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Cover

Elias Maria, BVK in Lago di Garda with new ARRI ALEXA 35 Xtreme, ARRI Enso Primes and a 69F foiling carbon fiber monohull sailing at 65 km/h.

Contents: Sept 2025 Issue 132

ARRI ALEXA 35 Xtreme

The ARRI ALEXA 35 Xtreme will replace the regular ALEXA 35.

It will cost the same.

But it goes extremely fast, with slow motion speeds up to 660 fps.

On the outside, the 35 Xtreme looks the same as ALEXA 35, except for the extremely Xtreme graphic on the camera right side and taller antennas.

ALEXA 35 Xtreme has a new processor, more efficient cooling and some new electronics.

The sensor, body, controls, buttons, finder, menu and accessories remain the same.

- In addition to familiar ARRIRAW, the ALEXA 35 Xtreme offers a leaner new codec called ARRICORE.
- Maximum slow motion speed is 660 fps in 2K 16:9 S16 sensor mode with ARRICORE and Sensor Overdrive.
- ARRICORE is a new, nimble, lighter codec than ARRIRAW.
- Overdrive is a sensor readout mode for faster speeds but with less dynamic range.
- Maximum slow motion with highest resolution 4.6K Open Gate 3:2 is 120 fps with CODEX Compact Drive 2TB.
- Runs up to 240 fps in 3.8K sensor mode, 2.39:1 aspect ratio, with ARRICORE and ProRes, and up to 190 fps with ARRIRAW.
- Up to 330 fps in 2K 16:9 S16 with all codecs.
- Pre-recording is now five times longer. This can be very helpful on a nature film when you're facing a rhino about to

charge but nervous about when to push RECORD. Or on the stunt with the longest jump the world has ever seen and "ready when you are CB."

- Power consumption is reduced 10% for 10% longer battery life.
- WiFi has been improved with various features.
- Sensor modes and recording formats have been pruned to a list that is less overwhelming.
- And yes, all your regular ALEXA 35 accessories will fit.
- A new ALEXA Xtreme will cost the same as an existing ALEXA 35.
- Upgrade your existing ALEXA 35 to Xtreme for € 15,900. The factory upgrade takes about 3 days at ARRI service centers in Munich, London, Los Angeles, Hong Kong and Sidney—with more to come.
- The upgrade of existing ALEXA 35 cameras includes parts and labor.
- Upgraded cameras will work just like a new ALEXA 35 Xtreme.
- ALEXA 35 Xtreme cameras begin shipping on August 1, 2025.

Filming with ALEXA 35 Xtreme prototypes, Elias Maria, BVK said, "We can dream of new and interesting ways to play with time and speed and motion. The ARRI color science and the workflow are familiar. And the 17 stops of dynamic range. You don't have to change anything to go to 240 frames. There are moments in almost every film where you need slow motion."

Cinematographer Charles Bergquist called it a "Swiss Army knife of a camera."

Stijn Van der Veken, ASC, SBC said, "We all know what chopped vegetables look like when they drop in slow motion on a food commercial, but this is a very practical way to use the camera."

Product Manager Marc Shipman-Mueller calls it an "A-Camera" that also does slow motion. "Our focus with the Xtreme development was greater efficiency on set and in post. So, with the Xtreme, you don't have to rent a separate specialized camera, and this will save production money. The same camera will speed up post-production, since your high speed shots now seamlessly match your sync sound shots, as they were both shot with the same camera with the same gorgeous REVEAL color science. And the improved WiFi and lower power consumption will also help to work more efficiently. "

Comparison of top speeds

	ALEXA 35 Xtreme	ALEXA 35 Xtreme with Sensor Overdrive	ALEXA 35
4.6K Open Gate	120 fps	165 fps	75 fps
3.8K 16:9	150 fps	240 fps	120 fps
3.8K 2.39:1	240 fps	240 fps	-
2K 16:9 Super16	330 fps	660 fps	120 fps

ALEXA 35 Xtreme

Streamlined Recording formats

There are 8 sensor modes—all are the same for ARRIRAW, AR-RICORE and Apple ProRes.

4.6K 3:2 Open Gate — Provides maximum image quality, resolution and flexibility in post for productions using spherical and anamorphic lenses. This is sensor mode has the highest data rate.

4.6K 16:9 — Full sensor width in a 16:9 format for many spherical Super35 and all Large Format lenses, with extra room for flexibility in post. Lower data rate than 4.6K 3.2 Open Gate.

4K 16:9 — For projects using spherical lenses with a 16:9 or 1.85:1 deliverable and 4K DCI resolution (4096 horizontal pixels). Also useful for spherical 16:9 or 1.85:1 projects with a UHD deliverable — with a bit of extra area for resizing, repositioning, stabilizing, or tracking in post. The sensor area is close to the traditional spherical Super35 film format for compatibility with a wide range of Super35 lenses.

3.8K 16:9 (UHD) — For projects using spherical lenses with a 16:9 UHD deliverable. This is the 4K recording format with the lowest data rate and with the smallest image circle for maximum compatibility with spherical Super35 lenses.

3.8K 2.39:1— For projects using spherical lenses for a 2.39:1 deliverable. Provides the highest maximum frame rate of any 3.8K sensor mode.

3.3K 6:5— For projects using 2x anamorphic Super 35 lenses for a 2.39:1 deliverable. Negates the necessity of cropping Open Gate footage and fulfills 4K mandates.

2K 16:9 S16 — For maximum frame rates with Sensor Overdrive on and off. Sometimes helpful fore extra padding around an HD deliverable. Close to the traditional Super16 film format. Most Super16 lenses cover.

HD 16:9 S16 —Same maximum frame rate as 2K 16:9 but this is native HD. For shooting HD without any cropping/resizing in post. Also used for live applications. Close to the traditional Super16 film format. Most Super16 lenses cover.

ALEXA 35 Xtreme Streamlined Sensor Modes			
Sensor Mode	Horiz x Vert photosites	Horiz x Vert mm	Ø Image Diagonal mm
4.6K 3:2 Open Gate	4608 x 3164	27.99 x 19.22	33.96
4.6K 16:9	4608 x 2592	27.99 x 15.75	32.12
4K 16:9	4096 x 2304	24.88 x 14.00	28.55
3.8K 16:9	3840 x 2160	23.33 x 13.12	26.77
3.8K 2.39:1	3840 x 1608	23.33 x 9.77	25.29
3.3K 6:5	3328 x 2790	20.22 x 16.95	26.38
2K 16:9 S16	2048 x 1152	12.44 x 7.00	14.27
HD 16:9 S16	1920 x 1080	11.66 x 6.56	13.38

New main processor board

New processor with "lid-less" design for improved cooling.
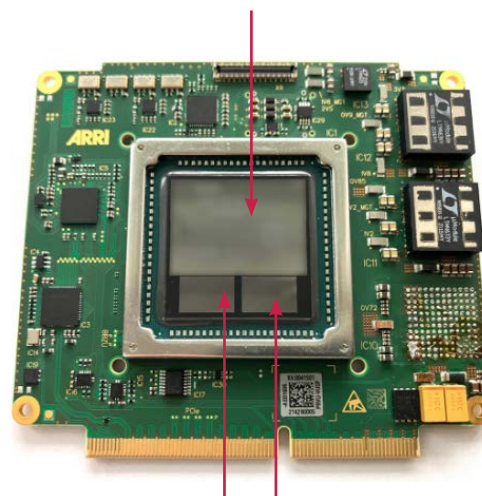
On Chip Memory

The new main processor board (motherboard) provides faster image processing. In addition, there is more memory there, and since the memory is on-chip, the main processor has also faster access to the memory. All that required a redesigned cooling system.

ARRI ALEXA 35 Xtreme

ALEXA 35 Xtreme

Original ALEXA 35

Quick Specs

*asterisks * show same specs as original ALEXA 35.*

- Super35 format ARRI ALEV 4 CMOS sensor. *
- Sensor size: 27.99 x 19.22 mm, 33.96 mm Ø. *
- Maximum resolution: 4608 x 3164 Open Gate. *
- Photosite pitch: 6.075 μm. *
- Original ALEXA 35 frame rates: 0.75 - 120 fps
- New ALEXA 35 Xtreme frame rates: 0.75 - 660 fps
- Dynamic Range: 17 stops. *
- Exposure Index: 160 - 6400 ISO in 1/3 stops. *
- Electronic shutter: 1.0°- 356° / 1s - 1/8000s. *
- Recording Formats: MXF/ARRIRAW *
  MXF/ARRICORE
  MXF/Apple ProRes 4444 XQ *
  MXF/Apple ProRes 4444 *
  MXF/Apple ProRes 422 HQ *
- Recording Media: Codex Compact Drive 1TB *
  Codex Compact Drive 2TB *
  Codex Compact Drive Express 1TB *
- Internal motorized ND filters: Clear, ND0.6, ND1.2, ND1.8. *
- Size: 147 x 152.5 x 203 mm / 5.8 x 6.0 x 8.0" (HxWxL). *
- Weight: approx. 3 kg / 6.6 lb (camera body with three antennas and LPL Mount with LBUS connector). *
- *arri.com/alexa35xtreme*

"Xtreme" History

We don't have to go into the entire history of slow motion and high speed cameras. Nor do we have to reminisce about certain cameras running so loud you often couldn't hear the word "Cut" as the stage floor vibrated and film sometimes jammed so tight you almost had to use a chisel to excavate the negative. Those were specialized cameras that came with a technician.

The name "ALEXA 35 Xtreme" honors the history of an earlier ARRI high speed camera that did not require an extra tech crew or sound blankets to subdue it. Here's an excerpt from a 2004 brochure about the ARRIFLEX 435 Xtreme film camera:

"Since the ARRIFlEX 435 camera first saw the light of day in 1995, it has become the workhorse of the film industry, the golden standard for MOS camera work. Over 1,200 cameras were sold worldwide, and 435 cameras can be seen in use in LA, Toronto, London and Berlin, from the deserts of Dubai to the wide Chinese landscapes, from Africa to Australia.

"Based on the original 435 design, ARRI has continuously updated the camera to add versatility and features, culminating now in the 435 Xtreme which can film at frame rates from 0.1 to 150 fps."

Sensor Overdrive
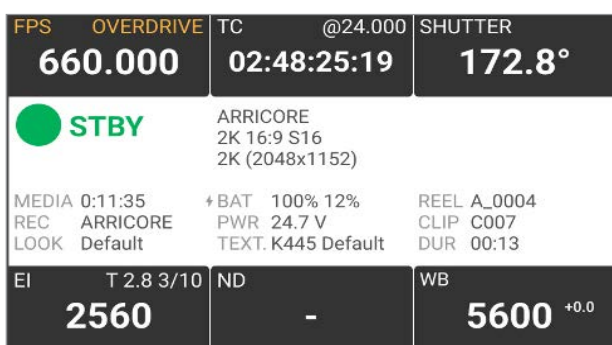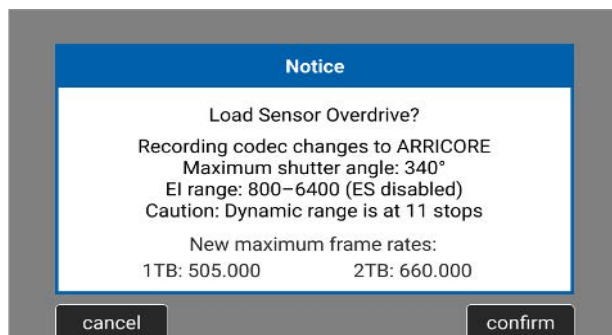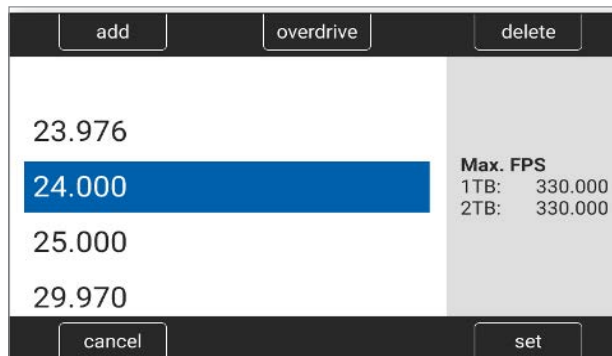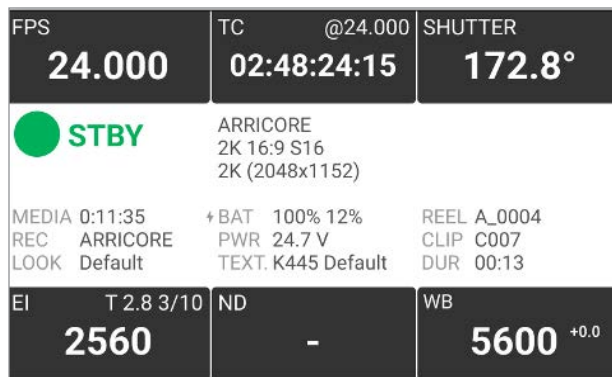
Sensor Overdrive provides the highest frame rates by reducing the sensor read-out time. It is only available with ARRICORE. It has the same REVEAL color science, but dynamic range is reduced from 17 stops to 11 stops. The exposure index is 800 to 6400 ISO and maximum shutter angle is 340°.

Marc Shipman-Mueller suggests: "Exposure with 11 stops of dynamic range is critical—you have 6 fewer stops in the highlights. To extend highlights and avoid artifacts, shoot at EI 1600 to 3200. Don't be afraid of grain, it can be fixed in post. Clipping cannot be fixed."

- To turn Sensor Overdrive on, click on FPS in the Menu (top left).
- You get a list of the frames per second, and there's a new button called Overdrive.
- When you select Overdrive, you will see a warning that informs you about some limitations.
- Once confirmed, the higher frame rates are available. In the 4th image from the top, we have 660 fps.
- The SDI signal to monitors will show OVD at the top left of the screen, next to the frame rate.

ARRICORE

ARRICORE is ARRI's next-generation RGB codec. It has been designed to deliver the ALEXA 35's familiar image quality at a significantly lower data rate. ARRICORE file sizes are significantly smaller than ARRIRAW.

ARRICORE will be familiar to anyone who has worked with ARRIRAW, with the same ARRI Look File ALF4 files, ARRI Textures, MXF wrapper, metadata and audio.

With ARRICORE, the 18-bit image from the sensor is debayered in the camera (not in post). This is possible because of the new and powerful processor of the ALEXA 35 Xtreme. The debayered RGB image is then encoded in a constant bit-rate to an MXF-wrapped file.

ARRICORE is not a RAW format. However, it retains flexibility to adjust exposure, white balance and color tint in post. This is familiar to users of Apple ProRes RAW and Blackmagic RAW. ARRICORE is constant bit-rate whereas ProRes RAW is variable and BRAW can be variable or constant.

ARRICORE bakes ARRI Textures into the file, as it does with ProRes and ARRIRAW.

Switching to ARRICORE is easy because on-set and post workflows remain consistent with existing ALEXA 35 codecs and drives. ALF4 ARRI Look Files, ARRI Textures, metadata, audio, and the MXF wrapper will all behave in a familiar way. Most third-party tools that already support the current ALEXA 35 codecs will also support ARRICORE.

ARRICORE will be out of Beta and production ready with ALEXA 35 SUP 5.1.0, which is planned for September 16, 2025.

Recording time at 24 fps 4.6K 3:2 Open Gate to Codex Compact Drive 2TB.	
Codec	minutes
ARRICORE	124
ARRIRAW	56
ProRes 4444 XQ	91
ProRes 4444	136
RorRes 422 HQ	202

Data rate at 24 fps 4.6K 3:2 Open Gate	
Codec	GB/hour
ARRICORE	930
ARRIRAW	2062
ProRes 4444 XQ	1421
ProRes 4444	952
RorRes 422 HQ	640

Elias Maria, BVK on *Nature of Speed*
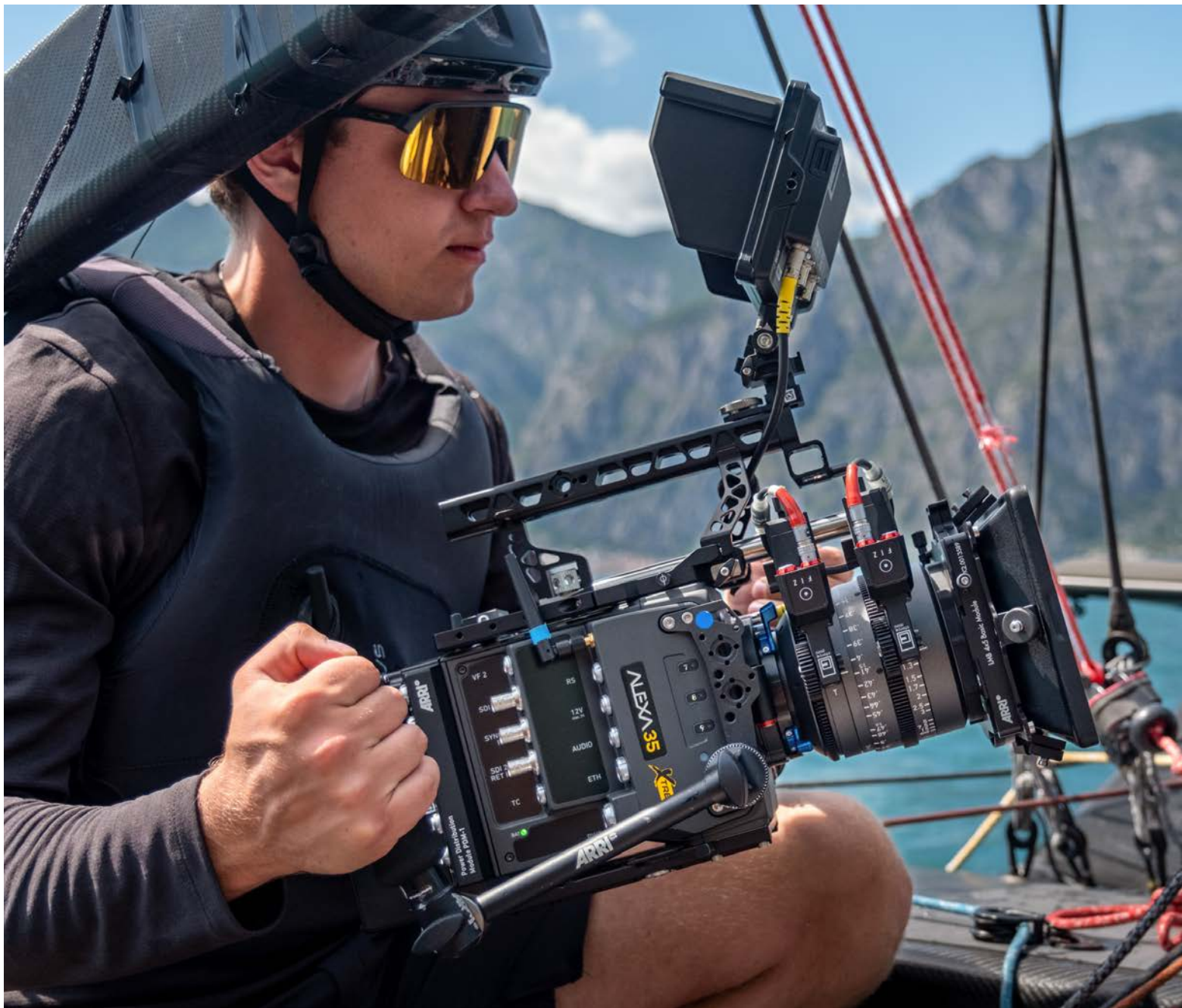
Elias Maria, BVK (above and on the cover) is based in Munich. He started in photography at a young age, became a camera assistant in action and sports photography and on ski movies. Next came work at an agency, then at a production company and as a freelancer making his own films. Lately, Elias has been doing commercials for major brands and fashion houses. His film caught the attention of this obsessed fast sailor who wanted to hear more from Elias and Henning Rädlein, ARRI Group VP Product Marketing.

Jon: How did this project begin?

Elias: It started with Henning Rädlein and Lukas Linner during a meeting at ARRI. I pitched an idea about a short sailing documentary. A few weeks later, they said that sailing might be interesting for the new ARRI ALEXA 35 Xtreme, an update to the current camera with new features and slow motion speeds up to 240 fps with 17 stops of dynamic range.

But then I remembered the challenges of getting good sailing shots. They need lots of equipment. Everything gets wet. And then I thought, why not? Let's subject this new Xtreme camera to one of the most extreme sailing conditions on a 69F foiling sailboat at Lago di Garda.

I'm surprised that Henning entrusted you with a new prototype camera to get wet and possibly lost forever at the bottom of a lake.

Henning: Elias promised that this was not going to happen.

Jon: How did you rig the camera on a 69F sailboat? (It is a one design monohull with hydrofoils, 6.9 meters long, made of carbon fiber, that foils up to 35 knots / 40 mph / 65 km/h).

In sailing, you usually have a lot of shots from the outside, but you're rarely inside of the action. It was important to show a lot

Elias Maria, BVK on *Nature of Speed*
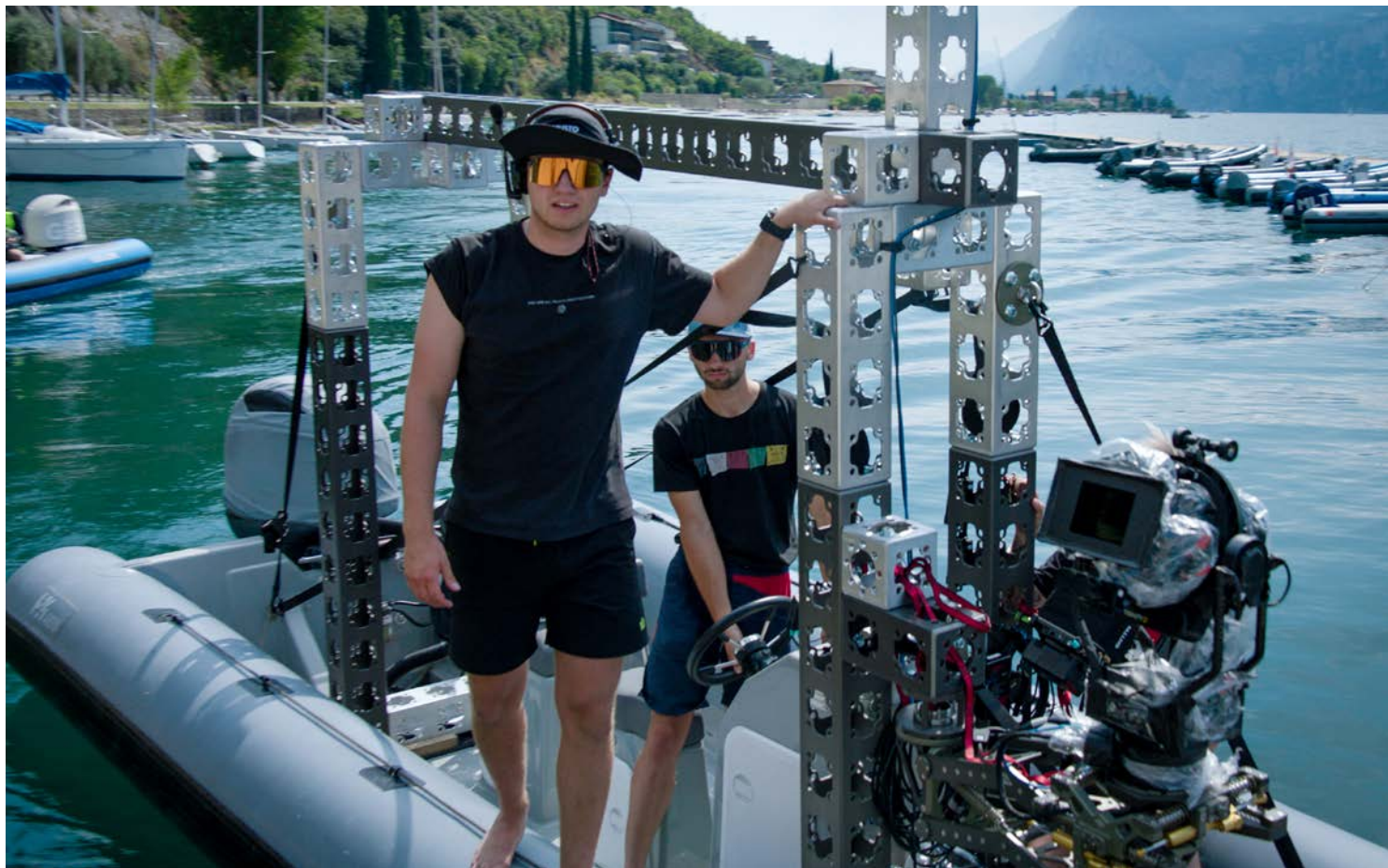
of the action in the boat, with lots of movement in the frame, at different speeds and angles. We wanted to show the speed over the water and the crew handling the boat. We needed a safe rig on the boat because the forces are incredible. You are sailing at 35 knots. If you capsize, a camera flying around could seriously injure someone.

So we rented a Modulus-X system (modulusx.ca) from GFM grip factory in Munich. The Modulus is a system of cubes and is much stiffer than typical pipe speed rails. This let us mount the camera to the 69F boom. We basically put the ALEXA 35 Xtreme into positions where you normally have a GoPro.

And you also rigged up a chase boat?

Yes, we got a Rigid Inflatable Boat (RIB) from Sophie Steinlein. We needed a chase boat that could go 35 knots. It had to be light-weight with a very powerful engine, but also stable enough to slice through the waves. We assembled all the camera and rigging equipment in Munich and then drove everything 5 hours south to Riva del Garda.

How did you stabilize the camera in the RIB?

We had an ARRI TRINITY 2 Head with the ARRI Pan Axis top-mounted to a GF-Vibration Isolator, controlled with ARRI Digital Remote Wheels. Christoph Werner was the camera operator, fol-lowing the sailboat at 35 knots, jumping over the waves, keeping the shot rock-solid. I don't know anyone else who could have done this kind of operating.

What frame rates were you shooting at?

We tested camera speeds earlier at ARRI Rental and decided on 12.5, 24, 48, 144 and 240 frames per second.

What lenses did you have?

We had a complete set of ARRI Ensō Primes. For this film, I was a big fan of the 14, 21, 32, 58, 105 and 150 mm. The 47mm was my absolute favorite. We used the 250mm on shore.

Did you work mostly in the afternoon for wind and light?

No, we only had four shooting days, so we decided to go when-ever the wind was good. So we wound up with many different lighting conditions: from full sunshine to misty and cloudy.

How did you keep everything dry?

Gates Underwater provided great support with a splash bag and an underwater housing. We were able to keep everything dry. But overheating was the next issue because we were not diving un-derwater; we were topside on a black carbon fiber boat in a black splash bag with direct sun. The camera got quite hot.

Did the camera keep running, did you lose footage?

Henning: The camera ran as is should, no footage was lost. Heat was not a problem and the new cooling inside the camera did exactly what it was supposed to do.

How did you find this 69F sailboat in Garda?

They have regattas around the world—it's like SailGP, but on a smaller scale and you can rent the boats. They also train on 69F for the America's Cup AC75 and the AC40 foiling boats.

Elias Maria, BVK on *Nature of Speed*

How did you take care of focus?

We had two focus pullers, Andreas Thomas and Darius Pfeffer. It was a challenge for them to pull focus while watching the monitor, judging the framing while bumping around in a RIB at high speed. They had 7-inch monitors with Teradek 750 Bolt Rx-Tx. They were lying down in the most stable place on the floor at the back of the RIB next to the motor. No one got seasick, even with eyes on the monitor—maybe because it was so stressful. There was no time for motion sickness.

How did you adjust frame rate, focus and iris?

We worked with the ARRI Hi-5 and the RIA-1. The camera assistant / focus puller was in the RIB chasing us and I was talking to him with my headset.

How did you determine exposure?

Sometimes with a meter on shore, but on the water I set the stop by eye and false color. I just did a quick check if something was burning out in the highlights. Sometimes the light changed rapidly when the boat changed direction or when the sails got wet and created different reflections. After the first two days I could

predict exposure most of the time.

In prep, we tested with different shutter angles. At 240 fps, I liked how the 144 degree shutter created very crisp images of water droplets. We also have some shots with a 270 degree shutter to get a more natural feeling.

Did you have filters on the Ensō lenses?

No Ensō Vintage Elements, but I used an FSND 0.3 on the front to remove more infrared light pollution from the blacks, especially when the light was reflecting everywhere.

Do you own equipment?

I own a set of Ensō Primes. They are like a blank sheet of paper and you can bring them in any direction, shape, color and form that you want.

Over the years I collected a lot of equipment. I also have a Mini LF camera and lenses, some accessories and a monitor.

Of course you're going to get an ALEXA 35 Xtreme next?

The ALEXA 35 Xtreme with slow motion and 17 stops of dynamic range is amazing. When you think about 17 stops, it just sounds

Elias Maria, BVK on *Nature of Speed*

like two and a half more stops than a Mini LF. What are 2.5 stops? But then you remember that it's exponential. 2.5 stops are 5 times more dynamic range, which is an incredibly larger amount.

At what ISO were you rating the camera?

800 was the base and we never had to adjust the ISO.

Did you strap yourself in to prevent falling overboard?

I was always grabbing onto something so as not to fall off because the g-forces were incredible and we were sailing at speeds up to 65 km/h.

How did you do the end shot where the camera goes from above to below the waterline?

There are few situations more difficult for dynamic range than a scene like this. We had an underwater housing with a dome.

How big a crew did you have?

This film was only possible because of our great team of more than 10 people. We had four cameras. We were always setting up rigs simultaneously. For example, when I was out on the water with the A camera, the operator and the B camera got already ready for the splash bag action.

The handheld scenes on the 69F were done by me 90% of the time. All the ARRI Trinity work and some handheld tracking shots from the RIB were operated by Christoph. We worked really long and tough days, from around 8 in the morning to 8 or 9 in the evening. We had long lunch breaks when there was no wind or the sun was too hot.

Did you apply a Look?

We did not apply a Look in camera because the lighting and water conditions were changing all the time.

Please tell us about the grading.

Henning: Lukas Linner edited with DaVinci Resolve. Florian (Utsi) Martin did the grading with Resolve in our cinema at ARRI Munich, viewing on a 4K laser projector. Of course we do also SDR and HDR video releases.

Elias: It's a showcase for a new camera and we wanted the grading to show a very new and fresh image. With all that slow motion water and dust, it was an interesting grade because of all bluish colors constantly changing, misty atmosphere mixed with high contrast sunny scenes and changing water and sky conditions. I'm really happy with the grading.

The look is very clean. That suits the story, the boat and the new camera. It's a story about playing with time and that's the feature of this camera and the images are crisp.

Henning: It was interesting that the shots with overcast light were actually much easier to grade with Elias´ vision in mind.

Your crisp and clean images added to the appeal of the extreme slow motion—not only the water and the action, but also on the faces of the sailors. It looked almost three dimensional.

Elias Maria, BVK on *Nature of Speed*
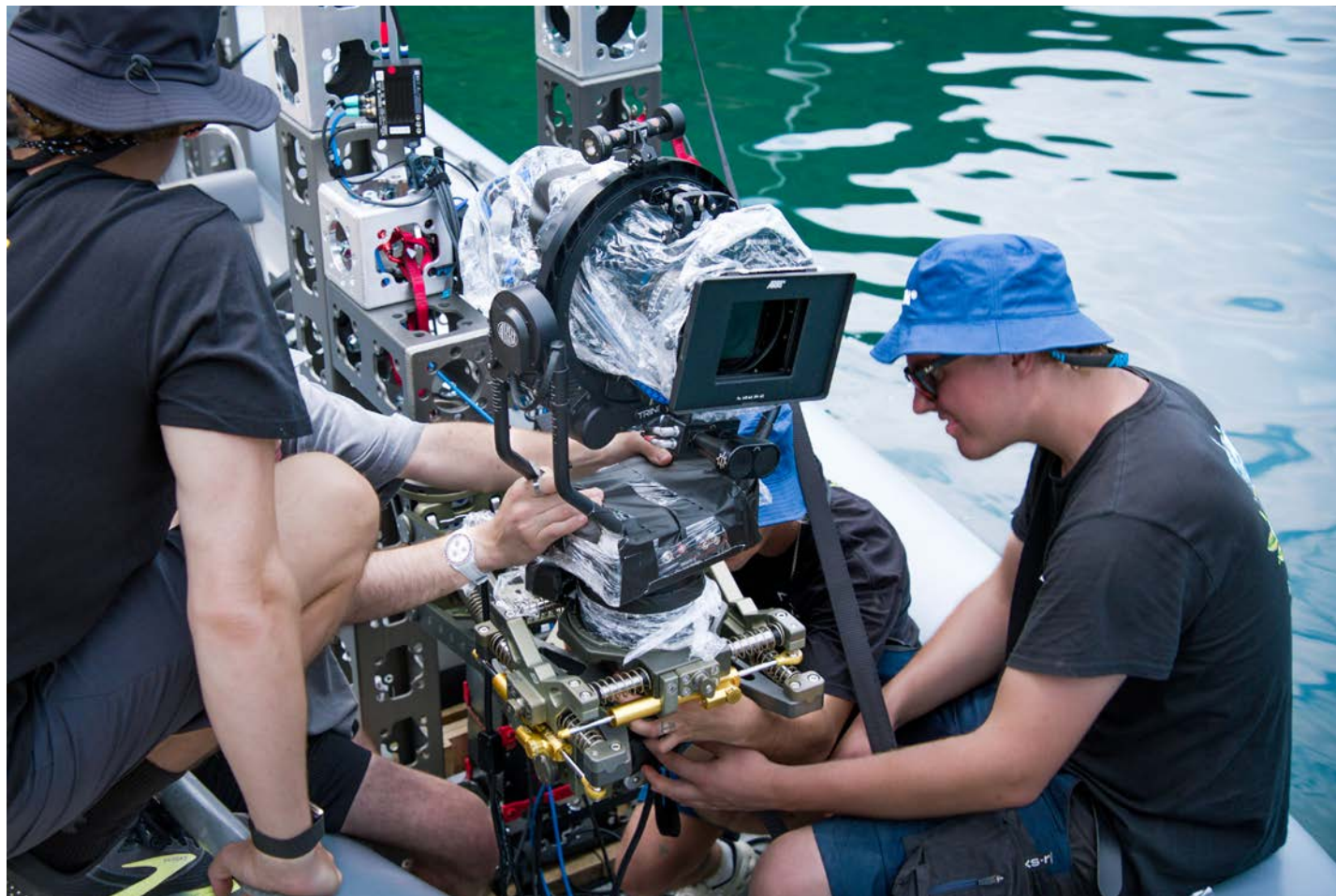
Elias: We can dream of new and interesting ways to play with time and speed and motion.

What's interesting about the new ALEXA 35 Xtreme is how one camera can do basically everything. You don't need a special operator or a technician and you don't have to wait to view the footage.

Directors and DPs will surely dream up innovative slow motion shots that integrate into the normal story. The opportunities are great.

The ARRI color science and the workflow are familiar. And the 17 stops of dynamic range. You don't have to change anything to go to 240 frames. There are moments in almost every film where you need slow motion. In commercial world, you definitely need slow motion.

I hope this movie will show the strengths of the ALEXA 35 Xtreme.

And your skill shooting sailing.

Thanks. They usually show the boat from the side flying perfectly straight. That's nice for a sailor. My heart goes, "Oh, that's a perfect foiling. The distance to the water and the trimming of the wing is just right." But does the audience want to see that? It is like with Formula 1 movies, you need to find the balance of showing the realness of the sport. You need to catch the attention of the viewer. That's why we also built in a lot of normal speed 24 fps scenes in this movie—to show the speed compared to the slow motion. We also have a lot of water splashing. Of course, if you sail this 69F boat like that in a regatta, you will lose. But that's the way it looks to be really exciting.

Henning: One more thing: Elias has managed to take several absolutely unseen shots, which really impresses me. Such a young team with such professionalism! Great!

Credits:

- Cinematographer: Elias Maria BVK
- Producer / Director: Lukas Linner
- 1st AD: Jannik Abelt
- TRINITY 2 / Camera Operator: Christoph Werner
- 1st AC A-Cam: Andreas Thomas
- 1st AC B-Cam: Darius Pfeffer
- 2nd AC: Simon Burger
- Key Grip: Lucas Bilang
- Grip: Mike Brunner
- BTS Filmmaker: Johan Munsberg
- Sailing Coordinator: Lukas Hesse
- Sailor 2: Victoria Schultheis
- Sailor 3: Lou Mourniac
- Sailor 4: Tom Heinrich
- Camera Boat Driver: Anthony Brandstetter
- Editor: Lukas Linner
- Colorist: Florian "Utsi" Martin
- Sound Designer & Composer: Martin Linka
- Theatrical 5.1 Mix: Clemens Becker
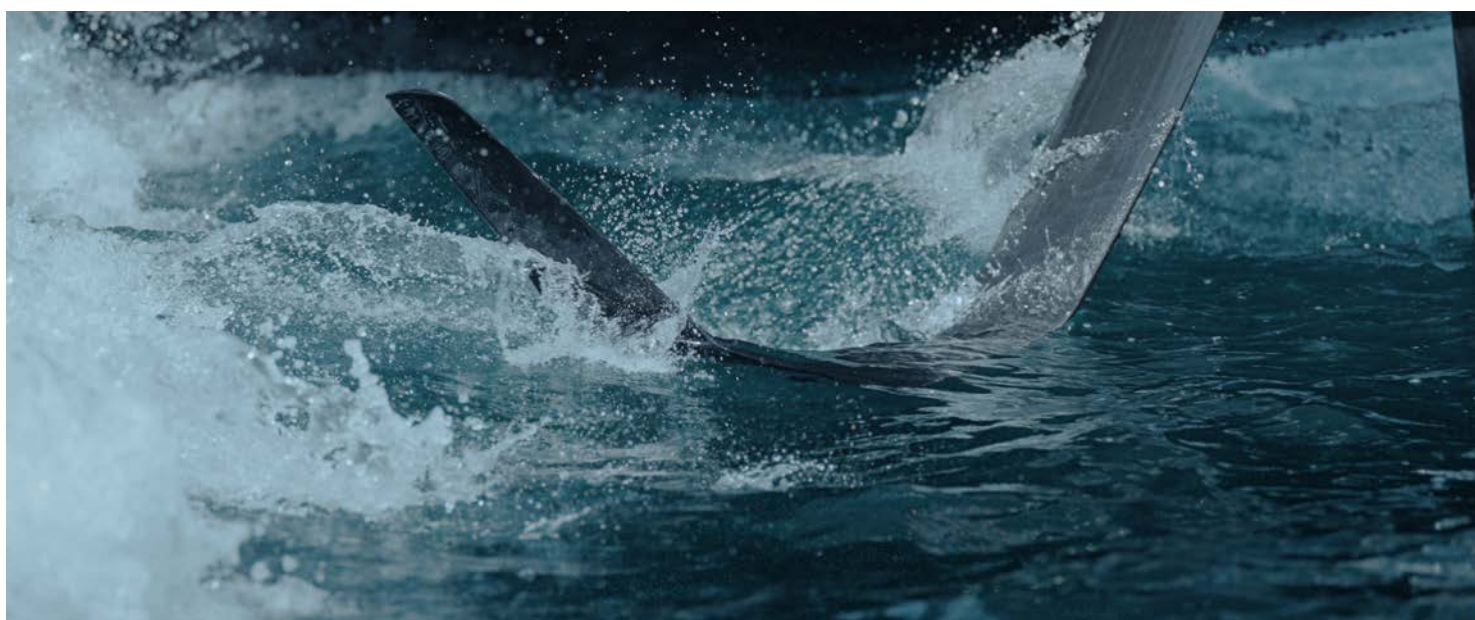
Charles Bergquist on ALEXA 35 Xtreme

Charles Bergquist discusses working with the ALEXA 35 Xtreme on his short film Mirage.

Equipment

ARRI ALEXA 35 Xtreme. The maximum frame rate was 660 fps. The lenses were ARRI Signature Primes with the 350P ARRI Impression Filter.

High-Speed

Alongside my work as a Director of Photography, I worked as a Phantom high-speed technician earlier in my career. I enjoy slow motion because it's something that you can't perceive and without high-speed cinematography, we wouldn't ever be able to glimpse these events, artistically or technically.

An Xtreme Film

Usually, I don't get to test prototype cameras. Art Adams and Chase Hagen from ARRI reached out right around when the cameras specs were being finalized. We had a couple meetings about it and then I was told I'd be able to use it and test it out, the specs alone were really exciting. It was something like, "The camera will be arriving in a couple weeks, you'll have a few days with it. Do what you'd like, have some fun with it!" The whole ARRI team was very supportive in letting me experiment with it. I immediately thought I wanted to shoot as much as I could and really get a feel for all the new abilities of the camera: slow motion, water, high dynamic range, handheld with my Easyrig, with minimal equipment and a small crew. Just me, our 1st AC, a model, a hair/makeup artist, and a producer in a great location. Let's figure out what this camera can do and how easy is it to work with from the high-speed perspective.

Easyrig Slow Motion

We had a head and sticks setup thinking we'd do a lot of static work, but since I was filming everything at 120 fps, 240 fps and 660 fps, I decided to go with the Easyrig for everything. The Easyrig allowed us to be fluid, get a lot of setups, be very fast and get interesting angles quickly. Because it's slow motion, you can see the movement but everything from the operator end is cleaned up and looks smooth.

Aspect Ratio, Details

The film's aspect ratio is 2.39:1, which you need to get 240 fps. The more you shrink the vertical height, the faster the sensor can read out and the faster the frame rate can be. To really get the most out of the shoot and learn as much as I could about the camera, I shot in Open Gate 4,6K and 2K 16:9 sensor modes with 2.39:1 frame lines. That said, the are some really pretty scenes in Open Gate 3:2 using the Signature Primes with the 350P Impression Filter where you see a lot of depth, swirling and smearing as you move away from the center of the image. I debated whether to mix formats in the edit, but ultimately decided on a UHD 2.39:1 delivery.

Location

The location was Malibu Canyon Ranch, owned by famous photographer Suze Randall. This was my first time at this location and it had amazing views of the mountains and sunsets. I wanted a bunch of looks out of one location and the ability to explore the property. It worked perfectly. To me it seemed as if the swimming pool is placed on purpose for the best sunlight with photography in mind. Suze was great. When we met, she took me on a quick but thorough scout and said, "If you go up on that hill, there's a nice view." I unwittingly said, "Oh, really?" She replied,

Charles Bergquist on ALEXA 35 Xtreme

"You should go up there for a sunset shot." As a photographer, she knows all the best places to shoot on her land, it was really helpful to have her show us around her property which she's probably shot at so many times.

ARRIRAW

This project was shot with ARRIRAW because the camera was an early version of the ALEXA 35 Xtreme. At 120 fps in 4.6K Open Gate on a 2 TB card, I got something like 11-13 minutes of runtime. Coming from the Phantom high-speed world, I am used to heavy data rates, so I was prepared that we'd shoot a lot. I did shoot so much that I had to transcode everything out to ProRes 4444 XQ, I used the ARRI Reference Tool to generate my ProRes files as well as Proxies.

Editing and Grading

I worked in Davinci Resolve 20 for editing and grading on this project. I did a rough grade with blue and purple tones in the shadows, a bit warmer at sunset and to establish a balance because I shot a bit of different looks from direct sunlight to completely backlit. Henning Rädlein and Utsi Martin at ARRI did the final grading and they have so much more experience with this sensor and ARRI color science.

Since this was a beta camera version, DaVinci Resolve handled all the ARRIRAW files except for the Overdrive files at 300 and 660 fps. To access those, I transcoded those files with the ARRI Reference Tool to ProRes 4444 XQ. Since everything was working in Resolve from the start, I'd imagine that the Overdrive files will be working when the camera is launched.

Resolutions, frame rates, ISO and Overdrive

I had a few days with the camera, and fortunately a weekend to go through the large amount of new features and specs, but it was easy to understand the characteristics. Everything we needed was in the menus and easy to navigate. Everything worked really well on the beta version of the camera that we had. Chase Hagen and Art Adams briefed me on best practices and were available for my questions— things like where middle gray lands with the Overdrive mode, best practices with rating the camera. They were super helpful and even fielded texts while we were shooting, which was great to have that support and feedback. I enjoyed figuring out how this camera worked and learning where the limits of the sensor are at different ISO settings with Overdrive on and off.

Favorite Frame Rates

Once you go over 400 fps, water, liquids and textures feel so different. There's almost a switch that happens. It feels very poetic and dreamlike.

LUTs and Look

Since the camera was new and the new Overdrive mode would be enabled, I wanted to stick with the standard ARRI Rec.709 LUT on set, knowing that I'd really push the image in post. I generally end up manipulating the image quite a bit for fashion style projects, so sticking to something I knew on set would give me the most flexibility in post.

Logistics

Putting this together was a little stressful because I wanted it to be a great shoot and we came up on our shoot day pretty quickly.

Usually, as a DP, you've been focused so much on the creative and achieving the vision of the project, you don't notice all the little things that need to come together before that. It was fun to do, big thanks to my producers that helped out on this.

Production

Mirage was a small passion project, I was fortunate to have our crew donate their time and effort, huge thanks to them. Suze Randall was great with the location. It was truly exciting to shoot with a new camera and being among the first people to understand it. Everybody else was excited to make something with this extremely versatile camera.

Bio

I was born and raised in Chicago. After graduating with a degree in Economics from the University of Iowa, I moved to San Diego and worked briefly with FUEL TV. Being freelance, you have to be versatile and know the environment. From there I started my career shooting a variety of work and eventually found myself working for VICE on HBO for about four years as a freelance cinematographer. I was fortunate enough to work on a lot of their high-profile pieces all over the world. We were primarily focused on the story and access, but we were pushed to really contemplate the cinematography of each story and that was a fun challenge because we were involved in situations where you had to think quick but still make it look great.

I remember Roger Deakins, ASC, BSC explaining how, when he started off, documentary work was one of those things that teaches you how to work quickly, precisely and knowing your camera, knowing what you're working with, where the light is, and how to move somebody closer to a wall to get a shot that you want instead of having time for large set up. Lately, I've been doing beauty and commercial work, which I really enjoy working on. I'd really like to work on narrative as well and see what I can bring to the table with the documentary and commercial background.

Conclusion

The way I see it, the ALEXA 35 Xtreme gets the camera into an area that never really existed before. For lack of better words, it's like a Swiss Army knife.

The camera can shoot at 10 fps and a 360-degree shutter to get a nice smear, then you can shoot straight 24 fps, all the way up to higher frame rates at 660 fps. You many not need that all the time, but it covers a large part of that slow motion world that previously was the realm of specialty cameras. It's an all-in-one camera, with ARRI color and dynamic range.

Credits

- Producer: Andreea Florescu + Taraneh Golozar
- Director of Photography: Charles Bergquist
- 1st AC : Joshua Cote
- Hair / Make Up Artist: Saruul Bekhbaatar
- Model: Danielle Dolinger
- Location: Suze Randall, Malibu Canyon Ranch
- Additional Equipment Support: CSLA (Cole Cyccone and Eli Shine)

Charles Bergquist's Technical Notes on *Mirage*

Model Danielle Dolinger is looking into a mirror with water cascading over it. The camera is running at 240 fps, also looking down into the mirror. This is one of our few tripod shots. The image is flipped so it gives the illusion of us looking up through the water.

This is 120 fps, Open Gate 3:2 and finished in 2.39:1 on an Easyrig gently pushing in on her. The 350P Impression filter curves the image at the edges of the frame.

660 fps Sensor Overdrive. End of the day backlit, trying to see what the highlights do compared to other high-speed scenes, but also getting a nice texture on the water.

240 fps.

Charles Bergquist's Technical Notes on *Mirage*

660 fps really shows out of focus swirly edges with the 350P Impression filter. Working for years with First AC Joshua Cote, we were wide open most of the time. He was great, especially with me just running around on the Easyrig with the model.

Moving in to a close-up on the Easyrig at 240 fps, looks like she's floating in the air. It was a very windy day and her hair flowed beautifully in slow motion.

660 fps Sensor Overdrive, as fast as the camera can go. This is as high stress as you can get on the image. There's a lot of high frequency, a lot of changing pixels the whole time. You have the sun almost directly behind her off camera, with no fill. The skin tones are beautiful. We had a little Hudson sprayer off camera to get a sun shower effect.

This setup was one of the suggestions from Suze Randall, the photographer and Malibu Canyon Ranch location owner. We were down the hill as the sun was setting, and she said, "If you go up to this peak right here, it's not a far hike and the view opens up." We climbed up. So we finished our day there as the sun was setting and you could see all the layers of the mountains on this beautifully clear day.

Stijn Van der Veken, ASC, SBC on ALEXA 35 Xtreme

R-L: Stijn Van der Veken, ASC, SBC; Jan Matthys - Director.
BTS Photos: Henning Rädlein.

Stijn Van der Veken, ASC, SBC was one of the first people to try ARRI's new ALEXA 35 Xtreme with the new ARRICORE codec and higher slow motion speeds. His credits include Rogue Heroes, Outlander, Four Weddings and a Funeral*, etc.*

Jon: Let's begin with a few leading, rhetorical questions. Once upon a time, not so long ago, in the "old" analog film days, we basically had a studio camera and we then we used a specialized high-speed camera. "What's wrong with that," some might ask. "Why have an ALEXA that does everything?"

Stijn Van der Veken, ASC, SBC: Well, there really isn't a high-speed camera that performs as well as the ALEXA 35. The dynamic range of some high-speed cameras is much smaller, so you wouldn't want to mix them too much with an ALEXA 35.

Some of these specialized high-speed cameras require an extra technician. Also, they have a different color space, which is not unsolvable in grading these days. But the dynamic range is a bit of an issue for me, especially in the highlights.

When did you test the new ALEXA 35 Xtreme cameras for your short AFTER THE RAIN?

We shot on July 1 at a nature reserve an hour south of Munich towards the Austrian border.

How big a crew did you have?

It was a small crew: an ARRI TRINITY operator with his assistant, a focus puller, a grip with an electrical tracking vehicle, one special

effects technician, a gaffer, makeup/hair, production coordinator, the director, myself as DP and support people from ARRI. That's basically it.

Please describe the concept of the film.

The idea is having two people running in a forest, a man and a woman. The man has a dog. It begins raining. They each take shelter under the roof of a small hut. Then the summer rain shower stops. They run towards a lake and connect a bit more. He throws a Frisbee into the water and the dog jumps in. They hug and smile. We see a lot of facial expressions. It's a basic story, but it was a way of showing movement, faces, slow motion, dynamic range and ARRICORE.

What lenses were you using?

We had Signature Primes, from 12mm to 280mm.

What was your maximum frame rate?

Our maximum was 240 fps. We were in a 2.39:1 sensor mode at 4K UHD. But a lot of it was done at 150 fps, which we found as a good speed to read the actors' emotions, to reveal their facial expressions without slowing it down excessively.

What did you think of ARRICORE, the new codec? More speed, less data?

It went very well and was difficult for me to see any difference in quality between ARRICORE and ARRIRAW. But it reduces the amount of data massively. Since it's still in beta, ARRICORE was transcoded to ProRes 4444 XQ and graded in DaVinci Resolve.

Stijn Van der Veken on ALEXA 35 Xtreme

DIT?

We had two guys from ARRI. I used my own LUT, developed with my colorist at Molinare in London and the one I usually apply. It's a gentle Log C 4 show LUT that doesn't crush the blacks and doesn't kick up the colors. It's actually like the old sensitometric curve from a negative film stock. It has a nice roll off on the top so I can see everything, and we can work from there.

Were you viewing the action on a monitor or operating?

I was viewing on a SmallHD Vision 24" 4K monitor and setting exposure by eye. The operating was mostly done by our TRINITY operator, and I was watching with the director. We did quite a few replays to see the results. The great thing was that we could play back immediately, straight from the camera, even at 240 fps.

The camera assistants replayed wirelessly, controlling the camera directly with an ARRI Hi-5 Hand Unit. They could fast forward, play, "rewind" and skip to the next clip. I was pleasantly surprised that it didn't take any rendering time or any delay. That's amazing. Real time play back at 240 fps. The camera assistant just pushed a button on the Hi-5 and the camera started replaying.

It was very helpful because we had to experiment with our frame rates as we went along. After a few takes, we saw that 150 fps looked like a good speed for certain scenes. In former times, you usually had to offload the data to have a proper replay.

Why 2.39:1 (widescreen, spherical) sensor mode?

Because I wanted to go up to 240 fps. In Open Gate, maximum frame rate is 120 fps. (The taller the sensor height, the longer it takes to read out, and the slower the top speed.)

Would you ever go into Sensor Overdrive, up to 660 fps?

In a controlled environment such as a studio space or a tabletop situation, I could do that. But on this job, we were going from full sun backlight, white clouds, mountains in the background with snow and benefitting from the 17 stops of dynamic range. Sensor Overdrive gives you 11 stops of dynamic range. You may be satisfied with that, remembering back to the analog film days. As a DP, you know what you're doing, and you can make that decision. You know what to control. But we got so spoiled with ALEXA 35's 17 stops of digital dynamic range. Imagine you have a car with reflections and you switch to 660 frames, then the reflections may be clipped. So that's something you need have under control. But if it's a drop of coffee in a cup or chopped vegetables on the plate, that's full control.

What about stunts at 660 fps, where if quickly cut, maybe clipped highlights are less important?

It depends how many highlights you have. If you are within an 11 stop range, then you can just cut it in, because the color space doesn't really change. It's just the dynamic range that changes.

You had a rain machine on AFTER THE RAIN?

The Special Effects crew pumped water from the lake to three rain towers. We also added a bit of breeze on the actors with fans.

Did you have a dog wrangler?

Stijn Van der Veken on ALEXA 35 Xtreme

At left: TRINITY with ALEXA 35 Xtreme hard mounted to rear of electric camera car.

Stijn Van der Veken, ASC, SBC with monitor at lower left.

Below left: TRINITY with ALEXA 35 Xtreme.

BTS Photos: Henning Rädlein.

Framegrabs, opposite page.
Top: Wide and low, 12mm. 150 fps.
Middle and Bottom: 150 fps.

No, Jacob, the actor, brought his dog. They both were so natural. Especially when the dog jumps in the lake in slow motion.

TRINITY wrangler?

For many of the running shots, the TRINITY was hard-mounted to an electric vehicle. We did a couple of runs mounted in front and then in the back. The advantage of the TRINITY was that we could go straight down almost to the deck when the dog was coming in, and then quickly move up to the actors' faces. It is a fantastic tool for running shots.

Tripod?

We used a tripod for the shot towards the end where the dog is running in slow motion along the dock and jumps into the water. We put the tripod in the lake, with a second ALEXA 35 Xtreme camera at 240 fps and a 180mm lens, operated by Sean Dooley. We were in a good position. The sun was full backlit at that point,

and we hoped the dog would jump in. The first time he didn't want to jump; he stopped at the edge of the dock. But then the second time he jumped. We did three more takes and the dog jumped in three times. And each time he shook his fur.

240 fps is a magical frame rate.

It's a simple story, uncomplicated, not technical. We all know what chopped vegetables look like when they drop on a cutting board at 240 fps, and we all know what happens when you a burst a water balloon, but this is another and very practical use of the camera. Maybe you don't need to go all the way to 240 fps, but you have that option without dialing down your resolution. You don't have to reboot the camera. Changing frame rates is quick and easy. You just dial it in. In fact, I have my own ALEXA 35, and I'm going to upgrade it to Xtreme. It becomes more versatile.
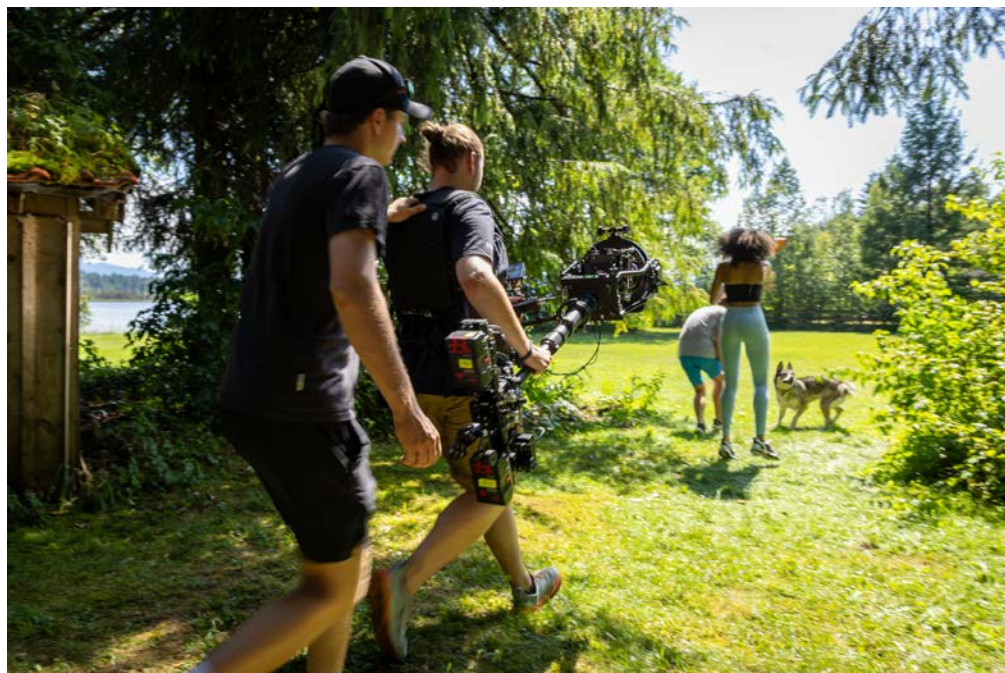
Credits

Stijn van der Veken, ASC, SBC - DP
Jan Matthys - Director
Henning Rädlein - Head of Project
Simone Eigl - Line Producer
Georg Lanz - 1st AC
Adrian Grbac - Trinity Operator
Stefan Hummel - Grip/tracking vehicle
Kai Giegerich - Gaffer
Andreas Knorpp - SFX
Lukas Linner - ARRI support, DIT
Sean Dooley - BTS Video
Elias Maria - ARRI support
Laura Rys - ARRI support
Leonie Wilfer - Hair & Make Up
BTS Stills - Henning Rädlein
Framegrabs courtesy of ARRI

200mm T 5.6
Internal uncoated filter
Oval iris
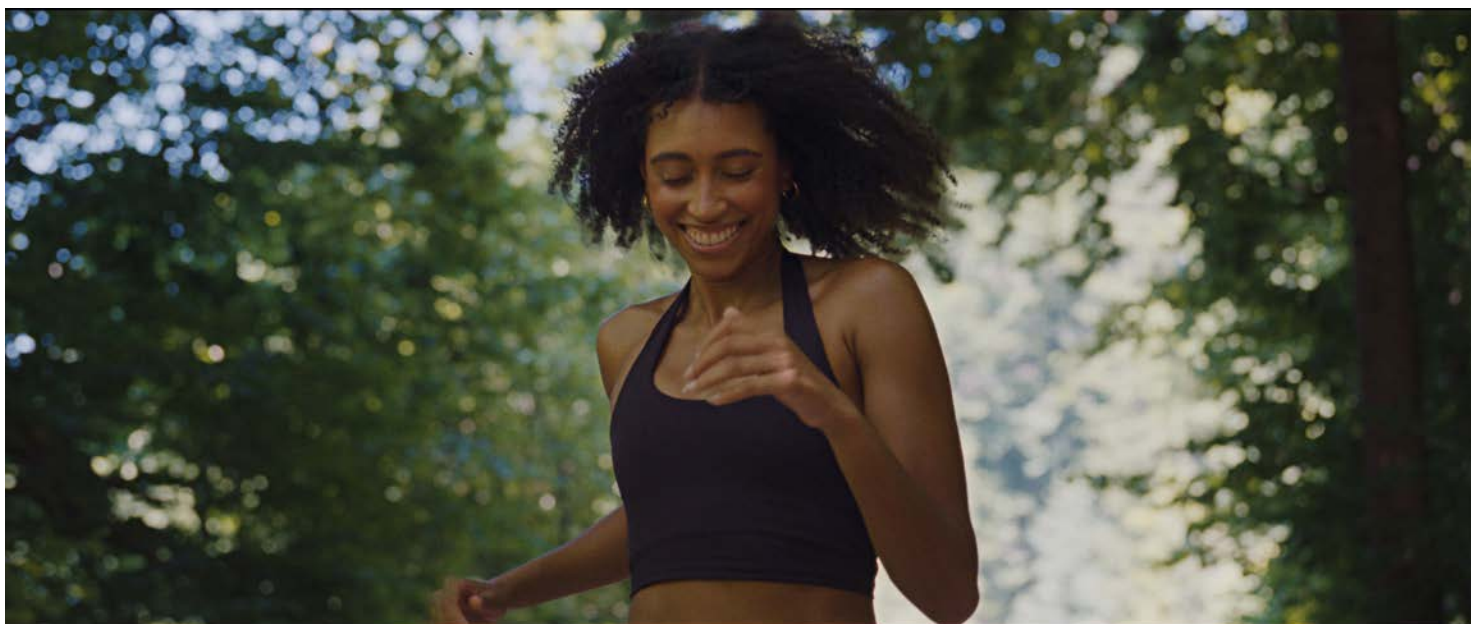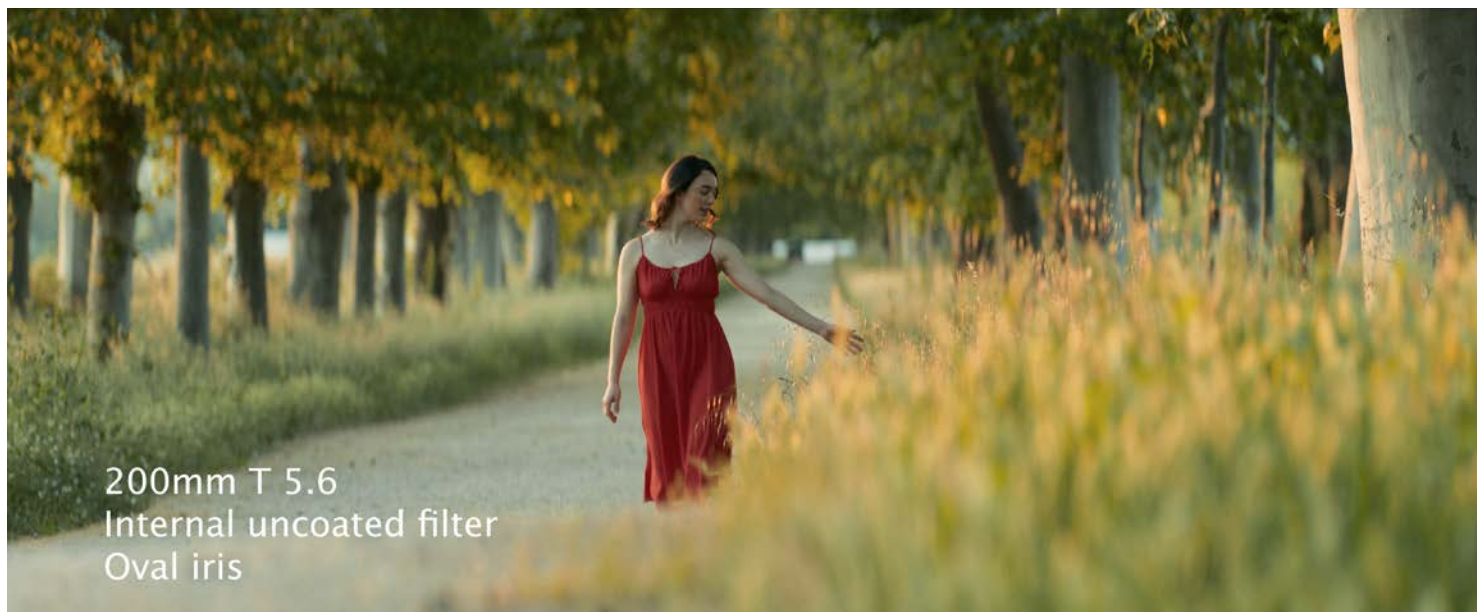
Angénieux Optimo Primes with new Oval Iris. Frames from a short film by Miguel Ángel Mora, AEC. Courtesy of Angénieux.
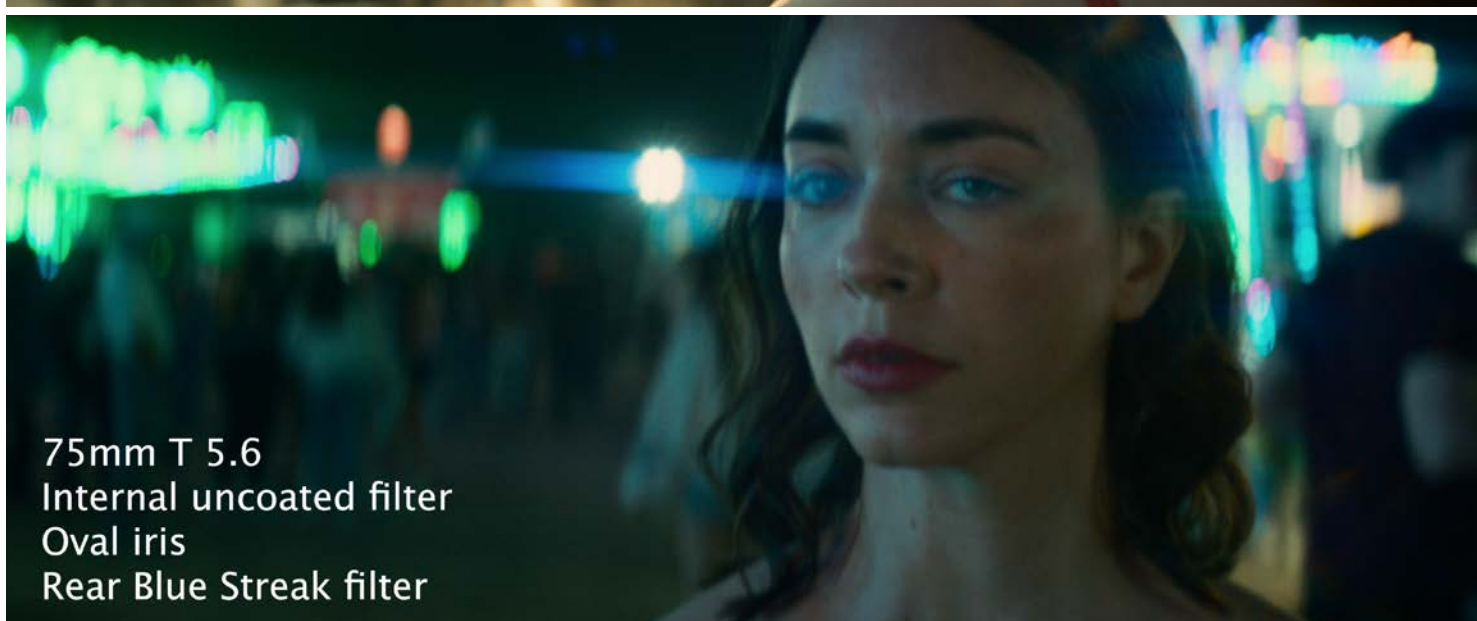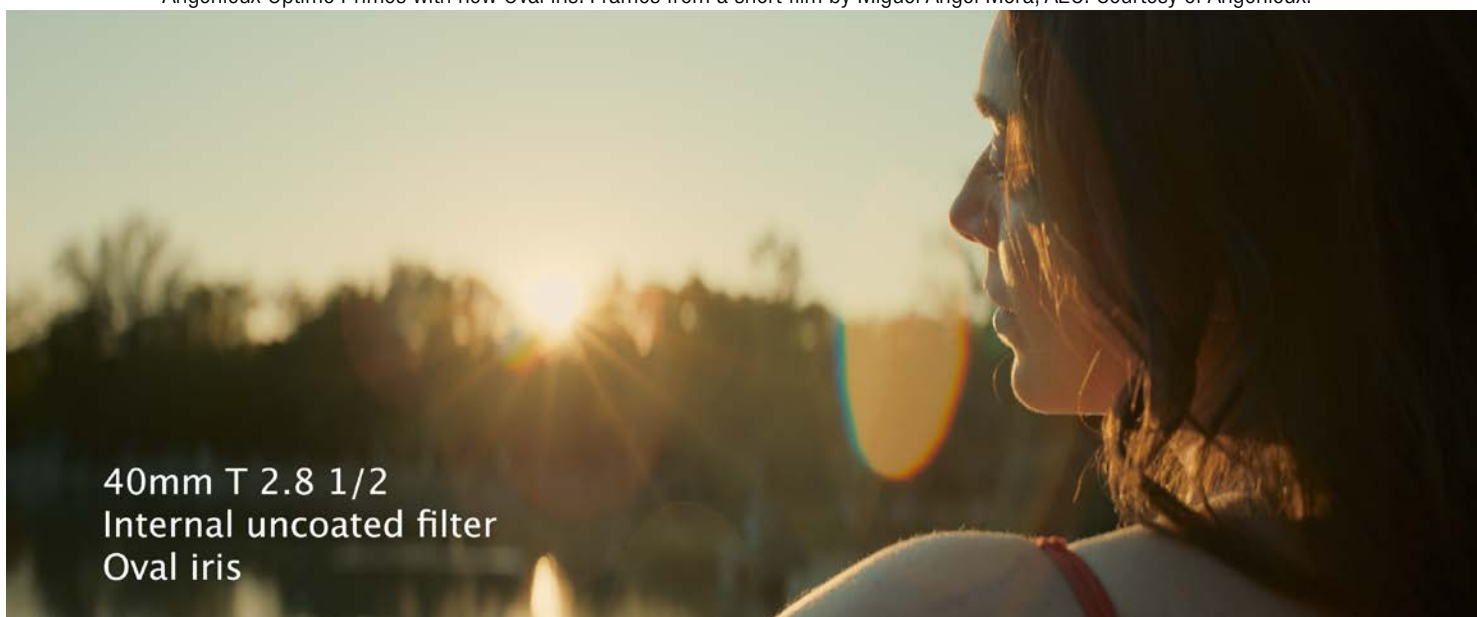
40mm T 2.8 1/2
Internal uncoated filter
Oval iris

75mm T 5.6
Internal uncoated filter
Oval iris
Rear Blue Streak filter

Angénieux IOP Oval Iris
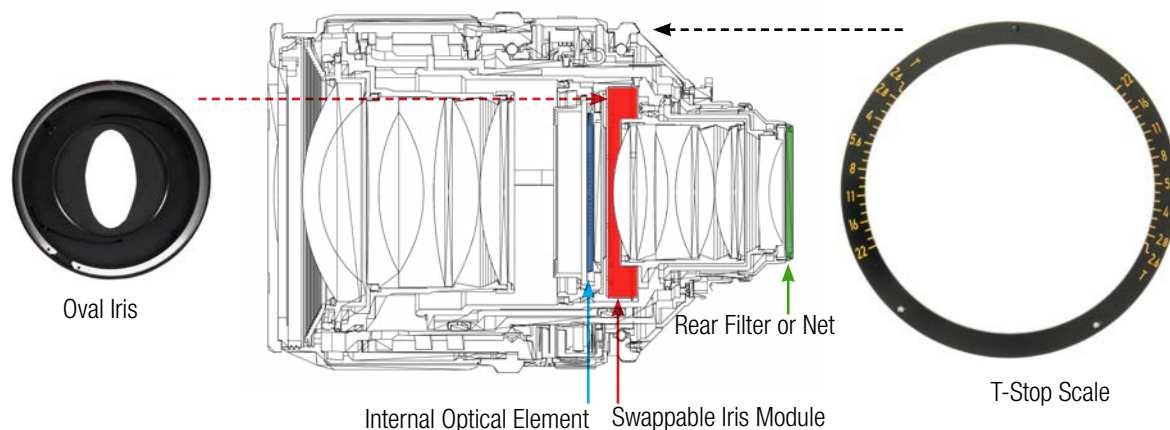
Oval Iris

Internal Optical Element   Swappable Iris Module

Rear Filter or Net

T-Stop Scale

Angénieux Optimo Primes get an appealing oval iris

Optimo Primes normally come with round 9-blade irises. Interchangeable 3-blade vintage-style iris are also available. But what if you want to have an anamorphic look, or match spherical with anamorphic, or the VFX team insists on distortion-free lenses? New 16-blade oval irises are now available.

Angénieux's new 16-blade oval irises have an intricate, patented design—not an easy feat—to maintain a consistent oval bokeh shape at all apertures across all 12 focal lengths of the Optimo Prime series (18, 21, 24, 28, 32, 40, 50, 60, 75, 100, 135, 200 mm).

Quick review: Angénieux Optimo Primes are compact and lightweight, with exceptionally customizable image looks. Maximum aperture with the 9-blade iris is T1.8 (except the 18mm is T2 and 200mm is T2.2). With the oval iris, maximum aperture is T2.6 (except the 18mm is T2.8 and the 200mm is T3.2).

Sur mesure

In the French fashion industry, *sur mesure* is bespoke—made to measure. *Prêt-à-porter* is ready-to-wear, off-the-rack. Creative cinematographers crave *sur mesure* lenses to shape their artistic style to the story involved. And so, Angénieux Optimo Primes offer *haute couture* tailoring with their Integrated Optical Palette (IOP) system.

Integrated Optical Palette (IOP)

The Angénieux Integrated Optical Palette (IOP) for Optimo Primes offers customizable, repeatable, creative possibilities for cinematographers. There are 3 components in the IOP system: the Internal Optical Element, the Interchangeable Iris module, and the rear filter. You can "balance" them independently.

1. Internal Optical Element

The Internal Optical Element of the IOP system can alter MTF, sharpness or softness, focus fall-off, shading, diffusion, flare, etc. The looks are often completely different from you'd achieve with a front or rear filter. Internal Optical Elements are available as Clear Coated, Clear Uncoated, Glimmerglass, Black Satin, Black Promist, Low Contrast, Net and more. Custom IOPs are available on request. You can even customize a Clear IOP yourself with an airbrush, hairspray or all kinds of imaginative applications.

2. Interchangeable Iris

There are several versions of the 16-blade Oval Iris to maintain consistent bokeh (out-of-focus highlight) shape and size, depending on the focal length of the lens. Each Oval Iris assembly comes with a dedicated aperture ring. Swapping the iris does not change the lens metadata as the iris design preserves the native lens data to ensure accuracy without any modifications.

3. Rear Filter

A rear filter or net screws onto the back of the lens.

Customizing Looks

Of course, you can also use a clip-on or mattebox filter in front. All the lenses have a 95mm diameter front barrel diameter except the 200mm Optimo Prime, which has a 114mm front diameter.

Working with cinematographers, rental houses and lens technicians have taken the IOP concept even further with their own bespoke takes on the IOP, as DP Abraham Martinez explains next. *angenieux.com   bandpro.com*   Thales Angenieux at IBC 12.F30

Set of 12 Angénieux Optimo Primes

Abraham Martinez on Optimo Primes and *The Lincoln Lawyer*

Angénieux Optimo Primes have an Internal Optical Palette (IOP) system consisting of an Internal Optical Element, Interchangeable Iris and Rear Filter. Together or individually, the IOP system provides cinematographers and lens technicians the ability to customize the look and style of Optimo Primes to tell their stories. Abraham Martinez discusses his work using IOP-tailored Angénieux Optimo Primes on The Lincoln Lawyer, *a legal drama series based on the books of Michael Connelly.*

The Netflix logline is "Hotshot LA defense attorney Mickey Haller will do whatever it takes to win as he navigates the criminal justice system from his trademark Lincoln Navigator." Abraham Martinez graduated from the University of North Texas film school, worked as a prep tech at MPS in Dallas, moved to New York, was a camera prep technician at F&B Ceco / Cinema-Vision, and then went from camera loader, AC, Operator and on to DP. He lives in Los Angeles. His credits include The Lincoln Lawyer, Cobra Kai, Queen of the South, *etc.*

Jon: When did you start on *The Lincoln Lawyer*?

Abraham: I started on season 2. Pedro Gómez, the previous DP, had opened the door to using Angénieux lenses. Then I got *Cobra Kai* and wasn't able to do Season 3, but it was a friendly handoff to Moira Morel, who continued using the Optimo Primes. I came back for all of Season 4, and of course kept the Optimo Primes — but went a few steps further with the Internal Optical Palettes.

How has the look of the show has evolved with each season?

Lenses give us the texture, contrast and tone to tell the story. The subjective and technical performance of lenses in alignment with the story speaks for you as an advocate for your show. You're translating the script. You stand in the gap between the rental house and the director, using a certain kind of language and grammar.

Lens couture

Using the Angénieux Optimo Prime lenses on *Lincoln Lawyer* was like something you might call "Lens Couture." Lens Couture means that you're tailoring your cloth, you're tailoring your lens to the measurements of the show. That's the best way I can describe it. It's almost like I bought a suit, but now I'm going to tailor the suit to fit me. Of course, there's the mass market way of making something, which is not bad, but this is something special.

This kind of custom measurement and style allows me to have the creative input and dialogue with my tailor. It's the opportunity to say, "For this show, we have these windows here, we want to see this sky, we want this kind of flare. And so, Angénieux Optimo Primes and the lens technicians at Camtec, provided the conversation and ability to custom tailor the lenses here in Burbank. I'm excited because our tailoring of the optical performance of these lenses can help us translate what the director or showrunners have in mind. What's in the magic box, what is the secret sauce? In this case, it was something that I went through with Camtec. I live in Burbank, they're also in Burbank. I was able to go there

Abraham Martinez on Optimo Primes and *The Lincoln Lawyer*

three or four times just to find the sweet spot of these lenses with Kavon Elhami, President of Camtec and his lens department. I was very particular about what I was looking for, and it did not take them long to figure out what we needed.

Lens spa

Pedro Gómez was the first out of the gate to choose the Optimo Primes. When Pedro was leaving the show, I came in mid-season. I had to get ramped up very fast to learn about the performance of these lenses.

Basically, there are two different ways of looking at lenses. Either you go to a rental house and it's like a lens spa. They lay it all out for you. You get to pick which lenses you want. That's a lens spa: checking the lenses on the camera, projector and then atmosphere (the real world on my stills camera). But in this case, it was like I had to go out on a speed date.

Speed date

I did some tests right away in the lens room at Camtec. Then I went to the projection room and looked at all the focal lengths. Then I had conversations with their lens techs. Next, I put the lenses on my Fujifilm GFX50R and 50S cameras, with a GF to PL lens mount adapter. I spent about a week in my three tier system of checking lenses, which is: projector lens test at the rental house, studio tests (courtroom interior to see the colors , windows and highlights) and then a street test right off the truck.

Honeymoon

Slowly but surely, I was in a honeymoon phase. I fell in love with these lenses. Having been a camera prep tech at rental houses and an assistant for many years, I was comfortable with specs, with the numbers, iris blade count, bokeh, all the classical things that one would look at in a lens. But now it was all about the magic: the fall-off at T2.0, at T2.8, at T5.6. I don't specifically shoot wide open all the time. I base everything on the scene. The story that we're trying to tell is in Los Angeles, after all. So sometimes you want a deep stop to show it all off, to tell the world we're here. I'm starting to go into the phase where I'm seeing where the stops are playing. I check every stop, the halation, where the highlights are blooming, I check for performance and character.

Tuning

The lens techs at Camtec also tuned the 60mm Optimo Prime because we were living on that focal length for many of the closeups. The result was beautiful portraiture with backgrounds that had the impression very much like a watercolor, very creamy.

For the colors in the courtroom, I was able to move backgrounds around to give them a little bit more of a watercolor creamier effect. Or if I wanted more contrast with darker backgrounds, we could place extras in dark suits. These lenses held the contrast very well, showed details in the shadows and in the highlights. It is a unique thing because sometimes to get that effect, you might

Photo by Lara Solanki, courtesy of Netflix

have to go for lower contrast. You want to have the colors meshed together. For me, the Optimo Primes had an in-betweenness that I really liked.

IOP and watercolor painting

When I think of watercolor, you're outlining with the pencil. You're actually giving it some sort of boundary. There's an interplay and that's the kind of falloff the lenses provided gave me. When I came back on Season 4, I decided to add some more lensing character to the show, which leans a bit on the warmer side. I decided to add in an IOP (Internal Optical Palette) with some more warmth. We also added diffusion. We went through a series of tests, looking at the stock options that they had, such as Glimmerglass and Black Promist. Kavon Elhami, President of Camtec, had everything set up for me to take a look at skin tones, highlight, fall off, contrast—everything in his Lens Spa.

Flare

I wanted to have some sharpness and yet have some gentle feeling of diffusion. On top of that, I asked for unique flare characteristics. To me, mitigating the flare is everything. We use hard mattes, we controlled the direction of light. I wanted to shoot the lens at their best performance, but still allow flares to sneak where it's appropriate. Lens flare is not an essential thing I look at. But here, we were able to micromanage the flare that offered a kind of

ocean mist, which if you're a fan of the show, is very much a part of the redemption or healing of Mickey Haller, our lead character. He goes to the ocean, he stands there, he works out of his car. There's this little mist that he sees before he takes on cases. And then at nighttime it gave a very interesting flare to the city lights. It had this glamor and grit quality.

The flare that barely covered the actor's face was pleasing. And at nighttime it gave us an edgy quality, giving us the grit we needed, which is basically the look of our show. It's daytime, it's sunny LA, almost blue sky. He's going out, he's trying to solve the case. And then at night, it's a little more neo noir, Los Angeles noir, a little bit of muscle and tone.

Are these custom IOPs and filters? Did you have a front filter?

My goal this season was not to have any front filters. Rolling out off the rental house with my IOP lens couture, I didn't want to undermine the values of the Optimo Primes that we tailored for the show. The whole concept was to use the integrated optical element inside that added some warmth and diffusion. Also, we did not use a rear filter. However, that excites me for Season 5. We definitely have options for front and rear optical filters in addition to the internal optical element.

I like your expression for the IOP as "tailoring."

With the IOP, we are not moving elements around; we are add-

Abraham Martinez on Optimo Primes and *The Lincoln Lawyer*

Photo by Lara Solanki, courtesy of Netflix

ing something inside. But you can still adjust the fall off of the Optimo Primes.

Camtec was able to dive into the optics and tailor those looks that I wanted to feel and see. I think Angénieux has opened up a door that I willingly want to explore further. I seek a lens couture approach with a full service rental company like Camtec where they can do this precision work anytime.

What cameras were you using?

We had Sony VENICE on Season 2. Season 3 was ALEXA Mini LF. On Season 4, I had four ALEXA Mini LFs, a Blackmagic Pocket 6K, Blackmagic PYXIS 6K, Blackmagic 4K Micro, and a Blackmagic URS Mini Pro 12K.

I also had my personal Sony FX6 for certain rigging shots and Ronin RS3 shots. I also own the Blackmagic PYXIS 6K and the Micro as well.

And then at the very end we used the new Sony Rialto Mini. Sony lent us a demo unit and I fell in love with the Sony Rialto, tethered to a VENICE 2.

You must have had a huge camera truck and a big camera crew.

It's a big courtroom show. We have a camera crew of 12 total for courtroom days. Having come up from being a film loader, where we'd work with many film stocks, my approach is the same with the

many cameras. Each camera has a different purpose in the lineup, based on things such as light-sensitivity, rigging, movement, or gimbal-mode. This way, I'm able to prepare or pivot as needed. I feel very lucky that all these cameras are able to blend seamlessly.

Are you operating or watching on a monitor?

I set up the lock-offs and work out the Blackmagic setups, but mostly I'm at the DIT cart.

There are so many cameras in the courtroom that some people say they feel like they're at Best Buy. We're a full-time two camera team. In the courtroom, which is at LA City Center Studios, we actually have many three camera days with our ALEXA Mini LFs plus lock-offs.

What are your focus pullers using?

They're all on Preston FIZ hand units and they have Preston Light Rangers.

You mentioned watercolors. Do you paint?

Before eighth grade, I was drawing comics and doing graphic novels. I think of every show in terms of art and drawing. My wife is also a painter. So we're always in and out of museums.

Are you using Zooms on this show?

Yes. We had Camtec's Angenieux 12x (36-435 mm) Full Frame

Abraham Martinez on Optimo Primes and *The Lincoln Lawyer*

Photo by Lara Solanki, courtesy of Netflix

Zoom and the Optimo Ultra Compact 37-102 FF, especially in the courtroom.

How do you match the zooms to the primes, because the zooms don't have the IOP?

For the zooms, we put a diffusion filter on the front.

What is the difference between the effect of a front filter, an IOP and a rear filter for you in terms of look and quality and performance?

Testing is everything. I would tell everyone to look on a lens projector. Then take your lens into the real world, put a front filter on. Then take a look with the IOP, see what that does. What really excites me about the IOP and even the rear filter is that it reminds me of the nets in the rear. I love filters. I use filters. But the IOP suggests something magical.

The beautiful thing about the Angenieux IOP system that you have your true north of the default lens. You say to the lens, "I can count on you, let's go on tour together, but let's do it for this specific project. Let's have this flare, let's have this much contrast or diffusion. Let's have uncoated, let's have glimmerglass, or something else." And then you know the beauty and the magic in the tailoring of it all. That is a very unique scenario.

Can anyone do that kind lens tailoring and customizing?

That's the beauty of the IOP system. It makes tailoring available to

most rental houses and lens technicians. In fact, a proficiently technical camera assistant could do it, preferably in a clean environment. When you go into a rental house and the cases are all pulled out, go and talk to the lens tech, look at the projection room, see what they have in terms of lens service hardware. Even it looks like a mad scientist's room, you're going to have great conversations. I need the math. I need to have a numbers to know where to stray from. You always have to know the lens and to have a relationship.

Tell us about your background working at rental companies.

I was fortunate to work at rental houses early in the mid to late nineties, going through lenses that were barely vintage back then, but are now revered as vintage today. Those were our day to day lenses. Connections and closeness between you, as cinematographer, and your lens technician at the rental house is very important. Some rental companies have had this all along. And often what it came down to was the serial number; it was like a bond that you had with the lens technician. It's something that producers are unfamiliar with or unaware because the lens tech is the magician in the box.

Prep Tech

Social media has flared up some of the terminology but for us back then, we knew the performance of the lenses and the characteristics, but sometimes it can be so subjective that people will assign certain terms to try to get their point across. You stand

Abraham Martinez on Optimo Primes and *The Lincoln Lawyer*

Photos by Lara Solanki, courtesy of Netflix

in the middle as a technician and an artist and determine what you're getting and what you are surprised by.

When I was a prep tech, working with Joe at MPS Dallas or Lowry at F&B/Ceco, I would look at dozens and dozens of lenses on a projector day in day out. I didn't know that the fruit of those labors would come out much later in my career, 20 something years later.

Back then, there was no website, no hashtag to look this up. Living in Manhattan, I could go to Washington Square Park during my lunch hour and read a camera manual or one of your books, then go back to work and hang out with the seasoned rental house technicians. It was done in a classical apprenticeship style.

Lenses were always a mainstay for me. I would put lenses on the projector, look at the chart. Back then, it was mostly about having the best possible image, sharp and in focus. It wasn't until later that my attention turned to all the things that were out of focus and intriguing. And then accidental and intentional flares added to the dialog.

Serial numbers

When we checked lenses at the rental house, we checked that focus scales hit the marks, tracking was true and if the flange focal depth was off, we'd change out the shims and get things consistent. I remember working as loader for Emmanuel Lubezki, ASC, AMC and for Ralph Bode, ASC. As a film loader, you're the per-

son writing down all the serial numbers during checkout. It was always about the serial numbers for these cinematographers.

True. We had carefully curated favorite serial numbered lenses. It wasn't fickle; these lenses were handmade and assembled by hand, just as many still are today. And that human touch made each individual lens unique. These days, the manufacturing can be more consistent. So that's where the IOPs come into play to tailor them.

The Angénieux IOP system lets us be adventurous and ask "Where else can we go? It's a gateway to find out what else can we do. It's about trying to create our own unique look by using the IOP system to custom tailor the lenses to fit the story and the show. It is very much in sync with the concept of French fashion and individual style.

That's what I love about Angénieux lenses. They definitely remind me of Impressionist painting. The impression of the background, what's out of focus, has a special look. It lets me talk to wardrobe and the art department to layer our backgrounds, knowing that the focus fall-off offers dimensionality. I want the image to have a pools of light and I want to stagger that with a rhythm similar to painting techniques of foreground, middle ground and background. That is very intentional, knowing the performance of these lenses and it is definitely my favorite piece of the puzzle.

Canon Cinema EOS C50

Lighter Smaller
Faster
Cooler
Full Frame
Full Width
Full Height
3:2 7K
36x24 mm

Canon Cinema EOS C50 with RF85mm F1.4 L VCM lens

Canon Cinema EOS C50 with RF24-105mm F2.8 L IS USM Z with Power Zoom Adapter

Canon Cinema EOS C50

Full Frame 3:2
full width,
full height

Full Frame 17:9
full width
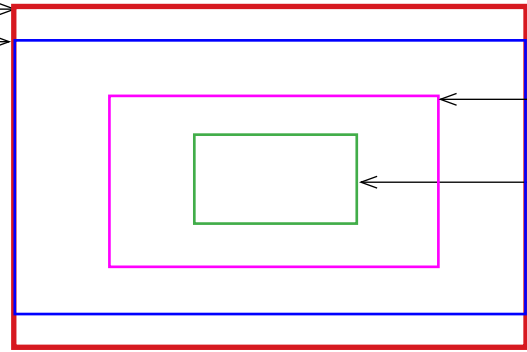
Super35
17:9

Super16
17:9

Canon Cinema EOS C50 with included top handle

For their great help with this article, thanks to Yuji Tanaka, Canon Senior Manager and Product Planner (below left) and Paul Hawxhurst, Senior Technical Specialis (below right)—shown here on location at Sistina NY testing the new EOS C50.

Canon Cinema EOS C50

actual size

Like the chorus "Asa Nisi Masa" in Fellini's *8½*, the chant for Canon's new Cinema EOS C50 camera is "Full Frame, Full Height, 3:2."

This is Canon's first Cinema EOS camera with a Full Frame 3:2 recording format. The Full Frame 32 Megapixel CMOS sensor can record 7K RAW ST internally, covering the entire 36 x 24 mm CMOS sensor area. It's the same image area occupied in 3:2 still photo mode.

The new Cinema EOS C50 is also Canon's smallest and lightest camera. It is is even smaller than Canon's ever-popular R5 C and even more dedicated to cinematography. Fellini's alter ego Guido Anselmi would now be chanting "Lighter, Smaller, Faster."

Until now, Full Frame video in Canon Cinema EOS and many

other cameras meant full width but with a 17:9 or 16:9 aspect ratio, which would not utilize the full height of the sensors. If you wanted a 3:2 aspect ratio, you would have to crop into the 17:9 or 16:9 frame.

Why do you want full height? Bigger picture. Anamorphic Full Frame. 9:17 vertical (portrait mode) compositions without having to rotate the camera. Higher resolution. Many cropping options in post.

There's an abundance of 1/4-20 threaded mounting sockets, begging to attach this camera to tripods, gimbals, Steadicams, remote heads, car rigs and wherever else the script imagines ingenious setups.

This is the go-anywhere camera for the hybrid world where you want the flexibility to film high quality images and take real photos, not framegrabs that too often can be motion blurry.

Canon Cinema EOS C50

Details

Here's a summary of some favorite things:

Video Mode

- 7K Full Frame full height, full width 3:2 sensor (6969 x 4640) recording up to 30 fps

- 7K Full Frame full width (6960 x 3672)

- 4K up to 120 fps

- Full Frame full height and full width, Full Frame full width, Super35 (cropped) and Super16 (cropped) sensor modes.

- Canon Cinema RAW HQ, ST, LT 12-bit internal recording

- and XF-AVC, XF-HEVC S, XF-AVC S internal recording

- CFexpress B and SD card slots with the ability to record different aspect ratios on each card simultaneously

- Dual Base ISO 800 / 6400 / Auto

- 100 - 102,400

- Dual Pixel CMOS Autofocus II is fast and incredibly accurate, even letting you choose whether to track the left eye or right eye of people, dogs, cats and birds.

- Canon RF lens mount. 20 mm flange focal depth, 54 mm inside diameter.

- Full size HDMI connector

- 13 or more user buttons, helpfully labeled for default settings.

- Timecode input

- Top handle with Zoom control and XLR audio connectors

Still Photo Mode

- Full-frame 32 Megapixel CMOS Sensor 6960×4640

- ISO 100-64000, expandable 50 - 102,400

- 40 frames continuous burst per second

- Dual Pixel CMOS AF II Autofocus

- RAW, CRAW, HEIF and JPEG files.

- IBC booth 11.C41   *usa.canon.com*

Canon Cinema EOS C50

Threaded socket for RF to PL lens mount adapter. There are 4 of these.

Canon RF Lens Mount 20 mm flange focal depth 54 mm inside diameter

RF Lens Release

Fan air intake

MENU

Focus and menu navigation joystick

3.0" touchscreen rear vari-angle, 1.62 million dot LCD

User Buttons can be programmed

Fan air intake

1/4-20 threads for mounting and accessories. There are 2 on top, 1 on camera left, 1 on camera right, and 1 on bottom.

21-pin multifunction hotshoe accepts top handle with XLR audio inputs and zoom control

Zoom Lever for Power Zoom Lenses

STILLS Shutter Release and VIDEO Recording Start/Stop

Image Sensor plane

PHOTO - OFF - VIDEO selector switch

Canon Cinema EOS C50

Fan exhaust

Camera Left Side.
Connectors for Time Code, USB-C, Full-Size HDMI,
Remote Control, Headphones, Microphone.

Camera Right Side.
CFexpress B and SD card slots are behind the door.

Top Handle comes with the camera.
It has 2 XLR audio inputs and controls,
a shock-mounted mic holder, zoom control and
recording start/stop button.

Canon Cinema EOS C50

Sensor Modes, Data Rates

Sensor Mode	Cinema RAW HQ 12-bit	Cinema RAW ST 12-bit	Cinema RAW LT 12-bit
Full Frame 3:2	—	7K 30 fps 1.8 Gbps	7K 30 fps 1170 Mbps
Full Frame 17:9	7K 30 fps 2.9 Gbps	7K 60 fps 2860 Mbps	7K 60 fps 1860 Mbps
Super35 Crop	5K 30 fps 1520 Mbps	5K 60 fps 1500 Mbps	5K 60 fps 972 Mbps
Super16 Crop	2.5K 60 fps 769 Mbps	2.5K 60 fps 379 Mbps	2.5K 60 fps 246 Mbps

Simultaneous Dual Card Primary and Proxy Recording Examples

CFexpress Type B Card in Slot A	SD XC II V90 Card in Slot B
Cinema RAW LT 7K	XF-AFC, XF-AFC S, XF-HEVC S — Proxy
XF-AVC	XF-AFC, XF-AVC S — Proxy
XF-AFC S, XF-HEVC S	XF-AFC S, XF-HEVC S — Proxy

Simultaneous Dual Card Recording Examples

CFexpress Type B Card in Slot A	SD XC II Card in Slot B
Cinema RAW LT 7K	XF-AFC 4K
Cinema RAW LT 7K	XF-AFC S or XF-HEVC S 2K
XF-AVC 4K	XF-AVC or XF-AVC S 2K

Canon Cinema EOS C50

Size Comparisons of Cinema EOS C50, R5 C, C80 and C400

C50   R5 C   C80   C400

Canon Cinema EOS C50 — Some Menus

Full Frame full width full height 3:2 aspect ratio.

Cinema RAW High Quality, Standard and Lite.

In this example: 7K RAW ST 6960x3672 (17:9) at 29.97P, 1430 Mbps.

Choices for dual card recording.

Select Shutter Angle instead of Shutter Speed.

You can select the Base ISO or let the camera choose.

Color Temperature units: Kelvin, Mired, etc.

Ever more sophisticated Autofocus.

Canon Cinema EOS C50 — Some Menus

9:16 full height vertical aspect ratio.

Anamorphic Desqueeze: 2x, 1.8x, 15x, 1.3x
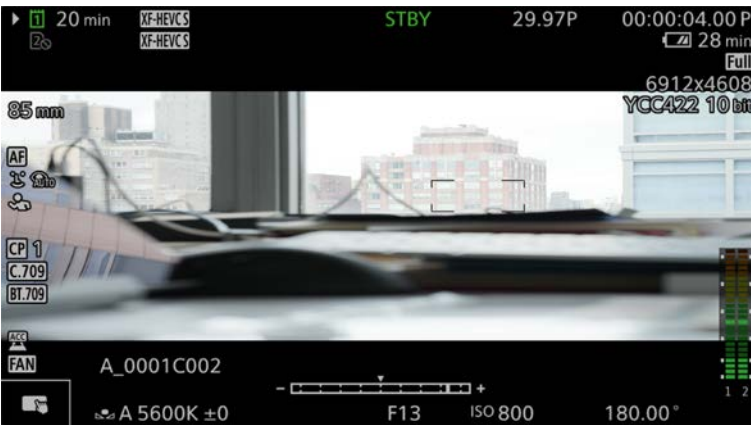
Anamorphic Desqueeze viewed on monitor, not desqueezed in file.

Aspect Markers (Framelines) with choices of colors and ratios.

Aspect Ratios are available as presets or custom.

Enter ratio as whole numbers or decimal values, e.g. 16:9 or 1.78:1, etc.

2.76:1 framelines shown here.

View framelines (Markers) on monitor or not.

Specification Comparisons of Cinema EOS C50, R5 C, C80 and C400

*the following specifications empha-
size the cameras' video mode.
Specs subject to change.*

	EOS C50	EOS R5 C
Image Sensor (effective video MP)	7K Full Frame full height 3:2 CMOS sensor. 32.4 Megapixels	8K Full Frame CMOS sensor. 35.4 Megapixels
Max video image area	6960 x 4640. 36.0 x 24.0 mm	8192 x 4320. 36.0 x 19.0 mm. (40.7 mm ∅)
Sensor Modes	Full Frame 3:2, Full Width 17:9, Super35 Crop, Super16 Crop	Full Frame, Super35 Crop, Super16 Crop

Maximum Slow Motion (Slow & Fast)
 	
not all shown here
	Full Frame 7K 3:2 RAW: 6960 x 4640 = 30 fps
	Full Width 7K 17:9 RAW: 6960 x 3672 = 60 fps
	                         4096 x 2160 =120 fps
	                         2048 x 1080 =180 fps
	Super35mm Crop: 5036 x 2656 = 60 fps
	Super16mm Crop: 2524 x 1332 = 150 fps
		Full Frame 8K Cinema RAW LT = 60 fps
		Super35 5.9K Cinema RAW LT = 60 fps
		Full-Frame 4K XF-AVC and MP4 =120 fps

Recording Formats	Cinema RAW 12-bit HQ, ST, LT; XF-AVC, XF-HEVC, H.264 Photo: JPEG, HEIF, RAW (CR3), RAW (C-RAW)	Cinema RAW 12-bit HQ, ST, LT; XF-AVC, XF-HEVC, H.264 Photo: JPEG, HEIF, RAW (CR3), RAW (C-RAW)
Autofocus	Dual Pixel CMOS AF II Autofocus	Dual Pixel CMOS AF Autofocus
ISO	100 - 102,400	100 - 102,400
Dual or Triple BASE ISO	Dual Base ISO: 800, 6400 / Auto	Dual Base ISO: 800, 3200 / Auto
Dynamic Range	16 stops	14+ stops
Gamma	Canon Log 2, Canon Log 3, Canon 709, BT.709 Wide DR, BT.709 Standard, PQ, HLG	Canon Log 3, Canon 709, BT.709 Wide DR, PQ, HLG)
Color Space	Cinema Gamut, BT.2020, BT.709	Cinema Gamut, BT.2020, BT.709
Lens Mount	Canon RF mount. 20 mm Flange Focal Depth, 54 mm I.D.	Canon RF mount
Internal ND	—	—
LCD Monitor / Menu	3.0" touchscreen rear vari-angle LCD 1.62 million dots	3.2" rear vari-angle TFT approx 2.1 million dots
EVF Viewfinder	—	5.76 million-dot viewfinder
Media	2x slots: one CFexpress type B, one SD	2x card slots: one CFexpress type B and one SD
Outputs	HDMI full size Headphones USB-C 3.2 data (shared with power in & video out) 21-pin multifunction shoe	Micro HDMI USB-C 3.2 data (shared with power in & video out) 3.5mm headphones
Inputs	Time Code (DIN connector), Remote Control. 3.5mm mic. XLR Audio Input x2 via top handle. Multi-function 21-pin shoe.	Time Code (DIN connector). 3.5mm mic.
Power	Internal LP-E6P or LP-E6NH 7.2 V DC battery USB-C PD external power 9 V DC, 3A	Internal LP 7.2 V DC battery USB-C PD external power 9 V DC, 3A
Dimensions mm / inches	142 x 88 x 95 mm / 5.6 x 3.5 x 3.7" (W x H x D)	142 x 101 x 111 mm / 5.6 x 4.0 x 4.4" (W x H x D)
Weight (body only)	670 g / 1.47 lb	680 g / 1.5 lb
First Introduced	Sept. 2025	Jan 2022

EOS C80	EOS C400
6K Full Frame CMOS sensor. 19.05 Megapixels. 36 x 24 mm	6K Full Frame CMOS sensor. 19.05 Megapixels. 36 x 24 mm
6000 x 3164. 36.0 x 19.0 mm. (40.7 mm Ø)	6000 x 3164. 36.0 x 19.0 mm. (40.7 mm Ø)
Full Frame, Super35 Crop.	Full Frame, Super35 Crop, Super16 Crop
Full Frame 6K Cinema RAW LT 12-bit = 30 fps S35 Crop 4.3K Cinema RAW ST 12-bit = 30 fps S35 Crop Cinema RAW LT 12-bit = 60 fps Full Frame 4K XF-AVC LongGOP = 120 fps Full Frame 2K XF-AVC LongGOP = 180 fps	Full Frame 6000 x 3164 = 60 fps Super35 Crop 4368 x 2304 =100 fps Full Frame 4K XF-AVC Intra-frame = 120 fps Full Frame 2K XF-AVC Intra-frame = 180 fps Super16 Crop 2048 x 1080 = 180 fps
Cinema RAW 12-bit ST, LT; XF-AVC, XF-HEVC S, XF-AVC S Photo: JPEG	Cinema RAW HQ, ST, LT; XF-AVC, XF-HEVC S, XF-AVC S Photo: JPEG
Dual Pixel CMOS AF II Autofocus	Dual Pixel CMOS AF II Autofocus
100 - 102,400	100 - 102,400
Triple Base ISO: Clog2 / Clog3 RAW = 800, 3200, 12800 / Auto Canon 709, PQ, HLG, Wide DR = 400, 1600, 6400 / Auto BT. 709 Standard = 160, 640, 2500 / Auto	Triple Base ISO: Clog2 / Clog3 RAW = 800, 3200, 12800 / Auto Canon 709, PQ, HLG, Wide DR = 400, 1600, 6400 / Auto BT. 709 Standard = 160, 640, 2500 / Auto
16 stops	16 stops
Canon Log 2, Canon Log 3, Canon 709, BT.709 Wide DR, BT.709 Standard, PQ, HLG	Canon Log 2, Canon Log 3, Canon 709, BT.709 Wide DR, BT.709 Standard, PQ, HLG
Cinema Gamut, BT.2020, BT.709	Cinema Gamut, BT.2020, BT.709
Canon RF mount.	Canon RF mount
Internal optical ND filters: Clear, ND.6, ND1.2, ND1.8, ND2.4, ND3.0 (2, 4, 6, 8, 10 stops).	Internal optical ND filters: Clear, ND.6, ND1.2, ND1.8, ND2.4, ND3.0 (2, 4, 6, 8, 10 stops).
3.5" touchscreen rear LCD approx. 2.76 million dots	3.5" side touchscreen LCD 2.76 million dots
—	—
2x SD card slots	2x card slots: one CFexpress type B and one SD
Full size HDMI connector 12G 4K SDI BNC connector Ethernet RJ45, USB-C 3.2 Multi-function 21-pin shoe.	Full size HDMI connector. 12G SDI and 3G SDI Monitor Out. Ethernet RJ45, Hirose 12-pin USB-C for monitor video & power
Timecode (BNC Connector). Remote Control. 3.5mm mic. Audio Input x2 (mini XLR). USB-C.	Timecode DIN connector Genlock, Sync, Remote Control Audio Input x2
Onboard BP battery 24 V DC external power	Onboard BP battery Optional V-Mount or G-Mount Micro battery 11.5 - 20 V DC external power 4-pin XLR
160 x 138 x 116 mm / 6.3 x 5.4 x 4.6 in. (W x H x D)	142 x 135 x 135 mm / 5.6 x 5.3 x 5.3 in. (W x H x D)
1310 g / 2.9 lb	1540 g / 3.4 lb
Sept. 2024	June 2024

AJA IP25-R

The IP25-R Mini-Converter from AJA Video Systems lets you connect 4K SDI and HDMI equipment to SMPTE ST 2110 networks that are sending digital audio, video and data via IP.

AJA President Nick Rashby explains: "SMPTE ST 2110 continues to surge in media and entertainment and proAV environments, while more productions are moving toward 4K and HDR. Yet many professionals still have SDI and HDMI equipment that they want to use. The AJA IP25-R provides an intuitive and cost-efficient way to combine the two in one environment, so that professionals can leverage IP while maximizing the life of their legacy SDI and HDMI equipment. With that flexibility and many other great features, this new throwdown Mini-Converter helps make IP transitions less complex."

The IP25-R Mini-Converter de-encapsulates SMPTE ST 2110 video, audio and ancillary data with frame-accurate synchronization for output to baseband 12G-SDI and HDMI 2.0 devices. This is helpful for monitoring, playback and routing in hybrid setups. Featuring dual 10/25GbE network ports, two HDMI 2.0 outputs, and four 12G-SDI BNC outputs, IP25-R enables the delivery of low latency video up to 4K DCI (4096 x 2160 60p) with advanced HDR metadata handling.

An intuitive browser-based UI with in-band control over a media network or out-of-band control via an RJ45 1GbE port makes it easy to set up IP parameters, manage PTP synchronization and configure external controls. Any of the ST 2110 RX inputs can be assigned to specific SDI or HDMI outputs for flexible signal routing, while HDR metadata and colorimetry settings can be adjusted and output routing replicated internally for intuitive IP-to-baseband monitoring and signal management.

IP25-R will be available soon through AJA's worldwide reseller network for $5,999 US MSRP.

Visit AJA at IBC 2025 Amsterdam in Hall 7: 7.B19.   *aja.com*

AJA UDC-4K Mini-Converter

"Managing a multitude of signal formats is crucial for any broadcast, live production, or proAV application. UDC-4K is built to address evolving signal conversion needs, especially as 4K/Ultra-HD and HDR adoption grows," said Nick Rashby. "Offering a near-endless array of conversion possibilities, UDC-4K combines 4K up/down/cross, HDMI/SDI conversion, frame synchronization and utility frame rate conversion in a compact form factor."

AJA's UDC-4K is a a 4K-capable 12G-SDI/HDMI 2.0 Mini-Converter with powerful scaling and frame synchronization. UDC-4K can seamlessly scale between HD and 4K/UltraHD, including frame rate conversion while also ensuring audio and video signals remain in sync.

UDC-4K features include:

- Front panel push button controls and a color LCD display for access to configuration and status information.
- 4K/UHD up/down/cross-conversion for 12G-SDI and HDMI 2.0.
- Built-in frame synchronizer for timing wild signals.
- Utility frame rate conversion.
- 12G-SDI and HDMI 2.0 conversions up to 4K 60p 12-bit.
- HDR signaling metadata pass-through and optional override.
- EDID emulation up to UHD 60p.
- Management for loss of input.
- HDMI embedded audio support 8-channel 24-bit.
- Embedded audio pass-through of AC-3 (Dolby Digital) and E-AC-3 (Dolby Digital Plus) compressed audio, including DD+ Atmos (aka DD+ JOC), up to 100 frames of audio delay.
- 4x 12G-SDI outputs can be 1-to-4 distribution amplifier (DA).
- Genlock: Reference in, SDI in, HDMI in, or Free Run.
- Universal power supply included.

UDC-4K will be available through AJA's worldwide reseller network for $1,595 US MSRP.

AJA BRIDGE LIVE 12G-4
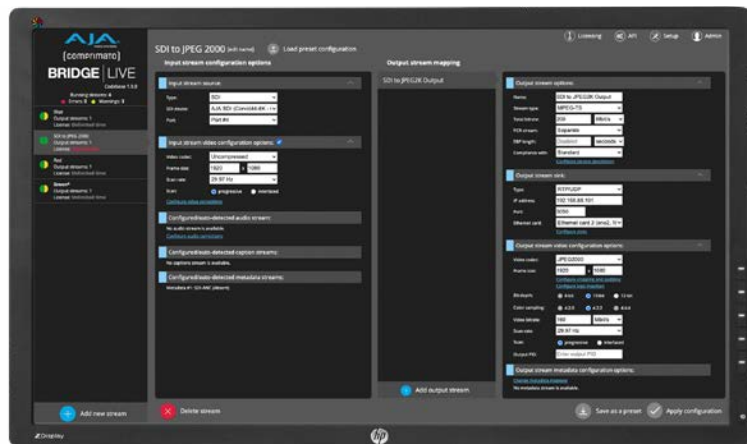
Nick Rashby continues his clear and concise descriptions of AJA's latest products at IBC 2025 Amsterdam: "Increased demand for higher quality video is creating new media workflow challenges, given all the different SDI and IP equipment in use, and all the various deliverables requested. BRIDGE LIVE has proven its value in helping production professionals seamlessly navigate these complexities, and the new BRIDGE LIVE 12G-4 builds on that core functionality. It provides the video transport, encoding, decoding and transcoding capabilities that professionals need today—and now with support for multi-camera UltraHD video."

AJA BRIDGE LIVE 12G-4 details include:

- Pure IP transcode capability to convert between any IP codec, such as NDI to/from H.264, with SRT or HLS encapsulation.
- 4x Bi-directional 12G-SDI ports enable multiple UltraHD encodes and decodes at once.
- Bi-directional NDI-SDI stream conversion to receive NDI (Full and HX) and transcode to IP video streams (H.265, H.265) and vice versa. Also integrate remote NDI and non-NDI equipment/facilities via RTP, UDP or SRT and tap directly into the NDI network for a conduit to content delivery networks (CDNs) or other delivery mechanisms.
- Synchronous multi-channel/multi-system transport to backhaul multiple SDI sources from remote locations without latency. SDI outputs are aligned and genlocked.
- HLS input and output to deliver content to a CDN or on popular devices and software, such as iOS, iPadOS and/or tvOS.
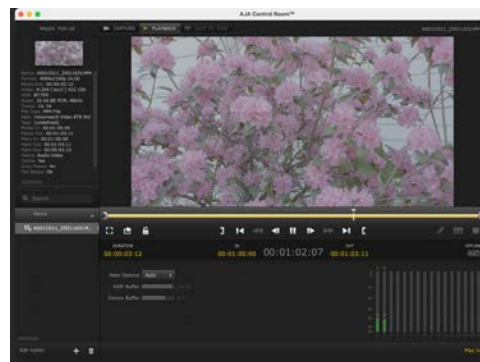- Video preview offers visual confirmation that the SDI input/content for encoding operations is correct.

AJA BRIDGE LIVE 12G-4 will be available soon through AJA's worldwide reseller network for $17,999 US MSRP.

AJA Desktop Software v17.6

Control Room

Control Panel

System Test

AJA is releasing the latest Desktop Software v17.6. As with earlier versions, it is a suite of three free apps along with drivers. The AJA Desktop Software package installs:

AJA Control Panel—to set up, update and control AJA products and for high quality capture, playback and output.

AJA Control Room—for high quality capture, monitoring, playback and output.

AJA System Test—to check read/write MB/Sec, fps and formats.

Desktop Software v17.6 expands the capabilities of the KONA IP25—AJA's IP video and audio PCIe I/O card.

The KONA IP25 is an 8-lane PCIe Gen 4.0, SMPTE ST 2110 IP I/O card supporting bidirectional uncompressed video. KONA IP25 has two SFP cages that support 10 and 25 Gigabit Ethernet (10/25 GigE) SFPs and also includes a 1 GigE RJ-45 connector.

With the latest release, KONA IP25 also supports up to 4:4:4 12-bit 4K and selectable multiple ST 2110-30 audio streams per video modes for routing up to 16 channels. And lots more.

Desktop Software v17.6 is now available as a free download from the AJA Support Page *(aja.com/support)*.

Photo: Dan Ming

Photo: Sony

Photo: Sony

Photo: Dan Ming

Claudio Miranda, ASC, Dan Ming, Nobu Takahashi and Sony Team on *F1*

Claudio Miranda, ASC (right) and Dan Ming (left).
Photo by Scott Garfield, courtesy of Apple.

This is a discussion about the making of F1 with the following cast of characters:

- *Claudio Miranda, ASC, Cinematographer on F1*
- *Dan Ming, First Camera Assistant / Systems Engineer on F1*
- *Nobu Takahashi, Head of Sony's Cinema Line Division*
- *Tanya Lyon, Sony Cinema Line Marketing North America*
- *Shunjiro Nishi, Sony Mechanical Engineer*
- *Koji Morioka, Sony Mechanical Engineer*
- *Kenji Sasaki, Sony Mechanical Engineer and F1 Camera Support*
- *Kohei Suganuma, Sony Electrical Engineer*
- *Keita Yasui, Sony Public Relations*

Jon Fauer: You, Claudio, seem to enjoy pushing the limits of camera technique and technology on big blockbuster films. How were *F1* and *Top Gun: Maverick* different?

Claudio Miranda, ASC: One of the big differences between F1 and Top Gun: Maverick is how camera placement influenced the actors' performances and how we could control the cameras in real time. On Top Gun: Maverick, the actors didn't really need to see where they were going. A pilot was flying the jet in the front seat and the actor was sitting in the back seat. Also, we weren't able to review the action until they landed. That changed on F1. We wanted to see where they were going in real time, live, around the track and we wanted to have them to see where they were going because the more they could see, the faster they could go.

I understand that Brad Pitt and Damson Idris drove modified F2 cars at speeds up to 200 mph. Leading question: why not just film against virtual backdrops?

Claudio: We weren't really interested in using a volume with virtual backgrounds. Those would have been sad versions of this movie. I visited Mercedes and showed them everyone's smallest cameras, like a RED KOMODO, a Sony FX6 and FX3.

I talked to Tanya Lyon at Sony, who put me in touch with Nobu Takahashi and the imaging team. I asked them, "Is there a way to basically make us a sensor on a stick? Just how much can you trim away and how small can you get it and can you build it so people can see where the actors are driving and, oh yes, can we pan the cameras and how do we do that in a network setup around various race tracks around the world?"

I went back and forth with Sony and they showed us what they could do with a camera system combining features of the FX3 and FX6 along with the remote camera operation capability derived from FR7 technology, but configured differently. Basically, Sony tore apart the FR7 and then we had a discussion about how long they could make the cable connecting the camera head to the body. I think Dan Ming (1st Camera Assistant and Focus Puller) initially wanted 20 feet and it ended up around 9 feet.

Photo courtesy of Sony

F1: Sony Prototype in 4 Months

Photo by Scott Garfield, courtesy of Apple.

Photo courtesy of Sony

We had so little room to play with. For Dan, it was like working on a puzzle, trying to figure out how all this stuff fit together. Before it actually went into the cars, he was putting all the pieces out on the floor to see how it would all connect and work.

Photo courtesy of Sony

Dan Ming: Mercedes said, "This big camera is never going to fit in the car. The engineer who was laying it out via CAD said, "You

guys figure it out." So we did—we just had to figure it out, and Sony made the cameras smaller.

Claudio: It was the same thing on *Top Gun.* The guy said "You'll never get more than one camera in the cockpit." And we got six. The F1 guy said that we wouldn't get any more than one camera inside and we got four, which is still pretty good considering the actors had to drive.

Sony built more than 20 of these little cameras for us. Normally we didn't pan more than two cameras, even though I guess we could have gone crazy and panned everything, but certain positions, like the center front, would not pan because we needed it to be as small as possible. That was a specific mount. The driver had to turn the steering wheel and see off to the sides, so we even shaved some of the cosmetic parts of the halo off the car. The halo is a primary safety structure for the driver. We did not cut the actual halo itself.

We shaved parts of it to get it further away from the steering wheel and all this had to be approved by Mercedes: the camera, the rigs, the cabling. Also, to help the driver, we had a little half-inch riser so they could see a little bit underneath the camera and give them a little more peripheral visibility.

I have to say, of all the companies out there, and I've worked with many, I just feel like the only one that actually could have come through with something like this was Sony. With anyone else, I just had the feeling that it might've taken until next year to engineer such a tiny camera and we didn't have until next year.

Dan: Our timeline in prep was 6 months to work this all out. We got the prototype from Sony in 4 months.

Essentially you wanted something even smaller than a Sony Rialto (VENICE Extension Unit) and the Rialto Mini hadn't even come out yet? You wanted a Rialto micro Mini?

Claudio Miranda, ASC, Dan Ming, Nobu Takahashi and Sony Team on *F1*

L-R at Sony LA: Simon Marsh; Nobu Takahashi; Claudio Miranda, ASC; Dan Ming. Photo courtesy of Sony.

Claudio: There was no room inside the cars for VENICE camera bodies. Basically, we needed to strip it down to a camera head just slightly larger than a sensor that could be panned, with a little plate and a lens mount, tethered to a small body.

Why not use a Sony FX3 on *F1*?

Claudio: We didn't want IBIS (in-body image stabilization), among other reasons. And even the FX3 was too big.

Top Gun: Maverick came out in May 2022. When did you start prepping and talking about building special cameras for F1?

Nobu Takahashi: Our first discussion with Claudio and director Joe Kosinski was in November 2022. Claudio asked for something like "a sensor on a stick." The Sony team included Mechanical Engineers Shunjiro Nishi, Koji Morioka, Kenji Sasaki; Electrical Engineer Kohei Suganuma; and many more. The first mockup was delivered in February 2023 and the first prototype came a month later. Test shooting began in April 2023 and the cameras were delivered in May 2023.

Claudio: Filming with these cameras began in June 2023 at Silverstone and followed at tracks around the world through November 2024.

Jon: Why does Sony take on these daring projects of Claudio? Most manufacturers wouldn't want to modify their beloved products to such an extent.

Nobu: I always like to challenge our engineers to become excited and do whatever they can. That's a very strong message. It is always exciting to work with Claudio. We had a similar experience working with him using the VENICE camera on *Top Gun: Maverick*. So we were very confident and happy to support Claudio and Dan Ming on this project. It was that simple.

Please describe the "sensor of a stick" concept in greater detail.

Claudio: The *F1* actors had to see where they were going because they were actually driving the cars. As mentioned, on *Top Gun,* the pilot was in the front seat and the actor was in the back seat, acting like they were flying. The VENICE Rialtos were mainly for these angles on the actors. And we also had reverse angles, over the shoulders and POVs of the real pilot. So, Tom Cruise had a control stick, and because he didn't need to see where he was going, we could put a blanket of cameras in front of him.

But on *F1*, it was very important that Brad and the stunt drivers could see where they were going because the more they could see, the faster they could push the cars. If they became unsure about visibility, they would just slow down. It's not like putting a big camera in there and they would go safely around the track at 30 miles an hour. That's so unexciting. We were trying to get the cameras running as they were driving over 180 mph and the stunt guys were hitting over 200 mph.

That sounds like an extra responsibility: keeping the actors safe from flying camera parts.

Claudio: With the actors actually driving, I was worried too. That's the main reason the cameras had to be made as small as possible. There was no other choice. When Brad got in the car the first time, he said, "I don't know about this." That's when we added a little riser that helped his visibility and he kind of felt better about it. Then he and stunt drivers got used to it.

I assume you rigged cameras on many cars, to be ready right away. How did you keep track of all the cameras?

Claudio: We identified them by their positions, from the front of the car to the back. 1C is the center nose mount, facing forward. 2C is front center, facing back. 3L and 3R are three-quarter views facing the driver while 4L and 4R are on each side of the driver, also facing back. And so on.

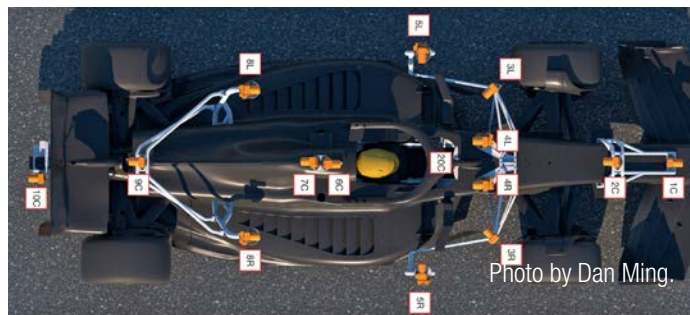Photo by Dan Ming.

Those are the camera positions and they are labeled based on the mounts that did. For the last race, I was getting kind of bored with all these things, so we made another mount called 2L and 2R that go over the tire looking back, which is used in the finale.

Dan: This is a view of what the driver saw: 20C in the middle and the riser with its gap underneath.

Photo by Dan Ming.

F1: Cameras, Carmen, Preston

That's pretty scary. The driver can barely see anything.

Claudio: We tried our best to make it so they could see something, and riser was really helpful.

Please take us through the choice of cameras.

Claudio: Initially, we looked at a bunch of different versions of the cameras and sensors. We knew that we wanted internal NDs. We didn't want mechanical variable ND filter wheels because they take up more room. There was talk about adding an extra half inch to the camera size. But really, a half inch was too much. So the Sony team built an internal filter slot between the lens mount and the sensor, as well as 8 ND filters per camera that could slide in. They said it took something like one hour to make each one.

Dan: We had Clear, ND0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, and 2.4.

Was this an early version of the Rialto Mini with its drop-in rear filters?

Claudio: No, Rialto Mini was not on *F1*. But the filter concept is similar.

Nobu: They called this camera "Carmen" as a nickname. Like Carmen Miranda, the famous singer, dancer and actress.

Claudio: No relation. But the last name is good. Why not? That's what we always called it on location. Even Joe called it Carmen.

Photo courtesy of Sony

Nobu: The camera is a special prototype for the *F1* film. It has the picture performance of the Sony FX6 and FX3 cameras with the remote operating capabilities of the Sony FR7. The camera head is separated from the body and connected by a tether cable. The remote control pan base was created by Panavision. Dan Ming can explain how the camera system came together.

Dan: My job was basically breaking down Claudio's call explaining what he wanted and putting those ideas into a workable system. He said, "We might have up to four cars, and we're going to have four cameras per car. We need to see the pictures from all the vehicles, and be able to start-stop each camera. You need to pull focus, we need to pan the cameras and we need to do all that simultaneously on multiple tracks around the world." So, that's how the conversation started.

As Claudio mentioned, he was in conversation with Sony about the cameras. The form factor of the camera was evolving, so we designed the panning mechanism around 3D models. To keep things simple, we wanted to drive all the motors with the Preston

Cinema Systems Hand Unit and MDR, so Claudio sent me a drawing of a pan head using a Preston motor. We then added another Preston motor to control the focus.

Photo courtesy of Sony

We got together with Panavision and built the head. Once we did that, we had to get the Preston wireless focus and pan system working remotely.

Photo courtesy of Sony

Photo by Dan Ming.

Claudio Miranda, ASC, Dan Ming, Nobu Takahashi and Sony Team on *F1*

Photo: Dan Ming.

Photo: Dan Ming.

Photo: Dan Ming.

Diagram by Dan Ming.

We went to RF Films to adapt their system that converts Preston serial protocol to network IP, which was then switched into a local network in each vehicle with the FR7's Internet IP and other system components.

Each car was its own mesh node and RF Films created a mesh network around each track where we filmed. The network connected to mission control. That way, we would monitor each camera from each car in real time around the track. My job was systems integration, figuring out how one thing communicated or interfaced with the next making sure that they all worked together. We were careful in the design process to minimize any incompatibilities, so that they would be ironed out early on as opposed to when filming began. The video transmission and receive network was handled by Hornets-Tech and Wireless Wizards in the UK.

How were you panning the camera with a Preston Hand Unit?

Dan: We used eight Preston HU-3 Hand Units paired with Preston MDR-3 Motor Drivers, which have four channels. Each camera pair was assigned an MDR-3. RF Films built custom knobs for the operators to pan with and we had the lenses mapped to the handsets for focus, all hard wired into the network.
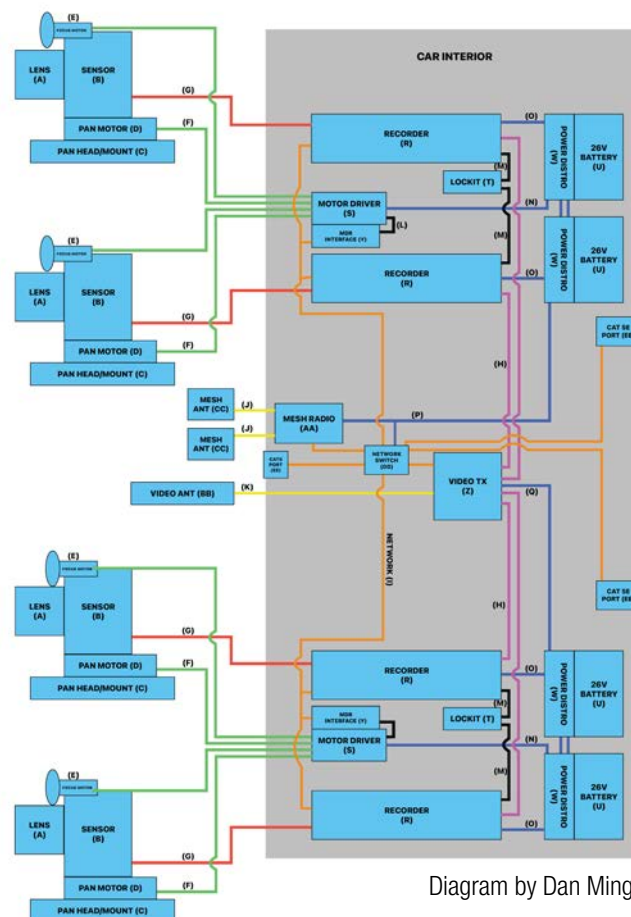
Which channel was controlling pan?

Dan: Focus usually, because it has the most amperage.

How do Preston MDRs connect to the mesh network? WiFi?

Dan: That was Greg "Noodles" Johnson of RF Film based in LA. They had previously extended Preston FIZ systems over IP on other projects. That is another reason why we built this around the Preston system because I knew that technology and camera control had already been figured out to channel it through IP.

Nobu: The Prototype Camera for the *F1* movie had the picture performance of FX6/FX3, but leveraged the very good remote control technology from the FR7.

Dan: Which saved us. The FR7 protocols really made it workable for camera control.

Prototype Camera for the F1 movie.
Photo: Sony.

What lenses were you using on Carmen cameras?

Dan: Many. For wide angles, we had Voigtlander E-mount primes—10mm, 12mm and 15mm with declicked irises. Our longer focal lengths were ZEISS Loxia E-mount lenses.

Claudio: It was critical to put the ND filter behind the lens because it would have been difficult to put a filter in front of the 10mm Voiglander. An unfortunate thing was our lack of a protective front filter on the 10mm lens. We went through 20 or 30 of them.

Dan: We basically just had to throw them away when the fronts got damaged, which was sad. Those lenses were beaten up.

Did the internal, drop-in ND filters inspire the Rialto Mini ND system?

Nobu: Yes, that's true.

Dan: One of the things we asked was whether they could have put an electronic ND inside, but it would've made the camera bigger. So it was a conscious decision to do that because it just had to be as small as possible.

Where are you two, Claudio and Dan, operating and focusing?

Photo: Sony.

Claudio: Mostly in mission control. We were like the 11th F1 team, in the 11th team slot. We moved around between different places. Sometimes we were around the track, shooting our exterior scenes. And then we'd go back into mission control, which was in back of the pit area. When the real races were going on and the teams were there, we would work in the front of our garage and that was kind of our set. Sometimes we were off in another garage, but we always had a mission control of some sort to view all the cameras.

It was also a place where Joe could talk to the actors and the operators who were working the pans. Often, it was quite busy.

Photo: Dan Ming.

Dan: This is an example of what we were looking at. Here we have four separate cars, with 14 of our 16 Carmen cameras going at the same time. Sometimes we had five cars going as well, with 20 Carmens to work with. Since our network would only handle up to 16 cameras at the same time, sometimes we would spread out 16 cameras over five cars as well.

Claudio: But a lot of times, you could see one team running and another one was getting ready to go out. There was a lot of leapfrogging. I could also go check and see how the other cameras were doing. For example, we'd be on Brad racing while they were getting ready for Damsons—since they didn't run together at the same time. They were running against stunt drivers. Our windows of filming were very short, so the one set of cameras would come in and then the other ones would go out. It was very ambitious.

Dan: Early on, we were still getting a feel for what we could get. It was like, why not roll 16 cameras on four cars? And so we did. Then we realized that there were limitations. Congestion of the network slowed down performance and increased latency. Cameras were getting in each others' shots. Also, F1 races are so crowded in terms of RF that they gave us just a very small slice of bandwidth. We had to work all our systems within that bandwidth and so choices had to be made.

Photo: Sony.

Were your cameras in the cars running during actual races?

Claudio: Not during real races, no. But at race time they would give us a slot sometimes before and after qualifying runs. We would never run our cars during a race except one time when we got really close to a race start.

Dan: Our cars were on the back of the grid and all the other cars started in front of us.

Claudio: And then we had to run our car really quickly. We had a minute or something to get everything off the field before the rest of the cars came around again. We were a little embarrassed because our car stalled. We had to push it off the track. They were like, "You newcomers, you film people..."

How many camera operators did you have?

Claudio: Four was our maximum. We averaged two. Sometimes I would jump in and be the third camera operator.

Claudio Miranda, ASC, Dan Ming, Nobu Takahashi and Sony Team on *F1*

Photo: Dan Ming.

How many focus pullers were in these massive setups?

Dan: Up to four focus pullers.

Claudio: Many cameras were lock-offs, like 20C on Brad. But if they had to pan from Brad, going from 4 feet to 50 feet, that would be a bit of a focus pull.

Flashback to the development process. Please take us through the timeline again.

Nobu: We had several video meetings between November 2022 and February 2023 with Claudio and Dan, exchanging data and feedback. In February 2023, I met with them at a Sony facility in Los Angeles to show them a 3D-printed mockup that looked like a black brick.

We met again in March 2023 at the Sony DMPC in Glendale with the first prototype. Prep began at Panavision the same month.

We had the first test filming in April at Willow Springs in Rosamond, CA (America's oldest permanent road race course) and delivered the cameras in May, which was six months after the initial request.

Photo: Sony.

We provided 20 cameras (we just called them prototypes for the F1 movie, until Claudio called them Carmen).

This is the original design of the camera that basically has the performance of an FX6/FX3, but with a smaller camera head, and tethered to the recording box that also has very good remote functions derived from the FR7, as I mentioned.

Photo: Sony.

One small detail is how we made a small cut on the right rear corner so the camera would clear the halo on the car. I remember Claudio was playing around with the CAD design to shave off parts of the camera and the car's halo as well.

Claudio: We needed still more room, so they made a little cut and we shoved it back further. But normally there's a plug that when they are racing, it covers that area.

Photo: Sony.

Were you developing the VENICE Rialto Mini at the same time or did that happen later?

Nobu: Actually, we were working on the VENICE Extension System Mini (Rialto Mini) at the same time and we had discussions whether Claudio would prefer that. But the VENICE Extension System Mini (Rialto Mini) camera head was thicker at that time and would not have fit under the halo.

When did you meet with Mercedes?

F1: Prototype, Format, Resolution, Media

Claudio: I met with Mercedes really early on, in January 2023. These cameras weren't around yet. I told them I'm working on something and they were all just saying, "No way."

How was Sony able to deliver a rapid prototype so rapidly?

Nobu: The reason we could deliver an early prototype within a very short period of four months is that our engineers had already been thinking about some of these concepts. We have a yearly Sony Bottom-Up Event where engineers do some crazy things to demonstrate the seeds of technology concepts that they would like to see in future products, including cine cameras. So that's how it developed very quickly.

Dan: I can add another reason why we went with the FR7 "brain" form factor: it is because the recorder is much more compact and much more power efficient. If we had to use a VENICE 2 body on the other end, I don't think it would've fit inside the cars.

How did you start and stop recording picture on all the cameras?

Dan: RF Films built boxes to trigger everything. We used the Sony VISCA protocol, which is in the FR7 and not in the VENICE system. The protocol in the FR7 was key to being able to have us control it remotely. (VISCA—Video System Control Architecture—is a protocol developed by Sony, used mainly to remote-control their PTZ pan-tilt-zoom cameras, that connects via serial RS-232/422 or IP networks.)

Photo by Scott Garfield, courtesy of Apple.

What was your recording format, resolution and media card?

Dan: XAVC/Intra 4K recording onto CFexpress Type A (same as with Sony FX6/FX3).

Nobu: The camera can also record to SD cards—we have two options, but for higher bit rates, we need CFexpress Type A. The media slots are in the camera body, not the head. They are tethered with a cable consisting of copper wires. The VENICE Extension System 2 (Rialto) and VENICE Extension System Mini (Rialto Mini) use fiber and copper. But for this special camera, it's only copper wire.

Dan: Also, to run the cables, we actually had to open up the cameras and disconnect the ribbon cables from the circuit board. There were so many pins that any connector would've just made the whole thing too big. So, we elected to just connect the cables directly to the actual circuit board. Sony made extra cables for us. They worked very well. But these cables were not meant to be plugged in and unplugged multiple times a day.

Nobu: Our engineering team would like to add a few comments.

Shunjiro Nishi: Thank you. I'm the project leader of this prototype. As Nobu-san mentioned, at the Sony Bottom-Up Event, we showed an early prototype using the FR7 mechanical and electronic parts, which basically had the picture performance of FX6/FX3, as a tethered "long-neck" model. Then, Nobu-san asked me to make it much smaller—to be used for high-end Hollywood productions. I was really surprised and then bit scared because he said I had only one month to redesign it. I worked very hard to make it smaller and then showed the mockup to Claudio and Dan. I remember showing them two designs: a larger one with the internal drop-in ND filter and another smaller mockup without ND. Of course, Claudio said, "We would like the smaller version, but with the drop-in ND." I was upset at first, but we figured it out because we had also been working on the idea of drop-in filters for the early VENICE Extension System Mini prototype. So we developed the final prototype to be small and to include drop-in ND filters.

Nobu: Filmmakers always give us lots of challenges, which we like.

You have to undo two screws to change filters in the Carmen camera. It doesn't just pop open like the Rialto Mini?

Photo: Sony.

Koji Morioka: We didn't have time to make a trap door, as it is often called. So, we had to make an easier way to exchange filters and we went with screws. But, after receiving feedback that people didn't want to use any tools, we implemented a quick release system on the VENICE Extension System Mini that shipped later on.

Dan: But for the Carmen cameras, they did make the screws captive. It was essential that these screws would not fall into the car or into the filter slot.

Nobu: Also, the VENICE Extension System Mini extension cable is detachable. That idea came from requests during this F1 project. Dan gave us advice, so it has a detachable cable system reflecting those requests.

Dan: And importantly, Sony engineers also made the Rialto Mini connection smaller, which was amazing.

This is a leading question that you may not want to answer. After the success of the F1 movie, everybody's going to want this camera that cannot be named Carmen. Will it ever be available for the rest of the filmmaking world?

Photo: Sony.

Nobu: At this moment, Jon, we don't have any solid plans to productize it, but we always listen to users like cinematographers, camera crews and the market. We may think about it in the near future, but at this moment we don't have any plans. But I know, it's a really, really good camera.

If you do, and the name Carmen is out of the question, perhaps it could be named Claudio or Danny.

Dan: If you do, please make a lot of extra cables. Size was so important and it was designed in a way that might not necessarily be practical for a mass market. A user who's not comfortable plugging ribbon cables onto a circuit board would probably prefer some sort of connector.

Photo: Sony.

Claudio: And there's no real monitor on the brain—the camera body. It's all through the network. It's not like a "normal" camera with a monitor, menu and record button. There's no record button other than through IP.

Dan: We knew there was a timeline that was so critical. So we made choices accordingly, concentrating on doing the things that were most important and letting other things slide as long as the image wasn't affected.

How did you involve Panavision for the pan mechanism?

Dan: They have a long history of manufacturing and were super excited as well. When I said we needed 20 of these heads, and showed them the design, they said. "OK, we can do that for you." They put other projects on hold just as Sony jumped us up the queue in the manufacturing process.

Everyone did an amazing job. It became a matter of making sure that things all worked together. When Nishi-san showed us the first 3D-printed prototype, I asked him, "The holes aren't going to change, right? Because we're going to manufacture the heads based on this model, and if the holes move, then the entire head design will have to be changed." The holes didn't change. There was a lot of trust in each other and communication to make sure that it would all come together. Everything was timed to show up at the same time and we just put it together and it all worked.

Photo: Sony.

Photo by Scott Garfield, courtesy of Apple.

Did you use "regular" cameras? I assume you must have had them for dramatic scenes, long lens setups, not in the car?

Claudio: Yes. All the dramatic scenes were on VENICE 2. And helicopter work.

What other lenses did you use?

F1: Lenses, Look, Style

Claudio: On the VENICE 2, we were basically on Fujinon Premieres, Premistas, ARRI/ZEISS Master Primes, some Sigma Full Frame High Speed Primes and some Sony G-Master primes. On the Carmen cameras, as mentioned before, we had Voigtlanders and ZEISS Loxia primes.

Dan: It was similar to the *Top Gun: Maverick* lens package, except we added more Voitlander focal lengths because they were more compact.

Claudio: some of the lens choices on the Carmen cameras were influenced by their size. Some Loxias were longer than the Voigtlanders.

Dan: The length of the lens was critical, especially with the halo of the car. If the lens was too long, then as the driver was steering, their knuckles would hit the lens.

Your Master Primes covered Full Frame?

Dan: The image circle is large enough from the 50mm and above. Except for the 65mm. J

And the Fujinon Premieres also covered?

Photo by Scott Garfield, courtesy of Apple.

Claudio: For the helicopters, I used Fujinon Premistas in Full Frame. On the ground, for long lens, we'd just go to 5.8K. Sometimes I like the way the 100mm looks on Full Frame. Sometimes we made an artistic choice to use the 100mm or the 150mm Master Prime. There were really beautiful in Full Frame. So we mixed formats. We wouldn't say we have to shoot 5.8K. Sometimes we shot Full Frame for different reasons. Sometimes I would have the helicopter crew shoot a little wider just in case—in 8.6 K for the full width, and then we knew that we could always crop in or stabilize if we needed to.

Photo by Scott Garfield, courtesy of Apple.

Did you and Joe talk about the style and the look of the film in advance?

Claudio: At first, I was sad—because there was nothing I could do about the fact that they start many F1 races at noon, which is hardly a DP's dream time to shoot. And then, the races are all at different places. Silverstone went from partial cloudy, to partly sunny to overcast. Abu Dhabi was actually a very interesting race. It starts an hour before sunset and then goes into night. Las Vegas was also interesting: the lights are dim, so it feels the fastest. The other tracks do stadium lighting from far away, so you don't get that kind of staccato feeling.

Monza has a tunnel, so it goes from dark to bright. Spa-Francorchamps has a fantastic uphill stretch. All the tracks have their own little personalities and we were trying to shoot as much as we could in the short windows between races, around 2:15 to 2:30 pm. We went around the track and basically had front light half the time and backlight for the other half. Sometimes I'd say to Joe, "This corner's really great at this time of day." But mostly we were just shooting for action and I think it feels real. I'll take all this real, natural light versus a beautiful golden-hour background on a volume any day.

Would you say that the style of *F1* is realism?

Claudio: I'm always trying to get cameras smaller anyway. Top Gun was trying to get it smaller. I'd rather have a really great shot with a smaller camera than a big cinema camera in a volume. We are at a great intersection where I'll take realism in a smaller form factor that has cinema qualities, which we did on F1. I think that's what is exciting when you see the movie, You go, "Wow, this is really happening."

We still want depth of field, so we still want lenses that have fall-off. If you get a shot where everything's in focus, that is a little sad. It's nice to have depth of field and have a person like Dan Ming pulling focus on it. That is awesome. And that's kind of what we built. So the style of the movie, I would say, is immersive realism.

Did you refer to old movies? You mentioned *Grand Prix*. Did you and Joe look at old racing movies during prep?

Claudio: We did. We watched *Grand Prix*, and then we love some of the speed on that, but that was more or less single camera footage. It was already huge. And seeing some of the making of *Grand Prix* was also not quite our safety zone.

And a young Otto Nemenz was a camera technician on Grand Prix, beginning his career at Panavision.

When Joe and I were watching movies, some did realism really well. *Grand Prix* did an excellent job. However, on other films, the exterior shots of the car look good but as soon as you get inside, it feels like you're on a boat and they're going at 12 frames a second to make the thing seem like it's going faster. Everyone's shaking and it doesn't feel real or connected.

Also, *F1* is really an exposed experience. You're not just inside a car, you're also out in the open. The onboard cameras really capture the whole adventure. If our car was going 100 miles per hour, it'd be too slow.

So the style of *F1* is immersive realism?

Claudio: Immersive realism, yes. We're getting away from the

technology of the virtual world, which is amazing and especially great when you can't really be there. But I still think it's a second choice.
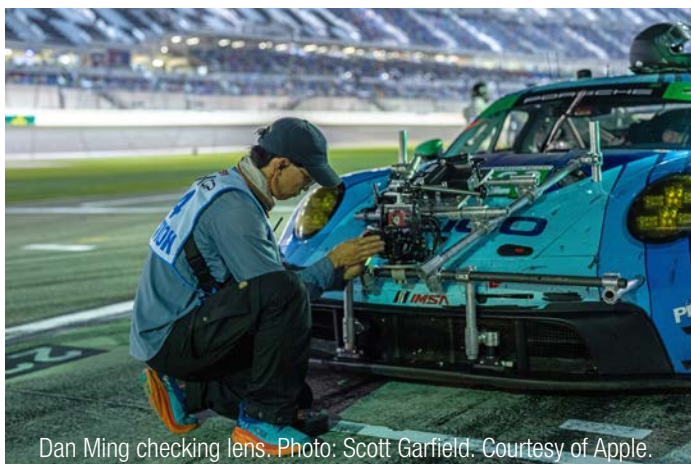
It's how you felt and when Tom Cruise went off the ship in *Top Gun: Maverick*. In *F1* you're going to feel Brad's driving, really driving, and you're going to feel that Damson's really driving. I remember when Joe went to watch the footage with the whole team and I thought, wow, this is going to be a room of very critical people. I was happy when they were all very complimentary about the whole thing.

Claudio talked about shallow depth of field. Did you use Preston Light Rangers?

Dan: Yes. For dialogue and VENICE setups, we had Light Rangers.

Photo by Scott Garfield, courtesy of Apple.

A devil's advocate question. Why not use Sony FX3 cameras?

Claudio: Image stabilization. IBIS was not compatible. Also, the FX3 would have been too big, too wide. Carmen is even smaller than an FX3. I would say for size, if you just take the mounting point and add three eighths of an inch around it, that's kind of it. It's pretty much just the sensor, the lens mount, the mounting plate and a little room for metal and that's kind of it. The FX3 was actually too big.

The Carmen cameras have Sony E-mounts. Did you lose any lenses flying off?

Photo: Sony.

Dan: No. The only time we came close was when the vibrations actually almost tore the whole mount itself off. We had one time where the lens mount came off and was hanging on by the cables and at that point we actually re-screwed everything with Loctite

and then we never had a problem again. But that was early on.

Dan Ming checking lens. Photo: Scott Garfield. Courtesy of Apple.

You were not eliminating vibrations, you just lived with them?

Dan: No, Sam Phillips, our key grip, and the car rigging grips took steps to minimize them and figured out that the best thing for that type of vibration was Sorbothane (a synthetic viscoelastic urethane polymer used as a shock absorber and vibration damper). Depending on how much we used or how tight we screwed into it, that's how we tuned it based on each track's individual characteristics. Some tracks were bumpy, some were very smooth, but they had a very fine vibration. Sometimes they resurfaced the track between one year and the next. Then the drivers would complain about the same thing, where it's totally different. For us, it was how the vibrations translated to the camera and we how we had to dial ourselves into each track.

Claudio: Each camera's car mount had different levels of Sorbothane. The most stable one that probably didn't need anything was 20C in the middle. But as soon as you got more towards the edges, they required different levels of Sorbothane. Also, we knew that some cameras needed to pan. The only way to do this was non-stabilized and finding some level of rubber to take the edge off.

Dan: The Sorbothane was attached between the base of the head and where it was bolted to the car.

Nobu: We have been talking about the toughness of the cameras. If I may show some pictures—these show the conditions the cameras endured. A brand-new camera looks like this, very clean (below, left). After a few races, they looked like this (below, right). I'm very relieved that they survived.

Photo: Sony.

F1: Like Driving into a Sand-Blaster

How did they become so battered?

Dan: Basically, it's like driving into a sand-blaster, along with rocks, dirt and things flying at the camera at 200 mph.

Photo: Sony.

Claudio: That's why we we're going through lenses so quickly.

Nobu: And all the cameras came back safe, which is very nice.

Claudio: They held up amazingly well. Those cameras were such heroes on this job.

Dan: There were crashes where we'd have footage of it.

Claudio: We had a car crash at, I don't know, 160 miles an hour and the cameras were still rolling.

Nobu: I would also like to thank Kenji Sasaki and the team who did a very good job of camera service support during the races.

Photo: Sony.

Was the Sony engineering team there the entire time?

Nobu: Not the whole time but they were always available.

Kenji Sasaki: I did maintenance on the cameras two times during the shooting. It was a pleasure to have joined the team.

Claudio: We had to be safe and careful on this movie. We had to be really careful about our mounts and where they went. If there was a crash, the driver had to be protected. I couldn't just come up with a mount and say, let's just get the guys to attach some speed rail. Everything had to be approved by Mercedes and checked by Graham Kelly, who was in charge of the cars and driver safety.

Everything was super safety oriented on this job. It's dangerous anyway, crashing at 160 miles an hour. But we couldn't just say, "Oh, let's just stick something out there for me to get a new camera position like the last one." It took me two and a half months to get a new one approved. We tried to do things that no one's seen before, like panning at 200 miles an hour.

Nobu: I'm so excited and I'll look forward to continue co-developing with Claudio and Dan. I'm very happy to do this. So much fun.

Congratulations. I look forward to the next excellent adventure of Claudio and Dan tormenting the Sony team to do something even smaller.

Claudio: You never know.

Photo: Sony.

Director Joe Kosinski. Photo: Scott Garfield. Courtesy of Apple.

Blackmagic URSA Cine Immersive

URSA Cine 12K LF   URSA Cine 17K 65

URSA Cine Immersive

This is the third and most recent camera in Blackmagic's URSA Cine line.

Blackmagic URSA Cine Immersive was designed to capture Apple Immersive Video for Apple Vision Pro headsets. The camera has dual 8K sensors, calibrated and synced, each recording 8160 x 7200 with 16 stops of dynamic range.

The fixed, dual fisheye lens system was designed specifically for the URSA Cine Immersive camera.

Apple Immersive Video

Stereoscopic 3D seems to rear its head every few years. In the beginning, of course there were Wheatstone, Friese-Green, assorted Europeans, Edwin Land, and then *House of Wax* (1953), *Dial M for Murder* (1954), fast forward to *Jaws 3-D* (1983), and *Avatar* (2009). But this time it's something completely different with Apple Immersive Video, introduced in 2024.

Photo courtesy of Apple

Apple Immersive Video is a 180-degree, 3D 8K recording format captured with Spatial Audio that you view on an Apple Vision Pro device. Vision Pro sort of looks like a something you'd wear skiing, but you can't look through it; you're viewing a micro-OLED display a few millimeters in front of your eyes. Look straight ahead, and your angle of view is about 100 degrees. This is not your grandfather's 3D. Move your head left, right, up or down, and spatial computing opens up a beautiful world of 180-degree horizontal and vertical angles of view that, as Apple says, "puts you right inside the action and transports you to places you've never been."

Blackmagic Design

If capturing immersive video had been a complicated task, Blackmagic's mantra of simplify and democratize is at play. Working with Apple, the new URSA Cine Immersive is shipping now.

URSA Cine Immersive Camera Details

- Sensors: 2 x 8K sensors. (Left eye and right eye).
- Effective Sensor Size: 23.66 mm x 20.88 mm each.
- Pixel Pitch: 2.9 microns.
- Resolution: 8160 x 7200 x 2 (stereo immersive)
- Lens: Fixed focal length, 180°+ field of view, stereo lens pair.
- Dynamic Range: 16 Stops.
- Project frame rates: 23.98, 24, 25, 29.97, 30, 50, 59.94, 60, 90 fps
- Apple Immersive Video stereo 3D is 90 fps.
- Internal IRND: Clear, ND0.6, 1.2, 1.8, 2.4 (0, 2, 4, 6, 8 stops).
- Aperture: Fixed iris — approx T4.5.
- Fixed focus: hyperfocal distance calculated at infinity to approx 1.5m.
- Metadata: Left and right eye optical calibration metadata, camera settings and slate data.
- Everything else will be familiar to users of Blackmagic URSA Cine 12K LF and URSA Cine 17K 65 cameras.

Blackmagic URSA Cine Immersive Q & A

Camera Right

Dunking into details of the new camera for this immersive medium, Tim Schumann, Senior Product Manager at Blackmagic Design, answered questions.

Jon: Does the camera have one big, wide sensor or two?

Tim Schumann: There are two sensors, each slightly bigger than Super35. The effective image area of each sensor is 23.66 x 20.88 mm with a resolution of 8160 x 7200.

Why is the capture area approximately 210 degrees horizontal when you're delivering 180 degrees?

It gives you a little more wiggle room horizontally. We don't know what people might want to do down the road. The extra area is there and captured if you want to use it for something. The lenses are very sharp in terms of MTF across the capture area. Obviously, towards the edges of frame you start to see a little bit of fall off.

The lenses are permanently attached to the camera?

Yes. We align and map each lens to each sensor at the factory. This provides lens projection and distortion data that is able to be used all the way through the process. It gets written to the files as metadata during capture and goes all the way through into the headset at the other end when you deliver.

As you know, with any lens and any image sensor, there are always some unique characteristics to them. That is why we actually map the lenses, so the lens projection data gets recorded into the camera and basically accompanies each file that the camera produces. When you deliver the images to the headset, it de-warps the fisheye image out so that it becomes a rectilinear image that's as accurate as possible to the ray of light that hit the sensor in the first place.

Oh, right—the camera lenses are fisheye but the image you view in the Apple Vision Pro doesn't appear distorted.

The camera and lenses effectively capture a wide-angle, circu-lar fisheye image. At the factory, we have analyzed the image to produce an ILPD (immersive lens projection data) data file. The metadata travels with the Blackmagic RAW file all the way through the process. When you render out to the headset, each clip will have that immersive lens projection data from the camera. You're looking at every pixel exactly where it was in the real world. No warping or projection mapping. It just looks exactly like you were standing there.

It's like lens mapping and distortion data for VFX?

It's almost like /i and eXtended lens metadata for distortion and aberration, basically mapping each lens and sensor together. We are creating an ILPD file for each camera, which includes the two eyeball characteristics of both lenses.

The lenses are fixed; you don't adjust the interocular distance?

Exactly. The interocular distance is 64mm from the center of each image sensor. You can adjust it in post if you want.

Are the lens focus distances fixed as well?

Yes. They are set to their hyperfocal distance, which keeps everything in focus from infinity down to about 1.5 m (4.9 ft). You'll still have a fairly sharp image even closer than that.

And the iris is also fixed?

Correct. The aperture is set at F4.5. The camera has internal ND filters to help control exposure: Clear, 2-, 4-, 6- and 8-stop IRND. This is one more than our URSA Cine 12K LF camera.

What is the effective focal length of these lenses?

Each lens is equivalent to about a 7.4mm fisheye. This project required a camera to work in a certain way with known entity lenses on the front. Apple had some specifications for what they wanted. So we worked with them on what the details and the practicality of those lenses.

Blackmagic URSA Cine Immersive

Camera Left

Camera Right Rear

Internal Storage

1x Blackmagic Media Module 8TB.

Recording Formats

8K Stereo Immersive 8160 x 7200 x 2
Storage Rates are based on 90 fps:

Constant Bit-rate

- Blackmagic RAW 5:1 - 3,202 MB/s
- Blackmagic RAW 8:1 - 2,001 MB/s
- Blackmagic RAW 12:1 - 1,334 MB/s
- Blackmagic RAW 18:1 - 890 MB/s

Constant Quality

- Blackmagic RAW: Q0 1,601-5,337 MB/s (10:1-3:1)
- Blackmagic RAW Q1: 1,334-4,574 MB/s (12:1-3.5:1)
- Blackmagic RAW Q3: 801-4,003 MB/s (20:1-4:1)
- Blackmagic RAW Q5: 534 - 2,287 MB/s (30:1 - 7:1)

Power

- B-Mount battery plate with Molex connector to camera, can be swapped for other optional plates.
- Camera has an 8-pin LEMO style connector for a +24 V DC external power supply.

Connections

- 2x 12G (and 1.5, 3, 6G) SDI Video outputs
- 2 x USB-C monitor ports for URSA Cine EVF, PYXIS Monitor or DisplayPort monitors.
- These same USB-C ports also support camera accessory power.
- Software updates use the USB-C port closer to rear.
- 2 x XLR audio inputs analog switchable for mic, line and AES audio. Phantom power support.
- 1 x 3.5mm headphone jack.
- Tri-Sync/Black Burst and Timecode input.
- 1 x 10Gb/s RJ-45 Ethernet connector for 10/100/1000/10G BASE-T for SMB file sharing, Web Media Management, Blackmagic Cloud uploads, camera control and streaming.
- Camera Control: Blackmagic PYXIS Monitor can control record start/stop and camera functions assigned to function buttons.
- External Camera Control is supported using REST API over Ethernet or WiFi as well as Blackmagic iPad control and Bluetooth control supported. Blackmagic Zoom Demand for controlling camera.

DaVinci Resolve Studio 20.1 Immersive

DaVinci Resolve Studio 20.1
Immersive Edit Page

DaVinci Resolve 20.1 Studio from Blackmagic Design adds for macOS support for Apple Immersive Video. This update enables seamless editing, color grading, visual effects, Spatial Audio mix, and delivery of Apple Immersive Video captured with Blackmagic's new URSA Cine Immersive camera.

With the new immersive video viewer in DaVinci Resolve Studio 20.1, you can pan, tilt and roll clips on 2D monitors or stream directly to an Apple Vision Pro headset connected wirelessly or hard-wired.

DaVinci Resolve Studio for macOS combines editing, grading, VFX, audio post-production and delivery for Apple Immersive Video. With support for decoding and playback of the stereoscopic 8K 90fps Blackmagic RAW files from the URSA Cine Immersive camera, it manages everything from editing to playback

on Apple Vision Pro. It's the same familiar user interface experienced with previous versions of DaVinci Resolve for "regular" 2D projects. The new project settings bring Apple Immersive Video to every page.

The Edit Page's new immersive viewer can show immersive video in its native state, converted to LatLong, or to a viewport view that you can "look around."

The Color Page has the familiar grading tools. In the 3D palette, you'll find new things such as Edge Mask—to adjust the field of view — for example, to crop out microphones, lights and any other unwanted item lurking in the shot. Edge Mask also adjusts the mask blend to soften the transition from the projected space to the backdrop.

blackmagicdesign.com   IBC booth 7.C49

DaVinci Resolve Studio 20.1
Immersive Color Page

Matthew Celia on Blackmagic URSA Cine Immersive

Matthew Celia was a theater kid in high school, growing up in Hanover, NH. He surprised most of his family and friends in senior year by saying he wanted to make movies and become a director. He graduated from Chapman University in Orange County, CA and founded Light Sail VR with Robert Watts in 2015. Their credits include SNL 50th Anniversary Special, Shawn Mendes: Red Rocks Live in VR, *and more than 200 projects in immersive documentary, narrative and music genres.*

Jon: How did you get into immersive filmmaking?

Matt: I've always been a technical person. I was into editing and computers, but also filmmaking, theater and acting. Immersive filmmaking is the perfect blend of everything I'm interested in.

Do you own your own equipment?

We do own a lot of equipment. We still rent a fair amount. We recently bought the Blackmagic URSA Cine Immersive camera. I'm very impressed. Blackmagic is doing some very interesting things that are going to take a lot of the technological hurdles away, and that's going to keep people in the creative lane.

Previously, when shooting with immersive cameras, it was often pretty complicated going from capture to edit to post to headset. There could be seven or eight steps in your post-production flow. Apple and Blackmagic have worked together to condense that into one tool and four steps. It's capture, edit, post, deliver. That's just like working in a regular digital workflow.

Take us through the steps from camera to headset.

The camera is filming with dual fish-eye lenses in stereoscopic 3D, with approximately a 210 degree field of view. The two sensors in the Blackmagic URSA Cine Immersive camera are matched, calibrated and synchronized as they are capturing left eye and right eye. Each eye is 8K. That is very important because it comes down to a little-known thing called pixels per degree. That's very important. It's why your MacBook Pro screen looks better than some other laptop screen because it's packing in more pixels in the same area. The same resolution has a higher number of pixels per degree of view angle. So, if you have a lens that's shooting 210

degrees and your sensor is only 4K and you do the math, you're stretching those pixels over more degrees and therefore it's fuzzier. By having an 8K sensor for that same 210 degree field of view, you get a denser image and that density translates into sharpness. Sharpness in VR translates into reality.

With the Apple Vision Pro headset, when you move your head, the image "look around" is 180 degrees horizontal and vertical. This means that those pixels appear very large in front of us, so treating them carefully throughout the post production process is vital to make audiences feel like they are there. By owning the pipeline from sensor through delivery, Blackmagic has pulled off something really special.

Which maybe is the opposite of a trend that many cinematographers are exploring in a number of feature films and series. So that trend will change?

That blurriness trend in traditional filmmaking I think is a style that further separates the artistic intention of flat films as opposed to immersive films which are giving audiences a more realistic sense of being present in the narrative. I think immersive is starting to define it's own rules as a medium and that's a very good thing. 180 degrees is a very wide canvas.

If the Blackmagic URSA Cine Immersive lenses have a 210-degree angle of view, how is it cropped down to 180 degrees?

It's a good question. Fish eye lenses degrade the image quality at the edges pretty significantly. By making a lens that's 210 degrees, you can cut out the poor image quality sections to keep the quality in the 180 space. It's a smart engineering decision that tells me the team is very focused on quality.

How do you compose with this camera?

You're seeing the 180 degree image and there are frame lines and guides showing you the hero point of view, as if you were looking straight ahead in your headset and not moving your head at all. Since we're looking at a fisheye, these guides help us relate to where viewers might need to be looking to see our shot. However, a lot of what I do is stand and look with my own two eyes and see if it's an interesting place to be.

What are your preferred recording settings?

It records Blackmagic RAW, embedding the lens calibration metadata in every file. The recommend Constant Bitrate is 12:1. Even at 12:1, your file sizes are large. An 8TB media module gives

Matthew Celia on Blackmagic URSA Cine Immersive

you about an hour and a half of recording time. Bumping up to 8:1 or 5:1 probably wouldn't give us much difference because our pixel density due to the fisheye lenses is already so much lower than most cinema cameras. But if you are using the camera for VFX plates, maybe there is a reason to go that high.

How do you compose and capture? Monitors or headsets?

At Light Sail VR, we've built our own live headset preview system while we wait for an official solution to come out. This is usually my number one requested feature! A lot of people may just look at the monitor, but then you see a fisheye image. The problem is that a fisheye image has all the wrong proportions and you're missing the experience of looking at how the finished deliverable will look in a headset.

Being able to look with your head is the end goal. That's what people are going to actually experience. I'm a big fan of on-set headsets. We have them available because helps our clients and it helps directors new to this medium close that knowledge deficit. Placement of the camera is very important. You can't zoom; the camera has fixed lenses. With headset preview, you get a one-to-one translation with the camera. And the whole system is designed to mimic human visual acuity.

I like to think about the composition as where's the most interesting place to stand. When blocking, I'm trying to build dioramas in a way. I'm inspired by Wes Anderson's blocking because I think he'd be a great immersive filmmaker. He has that world of dioramas and symmetrical compositions. And that works well in this medium.

It goes back to my theater roots in Hanover, NH, understanding how attention is given on stage, how you're building a world where audiences choose where to look. Immersive is very theatrical. We're playing on a 180 degree "stage," with a canvas that has depth because this is stereoscopic 3D. We have the Z plane to work with. Characters move in and out of depth. We place things in various layers. We can create frames within frames with blocking, art direction and set design that can help ground an audience in the narrative so that they know what to look at.

With such a wide angle, how do you keep lights out of the shot?

Lighting is hard, and we do a lot of visual effects work to remove lights in the frame. It's extraordinarily hard to light your project cinematically and not see any lights, so careful planning is critical to deliver cinematic work.

We capture clean plates to effectively paint the lights and other equipment out. Remember, not only are you often seeing the lights in frame, but you're seeing the ceiling, the rigging, the floor, the dolly track, or anything directly below you. We even use a 24-inch dovetail to put the camera out over the tripod legs so that the camera sits all the way out front and doesn't see the legs. We have a great VFX team at Light Sail VR and Resolve's deep integration with Fusion makes this process so much easier than in the past.

Authenticity is important in this medium because cheating is extraordinarily difficult and expensive. The camera shoots at a native frame rate of 90 fps. And Apple Vision Pro plays back at 90 fps.

Truth at 90 frames per second. Tell us about post.

We're a full DaVinci Resolve shop at Light Sail VR. It has been a game-changing tool for us because of the stability, the collaboration features, and how good it is at handling high frame rate, high resolution footage with really accurate color science. What's great about the new release of DaVinci Resolve when working with footage from this camera is how you have all of these tools natively integrated that previously required hacky workarounds. There is now an immersive viewer where you can punch in and see the viewport. You have the ability to work in stereoscopic 3D and have all the effects matched per eye. You can work on visual effects per eye without having to prepare individual plates. Huge time savings.

Are you using headsets when editing?

We have direct headset support streaming from DaVinci Resolve to a visionOS headset so we can see the work live in the editor. It's a wireless connection. No more waiting hours for an export just to check if your title is displaying correctly in 3D space. I find it's really helpful for understanding the geometry of the edit and also for nailing the color correction, since it supports HDR.

In conclusion?

Matt: It's a very exciting time to be working in this emerging medium. The storytelling techniques are getting better. The tools are getting better. I think we're going to see a lot of incredible content come our way this next year and beyond and myself along with the team at Light Sail VR are going to be a big part of that.

Hugh Hou & Keeley Turner on Blackmagic URSA Cine Immersive

Hugh Hou is a YouTuber (HughHouFilm) and Emmy-Winning Immersive Filmmaker. He graduated from Ithaca College (OCBD Masters degree) and Cornell University. Keeley Turner graduated from University of North Carolina Asheville with a BA in New Media. Together, they founded Metaverse Stage to produce immersive content.

Jon: Tell us about your work and the new Blackmagic URSA Cine Immersive camera.

Hugh: I am more an engineer than a filmmaker. Although, I have been a YouTube influencer for about 10 years.

Keeley: We started our company Metaverse Stage 3 years ago. I'm the CEO of our company, usually the director and often the camera operator.

Hugh: I can tell you about it from my perspective as a DP. This is the first camera that I know of that will reach 8K per eye, at, 90 frames per second, in HDR color space, for end to end, glass to glass, delivery from the camera all the way to Apple Vision Pro.

How do you edit this content in post?

Hugh: I edit the content by using Apple Vision Pro (seeing both eyes at the same time) and Davinci Resolve 20.1. This enables the creator / editor to work in immersive 180-degree video in full 3D inside Apple Vision Pro, the final delivery device. Previewing on a flat screen is shows "lens space" for quick checks. The ideal way to see what has been captured is inside Apple Vision Pro.

You're only shooting in Blackmagic RAW?

Hugh: Correct. It is the only option. There's no ProRes and other codec. We are capturing a stereo 3D fisheye image, editing the fisheye image, and delivering the Apple Vision Pro projects with the look-around image dewarped and rectilinear.

I heard you call it glass to glass?

Hugh: From the glass in the camera's lens to the glass in the Apple Vision Pro headset display.

Is it 4K or 8K?

Hugh: The URSA Cine Immersive camera is 8K per eye and it looks amazing in Apple Vision Pro. The Apple Vision Pro uses a micro-OLED display for each eye.

Is the camera static or moving?

Keeley: With the productions that we've done, it has always been static on a tripod. That's the most economical way to run the camera so far, especially if you're kind of a run and gun type production. If you need to be nimble, tripod is the way to go. The thing about this immersive medium is that for the best quality viewer experience, a static moment is preferred to moving the camera and getting the audience sick because of those camera movements. So there's a fine line.

Blackmagic suggested using a Steadicam to gently move the camera. We haven't done that yet, but I'm excited to try that out on our productions this fall.

How do you keep lights and equipment out of the 210°shot?

Keeley: I love having practicals lights in a scene. They seem very natural to me. Or we'll light through windows. That felt especially natural on our period piece *Vanilla Lily*. And then if we need to, we'll mask things out in post.

Are you shooting in Constant Bit-rate or Variable Bit-rate?

Hugh: Always Constant Bit-rate, 12:1. That is our go-to setting that keeps the best quality and decent file sizes. If it's green screen or VFX work, we'll use 8:1 for a cleaner key. If I'm running around the world solo as a YouTuber, then 18:1 will be fine to save storage.

Hugh Hou & Keeley Turner on Blackmagic URSA Cine Immersive

How do you deal with data wrangling if it's just you two?

Hugh: I'm the DIT as well. Actually, I used to work as a DIT on bigger productions. But in this kind of situation, I will download the data directly from the Blackmagic URSA Cine Immersive camera via its Ethernet connection and my laptop. We generate a lot of data, often 20 to 30 TB per production.

What are you working on now?

Keeley: We are very excited about working with this camera system. We're gearing up to go to the UK for some very interesting locations including Warwick, the Cotswolds, Bath and London.

How big a crew do have for a production like that?

Keeley: In Warwick, we'll have more of a crew and then it'll just be Hugh and me traveling. I think we can get some beautiful scenes this way.

Hugh: My background as a YouTuber, working run and gun style to create content at the lowest cost, highest quality, highest volume is very important as a filmmaker. Adapting that mindset of lean production but also high quality is very important for the next generation of filmmakers. The industry is changing because social media. We need to look at where's the audience is going to grow. Immersive filmmaking is one area in this the future of filmmaking. It is high resolution, in a new space, with zero training data. It's a brand new medium.

Keeley: We are not VFX heavy. We're capturing the real world, doing documentaries and history productions around the world. I also love films from the nineties films that have many in-camera, practical effects. That's something we can explore in immersive storytelling. Utilizing some of those old older techniques in this new medium is an exciting opportunity—to immerse your audience into a scenario that could really happen. I'm really excited about this medium telling stories and transporting the audience into the scene.

Do your scripts reflect this immersive technique?

Keeley: It's basically the same. I don't look at it any differently. Some directors get hung up on where the audience is looking.

They really want to get that closeup and make sure you're only looking there. That's not important to me as an immersive director. I want people to look all around. I don't want anyone to miss anything. But I want them to have the ability to rewatch it and see new things again that they didn't notice before. You can't rewind life and look back and say, oh, I missed that. But you can in immersive storytelling. I find that fascinating.

Hugh: It is safe from distraction inside an immersive headset. When people watch your film, they spend the entire time just experiencing your film. There are no distractions. They're not taking a phone call or checking their social media feeds. As storytellers, this is a holy grail. But that also puts heavy pressure on us. We need to make some very good content to keep our audience immersed.

How do you manage distribution?

Keeley: The major platforms are available. YouTube is a champion as of today for immersive posting and publishing. Anyone can publish there.

We also decided to build our own app. It's called Spatial Film, available on the App Store for Apple Vision Pro. For us as filmmakers, we find it very important to be on several platforms. We also wanted to have a degree of control for our distribution.

Technique and technology?

Hugh: The new URSA Cine Immersive camera and Apple Vision Pro brings this immersive experience closer to human visual perception. Actually, I would say that we are not really creating a film, but rather, we are creating something for somebody to experience—to be in it. That is why we need this camera, to have such high visual fidelity that your subconscious starts think "wait, hold on, I'm not watching something. I'm actually in the story. I'm part of the whole thing." That's a whole new level of experience that is new to the filmmaking world. They're not watching a movie in a theater anymore. They are there in the story. That's what we are trying achieve. We need this camera, we need the headset, we need the very spatial audio devices to get to close to that experience.

Steadicam Volt 3

Volt 3
Pan,
Tilt,
Roll and
Dampening
Controls

Steadicam Volt 3 shipping now from Tiffen Company

With this next generation Volt 3, Steadicam Operators benefit from Pan-axis stabilization, better control for smoother moves, level start-up and setup, dolly-worthy precision, greater flexibility, and much more.

The previous Volt system was 2-axis: stabilizing Tilt and Roll. The new Volt 3 is 3-axis: with Pan, Tilt and Roll stabilization. Volt 3 is available on new Steadicam M2 Systems and as an upgrade if you already have a Steadicam M1 or M2 Sled.

On the camera right side, Volt 3 has a control center, called a "Pot Box". These "Pots" (as in potentiometers) are dials that let you adjust the inertia and drag of Pan, Tilt and Roll, as well as the degree of Dampening and Dynamic Braking. A digital readout confirms the settings and displays the menus.

On the camera left side, there are Pause and Power buttons. Two buttons on the gimbal activate presets and Sticky/Normal Mode.

Some of Volt 3's New Features

- New Volt 3 Pan Control with Inertia and Drag adjustments.
- Volt 3 powers up quickly and sets up faster.
- Customizable user presets for repeatable settings.
- Center Post Compatibility: 1.58" and 1.75".
- Faster Low Mode calibration.
- Weight: 6 lb / 2.7 kg.
- Volt 3 is currently offered for new Steadicam M2 systems and is compatible with all M-Series sleds (M1 and M2).

Steadicam Operator James Marin on Volt 3

James Marin explains: "Up to now, the Steadicam Volt has had two 'motors,' one for tilt, one for horizon. It helps to level the horizon, and it also means that if you want to lock your tilt, for example when you're following someone up stairs, then you can lock the tilt in that position instead of using your hands to maintain that tilt.

"Now, with the Volt 3's new pan axis, you can dial in the amount of pan inertia. These days, pan inertia can be one of Steadicam's best friends because, with cameras getting smaller and lighter, there tends to be not enough inertia. Meaning when you pan, it's really easy to overdo it. So you have to be really gentle with longer, heavier cameras as well because they have more physical inertia. And so, the idea of having the pan axis control is to provide more inertia or less inertia.

"The Volt 3 pan axis control is very helpful when you want to do a really slow push-in and you want the lens to point perfectly straight.

It also helps to keep the whole system level against the wind because if you are in an even slightly windy environment, then the wind pushes the camera and the rig in one direction and you are pushing it back to keep it straight. And obviously the tighter the lens you use, the more difficult it is to keep moving straight in.

"Having that third axis pan motor lets you dial in the amount of control and basically decide when you want the frame to be perfectly centered and not wagging. Or maybe if you need less inertia. Or dial it back and then be able to whip pan rather quickly."

Volt 3 Q&A with Steve Tiffen

Steadicam Operator Tyson Galland with Volt 3, M2 System, G-70x2 Arm and Exovest.

Q&A with Steve Tiffen, CEO of The Tiffen Company.

Jon: How has the Volt 3 evolved since its introduction?

Steve: The Volt 3 was introduced last year. It's now in serial production with interesting updates resulting from user feedback.

After launching the prototypes and getting them on sets and locations, we learned a lot about the performance and made some modifications to the software. The physical look is the same. The update give users more ability to control the end result.

Volt 3 works with which rigs?

Volt 3 is specifically made for the M2 stage. Obviously, we recommend our G-70x2 Arm, but Volt 3 works with anyone's arm.

How is Volt 3 different from Volt 2?

Volt 2 was a revolutionary product to stabilize the camera and to keep the horizon level at all times. It was stabilized on the Tilt and Roll axis, but not the Pan. Volt 3 is stabilized in the Pan, Tilt and Roll axis. Hence the name—Volt 3. Steadicam Operators tell us it can work almost like a dolly shot because it has so much stability. You can move in from a wide shot to an extreme close-up and keep the actor's eyes centered without any wobble. You can do things like a whip pan and still have the horizon level and stable.

How does the stabilization work?

Sensors and software control the 3 motors, one each for Pan, Tilt and Roll. Remember, as a Steadicam Operator, you not only have it mounted on your body, but you also have to physically control the movement of the camera. With the Volt 3 assisting with the stabilization in each axis, it helps you both physically and mentally because you have fewer distractions to worry about. Operating a Steadicam requires a tremendous amount of physical and mental ability. When you see an Operator put on a rig and walk around, it kind of seems like they're just making it all float—until you operate it yourself and realize all of the elements of control that have to take place.

The Volt 3 hasn't eliminated the need for all of that knowledge and understanding. It has simply added electronic assist. The art form of Steadicam is still critical to learn and understand, but the Volt 3 helps operators have more ease of control and ease of use.

How does Volt 3 prevent wobble and wagging?

Until Volt 3 was introduced, most Operators have been confronted by wagging at the end of a camera move. It could be from the wind or slight camera movements that might throw it off axis, off horizon. Volt 3 reduces the need for retakes. Volt 3 hasn't eliminated the need to understand how Steadicam works. It is an assist, not a replacement. And the beauty of the Volt 3 is that it doesn't add any height from the sled to the camera.

Volt 3 should be on every set.

We heard from many Operators who said that Volt has become a standard that directors are asking for. It has become a product that people are aware of and know about and want to have on set. I think the Volt 3 is going to take that to an entirely new level.

flysteadicam.tiffen.com/pages/steadicam-volt-3

tiffen.com/pages/steadicam-volt-3

Sigma Aizu Prime Line Launch at Academy Museum

June 3, 2025. Sigma Corporation and Sigma Corporation of America invited the cinematography community to an afternoon at the Academy Museum for the LA launch of the new Sigma Aizu Prime Line, presentations and introduction to AF / Manual Cine Zoom Lenses.

Sigma Aizu Prime Line LA Launch

Sigma CEO Kazuto Yamaki began the afternoon's events at the Academy Museum with a brief company history.

"Sigma is a family owned business. This picture (above) was taken when the company was founded by my father Michihiro Yamaki in 1961 in Tokyo, Japan. The lady in the center is my mother. We are very fortunate because, as a family owned company, we can take a relatively long-term perspective that allows us to focus on the highest quality products and technical innovations rather than a short-term outlook that tends to pursue very short-term profit.
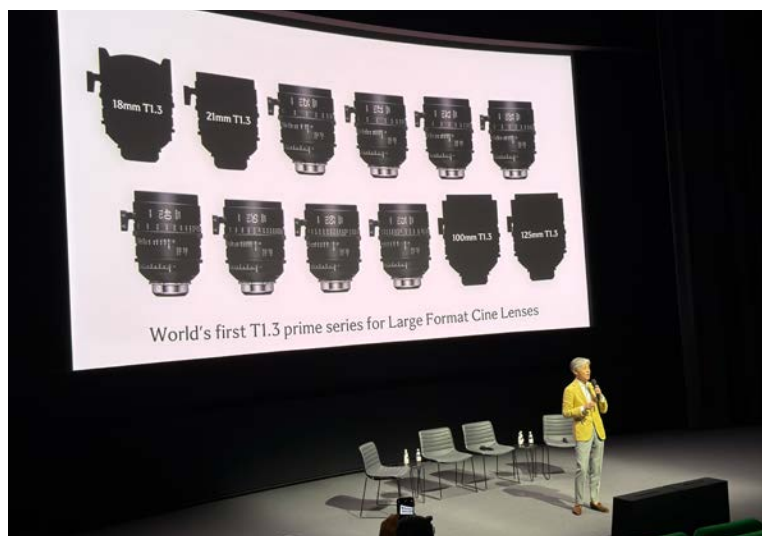
"Sigma specializes only in imaging devices such as cameras and lenses. There is no other businesses. This is because we love photography and cinematography. We manufacture all of our products, all of our cameras and lenses, in a single factory in Aizu Japan to ensure the highest level of craftsmanship and very careful quality control for every single product that we make. Aizu is approximately 300 kilometers north of Tokyo. It is an area blessed with great natural beauty, rich history, and traditional Japanese culture. The region is celebrated for its unspoiled landscapes, including beautiful mountains, lakes and rivers.

"The Aizu region is especially known for its clean water. The subsoil water from nearby Mount Bandai has been selected as one of the top 100 clean waters of Japan. As you know, polishing glass elements requires lots of clean water. So our factory truly benefits from Aizu's rich environment.

"On the other hand, winters in Aizu can be quite harsh. It's very cold and there is a lot of snowfall. Because of the severe climate, the people of Aizu have always led a very disciplined lifestyle. In winter, they may have to wake up an hour earlier than usual to clear away the snow that blocks access from their houses before they can leave for work.

"I live in Tokyo because we have our global headquarters there, but I usually go to the Aizu factory twice a month. I'm always happy to see the snow because it's so beautiful. But my point is the people of Aizu are very focused and committed. Their attitude toward life contributes greatly to our high precision parts processing and high quality manufacturing.

"We started manufacturing all of our cameras and lenses in Aizu in 1973 and still do today. For more than 50 years, we have been improving our manufacturing capabilities, including numerous technical innovations. This has enabled our Aizu factory to remain a world premier lens producer. Every product manufactured at our Aizu factory achieves first class quality with very minimal variation and with the highest reliability. **We make everything there, from polishing lens elements to the last screw and iris leaf spring**.

"Now, I'd like to introduce you to our new Aizu Prime Cine lenses. It's a new line of prime lenses, proudly bearing the name of the amazing place where our factory is located. Aizu Primes are the world's first T1.3 Full Frame lenses designed for Large Format cinema cameras. The T1.3 maximum aperture not only makes them highly capable in low light, but also provides very strong focus roll-off and silky out-of-focus rendering, delivering incredibly beautiful imagery. The image circle of 46.3 millimeters covers not only Full Frame format, but also covers some larger formats such as ARRI ALEXA Open Gate and RED VistaVision.

"All the lenses in the Aizu Prime line have a totally new optical design intended exclusively for cinematography. **You may remember that our Full Frame High Speed Primes were based on the optical designs of our Art photo lenses**. Each Aizu lens delivers a unique natural look with beautiful bokeh thanks to the T1.3 aperture. These are modern lenses with amazing resolution and minimal chromatic aberration. Every lens has been designed for close-up work as well, so you can use them in a variety of situations.

"We have a special team that reviews and reduces flares and ghosting when the lens is being designed. We call these engineers "Ghostbusters." Thanks to their dedicated work, we were able to eliminate excessive aberrations in the image, but at the same time, we could keep some of the natural flare characteristics to maintain a beautiful aesthetic character in these Aizu lenses.

"Despite the very fast T1.3 aperture and amazing image quality, each lens has been designed to be very compact and lightweight thanks to our state of the art technology. Without our technology, I don't believe we could have made these lenses so compact and lightweight. Furthermore, each lens has been designed to achieve the highest level of build quality to meet the expectations of cinematographers and camera crews everywhere."

Sigma Aizu Prime Look and Optical Design

R-L: Yutaka Uemura, Sigma Optical Designer;
Shinji Yamaki, Deputy Manager of Sigma Global Marketing Division.

R-L: Kazuto Yamaki, CEO of Sigma Corporation;
Mark Amir-Hamzeh, President of Sigma Corporation of America.

Yutaka Uemura leads a team of optical engineers at Sigma. He designed all of Aizu prime lenses, the 14mm and 28mm Full Frame High Speed primes and the ART 24-70mm F2.8 DG DN II, which has been the best setting Sigma lens in the world.

Shinji Yamaki did the translating.

Jon: In December 2022, you and your team met with cinematographers, assistants and rental houses in Los Angeles to hear comments about cine lenses. Was that the beginning of the Aizu Prime project? What there a consensus of opinion?

Yutaka Uemura: The comments centered on having a unified look through entire focal length range, keeping the front diameter at 95 mm, the weight not too heavy, and above all, having a maximum aperture of T1.3 for the entire the line. Mr. Kazuto Yamaki also made the same requests.

That must have made things very difficult.

Yutaka: We realized that making T1.3, 95 mm front diameter, Large Format and light weight lenses would be very challenging.

At first, we were not even sure it would be possible.

But we also understood that if we could not achieve those specifications, then a line of new cine lenses would not have great value for customers. So we tried our best.

How did you achieve these parameters?

We incorporated the latest technology, extra low dispersion glass and aspherical elements and previous experience.

The bokeh are beautiful, especially at T1.3, and the skin tones are amazingly smooth.

Thank you. We worked hard to unify the look for all the lenses. Also, we designed the Aizu Primes to have a slightly warm skin tone at the suggestion of many cinematographers and Mr. Yamaki.

How did you establish the look of the Aizu Primes?

We listened to cinematographers. Next, we considered the existing Sigma FF High Speed Cine Prime line. Then we went further. I collected many different lenses from many brands over many years. We considered which ones had the most appealing looks and established a baseline. Some vintage 50mm still photography lenses had very good skin tones, especially the Canon K35.

The Aizu Primes have uniform T1.3 apertures across the entire range of focal lengths and are mechanically even more robust than the Sigma FF High Speeds.

Those were also requests from users and Mr. Kazuto Yamaki.

Aizu Primes are sharp but not too sharp. Skin tones are refined. Bokeh are extremely smooth. The edges of frame balance beautifully with the foreground central area. Are those fair descriptions?

Good sharpness is a strength of Sigma. So we didn't put a low prioritization about the sharpness. But we also targeted not too sharp. And we also targeted having very smooth bokeh, with slight light fall-off at the edges of frame, and a little bit of focus roll off. This field curvature is minimized even though they are T1.3 lenses. It is difficult to explain.

Yes. When I asked Kanamé Onoyama, AFC after he filmed *About Love* **with Aizu Primes, he also couldn't describe the look in words. He said you just have to try them.**

I would like to say how much we appreciate the advice from cinematographers, camera crews and customers three years ago. Because of your comments, Our team was able to produce Aizu Prime lenses with a T1.3 maximum aperture in a very compact size. We would appreciate the opportunity to hear from the cinematography community for the next developments in the future.

Aizu Primes are shipping now. See them at Sigma's IBC booth 12.F55.   sigma-global.com

Sigma Aizu Prime Line Core Set

I also just had to try them. Aizu Primes remind me of a modern Full Frame re-imagining of vintage 35mm format Zeiss T1.3 Super Speeds because of their speed and small size. The smooth feel of the focus mechanism and again, the T1.3 aperture, evoke 35mm format Master Primes redux in a Full Frame world. Aizu Primes are at play in the fields of artistic expression as the DP creates character from lens, look, lighting and location. The quality is smooth and gentle, like an Impressionist painting.

Aizu Primes are sharp where you want sharpness—eyelashes or stars in a night sky where you don't want details to go mushy. Especially wide open at T1.3, the look is painterly. Backgrounds sometimes have a swirly out-of-focus character, with big, beautiful bokeh. At every aperture, skin tones are silky. Faces are smooth and not clinical, with a gradual focus fall-off. Landscapes, trees, flowers and nature have fine detail. And focus is breathless from ECU to far away.

Specifications

Focal Length	25mm	27mm	32mm	35mm	40mm	50mm	65mm	75mm
Aperture / Iris Blades	T1.3 - T22 / 13 Iris Blades							
Close Focus [1]	0.31 m 1'0"	0.33 m 1'1"	0.34 m 1'2"	0.35 m 1'2	0.38 m 1'3	0.48 m 1'7	0.61 m 2'0	0.73 m 2'5
Close Magnification Ratio	1:6.5	1:6.9	1:6.3	1:6.1	1:6.1	1:7.1	1:7.6	1:8.2
Image Circle	46.3 mm							
Front Diameter	95 mm l 3.7"							
Lens Mounts	PL Mount, Sony E-mount							
Length with PL Mount [2]	125 mm 5"	125.4 mm 5"	128.5 mm 5.1"	128.6 mm 5.1"	128.8 mm 5.1"	126.3 mm 5"	125 mm 5"	128.1 mm 5.1"
Length with Sony E-mount	159 mm 6.3"	159.4 mm 6.3"	162.5 mm 6.4"	162.6 mm 6.5"	162.8 mm 6.5"	160.3 mm 6.4"	159 mm 6.3"	162.1 mm 6.4"
Weight with PL Mount	1.7 kg 3.6 lb	1.7 kg 3.6 lb	1.7 kg 3.7 lb	1.6 kg 3.6 lb	1.6 kg 3.5 lb	1.7 kg 3.7 lb	1.6 kg 3.6 lb	1.7 kg 3.8 lb
Weight with Sony E-mount [3]	1.7 kg 3.7 lb	1.7 kg 3.8 lb	1.8 kg 3.8 lb	1.7 kg 3.7 lb	1.7 kg 3.7 lb	1.8 kg 3.9 lb	1.7 kg 3.7 lb	1.8 kg 4 lb
Barrel Rotation	270° Focus / 70° Iris							
Protocol: PL Mount	Supports ZEISS eXtended Data output (via /i Technology-compatible lens mount or 4-pin LEMO connector)							
Protocol: Sony E-mount	E-mount protocol,enables transmission and recording of lens metadata with supported camera bodies.							

1. Close focus measured from image plane.
2. Length measured from front of lens to mount flange.
3. Without lens support foot.

Aizu Prime eXtended Lens Data

External eXtended Data via 4-pin LEMO connector

PL Mount lens contacts for eXtended Data and /i Technology metadata

Future Sigma Aizu Primes

Focal Length	Maximum Aperture	Image Circle	Lens Mounts
18mm	T1.3	46.3 mm Ø	PL and Sony E-mount
21mm	T1.3		
100mm	T1.3		
125mm	T1.3		
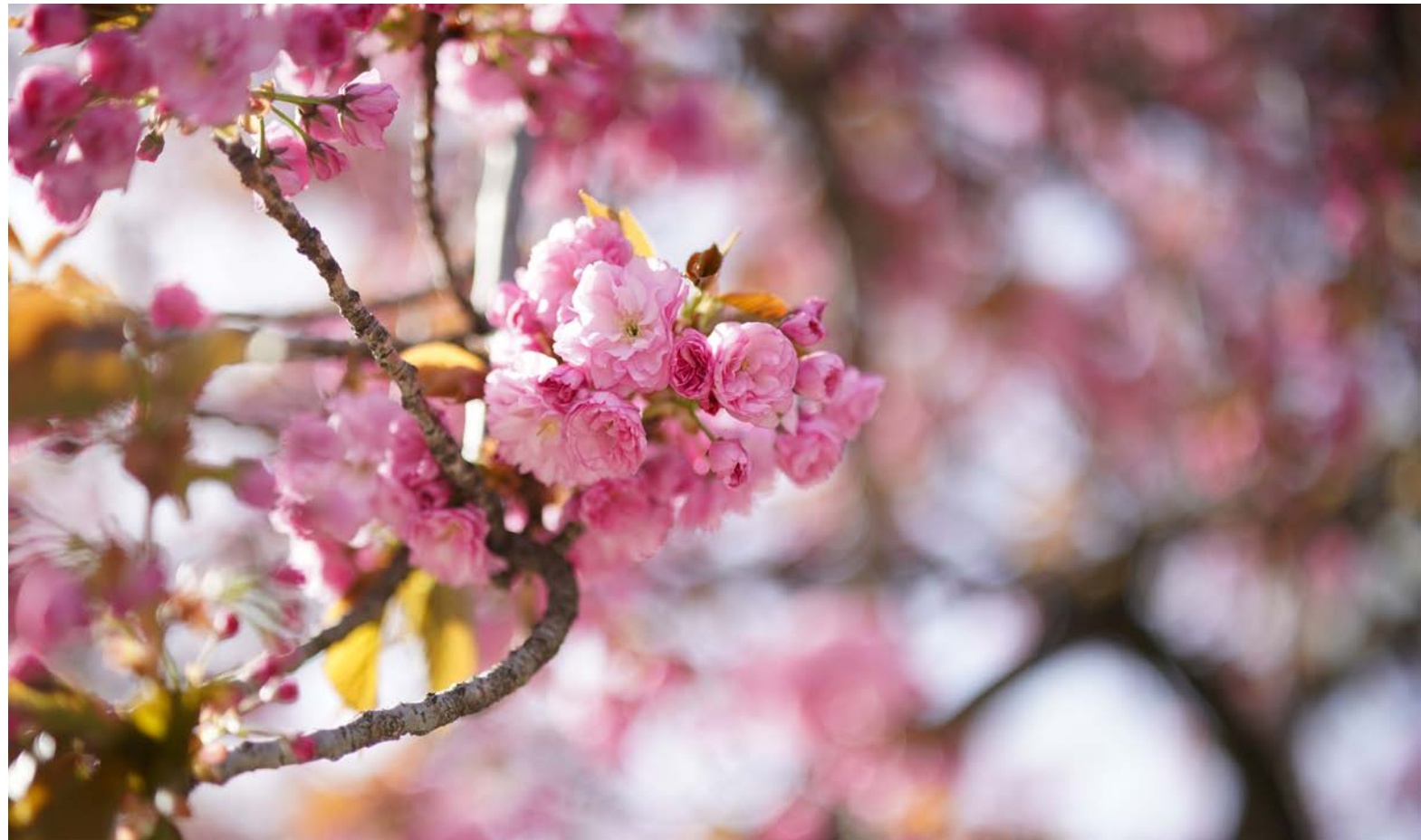
Aizu Prime 35mm at T1.3
Photos by Jon Fauer, ASC

Sigma AF / Manual Cine Zoom Lenses

The new Sigma 28-45mm T2 FF and Sigma 28-105mm T3 FF Zoom lenses join Sigma's CINE LENS series.

As Sigma's first AF-compatible cine lenses, the Sigma AF Cine Line brings the best of Auto Focus / Geared Manual Focus to cinematographers. The AF Cine Line builds on the optical designs of Sigma's Art series photo lenses, described as being "designed and engineered to provide photographers and filmmakers with outstanding optical quality and unmatched creative potential."

The new 28-45 and 28-105 Full Frame Zooms take this a step further, with highly accurate autofocus and manual focus, precise tracking and industry-standard M0.8 pitch geared focus, zoom and clickless iris rings. The lens goes from autofocus and auto iris to manual control by simply sliding a switch. Also unusual and very welcome: manual focus has hard stops and repeatable focus marks. This is not an easy thing to have achieved.

Why do you want these AF / Manual Cine Line Lenses?

Picture this. You bought the lens for solo documentary and interview filmmaking. Autofocus has been very helpful and good. So good, in fact, that a producer hires you for a streaming dramatic series with an ensemble cast. Of course you need a focus puller and traditional wireless lens control. You can use the same Sigma AF Cine Line Zoom Lens in manual mode.

The Sigma 28-45mm T2 FF and Sigma 28-105mm T3 FF incorporate the optical designs of the Sigma 28-45mm F1.8 DG DN | Art and the Sigma 28-105mm F2.8 DG DN | Art photo lenses. Manufactured in Sigma's Aizu factory, these lenses deliver exceptional resolution and beautiful bokeh at all focal lengths, along with a clean look and minimal flare or ghosting.

Specifications: Sigma AF/Manual Cine Zooms 28-45mm T2 FF and Sigma 28-105mm T3 FF

Sigma AF Cine Line	28- 45mm T2 FF	28-105mm T3 FF
Lens Mount	L-Mount, Sony E-mount	
Focal Length	28- 45 mm	28-105 mm
T-stop	T2 -T16	T3 - T22
Diaphragm Blades	11	12
Close Focus from image plane	0.3 m / 1'0	0.4 m / 1'4
Magnification Ratio	1:4	1:3.1
Front Diameter	95 mm / 3.7"	
Front Filter	M82 x 0.75 mm	
Length w L-Mount (front to flange)	151.3 mm / 6"	157.9 mm / 6.2"
Length w Sony E-mount (front to flange	153.3 mm / 6.1"	159.9 mm / 6.3"
Weight	TBD	
Focus Ring Rotation	200°	200°
Zoom Ring Rotation	60°	70°
Iris Ring Rotation	57°	54°
Lens Support Foot	SF-91	

At left: Early prototype of 28-45 shown under glass at IBC 2024, with focus, iris and zoom marks on top. At right: Now they are cine style, on the side.

Nanlux Evoke 150C & 600C

Evoke 150C

Having introduced Evoke 1200, 2400 and 5000 Watt LED spotlights, NANLUX launches their new 150 Watt Evoke 150C and 600 Watt Evoke 600C at IBC 2025.

Both the Evoke 150C and Evoke 600C are equipped with NANLUX's proprietary Nebula C8 Light Engine. It combines eight LED color chips: deep red, red, amber, lime, green, cyan, blue, and indigo—to render an impressive color temperature range from 1000K to 20,000K, with ±200 green/magenta adjustment. NANLUX says that this is the widest range available in the industry until now.

C is for Color, as in full color (and B is for Bi-color) in the NANLUX vocabulary. And so, the new Evoke 150C and 600C provide six choices of color control. These modes are: CCT (mentioned above), HSI, RGBW, XY Coordinates, Gel and Effect.

- CCT is Correlated Color Temperature, measured in Kelvin.
- HSI mode provides a wide spectrum of 36,000 color values.
- RGBW mode allows independent adjustment of red, green, blue and white channels for exact color matching.
- XY Coordinates provide precise color control within the CIE 1931 color space by setting the X and Y coordinate values.
- Gel mode lets you select the equivalent of 230 LEE and 230 Rosco gels, from Amber Delight to Zenith Blue.
- Effects mode simulates 15 lighting effects with adjustable parameters to simulate candles, fire, flash, TV, bad bulb, etc.

The Evoke 150C delivers 22,230 lux at 1 meter with a 45° reflector

at 5600K. Evoke 600C delivers 20,820 lux at 3 meters with a narrower 25° reflector.

Both fixtures provide outstanding skin tones, rich saturation for challenging colors such as deep red and indigo, higher overall color rendering, and operate without emitting any ultraviolet rays.

Like the Evoke 5000B, both the Evoke 150C and 600C are self-contained—no separate power supply with its tethering cable. The lamp head, control unit and power supply are all built into a single, compact housing. This design significantly reduces the overall weight and footprint compared to traditional setups with separate components.

The Evoke 150C weighs only 2.11 kg (4.65 lb). The Evoke 600C weighs 7.26 kg (16.01 lb), excluding the yoke. The all-in-one design, with just one power cable that plugs into a wall outlet or distribution box, improves efficiency on set, on location and getting there. The housing for both fixtures is made of magnesium alloy, which is lightweight and robust. The IP66 rating means that these fixtures can endure hostile environments: rain, sleet, dust and storm.

The controls are located at the rear of each fixture. The Evoke 150C has three buttons (Mode, Menu, Lock) and two knobs.

The Evoke 600C has four buttons (Mode, Menu, Preset, Lock) and three knobs.

Both fixtures support many control methods, including NANLUX Wired Controller (WC-EXT); the Nanlink App 2.0 for iOS, iPadOS and Android; Nanlink Remote Controller (WS-RC-C2);

Nanlux Evoke 150C & 600C

Evoke 600C

DMX/RDM; LumenRadio CRMX; and Art-Net/sACN protocol.

The Evoke 150C has an FE mount (FM mount with electronic contacts) to attach reflectors and accessories in front. It is compatibile with the majority of existing FM mount accessories.

The Evoke 600C has a BE mount (Bowens mount with electronic contacts) in front. It is compatible with Bowens mounts as well as NL mount accessories when paired with NANLUX's proprietary NL-Bowens mount adapter (under development). Both Evoke 150C and Evoke 600C use the PosiTight system on their mounts, which provides extra security for a tight, reliable connection between the fixture and accessories.

Similar to the Evoke 5000B, the Evoke 150C and 600C have extremely smooth dimming performance—fully linear and without flicker, which is very important within the critical 0.0% to 0.1% brightness range. This is very helpful for those 1 candle-power night interior period pieces when your camera is at 6400 ISO and the lens is "wide open with a wrench" at T1.3. It's also important for smooth fade-ins and fade-outs. The newly-added high speed mode ensures stable and consistent brightness during high frame-rate filming.

The fixtures have five fan modes for the best balance of noise control and thermal management, whether your setup is a dramatic closeup of a sensitive actor on a whisper-quiet set or high noon in the hot sun of a Formula 1 racetrack with engines roaring.

With the new 150C and 600C, the NANLUX family of Evoke lighting fixtures has grown to seven models, from 150W to 5000W. All of them are for professional productions, featuring impressive illuminance, outstanding color rendering, intuitive operation, high IP rating, and versatile control options. The new Evoke 150C and 600C are the versatile fixtures you'll want in the lighting package for all kinds of setups, almost anywhere.

Evoke 150C includes:

- Evoke 150C × 1
- RF-FE-45 FE Mount Reflector 45° × 1
- AC Power Cable 4.5m × 1
- D-Tap Cable × 1
- USB Flash Drive × 1
- AS-MB-1 Magnetic Base × 1
- User Manual × 1
- Carrying Bag × 1

Evoke 600C includes:

- Evoke 600C × 1
- Yoke × 1
- RF-BE-25 BE Mount Reflector 25° × 1
- AC Power Cable 6m × 1
- USB Flash Drive × 1
- AS-MB-2 Magnetic Base × 1
- WC-EXT Wired Controller × 1 (Connection Cable 8m × 1, AS-MB-1 Magnetic Base × 1)
- User Manual × 2 (Evoke 600C+WC-EXT)

See Evoke 150C and Evoke 600C at the NANLUX IBC booth 12.F21. *www.nanlux.com*

RAID Polaris and Sirius Fiber-Back Systems

Polaris

Polaris is a an advanced system equipped with all the latest available features.

Jon: What is the background behind your development of fiber-back systems for digital cinema cameras?

Maki Itakura (CEO of RAID): We exhibited RED Connect, manufactured by RED Digital Cinema, at InterBEE 2022 in Japan. At that time, we received many inquiries about systems for relaying and live-streaming cinema cameras. After consulting with TBS ACT, a company with extensive experience in cinema camera relay systems, we were introduced to ProTech, a company experienced in developing optical fiber systems in Japan. To confirm global demand, we exhibited Polaris at NAB 2023. Additionally, we developed Sirius, a shoulder-mounted optical fiber system using a compact camera head similar to RED's KOMODO, and exhibited it at InterBEE 2023.

Over the past two years, through numerous demos and specification revisions, we have achieved compatibility with almost all cameras, including RED, Sony, Canon, ARRI and Freefly. We are now set to release the New Polaris system, equipped with the latest technology, in September 2025.

How did you come up with the idea and turn it into a product?

The product idea was based on feedback from end-users. RAID conducted thorough market research and incorporated the opinions of our technical advisor, TBS ACT.

Who are you partners?

The technical advisor is TBS ACT. The manufacturer is ProTech, a company that holds numerous patents for fiber optic systems both domestically and internationally. Additionally, we receive advisory opinions from Greg Smokler for our overseas strategy.

Please tell us more about your company, RAID.

RAID Inc. was established in April 2012 in Minato-ku, Tokyo, as a trading company. The parent company is KOKIHIFUMI which operates in the cinema equipment rental and broadcast markets.

RAID's main business activity is importing overseas products used in the cinema and broadcasting industries. We have 13 employees. RAID handles the sales in Japan of products from over 70 companies, including RED Digital Cinema, Teradek, SmallHD, Wooden Camera, Bright Tangerine, Hollyland, Inovativ, FlowCine, Freefly, Thypoch, CORESWX, O2aid, and ProTech. We also handle service and technical support. The Polaris and Sirius products will be sold not only domestically but also internationally.

RAID Polaris and Sirius Fiber-Back Systems

Sirius

Sirius is a system equipped with features necessary for standard use. For relatively affordable cameras such as KOMODO and previous models like DSMC2, Sirius offers affordable options for systemization.

What is the difference between Sirius and Polaris?

Polaris is a full system equipped with all currently available features. Sirius is a standard system equipped with features necessary for standard use.

For relatively affordable cameras such as KOMODO and previous models like DSMC2, Sirius offers superior cost performance for systemization. Additionally, we have prepared an upgrade program from Sirius to Polaris.

What distinguishes Sirius and Polaris from other fiber-optic systems available on the market?

ProTech, which holds many patents related to optical fiber systems, has developed technology that enables stable transmission of video, audio, lens control signals, camera remote control signals, LAN control signals, and even power supply through a single optical composite cable.

Input signals and light intensity can be confirmed via LED lamps, and even when the power is off, the connection between the base station and camera adapter, as well as the power supply, can be verified. This enables stable transmission of high-capacity signals such as 12G-SDI with minimal jitter or degradation, and sup-

ports long-distance transmission of 4K/HDR video. The system has been adopted by nearly all of the major Japanese broadcasters, and its reliability, backed by extensive experience and patents, is a significant advantage.

Who is responsible for sales outside Japan? What kind of support is available?

We have received inquiries from several companies interested in sales outside Japan. We are currently discussing overseas strategies with Mr. Smokler and plan to announce our sales agents and support system in the near future. If you are interested in purchasing our products overseas, please contact us.

What's next?

Both Polaris and Sirius have been developed based on feedback from end-users. Going forward, we will continue to incorporate the latest technologies while making specification changes and updates based on your feedback. We would greatly appreciate hearing your requests and suggestions.

Visit IBC Booth 11.A 44 (Nippon Video System)

raid-japan.com

First Z Cinema Camera from Nikon and RED

24.5 Megapixel Full Frame Partially Stacked CMOS Sensor

Internal REDCODE RAW Recording: R3D NE 12-bit Log3G10

It was a stormy, windy day as Hurricane Erin moved up the East Coast. But things were bright and exciting inside the studio at Nikon USA Headquarters in Melville, Long Island.

A pre-production Nikon ZR camera was sitting on a table. Slim, stylish, lightweight, with an enormous and bright display, this new camera records internal 6K REDCODE RAW.

With the flip of a switch, the camera goes seamlessly from Video to Photo mode. Its partially stacked CMOS sensor may be familiar to users of Nikon's Z6 III—but this is the lighter and even smaller camera for cinematographers craving internal R3D, N-RAW, ProRes RAW or ProRes recording.

Geoffrey Coalter, Strategic Communications & PR Manager at Nikon, explained:

"This is a new camera and result of the cooperative efforts of Nikon and RED together for filmmakers. It is a continuation of our Z CINEMA series, which began with equipping RED V-RAPTOR [X] and KOMODO-X cameras with the Nikon Z Mount.) This is the next step in that same effort. RED adopted the Nikon Z Mount, and now Nikon is adopting R3D. This camera has Nikon Autofocus, Nikon sensor technology and familiar Nikon menus, but it is transformed into the RED color science and their cinematic DNA by means of the R3D platform.

"This camera is for a user who aspires to get a KOMODO or V-RAPTOR one day. It is a great first step for your cinematography journey to begin. If you're a solo, emerging filmmaker, or a one person shop, this is great for you. This is a great "B" camera to accompany your main RED camera. Or for multiple cameras mounted on cars, for stunts, action, remote heads, gimbals, stabilizers, quadcopters…"

The following details are preliminary, not official specs, and based on going through the intuitive menus of a pre-production model.

The 24.5 Megapixel CMOS sensor is partially stacked. (A partially stacked sensor separates the pixel layer from portions of the processing circuits. This provides faster readout speeds, higher frame rates and quicker autofocus.)

Internal recording formats include:

- RED R3D NE 12-bit (R3D) — Preview in Log3G10 gamma curve with REDWideGamut color space.
- Nikon N-RAW 12-bit (NEV)
- ProRes RAW HQ 12-bit (MOV)
- ProRes 422 HQ 10-bit (MOV)

Details:

- Records to internal CFexpress B card and/or Micro SD card.
- 6K 6048 x 3402 up to 59.94p and UHD 3984x2240 119.88p
- Load up to 10 custom 3D LUTs for the onboard display
- Programmable user buttons and menus.
- 4-inch 3.07 million dot, 1000 Nit articulating rear display — bigger and brighter than almost any camera this size. The touchscreen is fast and responsive and easy to use.
- Slim and stylish. No big battery bulge on the right side.
- Weather sealed.
- Remote control through the 3.5mm headphone port.
- 32-bit float audio.
- Digital hot shoe on top for accessory microphone input.
- Fanless design with enhanced thermal management.

IBC booth 11.C20c   *nikon.com*   *red.com*

Photo - Video Mode Switch

Shutter & Video Record Start - Stop

Nikon ZR Cinema Camera

Nikkor Z 28-135mm f/4 PZ Power Zoom is powered via the camera's Z Mount, which also transfers lens metadata to the recorded files and can be viewed on displays.

The large, bright 4" touchscreen monitor flips out and tilts.

Front Dial — default is set for lens aperture control.

Power On / Off

Main Command Dial — default is shutter angle but can be customized.

Monitor shows we're recording R3D NE Log3G10, 6K at 59.94P, 180° shutter, 3D viewing LUT applied, at 1250 ISO. FX is Nikon's designation for a Full Frame lens (DX is S35 / APS-C)

Mic

Headphones / Remote

Micro HDMI

USB-C

Joystick

Menu

Video Recording Menu

Leitz HEKTOR

Leitz Cine introduces HEKTOR primes—six Full Frame primes that come in user-interchangeable E, L, RF and Z mounts. These are short flange focal depth lenses, ready for the latest mirrorless mount cine, photo and hybrid cameras.

The look reminds me of Leica M lenses from the 1950s and 1960s, perhaps because these HEKTORs only have spherical elements inside. The lenses also look stylish on the outside—nicely matching the milled aluminum body of a Leica T or Sigma BF.

HEKTOR lenses are compact and lightweight, with an 80mm front diameter. Almost anyone can change the lens mount; it takes about 2 minutes. The 9-blade iris remains circular throughout all stops and the bokeh are beautiful.   *leitz-cine.com*

HEKTOR 25mm T2.1 on Leica T camera

Lens Focal Length	18mm	25mm	35mm	50mm	73mm	100mm
Aperture	T2.1					
Image Circle	47.8 mm					
Close Focus (ft)	0'9"	1'	1'2"	1'9"	2'6"	2'9"
Close Focus (m)	0.22	0.3	0.35	0.5	0.75	0.85
H AoV Full Frame 36 x 24 mm	101.4°	79.8°	63.2°	44.6°	33.1°	24.7°
H AoV Super35 24.9 x 18.7 mm	83.1°	63.5°	47.6°	32.9°	24.3°	18°
Weight (lb)	1.85	1.7	1.6	1.5	1.6	2.1
Weight (kg)	0.84	0.77	0.71	0.66	0.72	0.97
Length (in / mm)	3.47" / 88.2					4.84" / 123

L-Mount

Lens Mount: L, E, Z, RF - easy for user to swap, attached with five T4 Torx head screws
Front Diameter: 80 mm
Front Filter: M77 x 0.75 screw-in (except 18mm)
Focus Ring: 120° Rotation. Imperial and metric engraved focus scales.
Iris Ring: 49° Rotation. Linear marks, 9 Blades, circular shape through all stops.
Gears: Matched Focus and Iris ring locations for all focal lengths

E-mount

Hektor History

1930 Leica I Model A with Hektor 50mm f/2.5.

1932 Leica Standard with Hektor 50mm f/2.5.

1932 Hektor 73mm f/ 1.9 no. 129335.
Photo: Leica Camera Classics GmbH

Ernst Leitz Wetzlar introduced Hektor 50mm f/2.5 lenses in 1930 to accompany their Leica I Model A cameras. Max Berek, Leica's famous lens designer, named these lenses after his dog Hektor.

The Hektor 73mm f/1.9 came in 1932 and was the fastest aperture Leica lens at the time. That focal length inspired the team at Leitz Cine to include a 73mm lens in the new HEKTOR series.

Leitz Hektor 135mm f/4.5 lenses arrived in 1933 with Leica screw mounts. They were fitted with Leica M mounts in 1954 and manufactured until 1960.

The new Leitz Cine HEKTOR lenses take inspiration from the original Hektors, but neither the optical nor the mechanical designs are the same. These are not reworked vintage lenses.

Seth Emmons, Director of Communications, and the team at Leitz Cine write, "The look of these lenses was something that we researched quite deliberately. We went through Leica's 100-year history of photography optics and found a great deal of inspiration, especially in some of the lenses from the 1930s, 50s, 60s and 70s.

"As with all Leitz Cine lenses, and influenced by Leica Camera lenses, the color temperature of HEKTOR is fairly neutral and true. It matches what the eye sees, but with a subtle warmth like the late afternoon summer sun.

"In the center of the image, you'll find plenty of resolution and detail, but less than previous Leitz Cine lenses. These are scaled back to balance modern sensors with a softer and smoother aesthetic.

"Focus and resolution fall off persistently toward the edges of the frame along with a subtle Petzval effect that draws the viewer toward the center of the frame and creates a feeling of motion.

"HEKTOR delivers delicious flares with multiple colors from direct light sources and showery lenticular rainbow flares from strong, indirect sources. With coatings that maintain contrast and don't completely veil or wash out the image, the lens flaring exists as a confident artistic addition rather than a liability to be managed."

Leitz Cine HEKTOR lenses come in Sony E-mount, Canon RF Mount, Nikon Z Mount and Leica L-Mount. These are passive, non-electronic mounts without lens metadata. Because of the short flange focal depth, HEKTORs are not available in PL, LPL, PV or Leica M mount.

Leitz Cine HEKTOR 25mm, 50mm and 73mm T1.5 with my vintage 1954 Hektor 135mm f/4.5 M lens.

Leitz HEKTOR Frames

HEKTOR 18mm. Uli Schröder, Leitz Cine's lensmeister since the beginning with SUMMILUX-C. Photo by Florian Bode with Leica SL3.

Hektor 50mm. Sunlight Lens Flares on a Flower. Photo by Peter Karbe with Sony a7.

Leitz HEKTOR Frames

HEKTOR 73mm at T2.1. Marlena Fauer at Iden & Quanjude Beijing Duck House. Photo by Fauer with Sony a7R5.

HEKTOR 25mm at T2.1. Summoning the inner Peter Karbe ("Shoot wide open and up close," he urged). Photo by Jon Fauer with Sony a7R4.

Rainer Hercher, Leitz Cine Managing Director, on HEKTOR

Jon: What is the backstory of Leitz Cine HEKTOR lenses?

Rainer Hercher: When we finished development of HUGO Lenses, the first discussions of HEKTOR began in 2022. We knew that we needed to have cine lenses with an affordable price range. Few companies can survive in the long term by only doing expensive, high-end products. We needed something that would not damage our existing lines, but we also needed to do something that would be worthy of carrying the Leitz red dot.

How did you arrive at the look of the HEKTOR lenses?

We wanted to have a defined look that would be appealing on the latest cameras with "cleaner" sensors. But not everyone likes clean images—something for which we are also quite famous.

Please define "clean."

A "clean" lens renders an image without field curvature from corner to corner. It doesn't breathe. It's a technically and artistically pure lens like SUMMILUX-C, LEITZ PRIMEs and even ELSIE. We saw HEKTOR for the growing mirrorless market, not only for YouTubers and content creators, but also for professional productions using this kind of equipment, especially for their "B" and "C" cameras. You may not have as much time to use filters or to do a lot of grading when your project has to be ready to go online after a quick edit. That's why we wanted to have a defined look.

Did you listen to DPs, customers and rental houses?

We always listens. When they talked about using vintage lenses, they described those attributes and we listened. Many DPs like to use old glass, but they often say that they want more focal lengths. Vintage lenses are often difficult to replace or service because they are not made anymore. So, if a front element gets scratched, that could be a risk for the rental houses.

How did these discussions influence the optical design?

It was important to have good front and back separation to provide a more dimensional image. We wanted to have beautiful focus fall-off. We did not want any aspherical elements inside because we also saw these lenses as part of the Leitz heritage through the years. We saw qualities in these lenses starting from the thirties. There's a little bit of Petzval swirly bokeh that we added to the optical design. And there are qualities we liked about Leica M glass. The set is very consistent, so the contrast, skin tones and color are all the same.

And mechanical design?

We considered all of these optical attributes. But, on the other hand, these are also lenses with a modern mechanical design. We made sure that the HEKTOR lenses were simple to service. It is very easy to change the front and rear elements if they get scratched. It's very simple to change the lens mount—it can be done by almost anyone.

Are the HEKTORs for rental houses, owner-operators or both?

They're for both. They are for owner-operators, especially people who do their own productions. They are good for documentary work because all of them weigh less than one kilogram. They are very compact. You can pack the six lens set in a backpack and go hiking with them.

Where are the HEKTOR lenses made?

All the HEKTOR lenses are designed and manufactured right here in our factory at Leitz Park in Wetzlar, Germany. I would like to emphasize that HEKTORs are made by the same teams who build our LEITZ PRIMEs, HUGO, ELSIE and our other lenses.

Leitz HUGO Family Grows to 14

And now there are 14 Leitz HUGO lenses. A beloved 40mm focal length joins the HUGO Series from Leitz Cine.

In the beginning there were nine siblings in the HUGO family. They were descendents of beloved Leica M lenses, redesigned with robust cine-style barrels and gears and fitted with LPL, Leica M or Leica L Mounts. This is Series I. (The 50-N HUGO is in the N-as-in-Noctilux Series.)

The HUGO family grew to 13 a year ago with the addition of the 66mm T2.1, 75mm T2.1, and 90mm T2.1. This is Series II.

By the way, the 66mm HUGO Series II is based on the late '60s and early '70s ELCAN Leica M 2/66mm designed by Walter Mandler for the US Navy. Never intended for the public, it's estimated that fewer than 200 were ever produced. Considering that an ELCAN Leica M 2/66mm lens went for € 90,000 at the 37th Leitz Photographica Auction in Vienna, the 66mm HUGO from Leitz Cine is quite a bargain.

There's even more film history with the new HUGO 40mm. This is a favorite focal length. Gordon Willis ASC filmed most of *The Godfather* with a 40mm. And, the Leica Summicron-C 40mm f/2 was a go-to lens for the Leica CL camera (M Mount) introduced in 1973.

The new Leitz Cine 40mm T1.5 HUGO is ready for pre-order and expected to ship in Q4 of 2025. *leitz-cine.com/product/hugo*

Leitz HUGO	Series I										Series II			N
	18	21	24	28	35	40	50	75	90	135	66 II	75 II	90 II	50-N
Focal Length	18mm	21mm	24mm	28mm	35mm	40mm	50mm	75mm	90mm	135mm	66mm	75mm	90mm	50mm
Aperture	T1.5	T1.5	T1.5	T1.5	T1.5	T1.5	T1.5	T1.5	T1.5	T1.9	T2.1	T2.1	T2.1	T1.0
Close Focus (ft)	0'9"	1'	1'	1'2"	1'2"	1'2"	1'8"	2'6"	2'10"	3'3"	2'	2'6"	2'10"	1'8"
Close Focus (m)	0.22	0.3	0.3	0.35	0.36	0.36	0.5	0.75	0.85	1	0.6	0.75	0.85	0.5
Weight (lb)	2.29	1.87	1.9	1.8	1.8	1.92	1.85	3.09	3.02	3.5	1.81	1.98	2	2.55
Weight (kg)	1.04	0.85	0.86	0.82	0.82	0.87	0.84	1.4	1.37	1.59	0.82	0.9	0.91	1.16
Length (in)	2.8"	2.7"	2.7"	2.7"	2.7"	2.7"	2.7"	4.4"	4.4"	4.7"	3.2"	3.2"	3.2"	3.2"
Length (mm)	71	68	68	68	68	68	68	112	112	121	82	82	82	82

Image Circle:	43.3 mm	Focus Rotation:	270°
Lens Mount:	LPL, Leica L-Mount	Iris Rotation:	70.5° (except 50-N = 81°; 135 mm = 64.5°; 66, 75, 90 T2.1 = 62.5°)
Front Diameter:	95 mm	Focus Scales:	Imperial or Metric, easily swapped
Front Filter:	M 92 mm x 1 screw-in	Iris:	11 Blades, Circular Shape
Gear Rings:	Matched locations for all focal lengths	Specs subject to change - FDTimes	

ZEISS Cine Lens Team Stories

Above: Ben Hagen taken with ZEISS 50mm Supreme Prime Radiance (nice flare). Below: Ben Hagen; Christophe Casenave and Arato Ogura, taken with 29mm SPR at ZEISS HQ in Oberkochen.

Benjamin Hagen, Head of Marketing

I started working at ZEISS in January 2017—in a different product category. One of my first assignments was to hop on a plane and fly to Las Vegas for the Consumer Electronics Show (CES). These days, I'm responsible for marketing within our cinematography business unit—primarily for lenses. That means planning, producing and getting things done: product launches, social media, a lot of content and asset creation, website, trade shows, events in Europe, just to name a few.

I travel to events outside of Europe, for example to Cine Gear Expo in LA. Touring with our Asian colleagues is still on my wish list. I work closely with product management to get a marketing perspective for the products and vice versa. I coordinate with our colleagues in marketing and sales worldwide to see what is going on in their regions, how I can support them and how we can help each other. It's great to be involved on different levels, from working on the big picture to creating tactics and carrying them out.

The most rewarding part of the job is meeting so many amazing people, seeing how they react to our products and getting to know cinematographers who work with our lenses. I enjoy learning about their work and exchanging ideas. It is great to be part of such a fantastic team.

After graduating from university, I worked at a communications agency for about five years, doing public relations and social media

marketing. This was where I got to know ZEISS. Their Camera Lens Division, as it was called at the time, was our biggest client. We did interviews with photographers and cinematographers, managed press relations and took care of all the social media channels. In fact, with our agency's support, the Camera Lens Division became the first unit in the entire ZEISS Group to be active in social media.

I was born and raised in southern Germany, in the Lake Constance region of Baden-Württemberg. After graduating from secondary school, I went on to study media and communication science in Thuringia (the same state where Jena, the birthplace of the ZEISS company, is located).

In practically every stage of my life there was some connection to movies and series. When I was in secondary school and MiniDV was becoming more readily available, my friends and I took camcorders to produce all kinds of things—from short clips to skateboard videos and more complex short films. When I went to university, I was part of the university TV station and cinema club.

One of my favorite parts of the job is talking with cinematographers and camera crews about their work and experiences with our lenses. It doesn't matter if they are well-known filmmakers or up and coming, nor if the lenses they use are the latest or vintage Super Speeds dating back many decades. So, if anyone has worked on a nice project and is open to sharing their experiences, I am more than happy to talk.

ZEISS Cine Lens Team Stories

Simon Sommer, Int'l Service Coordinator

I began working at ZEISS in 2001 with an apprenticeship as a technical engineer. In 2005, I worked on the lens production line and in 2006 moved into the service department. From then on, I repaired cine and photo lenses and started training cine lens customers.

In 2011, I helped set up the first ZEISS service center in U.S. at Abel Cine and in Japan at NAC Inc. In 2014, we opened another service center in China at ARRI and in 2021 we set up our own ZEISS service facility in Beijing. In 2022, we installed a facility at SAEKI in Korea.

My current job title is International Service Coordinator. I help manage the service department in Oberkochen and run the ZEISS Cine Lens Academy. We teach lens technicians from rental houses and service centers to repair and maintain ZEISS cine lenses. Since 2006, I have taught more than 500 people and have visited more than 10 countries.

In addition to training, I take care of service, tools, specifications and after sales. I'm also involved in new product development.

I was born in Stuttgart and in 1989 moved to Aalen where I completed high school. I have always been very interested in filmmaking and lenses. I learned all my skills and technical knowledge on the job, from working at ZEISS. My philosophy is that you need passion for what you are doing, which is something people notice and can appreciate.

Working at ZEISS was my first job and I still love what I'm doing.

ZEISS Cine Lens Team Stories

Patrycja Vierkorn, Head of Service Department

I joined ZEISS 6 years ago as a project manager for service. After around 2 years I became Head of Repair Service for Camera and Cine lenses. Recently, I have also been working with the sales department.

My job at ZEISS involves working with a team of very experienced technicians who repair lenses. It is astonishing to see lenses coming into our service area broken and dirty, and leaving pristine and clean—as if granted a new life. These are lenses that usually were damaged by accident. We rarely get warranty repairs.

I also work with colleagues who sell lenses and care for our customers in After Sales. Our main goal is to provide excellent support, to be fast and flexible. I think the distinguishing characteristic of our Service and Sales Team is that we want to be close to our customers so that they feel comfortable to give us a call any time to discuss any topic.

I learned this empathetic and compassionate approach during my school days. I was born and raised in Poland until I was 14. We studied film beginning in the fifth grade, viewing screen adaptations of books that we read in literature classes. It was always reading first, then watching a film, and analyzing both in the context of story, symbolism and adaptation. We also had local film and book clubs that we enjoyed very much.

My family emigrated to Great Britain when I was 14. When I started school there, I could not speak any English. That experience taught me the importance of paying attention to both verbal and nonverbal communication which helps me today when connecting with colleagues and customers. I graduated with an English literature and history degree at Wrexham University in northeast Wales. After that, I moved to Germany, learned the German language and then worked at a company in customer service.

A bit later, ZEISS was looking for someone who had experience in customer service and business software. ZEISS seemed to be a dream company for me. So, I sent my CV but didn't have much hope; I knew that ZEISS was very selective in their hiring. However, I got the job. I am very grateful how so many people have supported me along the way.

I enjoy the work at ZEISS. It incorporates my love of art, close customer contact and product innovation. Ideas are welcomed and people are empowered to rise to their full potential.

I live around 45 minutes' drive from Oberkochen in the countryside next to the charming, historic town of Nördlingen (Nördlingen is located within the crater formed by a meteorite's impact around 14.8 million years ago.) My hobby is gardening.

ZEISS Cine Lens Service and After Sales Team, (L-R): Christian Griesser, Monika Froehlich, Stefan Martin, Sarah Wiedmann, Filomena Moore, Christine Hoepfner, Patrycja Vierkorn, Daniela Berberich, Philipp Haas, Simon Sommer, Kevin Stelle.

ZEISS Cine Lens Team Stories

Alejandro Alcocer, Sales Dir. Mexico & Latam

I am the sales director for cinema in Mexico and Latin America. I live in Mexico City. My job involves traveling to countries in South America: mostly to Argentina, Uruguay, Brazil and Chile. In Central America, I visit Colombia, Costa Rica, Ecuador, Perú, Panama, Guatemala, Republica Dominicana. And in North America, my market is Mexico.

I started working at ZEISS in January 2012. At that time, the Camera Lens Division was putting together a sales and marketing team in most of the world markets, including Germany and USA.

At that time, ZEISS was one of the first companies to take the first steps to address the convergence of photo and cinema lenses for both professionals and consumers. ZEISS was offering a direct connection to the end user. (It was considered disruptive at the time; until then, ZEISS had mostly been partnering with other companies with licensing, development and distribution agreements. Suddenly, they were doing it all on their own.) I was part of the team that began this journey and it has been a pleasure learning and working with so many people, colleagues, professionals and friends.

As you know, the ZEISS CP.2 Compact Prime line was the company's first Full Frame cinema lens family and it was a great success. I feel that the CP.2 Super Speeds are, in a way, an evolution of the original Super Speeds which were fast cinema lenses by ARRI / ZEISS. CP.2 lenses have a lot of character and also retain the ZEISS DNA and optical quality.

My job at ZEISS is to take care of the cinema and camera tracking sales and marketing in Latin America. I also contribute with content creation, discussions on lens projects, film production planning and PR. Also, a very important and rewarding part of my job is to have the opportunity to meet and talk with many different cinematographers, camera assistants and crew.

Before ZEISS, I had a video production company where we did advertising, TV, music videos and documentaries. I worked in my company as a cinematographer and producer and also as a freelancer. Then I spent some years doing production services for USA, Europe, EMEA and Latam projects in Mexico.

I grew up in the 70's in Greater Mexico City's area in the north, in a municipality named Naucalpan. I went to school there until 9th grade and then attended high school in the center of the city where my universe expanded and I met new people.

My initial interest in images comes from still photography. I was fascinated by seeing images in magazines and books. I watched dozens of shows like *BJ and the Bear, The Green Hornet, The Six Million Dollar Man, Little House on the Prairie, Starsky & Hutch* and *The Wonder Years* and absorbed some of the fundamentals of cinematography.

I started studying 35mm still photography and laboratory techniques in high school and then I studied film at CCC Centro de Capacitación Cinematográfica in Mexico City. For some years now, I have been interested in studying optical physics to better understand how a lens works and ultimately how this translates into characteristics that influence the resulting image.

My first job was as a runner, working from the bottom, attending to small things and from there always resolving and thinking of ways to make the work more effective and enjoyable for our team and me.

The idea of being able to create images is fascinating to me, as is the way they are made. Cinema is indeed the 7th Art. Being on set and seeing the way a scene is lit and captured by the cinematographer is fascinating. It is wonderful to experience the passion of everyone on set.

Image acquisition and image creation is evolving in super interesting ways. We are focusing a lot of attention there.

Javier Calderon on *Valdiodio* with Cooke SP3

Javier Calderon Guzman with Sony FX9, Cooke SP3, Abracam Mattebox, Sachtler Flowtech tripod.

Javier Calderon Guzman is the cinematographer of the feature film Valdiodio, *using Cooke SP3 lenses on Sony FX9 and FX6 cameras. Javier grew up in Xalapa, in the state of Veracruz, on the eastern seacoast of Mexico. In high school, he watched many French movies and was influenced by the Nouvelle Vague—lightweight handheld equipment and small crews. He flew to France and attended L'Université de Rennes 2 from 2009 to 2011. After graduating from L'École Nationale Supérieure d'Audiovisuel (ENSAV) in Toulouse in 2017, he worked at PhotoCineRent and progressed as a talented cinematographer. He lives in Paris.*

Jon: Tell us about the film *Valdiodio*.

Javier: It's a biopic about Valdiodio N'Diaye, a hero of Senegal's independence movement during the sixties. He's most famous for his meeting in 1958 with Charles de Gaulle about seeking independence. It was a special moment in history when the French colonies decided to vote and gained independence on April 4, 1960.

The director is Amina NDiaye Leclerc, daughter of Valdiodio N'Diaye. She is Amina, the little girl in the movie. So it's her life story too.

You had Sony FX9 and FX6 cameras?

There were two big reasons. First, we needed small equipment. The entire camera and lens package had to hand-carried onboard the airplane going from Paris to Senegal.

Second, our budget was limited. There is a rental house in Senegal, which was our first idea, but their equipment was already out on a production for Canal+. So I went to PhotoCineRent in Paris. Actually, I worked there for three years.

I remember you there!

So I spoke with Albrecht Gerlach, the owner of PhotoCineRent and said, "We're making this independent movie in Senegal. Tell me what can we do". He said, "Well, if you want an FX9, I can provide one, with an FX6 as backup. And there are these new Cooke SP3 lenses that are brand new and very small."

I packed all the equipment into my backpack. It was filled with the cameras, lenses, batteries, mattebox and accessories. There was no space for my clothing. Only a pair of my shoes.

Did you protect the SP3 lenses by stuffing them into your socks?

The first thing production did when we arrived in Senegal was to buy us clothing.

How did you choose the Cooke SP3 lenses?

That was an interesting thing. Above all, they looked great.

The film begins in the 1930 with Valdiodio's childhood and ends in 75 when he was liberated after 12 years in prison. You imagine

Javier Calderon and Cooke SP3

FX9 on a slider with Sachtler Video 15 head, Cooke SP3, SHAPE WLB right handgrip extender, SmallHD monitor, Teradek Bolt.

certain images from these eras. At first, I was looking for some old, vintage glass, which is what almost everybody does today. Albrecht has a series of very old Cooke Panchro lenses. I asked him if we could rent those. But, he said, "I don't think that's a very good idea taking them all the way to Senegal, especially if they need to be serviced.

"But, these new Cooke SP3 lenses have a similar Panchro style and look. And they all have modern mechanics. They all have the same maximum aperture, which the old ones do not. The focus is smooth, unlike the old ones." He was right. The SP3 Cookes were a very good idea, especially because they fit directly on the FX9 and FX6.

So you had the SP3 lenses in E-mount?

Yes. You do not need an E to PL mount adapter, which would have been necessary with the vintage PL mounted Cookes.

You had one set or two?

Just one set, shared between the two cameras. We had the 25, 32, 50, 75 and 100 mm. That was before they released the 18mm SP3.

Did you have any zooms with you?

No zooms. I tried to keep it as simple and small as possible. Also, we had a good grip and a dolly, jib arm, slider and other ways to gently move in or out, left or right to adjust the framing.

But come to think of it, if they make a Cooke SP3 Zoom, it would be a total success.

How would you describe the look of the SP3 primes?

Cooke look, for sure. It's a little soft, like the vintage Cooke Panchros. We liked the flares, a kind of violet purple flare, even if I didn't use it too much. And the overall SP3 tone is slightly warm. The field curvature is pleasing: the very edges of frame go slightly softer.

In the backgrounds, you have very beautiful bokeh. The area in focus separates very nicely from the foreground and background. The focus fall-off was something that I really liked because it directed your attention to the point of view of the scene and story.

Were you shooting wide open at T2.4?

Because I was operating and focusing myself, I tried not to make things too complicated. I was at T2.8 and sometimes T4 most of the time. On some special setups with the 75mm and 100mm, I was wide open for the closeups.

What about lighting?

Arona Camara was our amazing Gaffer. He's been lighting since before I was born, I think. During prep, he phoned me in Paris and asked what kind of lighting equipment I would like. I said that I was worried about our schedule and it would be a shame

Javier Calderon on *Valdiodio* with Cooke SP3

Director Amina N'Diaye-Leclerc at left.

Cinematographer/Operator Esther Barry adjusting Abracam mattebox on FX6.

Javier Calderon Guzman

Esther Barry with Easyrig.

to lose time with cabling and large setups. I told him about the Lightbridge system of mirrors, reflectors and diffusion and he was very excited. Since he works with German, French and UK companies going to Senegal, he decided to buy the system for our job and as an investment for future productions. So, we worked with a lot of available light, sunlight and the Lightbridge system. We also had Aputure and Astera fixtures, especially LED practical bulbs and tubes.

Did the lack of marked focus lines on the SP3 bother you?

Not at all. I worked as a focus puller and I also learned a lot by shooting TV realities and documentaries where the camera operators do everything by themselves. Most of those documentary style zooms don't have exact focus marks either. You don't really worry about distance, you don't make focus marks. You just focus by eye through the eyepiece and use your experience to keep things sharp.

The SP3 primes have the focus distances on top.

That's helpful when you estimate distance. I often like to hold the camera under my arm and look down into the eyepiece or monitor.

That is very French handheld underslung style.

I focus by eye through the eyepiece. I don't like focus peaking; it is distracting. You have to believe in what you see. That's another

great thing about the SP3 series—you can really see when you're in focus. And you can see where you are in focus, even on which eye of the actor in a closeup.

I see a mattebox in your BTS stills. Did you use filters?

I had the Abracam mattebox and used some filters for certain scenes to advance chronological time periods. I also used Tiffen Antique Suede filters. They're lovely and there were two reasons for them. The first is because this filter makes the skin tones warmer, especially in the green and brown colors—and it reduces the blue slightly. The second reason for this filter was to make the forties and the fifties scenes appear older. As we go forward in time, we reduce the filter effect until the main story happens. And then we only work with the unfiltered Cooke SP3s. I also had a Circular Polarizer.

Any diffusion?

I had a set of Tiffen Soft FX filters. I used them on interiors sometimes, but not really that often. They were helpful for flashback scenes to give the images a more dreamy look.

Follow Javier Calderon on IG: @iguanas_nuit

EMIT, the Cooke Distributor in France, supplied the SP3 lenses to PhotoCineRent. emit.fr photocinerent.com cookeoptics.com

Valdiodio Frames

Souleymane Seye Ndiaye
as Valdiodio

Aminata Niang as young
Amina.

Left to right:
Brice Dier Koue as Senghor
and Renaud Farah as Jean
le conseiller.

Javier Calderon on *Valdiodio* with Cooke SP3

Javier Calderon on *Valdiodio* with Cooke SP3

Adorama Rental Company + True Lens Services Vintage Lens Evening

Adorama Rental Company (ARC) hosted a Vintage Lens Evening at their Brooklyn, NY facility with True Lens Services (TLS) on June 19. The event centered around a dozen cameras with TLS rehoused vintage lenses, demos and discussions. Stephen Lowe, TLS Director of Operations, was there to explain character and coverage of each setup.

TLS is located in Leicestershire, UK, about 13 miles from Cooke Optics. Their team of about 46 people work in a 13,500 square foot facility appropriated named "Glass House." They currently rehouse about 30 different types of lenses. Each lens requires between 15 and 30 unique mechanical components: cams, barrels, geared rings and internal parts to replace the original ones.

The Adorama Rental crew had assembled a semi circle array of cameras from ARRI, Canon, Sony and a pre-production Fujifilm GFX ETERNA. Lenses included TLS Vega, Mamiya, Canon FD, Zeiss Contax, Canon Rangefinder, Leica R, Petzval and more. Cinematographer Robert Gregson lit the scene: a model on a motorcycle. There were lots of camera-lens changes during the evening. Among the many lenses tried, tested, viewed and discussed:

TLS Vega—Full Frame from 20mm to 135mm with a 16-blade iris, rehoused from the contemporary Nikkor AF-S series.

Zeiss Contax—1970s Full Frame from 15mm to 180mm. Sometimes called "Full Frame Super Speeds."

FUJI EBC—Introduced in 1971, Full Frame from 19mm to 135mm, with a 16-blade iris. EBC stands for Electron Beam Coated. Most focal lengths cover the GFX ETERNA sensor. TLS even has a helpful lens and camera coverage tool: *truelens.co.uk*

Derek Barocas, Business Development Manager, said, "Adorama Rental Company has an extensive selection of vintage lenses, and often the lenses are a real differentiator in terms of rentals. We reached out to TLS about having a vintage lens night to focus on show a wide selection of their vintage rehoused lenses in one room, in a controlled environment where we can do side by side comparisons on all different camera bodies."

Carl Cook, ARC Sales Manager, said, "This Vintage Lens Evening is an opportunity to meet new and upcoming filmmakers. We support independent projects, commercials, unscripted shows all the way up to high-end features and series. This is where TLS comes in. The more we add to our inventory and the more flavors we have, the more valuable we are to customers.

To my leading question as to why, after all this time, there is still such a strong interest in rehoused lenses, Derek replied, "It speaks to how good the cameras are now. Each DP and creative is trying to hone the look of their show, to do something that sets them apart. These unique lenses help them to achieve different styles."

Carl added, "Of course, many cinematographers like modern lenses that can be tuned or modified with filters. We also see cameras like the GFX ETERNA that can apply looks based on classic Fujifilm motion picture and still negatives. Or the ALEXA 35 with its Textures and Look Library. And all the customs LUTs for VENICE, RED, Canon, and others. So the TLS lenses are just another part of that big menu of choices for creatives. It's fascinating that even after all the advancements in technology, there's still a need to use a 60-year-old lens. Some of them look better now than they ever did in the film era." *adoramarentals.com*

ARC + TLS Vintage Lens Evening
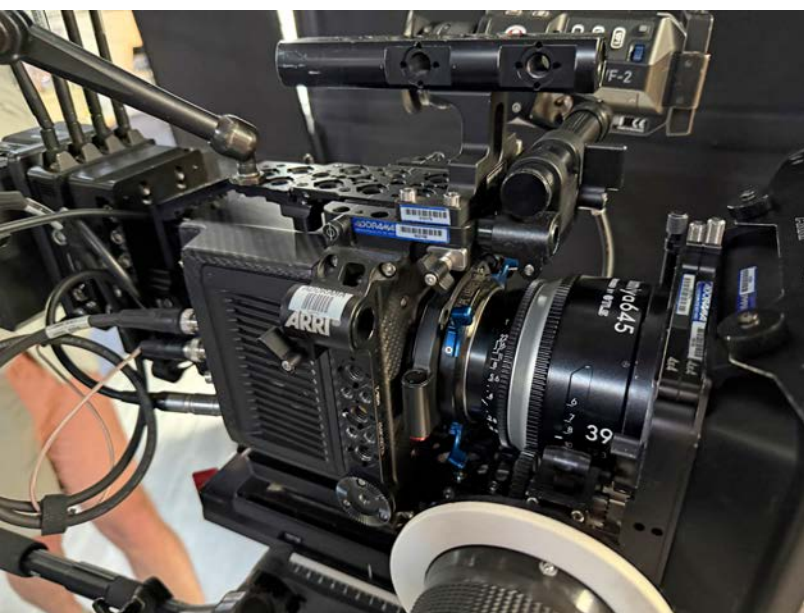
Stephen Lowe and Robert Gregson

Easyrig Vario 6

Easyrig's exciting new release this year is the **Easyrig Vario 6**.

It's been ten years since the launch of the Vario 5. It carries camera packages from 5-17 kg (11-38 lb) and the Strong version supports 10-25 kg (22-55 lb).

But in the years since 2015, many cameras have become lighter. Wouldn't it be nice to have a lighter, more nimble Easyrig as well?

Here it is. The Easyrig Vario 6 is 20% lighter than the Vario 5.

 It is intended for cameras weighing between 4–14 kg (9-31 lb). For reference, an ALEXA 35 Xtreme weighs about 5 kg with battery, prime lens and some accessories. VENICE 2 similarly equipped weighs about 6 kg.

You will be more agile with the Easyrig Vario 6 compared to the older generation. With a new sleek design and a completely new mechanism in the power pack, it enables all users to adjust the tension of the line themselves, without needing to ask for help.

The Easyrig Vario 6 has been stress-tested to withstand the rigors of work on location and on sets. It will not replace the Easyrig Vario 5, as they have different qualities.

The Easyrig Vario 6 can be retrofitted onto all previous Easyrig vests. To upgrade your current Easyrig, you only need to purchase the support bar by itself. You can also attach any Easyrig upper arm to the Easyrig Vario 6.

Available worldwide beginning October 2025.

See the new Vario 6 and new accessories at IBC booth 12.F82. *easyrig.se*

Easyrig Accessories

The new **Boom Rig Flex** is the same as the original Boom Rig vest, but with added support and adjustability around the chest area. Developed for female operators, but can be used by anyone. It is available by itself or as a complete Boom Rig.

The **Battery Plate for Boom Rigs** holding a light fixture instead of a microphone adds a battery plate to power the lamp and also works as a counterweight.
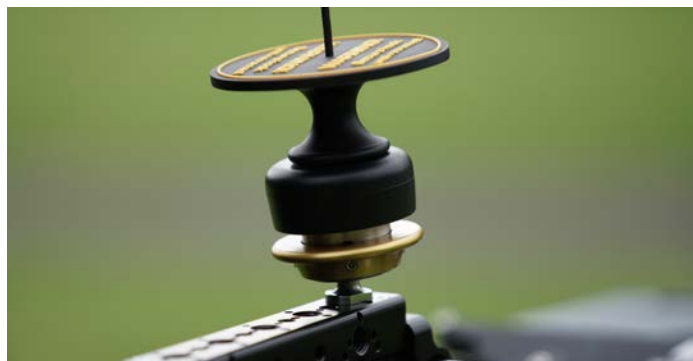
The new **2025 Quick Release** has been updated and is easier to attach and detach from the ball stud.

Additional new Easyrig Accessories include a **Padded Belt Extender** that fits the Minimax, Minimax Flex, Cinema and Cinema Flex vests. The new **Spacer**, developed with Niklas Johansson, FSF, helps to get your fingers around the housing of the quick release when working with heavy setups.

InviziGrain

| Film | InviziGrain |

In the examples above, original film and InviziGrain look identical.

InviziGrain, recreates digital footage using real film grain. Developed in close collaboration with the colorists at Harbor, Picture Shop, and Company 3 and with feedback from DPs, it is an incredibly realistic film emulation system.

InviziGrain has recently been used on productions at Netflix, Disney, Apple, WB, Bad Robot, A24, Universal, Hulu, StudioCanal, Focus Features, Peacock, FX and HBO.

InviziGrain runs on Mac, Windows, and Linux—using DaVinci Resolve, Baselight, Daylight, Colorfront, Flame, and Nuke. It can be used on-set for live previewing and for dailies, editorial, VFX and DI/color correction. InviziGrain looks can be shared between all systems. The system can run in real-time (with appropriate GPUs) and is completely resolution-independent, so a film-like look that is designed with InviziGrain that runs at HD resolution on set or in dailies will look identical at 4K for final output.

Because InviziGrain recreates each frame from actual film grain, it gives the image natural life and movement. This allows it to carry the film look all the way through video compression (i.e. HVEC, AV1, H.264/H.265, etc).   *invizipro.com/invizigrain*

Tilta Mirage Pro Matte Box

Tilta's Mirage Pro is a versatile, lightweight and modular swing-away Matte Box whose filter trays can tilt 0-25 degrees to eliminate annoying car headlight reflections and flares. The shade, eyebrow and side elephant ear flags are made of rugged carbon fiber.

Attach a Tilta VND (Variable ND) with wireless motor for up to 7 stops of remote exposure control. Three 4x5.650" trays can accept filters from 2mm to 4mm thick. There are many permutations of adapters and accessories, clamp-on rings, donuts, mattes, rod adapters, etc.   *tilta.com*   *IBC 11.A17*

Manfrotto One

The Manfrotto ONE Hybrid tripod system combining the best of the both worlds of photo and cine support. The tripod comes in carbon fiber or aluminum. Each pairs nicely with a Manfrotto 500X Fluid Head for smooth moves, a Manfrotto XPRO 3-Way Head for Stills, an XPRO Ball Head, etc.

The XCHANGE system lets you instantly swap heads, sliders and other accessories. It is a clever quick release system with a simple twist-lock mechanism.
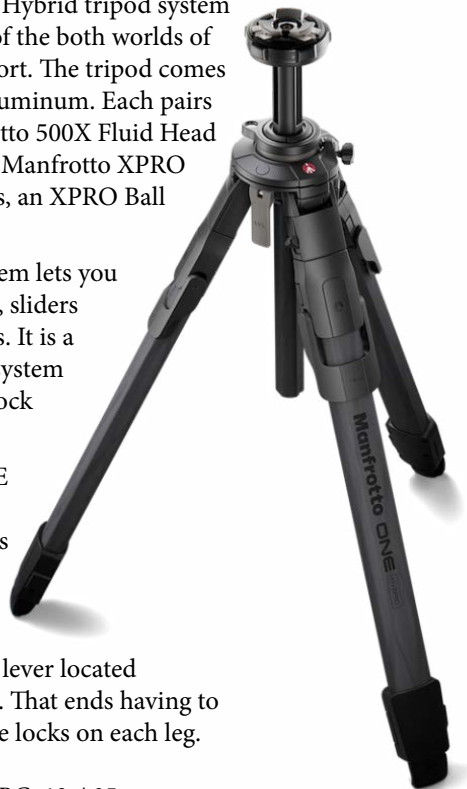
Each Manfrotto ONE tripod leg has 3 sections. The sections lock and unlock simultaneously with the XTEND mechanism—a large lever located at the top of each leg. That ends having to fumble with multiple locks on each leg.
manfrotto.com
Videndum booth at IBC: 13.A05

Manfrotto ONE Carbon Fiber or Aluminum Tripod Specs

- Weight: 3.15 kg / 6.94 lb
- Payload 15 kg / 33.07 lb
- Height: 19-140.2 cm / 7.48-55.2 in
- Closed Length: 70.5 cm / 27.76 in

Tokina 1.22x Expander

PL Mount
(lens side)

LPL Mount
(camera side)

Tokina's new 1.22x LPL to PL Expander enlarges the illumination circle of Full Frame PL Mount lenses up to 60 mm diagonal, enabling full coverage on 65mm format cameras.

Light loss is about 0.57 of a stop.

Because there are optical elements inside the expander, the distance from the PL flange to the rear protruding part of your lens depth cannot exceed 15 mm. *tokinacinema.com*

Wooden Camera AKS for Rialto Mini

Wooden Camera's new Accessory Collection for the Sony Rialto Mini includes:

- Cage – Adds mounting points around the body, including two angled mounts. The two-piece design lets you remove the bottom portion to maintain a low optical height.

- Cage Extensions – Available as a Top Cheese Plate or Top Dual Rod Clamp. Both options work so as not to block the filter slot.

- Rear Cheese Plate – A plate for mounting the Rialto Power Strip in various positions, with an extension for attaching a Micro Battery Plate.

- PL Support – A swappable lens support that aligns with the PL adapter's optical height. Compatible with ARCA base plates and works independently of the cage.

woodencamera.com   *Videndum booth at IBC: 13.A05*

SmallHD Quantum 27

SmallHD's new Quantum 27 is a 26.5" OLED reference monitor with grading suite image quality in a compact, set-friendly size. The Quantum 27 offers the same advanced display technology as the Quantum 32, in a smaller and more versatile chassis that is great for multi-monitor setups on DIT carts and in video village.

Continuing the partnership with Samsung Display, this monitor uses Quantum-Dot OLED panels that emit narrow-spectrum RGB light evenly in all directions, delivering uniform luminance of up to 1000 nits. The Quantum 27 has an exceptionally wide viewing angle of up to 60 degrees with consistent color reproduction across the entire screen.

The Quantum 27 was optimized for life on set (and on location) with helpful features that include a top handle and bottom feet for easy handling. It has a universal 100mm VESA mount and ARCA Rail on the back for easy mounting. Dials and buttons are there for tactile control.   *smallhd.com*

Videndum booth at IBC: 13.A05

Input/Output:	4x 12G/6G/3G/HD-SDI
Resolution:	3840 x 2160 (UHD)
Brightness:	Up to 1000 Nits
Color:	97% DCI-P3 / 80% Rec.2020
Bit Depth:	10-bit
Weight:	18.5 lb / 8.39 kg
AKS Output:	2x 2pin Lemo-style (12V), 2x USB-A, 1x USB-C
Power:	1x 3-pin XLR (142W max, 25V-34V, 12A max)
	Gold Mount or V-Mount battery brackets.

Teradek CTRL.5 WiFi Camera Control

Teradek RT CTRL.5 is a wireless lens control Hand Unit. The latest update of its CTRL.OS software adds WiFi camera control for RED and ARRI cameras.

In addition to controlling focus, iris and zoom, the Camera Page on the CTRL.5 display lets you view real-time camera status and make basic camera menu adjustments. Additionally, the ISO, FPS, shutter angle and white balance settings can be assigned to user buttons. Camera control for RED and ARRI operates on 2.4 or 5 GHz WiFi channels. Lens motor control operates on the frequency-hopping spread spectrum 2.4GHz band. So, they each operate independently.

CTRL.5 Camera Control can access multiple cameras on the same network and there are several ways to connect:
- Connect the CTRL.5 to the camera's WiFi network.
- Connect camera to CTRL.5's built-in WiFi access point.
- Connect both devices to a shared router, like the Link AX.
- Enable camera control to remote locations via IP.

Camera Control works with ALEXA 35, ALEXA Mini, ALEXA LF, AMIRA and more. RED camera control includes KOMODO, V-RAPTOR, DRAGON, MONSTRO and GEMINI.

Teradek Cine Product Manager Colin McDonald said, "In addition to WiFi support for RED and ARRI cameras, we are working on expanding to Sony and we have plans for additional camera manufacturers. Since this feature wasn't available at launch, we're offering it free, for a limited time, to all current CTRL.5 owners and new buyers as a thank you for their patience."
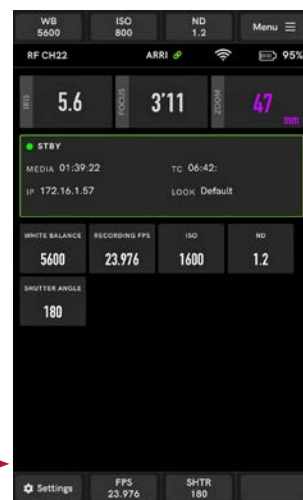
teradek.com   *Videndum booth at IBC: 13.A05*

CTRL.5 Home Screen with FIZ and RED Camera Control Status.

CTRL.5 ARRI Camera Menu

Bright Tangerine for Rialto Mini

Bright Tangerine offers various kits to rig your VENICE Rialto Mini.

The Base Kit includes Left and Right Side Plates; Top Plate; Rear Plate, Sliding Top Handle; and Top Bar Bracket for 15mm rods.

The Advanced Kit adds the LeftField Mini 15mm LWS Baseplate for quick-release with any ARRI-style dovetail; LeftField Mini Standard Riser; and an 8" long ARRI Standard Dovetail.

The Expert Kit has all of the above and adds KASBAH Hand Grips for comfortable, enjoyable, breathable handheld camera operating; KASBAH Extension Arms; Rosette Adapters and Rosette Extension Spacers that let you adjust the Hand Grip positions almost anywhere; a 15mm Rod Mount with ⅜-16 Anti Twist bolt; and a pair of 15mm Ø 9" long Titanium Drumstix Rods.

brighttangerine.com

Gecko-Cam Ayana

Here's a new set of 65mm format lenses.

The Gecko-Cam AYANA 65 primes are very fast and cover an image circle greater than 60 mm Ø diagonal. Maximum apertures are T1.7 and T1.8 and they focus extremely close. They come with an LPL mount.

Designed and made in Germany, the AYANA 65 lens elements are all spherical. The look is dreamy wide open and stylish as you stop down, with smooth skin tones and interesting bokeh.

gecko-cam.com

Focal Length	30mm	35mm	40mm	45mm	60mm	70mm	90mm	140mm
Aperture	T1.8	T1.8	T1.8	T1.8	T1.7	T1.7	T1.7	T1.7
Front Diameter / Image Circle	114 mm / > 60 mm Ø							
Iris Blades	14	14	18	18	14	14	14	18
Rotation	Focus Rotation: 270° / Iris Rotation: 80°							
CFD Metric	0.25 m	0.25 m	0.25 m	0.25 m	0.3 m	0.4 m	0.5 m	0.7 m
CFD Imperial	12"	14"	12"	12"	16"	16"	18"	2'6"
Total Length from LPL Mount	100 mm	114 mm	132 mm	158 mm	100 mm	114 mm	145 mm	179 mm
Weight	1.6 kg	1.9 kg	2.3 kg	2.5 kg	1.45 kg	1.6 kg	1.9 kg	2.9 kg

Hasselblad X2D II 100C

Gothenburg, Sweden. August 26, 2025. Hasselblad releases the X2D II 100C. It is a 100-megapixel Medium Format still photo camera capable of continuous autofocus, high dynamic range and 5-axis 10-stop IBIS (in-body image stabilization). Imagine handheld slow shutter speed photos without a tripod.

A new Hasselblad lens accompanies the X2D II 100C. The new XCD 2.8–4/35–100E zoom lens covers 35-100 mm in Medium Format, which is the equivalent of the popular 28-76mm range in Full Frame format.

Add any number of lens adapters to the Hasselblad XCD mount (38 mm flange to sensor depth), and go scouting or lens testing with V, H, PL, LPL, M, RF, EF, 645, 6x7. With its sensor size of 43.8 mm wide x 32.9 mm high, and an image diagonal of 54.70 mm, you'll get to see whether your cherished lenses cover or vignette for Medium Format 55 mm Ø cinematography.

For the first time on a Hasselblad camera, the X2D II 100C introduces AF-C continuous autofocus. Phase Detection Autofocus (PDAF) coverage has been expanded from 294 to 425 zones and works together with LiDAR-assisted focusing for fast and accurate results.

At the rear, there's a 3.6-inch 2.36 million dot OLED touchscreen with 1400 nit peak brightness—75 percent more than the previous X2D 100C. The screen tilts 90° up, 42.7° down and out to the side. There is also an Electronic Micro-OLED Viewfinder—with 5.75 million dots. A 5-way joystick enables quick focus point selection and intuitive menu navigation and 8 customizable user buttons provide quick access to system functions.

X2D II 100C Specifications

- Sensor: Back-side illuminated (BSI) CMOS, 100 megapixels (11656 × 8742 pixels, pixel size 3.76μm).
- Sensor Dimensions 43.8 × 32.9 mm
- Lens Mount: Hasselblad XCD. 38 mm flange to sensor depth.
- Lens Adapters: Hasselblad HC/HCD, XPan, and V System Lenses.
- File Format: Hasselblad 3FR RAW, full size JPG and HEIF.
- Image Size 3FR RAW: 206MB average.
- IBIS: 5-axis, 10-stop in-body image stabilization
- Storage: Built-in 1TB SSD and a slot for CFexpress Type B card (CFexpress maximum storage capacity is 512 GB).
- USB 3.1 Gen2 Type-C connector (theoretical bandwidth 10 Gbit/s).
- Shutter control port supports Hasselblad Release Cord X.
- ISO: 50 to 25,600, Auto and Manual.
- Touch display with click, drag, and pinch/spread to zoom.
- Display Monitor: 2.36-million-dots, 3.6-inch wide color gamut OLED. 1,000 nits sustained brightness (typical), 1,400 nits peak brightness (HDR), contrast ratio 2,000,000:1 (typical), P3 Daylight 6500°K display color temperature.
- EVF: Micro-OLED screen, 5.76-million-dot.
- Battery: Rechargeable Li-ion battery (7.27 V DC / 3400 mAh)
- Battery endurance is 327 photos according to CIPA standards, 466 photos in SDR mode.
- Dimensions 148.5 × 106 × 75 mm.
- Weight 840 g (camera body with battery), 730 g (camera body only).
- hasselblad.com

FILM AND DIGITAL TIMES

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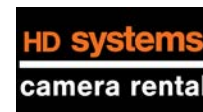
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Angénieux | CREATIVE SOLUTIONS | Cooke

Moguls

bandpro FILM & DIGITAL INC. | ZEISS | AJA VIDEO SYSTEMS | Panasonic LUMIX

TILTA | NANLUX NANLITE | TERADEK | Videndum Production Solutions

Leitz | FUJIFILM | FUJINON | Leica

ANTON BAUER | PRESTON CINEMA SYSTEMS | WOODEN CAMERA | TIFFEN

THE STUDIO B&H | CVP | oconnor | SMALLHD

Executive Producers

HASSELBLAD | Emit | STEADICAM | RED

Litepanels | RAID | lowel | sachtler

Producers, Co-Producers, Associate Producers, Rental Houses, Media and Production Partners on previous page