Arbeit" which now means part-time job, or "Messe" for the convention hall we will be visiting tomorrow in Makuhari.

LARRY THORPE: I have another question. If the design team conjures up a new aspheric, do you gentlemen have to work out how to build it? Do you work out the polishing that can implement that new shape?

TOSHIO SAITO: When the design team comes up with the blueprint of a new aspherical lens, for example, they will first give it to me and the first assessment is whether it's possible or impossible, but I personally don't like to say it's not possible.

LARRY THORPE: You can try.

MITSUHARU UMEI: But, when you bring the blueprint for a high-end lens to Saito-san, you will get the lens that you designed. He's actually involved in creating special devices to do the grinding and the polishing.

JON FAUER: It's interesting that your jobs are somewhat similar to being a cinematographer. Many of us also learned as apprentices and the people who taught us didn't talk very much. You had to watch and it also could take 10 to 20 years until you were recognized. The two jobs seem similar.

KENICHI IZUKI: In the lens processing department, there are several hundred people working there, but you're seeing number one and number two in this room. In other words, not everybody can rise to this level. You have to have that instinct. You have to have that craftsmanship, that artisanship in order to achieve this degree of perfection.

JON FAUER: Bravo.

Full Frame 50mm T1.3 and 35mm T1.5 Sumire Primes on Canon EOS C700 FF PL.

Fugu in Utsunomiya

Was this an ultimate test of our NDA, as Sanjo-san jokingly suggested? After all, I had sworn secrecy about Sumire, surrendered the SD card with all my EOS R photos, and relinquished final cut on all interviews. It was dinner time. We entered Asuka restaurant in Utsunomiya. There was a large pool by the entrance. Scarily swimming inside were Japanese Fugu, the notorious blowfish. I half-expected to hear Hibi-san imitate Ernst Stavro Blofeld, shark tank villain of the *Bond* films, with, "Good evening, Mr. Fauer."

Dining With Death—Fugu, the ominous article by Carey Jones, came to mind: "There may be no more notorious dish in the world than the Japanese Fugu, and for good reason. Their skin and organs carry an extremely potent poison called tetrodotoxin, a neurotoxin fatal to humans and other predators at very low doses. And if prepared improperly, yes, it can kill you. Fugu poisoning isn't a pleasant way to go. One thousand times more potent than cyanide, the lips and tongue grow numb first, followed by full-body weakness, seizures, and coma."

Fear was quickly dispelled over the assurances that they hadn't lost a customer yet and bottomless glasses of Junmai Daiginjo (I think it was Dassai 23.) Hibi-san explained that enjoying Fugu was common in Japan and you are at greater risk eating raw oysters in Los Angeles. Fugu chefs undergo years of training and must pass rigorous exams. I think becoming a Lens Meister might be tougher.

The Fugu was served over ice as paper-thin sashimi. It was almost transparent. The delicate, slightly sweet flavor was enhanced with shredded cucumber, wasabi and dipping sauces. Was that a slight tingling on my tongue, a numbness of the lips? No. It was delicious. The NDA endured and I would survive to write this article.
Tabelog details on Asuka Restaurant: tiny.cc/asuka

Sumire Primes and Prime Burgers at Flora Bar

A couple of months after the Utsunomiya visit and Fugu adventure, in early March 2019, Canon's Yasuyuki Tomita (above), Jay Sanjo (below), Rob Luckett and Joe Poch came by with production models of Sumire Primes to test on a C700 FF and Canon EOS R fitted with a Wooden Camera RF to PL mount.

It was lunchtime. We packed cameras and lenses into backpacks to test them at T1.3 in the soft northwest light filtering through tall picture windows at Flora Bar a few blocks away in the Met Breuer Museum. Chef Ignacio Mattos presides. He was awarded America's Chef of the Year in 2017 by Esquire. The New York Times named Flora Bar one of the city's best new restaurants. Born in Uruguay, Mattos cooked for Argentinian grill meister Francis Mallmann. That's reason enough to focus on the amazing Wagyu beef burger with pepper marmalade and Taleggio. But first, start with the sea urchin and red shrimp resting on a single strip of nori. Share plates of Jamón Ibérico de Bellota and marinated olives. Mattos' style is to use beautiful, honest ingredients at their prime.

Primes—the new Sumire Primes from Canon—were beautiful and honest as well. Their style is something different: creating beautiful portraits, smooth skin tones, gentle focus fall-off and pleasing bokeh. The Utsunomiya teams who created them should be congratulated. Users of Sumire Primes will be very satisfied.

Both frames: 50mm Sumire Prime at T1.3

Blackmagic RAW

Blackmagic Camera 6.2 update eanbles Blackmagic RAW in the Blackmagic Pocket Cinema Camera 4K.

The Pocket Cinema Camera 4K has a Micro Four Thirds (MFT) size 18.96 x 10 mm sensor. The lens mount has a Flange Focal Depth of 19.25mm and its inside diameter is nominally 40.2 mm Ø.

Blackmagic RAW is a new codec that combines the quality and benefits of RAW with the ease of use, speed and file sizes of traditional video formats. File sizes are smaller, which means recording time is longer. You'll be able to record 2 hours of Blackmagic RAW in 4K on a single 256GB SD UHS-II card.

Blackmagic RAW has two types of file compression. You can choose constant quality or constant bitrate encoding.

Constant quality uses variable bitrate encoding so complex frames are managed at higher data rates to preserve detail and maintain the highest possible quality. Blackmagic RAW Q0 has minimum quantization and yields the highest quality. Blackmagic RAW Q5 uses moderate quantization for more efficient encoding and a smaller file size.

Constant bitrate encoding provides predictable and consistent file sizes. Blackmagic RAW 3:1, 5:1, 8:1 and 12:1 ratios are calculated by the unprocessed file size of a single frame from the camera's sensor.

Blackmagic RAW Q0 and 3:1 are excellent for effects-heavy features and commercials. Blackmagic RAW Q5 and 5:1 are suggested for episodic television and independent films. Blackmagic RAW 8:1 and 12:1, with the highest compression, are enticing for productions that wouldn't normally consider shooting RAW.

Typically, RAW codecs typically had large file sizes. Blackmagic RAW offers the same quality, bit depth, dynamic range and controls as RAW, but with better performance and smaller file sizes. Once files are brought into DaVinci Resolve, additional GPU and CPU acceleration make decoding of frames incredibly fast.

When Blackmagic RAW settings are changed in DaVinci Resolve, a .sidecar file can be generated or updated if one already exists. When opened in other software applications that support Blackmagic RAW, the .sidecar file, which contains the Blackmagic RAW settings made in DaVinci Resolve, will be automatically used to display the image. If the .sidecar file is removed, then the file will be displayed using the embedded metadata instead. This new workflow gives you a non-destructive way to change Blackmagic RAW settings while working between different applications.

Image data, along with the unique characteristics of the image sensor, are encoded and saved into the Blackmagic RAW file, which offers better image quality, even at higher compression settings, and control over ISO, white balance, exposure, contrast, saturation and more.

Blackmagic RAW is optimized for AVX, AVX2 and SSE4.1 enabled processors, works across multiple CPU cores and is GPU accelerated with support for Apple Metal, CUDA and OpenCL. Frame decoding and image processing is extremely fast, making it nimble for editing, color correction and visual effects in DaVinci Resolve. There's another big benefit: media is stored as single files, and not image sequences. This simplifies media management and file copying is much faster.

The free Blackmagic RAW Developer SDK is available on Mac OS, Windows and Linux. This SDK helps developers add support for Blackmagic RAW to third party software applications. Developers get access to GPU and CPU accelerated algorithms for decoding files, along with unique information about the camera's image sensor, so their applications can accurately decode and display the files. The SDK has highly descriptive and flexible metadata options. Metadata is embedded directly in the .braw file or it can be stored in a .sidecar file. Metadata is important because it contains the Blackmagic RAW settings along with information about lens focal length, iris, focus, slate, white balance and a lot more. Metadata in the .sidecar files can be used on top of the embedded metadata without overwriting it. Blackmagic RAW also supports frame-based metadata. This is important when focus is changing on a frame by frame basis, for example, as you dolly into a subject.

Grant Petty, Blackmagic Design CEO, summed it up: "Blackmagic RAW gives you the visually lossless image quality of RAW with the speed of traditional video workflows."

Blackmagic Camera 6.2 update is available now as a free download. www.blackmagicdesign.com/support

New Blackmagic URSA Mini Pro 4.6K G2 with Blackmagic RAW

The URSA Mini Pro 4.6K G2 (Generation Two) camera comes with new electronics, a new Super35 4.6K HDR image sensor, 15 stops of dynamic range, 300 fps high frame rate shooting, Blackmagic RAW and more.

Blackmagic Design's URSA Mini Pro 4.6K G2 is the second generation URSA Mini Pro camera with fully redesigned electronics and a new Super 35mm 4.6K image sensor. URSA Mini Pro 4.6K G2 supports Blackmagic RAW and has a new USB-C connector for direct recording to external disks.

The new URSA Mini Pro 4.6K G2 has many technological advancements over the original model. It has entirely new electronics for higher speed processing. The new Super35 4.6K image sensor captures up to 4608 x 2592 pixels with 15 stops of latitude at up to 3200 ISO. You can record full sensor 4.6K images at up to 120 fps, windowed 4K DCI up 150 fps, and windowed 1080 HD up to 300 fps. That makes URSA Mini Pro 4.6K G2 an excellent choice for slow motion stunts, documentaries, nature photography, sports and tabletop food commercials.

URSA Mini Pro 4.6K G2 can capture Blackmagic RAW images in both film and extended video modes. This will be appealing for high end feature films, television shows, commercials, and independent productions as well as broadcast news, studio and live multi camera shows.

URSA Mini Pro 4.6K G2 is extremely tough. Its compact magnesium alloy body is durable, light and exceptionally hand-holdable. There's a bright, backlit LCD status display on the camera left side for essential settings and information. The foldout touchscreen monitor lets you view the picture and menu settings without needing an extra on-set monitor. Professional connections abound: 12G-SDI, XLR audio, built-in high quality stereo microphones and more.

URSA Mini Pro 4.6K G2 has 3 internal optical IRND (neutral density) filters with a precision mechanism that quickly moves them into place when the ND filter dial is turned.

URSA Mini Pro 4.6K G2 has external control buttons, switches, knobs and dials for direct access to the most important camera settings. Every control is redundant. They are laid out in a logical order that makes them easy to remember. You can operate the camera without having to look at the buttons, hunt through menus, or take your eye off the action. URSA Mini Pro 4.6K G2 also has a high visibility status screen that displays important information such as timecode, shutter and lens settings, battery, recording status and audio levels. The status display has a backlight and is designed to be clearly visible in both dimly lit studios and outside in direct sunlight.

URSA Mini Pro 4.6K G2 comes standard with an interchangeable EF lens mount. The Canon style EF mount is easy to remove and swap with the optional PL mount. There' are also optional B4 and Nikon style F lens mounts. URSA Mini Pro 4.6K G2 also includes a standard 12 pin Hirose lens control connector.

The camera has dual C-Fast 2.0 and dual SD UHS-II card recording slots. You can choose the media that works best for your projects. C-Fast cards are ideal for full resolution Blackmagic RAW 12-bit recording, while UHS-II SD cards are inexpensive and commonly available, making them excellent choices for recording Blackmagic RAW 8:1 or 12:1 Ultra HD and standard HD files. With dual slots for each media type, the camera never has to stop recording. This is called relay recording: when the first card is full, recording automatically continues onto the next card. Full cards can be swapped for empty ones, all without stopping the camera.

URSA Mini Pro 4.6K G2 also includes a new high speed USB-C expansion port. You can plug in an SSD for external recording. That means you can record for even longer durations without stopping. Furthermore, you can record directly onto the same ex-

ternal disks that can be used for editing and color correction.

URSA Mini Pro 4.6K G2 includes the full version of DaVinci Resolve Studio software. It combines nonlinear video editing with DaVinci Resolve's world-famous advanced color correction along with seamless importing, finishing and delivering projects shot on URSA Mini Pro 4.6K G2.

DaVinci Resolve Studio works natively with Blackmagic RAW files from the camera, so you can bring them directly into post production without having to convert or transcode them. Quality is preserved because it is a truly lossless workflow. Using DaVinci Resolve Studio is currently the fastest and highest quality way to work with Blackmagic RAW files from URSA Mini Pro 4.6K G2.

"The original URSA Mini Pro has been an extremely successful and very popular camera," said Grant Petty, CEO of Blackmagic Design. "Blackmagic URSA Mini Pro 4.6K G2 is exciting because it gives customers second generation electronics and an even higher performance image sensor so they can shoot at extremely high frame rates for crystal clear slow motion images. URSA Mini Pro 4.6K G2 is powerful enough to be used on high end feature films and television shows, versatile enough to be used for broadcast news and live multi camera event production, and affordable enough for indie filmmakers and even students. It's like getting 3 cameras in one."

URSA Mini Pro 4.6K G2 is available now for $5,995 from Blackmagic Design resellers worldwide.

Blackmagic URSA Mini Pro 4.6K G2 Key Features

- 15 stops of dynamic range.
- Super 35mm 4.6K sensor
- Supports project frame rates up to 60 fps.
- Slow motion recording up to 120 fps in 4.6K, 150 fps in 4K DCI and 300 fps in HD Blackmagic RAW.
- Interchangeable lens mount with EF mount included as standard. Optional PL, B4 and F lens mounts available separately.
- Internal ND.6, ND1.2 and ND1.8 (2, 4 and 6 stops) IRND Neutral Density filters.
- Fully redundant controls including external controls that allow direct access to the most important camera settings such as external power switch, ND filter wheel, ISO, shutter, white balance, record button, audio gain controls, lens and transport control, high frame rate button and more.
- Built-in dual CFast 2.0 card slots and dual SD/UHS-II card slots allow unlimited duration recording.
- High speed USB-C connection for recording directly to an external SSD or flash disk.
- Lightweight and durable magnesium alloy body.

Blackmagic URSA Mini Pro 4.6K G2, cont'd


PL Mount


EF Mount


F Mount


Shim Kit


B4 Mount

- LCD status display to check frame rate, shutter angle, ISO White Balance, Lens Aperture (on enabled lenses), timecode, battery, recording status, and audio levels.
- Support for Blackmagic RAW files in Constant Bitrate 3:1, 5:1, 8:1 and 12:1
- or Constant Quality Q0 and Q5
- as well as ProRes 4444 XQ, ProRes 4444, ProRes 422 HQ, ProRes 422, ProRes 422 LT, ProRes 422 Proxy recording at 4.6K, 4K, Ultra HD and HD resolutions.
- Supports recording up to 300 fps in HD, 150 fps in 4K DCI, and 120 fps at full frame 4.6K.
- All standard connectors, including dual XLR mic/line audio inputs with phantom power, 12G-SDI output for monitoring with camera status graphic overlay, and separate XLR 4 pin power output for viewfinder power, headphone jack, LANC remote control and standard 4 pin 12V DC power connection.
- Built-in high quality stereo microphones.
- 4-inch foldout touchscreen for monitoring and menu settings.
- Includes full copy of DaVinci Resolve Studio color grading and editing software.

Blackmagic URSA Mini Accessories

The Blackmagic URSA Mini Pro 4.6K G2 is compatible with the full range of URSA Mini accessories available from Blackmagic Design resellers worldwide:

- Blackmagic URSA Mini Pro PL, B4 and F lens mounts each sold separately.
- Additional Blackmagic URSA Mini Pro EF lens mounts also sold separately.
- Blackmagic URSA Mini Shoulder Kit has built in rosettes, rail mounts, viewfinder mount, integrated tripod quick lock release and top handle.
- Blackmagic URSA Viewfinder is a high resolution viewfinder that includes a full HD OLED display and glass optical elements to assure clear focus checking.
- Blackmagic URSA Studio Viewfinder has a 7" screen, variable tension mounting points, grab handles, external controls and more.
- URSA V-Lock Battery Plate provides a V-Lock compatible plate for attaching third party batteries.

AVAILABILITY AND PRICE

URSA Mini Pro 4.6K G2 is available now from Blackmagic Design resellers worldwide for US$5,995.

Also available from resellers are the optional URSA Mini Pro PL lens mount for US$245, optional F lens mount for US$375 as well as the optional URSA Mini Pro B4 HD lens mount for US$385.

URSA Mini Pro comes standard with an EF lens mount, and additional replacement mounts can also be purchased for US$175.

blackmagicdesign.com/products/blackmagicursaminipro

LEITZ PRIME Debut

Four LEITZ PRIME lenses at left and four Summilux-C primes at right.

In 1914, Oskar Barnack built a prototype "Lilliput Camera." In 1925, his camera went into production. It was called "Leica" ("Leitz+Camera.") The lenses retained the name "Leitz," "Leitz Wetzlar" or "Ernst Leitz Wetzlar."

Barnack's Leica I camera originally used 35mm motion picture film turned sideways 90 degrees. Whereas motion picture cameras had 18x24mm film gates, the Leica's image area was 1.5 times larger—24x36mm—providing greater resolution, less grain and a pleasingly shallower depth of field. This image size was called the Leica Format and it became a worldwide standard that has endured to this day. Leica Format is now known in cinema as Full Frame, VistaVision, VV, Large Format and LF.

June 2018: Leica Camera's cine lens sister company C.W. Sonderoptic is renamed "Ernst Leitz Wetzlar GmbH." September 2018: Leica Format cine lenses are presented by Leitz inside an untouchable glass case at IBC. February 2019: Four pre-production lenses are in the CVP Booth at BSC Expo in London. The name: LEITZ PRIME. (All Caps. Singular for one and collective noun for the set.)

Initially, the LEITZ PRIME set consists of 12 lenses from 18mm to 180mm, all T1.8. They all have 114mm front diameters. (Most Super35 Format Summilux-C lenses have 95mm front diameters.) Conventional wisdom was that Full Frame lenses would be twice as large as their Super35 counterparts to achieve the same performance. The designers at Leitz proved otherwise, as we shall learn in the following pages.

LEITZ PRIME

Focal Length (mm)	18	21	25	29	35	40	50	65	75	100	135	180
Maximum Aperture	T1.8											
Image Circle	Leica Format / Full Frame / VV / 46.5mm											
Close Focus (ft)	1'2"	1'10"	1'10"	1'2"	1'6"	1'2"	1'7"	2'2"	2'6"	3'3"	3'11"	4'11"
Close Focus (m)	0.35	0.55	0.55	0.35	0.45	0.35	0.47	0.65	0.75	1	1.2	1.5
Horizontal angle of view: Full Frame 36 x 24 mm	90.0°	81.2°	71.5°	63.7°	54.4°	48.5°	39.6°	31.0°	27.0°	20.4°	15.2°	11.4°
Horizontal angle of view: S35 24.9 x 18.7 mm	69.3°	61.3°	52.9°	46.5°	39.1°	34.6°	28.0°	21.7°	18.8°	14.2°	10.5°	7.9°
Weight (lb)	7.1	6.1	6.2	5.9	6.3	6.0	6.0	6.1	6.2	6.1	6.4	tbd
Weight (kg)	3.2	2.76	2.8	2.67	2.87	2.71	2.7	2.78	2.83	2.77	2.89	tbd
Length (in)	7.72	7.23	7.23	7.23	7.23	7.23	7.23	7.23	7.23	7.23	7.23	7.72
Length (mm)	196	183.7	183.7	183.7	183.7	183.7	183.7	183.7	183.7	183.7	183.7	196

Same Gear Positions: Focus and Iris gear rings are at the same distance from mount for all focal lengths
Same Length: All focal lengths are the same length (except the 18 mm and 180 mm, which are 12.3 mm / .48" longer)
Lens Mount: PL and LPL — both with /i Technology metadata, interface in mount
Iris: T1.8 for all. 15 blades, circular through all stops
Front Diameter: 114mm
Front Filter: 112mm
Rear Filter: Optional, via net holder
Focus Barrel Rotation: 270° - cam driven
Iris Rotation: 70° - cam driven
Focus Scales Easy to swap between Imperial and Metric

Key Features

Color Matched with LEITZ ZOOM
Breathing is minimal
Distortion is exceptionally low
Chromatic Aberration is not visible

LEITZ PRIME with +1 MacroLux Diopter.
It slips onto the front of a LEITZ PRIME (114mm front diameter).
Note, MacroLux for Summilux-C lenses fit 95mm front diameters and come in +0.5, +1 and +2 strengths.

LEITZ ZOOM

Focal Length Range (mm)	25-75		55-125	
Zoom Ratio	3:1		2.3:1	
Maximum Aperture	T2.8			
Image Circle	Leica Format / Full Frame / VV / 46.5mm			
Close Focus (m)	0.91		1.05	
Close Focus (ft)	3'		3'5"	
Weight (kg)	3.55 kg		4 kg (approx.)	
Weight (lb)	9.26 lb		10.4 lb (approx.)	
Length (mm)	266.6		307.4	
Length (in)	8.92		12.10	
Zoom Rotation	110°		120°	
Number of Iris Blades	15		21	
Horizontal angle of view: Full Frame 36 x 24 mm	at 25mm	71.50°	at 55mm	36.20°
	at 75mm	27.00°	at 125mm	16.40°
Horizontal angle of view: S35 24.9 x 18.7 mm	at 25mm	52.90°	at 55mm	25.50°
	at 75mm	18.80°	at 125mm	11.40°
Entrance Pupil	at 25mm: 268.7mm distance		at 55mm: 238.1mm distance	
to Sensor Plane	at 50mm: 266mm distance		at 90mm: 199.8mm distance	
Object at infinity	at 75mm: 258.7mm distance		at 125mm: 179.6 distance	

Same Gear Positions: Focus, Iris and Zoom gear rings are at the same distance from mount for all focal lengths
Lens Mount: PL and LPL — both with /i Technology metadata contacts in mount
Iris: T2.8 for both. Circular through all stops
Front Diameter: 114mm (same as LEITZ PRIME)
Front Filter: 112mm (same as LEITZ PRIME)
Rear Filter: Optional, via net holder
Focus Scales Easy to swap between Imperial and Metric
Focus Barrel Rotation: ~ 270°
Iris Barrel Rotation: ~ 55°
Contact: leitz-cine.com

Key Features

Color Matched with LEITZ PRIME
No light loss (no ramping) over entire zoom range
Parfocal
Breathing is minimal
Distortion is exceptionally low
Chromatic Aberration is not visible

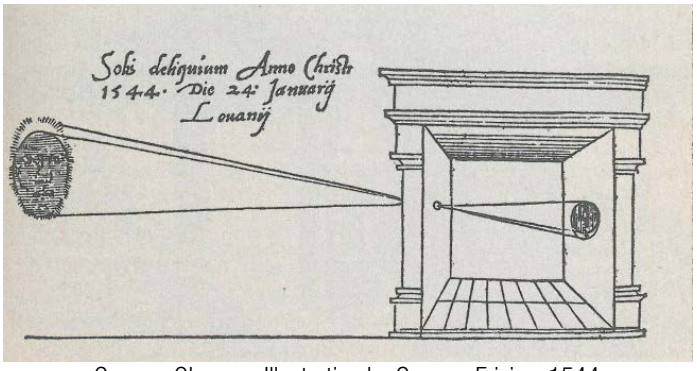
Dr. Aurelian Dodoc on LEITZ PRIME Design

Dr. Aurelian Dodoc is the Chief Technology Officer and Principal Lens Designer at Ernst Leitz Wetzlar GmbH.

JON FAUER: Aurelian, when I visited Wetzlar last June, you said, "Designing lenses is like archeology—searching for something." Please explain.

AURELIAN DODOC: Let's start with a short history of lenses. Lens development began more than 2,000 years ago, perhaps with a naturally polished convex crystal found in a river bed that magnified the image or worked as a "burning glass" that focused light energy in order to make fire.

About 14 centuries later, the development of lenses took a leap forward, with the goal of improving vision. In the Scriptoria of monasteries in the Middle Ages, around 1250, monks used reading stones made from glass spheres to help them read what they had written.



Camera Obscura. Illustration by Gemma Frisius, 1544.

Although the camera obscura had been known for some time, its pinhole was eventually replaced with a lens. And so, the first lens-produced image was created and reproduced as an aid to drawing or painting. This was first mentioned by the Italian polymath Gerolamo Cardano in 1550. Venetian architect and cleric Daniele Barbaro described the use of a camera obscura with a biconvex lens as a drawing aid in his 1567 work *La Pratica della Perspettiva.* Furthermore, he even indicated that the diameter of the lens has an influence on image quality.

Portrait of Gemma Frisius,
by Maarten van Heemskerck
Oil on panel, ca. 1540-1545
104 cm x 83.5 cm
Museum Boijmans Van Beuningen

Portrait of Daniele Barbaro
by Paolo Veronese
Oil on canvas, 1556 1567
121 cm x 105.5 cm
Rijksmuseum

By the 17th century, lenses were employed not only for eyeglasses and artistic aids but also for projection, far vision (telescopes) and near vision (microscopes). The center of the universe for polishing and making lenses was the Netherlands. Glass came from Italy, where there was sufficient wood for the fires that could melt the glass. In October 1608, a patent application was reviewed in the Netherlands "for a device that aided seeing faraway things as though nearby." The telescope.

Shortly after, scientists began to experiment with substances whose properties changed under the influence of light. In Germany in 1727, Professor Johann Heinrich Schulze discovered that a mixture of chalk and silver nitrate turned from white to black when exposed to the sun.

Jospeh Nicéphore Niépce
Musée Nicéphore Niépce
Saône-et-Loire, France

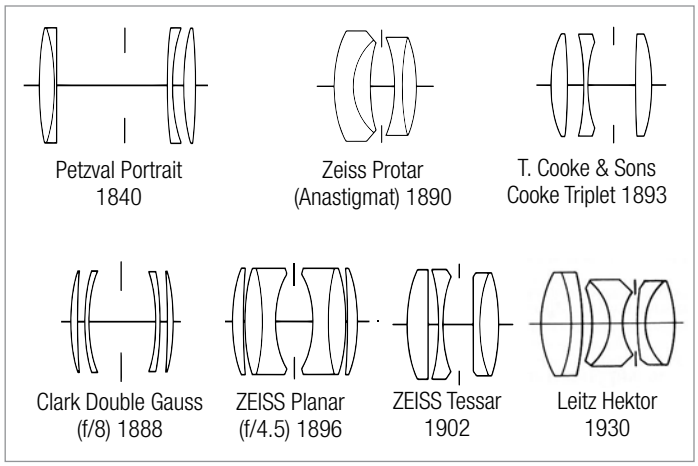
Louis Daguerre
Daguerreotype by Jean-Baptiste
Sabatier-Blot, 1844
6.9 cm x 9.1 cm
George Eastman Museum

Two French inventors, Joseph Nicéphore Niépce and Louis Daguerre, applied these new developments and achieved great renown in scientific and photographic history.

These discoveries enabled the third stage of lens development beginning more than two centuries ago. Lenses now were used to render an image on a substrate: first glass, next film and then sensors.

Joseph Petzval
Lithograph by Adolf Dauthage, 1854
Albertina Museum, Vienna

Max Berek
Professor Berek designed 20 Leitz lenses, including Hektor.



Historic Lens Designs

Before the development of optical theory for designing lenses in the middle of the 19th century, lenses were built by trial and error. Optical design mathematics based on aberrations was first developed by Ludwig Seidel and Joseph Petzval. Petzval solved the problem of field curvature (an object appears sharp only in certain areas of the frame) by formulating the conditions that the design should fulfill. It was the fist time that lenses were made according to mathematical calculations. His Petzval lens (in 1840, 160mm f/3.6) was popular for portrait photography, but did not satisfy his conditions as they exhibited noticeable softness at the edges.

A lot of manpower was needed to calculate an optical design because the formulas are quite complicated. Therefore, designers searched for simple solutions with maximum image quality. After Petzval, a number of historical lenses were created: Double Gauss by Clark (1888), Protar Anastigmat by Rudolph (1889), Cooke Triplet by Taylor (1893), Planar by Rudolph (1896), Tessar by Rudolph (1902), Hektor by Berek (1930), and many others.

At this time, optical design could be compared with archeology. Both required endurance, experience and the right starting point. Schliemann began excavating in search of ancient Troy in 1871. He was in the right place and found "Priam's Treasure" treasure two years later.

Lens designers understood the combination of positive and negative powered lenses, the influence of lens shape and the principle of symmetry. These designs are at the basis of all modern lenses for photography and cinematography. After WWII, large computers found their way into the industry and the complicated hand computing of optical designs was replaced by computer software. The preocess of optical design became faster. Better lenses, with more and more optical elements, were developed.

The "archeology" style is still in use today, in the early stages of personal development on the way to becoming a senior design scientist. Even with modern multicore computer systems, lens design is still a combination of science and art. As Michelangelo saw the final sculpture in each piece of marble, so the optical design artists knows how the lens has to look before starting work. And when you know where you want to go, the way is easier.

You search in the right place, in the right direction and every step brings you nearer to the final design. As in archeology, nowadays you have all the help of modern technical support imaginable. The learned lessons from centuries of development in optics and almost three decades of practiced experience in lens design are at the foundation of the LEITZ PRIME lenses.

When did the LEITZ PRIME "search" begin?

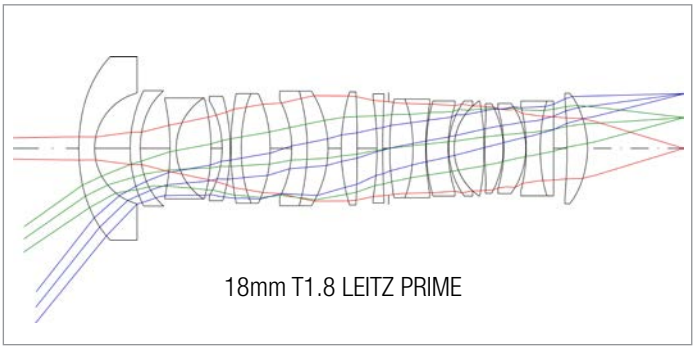
The development of these lenses started 2015.

Take us along the journey.

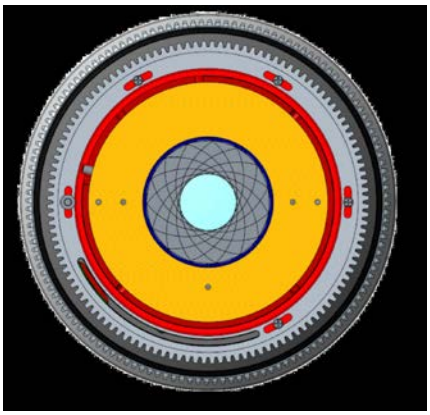
The design of a family of lenses starts with the concepts of complexity and geometrical size, mainly driven by the image field and f-number. In most cases the image field size is given by the application. For the LEITZ PRIME, it was clear that we had to cover at least the Leica Format of 24x36mm.

There have been a lot of discussions about the merits of this format. Those in favor talk about field of view, focal length and depth of field. All of them are right. My feeling is that we all have aspirations and desires for some kind of standard in this wild landscape of formats and for Cinematography to join the tremendous legacy from Photography. That should be our contribution in this direction. It was not a decision to be made; it was clear from the very beginning. Incidentally, we have the same problem with the mount, but we are working on it.

The geometrical size of the lenses is also critical to how they are applied. Size directly influences weight and indirectly influences performance and cost. The decision of size is not trivial. Let me explain this in more detail.

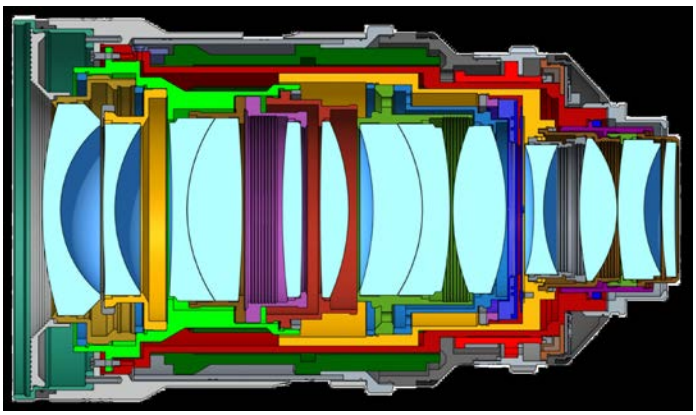


18mm T1.8 LEITZ PRIME



At Left: view from rear showing round iris.

At Right: CAD rendering in 2016 of 40mm T1.8 LEITZ PRIME.



If the size is large, then the lenses will be difficult to manufacture, they will be heavy and the mechanical parts need to be thicker in order to support the larger optical elements. For optical performance, this could be an advantage. The light-bending could be made smoother. I will come back to this idea later on. If the size prescription is small, the light rays' bending will be steeper and a lot of aberrations will decrease the lens performance. For correction you will need more spherical and aspherical elements.

So, these aspects, together with the image characteristics also given by the application, will determine the f-number. This is a very important decision on the way to the specification.

Describe the design process: mechanical, optical, artistic…

Once the so called "A4" specification (this is a rough outline on a single A4 sheet of paper) is fixed, the process of optical design starts. It is my personal style to start with the most difficult problems first. So, I started with the 18mm with the goal to maintain a consistent 114mm front diameter with a T1.8 maximum aperture and the best performance ever. Wow, this was a task.

If you do not wake up in the morning still dreaming of your lenses and you do not start every single day with enthusiasm, you'd better stop. Lens designers have to have it in their blood. You will find satisfaction and beauty with and within your lenses.

The 18mm took the longest time and it was a successful design. The next was the 21mm, also a challenging task since you cannot afford to have the same complexity as in the 18mm lens and you have to keep the same level of image performance. The next was the 29mm, then the 50mm, the 75mm and the 135mm. Don't forget, if possible, all the lenses should have the same or very similar sizes and share the same main mechanical barrel and maximum aperture. That was an even tougher task, taking months and months of work and work. Then the other focal length lenses were added to fill in between those already designed.

On the A4 sheet of paper, there is a very important number: the expected cost of production. In order to stay in range, you have to keep this in mind whenever you decide on a diameter, glass material or a surface shape being spherical or aspherical. The sensitivity of the lens to production errors also has a big impact on cost and final performance. There is another aspect that can kill the design, making hundreds of hours of work worthless. This is the behavior of ghost images inside the lens. The lens designer has to keep all these constraints permanently in mind, day in and day out.

After the first sets of designs are done, the mechanical design starts to fill the spaces around and between the optical elements. After this, the first mockup lens is 3D-printed in actual size. It is the first time you can see and hold the result of all this work in your hands. This is a great moment in time.

In April 2016, I asked, "Will we see more zooms and anamorphics?" And you replied, "Jon, don't forget new spherical primes." So, here we are.

Yes, I can remember and I have shown you a plastic model for the 18mm T1.8 design.

The concept and design philosophy of the LEITZ PRIME?

It was no doubt that our brands, Leica and Leitz (previously CW Sonderoptic) stand for lenses with outstanding performance. I do not mean the pure mathematical error function being zero. I mean an overall, holistic performance including all aspects of an image, lens element quality, mechanical quality, electronic interfaces, haptic and outer design.

One aspect of the artistic side of optical design is the beauty, smoothness and shape of the light ray's path. It is proven that lens designs showing harmonic shapes have the potential for beautiful and high performance images. The ray path has to be smooth, harmonic, without strain or steep direction changes. This condition is necessary but it is not the only thing.

You have to put your heart into every lens. This is the price you have to pay for the success of the project.

In the early days of optical design, the style had a clearly Renaissance philosophy, with harmony, balance and proportions well defined. Erhard Glatzel of ZEISS was an exponent of this style with his theory of strain in optical design. Lenses from that time had low levels of aberration in the image and also low levels of aberration from each element inside the lens.

This style changed a little bit in time and it is connected to the general evolution of cinematic trends and influence of technology. Not all contemporary lenses have to provide a pristine image but they certainly need to be as small as possible and with maximum speed.

The designer has to care about a lot of constraints. It is a matter of harmony, opposing forces, proportion, and the influence of constraints that give artistic style a touch of Mannerism. If you want to locate the artistic style of lens design today, it is at the border of High Renaissance (1490–1527) and Mannerism (1520-1590). You can see examples of Mannerism in the art of Benvenuto Cellini

Mannerism: by Parmigianino
Self-portrait in a Convex Mirror
Oil on poplar panel, 1523-1524
24.4 cm diameter
Kunsthistorisches Museum, Vienna

Notice how the clothing is almost abstract, clearly a reaction to the previous Renaissance style of "high resolution."

Mannerism: by Parmigianino,
Madonna with the Long Neck
Oil on panel, 1534-1540
216 cm x 132 cm.
Uffizi Gallery, Florence.

Notice out-of-focus exterior background and, of course, the elongated neck.

or Parmigiano. Another good example of this style in lens design can be seen in the middle surface inside the doublet in the Hektor design from Leitz's Max Berek. Aspheric surfaces, as used today, are another example.

Please tell us about building the LEITZ PRIME.

Leitz means tradition, unique performance and beauty. And there was no question about it—these lenses had to be manufactured in Wetzlar, Germany. The experience we have in Wetzlar is unique. But the challenges do not end with design. Two more tasks are still at the forefront of development: to support the supply chain and to assembly and adjust the prototypes. If the prototype assessment and the manufacturing price are OK, you can "open the bottle."

You have also compared the design of lenses to cars. But maybe I can "steer" you in the direction of art and wine?

Let me formulate this sentence: if you compare our industry to the car industry, we at Leitz are producing the Maybach— perfection in every detail. And if we are talking about wine, it is to savor something that will make you shed a tear every time you remember that evening moment with your love and your wine.

You said (April 2017) "I like to paint in what little free time I have when not designing lenses or working."

I like to paint. This is one way to release emotions and stress.

Please compare the LEITZ PRIME to the other Leitz lenses.

When our company took over the Leitz name and thus the heritage of the former Leitz Company, we decided to name the lenses LEITZ PRIME to honor this great name and brand. All our lenses fulfill certain requirements of cinematographers. From a global perspective, we can say that we cover all sensor formats with artistic images: Summilux and Summicron for Super35; Thalias for Medium Format; and now LEITZ PRIME in Leica Format++ (LF/FF/VV). It is a unique collection of high performance lenses. Like a family of lions, none is weak.

Dan Sasaki quoted you recently.

You know, Dan is a gentleman with outstanding experience and an impressive performance record. I once said, "In some ways, an almost perfect lens can be easier to design than a lens with character". I stick with this statement. A perfect lens has a clear mathematical target. But do not forget, you need at least twenty years of experience to achieve this target. Most lenses have a so-called character but only some of them achieve this with a preconceived, controlled design. Most of them have a resulting character after the design process. In order to be able to absolutely control the image character, you have to be able to control the performance in every aspect, you have to be able to make the image perfect and then adjust it. Once a lens intrinsically has any kind of disturbing aberrations, you will never be able to eliminate them. The use of that lens is limited. High performance lenses open intangible frontiers in the creation of emotions.

With the LEITZ PRIME, we actually had to work a lot harder on the optical and mechanical design to achieve the combination of imaging functions that are inherent in these lenses. It's a cinematic, beautiful image—the result of optical design, adjustments, coatings and glass materials for the optical elements. I think the best description would be 'iconic.'"

How else would you describe LEITZ PRIME, in a few words?

The purest essence of Emotion.

"The purest essence of emotion."
Photo by Aurelian Dodoc.
LEITZ PRIME 135mm on Leica SL with PL mount.

Photo: Aurelian Dodoc, LEITZ PRIME 135mm on Leica SL with PL mount.

Framegrab: Markus Ketterer, filmmaker, 135mm LEITZ PRIME, on Sony VENICE.

The current trend seems to be degrading the image, softening, flares, distressed. But I sense that the pendulum is swinging back. Styles in cinema, like fashion, change.

With the LEITZ PRIME, we will offer image customized versions of the lens set. We are still working on this concept.

How does a lens designer influence the way movies look? How did you try to guess what cinematographers are looking for in this new series of lenses?"

Philippe Rousselot, a great cinematographer, once said that if you notice the difference between the lenses used in a movie, then the movie is not good enough. Unfortunately, as a lens designer, you always have an eye on every aberration in the image. It starts with the shape of the aperture, as given by the number of iris blades, and it ends with the color fringing around car headlights in a night scene. Of course, we see the image errors and we surely make our seatmates in the movie theater crazy with all kinds of observations and comments. A typical viewer will probably not observe image errors. I think that our role is to give cinematographers the necessary tools to fulfill their artistic dreams and our Leitz Lenses are a large family covering many application aspects.

You said, "We have to establish a very clear goal at the outset."

Highest performance is one way. But if we want to have a very particular image, then the way of thinking would be different. We may have to change the mathematical and physical points of view that we engineers are accustomed to dealing with. We will have to think from the direction of how the image is perceived by the individual. How should we design the image, as opposed to how should we design the lens?

Design the image. This is the key point. It's not easy because it cannot be described mathematically. We have to imagine how we can arrange a balance between mathematical figures and numbers and a specific appearance of the image. If we want to have something apart from very high performance, we have to define the specific characteristic during the design phase.

After you derive the mathematical formulas, do you make a prototype lens that you actually look through and discuss?

Yes, we have to make prototypes. We don't really get the full impression from numbers and formulas. Seeing the real image from the prototype is important. And we hope that we have been on the right path when we began crunching numbers in establishing the image characteristics.

In the prototyping phase, which is absolutely necessary, we can adjust performance and image parameters, but not in a radical way. We cannot establish the fundamental image characteristics in the prototyping phase. The image characteristics are established somewhere in the middle of the design phase.

So the "look" of a lens designer is not only mathematics but also experience and art.

Correct. It's difficult to describe what we feel when we see something. We cannot always put it in formulas. Image characteristics today have a lot to do with feelings. This is the art of optical design. If you want to develop your brand then you have to create emotions that are impressive. We are constantly searching for ways to put emotions into mathematical formulas.

LEITZ PRIME lenses in LA

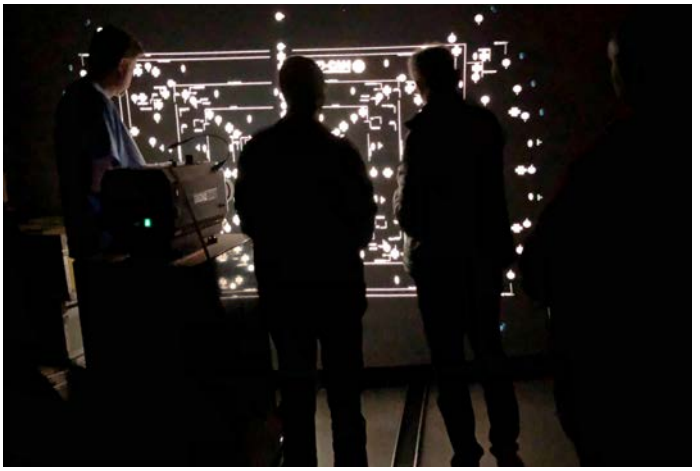
In early February, Rainer Hercher and Laura Kaufmann brought a set of LEITZ PRIME lenses to LA, where they were scrutinized by lens technicians and cinematographers.

Otto Nemenz and Dan Lopez examined every detail in their lens projection room, admiring the lack of distortion even on the 18mm LEITZ PRIME, the 200 line pair resolution, rich blacks, no color fringing, no shading (darkening toward the edges) and no loss of focus at the periphery. Next, Dan shot comprehensive tests to check focus fall-off, flaring, glaring and look—all good.

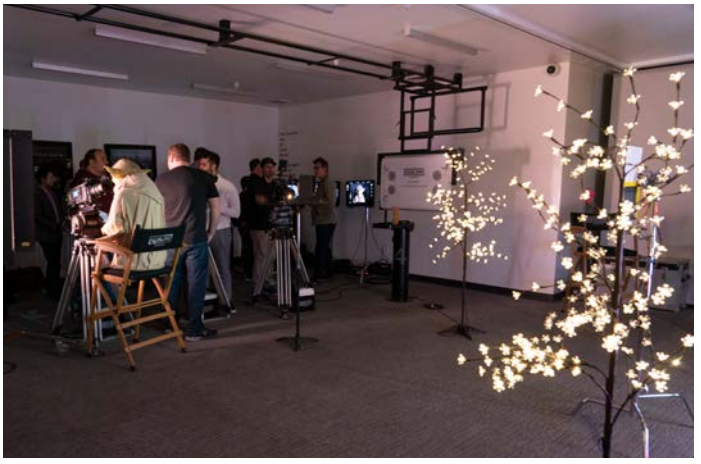
At Otto Nemenz Int'l, above, L-R: Fritz Heinzl, Rainer Hercher, Alex Wengert, Otto Nemenz, Dan Lopez, Laura Kaufmann.

LEITZ PRIMEs in focus and an out-of-focus Otto Nemenz. Otto Focus. Cooke FF Lens Projector. Below, LEITZ PRIME on RED MONSTRO 8K VV.

The next day, a squadron of cinematographers joined Brett Reed, Ned Martin and lens technicians at Keslow Camera to look at the LEITZ PRIME lenses. A check-out room was outfitted with a test dummy, real people, choices of lighting, the inevitable "fairy lights" (Christmas tree LEDs) to see bokehs in the background and color charts. Three large format cameras were set up with LEITZ PRIMEs: ARRI Alexa LF, RED MONSTRO 8K VV and a Sony VENICE. The cinematographers in the room swarmed the setup, lit and relit, milled around monitors and waved Maglites in front of the lenses to check flares. Nods of approval. Thumbs up.



At Keslow Camera, Brett Reed testing a LEITZ PRIME on Gecko Pro Full Frame projector.



Yoda the test dummy, lights, test charts, LEITZ PRIMEs, 3-cameras-no-waiting (ALEXA LF, RED MONSTRO, Sony VENICE) and Cinematographers.

LEITZ PRIME at Charcoal Venice

But what does the LEITZ PRIME look like in real life, on location? If most of production involves portraits and people, how do they look? And how do we describe the LEITZ PRIME look? It was time for an FDTimes T1.8 restaurant lens test, and we were off to a favorite haunt in L.A.—Charcoal Venice.

Charcoal Venice came via Michelin-starred Chef and Owner Josiah Citrin's take on the backyard barbecues he enjoyed on weekends with friends and family. As the name suggests, things are cooked indoors over a live fire at Charcoal Venice.

Begin with Cabbage Baked in the Embers, Yogurt, Sumac and Lemon Zest" Then slide into two salads: Collard Greens, Brentwood Corn, Charred Corn and Cider Vinaigrette, Shaved Onion, Aged Cheddar, Bread Crumbs and Little Gems, Shaved Fennel, Carrots, Radish and Sweet Onions, Grilled Scallion Vinaigrette." If it's meat you want, you're in the right place for a 14 oz Angus Beef New York Striploin, Roasted in Coals.

We tested the 18mm, 65mm and 75mm LEITZ PRIMEs. The photos below were taken wide open with a wrench at T1.8, using a Sony a9 fitted with a Wooden Camera PL to E-mount.

My immediate impressions: glowing, lusciously smooth skin tones, detailed details where you want them—like eyelashes and eyebrows—with silky sympathetic focus roll-off, gently tempered depth of field dimensionality, impressionistic luminous backgrounds, beautiful bokeh and harmonious contrast.

Above: Laura Kaufmann, Leitz Marketing Manager, with 65mm LEITZ PRIME at T1.8. Silky skintones, fabulous flares, beguiling backgrounds.

LEITZ PRIME at T1.8

Above: Rainer Hercher, Leitz Director Sales and Marketing, with 75mm LEITZ PRIME at T1.8.

LEITZ PRIME at Mélisse

After rhapsodizing over the LEITZ PRIME, Prime Beef and painterly portraiture at Charcoal Venice, we heard that chef Josiah Citrin's other restaurant, Mélisse in Santa Monica, was closing soon for renovations. We were there the next day, trying to avoid buzzed focus or worse, wine buzz. The quest continued to stretch the parallels between wine and style, lenses and look.

The reviews are cinematic. "Look," Forbes writes. "Clean lines combine with soft accents that allow the food to be the star of Mélisse's show."

The late, great Jonathan Gold wrote, "There's joy in the journey as you make your way through an evening at Josiah Citrin's Mélisse in Santa Monica. The dining room hits all the marks. When you are in a certain frame of mind, as if world happiness may yet depend on the ready availability of caviar and white asparagus, Mélisse is the real deal, where you always know when truffles are in season and the thick wine list is especially good."

Mélisse is a serious 2-star Michelin gateway of gastronomy and pantheon of Pinot. The lighting is very good. The elegantly dark interior is dappled with brushtrokes of light that remind you of Renoir's cucoloris effects in *Moulin de la Gallette.* This is the perfect place to exercise an appreciation for depth of field so shallow that you can see focus gently rolling off a single caviar pearl.

Melisse is famous not only for the ingenuity of Josiah Citrin's cuisine but also for the skillfully articulate sommelier. Could we dive deeper, after the diver scallops (Stonington, Maine, Yellowfoot chanterelles, salsify, black truffle coulis) into descriptions of the LEITZ PRIME and prime Pinot?

This was the perfect place for a LEITZ PRIME test. But, having been threatened with expulsion from lesser establishments for disturbing the peace of their prandial patrons, I grew worried as a serious looking gentleman approached our table. It was Matthew Luczy, the Wine Director of Mélisse. Was he about to escort us out?

Matthew said, "Oh, cool. Leica cameras and lenses. I grew up with Leicas in our family. But what kind of lens is that?"

Rainer and Laura explained. Matthew asked, "Can I have a look?"

We had an idea. What if our erudite sommelier would suggest wines that were evocative of the images he viewed with the LEITZ PRIME? To make the task even tougher, the pairing of Pinot with PRIME would also have to be in harmony with the Loup de Mer en Ecailles with Bloomsdale spinach and sunchoke veloute, and the Aged Liberty Duck with butternut squash, red wine braised radicchio and dandelion greens.

Matthew chose two Cobb Pinot Noirs from Northern California. He explained, "Let's begin with the 2013 Cobb Coastlands Vineyard. It is silky, precise and airy. Red cherries and rose petals on the nose, pomegranates and nutmeg on the palate. Finishes with a weightless lift that I consider the signature of Ross Cobb."

Next came a 2013 Cobb Rice-Spivak Vineyard Pinot Noir. "Same precision as before, but a notch deeper and more herbal than the Coastlands bottling. Raspberries, potpourri and evergreen needles throughout, with a powdery finish," said Matthew.

And what of the LEITZ PRIME? My turn. "Like the Cobb Pinots, also silky, precise and airy. Smooth and complex. Finishes with a weightless lift of emotions."

Above: At Melisse Chef and Owner Josiah Citrin. Below: Matthew Luczy, Director of Wine. 18mm LEITZ PRIME at T1.8. Bottom: 65mm LEITZ PRIME.

Carey DuffyCooke Optics Director of Sales, Europe.

Yves Saint Laurent *Black Opium* with Cooke S7/i on RED MONSTRO.

by Carey Duffy

By Invitation

Shotoncooke.com is designed to show content created with all of our current, and some of our discontinued, Cooke lens series.

Shotoncooke.com is by invitation only. Having said that, anyone can contact us with a link to his or her work so we can review it. We have started off slowly by contacting cinematographers we already know. Cathy Crawley, Cooke's Marketing Director, has been paramount in overseeing the build as well as collating material she finds in her daily digital interactions with cinematographers worldwide. By the way, it is not a trailer park of quick-cut montages from many sources. It's sequences we want.

How it began

Shortly after I started working for Cooke in January 2016, I reviewed our website. I presumed that Cooke Optics, being a lens manufacturer, would have amazing content at our finger tips. If we could harness this content, it could be used to educate and inform customers about the different lens series we manufacture. Our first step was to get up and running on Instagram. We then started reviewing DPs' Instagram accounts to see whether the work was promoted with dynamic search options on Vimeo, YouTube, etc.

It soon became apparent that something more was required than just having a bigger Vimeo account page or a redesign of the website. The Cooke website has a very structured reason for being. It has technical PDFs such as DOF charts along with lens specs, a break-down of rental customers' details, sales contacts, a historical archive, and i/ Technology information. What we needed was a digital platform that could market the vast array of stories on which our lenses are used.

Many years ago, I ran a small bespoke camera filter company, South London Filter Ltd, to rent and sell filters. This was in the days before Internet. I would have long conversations with DPs about the look they were trying to achieve. They would reference films, photos and commercials. I would listen and then guide them through what filters we had in sales or rental that might work for them. Cinematographers would come to the office to shoot tests, borrow filters for weekends or on recces (scouting). Discussion would also include what Directors and Producers expected and were looking for.

Some of the test photos, along with others I shot, were edited into the company brochure with short explanations about each filter type. This book was sent to all our customers (DPs, ACs and Rental Houses) free of charge across the UK and Europe. It was a quick reference you could pull out of your kit bag as a go-to reference.

Later, when I joined Tiffen, I had the opportunity to shoot an extensive filter test film that showed split screen comparisons of each diffusion filter against the non-filtered original image (see FDTimes April 2014, Issue 60, pp 46-48). However, this was not what Cooke was looking for.

I had gone from selling a lot of different looks that needed a concise reference to talking about "The Cooke Look". The unique look of Cooke lenses means that a one-size fits all test film wouldn't do justice to the different lens series within the brand. The dimensionality, roll-off and edge fall-off are present across all the different Cooke lens series. But, T-stop, lighting, focal length choice, combined with composition and movement, made me realize that we had to produce something completely different.

We needed something that incorporated all the wonderful material that I knew we could get from a wide array of different types of productions: Commercials, Drama, Docos (Documentaries), Features, Music Videos and so on. Cooke Chairman Les Zellan and I sat down to discuss ideas about lens series, technical data, DPs' insight, the genres that Cooke lenses are used on, the material that was available, and how we could get everyone to contribute material and information about what is shot on Cooke onto a place called #shotoncooke. A few days later, Les sent an email that he had registered www.shotoncooke.com and to get on with it. We have now been working on this concept for about 24 months.

ShotOnCooke Website

The website navigation is designed to let you search by genre and lens series. So, if you want to look for Commercials shot on Anamorphic/i SF lenses, you click the drop-down menus and up they come. If you just want to search for anything shot on S4/i, reset the genre to ALL and click S4/i from the lens series drop-down box. Or, if you want to search for Features without a par-

Stephen Murphy with Cooke Mini S4/i on Alexa for BBC's *Moonstone.*

ticular lens series in mind, reset Lenses to ALL. The menus have been designed so that more items can be added in the future.

Video and Production Notes

Each video is accompanied with production and technical notes. These include Lens Series, Format, Aspect Ratio, Cameras, Format and Rental House. Next, we have the Cinematographer's details: name, agent, web site, Instagram, Vimeo and Twitter contacts. There are additional fields for the contributing DPs to complete if they can: Director, Producer, Production Company, Distributor, Colourist and Post House.

The most important area is the 2000-character description field. Cinematographers can describe why they used Cooke lenses on their project. For example, Matias Boucard AFC describes a commercial for Yves Saint Laurent's Black Opium starring Zoe Kravitz, "I wanted to use the Cooke S7/i to combine with the extraordinary resolution of the RED MONSTRO. Also I needed a fast lens because all of the shoot was at night and needed something organic with nice skin tone, with a high colour contrast resolution."

David Procter describes his lens choice, "I regularly use the Cooke 5/i range for car work because of their lack of distortion, and excellence performance wide open." We want to hear the real opinion, explanations, technical thoughts and emotions that the cinematographer had about using our lenses on the project. They say what they want to say. We don't doctor the text or interview the cinematographer. Of course, we proof for typos. It's a unique opportunity to inform the community about their experiences with Cooke lenses. There is also a 500-character production explanation, which is a brief description as to what the project was about. The submission can be completed in 10 to 15 minutes. To expedite things, our only caveat is that the work has already been uploaded onto Vimeo or YouTube. Once completed, a submission can be live quite quickly.

An initial contributor and good friend, Stephen Murphy, uploaded footage onto his Vimeo page that nailed our thoughts about the diversity of material. It was from the BBC period drama, *The Moonstone,* that he shot with Cooke Mini S4/i lenses. I often hear people say, "I'd like to use these lenses but they are T2.8." Stephen's sequences show that one can use these Mini S4/i T2.8 lenses on a period drama using candlelight.

He writes, "I needed reliable lenses with good minimum focus and a physically small size. The budget wouldn't let me get a full set of Cooke S4. We had a lot of low light night interior work where I'd primarily be lighting using candles and off-screen china balls. I had plenty of flexibility to work at low light levels with the Cooke Minis' T2.8 stop and never needed to shoot with a lens that had a wider aperture, especially with the Alexa at 800 ASA. I used the lenses with a combination of Smoque, Black Diffusion FX and Low Con filters. The Minis gave me exactly the same qualities I'd expect from Cooke S4 glass. I was very pleased with the final results."

You'll also notice that we also have the new Cooke Society for those who want early access to content and other information that Cathy has planned. We are aiming to build the community. *shotoncooke.com/why-join-the-cooke-society/*

As the saying goes, "Be careful about what you wish for." I am sure that Cathy and I, with one or two others, will be very busy with ShotOnCooke. We expect to see a lot of email traffic and the entire sales team is part of the process as well.

It's not always about the most amazing, stunning big budget, A-List production that we are after. There are many things to consider. Hearing from DPs who are happy to share insight into why they used one of our lens series is essential to making this site work for everyone. The type of material we are looking for is varied. We love big viewer numbers but we are just as happy to introduce material that has hardly ever been seen before. I am thrilled with the material that so many cinematographers have already submitted. I trust the videos and the data will be enjoyable, interesting and useful to everyone.

And above all, promotion on a Cooke web site—what's not to love about that if you're a cinematographer who uses Cooke lenses?

And speaking of websites, Cooke Optics announced that it will rebrand its subsidiary distribution company, ZGC, as Cooke Americas. The ZGC service center in Brasil, which provides full lens servicing and testing, will be rebranded as Cooke Brasil. Les Zellan commented, "This strengthens Cooke Optics' ongoing commitment to worldwide service and support."

cookeoptics.com *CookeAmericas.com*

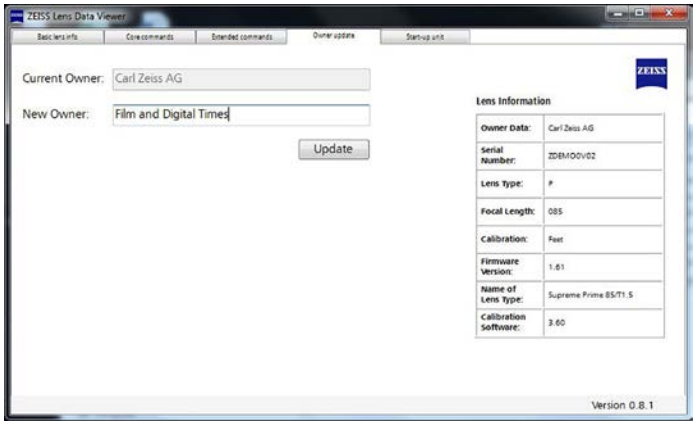
Stephen Murphy Shot *Moonstone* on Cooke Mini S4/i

ZEISS Supreme Primes

Now there are nine Supreme Primes. In order: 21, 25, 29, 35, 50, 65, 85, 100, 135 mm

Lens	Release	Aperture	Close focus	Front Diameter
15 mm	2020	T1.8-T22	0.35 m / 14"	114 mm / 4.5"
18 mm	2020	T1.5-T22	0.35 m / 14"	114 mm / 4.5"
21 mm	Q3 2019	T1.5-T22	0.35 m / 14"	95 mm / 3.7"
25 mm	May 2018	T1.5-T22	0.26 m / 10"	95 mm / 3.7"
29 mm	May 2018	T1.5-T22	0.33 m / 13"	95 mm / 3.7"
35 mm	May 2018	T1.5-T22	0.32 m / 13"	95 mm / 3.7"
50 mm	May 2018	T1.5-T22	0.45 m / 18"	95 mm / 3.7"
65 mm	Q2 2019	T1.5-T22	0.6 m / 2'	95 mm / 3.7"
85 mm	May 2018	T1.5-T22	0.84 m / 2'9"	95 mm / 3.7"
100 mm	Dec 2018	T1.5-T22	1.1 m / 3'9"	95 mm / 3.7"
135 mm	Q3 2019	T1.5-T22	1.35 m / 4'5"	114 mm / 4.5"
150 mm	Q4 2019	T1.8-T22	1.5 m / 4'11"	114 mm / 4.5"
200 mm	2020	T2.1-T22	2 m / 6'7"	114 mm / 4.5"

New LPL mounts



Screenshots of ZEISS Lens Data Viewer, showing (right) Basic Lens Information, and (above) Owner Update (helpful if lens is lost or looted.")

Order! Order!

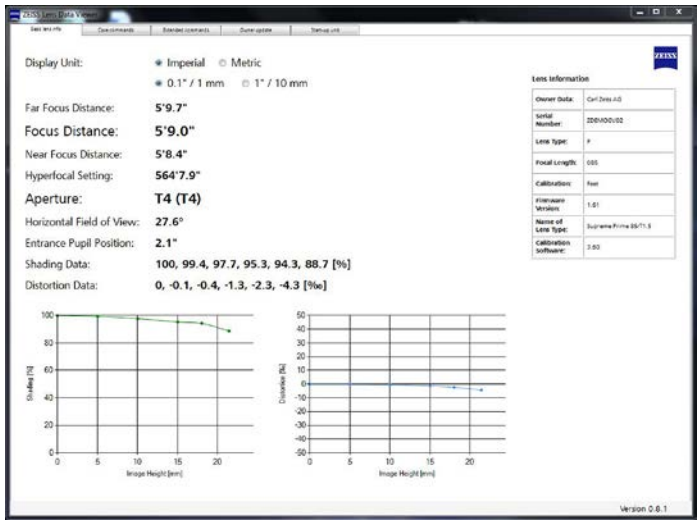
No, this page is not about John Bercow who calls for order as Speaker of the British House of Commons. He's the one described by The Washington Post as having "the vocabulary of an Oxford professor and the vocal projection of a carnival barker."

Instead, our order of business today is about the rapidly growing family of ZEISS Supreme Primes. We first met the Supremes less than a year ago, at Cine Gear 2018. ZEISS introduced a core set of 5 focal lengths. Now there are 9. They have arrived in order of appearance (shown at left) like clockwork, as initially announced.

A quick review is in order in case you were too busy watching John Bercow and the Brexit debacle debates. ZEISS Supreme Primes cover an image area up to 46.3 mm diagonal (FF/LF/VV). They are small, lightweight and fast. There are 13 lenses in the set. ZEISS Supremes have an interchangeable lens mount system. You can swap them yourself. They come standard with PL lens mounts. At NAB 2019, ZEISS introduces LPL mounts. They will be sold as optional accessories. Rental houses and users can change the mount and shims easily and quickly.

The lenses communicate /i and ZEISS eXtended Data to the camera through the lens mount or the on-barrel 4-pin connector. You can customize the look of your lens by tweaking its shading, distortion and other parameters via a laptop.

Christophe Casenave, ZEISS Product Manager for Cinema Lenses, describes the Supreme look as "gentle sharpness." Many would agree. As in the House of Commons, there have been many orders.



Serguei Saldívar, AMC.

"I think that 2019 is the Year of Full Frame."

SERGUEI SALDÍVAR, AMC: I have been an avid reader of your Film and Digital Times from the beginning. I find that the way you write is not only technical but I really like the way you tell a story.

JON FAUER: Thank you. I appreciate that. Now, let's tell a story about you and your work. How did you start out?

I went the usual route. I attended film school at the CCC - Centro de Capacitación Cinematográfica. I started working with cinematographers such as Xavier Perez Grobet, Claudio Rocha and Rodrigo Prieto. I am very grateful to them. Rodrigo moved me up to Second Unit DP on films like Frida.

Was it difficult graduating from AC to DP?

It's not so much about the tools but about the way you work and how you use your knowledge.

In that case, please share some knowledge about your last job with ZEISS Supremes.

The story started 8 months ago. ZEISS contacted me and asked if I could do a demo film for Latin America about their new Supreme lenses. I immediately said yes. I wrote a script that would be practical to shoot in the short time we had available. The title is *El Viaje (The Trip)*. *youtu.be/fd5ld4-I8jc*

We begin with a night exterior scene. A girl is walking along a downtown street. We see lots of bokehs from street lamps, office buildings and cars. She is very sad. She decides to go on a trip to the countryside. She rediscovers the beauty of these surroundings and we discover the beauty of these lenses in the way they handle detail, texture, faces, close-ups and landscapes.

Pre-pro, production and post lasted 11 days, including the original score with guitar and cello.

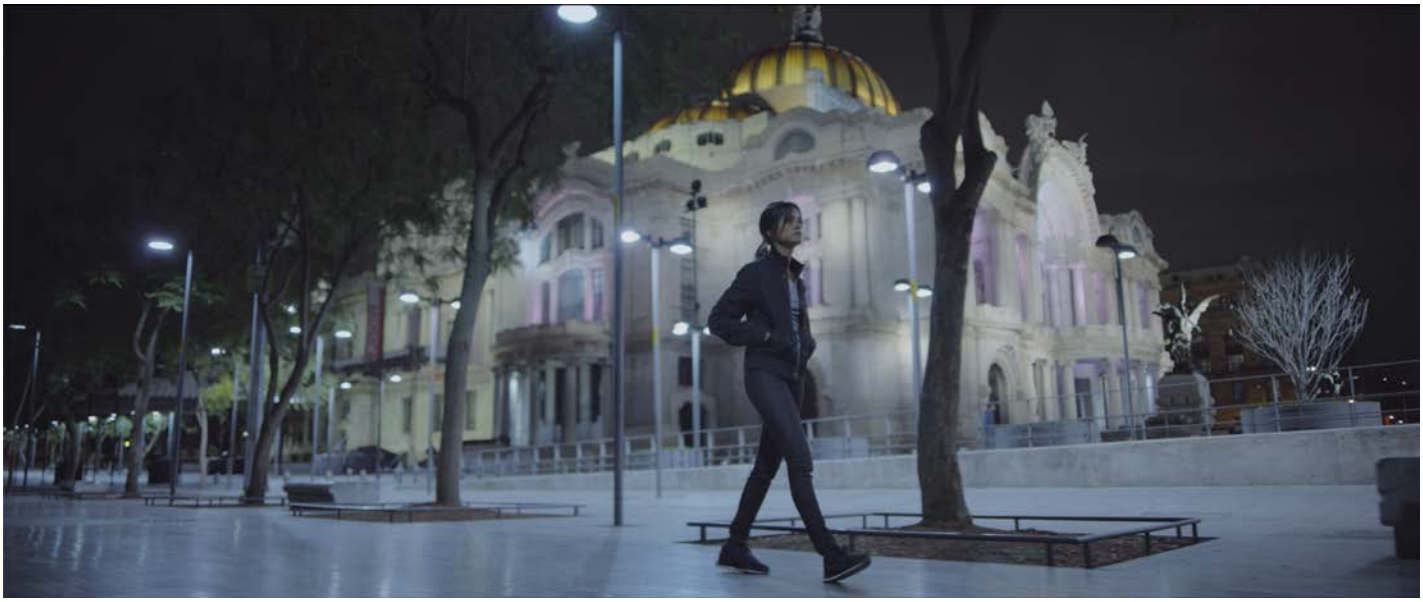
What camera?

We shot Full Frame with the RED MONSTRO 8K VV. I couldn't be happier. I was really impressed. The size and weight of the camera with the Supreme Prime was comfortable for shooting handheld and with the MoVi Pro all day.

The film that I just finished a few days ago, *Mírame (Look At Me),* had many setups where I used my MoVi with the RED MONSTRO 8K VV and ZEISS Supremes. The weight of the MONSTRO and the Supremes is perfect for working with gimbals. Also, I was very impressed with the low light capability of the MONSTRO with the T1.5 maximum aperture of the Supremes—especially for the night exteriors.

Mexico City is not as bright as LA, New York or Paris. We have fewer streetlights. Directors often show me amazing night exteriors shot in downtown LA. Before, in the analog film times, it was a bit tough, but now with the new technologies and the digital sensors, we're able to shoot with almost available light.

Working wide open is not so easy if you don't have fine optics; you lose resolution and you lose detail. I love the Master Primes because you can go wide open and you still have detail. Of course,



Frame from *El Viaje.*

they are Super35 format and the Supremes are Full Frame. I found that the Supreme Primes are very good wide open. When you focus on the actor's eye, the detail is very, very fine. I wouldn't use the word sharp, because nowadays sharp is kind of synonymous with looking digital. Ironically, shooting with more pixels helps to make the image smoother. Shooting in 8K makes the image more pleasing.

For example, let's say you have a line, like an eyelash. Instead of having only a few pixels that make up the edge of this straight line, with the 8K sensor, you now many more pixels and that renders the fine edge more subtle. The same with skin texture. The greater number of pixels makes the skin feel smoother. And it gives you more information in the subtleties of the gradient between light and shadow. Also, the micro contrast of the ZEISS Supreme Primes does something to produce these fine details and yet give us gentle and smooth skin tones.

I shoot a lot of fashion, beauty and car commercials. Because of the higher resolution and the new formats, they want you to shoot wide and tall. I did a Garnier commercial a few months ago and we worked in 8K with a 16:9 aspect ratio as well as a vertical crop for Internet, iPhone and social media. The high resolution helps maintain both aspect ratios and display formats. The combination of a camera with more dynamic range, more latitude in low light, and a super fast lens that covers the Full Frame enabled all these things. The marriage was perfect.

What else attracts you to Full Frame / Large Format / VV ?

It's like going back to the original still frame Leica Format, Full Frame. That was the image size we were so familiar with, growing up, taking still photographs. Many of us started our visual experience with still cameras. It's nice to be back again. It's like completing a circle now with digital. We're working in Full Frame as we did before.

These days, my new best friend is the 50mm Supreme Prime lens. Before, in Super35, I loved the 32mm and the 35mm focal lengths. The 50mm Supreme Prime has a very close minimum focus. You can get really close-up and at the same time, see a very really wide field of view. It looks beautiful. I'm still learning and changing my way of thinking about lenses.

Is Full Frame catching on with you and your colleagues in Mexico?

I think so. Guillermo Granillo finished the first film in Mexico shot in Full Frame with an Alexa LF and ZEISS Supremes. I completed my jobs with the RED MONSTRO 8K VV. In the AMC (Mexican Society of Cinematographers), we are a community of around 60 DPs or more, and everybody is very excited by this new, larger digital cine format.

I think that 2019 is the Year of Full Frame. The previous years were basically introductions to the new Full Frame format. For example, just a few days ago, there was a presentation from Canon of their C700 FF and everybody was very excited by it.

Almost everybody has Full Frame still lenses from Nikon, Canon, Leica, and more. It's very exciting because now you can use your vintage still camera lenses or try to do interesting things on these large format cameras. It's a good time to stock up on lens adapters.

What about the Alexa LF in Mexico?

I think that ARRI should come out with an Alexa Mini LF. If they did that, they will be selling those cameras like fresh bread. On the other hand, RED is doing really well with the MONSTRO 8K VV cameras and Sony is doing well with the VENICE.

And you know why? Size and weight matter. It matters to me because I own a MoVI Pro. For example, in a couple of days, I'll be shooting a commercial and I will bring the MoVi pro to do crane shots. During our scout, the English director said he wanted a high-angle overhead shot. The budget did not allow for an extra remote head in addition to all the other toys we were asking for. I said, "No worries. I'll bring the MoVi Po and we can do it because we're shooting with a lightweight, compact camera and lightweight, small, fast lenses.

How would you describe the look of the Supremes?

Serguei Saldívar, AMC on *Mírame*. Photo: Daniela Fenton.

They have really fine detail and a very pleasing contrast. I find that the transition between the detailed part where you have focus and the out-of-focus area is very smooth and gentle. It's not like a hard edge where you have the focus defined and then everything else is totally out of focus. It has more of a gradient. The bokeh is really nice and round. It does not have octagon shapes like some lenses in the past.

Do you add diffusion filters to soften the image?

I love the Tiffen Black Diffusion/FX filter. On the last job, the director didn't want the glow that you usually have with diffusion filters but these glows are very subtle. I was working with the half and the one. But sometimes I don't use any diffusion at all.

How did you grade the demo and this feature?

The demo was graded with DaVinci Resolve and we viewed it on a Sony HDR monitor.

On the demo night scenes, what ISO ratings did you have?

800 ISO. At night and also daytime. The whole show.

Did you use zooms on these Full Frame projects?

Yes. We used the ZEISS 28-80 and the 70-200 T2.9 CZ.2 Cine Zooms on *El Viaje* and *Mírame*.

Do the CZ.2 zooms match the Supremes?

Pretty much. I would say they are tiny bit more contrasty. It's easily corrected in grading. It is very subtle. Maybe because of the coating. So, ZEISS, I think you're reading this, my request is to please make some Supreme zooms, similar to the CZ.2. And maybe some Macro Supremes: 200mm and 65mm. Everybody will need them. And flare sets. It would be really nice to be able to play around with the texture so you are not stuck with just one look. Working with filters in front of the lens has some problems. Sometimes you get flares that you don't want, or double images. To be able to add flare sets or special elements inside the lens, to alter the look, would be really cool.

Generally, how do you work on set and location?

In Mexico, we're working with little time and little money. You want to go fast and do many setups. My starting point is usually to begin by lighting from outside, through the windows.

On *Mírame,* if we were looking through a window, I would usually put an ND.9 gel on the window and maybe a double net outside to reduce contrast. Also, I didn't want a bright exterior. Inside I'll work with balanced LEDs like the Celebs, between 30% to 70% on the dimmer. The interior ambient lighting was very low, using the lens at T 1.5, and could have made the focus puller tremble. But he didn't because he was outstanding.

This is quite contrary to older times when the set was really bright and it was dark outside and everybody was stumbling around with cables and apple boxes. Now, I have changed the way I work and aim to go faster and with less equipment, shooting at T1.5.

How else do you summarize the look of Large Format / FF?

If you go for landscapes, or for architecture, going bigger is better because you not only have less distortion, but you also can get a shallower depth of field. You can do a head to toe shot of your actor or actress and still have shallow depth of field with a wide lens. That subtle difference is very important for me and I think it will be for many DPs.

Chivo shot some of "The Revenant" with Alexa 65, Rodrigo Prieto did "Passengers" with Alexa 65 and Alfonso Cuaron directed and shot "ROMA" with Alexa 65.

I think we see a pattern here.

If you want to go theatrical, and you want your images to look different from what everybody else is grabbing, try to go wider, in Full Frame. It's maybe a snobbish way of thinking. But it's also a way to show the reality that's out there in a different way.

With thanks to Alejandro Alcocer, ZEISS Cine Lens Representative for Mexico and Latin America for all his help on this article. Watch his BTS of Mírame *at: youtu.be/JPQoHXXy7MM*

Supreme Frames from Serguei Saldívar's *El Viaje*

Photos of Alfonso Cuarón, above and below, by Carlos Somonte, courtesy of Netflix.

If anyone is still wondering whether larger formats have legs, look no further than the 2019 Oscars.

Alfonso Cuarón won Awards for best Foreign Language Film, best Director and best Cinematographer on *ROMA*. More common on commercials, it is not common for one person to direct the talent and manage the camera work. Even though Cuarón studied cinematography and shot projects in film school, the director-cameraman hyphenate requires great fortitude.

The camera was ARRI Rental's 65mm digital format Alexa 65 with ARRI Prime 65 lenses in 24, 28, 35, 50, 80, 100 and 150 mm focal lengths. Cuarón favored the wider ones.

IB/E Optics, working under contract for ARRI Rental, completely redesigned the mechanics, including iris and focus cam mechanisms, XPL and LPL mounts. IB/E performed the final assembly of the given glass (the optical elements from original Hasselblad/ Fujinon HC lenses) into the new lens barrel systems for use on the Alexa 65 cameras. This is not vintage glass.

ROMA just looked different—a combination of the large format esthetic, wide angles, wide dynamic range, high resolution, black and white, pristinely beautiful lenses.

In Anne Thompson's report on a Q&A with Emmanuel "Chivo" Lubezki, Cuarón says, "I didn't want a film that looks vintage, that looks old. I wanted to do a modern film that looks into the past."

ARRI Prime 65 Lenses

So, *ROMA* was shot with Prime 65 lenses. Let's look back at an article we wrote in September 2014.

ARRI Prime 65 lenses began life as Hasselblad HC lenses. These were made by Fujinon for the Hasselblad H5D (image circle 61.9 mm and larger). They had an XPL mount (60mm FFD, 72 mm ID) which has been replaced by LPL (44mm FFD, 62mm ID).

Klaus Eckerl, Managing Director of IB/E Optics, explained:

"The ARRI guys came to us with a very special, very exciting idea: create a set of lenses for the big camera sensor of the new ALEXA 65. It started with a call from Manfred Jahn of ARRI Rental. They had a choice of several The well-known contenders in medium format lenses. Together, we tested lenses, did MTF tests and comparisons. We liked the Hasselblad/Fujinon lenses. When we looked at the MTF values, they were really great lenses.

"It sounds quite simple to just rehouse some existing lenses, but the Hasselblad/Fujinon lenses, of course, are fully auto-focus. They have a completely different mechanical setup with motors inside that drive the shutter, iris and the focus movement parts. The new Hasselblad lenses are designed as still lenses, but optically they are very good lenses. We removed all the mechanical parts of the original lenses. Only the optical elements and some of lens barrels were used.

"The challenge was to combine the opto-mechanical needs of the cine world with the good optical elements of the Hasselblad/Fujinon optics. We did a feasibility study with Manfred Jahn. We disassembled the lenses and did a CAD redesign. We also designed and manufactured new linear irises. We developed a focus mechanism with full 300 degree rotation that camera assistants are familiar with. We needed all the focus and iris barrels to be in the same relative position. This turned out to be more difficult with the zooms. One of the biggest challenges was to get our new iris and its mechanical carrier between the complex zoom mechanism.

"Another difficult job was to get good ergonomics for the feel of the focus. The main thing Manfred Jahn told us was that the focus barrel should feel like a Master Prime to a camera assistant. That may seem to be a quite short specification for mechanical issues, but it was quite a challenging one.

"Focus is managed by a smooth cam mechanism. We do it in-house, along with all the other key parts. We have very special software and hardware tools that to do it, because we are milling in a special way. You can't do it without this unique tooling and we actually created two hardware systems in case one machine breaks down. It's especially critical to pay attention to the small details, choosing the components, assembling hundreds of parts, checking and doing quality control." Clearly, Fujinon has a Large Format optical heritage in primes and zooms that is especially appealing. Read on.

Hasselblad/Fujinon HC Lenses

24mm f/4.8, 28mm f/4, 50mm f/3.5, 50mm f/3.5, 80mm f/2.8, 100mm f/2.2, 150mm 150mm f/3.2, 50-110mm f/3.5-4.5 zoom

Fujinon Premista 28-100 mm T2.9 Large Format Zoom

Actual size

Fujinon launches a new Large Format Zoom lens at NAB. The name is derived from Fujinon's top-of-the line zooms, "**Prem**ier" and "V**ista**," as in VistaVision. Premista.

Fujinon Zoom	Premista 28-100 mm T2.9
Range	28-100 mm
Aperture	T2.9 - T22
Lens Mount	PL Mount
Image Circle Ø	46.3 mm
Close Focus	0.8 m / 2' 7"
Focus Barrel Rotation	280°
Zoom Barrel Rotation	120°
Iris Barrel Rotation	48°
Iris Blades	13
Front Diameter	114 mm
Length (approx.)	255 mm / 10 in
Weight (approx.)	3.8 kg / 8.4 lb

Premista 80-250 mm T2.9-3.5 Large Format Zoom (under development)

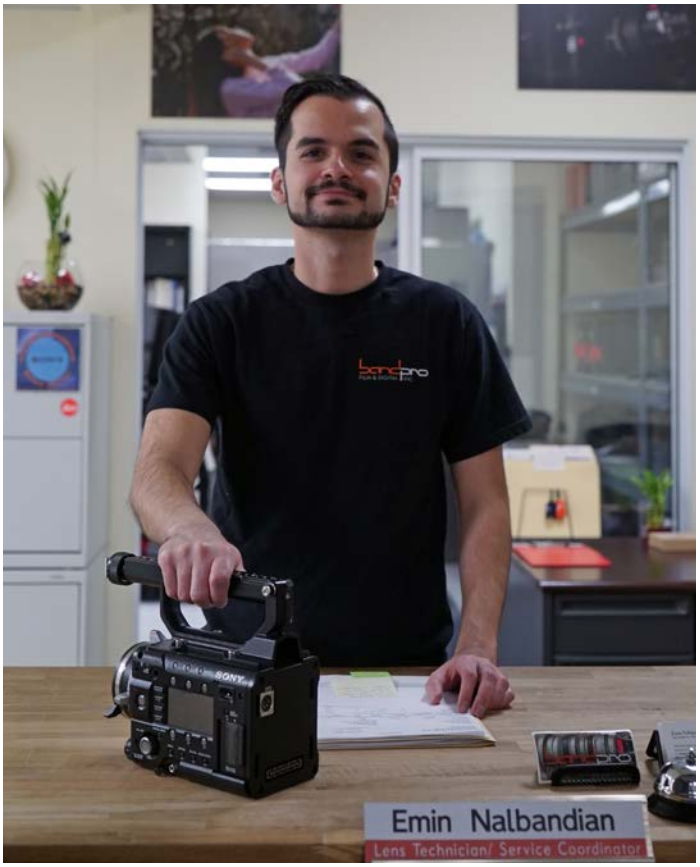
A companion to the Fujinon Premista 28-100 will arrive later this year: a nice long 80-250.

Under development - specifications may change:

Fujinon Zoom	Premista 80-250 mm T2.9-3.5
Range	80-250mm
Aperture	T2.9 - T22 (80-200) T3.5 - T22 (200-250)
Lens Mount	PL Mount
Image Circle Ø	46.3 mm
Close Focus	1.5 m / 4' 11"
Focus Barrel Rotation	280°
Zoom Barrel Rotation	120°
Iris Barrel Rotation	48°
Iris Blades	13
Front Diameter	114 mm
Length (approx.)	255 mm / 10 in
Weight (approx.)	3.8 kg / 8.4 lb

Actual size

Band Pro Optical Department



Emin Nalbandian, Band Pro Lens Technician and Service Coordinator.

Band Pro has a long legacy in lenses. They partnered in the development and launches of a number of successful ventures: ZEISS DigiPrimes and DigiZooms, Leica Summilux-C and Angenieux Type EZ zooms. Summilux-C lenses were teased as "Mystery Primes" at Band Pro's Open House in December 2009. And then, at NAB 2010, these fast, light, multi-aspheric mysterious prime lenses were unveiled carrying a very familiar red logo with the "L" word, confirming what many guessed: Leica.

There are indications that maybe more mysteries are to be revealed. There has been a lot of construction, renovation and hiring at Band Pro's Burbank headquarters. You don't hire a skilled lens technician like Emin Nalbandian for amusement. And you don't build a Class 100 cleanroom with airlocks for fun.

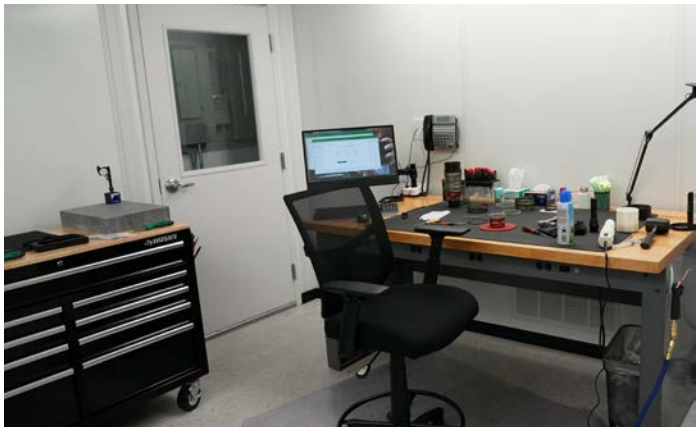
Or, maybe Band Pro simply wanted a professional Optical Department as a one-stop resource for lens testing and repairs. Band Pro has already been authorized as the official repair facility for Angenieux Type-EZ zoom lenses. They also are certified to service most major cine lenses—including Canon, Cooke, Fujinon, Sigma, ZEISS and more.

Band Pro's Optical Department has a brand-new DENZ MFC65 Large Format Lens Projector, Gecko collimators and full service lens repair tools. Band Pro's cine lens and service department, supervised by Jeff Cree, SOC, is an Authorized Sony Warranty Service Center. Additionally, they work on most major brands and are set up for firmware upgrades, trouble-shooting, and state-of-the-art camera, recorder and lens repairs.

bandpro.com NAB Booth C8319


Suit up before entering the dual air-locks of the Class 100 Cleanroom.


Gecko collimator in the lens test room.


Workstations inside the Cleanroom.


Lens testing room with new DENZ MFC65 Large Format Lens Projector.

Band Pro Optical & Service Department, cont'd

Servicing an Angenieux Type EZ-1 Zoom Lens.

Henry Grenier, Sales Associate / Technical Consultant behind MFC65.

Jeff Cree, soft focus, top left.

DENZ MFC65 Large Format Lens Projector.

Accordion rolling wire storage shelving.

Sony VENICE Upgrade 4.0

VENICE "Rialto" Extension System

Sony announced VENICE Firmware Version 4.0—to be available in June, 2019.

With Version 4.0, you can purchase an optional HFR license (High Frame Rate) that takes VENICE up to:

- 120 fps in 4K Super35 2.39:1 (4096 x 1713).
- 60 fps in 6K Full Frame 3:2 (6048 x 4032).
- 72 fps in 4K Super35 4:3 for full 18mm height anamorphic (4096 x 3024).
- 110 fps in 4K Super35 17:9 (4096 x 2160).

Note, 120 fps in 2K was announced at CineGear 2018. It will not be implemented because the engineers were able to manage 120 fps in 4K. All of the High Frame Rates (except 6K 50/60p) support X-OCN recording, including X-OCN XT implemented in Version 3.0. High Frame Rates up to 60 fps support XAVC 4K/QFHD and ProRes recording.

The HFR license can be activated with the Firmware version 4.0 upgrade. You can select a 7-day, 30-day or permanent license.

Free Version 4.0 features

Version 4.0 will come with these features at no cost:

- Mask+Line in Frame Line menu.
- Assignable buttons on the DVF-EL200 viewfinder
- Pure Progressive HD-SDI output in 25p and 29p
- 700 Protocol for Camera Remote Control

700 Protocol is a camera control protocol developed by Sony. It lets you connect VENICE to a Remote Control Unit (RM-B750 or RM-B170) or RCP-1500 series Remote Control Panel for iris control, recording start/stop, clip control, paint control and so on.

Sony SxS PRO X Cards and Reader

Sony also announced 120GB and 240GB SxS PRO X media cards. They offer Stable 4K video capture at high frame rates and ultra-fast transfer speeds up to 10Gbps (1250MB/s). For example, it takes 3.5 minutes to transfer 240GB from SxS PRO X card to computer with the new SBAC-T40 reader/writer.

To go from fully rigged VENICE Camera to "Rialto" tether extension mode is quick and easy, using the same camera body and sensor block.

VENICE "Rialto" Extension System: camera head has the lens mount and sensor.

BLACKWING[7] from Tribe7

Black BLACKWING[7]

Brushed Aluminum BLACKWING[7] Binary

Top view

BLACKWING[7] Primes

Tuneable optics. Seven focal lengths in the initial set. A choice of 3 looks. Custom tuning by design and by appointment.

BLACKWING[7] prime lenses will be available to order exclusively from TRIBE7 beginning March 2019, with production deliveries starting in Summer 2019. Additional focal lengths—including wide angle, macro, close focus and faster T-stop versions—will be developed during late 2019 and ship in 2020.

BLACKWING[7] binaries

Ten sets of first-edition lenses will ship from March 2019 to select clients: initially 37, 57 and 77 mm, with the rest delivering by September 2019. The BLACKWING[7] binaries are slightly faster at T1.8, but have the same response and overall image qualities as final production lenses. The housings have a polished aluminium finish. They have T-tuned characteristics with exaggerated flaring because of selective lens element coating.

Looks & Pricing

- S-tuned BLACKWING[7] lenses begin at US$ 10,000 each.
- T and X BLACKWING[7] are between US $ 10,770-11,700 each.
- BLACKWING[7] binaries are about US$ 12,700 per lens.

These prices are preliminary and may change. Individual custom lens tuning and personalization services are available on request and will be priced accordingly.

Contact: *7isatribe.com*

BLACKWING[7] Specs

Focal lengths	27, 37, 47, 57, 77, 107, 137 mm
Aperture	T1.9 -T22 for all
Looks	S: Medium focus roll-off, medium flare T: Heavy focus roll-off, medium flare X: Heaviest focus roll-off, high flare
Lens Coating	Single and multi-layer anti-glare
Anti-reflection	Fixed on S version Tuneable on S, T, X versions
Iris	14 blades, Circular
Image Circle	48mm Ø Full Illumination (Full Frame / VV format)
Illumination	60mm Ø (65mm Format coverage, except 27mm)
Image Distortion	Within -4% to + 0.5% (FF /VV)
Transmission	420nm to 680nm waveband
Breathing	< 4% magnification shift from ∞ to close focus
Mount	PL mount (other options on request)
Focus Scale	Windowed left / right, Imperial (Metric on request)
Focus Barrel	270° rotation
Iris Barrel	90° rotation
Aperture Scale	Non-windowed left / right
Gears	Consistent focus and iris gear placement
Front Diameter	114mm O.D. / 104mm I.D.
Operating Temps	-20 to +45 °C

BLACKWING[7] Backstory

Neil Fanthom and Bradford Young ASC have launched a new company called TRIBE7 and a new series of Large Format lenses called BLACKWING[7]. Focal lengths so far are: 27, 37, 47, 57, 77, 107, 137mm. Lots of sevens.

Neil Fanthom was one of the ARRI Rental gentlemen who whisked me off to an undisclosed NDA location at NAB in April 2013, exactly 6 years ago, to foreshadow what would become the ARRI ALEXA 65 and its creative collection of characterful lenses. One year shy of seven years later, Neil and Bradford launch BLACKWING[7].

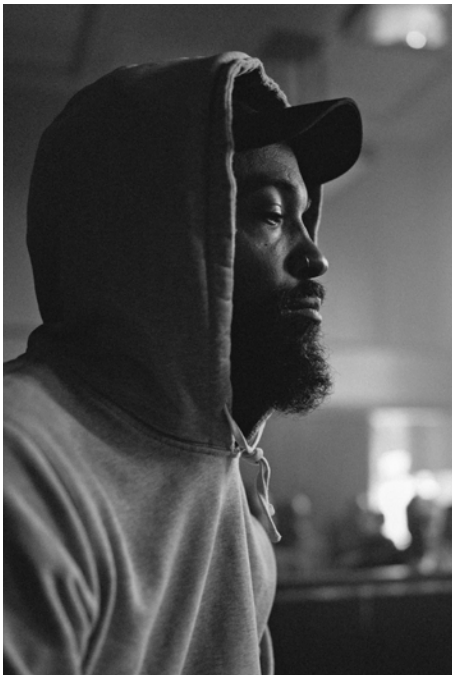
Bradford Young, ASC is the acclaimed cinematographer whose credits include *Selma, A Most Violent Year; Arrival;* and *Solo: A Star Wars Story*. He studied film at Howard University. Bradford's cinematography on *Arrival* won a Silver Frog Award at Camerimage and nominations from the Academy, BAFTA and the ASC.

Clearly, these gentlemen know about lenses and look and cinematography.

Neil explained, "TRIBE7 is a company interested in all aspects of creative image making and especially in color science, light and optics—how those facets of imaging can be explored, and re-imagined, to the benefit of today's creative filmmakers. One of our aims is to provide artists the ability to tune (enhance) and de-tune (distort) elements of color and light to bring a greater intentionality and visual authority to their story."

Bradford added, "It has been an interesting journey. It all began when I was researching cameras and lenses for *Solo: A Star Wars Story.* Neil came to me with a wonderful opportunity to experiment. They were developing the DNA lenses at ARRI Rental and that gave me an opportunity to embed some of my own meta, my history and some of my own life into the glass. Things progressed from there and now we are introducing BLACKWING[7]."

The new BLACKWING[7] lenses are Large Format T1.9 tuneable lenses based on designs from the early 20th century. There are 3 sets of lenses with varying degrees of "distress," distortion and look. Additionally, they can be tuned-to-order to the taste of the individual cinematographer. The optical design allows for the flexibility to provide varying degrees of spherical aberration, halation, and flare. This offers varying degrees of smoothness to the in-focus image area, different amounts of focus roll off in the out-of-focus areas, and unique flare characteristics.



Bradford Young, ASC

Neil Fanthom

Each focal length in the set has three variations: S (Straight), T (Transient) and X (Extreme). The lenses have been designed from the ground up with subtle distortions and edge halation that is generally seen with 1930-1950s lenses. The halation can give the lenses a look that's even faster than the native T1.9 because it lowers contrast, fills in the shadows and accentuates the focus roll-off on faces and objects.

The first focal lengths out of the gate will be 37, 57 and 77mm. The additional four focal lengths, 27, 47, 107 and 137 mm will be delivered next. A 17mm and additional focal lengths may come later.

From the beginning of our discussions about this new venture, Neil made frequent references to music. He pointed out that just as cinematographers are constantly seeking unique visuals that differentiate their work, so do musicians modify their instruments and tune the acoustics.

BLACKWING[7] tuning

Every BLACKWING[7] lens is hand-built in Germany in cooperation with a long-established and well-respected optical manufacturing firm. A proprietary production tuning process allows the optical performance of each lens in the range to be uniquely configured—tuned or toned—to their owner's wishes and creative style. Three pre-set tonalities are available:

S STRAIGHT (Standard)

S-tuned BLACKWING[7] lenses have a profile founded on lens designs from the first half of the 20th Century, such as the 1936 Kodak EKTAR 45 mm f/2, and the 1950 Wray UNILITE 50 mm f/2. Lenses have a simple one-layer coating and a smooth roll-off to their sharpness characteristic.

T TRANSIENT (Middle)

T-tuned BLACKWING[7] lenses have a profile which further softens the roll-off to the edge of the frame, and provides increased edge detail halation. T lenses are designed to capture a slightly softer, artistic image, with a higher degree of light reactivity and flaring characteristics are harder and more prominent than with the S-tuned version.

X EXPRESSIVE (Extreme)

X-tuned BLACKWING[7] lenses exaggerate the image roll-off to the edge of the frame, to the point where only low frequency performance is evident in the outer thirds of the frame. X-tuned optics have further exaggerated edge detail halation and a minor degree of spherical aberration and focal plane curvature, which exaggerates the effect of shallow depth of field. X-tuned lenses are designed for filmmakers who light aggressively and expect their lenses to offer luminous characteristics, especially with hard lighting.

BLACKWING[7] Backstory, cont'd

Bradford Young, ASC

Bradford Young, ASC continued the discussion on how BLACKWING[7] began, "During prep on *Solo: A Star Wars Story,* I was excited about what was happening with the DNA glass. We kept testing and pushing hard. Then, I got a call from Neil one day as I was testing 'donor' lenses with the whole camera crew and looking at flares, uncoated glass, compression, fall-off and chromatic aberration.

"Neil had a lens that he wanted us to take a look at. It was a vintage 50mm T2.0 that he'd sourced, but which was proving tricky to rehouse. The optical groups were in a jury-rigged rehousing and we had to be very gentle with it. I don't mean to exaggerate, but when we mounted it on the camera, it was one of the best looking lenses I've ever seen. It had so much going on— so many imperfections that were really strange.

"There was a beautiful roll-off distortion. The inside of the barrel hadn't been anodized so it was getting a strange flare that I hadn't seen before. It was gorgeous portraiture glass. We pushed to make the look more 'dirty,' more atmospheric, less clean. As the DNA project progressed, I could choose each lens for different scenarios in a different way.

"Once we started shooting, Neil would pop in every now and then. One day, in 2017, we got to talking about the future. I said that I love shooting, I love being on set. But I come from a family of teachers. I always thought I'd be a good supporter. I like to stand next to other cinematographers and hear what they have to say about the craft, the art form. I'd love to pursue something additional in my life and provide a service for my colleagues.

"The next day, Neil comes to set again and asks, 'Do you have a moment? Can I talk to you about something?' We walked off set and settled to talk, of all places, next to a dumpster in the middle of Pinewood.

"He said, 'I've been thinking about what you said yesterday. I love filmmaking. I love the art. And I'm also a scientist and I have seen how you cinematographers really want customized lenses that are unique and have personality.'

"Neil described a concept that addressed the needs of Full Frame, high resolution acquisition.

"The dilemma for everybody at the time was that producers wanted us to capture more resolution in Full Frame / VistaVision formats, but there was not enough lens support. I totally did not understand that concept before Neil pulled me outside. I had skipped from Super35 to Alexa 65. And I had not paid attention to anything in between.

"I get it now. That was the reason why the Full Frame cameras and lenses started coming out. Neil explained that he was not thinking of sculpting glass to replicate the old formulas, which were essentially ZEISS lenses from the 1930s to 1960s.

"He wasn't trying to write an algorithm on how to grind the glass exactly the way they did then. Instead, he wanted to take current technology and use those biases that we liked to give a new series of lenses a certain kind of character.

"This was very interesting because I could see why many people were yearning for such a lens series. This would be a new opportunity for us to introduce a new normal, not a sub-culture perspective to glass."

Neil Fanthom

Neil explained, "BLACKWING[7] lenses are crafted though a process of innovation and intention. The lenses exhibit unique imaging properties that arise from the introduction of distortion during the development and manufacturing processes. This distortion is modular by design and allows control over key parameters that shape many creative characteristics of the lenses.

"The range comprises a core set of 7 focal lengths, with each lens having tuneable optical qualities. BLACKWING[7] lens tuning allows parameters such as sharpness, contrast roll-off, spherical aberration, field curvature and edge halation to be modified. This level of tuneability can be applied to the entire set of lenses, or on a lens by lens basis, to create curated optics that suit the personality and intent of the owner. In concept, the ability to individually tune each BLACKWING[7] lens is identical to how EQ adjusting is used in music production—to control the range, or shape of tonality in specific wavelengths across the audio frequency spectrum.

"Many of the design cues for the BLACKWING[7] series are founded on vintage lenses, but the real inspiration for our tuneable optics lies in the experimental nature of jazz music. The resulting image from a tuned BLACKWING[7] lens can be described as having an artistic, musical fidelity to it.

"The aesthetic design of the lenses is minimalistic yet purposeful and ergonomic. Focus and iris gearing placement is consistent across all focal lengths, scale rotation is smooth, and the lens casings are robust. BLACKWING[7] optics will provide years of dedicated service.

"The set is designed to fully cover Super35 and Full Frame formats, with all but the widest BLACKWING7 lens illuminating the 65mm format. Lenses exhibit good close-focus performance. They will fit onto both film and digital PL mounted cameras and are uniformly rated at T1.9 across the range.

"Unique and uncomplicated lens element coatings produce a variety of flare characteristics, ranging from the subtle to the exaggerated. Pricing will appeal to individuals and rentals alike. Due to the tuneable nature of BLACKWING[7] lenses, availability is strictly through advance order placement."

AbelCine Accelerator Program

Alicia Atterberry, AbelCine Project Manager; Sam Sielen, Fathom Camera; Jesse Rosen, AbelCine Director of Technical Development

Fathom Camera Cage One

Sam Sielen configuring the Fathom Camera Cage One.

Cinematographers, camera assistants, gaffers, grips, and filmmakers in general are known for an irresistible itch to modify equipment to suit the special ways in which they work.

It's always been this way. From the beginning, Pete and Rich Abel were adapting technology, urging manufacturers to enable equipment made for one thing to be used for another. "Sometimes what is lost in this industry, where products have to be mass-produced, is the ability to harvest the best for particular situations," Pete said. "We grew up in an environment of creative inspiration."

But going from inspiration, to a custom piece of gear, to a product that's ready to sell isn't so easy. To smooth the way and support filmmakers, AbelCine has launched their new Accelerator Program, which refines these concepts and brings them to market.

The Accelerator Program is an initiative of AbelCine's Development Center, located in Brooklyn's Industry City. This facility is home to the company's engineering, product development, and integration teams. These engineers, led by Director of Technical Development Jesse Rosen, are behind the CameoGear line of camera accessories and analysis charts. Now, they are sharing their expertise and resources with others who want to manufacture products of their own.

Jesse also started out as a DP. When he joined AbelCine, he helped optimize products for the cine market. He explained, "Our goal when we opened the Development Center in 2016 was to bring new products to market that address the challenges our clients see in the field everyday. Launching the CameoGear line is one way we've done this. The Accelerator Program supports this by bringing great ideas that are out in the production community to market where they can serve a wider audience."

The first partner in this new initiative is Sam Sielen. Sam is an accomplished documentary DP and Camera Operator. His credits include *Inside the FBI: NYC* (USA Network), *Ocean Warriors* (Discovery), *Whale Wars* (Animal Planet) and appropriately, *Tech Toys 360* (Discovery Science). Along the way, Sam built his own custom rigs and accessories. Each was a one-off, hand-made design, until he eventually started Fathom Camera to make some of his creations available to other filmmakers.

After a small initial run of the Fathom Camera Cage One, Sam realized that he needed help to sell his product. That's when he connected with AbelCine. Jesse and his team saw the potential in the camera cage and agreed to help Sam develop it.

AbelCine worked with Sam on modifications that would improve the product design, and also help bring manufacturing costs down. Besides collaborating on the design, as an Accelerator Program partner, Sam has access to AbelCine's facilities and tools. This includes a machine shop with a 3D printer, CNC lathe, CNC milling machine, bandsaw, and drill press. Since the Fathom Camera Cage One is a universal product for mirrorless and DSLR cameras, AbelCine's sales and rental inventory were used to test the final design's compatibility with a variety of models from different manufacturers.

"Working with AbelCine was a catalyst for scaling up production and expanding the distribution channels for Fathom Camera," Sam explained. "AbelCine's highly qualified team provided the knowledge and direction to help Fathom overcome many of the obstacles we encountered in the early stages of starting a business in the motion picture equipment industry."

Access to AbelCine's manufacturing partners allowed the Fathom Camera Cage One to be produced at a lower cost and in greater quantities. AbelCine also brought their knowledge of industry trends and equipment sales, an in-house marketing department, and an international distribution network to the partnership. If product designers want feedback from end-users, they can tap into AbelCine's client base as well.

The Fathom Camera Cage One will be available mid-May for $495 through the CameoGear distribution network, which includes AbelCine, B&H, and CVP. *abelcine.com/r/accelerator-program*

Fathom Camera
Cage One

Fathom Camera Cage One Product Overview

Fathom Camera Cage One is adjustable to fit most DSLR and mirrorless cameras. It provides countless mounting options and configurations and allows for full access to all features of the camera.

Weight: 10oz / 285g
Materials: 6061 Aluminum alloy; 316 and 304 stainless steel fasteners

Mounting Points

Threaded holes:

- (57) 1/4-20, most with 9mm center-to-center spacing
- (7) 3/8-16 holes w/ ARRI-style locating holes
- (2) 3/816 holes, non-ARRI-style, in base for tripod plates

Quick Release Mounts:

- (3) cold shoes
- (4) NATO rails

Mounting Details

- Shoe-mount lock adjustable on 3 axes
- Repositionable M2.5 anti-twist screws

The cage has a shoe-mount lock for the following settings:

- In normal configuration mounted to lower NATO rail of top plate—fits cameras with a minimum height of 89mm (measured from base to top of shoe-mount) and a maximum height of 104mm.
- In flipped mode on upper NATO rail of top plate—fits camera with minimum height of 110.5mm and maximum of 125mm. (The fit for cameras with height between 118mm and 125mm is dependent on clearance in front of camera's hot shoe.)

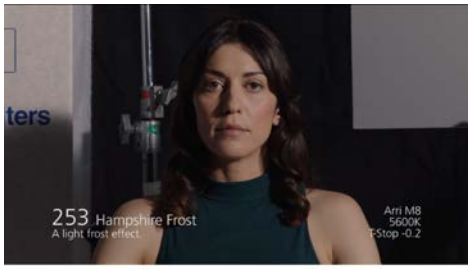
Once the camera's top shoe-mount position is set, the camera can be installed and removed from the cage by simply installing/removing the two included slotted screws—one on the base, and one on the shoe-mount lock. Mounting screws can be replaced with standard Manfrotto / Sachtler tripod screws if lost.

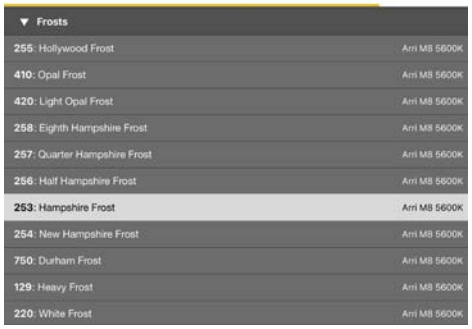
Compatibility

Works with (but not limited to) the following cameras:

- Panasonic GH5, GH5s, GH4, GH3
- Canon EOS R, 5D Mark II, III, IV
- Blackmagic Pocket Cinema Camera 4K
- Nikon Z6, Z7
- FUJIFILM XT-2, XT-3
- NATO clamp compatibility
- Compatible with Cameo Swivel Mount and CameoGrip

LEE Filters Diffusion Comparator App



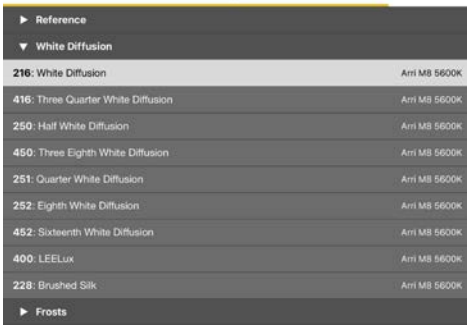


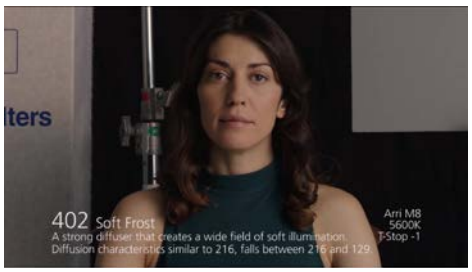
Have you often wondered what if...? What if you were to use a 4x4 Grid Cloth instead of an ever-popular 216 White Diffusion? And what's the real difference in look between a 253 Hampshire Frost (sometimes called "Hamster Frost" by New York crews) and no diffusion at all?

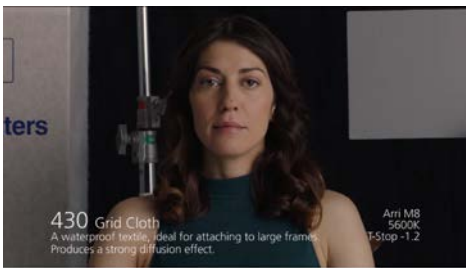
The answers are presented in practical diffusion demos of the entire line from LEE Filters. Go online for a comparison of any two filters side-by-side or by density: *leefilters.com/lighting/diffusion-list.html*

Download the LEE Filters Diffusion Comparator App for iOS or Android. The larger screen area of an iPad or tablet helps in viewing the interactive video that shows degree of softness, wrap and shadow fill.

From LEE Filters & Panavision Europe Ltd.







Panasonic EVA1 Upgrade 3.0

EVA 3.0 is a free firmware upgrade that greatly improves the Panasonic EVA1 camera's capabilities, including 4K60p 10-bit capture, hardwire remote control via USB-Ethernet adapters, and the addition of a user button function for quick switching of shooting modes and frame rates.

EVA 3.0 is the 7th firmware upgrade since the EVA1 camera's release, with more upgrades planned. Introduced in late 2017, the AU-EVA1 is a 5.7K cinema camera with EF-mount, a Super-35mm sensor, 14 stops of dynamic range, Dual Native ISO ratings of 800 and 2500, and the same colorimetry as the rest of the Panasonic VariCam camera system.

EVA 3.0 adds HEVC (High Efficiency Video Coding) H.265 for 4K 10-bit recording up to 60 fps. The EVA1's other recording modes include 4K 10-bit up to 30 fps or 4K up to 60 fps in 8-bit. HEVC H.265 has twice the efficiency of H.264, enabling 4K 30p 10-bit recording at 150Mbps and 4K60p 10-bit recording at 200Mbps. 10-bit recording allows the use of V-Log and HLG capture without banding or other artifacts. 4K 60p 10-bit at 200Mbps can be recorded onto V30-class SDXC cards.

The EVA1's USB port accepts Panasonic's dual-band AJ-WM50 WiFi Adapter for remote control by using the free EVA ROP (Remote Operation Panel) app on Android and iOS devices. The EVA1 USB port now also works with several inexpensive third-party USB-LAN adapters for ethernet cable connection to remote control apps and devices.

Quick Switch adds User Button shortcuts, which allow fast changes to all camera settings. At the press of a button, you can see a menu of preset setting shortcuts to be saved to or retrieved from an SD card. Select one and in a few seconds all the camera settings can be reset, including frame rate, resolution, recording mode, color setting, and more.

EVA 3.0 provides a focus position indicator in meters or feet for the EVA1 On-Screen Display. When recording or playing back HLG (Hyper Log Gamma) material, the LCD, SDI and HDMI video outputs can be individually set to display in HDR or SDR on monitors. A second Auto White Balance memory position now allows quickly scrolling to two AWB selections as well as up to 8 preset white balances. 8 Still Image Capture enables JPEG frame captures to an SD card during playback, along with an intuitive frame advance added to the playback controls.

EVA 3.0 free download: *bit.ly/2RzEWUU*

Cartoni Sport 200 Tripod

Cartoni launches the new Sport 200 heavy-duty Sports 200 tripod legs.

The Sport 200 is designed specifically to meet the rigorous demands of sports, location and OB production.

"The new Sport 200 is a game changer. It features an extremely innovative profile and angular structure, which gives it a sturdiness you simply cannot get from standard tripod tubes. The rigidity allows camera operators to be extremely precise in their movements—from whip pans to tracking players or objects," explains Elisabetta Cartoni, President and CEO of Cartoni.

The new Sport 200 is built with Duralumin as used in the aircraft industry and offers outstanding torsional rigidity with camera packages up to 200 kg (441 lb), in all kinds of large camera/lens configurations.

Its innovative profile is angled and shaped to ensure maximum strength while weighing only 10.5 kg (23 lbs). Designed to withstand even the harshest weather conditions, the Sport 200 can endure rain, dust, moisture and extreme temperatures.

Built with the camera operator in mind, the Sport 200 has a center brace and a telescopic mid-level spreader that is equipped with a truss structure to ensure stability in any situation.

Set up is fast and comfortable. Each leg has positive rotary locking knobs and safety pins. A bubble level is located on the side of the platform where it is easy to see. The Sport 200 also has both a spiked foot for soft terrains and also a pivoting rubber pad for flat surfaces. Simply twist the rubber pad to reveal the spiked foot.

The Sport 200 accepts classic Mitchell flat base heads and has 4 standard bolts on top as well. It is compatible with Cartoni and competitor heads as well as the Cartoni HD Dolly and HD floor spreader.

The new Sport 200 comes with a five-year warranty. But, thanks to Italian engineering, you might never need it!

For more information, visit Cartoni, and Manios Digital & Film, at NAB Booth C9020.

cartoni.com

Cartoni Master 25 Fluid Head

The new Cartoni MASTER 25 comes in a classy Black and Gold design as a tribute to the famed CARTONI Fluid Heads of yesteryear. It is also available in grey anodized aluminum.

The Master 25 is a rugged yet lightweight fluid head designed for studio and location production. It supports cameras (complete with long lens, viewfinders, and pan bar controls) with a payload capacity of up to 30 kg (66 lb).

The Master 25 weighs 5 kg (11 lb), which is extremely lightweight for a head that can carry so much. It has a tilt range of +/-90°. Easy-to-use rings allow the camera operator to preselect the continuously adjustable fluid drag and counterbalance on a numerical scale from 0 to 10. Both the pan and tilt brake levers are easy to reach, and the head has a convenient horizontal lock for setup.

With a 150 mm bowl, it offers a wide and stable base on tripods or hi-hats. The head base also includes 4 bolt threads for direct mounting. Additionally, the sliding camera plate is compatible with other brands, and is available with standard 11 cm plate or 22 cm extra-long plate for balancing various camera configurations. It comes with a single telescopic pan bar, a second one is optional.

The Master 25 is a versativle, competitively priced head with superb balance and a super-smooth, continuously variable patented fluid drag on pan and tilt. That means it can precisely track slow moving objects and then whip-pan in an instant.

Litepanels Gemini 1x1 Soft RGBWW LED

Gemini 1x1 Soft RGBWW LED Panel

The new Gemini 1x1 Soft is an all-in-one, LED light fixture that is easy to transport and rig for all kinds of location setups.

Think of it as the smaller sibling of the Litepanels 2x1 Soft Panel introduced in September 2017. They both can be plugged directly into an AC wall socket. One notable difference is that this Gemini 1x1 Soft Panel can be powered with an onboard 14.4 Volt Battery, see below. (The 2x1 can be powered by 14.4V batteries with the optional dual mount battery bracket. Available for V-Mount or Gold-Mount batteries.)

The Gemini fixtures have RGB+WW LEDs: Red, Green, Blue + White Tungsten and White Daylight. RGB LEDs let you dial in almost any imaginable color.

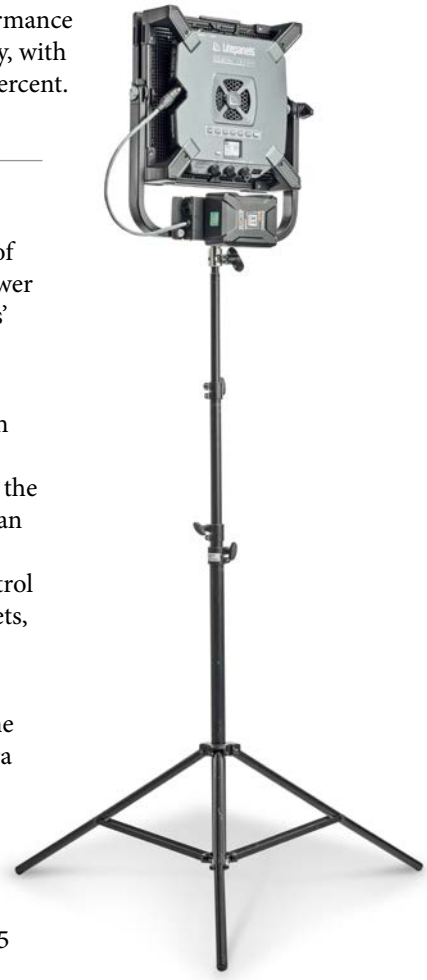
There are 4 color modes:

- CCT (Correlated Color Temperature) is the familiar Bi-Color (Tungsten to Daylight) setting with the addition of Plus and Minus Green correction. There are also 6 presets: 2700K, 3200K, 4000K, 5000K, 5600K and 6000K.
- HSI mode is for full control of Hue, Saturation and Intensity from the 360° color wheel.
- Gel mode is like having an electronic swatch book inside the fixture's control panel.
- Effects mode offers a dazzling array of creative lighting effects such as emergency lights, strobe, paparazzi, party lights, TV, etc.

Gemini 1x1 Soft provides an extensive choice of control options with intuitive onboard buttons and dials, as well as remote control via wired, built-in wireless DMX or Bluetooth with Litepanels SmartLite Director app.

The Gemini 1x1 delivers flicker-free performance at any frame rate, shutter angle, or intensity, with smooth dimming from 100 percent to .1 percent.

litepanels.com NAB Booth C5725



Anton/Bauer Titon

Anton/Bauer's all-new Titon series of 14.4 Volt batteries is designed to power most LED panels, such as Litepanels' Gemini, along with a wide range of Cine, Broadcast and ENG cameras.

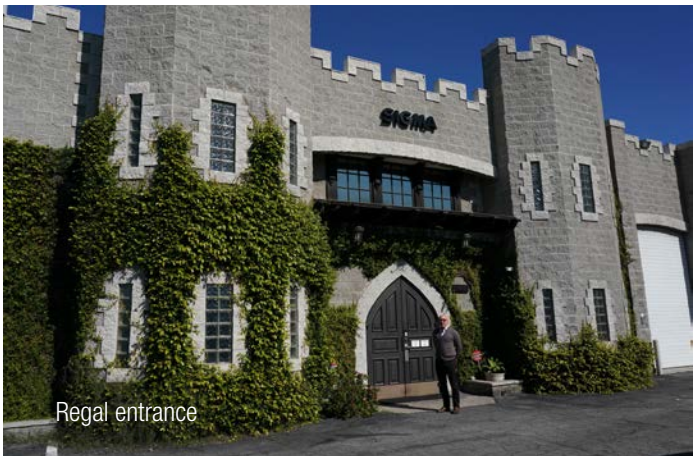
Titon batteries are available in 90Wh and 150Wh versions for both Gold Mount and V-Mount. Furthermore, the Titon's P-Tap and USB connectors can also power accessories such as wireless transmitters, receivers, lens control systems, monitors, cell phones, tablets, and more.

Each Titon battery includes an LCD screen that shows remaining runtime down to the minute for every camera and accessory being powered.

Titon batteries are rated at operating temperatures from -4F to 140F (-20C to 60C).

antonbauer.com NAB Booth C5725

SIGMA Burbank Studio



Regal entrance

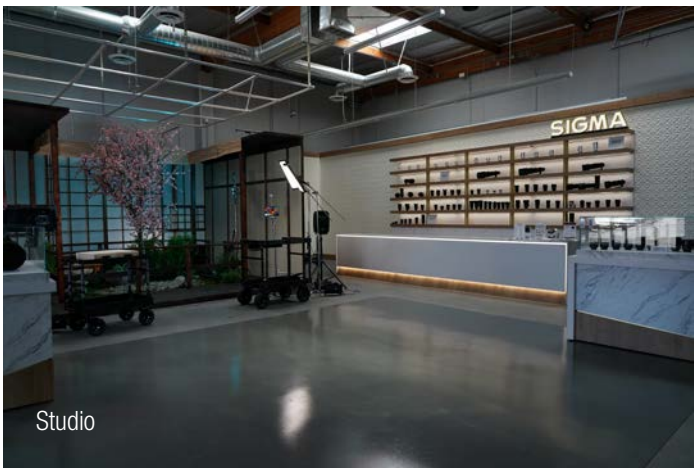
Sigma Corporation of America will debut three Sigma high-speed Full Frame cine prime lenses at NAB: 28mm T1.5 FF, 40mm T1.5 FF and 105mm T1.5 FF. This brings the total count of Sigma cine lenses to 13: FF Zoom, High-Speed Zoom and FF High-Speed Primes. They have PL, E and EF mounts. LF to come. Directly across from Film and Digital Times at NAB 2019, Sigma is in booth C10308.

Meanwhile, back in Burbank, Sigma recently opened a new 10,000 sq. ft. studio, showroom, screening room, lens repair shop and office facility. Aubrey Duclos, Cine Operations Manager at Sigma Burbank, invites filmmakers to visit, test, attend presentations and workshops. Sigma Burbank is at 148 S. Victory Blvd., Burbank, CA 91502. The doors are open to everyone during regular business hours; no appointment needed. *sigmacine.com*


Warranty Service Center. Mark Amir-Hamzeh, Timur Civan, Eric Hall, Jordan Smith


Screening Room

Reception



Studio

Mark Amir-Hamzeh, President, Sigma Corp. of America

Showroom

Don Burgess, ASC, Camera Owner

"I want to have the cameras that I can really get to know. It gives me more control over the images that I'm delivering."

JON FAUER: Don, I understand that you own your cameras.

DON BURGESS: Yes, I own 2 RED MONSTRO 8K VV cameras.

Who takes care of them?

I have a good relationship with the rental houses. It depends on where in the world we're shooting and where we're getting equipment from. You have to be flexible these days.

I think it's a great idea to own your own equipment. Please give us some examples.

We recently shot "Sextuplets." The challenge was the fact that one actor was playing six, and at one time seven, parts in the movie. Ultimately that involved a lot of motion control work to pull off the illusion that in the same scene you've got seven different characters. The RED camera with the MONSTRO 8K VV sensor was a perfect choice for the movie because you need to "oversize." In other words, it's good to have extra room around the frame to move things and adjust in post when you do all your visual effects work putting the composites together. Having that extra VV frame size really helps in keeping the quality of the image high and also giving you the ability to shoot it like a normal movie. A lot of people were involved. It's a Netflix film. Light Iron's does the DI. A few visual effects companies are involved. It's pretty complex.

What aspect ratio were you shooting in?

We decided on a 2:1 aspect ratio.

I guess you crop in post?

Yes. We we created the frame lines within the frame lines. That gave us wiggle room later to adjust the frame around in post, working ultimately at a 7K extraction inside the 8K frame.

And the native MONSTRO sensor is pretty close to 2:1 anyway?

It's pretty close to that. It's a format that I think works well on the television screen. It fills up the Smartphone, iPhone, iPad and the TV screen. But you never know. You might end up doing a 1:85 release, too, in a few theaters. So you kind of have to be ready for all of that.

Why did you decide to shoot FF/VV large format?

Mike Tiddes, the director and I basically had conversations about how this show would be viewed and what Netflix wanted. We wanted to fill up the frame with as big an image on the TV as possible. When we looked at the various ways to approach that idea, this one seemed to be a balance between shooting for the big screen in 2.39:1, which I love. I'm not crazy about 16:9. So 2:1 was something that could work for the director and me.

Agreed. But, I guess someone could ask, why not shoot in Super 35 format? That's a leading question because I think I know your answer.

Well, what do you think the answer is?

It just looks better in large format because of the more compressed perspectives that you can get in large format. You're using longer lenses and getting wider shots.

Yes, I think that the bigger format in 8K with these essentially medium format lenses allow you to shoot much wider and still not get distortion. So that's a wonderful thing. Especially in certain types of films, the wider lenses really put the audience right in there with the characters.

What about depth of field? Was that part of your decision?

Not as much on this one. But I do like the out-of-focus fall-off. I like that you can be wider on the lenses and still still get a fall-off that it gives you more control over the T-stop. Especially at 800 ASA, you have more tools in the toolbox to work with. You know, you can try a lot of different things until it feels right to you. And it's just a lot more fun.

Do you own your own lenses as well?

No, I don't. I sold all my lenses when I was worried about where this was all going to end up. All of a sudden your lenses become obsolete because they don't cover the format that everybody falls in love with. So at the moment, no I don't own lenses. But maybe the dust will clear and we'll all settle on a 8K VV (40mm x 20mm). But we'll see.

Sensor sizes and standards are like the Wild West.

It is pretty wild. But the projects vary so much. On "Aquaman" I had three units shooting all the time and I needed a massive amount of cameras and lenses. You can't come up with that with a guy building lenses in the garage. You've got to be able, on every show, to approach the material and be flexible to go a lot of different directions.

"Aquaman" was shot with what cameras and lenses?

"Aquaman" was a combination of Alexa Open Gate and RED DRAGON 6K sensor with Primo 70 lenses.

Same lenses as on "Sextuplets?" You must like them.

Yes. Originally I was planning on shooting the DXL for "Aquaman" but the studio wasn't ready to go there yet. They wanted assurances that the camera had really been used on enough productions for them to feel comfortable going with them. But my original intention was to go with the DXL. I was very happy with the way it looked. But now, the RED WEAPON with the MONSTRO 8K VV sensor is my first choice. It is basically the same RED sensor technology used in the DXL. The color spaces are a little different and there's a lot of ways to skin that cat. But with the way my cameras are set up now, I'm very happy with the way they look.

Tell me a little bit about how you have your RED MONSTRO 8K VV cameras outfitted.

I used all Panavision lenses and the latest Panavision accessories. We used their set-up as far as the connectors and the lens mount. I had two of my cameras and one of theirs and we had a second unit for awhile. It was good to keep the system all the same. The lens mount is the Panavision SP-70.

Did the Primo 70s have the internal motors?

No. The assistants were using their own lens motors and wireless lens controls. They all have their own gear. They live and die by that stuff. And so they all prefer to have their stuff tweaked out the way they like it.

I think that's a good thing. Rental houses may complain about how they're losing money on kit rentals, but I think for the assistants, it's their life-blood.

It is. They rely on it so much and it's all about touch and feel. How do you develop that if you've got a different system every time you go out?

You're absolutely right. So who were your focus pullers on "Sextuplets?"

Don Steinberg on "A" camera. The DIT was Mark Gilmer.

Did you set a look for the show and your DIT kept it, or how did that work?

Pretty much. We found a contrast that we liked in pre-production. It was the first time I used RED's IPP2 (image processing pipeline) and it worked great. It was comforting to see the look of the film on the monitors as we were shooting. They did a really good job.

Did you tweak anything from shot-to-shot or you just went with it as is?

Only when we got into extreme situations where you're kind of rescuing data being shot really late in the day or with extreme color temperature differences. Then we would go in and make some adjustments. Sometimes we would do a little color correction in the camera to keep it all looking the same and keep it matching.

Did you have dailies?

I looked at dailies on an iPad. It was set-up by Light Iron with their system. Mark would handle that and it would all get delivered to us on the iPad . I'd take it home with me every night and look at it. Pretty great.

How did you and the director come up with a look and a style?

You spend a lot of time early on and you keep talking about what the movie should feel like and how we're going to make all these motion controlled shots. We decided to use the Technodolly extensively on the film. Then we figured out how to block with it so we could always recreate all the shots day after day depending on how many characters were in the scene. So the technique evolved around that. Then as you're picking the locations, talking about it and looking at it, you develop a language of what the film should look like. It all gets sorted out as the director spends time with the production designer. Next, you figure out what the lighting should look like and, by the way, how do we keep it consistent from day one to day six in the same scene with the characters interacting with each other.

It becomes a combination of look and technique. It's very complicated to shoot a scene day after day and have to keep coming back to specific shots and match the lighting. You can't rehearse every character all the time before we start. So you have take a leap of faith and figure out as best you can how that shot's going to work days ahead of time. It was a real continuity challenge to shoot all these images and know that they will blend together and look organic and look like it's all part of the same scene.

I guess RED's MONSTRO 8K VV sensor was helpful because of its high resolution.

Right. The high resolution really helps because you can shoot wide knowing that you're going to tighten up the frame later. That way, you've left yourself plenty of room for anything that may happen. Because if you think you know you have it all worked out but then the actor gets creative and decides to turn and move a different direction, hopefully you have enough room to accommodate that.

Did you shoot everything on the Technodolly?

We used it for all the scenes where we had multiple characters

Don Burgess, ASC and Mike Tiddes, Director

and we needed a motion control head and motion control dolly. It allows you to create camera movement. You want the audience to forget that it's one guy playing all these characters. It's a much more elegant way to tell this story.

When shooting multiple cameras, were they both on Technodollies?

We would shoot one motion control shot but at the same time we may take the B camera and shoot over the shoulder with a double playing one of the characters. We set up the Technodolly and the track in one place and we're going to get all 18 shots off this particular setup because we can swing the arm around for almost any angle from master to close-up.

What focal lengths did you mostly work with?

Wide Primes. I would the 35mm, 50mm and the 65mm were probably the three lenses we used the most. Occasionally we'd go super-wide with the 14mm or 24mm to create, a different feel for a particular situation. Those very wide lenses focus very close and have a minimal amount of distortion. You can really have a lot of fun with them.

Speaking of focus, are you shooting wide open a lot?

No, because when you have all the different characters and you have to rack-focus to the person who is speaking, it becomes almost impossible to figure out the timing. We had to create more depth of field to keep more things in focus and bring less attention to an actual focus-shift and to make it feel more organic.

With motion control and multiple cameras, were you using wireless video or were you hard-wired to your monitors?

Most of the time we went wireless, not hard-wired.

Do you have your own wireless system with MONSTRO?

I don't. I find that wireless video improves every job, and that's a good thing.

So who provides it?

Sometimes it's the first assistant cameraman who has that gear. Sometimes it's the DIT. Sometimes it comes from the camera rental company. It's different on every show. I let the first AC and the DIT duke it out on that. I just want the best equipment going and they do, too. They're always in search of equipment that not only works great but doesn't break down and functions well. You never want anybody waiting on you because your stuff is not working.

Who maintains your equipment?

Don Steinberg. Whenever we start a show, usually I'll contact someone at RED and one of their people will come to the prep and then ensure that the camera is tweaked, up-to-date, performing brilliantly and both cameras are in sync and look the same. RED has been very helpful in sending a technician to come out during prep and get the cameras all tuned up.

What's the reason that you own your own RED cameras? (As you know, I'm in favor of owning/operating.)

I want to have the cameras that I can really get to know. It used to be that you got to know film stocks. Now we have to get to know these cameras. They change so much and there's always so much to learn. But with these two cameras, I can keep them up to date. When the next generation is ready, then I can update. It gives me more control over the images that I'm delivering.

I agree. When you say update, does that mean you trade them in and get the new ones?

Sometimes it's upgrading the camera system. I've had these RED DSMC2 camera bodies for quite awhile. I just upgraded them to include the latest sensor technology from RED with the MONSTRO 8K VV sensor before the last film. It's worked out great. I couldn't be happier.

In between jobs, which I know is a very short duration of time with you, where does the equipment go?

It goes to a rental house. They look after it. I'm getting ready to go do some commercials in Vancouver next week.

I think that's a good model for rental houses, to work with owner/operators and DP's who own their own equipment and have the rental house store, service and even do the billing. I think it's good for everybody because the rental house doesn't have to spend all their capital on new gear. And you have the equipment that you need.

That's something that's always kind of existed. Otto Nemenz, when he first started and had his little place on Sunset Boulevard, a lot of the equipment was owned by guys like us. He maintained it and rented it out. Then he got bigger and bigger and eventually he didn't need our equipment. But that's how it all began. When he first started, Otto was an assistant cameraman who was very busy and then became a cameraman in his own right, and was always involved in equipment.

I remember that narrow, long space of his on Sunset Boulevard. Owning equipment is not for everyone. Why do you?

There's a certain comfort in knowing that your cameras are only being used by you. You know where they've been and you know what they've been through. You can rely on them and you have certain people working on them. There's more comfort in that for me.

Hydra-Arm

This is a stabilized, carbon fiber camera car arm that breaks down small enough to pack into a few cases. When assembled, the Hydra-Arm's total weight is 175 lb. It supports a remote head / camera package payload of up to 55 lb.

Think of the Hydra-Arm as a BYOV (bring your own vehicle) style of camera arm. It has suction cups that the company says are gentle enough to mount onto a Lamborghini Urus or your favorite SUV. Be sure to add safety straps. In addition to bringing your own vehicle, bring your own remote head: Shotover G1, Flight Head Mini 3, ARRI SRH-3, Ronin2, Movi XL, etc.

Be sure to have a highly skilled, trained crew and plan the sequence of building, operating, and breaking down in advance. Although the Hydra-Arm and camera remote head can theoretically be operated by one person, it's best to have one "crane" operator for the up-down-pan moves of the arm and another camera operator for the tilt, pan, and roll of the remote head.

Specs

- Built-in stabilization at the axis point.
- Control with joystick, wheels, MIMIC, etc.
- Tilt axis (up-down): 35°
- Pan axis of the arm: full 360° rotation in 5 seconds
- Pan axis circumference: 24 ft
- Built-in self stabilization.
- Lightweight modular design for simple assembly.
- Can be assembled in 30 minutes by 2 grips.
- Compatible with hard-roof cars.
- Eighty percent of the arm is made of carbon fiber.
- Lightweight, carbon fiber arm weighs approximately 175 lb.
- Maximum payload: 55 lbs
- Compatible with Ronin 2, Movi XL, Flight Head Mini 3, Shotover G1, Arri SHR 3etc.

hydra-arm.com

Cinetech Italiana Capinera Dolly

Laggiù nell'Arizona
terra di sogni e di chimere
se una chitarra suona
cantano mille capinere…

(Translation) Over there in Arizona
land of dreams and chimeras
if a guitar plays
a thousand warblers sing...

by Jacques Lipkau Goyard

So goes the "Tango delle Capinere" (composed by Cesare Andrea Bixio with lyrics by Bixio Cherubini), a famous 1928 Italian song about guitars, dark-haired ladies, kisses, gold, passion and more.

Capinera, the Blackcap Warbler bird, has been the source of inspiration for a number of literary and artistic creations, most notably the Sicilian realist writer Giovanni Verga's 1871 novel *Storia di una Capinera (Story of a Capinera)*, translated into English by D.H. Lawrence. More recently, the Capinera influenced the Motion Picture industry when Armando Grottesi, owner and President of Cinetech Italiana, introduced his CAPINERA Dolly in 2015.

Cinetech introduces the revamped Capinera Evolution: a light, maneuverable, reliable and compact dolly with advanced steering capabilities and a 60 kg / 131 lb maximum payload. The innovative bi-component wheels are one of the updates featured on the Capinera, now standard on all of Grottesi's Dollies. They offer smoother rides and traditional pneumatic wheels are replaced with solid ones. (No need to fill with air).

Characteristics of the Capinera Evolution

- It can position the camera extremely low and high.
- Runs smoothly both on tracks or on the ground.
- The inner rims have a 90 Shore hardness for better movement, high stability and smoothness on tracks.
- The outer rims have a slighly softer 70 Shore hardness for improved steering and grip on any surface.
- Enhanced steering and faster, smoother boom operation.
- New steering lock for tracks or any surface.
- All metal parts are made of stainless steel or light aluminum alloys for low weight.

Mr. Grottesi's philosophy invites you to own your own dolly. Cinetech Professional Dollies, designed and manufactured entirely in Rome, are sold to rental houses and are now part of grip packages in 41 countries around the world. The Capinera Evolution is the result of 36 yers of experience in building dollies known for extreme ruggedness and durability, and the efficient customer service of the company. Cinetech Italiana is represented in the Americas by their new distributor, Cary C. Clayton of The Concept Company. *cinetech.it* NAB 2019 booth C-12520

Ronford-Baker Atlas 360 Rollover Rig

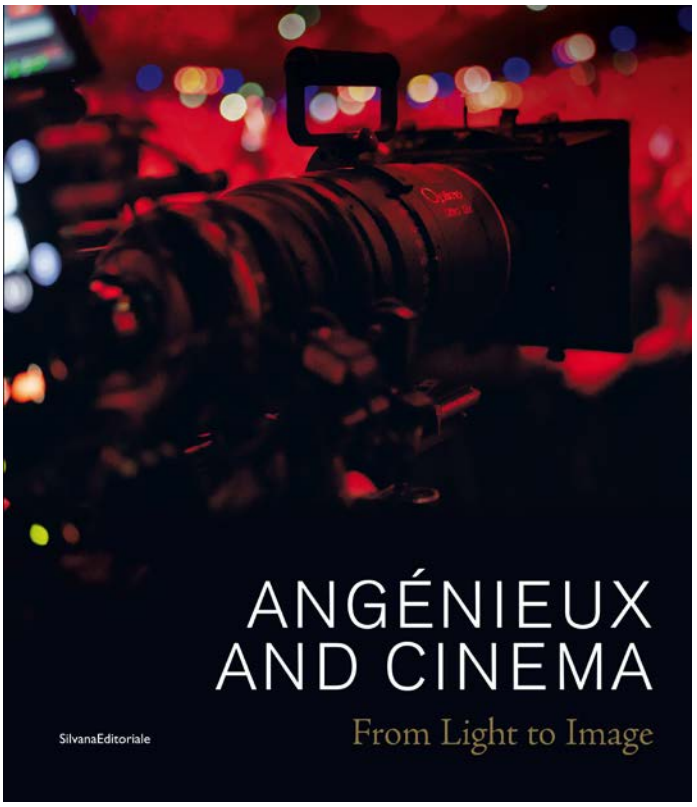
The new Ronford-Baker Atlas 7 360 Rollover Rig is designed to fit onto all Ronford-Baker heads, OConnor and other compatible fluid heads.

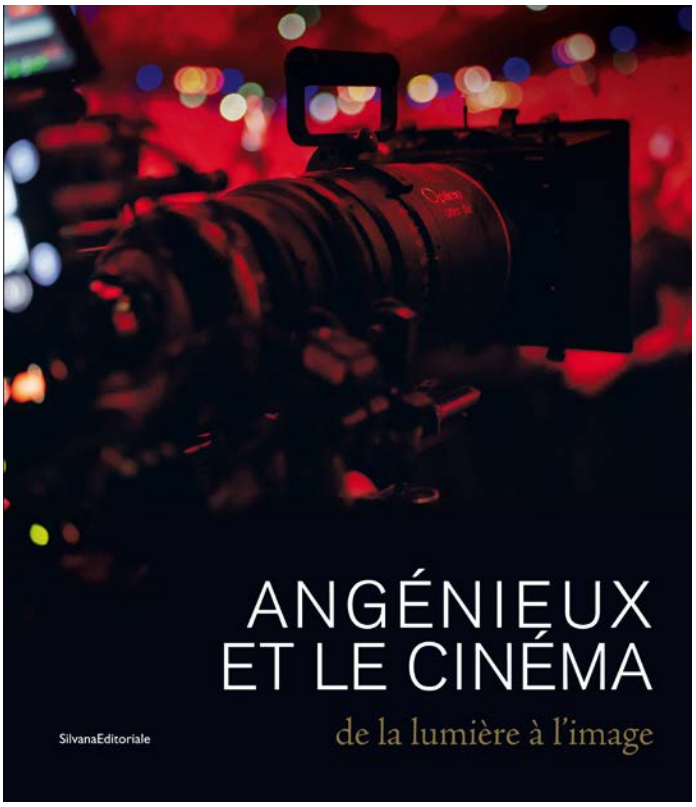
- 360º rotation
- The fluid unit has 15 variations of fluid control, as well as zero (fluid free) positions at both ends of the scale.
- Smooth positive braking.
- Camera is mounted onto sliding plates of different lengths and styles, including ARRI Dovetail or Quick Release types.
- The Platform is vertically balanced by a quick adjusting ratchet mount followed by a fine-tune nodal adjuster.

See videos of the system in use on Ronford-Baker Facebook and Instagram pages.

ronfordbaker.co.uk

Angénieux and Cinema, from Light to Image





For quite some time, Angénieux has entertained the idea of doing a book about the incredible story of the Angénieux brand since the creation of the company in 1935.

FDTimes and Edith Bertrand already took a first step with a special Angénieux History edition a couple of years ago. This was followed by a beautiful exhibition at the Museum of Art and Industry in Saint-Etienne, France from March to November 2017. At that time, 700 sqm were fully dedicated to the Angénieux adventure.

Following this exhibition, Angénieux wanted to go further and continued to collect material from experts, conduct research, talk to former engineers, and interview DPs, rental houses and other key "witnesses" from around the world. This is how a 270 page book was born, with a French and an English edition.

Angénieux is pleased to release this book around NAB exclusively for the cinema community before its release in book stores. It will be available via the Angénieux web site's new e-shop *(Angénieux.com)* at 39€ / $60. The bookstore release will come at the end of April in Europe and Cinegear time in the US. Worldwide distribution will follow.

The common thread of the book is the Angénieux company's 80-year, long-lasting passion for cinema, complemented by industrial adventures in photography, television, medical, optronics, and also space exploration.

By the way, on July 20, in the US (July 21 in some other parts of the world), the 50th anniversary of the success of the NASA Apollo 11 mission will be celebrated. Angénieux was on board Apollo 11. The book discusses the full participation of Angénieux in NASA missions.

For cinema, the book focuses on the technological achievements of Angénieux zoom lenses. Pierre Angénieux pioneered the mechanical compensation system that opened the door to high ratio zooms. All current cinema zoom lenses are based on the principle developed by Pierre Angénieux and his teams in the 1950s.

Angénieux zoom lenses accompanied cinema trends and continue to participate in the history of cinema. The book explains how the brand lived through the shift from analog to digital. In this new digital world, the brand continues to be a market leader. For example, the new zoom lenses for Full Format (Optimo Ultra 12x and EZ) integrate Angénieux's innovative IRO technology. The book also points out the brand's current technological and geographical challenges.

Excerpt from the back cover

"This work tells the incredible tale of Angénieux, a flower in the button-hole of French industry and a key name in world of cinema for more than 80 years. The saga starts in 1935 with a man, Pierre Angénieux, the founder of the company that bears his name. He revolutionized optical calculation and displayed a peerless spirit of invention all through his life, making the plant in Saint-Héand a worldwide point of reference for cinema lenses.

"In recognition of its contribution to the world of cinema, the company has received three Scientific & Technical Academy Awards in Hollywood. Angénieux lenses even played their part in achieving the impossible, traveling on board Apollo 11 to make man's first steps on the Moon a shared experience on July 20, 1969. A company of the Thales group since 1993, Angénieux continues to place the best technological solutions at the service of filmmaking. This book is aimed at all lovers of the cinematographic image, including photographers, video makers and cinematographers, as well as all those interested in discovering a truly outstanding industrial adventure." *angenieux.com*

Ben Richardson on *Yellowstone*

Ben Richardson, Cinematographer.

JON FAUER: Ben, What is the plot of Yellowstone?

BEN RICHARDSON: Yellowstone is a TV series from Paramount Network. It stars Kevin Costner as the patriarch of the Dutton family, who own the largest contiguous cattle ranch in the United States. Taylor Sheridan is the Co-Creator and Writer/Director of all of Season 1.

Where did you shoot?

The show is set in Montana. We spent about a quarter of our shoot days in the Bitterroot Valley at the Chief Joseph Ranch, just outside the town of Darby, about an hour south of Missoula. And the rest of the show was shot in Utah, based out of Park City. There's a fantastic studio, Utah Film Studios, with 3 state of the art sound stages. The Utah locations gave us a Montana look higher up in the mountains. We often worked at Thousand Peaks, where we also shot parts of Wind River. Both the Utah and Montana locations are relatively distant and challenging to get equipment in. The Bitterroot Valley is miles from major transit. One day we brought in a 43' Hydroscope crane for work in a river. They had to drive two days there and two days back from LA to get us that piece of equipment.

And that's why you wanted a remote head system that you could take with you all the time?

Exactly. And something that was also flexible for a variety of set-ups. We used a DJI Ronin 2 gimbal in a range of configurations through the season. It was controlled by DJI's Master Wheels. We also had a backup Ronin 2, because the system is affordable enough to carry a spare. The Ronin 2 is also very lightweight compared to traditional remote heads – the entire system is hand-holdable. You can also mount it for almost any scenario. We used it traditionally handheld by the operator. We used it attached to a piece of speed rail and carried by grips if we wanted to skirt the ground. We put it on a 13 foot jib arm; on our Giraffe crane; and we also rode it on the dolly because it was a great way to take out little lumps and bumps in challenging locations.

Describe the style and look of the series. Did you decide early on that there would be a lot of camera moves?

Taylor and I wanted to bring the scale and scope of old westerns to the show. A big part of that seemed to be classical camera work, avoiding the rougher edge of handheld. But obviously, laying dolly track in fields and forests is challenging. The Ronin 2 was often be the last touch to smooth things out. While we wanted to have a grandeur of the classic Western style, we didn't want that to mean that we ended up tethered and we didn't want there to be too much static composition. I tried, wherever possible, to find ways to bring the audience the experience of these enormous environments we worked in. Longer lenses are a huge favorite of mine and Taylor's, especially for wider frames. The wide shots in Yellowstone were often shot on 85mm and above, which, necessitates sending a camera crew half a mile away. We used all kinds of tools, from larger jobs and cranes, to ladderpods and Dana Dollies , but there were definitely times where the camera position was so inaccessible that I would simply find a 10 foot stretch where the gimbal operator could walk and that would give us a little movement to the shot.

What cameras did you have?

We shot on the ARRI Amira and Alexa Mini cameras recording 3.2K ProRes 4444. I love the Alexa Minis and they are a huge advantage in terms of size and weight, but by the time you build them out to be a functional Studio Camera, they can grow to the size of a regular Alexa. So we used the Amira for a more studio mode. It too is a very lightweight camera and we didn't need ARRIRAW, although I believe the Amira does now have that capability.

Lenses?

The Montana and Utah landscapes are vast and wide, and I found that if we used wider lenses, they diminished the scale of the landscape. So even our wides and mediums were shot at a minimum of 40 or 50mm, with the camera at a distance. This brought those rolling hills into the scene, in a grand way.

We carried several full sets of ARRI/ZEISS Ultra Primes, and a number of Angenieux zooms, including the Optimo 24-290 and

Steven Finestone, Camera Operator with DJI Master Wheels.

Optimo 45-120. We also had a wide zoom, but I tended to not pull it out as often. I was a big fan of the 45-120 for aerial work, as it helped avoid the temptation to go wider, and kept the landscape feeling epic and imposing even from the air.

What was it about Ultra Primes that you liked?

They are the closest modern lenses to my beloved ZEISS Standards. I couldn't in good conscience put our assistants through a 98 day shoot with the much older mechanical design of ZEISS Standards. It can be challenging to get lens motors on as the iris and focus rings are very close together, and they can have issues with binding occasionally, especially in bad weather. But the optical design of the Ultra Primes has a very similar simple, clean aesthetic, with just enough business in the backgrounds to please my eye. They don't get in the way, but they have enough aberrations to make the image interesting. They're in a consistent modern housing and they don't let you down.

And they match the Angenieux zooms pretty nicely?

Beautifully, although we did shoot a majority of the show on the primes. We averaged about 75 or 80 setups a day and we shot three cameras almost all the time. Working with primes helped me to keep track of what we were covering and how we were covering it more easily than working with zooms where it's easy to lose sight of who had what focal length from what position. But when I watch the show, I'm hard pressed to tell when we did switch to the zooms.

You shot in a 2:1 aspect ratio?

Correct. It provided interesting framing, and has been gaining a little bit more traction recently. It enjoys the feeling of 2.39:1 widescreen ratio while still providing for a better TV deliverable. For a number of reasons networks don't want to commit to a show being a true 2.39:1. But the 16:9 ratio always has been a little bit of a problem for me. It always seems to make the world feel smaller.

Yellowstone had an epic feeling with great camera movement.

In addition to the traditional dolly work, we often used the Ronin 2 with a Flowcine Black Arm. The Black Arm is a 3-axis stabilization system with vibration dampening, built for gimbals. It is absolutely phenomenal, terrific engineering. You hard-mount it to vehicles, ATVs — even our electric gator (for use around horses) — and it takes out the gross vertical movement. The grips would add an upright speed rail and the Black Arm was attached to that. It gave us unbelievably stable shots at speed. I could use an 85mm or even 135mm lens and be able to hold frames as steady as much more expensive solutions. As you said, these were very democratized resources. We were able to do chasing shots with horses and move alongside cattle. We did following, leading, and chase shots of vehicles and animals.

The Ronin 2 motors are very robust and responsive. I think that was the smartest choice DJI made with the move from the original Ronin to the Ronin 2: going with more substantial motors. There was a window of time with early gimbals where everyone thought that smaller and lighter was the goal. But ultimately that affected payloads and made it challenging for professional work. I think they made the right choice: the Ronin 2 is bigger in all dimensions and heavier than the original. But in the end, those are not negatives. It is still very small compared to similar solutions, and is a remarkably robust piece of equipment. It's pretty tough to knock it off course.

DJI Master Wheels have wireless control of the Ronin 2?

The breakthrough from DJI was the development of the Master Wheels. Operating with wheels is by far the best way to interact with a remote head, and Camera Operators are comfortable with it. It's also the best way to get precise, repeatable moves. Prior to DJI making their own wheels system, there had been other companies who had done very commendable jobs. But the transmission protocols weren't designed to support it in the same way, and they sometimes had issues with drift and centering. The DJI Master Wheels are a real game changer. They connect seamlessly and are extremely configurable in all the ways that operators require.

If you have familiarity with the Ronin set up screen, it's got all the same controls built into it. You make your balance adjustments on

the gimbal side. And then on the wheels themselves, you get direct control of the speed and response from the wheels. Operators are able to tweak and fine-tune as we're setting up and rehearsing a shot in the way that they are used to on any other remote head. They take gimbals out of the joystick operating mode.

What do you not like about joysticks? (Leading question.)

The joystick is a good way to for people to start learning what a remote head can offer, but ultimately it's not the right tool for complicated and elegant camera moves. For DJI to actually build and design their own wheels demonstrates their commitment to the professional industry. They are intuitive and reliable and yet come at a very reasonable price for a high-end remote system.

Is this a big market?

In the grand scheme of things, I imagine it has to be considered a niche market. So it was pleasing to see that DJI took this so seriously. We met with them multiple times as they were designing and developing the products. They listened. We had prototypes of both the Ronin 2 and the Master Wheels with us for several months. And then, when they went into full production, we switched out to those.

Did you seek DJI out to get prototypes?

I did. As soon as I started talking to Taylor about the fluidity he wanted on set and the freedom to keep imagining and reinventing as we worked through a scene, I realized this was a tool we were going to need. While we would use the traditional tools extensively, it was clear that adding a gimbal to the mix was the right way to go. So I did a lot of research and called up the various manufacturers. DJI were very receptive and told me that yes, they had a new model coming up and if I wanted to try it, they could lend me a prototype.

Did they send engineers with you?

They sent out some of their team with the prototype to help get us familiar with the system. We tested it around the studio parking lot, rigged to the Black Arm, and everyone in production was impressed with the results. The team stayed to observe the way we worked with the tool and feed that information back into the design process. It's a testament to the system that we were shooting with prototypes on weeks one and two of Yellowstone and by weeks 18 and 19, we had fully working, off-the-production-line models and we didn't need any technical help.

Why the Flowcine Black Arm?

Gimbals can correct for everything but the vertical translation (booming movement). When the gimbal is handheld, the operator is intuitively using their arms to smooth that vertical axis. But when the unit is hard mounted, to a vehicle for example, that needs to be compensated for. It's such an efficiently stabilized head that a little bit of vertical movement, an inch or two, doesn't show unless you have very close foreground elements. But when you start moving at speed over terrain, it becomes imperative that you stabilize the movement. Also, the Black Arm helps the gimbal out because. while it is very robust, I'm sure there is a degree to which the motors would be unhappy if you were to aggressively bring too much g-force to bear on them. So the Black Arm is like a single piece of a Steadicam arm and it has a travel of a little under two feet. That's enough to stabilize a decently rough route at a good speed, across a grassy fields with a few rocks, for example.

Where do you think this technology will take you? Is there an evolution that you'd like to see?

Honestly, as long as they continue to be as reliable in the field, I will be happy. The only issue, compared to more traditional remote heads, is that it's a bit of a "black box." They are relying on very sophisticated electronics. If DJI wants to renew their commitment to the professional market, it would be great to see these designs become perhaps slightly more modular, to facilitate repairs on set But, the honest truth is we didn't have any reliability issues at all over the duration of the show. At the relatively low cost of either buying or renting a Ronin 2, your insurance policy is simply to have a second one on the truck as a redundant backup. That's what we did, and we didn't need it.

How did you begin in the business?

I spent a couple of years living in the Czech Republic, working on an animated project. While I was there, I met Benh Zeitlin and some young American filmmakers with similar interests. That led to a friendship which saw me working on short films and ultimately shooting Beasts of the Southern Wild. In the end it's all about seeking out the right collaborators; filmmakers with a style and aesthetic that you share. I'm grateful that to this day I seem to be able to continue that.

The Crew?

A shout out goes to Steven Finestone our gimbal unit Camera Operator who worked closely with Brett Harrison, our Gimbal Rig Operator. Brian Sullivan and Christina Voros rounded out our Operators. "A" camera First Assistant was the fantastic Danna Rogers; with Valentine Marvel and Alex Worster doing great work focus pulling on "B" and "C" cameras in always challenging conditions. And I couldn't do what I do without Gaffer Corrin Hodgson and Key Grip Craig Sullivan.

Steven Finestone (Camera Operator); John Cook (Dailies Tech); Nic Edwards (2nd AC); Matt Leslie (2nd AC); Lisa Konecny (DIT); Brett Harrison (Gimbal Rig Operator); Danna Rogers (1st AC); Angel Fisher (Video); Ben Richardson (DP); Alex Worster (1st AC); Elver Hernandez (2nd AC). Bottom row: Christina Voros (Camera Operator); Emerson Miller (Still Photographer); Valentine Marvel (1st AC)

DJI Master Wheels

DJI Master Wheels

DJI Ronin 2

Flowcine Black Arm

for more information:
dji.com

Neo Super Baltar

At the BSC Expo in February, Will Bartleet of The Vintage Lens Co. discussed their Neo Super Baltar lenses: "We have formed a close collaboration with Whitepoint Optics in Helsinki to do the mechanics for Brian Caldwell's optical work. These are a re-imagining of vintage Super Baltars. The mechanical design has been tested rigorously at -20° to +45°C. They are easily serviceable without the need for shims; the adjustment can be made by moving the focus scale. The focus mechanism is a dual cam design with bearings and are ready for modern motors. The aesthetic design references the original Super Baltars and incorporates vintage design cues and typography.

"The Neo super Baltar produce the same gentle rendering gorgeous skin tones and rich warm colours of the originals. Optical Designer Brian Caldwell has resurrected these famous lenses from original Bausch and Lomb design blueprints to create the Neo Super Baltars.

Glass types and coatings have been painstakingly researched to ensure the Neo Super Baltars produce the same gorgeous images as their namesake. Focal lengths are 20, 25, 35, 50, 75, 100, all T2.3 and 152mm T3.0 and 229mm T4.4. They all have 300° focus barrel rotation, 110mm front diameters, and PL mount. The 20 and 25mm cover S35. The rest cover Full Frame. Also, the 75, 100, 152, and 229mm cover ALEXA 65.

Shipping from May 2019. Available exclusively from Vintage Lens Co. Contacts. USA: +1 310 256 3793. UK: +44 (0)117 230 8775 *Vintagelensco.com*

Vintage Lens Co is at NAB in booth C11419

Caldwell Chameleon Anamorphic 1.79x

Caldwell Chameleon Anamorphic lenses come in Super35 and Full Frame/VV versions, depending on the rear optical group you choose. They have a l.79x squeeze factor and can be configured with different rear optical groups to cover Super35 or Full Frame /VV. All the Chameleons are the same size and focus to 2.5 feet.

They were on display at the BSC Expo and did indeed live up to their stated look, "Capable of high resolution, they embody the distinct aberrations one would expect from anamorphic lenses, with a subtle elegance and flare characteristics reminiscent of classic anamorphic lenses."

The first batch of Caldwell Chameleon 2x anamorphic primes should be shipping end of June 2019: 32mm, 50mm and 100mm The 40mm, 60mm and 75mm are expected towards the end of 2019. *cintek.co.uk*

Super35		Full Frame	
32mm	T2	48mm	T3
40mm	T2	60mm	T3
50mm	T2	75mm	T3
60mm	T2	90mm	T3
75mm	T2	112mm	T3
100mm	T2.6	150mm	T4
150mm	T4	225mm	T6

Super35+ Series
Image Circle: ≈33m
Length: 142mm
Front Diam: 114mm
PL mount

Full Frame Series
Image Circle: ≈50mm
Length: 163mm
Front Diam: 114mm
PL mount

Distributed by Cintek in the UK. *cintek.co.uk*

Possibly at NAB in booth C11419

Tokina Vista One, 50-135mm, 105mm

Tokina has a new series of Vista Primes called Vista One. (Both sets cover well beyond Full Frame.) Vista One primes have a single-coated front element for more dramatic flares. Sharpness and contrast are retained with on-axis lighting. Off-axis lighting will introduce a blue flare. Tokina decided to go with single coated rather than uncoated element to maintain resolution and prevent complete "wash-out," while still offering this option for more dramatic lens flare. The Vista One is a limited quantity, single release lens set available upon pre-order. It will not be mass produced for at least the first year or two. The price will be around $55,000 USD for a set of 6 Vista One lenses.

Tokina's new 50-135mm T2.9 MKII is an update to the previous 50-135mm T3 Super35 zoom. It has a smaller 95mm front (vs 114mm) and mechanics that match the 11-20mm T2.9. It also has interchangeable mounts: PL, EF, Sony E, MFT, and Nikon F.

Tokina Vista Prime 105mm T1.5 gets a new Focus Scale with tighter witness marks. The rest of the Vista Primes will have this in the future.

tokinacinemausa.com NAB Booth C11419

IB/E Optics Smartfinder

Mitch Dubin with IB/E Smartfinder Pro prototype

IB/E Optics' Smartfinder Pro prototype was tested on the set of *Legion* with the help and support of Keslow Camera. Dana Gonzales, ASC; Mitch Dubin, Camera Operator; and David Edsall, First Camera Assistant provided input in the development phase of IB/E Optics' new large format digital DP and Director's Viewfinder.

Dana said, "It has been very good for us to have a Large Format option as we depend on a Director's Viewfinder to plan our images shot by shot."

The Smartfinder Pro is designed for lenses from S35 to Full Format and up to 65mm format and will be available in both PL and LPL versions. You attach a lens. The image is gathered on groundglass. It has a 62mm Ø image diagonal, which is slightly larger than the image of an ARRI Alexa 65. The groundglass concept is just like a traditional, optical Director's Finder. An iPhone is attached behind the groundglass. The camera focuses onto the groundglass image, through four optical elements made by IB/E, and you view the shot on the iPhone 7 Plus or 8 Plus screen.

The iPhone lets you shoot framegrabs and, of course, video. This is helpful for scouting and pre-viz.

IB/E Optics is expected to begin shipping the first production models by Cine Gear. *ibe-optics.com*

Dana Gonzales, ASC viewing the Smartfinder Pro prototype.

Phantom v2640 Onyx Specialty High-Speed Camera

The Phantom v2640 Onyx is Vision Research's latest high-speed camera. You can record up to 6,660 fps in 2K almost-square resolution, 12,500 fps at 1080p, and 19,690 fps in 720p.

These are the speeds you want to slow the wings of a bumblebee hovering, firecrackers exploding, mousetraps springing shut, volcanoes erupting, balloons popping and lightning striking. If you shoot tabletop food, you want this camera when eggs crack, milk pours, salt sprinkles and ice cubes fly through sheets of falling water.

The Onyx is designed for cinema production. It has the lowest noise and highest dynamic range of any global shutter Phantom camera. It is also four times faster than any other Phantom camera in HD.

There's a special optical low pass filter to reduce aliasing and moiré. Data can be recorded to the internal 288 GB of memory or onto a familiar Vision Research 1TB or 2TB CineMag IV. Data also off-loads via 10Gb Ethernet at up to 600 MB/second.

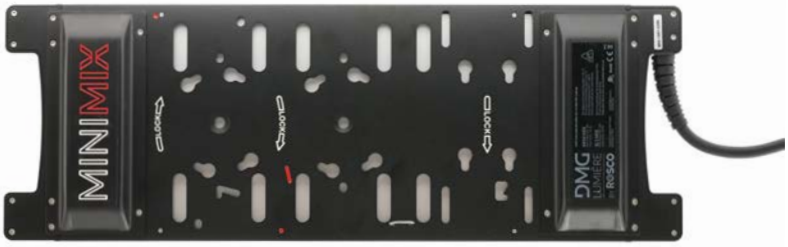
You can't buy the new Phantom v2640 Onyx Ultra-High-Speed Camera. It is only available to rent. Vision Research has appointed AbelCine as their North American Rental Partner. (Incidentally, AbelCine is also the exclusive sales agent for Vision Research Phantom cameras for the motion picture and TV production market in the US and Canada.) AbelCine will also make the Phantom Onyx available for sub-rent by North American rental houses who currently offer Phantom cameras. In Europe, Vision Research's rental partner is Love High Speed.

abelcine.com *lovehighspeed.com*

Phantom Onyx Specs

- 4 Megapixel sensor
- 2048 x 1952 maximum resolution
- Bayer pattern array
- Photosites are 13.5 microns
- Interchangeable lens mounts
- 12-bit recording to 288GB memory or 2TB CineMag IV
- ISO average: 3,200 for color and to 16,000 for monochrome
- 100-240 VAC, 280 Watt power supply included
- Weight: 17 lb / 8.1 kg
- Global shutter
- Multiple recording modes

MINI MIX from DMG Lumière by ROSCO



Power Supply & Onboard Controller can run remotely

The MINI MIX from DMG Lumière by ROSCO uses a patent-pending technology with a blend of six LEDs to create almost any color you can conjure up or accurately match Rosco gels.

The MINI MIX is extremely thin and lightweight. There are no complicated menus. Choose between 3 different modes: White, Gel and Color. Then adjust color temperature. Change hue, saturation or Rosco gel color. Pick an effect. Match an existing photo. You can access these intuitive controls with the fixture's onboard controls or by opening the myMIX app on your mobile device.

MINI MIX
585 x 205 x 37 mm / 23 x 8 x 1.4"
2.56 kg / 5.6 lb 12-35 VDC Power
100 Watts; 288 (6x48) LEDs
1700°K to 10000°K
CRI Average >95 / TLCI Average >90
Flat or Round Diffusers
NAB Booth C9518 *dmglumiere.com*
rosco.com

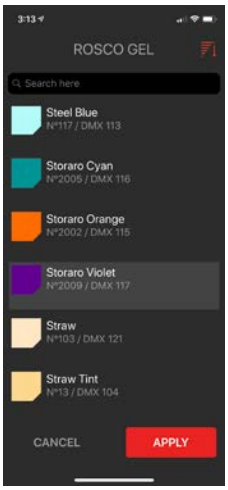
DMG Lumiere MIX uses 6 LED chips: Phosphor-coated Red, Green, Blue, Phosphor-coated Lime, Amber and neutral 4000K White.

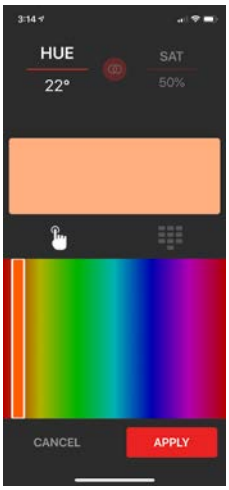
Typical LED systems mix various colors together: for example, RGB, RGBW, RGBWW (Warm & Cool White), RGBA (Amber).

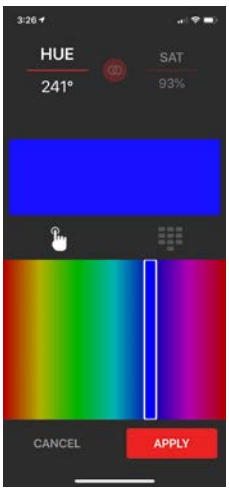
dmglumiere.com

Adjust settings with the MIX Controller (above). It attaches to the back of the fixture or can be connected with a longer cable.
But the most fun is controlling everything with DMG Lumière's myMIX app. It connects seamlessly and simply by Bluetooth.

My favorite feature of the app is the CAPTURE screen (below, 2nd from right). In COLOR mode, touch the CAPTURE button (camera icon) to choose a picture from your gallery or to take one. Then, drag the white circle (far right) to pick a color from the picture and the MIX will match it.







Wooden Camera LPL Mounts

Wooden Camera has LPL Mounts for RED DSM2), Sony VENICE and Sony E-mount Alpha mirror cameras (a9, α9).

LPL is the new lens mount introduced by ARRI in February 2018. It is standard on ALEXA LF and now ALEXA Mini LF. LPL has a 44 mm Flange Focal Depth and 62 mm Inside Diameter. ARRI Signature Primes only come with LPL mounts. . By the way, all PL mount lenses fit by using a PL to LPL adapter.

For a RED MONSTRO 8K VV, attach the mount with 4 captive screws. The Wooden Camera LPL mount has LDS-2 pogo contacts that connect to a 00 Lemo connector on the outside.

Wooden Camera's ARRI LPL Mount for Sony VENICE replaces the existing PL mount. Remove the PL mount by unscrewing the 6x 2.5mm hex screws. This will reveal the native Sony E-mount underneath. The new LPL mount fits directly over the E-mount, just as the PL mount did.

ARRI LPL Mount for Sony E-Mount Cameras allows ARRI LPL Signature Prime Lenses to be used with Sony E-Mount Cameras, such as the Sony Alpha series, FS7, FS5, etc. LPL Mount is passive and does not communicate lens data to the camera.

woodencamera.com NAB Booth C5725

New Mole-Richardson LEDs

20K LED

20K
24" Fresnel LED
Type 9391 Daylite

1600W 2700K – 6500K
14" Vari-Tener LED Fresnel
Type 9541 Variable-Color

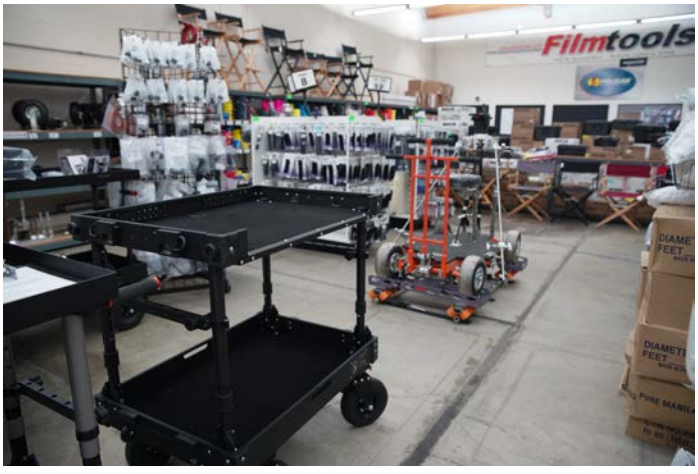
- Dual user interface for local control with 2.8" LCD touch screen and twist & pull selector
- Factory presets and variable color temperatures
- +/- Green and Magenta correction
- Lumen radio, RDM
- Bluetooth capable via Mole-Richardson iOS App
- Firmware updateable
- User presets

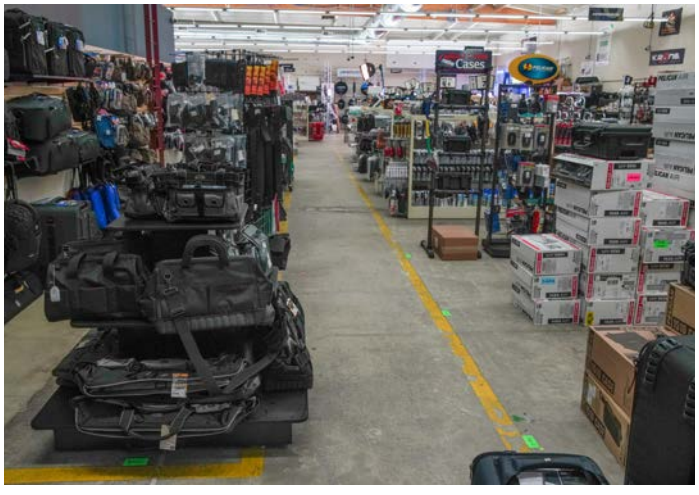
Also new at NAB 2019

400W Vari-Soft LED – Type 9421 Variable-Color 2700K – 6500K

- Dual user interface for local control with 2.8" LCD touch screen and twist & pull selector
- Factory presets and variable color temperatures
- +/- Green and Magenta correction
- Lumen radio, RDM (Remote Device Management)
- Bluetooth capable via Mole-Richardson iOS App
- Firmware updateable
- User presets

NAB Booth C5044 *mole.com*





Filmtools is sort of like the Home Depot of the Motion Picture Industry. This is the one-stop shop where you can outfit a production with everything—wooden wedges, C47 clips, apple boxes, director's chairs, grip gear, sand bags, C-Stands, lights, cables, lighting fixtures, camera carts, cameras, lenses and accessories. And it's all in stock or available online for quick-ship. Browsing the vast showroom reminds me of the location of the last scene in *Raiders of the Lost Ark*. It's huge.

Filmtools has been at 1400 West Burbank Boulevard in Burbank, CA for about 12 years. But first a bit of history.

Stan McLain, accomplished aerial cinematographer, founded Pasadena Camera Rentals in 1985. His gorgeous Amazon rainforest flying sunset shot in *At Play in the Fields of the Lord* is still one of the most beautiful aerials the world has ever seen.

Around 1995, Stan purchased Filmtools, an online expendables company, from Ron Coons, and set up shop in his Pasadena store. Almost every cleaning and camera repair product I've ever written about could be obtained from Filmtools, and still can.

In August 2014, J&R Film Company acquired Filmtools.

J&R was founded in 1958 by Joseph Paskal, who was a film editor at MGM. In 1984, he purchased the Magnasync/Moviola Company. As the digital age approached, the family transformed the company from manufacturer of iconic sprocket-driven film editing machines into a non-linear editing and post facility. That company, Moviola Post, is now a full service editing and post-production company with locations in Hollywood, Santa Monica and Burbank. Randy Paskal, Joe's son, is the president.

Filmtools has expanded. They carry everything from expendables to cameras, from GoPros to Canon Cinema EOS, RED, Blackmagic Design, Sony and more. Joe Nunez, VP at Filmtools, explained, "We've grown from just being an expendables place. And it's more than production. We now carry media, storage for post, and software for pre-visualization. We are a full-service resource for filmmakers. We continue as a family business, just as Stan started. Now the Paskals are carrying that vision forward. Stan was a filmmaker; Randy's a filmmaker and so is his son Avery.

Avery Paskal, Social Media Marketing Coordinator at Filmtools, added, "We are involved in almost every level of production. Our Moviola Education Center provides training. Filmtools supplies the production side with tools and equipment. And for post production, we can rent you the space." *filmtools.com*

Gecko-Cam Lenses, Lens Controls and FF Projectors

Genesis G35 Full Frame lenses. 14.5mm T3, 16mm T2.4, 20mm T1.8, 25mm T1.4, 35mm T1.4, 50m T1.4, 85mm T1.4, 135mm T2. PL or LPL mount. Image circle 46.3 mm; interchangeable focus rings—Metric & Imperial; Optional motor for focus & iris; Gear rings all in the same position; 114mm front diameters; Dustproof housing.

GENESIS G35 Vintage 66 Full Frame lenses. 14.5mm T3, 16mm T2.4, 20mm T1.8, 25mm T1.4, 35mm T1.4,50m T1.4, 85mm T1.4, 135mm T2. PL or LPL mount. Same mechanical specifications as G35, also designed by Thoma engineering. Mechanics and housings made in Germany. Gecko-Cam describes the look: "GENESIS G35 Vintage 66 lenses have a Canon K-35 style vintage look with special flare and bokeh characteristics and warmer skin tones."

Vintage Carl Zeiss S35 Ultra Primes: 14, 16, 20, 24, 32, 40, 50, 65, 85, 100, 135, 180 mm — all T1.9. Optically modified, more flaring, softer image, warmer colors. Redesigned and rehoused by Gecko-Cam with modern mechanics, re-anodized surfaces. Option for a lens motor bracket. PL or LPL mount.

Stealth HS Rehoused S35 ZEISS Super Speeds: 18, 25, 35, 50, 65, 85mm T1.3. Same 80mm front diameter, cam focus, gear rings in same position, PL or LPL mount. Unlike the original Super Speeds, tightening a clamp-on mattebox will not bind the hard-mounted cam-follower construction.

FULL-FOX is a lightweight and compact active focus system designed by Fritz Gabriel Bauer, AAC. It is manufactured (in Germany) and distributed by Gecko-Cam. FULL-FOX uses an invisible, safe laser and a touch-screen tablet on which you can track objects with a mouse or pen. FULL-FOX works with L-Bus lens control systems. Works from 3 - 450 ft.

DC-FOX tracks and maintains focus on the actor or object moving in the center of your viewfinder or monitor. It's a simpler version of the FOX system and does not require a tablet. Works from 3 - 450 ft.

Gecko-Cam's GENIUS GLC is a 3-channel Hand Unit, part of the GLC Lens Control System. The ergonomic Hand Unit works in your right or left hand and has a smooth, fluid feel. Up to 10 motors can be controlled. Buttons and functions are easy to configure. User data and configurations can be stored, saved to USB stick and loaded to another GENIUS GLC. The coax power cable plugs in easily (you do not have to search for 2 red dots to line up.) The GLM lens motors connect via WiFi. Soft ramping protects lens mechanics. A patented clamp system attaches the motors to 15 and 19mm rods.

Gecko Pro Projector: 60mm image circle and brighter light. Motorized back focus, OMS-mount system, made in Germany, halogen light source, optional WiFi hand unit, optional /i System reader for Cooke and ZEISS.

The new Gecko LF45 covers a 45mm image circle and has a new mount that accepts lenses to 18mm FFD—so you can test Sony E-mount optics. Also: upgrade your existing S35 Gecko MKII lens projectors to Full Format 45mm image circle coverage. ***gecko-cam.com*** **See Gecko-Cam at NAB C8336**

Scorpiolens 20mm T2.8 Anamorphic

Here's the Scorpiolens 20mm T2.8 Anamorphic 2x lens for Super35 format. It is the widest focal length in the set, and certainly one of the widest on the market. The 20mm anamorphic gives you the angle of view of a 10mm spherical prime in S35. Furthermore, you can use a 95mm diameter clip-on 4x5.65" mattebox holding up to 3 or 4 filters — without vignetting — which is something quite unique for a lens so wide.

Andrés Vallés tells us, "The Scorpiolens 20mm T2.8 Anamorphic is unique in that it has minimal geometric distortion, which is quite incredible for an anamorphic lens this wide. The lenses are already in production and we look forward to showing it at NAB 2019 in our booth, C8635."

servicevision.es NAB Booth C8635

Scorpio Stabilized V Remote Head

The Scorpio Stabilized V remote head follows the principles of its predecessor. With new gyroscopes, new mechanics and new software control, it is faster, easier and more effective. Setup time takes no longer than a regular remote head.

Faster: rotates 360º in 3 seconds. Connections and covers are protected against water, rain and spray.

Easier: Tilt axis adjustments can be done quickly by sliding the camera platform along the carbon fiber frame. It is easy to change camera packages having more weight or volume without affecting the level of stabilization. The Real Horizon function and new controls reduce drift almost to zero.

Effective: The most important thing in this type of head is the level of stabilization. The Scorpio Stabilized Head V incorporates new mechanics and electronics designed to detect a wide range of vibration frequencies and can compensate accordingly with incredibly quick, smooth and accurate corrections.

All these things make it the Scorpio Stabilized V an excellent choice to use alone or to work with the Scorpio Arm, Scorpio telescopic cranes or Servicevision Electric Car.

Head weight: 33kg / 72 lb. Maximum camera payload: 45kg / 100lb

Rotation: Pan 360º / Tilt 270º / Roll +/- 30º

Scorpio 10' Dolly

The Scorpio 10' telescopic crane can be mounted on any standard rolling platform on the market. Now, it has its own Dolly designed by Servicevision to give it more flexibility.

It has traveling wheels for standard 62 cm dolly tracks as well as rubber wheels designed for studio and irregular floors.

The base-width is adjustable with tilting arms to fit into spaces as small as 65 cm (25.5") wide.

The double telescopic column adjusts to a minimum height of 144 cm (4.75 ft). You can raise it an additional 35 cm (13.7") higher to achieve the maximum tilt angle and height. It has been designed as a stable and solid base that is agile and beautiful at the same time.

The new dolly is a great complement for the one of the most famous telescopic arms on the market, the Scorpio 10'.

Also available: accessories such as a basket on the dolly for weights and a night cover.

Tiffen Steadicam

The Steadicam Steadimate-S offers new camera movement possibilities while providing a more comfortable operating experience for popular single-handed gimbal stabilizers like the DJI Ronin-S.

By pairing a 3-axis gimbal rig with a body-worn Steadicam stabilizer, you can work for hours with minimal fatigue while maintaining a wide range of vertical movement and adding full panning and low-mode operation capability. The Steadicam's support vest and arm can minimize or eliminate the up-down bouncing image effect that can occur when using single-handled stabilizers. The Steadimate-S provides x-axis and y-axis (pan, tilt) stabilization while the Steadicam arm provides z-axis (vertical travel) stabilization.

The Steadimate-S adapter can be purchased individually for existing arms with ½" posts, or as a complete kit. The Steadimate-S 15 System comes with the Steadicam A-15 Arm and Scout Vest while the Steadimate-S 30 System comes with the A-30 Arm and Zephyr Vest. They support 15 lb / 6.8kg and 30lb / 13.6kg, respectively.

tiffen.com NAB Booth C6821

Lowel TotaLED

The new Lowel TotaLED location lighting fixture updates the original iconic Tota Light with a bright, daylight balanced LED source. The TotaLED has a rugged metal housing, which has always been expected in the Lowel brand. You can powered it with standard V-mount batteries for location work or plug it into an AC wall outlet. The dimmable flood source offers a 65° angle of illumination that can be expanded to 100° with a removable diffuser panel and shaped with integrated barndoors.

The TotaLED's daylight balanced light has excellent color accuracy with a CRI rating of 96.3 and a TLCI rating of 95.3. It produces the equivalent of a 750W tungsten bulb, while only drawing 70W of power, and weighs a mere 5.1lb / 2.3kg.

The TotaLED is quick and versatile. You can run-and-gun with it on docs, events or ENG productions. Bounce it into an umbrella for beautiful portrait lighting on features or commercials. It has an integrated umbrella mount, of course—just like the original Tota Light designed by Ross Lowell and beloved by John Alcott, ASC, BSC. Ross, a great cinematographer and innovator, passed away this year at the age of 92. He was the inventor of Gaffer Tape, founder of Lowel Light and creator of the lighting kit. The original Tota kit was like a lighting and grip truck in a suitcase. Ross loved puns. So, with this TotaLED, I'm sure he'd be de**light**ed.

LED Count:	160
Color Temperature:	5600K
Luminance:	4275 lx @ 1m
CR:	>96.3
TLCI:	>95.3
Coverage:	65° (without diffuser)
	100° (with diffuser)
Power Consumption:	70 W
Tungsten Output Equivalent:	750 W
AC Power:	100 - 240 V, 50/60 Hz
Battery:	14.8 V
Power Cord Length:	9.5 ft (2.9 m)
Bulb Life:	50,000 hr.
Material:	Metal chassis
Weight (w/ control box):	5.1 lb (2.3 kg)
Dimensions (H x W x D)	7.3 x 12.3 x 3.9"

Dimmer: 100% - 0 flicker-free
Silent fanless cooling
Integrated umbrella mount
¼-20 threaded accessory mount
Tilting yoke with standard 5/8" mount

Bright Tangerine Drumstix

Drum roll please.

Bright Tangerine's new Drumstix Sterling Titanium Support Rods are incredibly lightweight and very solid—¼ of the weight of stainless steel lens rods.

Saving weight matters. If you're working with drones for aerial shots, every gram saved can add crucial flight time. If you're trekking in a remote location, it could mean the difference between taking an extra lens otherwise left behind. Lighter rods also shift the center of gravity so your camera is not so front-heavy.

Cue the new Bright Tangerine Drumstix.

With a stunning strength-to-weight ratio, these new Sterling Titanium rods will blow you away from the moment you first hold them. Even though their weight is comparable to that of carbon fiber rods, there is no compromise when it comes to build quality. They will not shatter, they will not dent, and they will not falter.

Manufactured in the UK to exacting tolerances, the sensibly-priced Drumstix are available in a range of lengths in both 15mm and 19mm diameters.

Over the years, Bright Tangerine has earned a reputation for product ingenuity and pristine engineering. They believe that "OK, is not OK" and these new rods are no exception.

Machined to perfection and backed by a lifetime warranty, Bright Tangerine's new Drumstix are like no other support rods we've seen before.

brighttangerine.com/drumstix

RED DSMC2 Ultra-Brite LCD Monitor

RED Digital Cinema's new DSMC2 Touch 7.0" Ultra-Brite LCD Monitor lets you watch what you're shooting and also control the camera with its touchscreen.

The 1920x1200 resolution display panel is extremely bright: 2,200 nits, so it's easy to view in bring sunlight or when a 20K is aiming right at you in a studio. Pixel density is 323 ppi, contrast ratio is 1200:1, and it has a wider color gamut than earlier monitors for better color accuracy.

The new RED DSMC2 Touch 7.0" Ultra-Brite LCD Monitor has a tough, thin, light and scratch-resistant Corning Gorilla Glass optically-bonded touchscreen. Menu navigation is intuitive. You can adjust camera settings and review .R3D clips directly.

The Ultra-Brite display mounts onto RED's DSMC2 BRAIN. It has 3/8-16 and 1/4-20 mounting points. A standard RED 16-pin LEMO connector plugs into the camera.

For viewing when the camera is on a crane or remote head, you can run a longer cable to the Touch 7.0" Ultra-Brite LCD Monitor with a DSMC2 LEMO Adaptor A.

The DSMC2 Touch 7.0" Ultra-Brite LCD Monitor is US $3,750.
See demo here: *youtu.be/sF2PmdoAZoM*
More info: *red.com/DSMC2-Touch-Ultra-Brite-LCD*

RED at NAB: N201LMR, N202LMR, N24LMR
red.com

Vocas LPL Mounts

LPL to E-mount adapter

The Vocas camera accessory line will be shown at NAB 2019 in the booths of several leading brands such as Angenieux, Atomos, Panasonic, Spirit Labs, etc.

New Vocas products at this year's event include a complete cage package for Blackmagic Design Pocket Cinema 4K Camera, the Director's Monitor Cage and several new and interesting lens mount adapters.

Back focus can be adjusted by means of shims.

The lens mount adapters also have the ability to attached to 15 mm rods for increased support and steadiness.

There are 3 new models in the lens adapter series:

- E-mount to LPL adapter (to use LPL lenses on E-Mount cameras such as the Sony VENICE.
- LPL to PL adapter for traditional PL lenses on LPL cameras.
- LPL to LPL 20 mm close-focus adapter for extreme close-ups without having to use of a dedicated macro lens or diopter.

vocas.com

E-mount to LPL adapter exploded view

PL to LPL mount adapter

LPL to LPL 20mm C.U. adapter

Easyrig Flow

Johann Hellsten and his happy crew will be at NAB with his latest-secret (until NAB) invention.

The Easyrig Flow supports gimbal stabilized camera systems. The arm moves up and down to remove camera shake when you walk with a handheld camera or with a gimbal.

The up and down length of stroke on the Easyrig Flow is about 38 cm (15 in.) It accepts payloads from 5-25 kgs (11-55lbs).

In the photo above, cinematographer Stefan Kullänger is testing the Easyrig Flow with a Maxima rig on a major feature on an island outside Stockholm. This picture is not the final design.

Easyrig will also release a new product called "Cheese Plate for Sony Venice," shown at left.

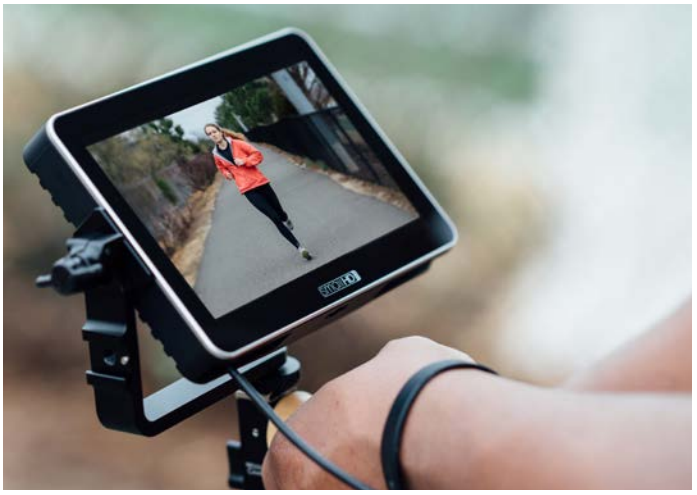
It can be attached to all Easyrig systems, including the Minimax.

This attachment lets you lighten camera payload. For example, with Sony VENICE in "Rialto" tether extension mode, mount the camera body on the Cheese Plate, and then all you have hanging from the Easyrig is the lightweight Camera head with lens. This way, you can use a heavy high-end camera together with a Minimax since the camera is on your back and not on the hook.

The Cheese Plate can also be used for many purposes other than the Sony Venice. So, you can attach batteries and video transitter to the back of an Easyrig, The price is roughly $100 USD.

easyrig.se NAB Booth C8319

SmallHD FOCUS 7 Monitor



7" Touchscreen, 1920x1200, 1000 nits, 4K HDMI Input

SmallHD has a new 7-inch touchscreen monitor: FOCUS 7.

You'll remember that their FOCUS 5 is a 5-inch, 1280x720 800 NIT monitor. The FOCUS 7 is about the same size, but display size and resolution has increased. The FOCUS 7 on-camera monitor has a 1000 NIT, 1920x1200 IPS LCD touchscreen display. it can input video up to 4K at 30fps via a full-size HDMI connector. The 2 integrated Sony L Series battery slots are hot-swappable. There's a 3.5mm barrel output to power small DSLR and mirrorless cameras using battery specific adapter cables.

With SmallHD OS3 software and SWIPE user interface, the FOCUS 7 offers HD Waveform, Vectorscope, False color, Focus Assist/Peaking, Anamorphic De-Squeeze, Frame Lines, and 3D LUTs via SD card. *smallhd.com/focus7*
smallhd.com NAB Booth C5725

- Size: 6.9"/17.5cm w x 4.7"/11.9cm h x 1"/2.5cm d.
- Weight: 11.28 oz/0.319kg.

SmallHD FOCUS 7 Bolt 500 RX

Built onto a FOCUS 7 touchscreen monitor, the FOCUS 7 Bolt 500 RX adds an industry standard Teradek Bolt receiver. Transmission from a SmallHD TX monitor/transmitter or Teradek transmitter can multicast to up to four FOCUS Bolt 500 RX receivers simultaneously. This allows a combination of crew members including Director, DP, DIT First AC, or Mixer to view live video untethered. The FOCUS 7 Bolt 500 RX can either receive a transmitted signal or work as an on-camera monitor when connected to the video source through an HDMI cable.

Teradek RT CTRL.3

The Teradek RT CTRL.3 is a new, 3-axis wireless Focus, Iris and Zoom lens control.

With built-in lens mapping, you can set up and calibrate the scales of your lenses and store the data inside the control unit—to be summoned up in an instant when you change lenses, thus avoiding time-consuming end-stop and focus mark setup.

A very helpful new feature of the CTRL.3 is that, when paired with a SmallHD monitor, it can display lens data overlays of focus and iris scales directly on the monitor. This is available on all of the newest generation SmallHD monitors and can be enabled as a menu tool on any compatible monitor.

You'll also need to enable this function in the control unit. The setting can be accessed via the menu button located on the front of the controller. This menu also controls settings to change motor response, wireless configuration, and many other details.

The large, fluid-feel knob on CTRL.3 has more than 300°of throw for smooth, accurate control. The iris slider has a pre-printed aperture scale as well as a markable blank strip. Zoom is controlled with a force sensor button. A and B knob wheels can be mapped to zoom speed or any other function or axis. For example, if you're using the controller with a RED DSMC2 camera, you can set the A wheel for electronic ISO control, and the B wheel to Shutter Angle control.

CTRL.3 has limit functions that essentially act as hard stops between two points on the lens. And there are many more details.

NAB Booth C5725. *rt.teradek.com*

Teradek 4K Wireless Video

Bolt 4K Transmitter
TX

TX: transmitter has 4 antennas vs 2 of previous models.

RX: Receiver has 5 antennas, like before.

Bolt 4K
Receiver
RX

You're the director of a Netflix show, shooting in 4K, viewing video on a gorgeous 4K HDR monitor. But you're still tethered to the camera by cables because you don't have 4K wireless. Or you're watching wireless video when the camera is unleashed on Steadicam or gimbals—but it's HD video, not 4K. You bellow, "When is Teradek going to build a 4K video wireless Bolt?"

Here it is. Teradek introduces the Bolt 4K Wireless video transmitter/receiver system at NAB 2019. Bolt 4K transmits zero delay, uncompressed, 4K HDR video. And, Bolt 4K has improved signal robustness with increased range, and can transmit to up to 6 receivers simultaneously with no performance loss. Bolt 4K also includes Bluetooth for fast, effortless pairing, and added functionality via an iOS app.

Initially, there will be two models of the Bolt 4K wireless video system: Bolt 4K 750XT with 750' line of sight transmission range and Bolt 4K 1500XT with 1500' line of sight range. The transmitter has 12G SDI and HDMI 2.0 inputs. The receiver has 12G SDI and HDMI 2.0 outputs.

The new Bolt 4K has a totally new generation of patented Amimon video modem technology inside. This new chipset and redesigned RF circuitry supports HDR video with resolutions up to 4K 10-bit 4:2:2 60 fps via the 5GHz frequency band.

Greg Smokler from Teradek Cine Products volunteered to answer some questions in the sleep-deprived days before NAB.

Up to now on set or location, if you wanted to view 4K on a big monitor (or small), you had to run cables. Will the picture quality with Bolt 4K be as good?

The picture quality will be excellent. It also has improved robustness that will keep the video link engaged even as the signal quality degrades over distance or with interference.

What 4K monitors do you suggest for Directors and DITs on set to work with Bolt 4K?

Currently we recommend the Sony X310 monitor for reference-grade 4K video.

OK, I'm a focus puller. What small (7-15 inch) 4K monitors can I use as a focus-puller?

We're on it, stay tuned. Currently there are no great options for a compact 4K monitor. However, the Bolt 4K will be able to downcovert to HD on the receiver, so existing monitors can be used. Additionally, if you're only transmitting HD over the Bolt 4K, the image quality and signal robustness is greatly improved over the existing generation of Bolts.

Is the Bolt 4K bigger and heavier than current Bolts?

The new Teradek Bolt 4K transmitter is a bit larger than the existing Bolt HD Transmitter. It is almost exactly the area of a Anton/Bauer battery plate. For this reason, we designed it to be able to pass battery power through and have male and female battery plates mounted on it so it can be placed on the back of the camera.

Approximate cost and availability?

Bolt 4K will be priced above the current Teradek HD products. Shipping is expected in June 2019.

Will Focus Pullers, DPs and Directors really see a difference?

Detail Matters. It gives you the ability to truly see a high-resolution video image in great nuanced detail. You get 10-bit 4:2:2 HDR capability with the ability to apply 4K LUTs in the receiver output. There's improved robustness. Technically, Bolt 4K has 8 times better signal integrity and twice the amount of fine detail. This is a quantum leap forward. You will see improved 4K images even as the distance from transmitter to receiver increases; previously, as you got further away, the picture would just drop out. For HD transmission with this system, you get better detail and color.

Full 4K 10-bit HDR wireless video will be welcome for productions demanding these specs. The ease of use and convenience makes it compelling and simple to adopt. No more quad link or short BNC runs. In the beginning, the immediate market probably will be the Director and DIT, because they can demand it. And then Focus Pullers and everyone else on set will want it.

teradek.com NAB Booth C5725

SmallHD Cine 7

You're probably familiar with SmallHD's system of "pages," where you swipe the touchscreen to view various modes and functions.

The new SmallHD Cine 7 Monitor takes this another step, with screens for video, tools and now direct camera menu controls.

SmallHD's Cine 7 has a 7-inch, touchscreen LCD monitor. It is extremely bright (1800 nits), highly visible in direct sunlight, has superb color reproduction, and you can view it nicely from the sides. The monitor covers 100% of the DCI-P3 color space for cinema, well beyond Rec.709 broadcast specs. This means you can be confident that the image on screen is accurate to what is actually being recorded in camera.

Cine 7 has an intuitive touchscreen menu system. Using SmallHD's built-in OS3 operating system, you can customize pages on the monitor to suit the way you shoot. The User Interface is page-based. For example, if you're a focus puller, you can set up one page to show the live video feed with custom framelines, and a second page with customizable focus assist tools or exposure tools. You can toggle between pages with a quick swipe.

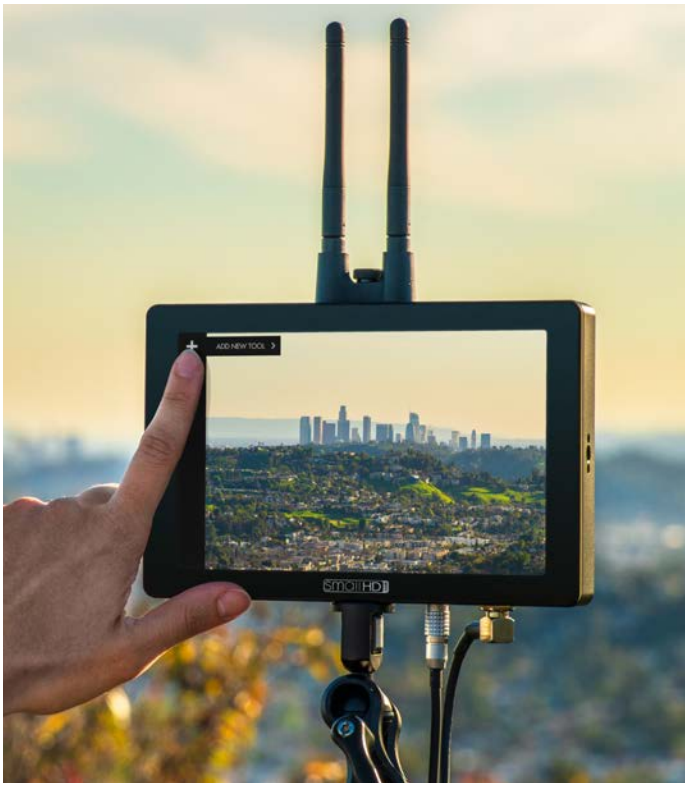
Furthermore, the next page can be for dedicated camera controls. It mimics the camera's main menu and lets you control commonly used settings remotely. This is done via the Ethernet connection at the bottom of the monitor. So, essentially, you have 3 things to plug into the bottom of the Cine 7: power via the 2-pin connector, video through the SDI or HDMI ports, and Ethernet.

You have access to commonly used settings of supported cameras by means of the touchscreen. The menu system is simple and easy to use. Currently, camera controlis available for ARRI Alexa Mini, Mini LF and Amira cameras. There are plans to expand this for other major camera brands. This feature can be enabled on the monitor through an optional paid software upgrade.

Cine 7 has two 3G-SDI inputs. The second input doubles as a loop-through. There is also an HDMI input with loop-through. There is a 2-pin power input so you can easily power the monitor when it's onboard a camera. Integrated battery plate power options are available for Sony L-Series, Gold-Mount, and V-Mount.

The Cine 7 also comes with integrated Teradek wireless transmitters and receivers.

Cine 7 Bolt 500 TX includes a built-in transmitter that is able



to pair with any Teradek 500 or Sidekick receiver. This monitor works great as an onboard operator or assistant monitor. It eliminates the need for having another transmitter on camera—since you feed the video from camera to Cine7 Bolt 500 TX, and then its onboard transmitter does the job of sending video to the set.

The Cine 7 Bolt 500 RX includes an integrated Teradek 500 receiver that is capable of pairing with a Bolt 500 transmitter as well as the Focus Bolt TX line. This is great when the focus puller works off-camera. And it's helpful for anyone else on set to view the shot: boom operator, mixer, script supervisor, AD, Director, DP, etc.

Cine 7 Bolt RX Sidekick will be able to pair with any Teradek transmitter that has a range of 500, 1000, or 3000 feet. The Cine7 Sidekick will also pair with all of the monitors in the Focus Bolt TX line.

NAB Booth C5725. *smallhd.com/cine7*

SmallHD Cine 7 Specs

- Batteries: 2 Sony L-Series (6V to 16.8V input), V-Mount, Gold Mount
- DC in (10V to 34V, 2A)
- One 3G SDI input/Output; One 3G SDI input
- One HDMI input/Output; One HDMI input
- Audio: 2.5mm audio out headphone jack
- Display: 1920 x 1200, 7.02 inches, 16.7M color, 8-bit
- Capacitive Touch - supports 5 simultaneous touches
- Viewing angle - 160 degrees in x and y
- Brightness: 1800 nits

www.fdtimes.com

On Paper, Online, and now on iPad

Subscribe

Online:
www.fdtimes.com/subscribe

Call, Mail or Fax:

Direct Phone:	1-570-567-1224
Toll-Free (USA):	1-800-796-7431
Fax:	1-724-510-0172

Film and Digital Times Subscriptions
PO Box 922
Williamsport, PA 17703
USA

☐	1 Year Print and Digital, USA	6 issues	$ 49.95
☐	1 Year Print and Digital, Canada	6 issues	$ 59.95
☐	1 Year Print and Digital, Worldwide	6 issues	$ 69.95
☐	1 Year Digital (PDF)		$ 29.95
☐	1 year iPad/iPhone App upgrade (normally 29.99) *Get FDTimes on Apple Newsstand with iPad App when you order a Print or Digital Subscription (above)*		+ $ 9.99

Total $ _____

Payment Method (please check one):

☐ VISA ☐ Mastercard ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code_____

Expiration Date_____

Signature _____

Name _____

Company _____

Title_____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code_____

Phone _____

Fax_____

Email_____

Sponsors and Educational Partners

Titans of the Industry

arri.com
blackmagicdesign.com
canonusa.com
creativesolutions.io
leitz-cine.com
sony.com/professional

Moguls

abelcine.com
aja.com
Angénieux.com
bandpro.com
cookeoptics.com
cvp.com
dji.com
fujifilm.com
leica.com
panasonic.com
prestoncinema.com
red.com
sigma-global.com
teradek.com
zeiss.com/cine
zgc.com

Executive Producers

ibe-optics.com
litepanels.com
ocon.com
panavision.com
servicevision.es
smallhd.com
tiffen.com
woodencamera.com

Producers

antonbauer.com
cartoni.com
cinemaelec.com
emit.fr
hawkanamorphic.com
ottonemenz.com
photocineshop.com
C&L Studio: camarasyluces.com
transvideo.eu

Co-Producers

aatondigital.com
BandH.com
chrosziel.com
manfrotto.us
mole.com
msegrip.com
orcabags.com
pstechnik.de
steadicam.com

Associate Producers

16x9inc.com
bertonevisuals.com
brighttangerine.com
cinetech.it
cmotion.eu
dmglumiere.com
denz-deniz.com
easyfocus.at
easyrig.se
filmtools.com
gecko-cam.com
hd-systems.biz
jlfisher.com
K5600lighting.com
kinoflo.com
leefilters.com
loumasystems.biz
lowel.com
oppenheimercameraproducts.com
ronfordbaker.co.uk
rosco.com
schneideroptics.com
sekonic.com
shapewlb.com
vocas.com
whitepointoptics.com

Rental Houses

abelcine.com
arri-rental.com
camalot.com
camarasyluces.com
camtec.tv
cinediving.com
www.hd-systems.biz
jpfcine.cl
keslowcamera.com
koernercamera.com
lemac.com.au
lites.be
musitelli.com
nacinc.com
panalight.it
photocinerent.com
rawcamera.com
rvz.fr
sanwa-group.com
servicevision.es
storyline.no
vantagefilm.com

Media Partners

afcinema.com
airstar-light.us/film
bscexpo.com
camerimage.com
cinec.de
cinegearexpo.com
ibc.org
icgmagazine.com
imago.org
inter-bee.com
nabshow.com
soc.org

Sponsors and Educational Partners

Associate Producers

Rental Houses

Media and Production Partners

Titans of the Industry

SONY

Leitz

ARRI

Canon

CS CREATIVE SOLUTIONS

Blackmagicdesign

Moguls

Cooke

RED DIGITAL CINEMA PROFESSIONAL

CVP

ZEISS

FUJIFILM FUJINON

Leica

SIGMA

AJA VIDEO SYSTEMS

angénieux

DJI PRO

Panasonic

PRESTON CINEMA SYSTEMS

AbelCine

TERADEK

ZGC

bandpro FILM & DIGITAL INC.

Executive Producers

oconnor

PANAVISION

smallHD

Litepanels

IB/E OPTICS

TIFFEN

SERVICE VISION

WOODEN CAMERA

Producers

C&L RENTAL

Emit

Tokina VISTA BEYOND FULL FRAME

TILTA

PHOTO CINE SHOP.COM

HAWK

ANTON BAUER

CARTONI

CAMERAS BY OTTO NEMENZ

CINEMATOGRAPHY electronics

transvideo

sachtler

Co-Producers

TERADEK RT

Manfrotto Imagine More

ORCA

P+S TECHNIK

THE STUDIO B&H

Chrosziel ... for optical excellence

AATON DIGITAL

STEADICAM

Mole-Richardson Co.

matthews studio equipment

Associate Producers, Rental Houses, Media and Production Partners on previous page