Vanja Černjul and *Crazy Rich Asians*
Creative Solutions acquires Amimon
Nicol Verheem, Ikigai, Art, Analogies
Still Moving Pictures: *The Favourite*
Greig Fraser, *VICE,* Arricam, Cooke
Tour of Sony's Atsugi Tech Center
Sasaki & Cioni on Large Format
CVP in the Camera Triangle
RED Ranger for Rentals
Sony VENICE 120 fps
Panavision Lens Bar
Tokina Vista Primes
cmotion cPRO
DJI Ronin-S
Panther S-Type Dolly
Transvideo Metadator
Louma 2 Point & Plane
ARRI ALEXA LF SUP 4.0
Sekonic C-800 Color Meter
Preston Cinema Light Ranger 2W
P+S Technik Evolution Anamorphic
Cages for Pocket Cinema Camera 4K
Blackmagic Pocket Cinema Camera 4K
Cooke Panchro/i Classics & FF Anamorphics
Guillermo Granillo, ALEXA LF & ZEISS Supremes

Cover: Awkwafina on *Crazy Rich Asians*
with Panasonic VariCam. Photo courtesy of Warner Bros.

FILM AND DIGITAL TIMES

Art, Technique and Technology

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

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

subscribe
www.fdtimes.com

Subscribe online, call, mail or fax:

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

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

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

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

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

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

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

Editorial offices in New York City

---

www.fdtimes.com

On Paper, Online, and now on iPad

Subscribe
Online:
www.fdtimes.com/subscribe

Call, Mail or Fax:

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

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

☐	1 Year Print and Digital, USA	6 issues	$ 49.95
☐	1 Year Print and Digital, Canada	6 issues	$ 59.95
☐	1 Year Print and Digital, Worldwide	6 issues	$ 69.95
☐	1 Year Digital (PDF)		$ 29.95
☐	1 year iPad/iPhone App upgrade		+ $ 9.99

(normally 29.99) *Get FDTimes on Apple Newsstand with iPad App when you order a Print or Digital Subscription (above)*

Total $ _____

Payment Method (please check one):

☐ VISA   ☐ Mastercard   ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code_____

Expiration Date_____

Signature _____

Name _____

Company _____

Title_____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code_____

Phone _____

Fax_____

Email_____

Contents: Feb 2019 Issue 92

Placement of articles is often a random race to see who comes closest to stopping the presses. Large Format popped up as the theme this month, and most of those stories are up front.

RED RANGER for Rentals

Jarred Land talks about the new RED RANGER Camera, available exclusively to Rental Houses.

JON: At your RED Studios Hollywood gathering during Cine Gear, you floated the idea of a custom camera for rental houses.

JARRED: We had a rental house event here in our theater at RED Studios. The Panavision DXL2 was just launching at that time and some of the other rental houses wish they could be part of that program. But of course that was a Panavison exclusive camera so they couldn't. I reminded them of what I tell everyone, that we can make custom cameras for anybody as long as they buy enough of them :) Enough hands went up publicly and later privately to make the project viable. Hence, the RANGER is a special camera that we will sell only to authorized rental houses. They will get this camera that hopefully addresses some features and requests that are unique to rental houses.

JON: What is the background for the evolution of its design?

JARRED: Matt Tremblay, our chief designer, and I love building these custom cameras. After we built David Fincher's custom Xenomorph camera, and of course what the Panavision DXL became, we designed a more condensed version with NASA in mind that benefited from everything we learned with the Xeno. Michael Bay saw that original RANGER and wanted his own version, and that evolved into his Bayhem camera.

The new RANGER is a unified camera that integrates what you'd get if you bought a MONSTRO and a DSMC2 PRODUCTION MODULE, and then added a few things on top of that. It's really a production camera for features, TV movies and commercials where being modular isn't as important as having everything integrated.

Brian Henderson (RED's VP of Business Development) and his team have been spearheading this project and have been doing a great job building up our connections at rental houses a little bit further than we had in the past. He's going to start showing the camera mid-January and then we are launching it properly in March.

The RANGER really is a focused rental house-only camera. We won't make too many of them, but enough for everybody in our authorized rental program to have something special.

JON: Will you sell RANGER to DPs who would like it as well?

JARRED: Probably not, and it's not going to dealers either. Basically, this is our offer to the rental houses and to have them guide us where it goes. The RANGER is expensive to make because the quantity is small. Also, the rental houses are absolutely the best ones to support a camera like the RANGER on larger productions.

JON: Same MONSTRO sensor?

JARRED: Yes, it is the same MONSTRO sensor inside RANGER as our DSMC2 camera body. It's not modular, so we make 2 versions , one with an integrated V-Lock and one with an integrated Anton/Bauer battery plate. It accepts 24 Volt external power which is one of the biggest things that we've had requests for over the years. And, with everything integrated within one larger body, we have more space so the fan is bigger and quieter. That was the other big

request we have always had from Rental houses. Also, stability is improved because you're not adding various modules and risking failure of connections through the pogo pins.

Our third-party program was great for everybody to make modules and it's awesome that people are starting to make some really cool stuff, but a lot of rental houses and their customers don't really want to have to learn how to support every single module that comes out.

I think it's safe to say that everybody appreciates the modular aspects and the small size of the DSMC2. But, when you see these large productions taking our little camera , it ends up looking like a big Medusa. They have all these wires and connectors added on, so then size becomes less important. Also, when you are on a production that travels and involves getting cameras from multiple rental houses, it is also beneficial to be able to replicate the configuration exactly from rental house to rental house. When you ask for a RANGER you will get a RANGER ready to shoot and that helps reduce some of the unknowns that can happen with the modules.

That said, RANGER is not a camera for everybody. But I think the rental houses are going to like it a lot. It's their kind of camera.

more productions thanks to streaming like Netflix and YouTube and Amazon and others that really didn't exist 10 years ago.

JON: RANGER might make the rental houses happy because I can imagine they are also concerned about the large percentage of income they have to share with crews who have their own cameras, lenses and accessories. I've heard numbers as high as 80% sub-rentals on some productions.

JARRED: This sub-rental trend has benefits and negatives. It helps the rental house by moving that increasingly frequent short-cycle investment away to the owner-operator. But then the rental house has to share the revenue. Kitsplit, Sharegrid and other Internet services are proliferating. Which is awesome for the renters, but hard on the traditional Rental houses.

For 50 years, the camera rental industry has been pretty predictable. And then about 10 years ago it seemed like the entire world changed. Digital became a real choice and cameras became cheaper and many more shooters became owner-operators. Some other manufacturers actually chose to become rental houses themselves to compete with their own customers. Rental houses, of course, again adapted. You started seeing some rental houses doing post and finding other ways to diversify.

Rental houses have a certain kind of support and knowledge that nobody else can do and that knowledge became even more valuable. There was also a lot of consolidation. It was gloomy for a little while there, but now I think it is a very interesting time for rental houses with a ton of opportunity.

All we want to do is just make the best cameras we can for everyone, and we are happy to help enable all of our rental house partners to succeed in their own way. RANGER is what they asked for, so we made it. Pretty simple.

JON: How did you arrive at the camera's shape? It looks nicely 435-ish.

JARRED: I'm going to give credit to Christopher Probst and Fincher for the part of the shape I think you are talking about. There are also, of course, a lot more ports, proper full-size XLR connectors, multiple BNC, SDI outputs and everything that you would have to add a module on with our regular DSMC2 cameras, plus a big fan and 24 volt input and output power. We have 24 volt accessory output in the front of the camera for lens control and so on. That's something that people have been asking us for years. It kind of looks as if you took one of our DSMC2 cameras and added the PRODUCTION MODULE that we added to the line-up last month. It's all integrated so there's no confusion.

The modular system is great, but as I mentioned before, when you're a customer and go to a rental house looking for a MONSTRO or any of our cameras, you sometimes get surprises and need to piece everything together. That is sometimes an asset, but it also creates uncertainty. With RANGER you have a really great foundation to start your build with and you know what you're going to get every single time.

We'd like them to drive the program. There have been a lot of changes over the last couple of years in the rental business and RANGER offers them something that is unique. Most rental houses have, to various degrees, offered custom solutions for their customers in other ways. This gives them the opportunity to again have something special that sets them apart from everybody else.

JON: How have rental houses changed over the last few years?

JARRED: Well, we are probably responsible for some of that change. When we started in this industry, a professional cinema camera was well over $100,000. It wasn't really an owner-operator world. The price was high, but that was ok because the return on investment was very long. You could buy an Arriflex 235, 435, 535 or any of the other film cameras and have them last for 10 or 20 years. So, after purchasing a camera, you could be pretty confident that you'd eventually make that investment back. And then we came along and so did pretty much everybody else with a whole new generation of cameras, at a much more affordable price point, at much quicker cycles, which is not the best way for the market to move if you are a rental house.

The bright side of this explosion of cameras is that there also has been an explosion of the amount of content and there are a lot

Choice of V-Lock or Gold Mount Rear Battery Plate. Same 11.5-17 V DC as DSMC2. Same batteries that work on DSMC2 will work on RANGER.

Wi-Fi

MONSTRO Sensor

24 V 3-pin RS

11.5-32 V DC IN, 4-pin 2B Lemo compatible connector. Average power consumption is about the same as a DSMC2 MONSTRO with 7" LCD, PL mount, SIDEKICK, and PRODUCTION MODULE.

JON: How does it compare in size to the DXL2?

JARRED: It's smaller than the DXL2, so it's somewhere in between a MONSTRO with the PRODUCTION MODULE and a DXL in terms of size.

JON: What kind of wireless control is in RANGER?

JARRED: We have an antenna and increased Wi-Fi range for foolcontrol, which has now become pretty much the standard. Mikael Lubtchansky does a really awesome job with that. Wi-Fi is built into the camera so you can control it just like you do with the DSMC2 camera.

JON: How much more expensive is RANGER than a regular MONSTRO 8K camera?

JARRED: It's not much, much more. But it's definitely more expensive because of the integration and low volumes.

JON: But the rental house will probably still be able to pay it off on one 6-month series. Now we get into my favorite part of discussions with you. Philosophically, what does this mean as to where the industry is going? Does this give the rental houses more influence? And where do cameras in general go from here?

JARRED: Those are great questions. Our normal cameras are obviously going to evolve. We can do a lot more things as technology improves and we learn different ways to integrate. We are committed heavily to our Sensor and ASIC program and that remains where our core focus is. You will see more improvement in sensors, and then doing some mechanically and electrically different variations where you can leverage all that technology to do something special, like we did with the RANGER. And certainly some surprises.

JON: Do you think users prefer an "SUV" style of camera where everything is together like you did with the DXL2, or do they prefer a modular approach like the DSMC2?

JARRED: I think the answer is both ways. The DP can find a reason to shoot both. A lot of them love the small DSMC2 brain. They can just put a handle on it and shoot in a corner or run and gun. The bigger question is what camera assistants prefer and I think they would prefer something like RANGER that is integrated that has higher reliability, not just from a functional point of view, but also in knowing exactly what they have from show to show. The good thing is that we can provide solutions for all of the above, which is the best of both worlds. If you're a car company and you have a great platform, you can make a great sports car, and also make a great SUV and sometimes if the need arises you can even make a really great station wagon.

JON: Is Panavision OK with the new RANGER camera after you've built the DXL with them?

JARRED: They've known about it for a while and it will be interesting to watch Panavision because I wouldn't be surprised if they make a Panavised version of this camera as well, at some

point. That goes back to an important part of their history of Panavising all kinds of cameras and accessories for their customers. So the DXL2 does a lot more things than this camera and it is definitely their workhorse camera. I don't think the DXL is threatened by the RANGER in any way.

JON: This makes good sense for the rental houses economically.

JARRED: RANGER is another tool that the rental house can hopefully use to be successful and to help them support their customers in a way that only they know how. I think RANGER is something that I think the rental houses need and, quite honestly, deserve. Rental houses are just as important to the success of RED as our individual customers.

Jarred Land and Matt Tremblay with the first 2 prototypes of RANGER.

Guillermo Granillo AMC AEC on ALEXA LF and ZEISS Supremes

Guillermo Granillo, AMC, AEC

Guillermo Granillo, AMC, AEC graduated from the Escuela Activa de Fotografía in Mexico City, studied graphic design at the Universidad Autónoma Metropolitana (UAM) and film at the Centro de Capacitación Cinematográfica (CCC). He is a member of the Sociedad Mexicana de Autores de Fotografía Cinematográfica (AMC) and the Asociación Española de Cinefotógrafos (AEC).

JON FAUER: Please tell us about *La Nave*.

GUILLERMO GRANILLO: *La Nave (The Ship)* is a feature film about a radio announcer who helps a child fulfill a dream. The Director was Batan Silva.

You worked with ARRI ALEXA LF cameras and ZEISS Supreme Primes?

Yes. It was the first Mexican feature film shot in this digital Large Format. EFD was our camera equipment rental house.

The difference between ALEXA LF and SXT cameras, for me, is mainly the depth of field. I have used ARRI cameras often because I do a lot of handheld and they are very well balanced. The ALEXA LF is as well.

Not too heavy?

The weight is a little more than an SXT, but it is not a problem. It is very comfortable on the shoulder. Also, I love the images, colors and the resolution of the ALEXA LF. I have been working in various digital formats for some time now, but this Large Format seems to bring me closer to what I liked about analog film.

Do you operate yourself?

Yes. I operate the "A" camera. Usually I have a Steadicam Operator working on the "B" camera as well. In Mexico, the DP is also usually the Operator.

Which Supremes did you have?

The core set: 25, 29, 35, 50, 85mm—all T1.5.

We also had a complete the set of the ZEISS CP.3 XD primes: 15mm T2.9, 18mm T2.9, 21mm T2.9, 25mm T2.1, 28mm T2.1, 35mm T2.1, 50mm T2.1, 85mm T2.1, 100mm T2.1, and 135mm T2.1

Do the CP.3 primes match the Supremes?

They're good. The CP.3 are a little more contrasty and the focus is a bit more hard-edge. The Supremes have a gentler falling off of the out-of-focus areas. The transition from what's in focus to the area that's out of focus is smooth, gentle, not harsh. For example, it's like comparing a soft-edge grad to a hard-edge grad.

Guillermo Granillo and Batan Silva. Production stills by Jorge Medina

Why did you mix Supremes and CP.3s?

Because we did not have a lot of Full Frame lenses here in Mexico at the time. EFD, the Rental House, had complete sets of CP.3 XD lenses, and the Supremes were just arriving. They're a little different but it's not a problem.

Did you have zooms as well?

Yes. The Full Format ZEISS Cinema Zooms (CZ.2): 15-30mm T2.9 and 70-200mm T2.9. They matched the Supremes nicely.

Did you have to have to use filters on the zooms or the CP.3 primes to match the Supremes?

Only ND filters. But I worked with our DIT and applied a LUT for the whole film. On set, we would adjust for any variations in color and look. We recorded in ARRIRAW.

This must have been a big budget film?

No, not really. [laugh]. But we had the possibility to work with all the latest equipment and tools.

You were talking about depth of field. Were you shooting mostly wide open?

Yes. I like to see very good texture in the out of focus areas. When you put your actor in foreground, the focus in the background is really nice with the Supremes. It's like silk. The texture, for me, is friendly. And when you have highlights like bulbs in the background at night, you find pleasing shapes and beautiful bokeh with the Supremes. I was very happy with these lenses.

But maybe your focus puller maybe was not so happy? [laugh]

Not so happy. I like to shoot wide open. I really don't want the entire frame to be in focus. Instead, I prefer selective focus. On the ZEISS Supremes, we were very often wide open at T1.5.

Yes, it was difficult for Adan Amalio, my focus puller—but he is very good. He uses the Preston FIZ because it gives him good control and it has fast response.

Are there other reasons that you like Full Format?

It is a new technology in cinema, but it is an old technology in still photography. When we studied in school, we used full frame still cameras. And now, the technology changes back to full frame for cinema—and why not? It's good to find this new technology because I have worked with a lot digital cameras. All their sensors are good and very accurate. I like to embrace new technology. Netflix and other companies are asking for more resolution in our work. So why not use Full Format?

We create images with light and lenses, cameras and movement.

Guillermo Granillo on Large Format, cont'd

The technology is like a partner for us. We need to work with the new, with the old, but we must not forget the essentials of cinematography. This is true no matter which camera we use. We become comfortable with our equipment, but I think it is most important that we do not forget the aesthetics of what we need to tell the story. We still need to work with the actor and the script. But Large Format opens up new possibilities to imagine, to dream.

That is interesting about technology in support of your style and your technique. How would you describe the look of the Supreme lenses artistically?

Gentle and smooth and neutral—with character.

What about lighting and post?

We used ARRI SkyPanels. Also Velvet (from THELIGHT in Barcelona). But with the ALEXA LF and Supremes, we're working at much lower light levels. The dynamic range from highlights to shadows is wonderful. So, lower light levels and fast lenses enable faster setups on set and location. Our post house was Oxido.

What's next for you?

A comedy with the same director. The title is *I Married an Idiot*. We are in production now, using an ARRI Alexa LF, Sony VENICE and ZEISS Supreme Primes. We now have the 100mm T1.5 ZEISS Supreme as well and are very happy.

guillermogranillo.com

See the Zeiss video interview:

zeiss.com/cine

vimeo.com/300760179

Above: First AC Adan Amalio pulling focus in trunk of car.

11 Series of Panavision Large Format Lenses

Primo 70

Primo Artiste

H Series

Super Panavision 70

Ultra Panatar - 1.3x anamorphic

Ultra Vista - 1.65x anamorphic

System 65

Sphero 65

Vintage 65

PanaSpeed

Primo X

Sasaki, Cioni and Panavision Large Format

Dan Sasaki testing a lens at Panavision Woodland Hills.

Panavision team in front of Lens Bar at 2018 Cine Gear. Michael Cioni is third from right in the front row.

In anticipation of Panavision's popular Lens Bar at the BSC Expo in London, Dan Sasaki, VP of Optical Engineering at Panavision, and Michael Cioni, Senior VP of Innovation at Panavision and Light Iron, had a few things to say.

JON FAUER: Let's begin by talking about a fun subject, lenses and wine, and how they relate.

MICHAEL CIONI: I've always felt that comparing lenses is a little like tasting wine. If you've ever done a wine tasting, you know that unless you have a direct comparison, it can be difficult to truly discern the notable, even subtle differences. Our biological reset mechanism prevails and as soon as you switch drinks (or lenses), you may forget some of the details of what you were observing even moments ago. Have you ever gone skiing or snowboarding and noticed that when wearing orange goggles the snow eventually appears white? That's an example of how good our brain is at neutralizing and resetting. I think what I've noticed in a lot of lens evaluations is that the reset function in each of our brains can make the most critical differences difficult to observe.

JON: Good point. When you do a wine tasting, there are often four or five glasses in front of you and you compare them. Most lens tests have been shown with one lens after the other.

MICHAEL: At the BSC Expo in London, we're going to have a lens bar of Panavision optics and our new lens demo screening system. Like a wine tasting, it's helpful to compare them together and at the same time.

So, when we shot our latest lens tests we came up with the idea to use a click track so the actors could repeat the same action over and over while shooting with each lens from the same camera, same vantage point and same focal length. We then play back the footage on four 4K monitors simultaneously so DPs can make the comparisons at the same time. We've all seen lens tests conducted with various lenses on multiple cameras, but the problem with that is each angle is different because of the parallax. So, our idea was to shoot everything from one camera position, change the lens, and repeat the action for the best evaluation experience.

The Panavision Lens Bar at this year's BSC Expo gets bigger and becomes more hands-on. It's sort of like a lens petting zoo. We're not championing one set of lenses. We offer a variety of lenses and let the Cinematographer decide which fits their project which makes the experience very personal. In terms of large format, when the Panavision Millennium DXL 8K camera was introduced in June 2016, how many lenses did we have?

DAN SASAKI: Now we have 11 series of large format lenses.

Panavision Ultra Vista lens tests. Michael Cioni at camera.

Kylie Hazzard mounting a PanaSpeed on DXL2 for testing.

Shooting the Panavision quad-split lens tests

Below: Cinematographer Brandon Trost and Director Marielle Heller on location in the Logos Bookstore (coincidentally across the street from FDT in NYC). Photo: Mary Cybulski.

JON: Thinking of our wine analogy, "vintage lenses" like "vintage wines" were not considered "vintage" when they first came out. Hopefully, they were the best that a manufacturer could build. When Panavision first started making lenses, were cinematographers using the vocabulary of character and look that we discuss today? I have a feeling that lens choice back then was more a matter of whether the lens was "good" or not. Am I wrong about that?

DAN: That is correct. Many of the characteristics cinematographers tried to avoid in the past are now attributes. I believe this is largely due to the many outlets where an audience can view material. We are viewing shows on smaller devices such as televisions and personal devices as much as large theater screens. The visual cues stimulated by home viewing differ from those being used when viewing a movie at a large screen venue. Many of the nuances we might have ignored or avoided in the past are becoming more relevant and interesting. Due to this, the paradigm of how we choose and create lenses has changed quite a bit.

JON: Dan, has your job therefore changed over the years? In the film era, were you trying to overcome the bouncing film in the gate and the projector and the multiple generations from negative to print degrading the image? But now it's another story: we are much more aware of different looks, different feels, different styles?

DAN: Yes, you summarized it well. In the last two years, I have seen more changes to lens imaging traits than I have over my entire time at Panavision. The changes in cinematography trends have made it possible for a new lens class to be introduced at nearly all of the major trade shows such as the BSC Expo.

MICHAEL: The Lens Bar is also a bidirectional place where we get feedback from users and it helps us modify or augment what we're doing based on that. We have had a number of lenses change in prescriptions based on user feedback. Sometimes we expect a lens to behave or be used in a certain way when it's actually used in a different way. For example, last year, Dan built one Ultra Vista lens and people had a strong positive reaction to it, so that encouraged us to build many more.

One of the favorite lens series for the DXL has been the Primo Artiste. The first person to use the Artiste on DXL was Brandon Trost on the film *Can You Ever Forgive Me*. Brandon worked with Dan on optimizing and finding the ideal prescription that looked best for the show. Since then, a lot of people have elected to use Artistes after seeing the results from that first shoot.

> *Cinematographer Brandon Trost commented: "Often, large format is chosen for grand scale and scope.* Can You Ever Forgive Me *was the opposite. This system can really allow for a special sense of intimacy and closeness. We wanted to feel like we were in the rooms right next to our characters, experiencing this story with them. The large sensor helped us with a more personal feeling of depth. I chose to shoot DXL at 3200 ISO because I loved the texture and subtle softness that it induced while allowing for low light levels. The Primo Artiste T1.8 lenses told the story perfectly. The shallow depth of field and smooth optical resolution allowed for the sense of time and intimacy we wanted to feel."*

JON: What specifically was done to create the look of the Primo Artiste lenses?

Can You Ever Forgive Me? Panavision Primo Artiste lenses. Light Iron Colorist: Steven Bodner. Frames courtesy of Fox Searchlight Pictures.

DAN: Basically, we started with a look in mind and came up with a new design that was amicable to the aesthetic we were after. Once the core design was decided upon, we targeted a handful of aberrations. Think of those aberrations as ingredients in making a cake. The proportions of those aberrations give the cake a unique flavor. Without getting in too deep, we enhanced certain ingredients to be stronger than others. It comes down to what Michael said: we have a very short-term memory for what our eyes process. Because we really don't see with our eyes. We see with our brain. And our brain is constantly trying to match and make sense of things. Realistically, any casual variances or types of qualities that stand out are what give the Artiste lenses their style.

With the Artiste lenses, you'll notice the contrast looks different from a modern lens. In the digital world, automatically you're going to see a lot more contrast, so we had to break that down. Oddly enough, a lot of the artifacts that we targeted in the Artiste lenses were preferred to be corrected and avoided in the 70s because we were working with motion picture film emulsions. For example, the

flares and color attributes that were the result of the anti-halation layer on the film was disturbing back then. But now, we find that people gravitate towards that kind of glowing flare.

I believe this type of artifact is more sought after these days because it provides a characteristic. It's something that survives imaging chains and preserves a unique character that identifies a cinematographer's artistic intent. It really comes down to the unique combination of ingredients that go into the Artiste. Basically, select aberrations and the proportions of those aberrations are what we use to give the Primo Artiste lenses their unique look.

MICHAEL: There's a lot of debate out there surrounding perceived benefits of shooting large format. Brandon celebrated the use of large format on *Can You Ever Forgive Me*. He often favored wider focal lengths, got closer to the subject, and shot wide open. Even when he was shooting in daylight, he put on ND filters so he could maintain a T1.8 aperture.

The Artistes have a unique contrast characteristic where they will give you good focus and rich blacks, with a hint of light wrap.

> ## "This new class of large format sensors has made it possible for anamorphic to have a technical as well as an artistic advantage over its spherical equivalent in the digital arena."

That light wrap "takes the edge off." I've seen situations where the halation, which is one of your five major lens characteristics, actually acts a bit like a fill light. If you are keying someone from the left side, the halation wraps the light around and it fills in the shadow side slightly. There are a few examples of that in Brandon's film, because he used a lot of New York natural lighting situations in the film.

JON: It was a painterly look, golden in the highlights. If we were comparing wines, it would probably be a Chateau Margaux 2005. I hope you pour that at the lens bar. It was elegantly rounded and gorgeous. Next, can you please tell us more about the Panavision Ultra Vista lenses?

MICHAEL: The Ultra Vistas are full format anamorphics with a 1.65x squeeze. They're built from scratch. The focal lengths right now are currently 40, 50, 60, 75, 100, 135, 150, 180 mm and we're working on zooms at the moment.

JON: How did you settle on the 1.65x squeeze?

DAN: The 1.65x squeeze came about as the result of a squeeze progression ratio. There were multiple considerations involved. The ARRI LF and Sony VENICE have approximately a 1.5:1 full format sensor. The Panavision DXL and RED Monstro 8K (and Canon C700 FF) have a 1.9:1 full format sensor. With all these sensor sizes, 1.65x retains as much of the native resolution as possible while maintaining the anamorphic look of 2x. Largely, it worked out this way because we don't use spherical components to correct the focus. We use cylindrical correction to accommodate focus and as a result the lens tends to maintain a more anamorphic look. Another reason we targeted the 1.65x squeeze is due to something called the Renard Series (a system of preferred numbers). We considered the squeeze ratios of the various anamorphic lenses Panavision offers. These are Ultra Panatar with 1.3x squeeze, Ultra Vista with 1.65x anamorphic squeeze, and traditional 2x squeeze anamorphics. The Renard Series points to

a 1.2x progression from one format/aspect ratio to the next. This progression translates into a series of anamorphic lenses that have their own unique characteristic and identity. Each series does not walk over each other and there are certain technical attributes that uniquely separate one lens series from the other.

We also are noticing that aspect ratios are fluid lately. More OTT streaming shows are requiring 4K distribution. With the 1.65x squeeze, we can give someone a 1.76:1 aspect ratio and still maintain 4K. A good example would be the current series *Homecoming* which switches back and forth from 1:1 square aspect ratio to 1.76:1 (16:9) throughout show. I'm noticing that more and more.

Another example is Marvel using the 1.9:1 aspect ratio as its base delivery format. It is worth noting that anamorphic does not necessarily mean a 2.40:1 aspect ratio anymore. Anamorphic lens technology has many valuable attributes that give a cinematographer the power to negotiate through various aspect ratios with maximum fidelity. This new class of large format sensors has made it possible for anamorphic to have a technical as well as an artistic advantage over its spherical equivalent in the digital arena.

MICHAEL: The Ultra Vista lenses are a cool twist of arithmetic and in a league of their own. If you use the 1.77:1 area within the 1.9:1 sensor of DXL2, and then shoot with 1.65x squeeze anamorphic Ultra Vista lenses, you get a 2.76:1 desqueezed aspect ratio. You can use 92% of the entire sensor, and are able to distribute in Ultra Panavision 2.76:1 format at 7.5K. Furthermore, you're getting another 60% magnification factor because of the large format anamorphic. So, the big sensor and the big resolution and the big squeeze all add up to something completely different.

And it's an optical characteristic people really notice. Every time we show a demo of all our lenses, when they see the Ultra Vistas, they ask, "What's that?" There's something about them that stands on their own that's probably the combination of all the things we talked about.

Above and previous page: 4K framegrab from Panavision Ultra Vista lens test, with model Aubrey Cooke. Available light with DXL2. Light Iron Color2 Film LUT with no additional correction.

JON: How would you explain the differences technically, and also in look, between the Ultra Vistas and Ultra Panatars?

DAN: The primary trait of the Ultra Panatar lenses is they have a 1.3x anamorphic squeeze and basically use the entire large format sensor area or motion picture film aperture. Although they possess a weaker anamorphic squeeze, they still provide the visual attributes that are anamorphic. The Ultra Panatars still produce the anamorphic lens flares, the unique vertical breathing, and convolved out-of-focus bokehs.

The focus decomposition (the unique quality that an anamorphic lens de-focuses versus a spherical lens) is less than that of the Ultra Vistas. This means that the disproportionate focus fall-off of the Ultra Panatars is not as abrupt and significant as the falloff associated with the Ultra Vista lenses. For example, the elliptical out of focus cues are not as exaggerated. The depth of field of the Ultra Panatars appears to have a less full anamorphic characteristic, yet the qualities of the image definitely do not look spherical. The Ultra Vistas, on the other hand, have a 1.65x anamorphic squeeze which is about 1.2 times more squeeze than the Ultra Panatars. Ultra Vista anamorphic lenses yield more deliberate anamorphic out-of-focus and depth cues than the Ultra Panatar optics.

Now if you apply that mathematically to the DXL, for the first time since digital cinematography came about, anamorphic now has a technical advantage over its spherical counterparts as well as an artistic distinction.

This is the result of the multiplication factor of Ultra Vistas when it is leveraged with the high magnification and the sheer amount of pixels associated with larger format sensors. Ultra Vistas have a compression (magnification) factor that is about 2.5 times more than their native spherical Super35mm counterpart. So, if I'm doing my master wide shot on a 27mm lens in the Super35 format, compare that to the DXL large format where I'd be using a 67mm Ultra Vista lens to get the same field of view. It's kind of crazy when you think about it.

Considering magnification and out of focus cues, Ultra Vistas are a 1.2x greater step up from the Ultra Panatar lenses. You are going

to share the familiar attributes of the anamorphic flares, the vertical breathing, but with a higher intensity.

The next step in the series (Renard) would be 2x squeeze anamorphic optics, which would be the next mathematical step in the progression. A casual viewer may not see the differences independently. But as Michael said, if you see them in relationship to each other during a demo test, those differences will actually stand out on small television sets or monitors. Each series has incrementally different amounts of anamorphic feel and personality built into them that are familial yet possess their own characteristic that is unique to their brand.

MICHAEL: At this point, it's worth talking about what happens when the content ends up on a Smartphone. I often hear cinematographers, content owners, directors and producers having concern that it's not worth shooting large format because you can't notice the benefits when it gets to the phone. But the fact is, that's not an accurate assessment of how display pipelines work. The most important thing about this entire subjects is that all the optical properties we've discussed here are resolution independent.

Virtually the only thing you can't see on a phone is how many stitches are in the blanket in the shot. That is pure resolution, which admittedly very few people are after. But magnification, field of view, depth of field, distortion, physical distance between subject to lens and subject to background, all of those are relevant at any scale and at any resolution. Glare, spherical aberration and color, of course, all translate to any resolution at any scale. Sometimes people think it's not worth spending the extra dollar for the good stuff, but honestly it all translates and it makes a difference. I think what Dan's doing with his team is taking lenses to the next level and DXL takes cameras to the next level and all of these qualities can even be experienced on a phone.

We have to work harder to make sure that our unique characteristics translate. That's why we talk about 8K from its magnification properties and detailed clarity properties, not in its resolution or sharpness. I don't think you'll find a quote anywhere of me talking about sharpness as an advantage. I talk about 8K and large

"aggregate aberration accumulation"

format as workflow and creative tools. And, partnering optically with the Ultra Vistas, these are among the best examples of what all of these things together can achieve.

JON: Earlier, you mentioned the five lens characteristics that contribute to the look. What are they?

DAN: I guess for lack of a better word, we call them the "five tenets" that viewers tend to see. You don't have to have a technical degree in optical physics. These are all unique characteristics that you can recognize regardless whether you're watching on a 50-foot screen or a 4-inch smartphone. *Flare, glare, bokeh, spherical aberration* and *color* are the things that will separate brand A from brand B in an optics/camera/post-production combination. Let's not forget that post has a large provenance in the overall look. If I were to take a picture and add a sepia tone to it, we instinctively tend to think of it as antique, something from the past. Color has a very big influence. We don't want to define look strictly by the lens only. It's an entire infrastructure of the whole imaging chain.

MICHAEL: I would also add also add magnification factor, because when you use large format and you get a different geometric relationship between subject, camera and background, that geometrically translates as well to the phone.

JON: Dan, as Panavision's "lens sommelier," what are the 10 different varieties of lenses that you are "pouring" at the BSC Expo Panavision Lens Bar?

DAN: Well, to continue your wine vocabulary, perhaps a Pinot-like Primo 70, or a well-rounded Ultra Vista. The System 65 comes from an excellent year, as do the Sphero 65, the H Series, the Ultra Panatars and the Artiste lenses. We have the new, expanded 2x squeeze anamorphics that cover full height of the 5:4 full format sensors. There are modified PanaSpeeds, and something else I think we might introduce at BSC—we call them the Vintage 65 Spherical lenses.

JON: What are the 2x anamorphic full height lenses that you just mentioned?

DAN : Our 2x squeeze anamorphic lenses for Super35 were traditionally based on the Academy aperture or sensor height, which is about 18mm. Now, with the new class of sensors, the image height ranges from 20mm to 25mm high. So, we had to redesign our anamorphic lenses to cover up to 25mm height. Basically, it's a redesign or a re-spin of our existing 2x squeeze anamorphic inventory to cover the full height typical of the full format cameras like the LF, VENICE or the DXL.

JON: Do you have to build these lenses from the ground up?

DAN: In most cases, we actually take the existing lenses and modify them. We've modified the optics, rescaled the focus and rebranded the lenses to reflect their new iteration.. It was kind of a partial redesign, but it wasn't from the ground up. And we are always working on additional new lenses.

JON: I noticed that you also carry Tokina Vista Primes as well?

DAN: We like Tokina's design philosophy and we started renting them. They chose a fairly traditional design form that utilizes a type of free form design to reduce the aggregate aberration accumulation. I liked the Tokinas because they based a lot of their design philosophy around known tenets that offer very strong artistic qualities without being too crazy. I think Dr. Aurelian Dodoc of Leitz Cine said a similar thing: it's relatively easy to make a technically perfect lens. It becomes very difficult to make a lens that provides an artistic look because you're actually making an imperfect lens that has an attractive appeal to it.

JON: Do the Tokinas retain their native PL mount or do you rework them with an SP70 lens mount for the DXL2 camera?

MICHAEL: Right now, all of our Tokina Vista Primes are out on jobs. We're using them with their PL mounts. There might be a possibility that we fit them with SP70 mounts later on. But we already have the SP70-to-PL mount adaptor that's very easy for customers to use. They can shoot with the Tokinas and Primo 70s on the same job. That's another change in cinematography recently. DPs are switching lens series within the same job a lot more than they ever used to. When Dan and the engineering team came up with the SP70 mount and adapters for the PV, PL, and other lenses, it became incredibly handy. We used to have to change the physical mount on the camera every time we changed a physical mount on the lens. Now it's just a mechanical adapter.

I think that is another example of DPs looking for their own recipes. I'm proud to have these new Tokina Vista Primes working on the DXL2. These lenses are a good example of how the cinema lens market is widening with new contributors, and you know I believe that change is super healthy. It is an indication of how fast the large format market is exploding. That's another healthy change to our market.

JON: Do users mostly prefer to have the SP70-to-PL adapter on the camera, or do they prefer to have an adapter on each lens?

MICHAEL: Usually on the camera—so you need fewer adapters.

JON: Dan, I remember when we were talking this time last year and making grand predictions about where the business was going and where you saw full format compared to Super35. How has that changed this year?

DAN: We're seeing more and more traction of full frame format. But what's interesting, and I really didn't see it coming, was the domination of demand for full frame anamorphic.

I think it has a lot to do with the fact that anamorphic has such a unique look. For example, if I put any of the well-corrected spherical lenses on a digital camera, they would pretty much start looking the same. Many spherical lenses from 1980 to present, whether Master Primes, Super Speeds, Primos, or Primo 70s, have compression artifacts that look similar. If I do the same exercise with an anamorphic lens, the qualities associated with out-of-focus bokeh, flare, glare, and color are uniquely different. As a result, I am noticing a lot of cinematographers are gravitating towards full frame anamorphic.

I have observed many cinematographers like the fact that the unique magnification of large format really sends a message, and this process is even more prevalent with large format anamorphic. This trend is beginning to dominate the way movies are shot and viewed. I had underestimated the power of anamorphic and its relevance in full frame cinematography. I figured that the magnification changes associated with full format spherical, by themselves, would have driven the direction of large format cinematography. Instead, I'm seeing a shift where large format, coupled to a variation in anamorphic optics, manipulates the five tenets in a very unique manner and is becoming a very popular choice among cinematographers.

Within the last one to two years, the proliferation of spherical full frame has most definitely grown, but it's almost become commoditized. The anamorphic proliferation has increased exponentially. We're seeing a rebirth of anamorphic photography and cinematography, something similar to the 1970s when there were more than 80 different varieties of anamorphic lens manufacturers or processes.

Tak Miyagishima made a list of all the different types of anamorphics that were available, including all the CinemaScope derivatives: from Adhi Scope to Yangtze Scope, with Superscope, Panascope, Pariscope, Technovision, Todd-AO and Toho-Vision along the way. You can see more than 200 variants by googling and going to the glossary of *Gary Palmer's Widescreen List*.

MICHAEL: That's when anamorphic was used to overcome the grain and limitations of 35mm film at a lower cost than 65mm film.

DAN: Michael brings up a good point: anamorphic had a distinct technical and financial advantage, but then it slowly died out through attrition. Lately, I've noticed how anamorphic is gaining ground again, not only because of its technical attributes, but mostly for its artistic qualities and its unique imaging characteristics. Couple anamorphic with large format, and for the first time since digital sensors came out, anamorphic again has a technical advantage over its spherical counterparts. There's no right or wrong way to make anamorphic lenses. The net result comes down to really cool artifacts that cinematographers seem to grab onto and really take notice.

MICHAEL CIONI: Something I noticed in the last year that also changed was the question about resolution. It's no longer a taboo subject. I think it shows the market maturity and understanding. 2018 was a year where everybody has gotten onboard 4K and higher, and we're all headed in the same direction. Even in the consumer electronics market, you can't even buy an HD TV anymore if you wanted to.

4K carries very well to smaller monitors. HBO, Netflix, Amazon, and other entities have embraced anamorphic. Originally, you couldn't shoot anamorphic for episodic unless you got specific permission, or the most you could go was 2:1 aspect ratio. Now that's changed, and I think we have the mobile platforms to thank for opening up those floodgates.

JON: Back at the Panavision Lens Bar and Lens Test area at the BSC Expo, what else can we expect?

MICHAEL CIONI: This year's Lens Bar is the first time we show tests simultaneously on four 55-inch 4K monitors. It's a video wall that compares 4 lenses, one on each monitor. Our hope is that users take a moment to watch the lens tests and then go to the Lens Bar and discuss their own "wine pairings," recipes or mixology. All our lenses are represented at the Lens Bar, so users can test, hold, inspect and ask questions. Panavision lens experts are there to answer specific questions.

We are also showing improvements to our recent /i lens metadata adoption and other things that help improve the lens on the workflow side of things. The DXL did not support /i a year ago, but now it does. At Panavision, we are very focused on the entire imaging chain. And so much of it starts with lenses.

Tokina Vista Primes

Planning for the Tokina Vista Primes began in 2013. During the early stages, Ryan Avery, VP of Formatt KT America and Tokina Cinema products, met with cinematographers to get feedback. He also came up with the name: Vista Primes. From the beginning the lenses have been designed to cover beyond Full Frame and cover the RED 8K VV sensor (46.7mm image diagonal) that was introduced in June 2015. The image illumination of the longer focal lengths covers the 5K image area of the Alexa 65 camera that was introduced a year earlier, in September 2014. The lenses came to market a year later, in 2016.

The principal lens designer for the project at Tokina was Nobuo Seki. We corresponded with Mr. Seki via Ryan Avery to learn more.

Jon Fauer: Why did you decide to design Full Frame cine lenses instead of Super35?

Nobuo Seki: We believed that Full Frame would continue to gain popularity.

When did you first begin thinking about these lenses?

Spring 2013

What was your concept, technically and artistically?

The technical concept was to have a good balance of higher performance lens specifications. To be more specific, these specifications included: no breathing, covering the large sensor cameras, high resolution, low distortion, low chromatic aberration, T1.5 for all lenses in the series, 300 degree focus barrel rotation, and interchangeable lens mounts. The lens markings are easily visible in low light because of the special paint color we used on the barrels.

In summary, the Tokina Vista Primes were designed to be rugged, easy to use and of the highest quality.

Artistically, the concept was that the image should have a pleasing and slightly warmer look.

There is almost no breathing. How did you achieve this?

We have a proprietary optical design to minimize breathing.

In designing and building the Vista Primes, what were some of the challenges?

The big challenge was to use new materials, new types of glass and aspherical elements that needed a lot of trial and error until we were satisfied.

With the Vista Primes, what are the things that you are most happy about?

We are very pleased that customers appreciate the concept of our design and the quality.

Did you imagine that Full Frame was going to become popular for cine when you planned these lenses back in 2013?

Yes, we did. Increasing the sensor resolution (number of pixels) to 4K and 8K was a trend we saw early on. The larger Full Frame sensor helps to improve the image quality and is especially helpful in low light. It also has a pleasingly shallow depth of field and a natural looking magnification. The high resolution contributes to the look of the image. So, back in 2013, we naturally believed that Full Frame cameras would become popular for cinema.

tokinacinema.com

Preston Light Ranger 2W

LR2W
Prototype

Preston Cinema Systems will be showing their Light Ranger 2W prototype at BSC Expo. Focus Pullers will be shouting with delight: "A lighter, smaller, game-changing, essential focus helper."

LR2W is a wide-angle, 48 degree version of the existing LR2, which covers 18 degrees. You will want both. LR2W is great for wide angle shots, for example when the sheriff shoves open the saloon's swinging doors and walks into an ECU as he confronts the bad guy playing poker in the foreground. When not shooting Westerns, you'll be happy to have LR2W on Steadicam, gimbals, handheld and for any scene where the action is wide and distance is up to 40 feet.

Think of these two Light Rangers the way you consider a wide angle or medium telephoto lens. You'll want the regular LR2 for tighter shots and those impossible single-take shots that Gods of Focus eloquently love to recall: speeding car, far away, 200mm lens, drives straight toward camera.

The new 48° LR2W is the ½ the height and 25% lighter in weight than the current 18° LR2. Production models will have black IR filters over the lenses. And, of course logos and graphics.

Preston Cinema Systems LR2W will be available this Spring.

prestoncinema.com

Sony's Atsugi Technology Center

The Sony Atsugi Technology Center sits on about 25 acres next to the Sagami River in Kanagawa, Japan. It's a 1 hour ride southwest of Tokyo. I take the subway to Shinjuku Station. It's rush hour. Locals call it *sushizume,* like sushi in a bento box, also described as 198% congested, which means "can barely read a folded newspaper." No wonder everyone is reading on smartphones.

Yutaka Okahashi has kindly offered to meet me at Shinjuku. Otherwise I would never have found the required Romancecar of the Odakyu Electric Railway. It's reserved seating, an oasis of calm, and named "Romancecar" because of the double seats that don't have armrests to separate passengers. The train services the resorts of Hakone, a gateway to Mt. Fuji, Gotemba and the beach resorts of Odawara and Enoshima. Romancecar trains started running in 1957. They had the world speed record of 90 mph.

The Sony Atsugi Technology Center opened a few years later, in 1960. This is where Sony Atsugi engineers devised Electronic News Gathering (ENG) in 1971. The single operator video camera was developed in 1982, replacing traditional 3-person news crews. The digital VTR was launched here in 1987. In 1989, Atsugi developed SDI. Standard Definition was replaced by many iterations of HD equipment from the mid 80s to 90s. Non-linear digital came in 2000.

Cinealta digital cine cameras were born at Atsugi in 2000 with the HDW-F900 (HDCAM tape, 24p, three-chip, ⅔″ CCDs). It was used by George Lucas on *Star Wars Episode II*. The CineAlta logo was designed in the same year by Hiroki Oka, Chief Art Director at Atsugi. F35 was Sony's first Super35mm, PL-mount, single-CCD Cinealta camera came in 2008. Next came a rapid succession of digital cine cameras: F3 (CMOS, Super35, FZ mount, SxS cards) in 2010; F65 (S35, PL mount, SRMemory) in 2011; F5 and F55 (S35, FZ mount, SxS and AXSM) in 2012.

And then came VENICE, the camera that changed everything in 2017. That's the reason we're here in Atsugi: to visit the team that developed, and continues to support, the Sony VENICE camera.

Sony's Atsugi Technology Center, cont'd

Members of the Atsugi team who designed Sony VENICE. The cameras are manufactured at the Sony Kosai factory, 235 km further southwest.

The studio in Atsugi where cameras are tested.

The Panavised F900 that shot *Star Wars Episode II.*

Yutaka Okahashi, Product Planner of VENICE, in the studio.
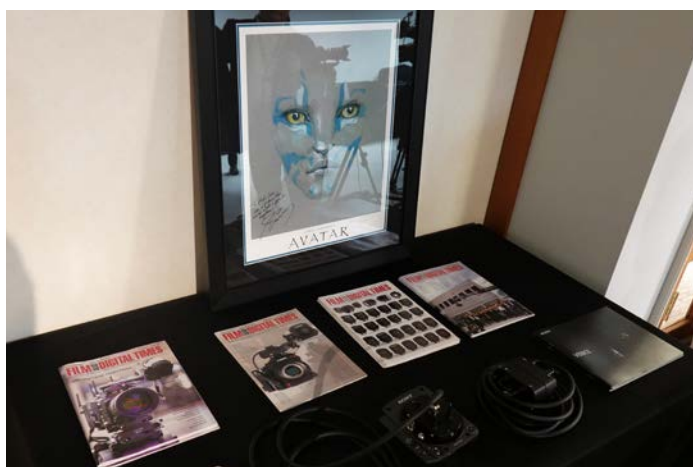
FDTimes in the studio and *Avatar* poster. *Avatar was* shot with Sony F23.

Sony's Atsugi Technology Center, cont'd

Sony Digital Cinema 4K Theater in Atsugi.

With Masato Aizawa in the projection room.
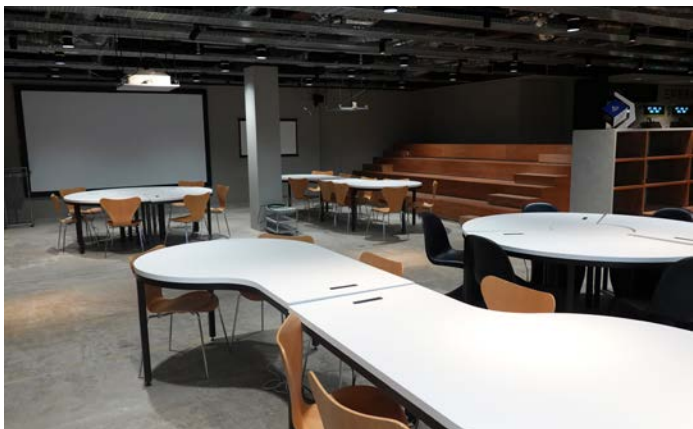
Atsugi creative collaboration space.

Creative Space workshop with 3D printers, laser cutters, high tech tools.

Pegboard paradise.

Lunch time in the Atsugi Cafeteria.

Food is charged according to electronic chips in the bottom of plates.

Lunch with the Atsugi VENICE Team.

Crystal LED Display System

Above: 3200 x 1800 CLED with Toru Suzuki, General Manager of CLED Business Office.

At the entrance lobby of the Atsugi Technology Center, a large area is devoted to Sony's Crystal LED (CLED) Display System. They are made up of modular 403 x 453 mm panels that are tiled together to create various sizes. Alignment is achieved with X-Y-Z plots.

Each microLED pixel is only 0.003 mm² in size, measuring about half the thickness of a human hair. The display system is 10-bit HDR and 120 fps. Brightness goes up to 1,000 nits and the contrast ratio can be 1,000,000:1. It is scalable in size (and therefore resolution). A huge 8K x 4K Crystal LED wowed the crowds at InterBEE in Chiba in the days that followed (shown below).
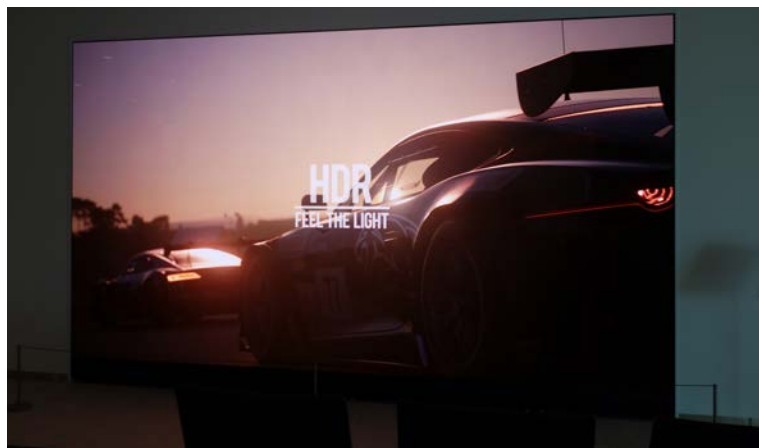
Designing Full Frame VENICE

We now came to the high point of the visit: a meeting mechanical, styling, electronic and software engineers who designed VENICE at the Sony Atsugi Technology Center.

JON FAUER: How did you come up with a design and the shape for the VENICE camera? It has a nice shape.

SONY Engineers: Usability was a top priority. We had a lot of discussions with cinematographers. Then, incorporating their feedback, our designers who specialize in styling proposed shapes based on aesthetics and artistic characteristics. That was done concurrently with many discussions among the mechanical and electronic engineers.

Was the E-mount part of the design from the beginning?

No. Not in the beginning.

If I remember correctly, in the beginning it was just a PL mount. And the E-mount came later.

Originally, the VENICE design used the FZ mount of the F55. The reason was that we had a few FZ lenses. Also, some vendors were supporting FZ with lens mount adapter kits. So, our original VENICE plan was an FZ mount with adapters for other lens mounts. But, simultaneously, the Alpha 7 and its E-mount ecosystem was a growing rapidly and gaining great market share. The E-mount lenses had an advantage of being among the smallest and lightest available. When we decided to use a Full Frame sensor in VENICE, the best match was our E-mount and that is how we chose it in the development phase.

The E-mount was a good decision. With its very short 18mm Flange Focal Depth, it allows users to have lens mount adapters to work with almost every lens mount and depth.

Additionally, the FZ mount had some advantages, but also disadvantages. FZ has a 19mm Flange Focal Depth, so it's difficult to fit E-mount lenses. The FZ mount has a breech lock system: strong and tough. But many customers preferred a more secure mount, especially for large or heavy lens like the Angenieux Optimo 12x zoom. So, with VENICE we have the native E-mount with a lever lock. And around the outside of the E-mount, we have six screws to attach additional lens mounts. These are solid lens mounts, not adapters. VENICE ships with a PL mount.

I don't think PL will be the standard forever and we are entering an era now where cinematographers are using all kinds of different lenses and mounts on the same show. The fact that you have the E-mount as the base is a great idea because you can move out from there. DPs can use not only Sony E-mount, but also RF, L, Leica M, LPL, EF, F, Panavision SP70, PL, PV, XPL, and so on. VENICE is very versatile.

The E-mount with lever lock design originated with our FS7 II

(PXW-FS7M2) camera. There are many lens mount adapters for the E-mount, but as we mentioned earlier, customers asked us for a more robust system on the VENICE. Now, they have a choice: E-mount adapters or direct mounts with six screws.

I have a question for the software engineers. What does the software control?

Software controls three layers of overall functions on VENICE. One is Device control. That's like a device driver for a personal computer. The second function of software is middleware control, which is like a file system for camera control and picture control. And then there's Application control. Application control is what shows you the menu on the LCD, in the viewfinder and on output, for example, external monitors. Our software engineers worked on many kinds of layers of the software within the camera. So, VENICE is sort of like a small computer that takes beautiful pictures.

Also, the software works in two different timings. One is synchronized timing with each video frame. For every frame, the software works for the camera system. As for media control such as recording stream, it works in unsynchronized timing.

In recording, what's the difference between X-OCN XT, ST, and LT?

X-OCN is short for "eXtended tonal range Original Camera Negative." It is a codec that combines 16-bit linear encoding at bit rates that are much lower than you might expect. Used with the Sony AXS-R7 portable memory recorder, X-OCN gives you image quality comparable to F55RAW, but with file sizes that are much smaller. You get longer recording times, faster file transfers and more affordable post-production.

With X-OCN, settings like exposure index, color space, LUTs, gamma and log are not "baked into" the file. X-OCN treats these as monitoring settings.

VENICE has 3 varieties of X-OCN. X-OCN XT is the highest quality recording mode and it still provides reasonable file sizes comparable to F55RAW, making the workflow affordable and efficient. It is even better than F55RAW in terms of picture quality.

The other X-OCN varieties are X-OCN ST (Standard) and X-OCN LT (Light). With X-OCN ST, the files are around 30% smaller and X-OCN LT achieves an incredible 60% file size reduction over current F55RAW files.

Please tell us more about the VENICE Extension System where you separate the Sensor Head from the Camera Body.

Our CBK-3610XS Extension System works with any Sony VENICE. You don't have to purchase a different camera. It lets you separate the image sensor, with its lens mount, from the camera

Designing and Deconstructing VENICE

body. To set up the Extension System, we separate the sensor / lens mount head from the VENICE body by unscrewing the four 3mm shiny hex screws in front. Attach the sensor / lens mount rear protective cover. Attach the body / recorder cavity cover. Connect the tether cable. It takes about a minute.

How long would it take to deconstruct the entire camera to its core?

About five minutes.

Five minutes? You're joking.

I should not have said that. Engineers do not joke about such matters. Sure enough, in the next five minutes, Sony mechanical engineer Hitoshi Kawabata proceeded to take the VENICE totally apart. Like they say in the car commercials, "Do not attempt. Professional Sony Engineer on a closed track who also knows exactly how to put the camera back together again."

Deconstructing VENICE, cont'd

Sure enough, five minutes later, Mr. Kawabata has disassembled the VENICE camera down to its core magnesium skeletal structure.

Above, from left: Hitoshi Kawabata (Mechanical Designer); Takahiro Kagawa (Marketing); Yutaka Okahashi (Product Planner); Katsuya Kondo (Product Designer); Shuichi Akazawa (Product Designer); Shigeki Yamaoka (Software Designer); Yuuji Ooba (Product designer); Yuya Ono (Mechanical designer); Kenichiro Aridome (General Manager, Design Dept.)

But next, they have to put the camera back together again. Secrets of the pros: use a paper plate to gather all the screws. Use a paper cup when you want to move those screws to another room for reassembly.

Sony VENICE Firmware Update 4.0 — 120 fps!

Coming soon to a VENICE near you: 120 fps in 4K 2.39:1, 60 fps in 6K 3:2 Full Frame and lots more.

Sony VENICE continues to catch the attention and imagination of filmmakers worldwide. It is working on many features, commercials and television productions. Full Frame is gaining traction as almost every lens manufacturer rolls out an increasing number of Full Frame lenses.

Firmware version 3.0, planned for February 2019, arrived on time and is available now as a free update.
pro.sony/ue_US/support/software

The VENICE Extension System is already working as non-serial models on undisclosed major productions and will soon be available to everyone, as announced, by the end of February.

The big news, what everyone has been clamoring for, is 120 fps.

Sony now announces VENICE Firmware Version 4.0. It will be available in June, 2019.

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

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

Note, 120 fps in 2K was announced at CineGear 2018. It will not be implemented because the engineers worked real hard and were able to manage 120 fps in 4K. There's a Starbucks on the main floor of Sony's Atsugi Technology Center, and perhaps extra caffeine helped the VENICE engineers in this pursuit. Coming up two pages from here: we'll visit Atsugi.

All of the High Frame Rates (except 6K 50/60p) support X-OCN recording, including X-OCN XT implemented in Version 3.0.

High Frame Rates up to 60 fps support XAVC 4K/QFHD and ProRes recording.

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

Free Version 4.0 features

Version 4.0 will come with these features at no cost:

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

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

VENICE Roadmap as of February 2019

	V1.0	V2.0 (July 2018)	V3.0 (Jan 2019)	V4.0 (June 2019)
Imager modes	4K 17:9 4K 16:9 4K 4:3 Anamorphic 6K 3:2 Full-Frame recording (without in-camera playback) When VENICE is set to 6K Full-Frame, SxS recording is not available	4K 6:5 Anamorphic 6K 1.85:1 6K 17:9 6K 3:2 (In-camera playback) When VENICE is set to 6K Full-Frame, SxS recording modes are supported	5.7K 16:9 6K 2.39:1	
High Frame Rate				Speeds up to: • 120 fps in 4K Super35 2.39:1 (4096 x 1713). • 60 fps in 6K Full Frame 3:2 (6048 x 4032). • 72 fps in 4K Super35 4:3 for full 18mm height anamorphic (4096 x 3024). • 110 fps in 4K Super35 17:9 (4096 x 2160)
Lens mount support	PL lens mount (with ARRI® LDS and Cooke® /i™ technology)	E-Mount (lever lock type)	VENICE Extension System end of Feb.	
Recording formats	16-bit RAW with AXS-R7 16-bit X-OCN with AXS-R7 XAVC® 4K/QFHD* MPEG50* *When camera is set to 4K mode	Apple ProRes	X-OCN XT 47.952 project frame rate (4K 4:3 and 4K 17:9)	All High Frame Rates (except 6K 50/60p) support X-OCN recording, including X-OCN XT implemented in Version 3.0. HFR up to 60p supports XAVC 4K/QFHD and ProRes recording.
Simultaneous Recording combinations	RAW/X-OCN & MPEG50* XAVC 4K/QFHD & MPEG50* *When camera is set to 4K mode	RAW or X-OCN & ProRes	XAVC 4K/QFHD & Apple ProRes (Proxy only) RAW/X-OCN & XAVC 4K/QFHD	
Shooting functions	Variable White Balance (100K increments) Tint color correction control Relay rec. (SxS)	Select FPS (Off Speed) Dual Base ISO mode: 500 and High Base ISO 2500	Cache Rec. (AXS, SxS)	RM/RCP control (Including paint)
Monitor Out functions	OSD on Black MLUT on Playback Independent MLUT On/Off (one preset) Double speed VF Two OSDs and two Markers selection 4K-SDI output in RAW / X-OCN recording	Independent MLUT select (several presets) MLUT in Off-speed shooting User 3D LUTs (install user-generated 16 or 33 cube files) Preset LUTs for S-Gamut3.cine/S-Log3 and S-Gamut3/S-Log3 with EI applied	Anamorphic De-squeeze ratios: 1.25x, 1.3x, 1.5x, 1.8x in addition to current 2x 6G / 12G-SDI .cdl file import 4K SDI output during RAW & HD Video simultaneous recording	Pure P HD-SDI output in 25p/29p
Shooting Assist functions	Digital Magnification in viewfinder Highlight Clip Indicator	Look Around (Surround View) High Resolution Magnification Auto White Balance High-Low Key False Color (use B button on DVF-EL200 viewfinder)	VENICE VF function control in EL200 SxS XDROOT Folder and Volume name changing to CamID+Reel# False Color (SDI Monitor) 2:1 Frame Line preset	Line+Mask Frame Line
Hardware	Go to: www.sony.com/VENICE	Inside Clips Button	12-pin lens remote	S700 Protocol
Network functions	–	Wired LAN control (basic functionality)	Wireless LAN control (CBK-WA02) Wired LAN control (full functionality)	

This roadmap, its features and timing may change.
New functions may pop up at any time.
Roadmap courtesy of Sony.

Vanja Černul ASC HFS on *Crazy Rich Asians*

Photo:
Sanja Bucko

JON FAUER: How did you get started on *Crazy Rich Asians*?

VANJA ČERNJUL, ASC, HFS: I shot two seasons of the Netflix series *Marco Polo* in Malaysia. Tim Coddington, the line producer on *Marco Polo*, got involved with *Crazy Rich Asians* right after we finished the second season. I was prepping a film in Prague when Tim called and asked if I was interested in meeting director Jon Chu about this film. I think we clicked right away and I got really excited when Jon said he wanted to elevate the style visually. That's how it started.

How did you decide on the camera?

We were considering a large format camera initially. I knew from my previous experience on *Marco Polo* that the weather in that part of Asia dramatically changes throughout the day, especially during the monsoon season. We had to move around quickly with a large cast who had to look their best and were dressed in amazing costumes all the time. You can imagine that the heat, humidity and daily storms weren't going to be helpful. We had to be able to quickly adjust to the reality of our locations.

There were 38 locations in 42 days in 2 different countries and 4 different cities. It was also important to capture and heighten the beauty of all the landmarks in Singapore at night without really being able to light too much.

I discovered VariCam on my previous experience on the TV series *The Deuce* for HBO. I was looking for a low-light camera for *The Deuce* because most of that show was going to be shot on locations in New York City at night.

I tested the VariCam against other cameras and I was impressed

with the flexibility that the dual native ISO was offering. It gave me freedom that I didn't have before.

When I started to realize the magnitude of all the challenges we were going to face in production of *Crazy Rich Asians,* I became convinced that a small and flexible camera like VariCam was the right tool for the job.

As for lenses, I used Hawk 1.3x squeeze anamorphic lenses. An anamorphic look was important to us but we didn't want to crop the image and lose resolution, which we would have to do if we had gone with full 2:1 anamorphic lenses. That suggested using the Hawk 1.3x anamorphic lenses I knew well from previous jobs. The VariCam has a Super35 17:9 (1.89:1) sensor and in combination with 1.3x Hawks we got the anamorphic look we wanted, the flexibility of the native dual sensitivity sensor and the desired aspect ratio (1.89 x 1.3 ≈ 2.39:1).

Where did you prep *Crazy Rich Asians*?

We had a very condensed pre-production schedule in Malaysia where we shot most of the film. We shipped the cameras from TCS in New York to Kuala Lumpur and prepped everything there. The camera rental house Cinerent from Kuala Lumpur helped us with local support and additional equipment.

Which lenses did you have in your package?

We had the full Hawk V-Lite 1.3x prime anamorphic set and two V-Plus 1.3x anamorphic zooms. We mostly used the primes. We tried to stay on wider focal lengths because we wanted to have the environment present at all times. Even the close-ups were shot with the 32 and 40mm. We only used zooms sporadically.

Photo: Sanja Bucko

It looked great. After seeing this film, some DPs who might have been hesitant about 1.3x squeeze anamorphics will be very encouraged by your exquisite anamorphic look, shallower depth of field, nice oval bokehs…

I wish more of us cinematographers were using 1.3x anamorphic lenses.

Which VariCam did you have?

We used the Panasonic VariCam Pure. It had just come out. I believe we were the first feature film shot with this system. Actually, that was also a little bit of a leap of faith, but everything worked beautifully. I shot another feature in Canada with the VariCam Pure right after *Crazy Rich Asians* because I loved the combination of VariCam's sensor and Codex 4K RAW recording.

Did the VariCam Pure have 1.3x anamorphic desqueeze in the viewfinder?

Yes, it's built in.

How many camera bodies did you have?

We had three bodies. We had two camera crews and the third body was a back up. We used three cameras only on big scenes at the end of the film.

Did you have a DIT?

Yes. I couldn't bring many people from the U.S. with me. But the one person I decided I really needed was our DIT from New York, Matt Selkirk. I needed an experienced DIT because I just didn't have a lot of time to experiment and I wanted to shoot the film in ACES color space. The key for correct color management from the

set to final color grading is in pre-production. I normally take the time to do proper tests and establish the communication between DIT, colorist and all the other people involved as early as possible.

Adjusting and fine-tuning the LUT to the lenses, lighting gels and set design is very important. Once I have a bulletproof LUT, I light and expose all the material for it specifically. If this part of the process is done correctly, the time in final color grading can be spent on creative work rather than on fixing inconsistencies. This ensures that the original ideas aren't lost in the process. We had a very condensed pre-production schedule and I didn't have enough time for much testing. Luckily, Matt had just worked with ACES and was familiar with the VariCam. Thanks to his strong experience we were ready on day one.

At what ISO did you rate the camera?

Once we had the LUT, we tested it under different ISO settings and decided that the range between 800 ISO (from 800 Base) and 2500 ISO (from 5000 base) was right for the look we were going for. This was the first time I used the VariCam for a theatrical release so we found a large screen in Kuala Lumpur to view all our ISO tests. The beauty of this technology is that it made me comfortable switching to different ISO settings even within a single scene, without noticeable change in texture. It was liberating not being held hostage by light levels from practical sources.

Most of the film was shot at 2000 ISO. I went to 2500 only when I really needed a little extra exposure like in the big reception scene towards the end of the film that took place in one of the major landmarks of Singapore, Gardens by the Bay.

The day exteriors were shot around 800 ISO.

Photo:
Sanja Bucko

Frames above and below © 2017 Warner Bros. Entertainment Inc. and RatPac-Dune Entertainment LLC

Vanja Černul on *Crazy Rich Asians*, cont'd

Please explain dual ISO of the Panasonic VariCam.

There are basically two native ISO settings: 800 and 5000. You can adjust the gain above and below these ratings. I love the texture at 5000 ISO which produces something called shot noise. That was a new phenomenon for me. Shot noise occurs at extremely low light levels and is not noise from the camera, but rather, it is photon movement. Sometimes, you might want that. If you don't want it, you can just overexpose by a stop and the noise becomes almost indistinguishable from the footage shot at native 800 ISO.

If you're shooting day exteriors, you're at 800 base ISO. And then you use ND filters?

That's right, to keep the maximum latitude. If I need to go above 1280 ISO, I normally switch to 5000 base ISO and then overexpose by dropping down to 2000 ISO—which is how I shot most of interiors and night scenes in the film.

Why did you shoot many of the scenes in Malaysia?

Shooting in Singapore is like shooting in Venice, Italy. There are a lot of restrictions. Getting permits takes time and the city is among the most expensive in the world. We shot in Singapore for only three weeks. In those three weeks, we needed to capture all the major landmarks and the atmosphere of the city. The rest of the film was shot in Malaysia. I knew a lot of local crew from our work together on *Marco Polo*. So, many of them worked on *Crazy Rich Asians*. The entire B camera crew was Malaysian. The rest of the crew was very international. Our key grip was Italian. The gaffer was English. We had a Croatian camera operator, a Belgian focus puller and a German Steadicam operator. It turned out to be one of those rare experiences that was pleasant and fun to shoot and it turned to be a successful film of huge cultural importance that exceeded everything anybody hoped for. It was not easy to make, but the camaraderie and good vibes among our crew made it truly enjoyable.

And camera moves?

We used a handheld camera and looser framing in the scenes that took place on locations outside of the Young clan's world of wealth and prestige. For the scene at the Hawker food center we wanted to capture the real atmosphere of Singapore's streets with a documentary style camera and used mostly existing, practical lighting.

In juxtaposition to those scenes, reflecting the traditional and strict order inside one of the wealthiest families of Southeast Asia, we used strong and almost geometrical compositions. We stayed on the dolly and lit those scenes in a more stylized way. We wanted a timeless and controlled look.

Were the interiors a studio or location?

We had only one scene in a studio. It took place in first class of the airplane at the beginning of the movie, because it was just impossible to get on a real plane. Everything else was on location. We found a great house in Kuala Lumpur that was literally falling apart. It was dangerous to walk in. The floor was not safe. Nelson Coates, the production designer, and the art department basically built an amazing set inside of that house.

We wanted the kitchen to have a more utilitarian look than the rest of the house. It was like the underbelly of this world where Eleanor Young, the matriarch, was pulling the strings, almost like a wizard behind the curtain. The kitchen wasn't a real kitchen. It was a space that we found and converted.

The rest of the house was lit mostly with practical lamps and small tungsten lights coming through the windows. We had to shoot the interior of the house day-for-night, so it was a big tenting job. You can imagine how in the tropics, once you close up all the windows and light with traditional tungsten units, it became very hot inside.

Jon wanted to cover the scene where the hero couple first walks into the house in one shot. So, I knew I needed to light it to give the actors and the director as much freedom as possible. This is where the low light capability of the camera helped because I didn't need big lighting units outside which normally would be 5Ks or 10Ks. They would make the set so hot that it would not be possible to work. So, practicals and smaller units were used.

I guess LEDs were not possible?

There just were not enough LEDs available in Malaysia at the time, so we had to work with what we could find.

What exposures did you work at?

The interior of the house was shot at 2000 ISO, wide open. We were at very low light levels. I always tried to be between T2 and T2.8. No matter how sensitive the camera is, I always want to shape the light, diffuse and gel it. As a result, a lot of light is ultimately lost. I was pretty much wide open the whole time.

Did you use any filters?

I used a ¼ or ½ Tiffen Black Diffusion FX filter on almost every shot. It's something I like to use when I'm shooting digital to take a little bit of that digital edge off.

In your credits, I see ASC and HFS. What is HFS?

HFS is the Croatian (Hrvatska) Society of Cinematographers. I am originally from Croatia but New York has been my home for 25 years. During that time I stayed connected with a lot of directors in Croatia who were also my friends and I shot some of their films and earned a place in Croatian Society Cinematographers.

Did you notice that Panasonic is coming out with a new mirrorless digital still camera with an L mount?

Yes. I look forward to testing that camera because I think it could be a great tool for previsualizing and scouting locations. I would imagine its sensor would have similar characteristics to the VariCam. Hopefully I could scout, take stills and then work with my DIT to find the direction I want to go with the LUT and color temperature. It could be very helpful.

Tell us about postproduction on "Crazy Rich Asians."

Our colorist was Stephen Nakamura at Company Three. The choice to shoot in ACES really paid off during final color grading. Working in ACES on the set is not easy. It forces you to be more precise with colors. You can see all the inconsistencies and all the problems in color balance and it just makes you work harder.

Matt Selkirk, our DIT, was fine-tuning the contrast and applied CDL corrections to every shot. We liked what the dailies looked like and then with Stephen Nakamura, who is one of the best colorists out there, the supervised part of the color grading only took five days. It was the best color grading experience I ever had. I saw the images that I was expecting to see, which doesn't always happen.

Cooke Panchro/i Classics including (65mm Macro)

The Cooke Panchro/i Classic family of prime spherical lenses provide the beloved vintage look of Cooke Speed Panchros with the benefits of modern housings, new optical elements, PL mounts, 270° rotation of the silky smooth Cooke cam mechanism focus barrel, and close focus.

They all have a front diameter of 110mm. Most have a maximum aperture of T2.2.

The 18mm through 50mm cover Super35 (31.5mm Ø). The 65mm Macro through 152 mm cover Full Frame.

The 65mm Macro Panchro/i Classic focuses up close to 2:1, as shown at right, shot with a Full Frame Sony a9 with Vocas PL to E-mount adapter.

Cooke Panchro/i Classic	T-Stop Range	Min. Marked Object Distance (MOD)		Close Focus from Lens Front		Angular Rotation to MOD	Rotation of Iris Scale	Length: Lens Front to Mount	Maximum Front Diameter	Total Weight	Maximum Image Coverage
18 mm	T2.2–22	250	9"	111mm	4.6"	270°	90	87mm	110mm	1.6kg	31.1mm
21mm	T2.2 -T22	200mm	8"	80mm	3.3"	270°	90°	92mm	110mm	1.5kg	31.1mm
25 mm	T2.2–22	250	9"	106mm	4.2"	270°	90°	92mm	110mm	1.5kg	31.1mm
27mm	T2.2 -T22	250mm	9"	106mm	4.2"	270°	90°	92mm	110mm	1.5kg	31.1mm
32 mm	T2.2–22	325	12"	181mm	6.3"	270°	90°	92mm	110mm	1.2kg	31.1mm
40 mm	T2.2–22	450	16"	280mm	11"	270°	90°	118mm	110mm	1.4kg	31.1mm
50 mm	T2.2–22	550	20"	380mm	15"	270°	90°	118mm	110mm	1.5kg	31.1mm
65mm Macro	T2.4 - T22	325mm	13"	114mm	4.5"	270°	90°	197mm	110mm	2.8kg	Full Frame
75 mm	T2.2–22	800	30"	593mm	23.3"	270°	90°	155mm	110mm	1.8kg	Full Frame
100 mm	T2.6–22	950	36"	743mm	29.3"	270°	90°	155mm	110mm	1.8kg	Full Frame
135mm	T2.8 -T22	850mm	2'9"	657mm	2'1.5"	270°	90°	167mm	110 mm	2.1 kg	Full Frame
152mm	T3.0-T22	1100mm	3'6"	903mm	2'10"	270°	90°	167mm	110 mm	2.1kg	Full Frame

Cooke Anamorphic/i 1.8x Full Frame Plus

Cooke Anamorphic/i Full Frame Plus	T-Stop Range	Min. Marked Object Distance (MOD)		Close Focus from Lens Front		Angular Rotation to MOD	Rotation of Iris Scale	Length: Lens Front to Mount	Maximum Front Diameter	Total Weight	Maximum Image Coverage
32 mm	T2.3-T22					270°	90°				Full Frame
40 mm	T2.3-T22					270°	90°				Full Frame
50 mm	T2.3-T22	850 mm	33"	600mm	24"	270°	90°	203mm	110mm	3.8kg	Full Frame
75 mm	T2.3-T22					270°	90°	203mm	110mm	3.8kg	Full Frame
100 mm	T2.3-T22					270°	90°	203mm	110mm	3.8kg	Full Frame
135mm	T2.3-T22					270°	90°	203mm	110 mm	3.8kg	Full Frame
180mm	T2.3-T22					270°	90°				Full Frame

Anamorphic Squeeze ratio: 1.8x

Anamorphic/i 1.8x Full Frame Plus

Cooke Optics presents their Anamorphic/i Full Frame Plus series of lenses at the BSC Expo in Battersea Evolution, London on February 1 and 2, 2019. Stand 338.

The Cooke Anamorphic/i 1.8x Full Frame Plus lenses come at the right time. Cinematographers are showing an increasingly ravenous appetite to fill as much of the Full Frame as possible. These new lenses provide archetypal anamorphic characteristics: pleasing skin tones, an almost 3-dimensional look, flare, oval bokeh.

For exaggerated flares, the set will be available with SF "Special Flair" coating. The 50mm is the first lens to be shown. The first core sets are planned to deliver in April: 40mm, 50mm, 75mm and 100mm; the remaining three lenses will follow later in 2019.

The image circle covers the Full Frame 36x24 mm sensor area. The anamorphic squeeze is 1.8x. So, when covering the full 24mm height of the sensor and 90% of the width, the anamorphic image desqueezes to a 2.39:1 aspect ratio. If you "expose" the full width of the 1.5:1 (3:2) sensor, the desqueezed aspect ratio is 2.7:1.

The Anamorphic/i Full Frame Plus series comes with Cooke /i Technology lens metadata.

Cooke /i³

Cooke also introduces /i³ (/i Cubed), the latest version of its /i Technology metadata system. The /i³ technology provides distortion mapping for each individual lens. It is not a theoretical measurement of all lenses of a particular focal length, but of the specific lens in use. New deliveries of S4/i, 5/i, S7/i and Panchro/i Classic lenses now include /i³ inside.   *cookeoptics.com*

Greig Fraser ASC ACS on *VICE*

Cinematographer Greig Fraser, ASC, ACS with Arricam and Cooke Anamorphic /i 75mm.

VICE, directed by Adam McKay, swings from drama to satire with a hint of the absurd (if it weren't so true.) It's the story of Dick Cheney, a Washington insider who maneuvered to become the most powerful person in the US government as Vice-President to George W. Bush. Greig Fraser, ASC, ACS was the cinematographer.

JON FAUER: Please tell us about the logistics of this film—that was shot on film.

GREIG FRASER: Keslow Camera did a great job of supplying our film. In the early stages, I spoke to a number of rental companies about the possibility of shooting anamorphic, spherical, and 16mm. Keslow Camera was fantastic. They had all the cameras, equipment and lenses, and were experts in ALL the formats. In researching the job, I found that no one else had the depth and knowledge they did. I discussed the logistics with them and they really bent over backwards. I was super excited to be working with them.

Anamorphics.

At first, I wasn't sure which anamorphics I really wanted. I didn't know the Cooke anamorphics very well, and I thought maybe I'd test them along with some other lenses that I did know well. But I ended up finding the Cookes had the perfect balance of sharpness and character that I needed. I augmented the Cookes with some beautiful, vintage Todd AO anamorphic primes and Elite spherical primes that Keslow had.

It's interesting that Cooke 35mm format Anamorphic /i T2.3 primes were designed in the digital era, I guess mainly for digi-

tal cameras, and yet they look fantastic on film.

Yes, and I'm a strong supporter of Cooke. I used to own a set of Cooke S4 primes. I shot *Zero Dark Thirty* with Cooke S4 and Elite. So, I'm a huge fan of the Cooke spherical lenses. These Cooke Anamorphics have a similar quality, with beautiful bokeh. There's a Cooke smoothness that I can't really describe. Focus falls off beautifully. Away from the center, they are not fully sharp left, right, top and bottom. I know Cooke prides themselves on being really great technically and they are. They have a special warmth to them that I felt certain other lenses maybe didn't have for this film.

Brad Wilson at Keslow Camera said you had a bunch of 35mm and 16mm cameras with spherical and anamorphic lenses.

We used Cooke 35mm anamorphics and Elite 35mm spherical primes. We had Arricams, Arriflex 435 and 235 and 35mm Eyemos. For 16mm, we had Bolex. We had great opportunities to shoot in whatever format we wanted, covering the wars in Afghanistan, Iraq, Vietnam, Cambodia, inaugurations of presidents and so on. We really went to town on formats.

Mix and match?

It was rewarding to match stock footage and video from the different eras with footage that we just shot six months ago. When I was grading, I was pleased to see how it cuts back from beautiful anamorphic 35mm to grainy or hazy video footage or grainy film to great footage and then back to the beautiful 35mm. That's essentially the underlying story.

Part of the VICE package in the Keslow Camera prep area. L-R: Ryan Griffith (Senior R&D Technician with Arriflex 435), Ethan Cruice (Operations Supervisor with Arriflex 235), Mitch Rutherford (Senior Camera Technician), Brad Wilson (VP, Business Development with Arricam LT), Nick Lanata (Marketing Agent with Arriflex 416).

How did you decide to shoot film in the first place?

Thankfully, we had a supporter of film in director Adam McKay. When we talked about it, he said "What do you think about shooting on film?" I love film, so why wouldn't I shoot on film?

We shot some tests, in 35mm and 16mm film. We pushed the 16mm, we pushed the 35mm film, and then we tested digital. We tested digital 65mm. Digital large format was fantastic and we loved it. But we felt that this film, which spanned the course of maybe five decades, would be better in film. I wouldn't use the word nostalgic, because that is not what we were aiming for. It felt like something you were watching from the period that it was being shot in.

Nostalgia is not the right word. It's more indicative of a memory, of imagining how images from those periods might have looked.

Was it difficult assembling your large package of analog motion picture camera equipment?

Keslow knows very well about my love of funky bits of kit. [laughs] I guess I was lucky that they had just acquired Denny Clairmont's vast collection of analog equipment. When the sale went through, I got a very excited phone call from Brad Wilson saying, "You've got to check this out, it's like a treasure trove." Clairmont had such an amazing history of making custom gadgets and bits of great optical equipment and lenses, and to have that at my fingertips, it felt like I had a really full toolbox from which I could draw upon.

Your assistant Bill Coe said that when he walked into Keslow Camera on his first day of prep, it was terrifying: every film camera the world has ever seen was lined up. [laugh]

Yes, it was like they had pulled out every single camera that Keslow had. It was sitting there in the prep area. I felt bad for him, be-cause I wasn't sure exactly what cameras we would use for what, because I was still brainstorming with Adam.

I was still getting a feel for where we were going to use 16mm for the early days and 35 mm sphericals for the 70's. I was still trying to get my head around the rules for the film.

Poor Bill had to endure a bit of time of me being a little bit wishy-washy about what they were for. But, I did assure him that what-ever happened, we would work within the limitations of our de-partment. We certainly had our work cut out for us in the first few weeks, but we soon came into a very nice rhythm that worked out well.

The toughest job might have been your loader?

Yes, that's exactly right. There were a lot of different film maga-zines to load. There weren't that many different stocks. I think we only had two stocks, Kodak Vision 500T and 200T. But we had three different gauges, and many different cameras. We had an Arriflex 235, Arricam LT, Arriflex 416, Eyemos, and so on.

We had a good idea of what we were using coming up. It wasn't like all of a sudden we'd switch to the 235. If we were shooting an interior on Vision 500T, then there was a good chance that we would do a handheld shot on the 235. There was always that knowledge of what the scene was requiring. But loading is almost a dark art now. People who know how to do it are really quite special.

I was wondering if they are still making changing bags, or dark rooms.

Actually it's a very good question. I think we had to build a dark-room or at least get rid of all the spare tires and the stuff they stored in the darkroom on the camera truck.

Greig Fraser and Bill Coe, First AC, with Arriflex 235.

Greig Fraser with 35mm Eyemo.

I guess Keslow still has people who remember how to maintain and repair film cameras and magazines?

Yes, I think they pride themselves on that. We had great kit, great support, and they were doing everything extraordinarily well.

In post-production, was the negative scanned and then DI?

The film was actually scanned in 4K during production for the dailies. The scanning process has gotten so good now that we touched the negative only once and that was all.

When you say the negative is only touched once, that was in the dailies stage?

That's correct. We went through FotoKem and used their Nextlab Dailies system. That translated directly into the final grades. It was awesome walking into the final grading suite and the colors were identical to the dailies and what everyone had been watching during the Avid edit. Our colorist was Dave Cole.

Dave Cole, Senior Colorist at FotoKem, adds: "We scanned the negative once at 4K on Scanity and used this for both dailies and final DI using DaVinci Resolve. The grade by FotoKem's dailies colorist Jon Rocke was used as a jumping off point for final grading where Greig and I further tuned the color for the various eras and visual formats. For some of the footage that needed additional degradation/aging, we graded the scans in our theater. Then, Greig and crew re-shot the images directly off the theater screen— both handheld and on sticks using Super16 and Super8 cameras. This new footage was then processed, scanned and brought in to the final sequences in the DI and re-graded. Digital degradation was also performed in the DI with frame edges drawn by hand.

Chromatic lens aberrations were introduced via custom nodes as well as some scratches and dirt. To keep a true-to-period feel, it was decided early on in pre-production not to clean the film. Most of the dirt you see is actual dirt from the negative with only egregious marks cleaned up. Final optical effects for the titles were achieved by slight intermittent flicker, de-focus, and misregistration."

Greig, did you refer to old films or stills in prepping "VICE?"

We looked at some footage from the era. We weren't trying to mimic it, we weren't making a documentary. We were doing a drama. We stuck to a line of creating simple, elegant images for the main narrative thread that wasn't outlandish, that wasn't crazy. It was relatively austere and simple, because we could then go to the different formats of 16mm and video to create some craziness in between the anamorphic 35mm.

What about lighting on the show? Did you use vintage lighting fixtures?

No. I'm a very strong advocate of solid-state (LED) lighting. I know it's not for every DP, and I know I often chew people's ears off with my strong opinions about these things. As you know, I drive an electric car in Los Angeles because I try to do my part for the environment.

If I then go off and light our set with fifty 6K space lights, then I just wiped out six months of good zero-emissions driving in my electric car. In one hour of using 50 x 6K fixtures, that's 300,000 watts (300 kilowatts). But that's not the only reason. I'm also very much into the flexibility and the ability to change colors with LED fixtures, because that means I can treat the set the same way that I

Above: framegrab from film. Christian Bale (center) as Dick Cheney in Adam McKay's VICE, an Annapurna Pictures release. © 2018 Annapurna Pictures, LLC.
Below, the location where it was shot. City Hall, Los Angeles. 10 bi-color Lite Tiles in a rig suspended from each corner with 4 block and tackle lines. Photo below left by Matt Kennedy. Photo below right by Mike Bauman.

would do a color grading session in post production.

I can adjust the green and blue, really refine the look and get very particular with the color. To me, it is a tool that I think is unbeatable: the ability to create very interesting, beautiful, subtle colors. When you shoot digitally, you can refine while viewing a monitor on set. When you shoot with film, though, it's a little bit harder because you rely on your color meter and your testing.

Gaffer Mike Bauman comments:
"It was the Sekonic C-700. I just tried the new C-800. That is a game-changer in my humble opinion."

Greig, what kind of light fixtures did you use?

On the recent movies, I've used Digital Sputniks and LiteGear units. "VICE" was no different. The Digital Sputniks were used to create a soft sun. If you put enough Digital Sputniks together side by side, you end up with a light that looks a lot like a soft sun, but with the ability and flexibility to adjust the color. For example, you can make it warmer or a little bit more magenta for a late afternoon warm glow. We used a lot of the LiteGear panels in the studio to create the ambiance outside the White House and the West Wing. We also used the Creamsource Doppio bicolor LED lights and they're incredibly useful as well.

You were one of the first cinematographers to embrace LEDs.

If I can power a light source with a battery, then suddenly it removes a lot of the infrastructure that you need to run a light. Suddenly, you need less power, maybe no generator, you need fewer cables, expendables and consumables. It's about flexibility. If I want to make a light slightly cooler, slightly warmer, without

Greig Fraser on *VICE,* cont'd

Above: Framegrab of Sam Rockwell (left) as George W. Bush and Christian Bale (right) as Dick Cheney, courtesy of Annapurna Pictures, LLC.
On location in the Biltmore Hotel, LA. Greig explained, "We needed to carefully plan the sun path, and we then augmented with LiteGear LiteMats when the windows were not getting hit with sunlight."

Below: Baz Idoine, Camera Operator behind camera. LiteMat Plus LED fixtures were mounted above the windows. They plug directly into the wall. Photo by Mike Bauman, Gaffer and CTO of LiteGear Inc.

Greig Fraser on *VICE,* cont'd

having to send a group of five people with gels and ladders and frames and making lots of noise, in this case I can do it quietly without disrupting the actors. The lighting department and I suddenly come out looking good because we're being quick and efficient, and no one notices our behind-the-scenes workings.

This current world of lighting is so exciting because the quality that comes out of these LEDs now is so good. I'm talking about the appearance of color and how good they are with skin tones, particularly the fixtures that I have just mentioned.

I'm not one of those guys who want to throw tungsten lights away. I think options for DPs are great. At some point in the future, I may want to use those lights again. But right now I'm really into simple rigging, flexibility, and color changeability of LED lighting.

How did you get started in the film business?

I was at a photography school in Melbourne called RMIT. I became a photographer, working professionally. But I had some friends at a film production company and I thought that was actually more of what I wanted to do because film production is a team effort and that really appealed to me.

As a photographer, you often work by yourself. You might live in a vacuum. But as a filmmaker, you collaborate. You brainstorm with the director and crew, talk about references, and develop an idea. It is a very invigorating experience because you draw upon your own experiences and hopefully support each other's ideas and grow them.

Mike Bauman on *VICE*

Mike was the gaffer on VICE. He's also CTO of LiteGear. Mike took the photos on this page. He commented:

Greig certainly was willing to take a lot more risks than most. We used a lot of custom-fabbed equipment from LiteGear to meet some of the needs that he wanted.

We worked on a spreadsheet and found that to hang one space light, from the start of rigging it in the air, to when it's burning, is between 3½ to 4 four hours of labor. And we would require about 150 of them to get the output we needed. Between the labor numbers, the initial power and dimmers, it would have been very cost-prohibitive. On top of that, because there was so much makeup in the film, there was concern about ambient temperature and the actors sweating a lot under the makeup.

We did a test to see how many watts of LED equal 6K space lights. We found that around 400 to 500 watts of LED is the equivalent to 6000 watts of an incandescent space light. In the photos below, we have large panels that are spread above the set. Each of those 10x10 panels was the equivalent of five 6K space lights as far as output. Greig's average ASA was 320. That needs a fair amount of light.

Bill Coe and *VICE* Camera Crew

Above: Greig Fraser look-alike Halloween day with camera crew. Left-to-right: Amanda Levy, "B" Camera 2nd Assistant; Paul Metcalf, "B" Camera 1st Assistant; Baz Idoine, "A" Camera Operator; Greig Fraser, ASC, ACS, Cinematographer; Bill Coe, "A" Camera 1st Assistant; Ryan Creasy, "A" Camera 2nd Assistant; Christian Kessler, Additional 2nd Assistant; Rob Reaves, Camera PA.

Bill Coe was the "A" Camera First Assistant on VICE.

JON FAUER: Bill, tell us about the production still above.

BILL COE: It's a funny photo. Greig often wears the same style of clothing every day—cargo shorts, Blundstone boots and a blue or white shirt. So, for Halloween, we all dressed up like Greig.

How did *VICE* begin for you?

I was in Paris on the Clint Eastwood 15:17 to Paris movie and got a phone call out of the blue to work on *VICE*.

I hadn't done a photo-chemical movie for a few years. So, it was interesting to go back. As you know, Keslow fairly recently had acquired Clairmont Camera. When I got to the prep area at Keslow, I don't think I had seen that many film cameras in one room for some time. It was interesting to go back and revisit everything. Digital cinematography is so much different.

Keslow Camera.

The Keslow team had everything working very well in terms of supply and maintenance. But we still went through all the film tests and the steadiness tests and lens tests. With a digital shoot, you put up a lens and look at a monitor and you can see if there are any problems right away. With film, it's a bit of a process. I arrived to the prep late and I got a lot of help from the people over at Keslow to get it all done.

I think we had eight or nine different cameras for various purposes. The Arriflex LTs and the STs were for the bulk of the sound takes. There was quite a bit of handheld. The Arriflex 435 cameras were for high speed. And we had an Arri 35-3 for some handheld sequences. The Arri 235 was for some Vietnam flashback scenes. Colleen Mleziva was our loader and she did a fantastic job.

Visually, there are different palettes for different time periods with lots of different lenses. The Cooke Anamorphic /i sets were for the bulk of the film. We used the Cooke anamorphic lenses for our main lenses. The Cookes have a nice focus roll-off and their own unique look: softer—not softer, maybe smoother. They're sharp, but they have a great feel for sure.

Cookes always had that. I don't know whether it's the glass they use or their design, or the number of iris blades—but all these things make up that phenomenon. Cookes have always been very, pleasing.

Bill Coe, AC on *VICE*, cont'd

We also had a set of vintage Todd AO anamorphic lenses that came from Clairmont. It's funny. As a first assistant, you try to find lenses that are perfect and sharp. Well, these were not that. They had character and personality. The Todd AOs were like a special treat that we'd use for particular sequences.

Zooms?

We had an Angenieux HR 10:1 spherical zoom and the Angenieux Optimo 44-440 T4.5 Anamorphic. On the 16mm Arriflex 416, we had a vintage Canon 11-165mm T2.5 zoom.

Keslow has technicians still familiar with film cameras?

Yes. We should give a shout-out to Brad Wilson. He was fantastic. And Mitch Rutherford. He was our go-to technician; he really babysat us through everything and kept everything going. He was great. Our liaison person was Nick Lantana.

Keslow did a great job getting all those film cameras ready to go. And all those film cameras required that all their accessories were working properly—magazines, eyepieces, extenders. It's like you have to go back and revisit all the things you used to do.

Like a lesson in film history.

When I walked into the prep room the first time, it was a huge double room. They had all the equipment laid out. I thought, "Wow, what did I get myself into?"

Camera trucks?

One of the funny things is when you ask for a camera truck now you have to specify that it has a dark room. Because everybody's torn them out of the trucks so that they can get more room.

We had two trucks just jam-packed full of stuff. I had a funny conversation with the production people one time, because they had sent over just one truck. I called them up and said, "I'm looking at what I have and I'm looking at the truck, and it's not going to fit." And they replied, "Well, that's all we got." And then I said, "Well, somebody from production should come over to Keslow and tell me which gear that Greig ordered I should leave behind." [laughs] They got us another truck." It's pretty funny.

We had two trucks full of stuff. We had nine camera systems. And you have to deal with magazines taking up a huge amount of space. I mean, the magazine packages were insane: 400-footers, 1,000 footers, handheld, studio mags, Steadicam. Those things took up half a truck.

Lenses.

Nothing was preordained in terms of which lenses would be used for which sequence, or anamorphic for this, and spherical for that. It was a more organic thing with Greig that came up on the day. Greg could really grasp the look and the feel of the scene. There are a lot of different layers to the movie. It's not like a straight drama or a straight comedy. There are some very satirical pieces, flashbacks, action, and so on. Greig would get a sense of the scene and then try to match it visually. We certainly had a lot to choose from, carrying all that equipment with us.

Video Cameras.

Another thing that was very interesting and challenging was that they wanted to shoot a lot of the footage the way it might actually have been done at the time, like interviews, speeches or press conferences. We had to come up with a whole slew of different video cameras from the 1970s and later. Randy Wedick and Steve Irwin supplied a number of vintage video and ENG cameras and we shot with them.

(Randy Wedick comments: I own a few vintage video cameras and I have set them up to output SDI video. We used them for the court room video and also for C-SPAN and CNN angles that they mixed with actual historical footage. The Sony BVP-7 3-CCD camera has an early 90s look to it. The ancient RCA-CC002 from the late 70s makes incredible tracers and smears and overloads.

You just can't fake the analog look—sometimes you have to do it live. The expectation of a modern set is that lots of people will want to watch a live picture, so I set the cameras up with AJA serializers feeding into a Pix recorder and then out to a Teradek, which goes to VTR and then out to the rest of the set.)

Bill, how did you deal with focus? Eye focus or off monitors? Did you have to do something different for this show?

That's a great question. I have done a lot of film anamorphic movies. That's the process we've all come to know and love and bite our fingernails over. Especially anamorphic with a lot of handheld. We did a lot of extraordinarily close-up work.

We tried to get HD video taps for the main cameras, and HD taps on film cameras are better than NTSC obviously, but I wouldn't feel comfortable pulling focus from a monitor like that, because you just can't really tell. I pulled focus old school, from eye to knob. 90 percent of the film or 95 percent of the film was focused old school, from eye to knob.

The muscle memory is still there, and so is the memory that comes back, waiting for the lab report the next day. I've had many sleepless nights in my career as focus puller. On digital movies, one of the nice things is that you know immediately when you have focus or when you don't.

Wireless lens control.

I was on a Preston FIZ the whole time. As I said, there was a lot of handheld. It's difficult to be connected to the camera and moving with the operator and try to see the lens at the same time. So, to be separated and pulling with the Preston is better. There's a lot of walking, talking, dolly, and moving.

Monitors.

That's another nice difference with the digital camera way of doing things. Viewing on a monitor means you don't get involved in all that movement anymore. You can stay out of the way. You don't get run over. There no more jockeying for position. You don't bump into people. It's much cleaner to do it like that. But that was not the situation on *VICE*. It was like saying to the boom operator and unit still photographer, "Hey, I'm back." [laugh]

Visually interesting.

It's a really interesting film. Visually it's great. The subject matter is on the pulse of what's happening right now. The way it looks, with all these different formats and ways to capture scenes, I think the audience will find it's going to be really interesting to see.

ARRI Alexa LF Update SUP 4.0

ARRI released SUP 4.0 at the end of November 2018—a suite of helpful new updates for ALEXA LF cameras.

My favorites are additional anamorphic desqueeze ratios and LBUS support.

Anamorphic Desqueeze

```
MENU>PROJECT                    1.00
-------------                   1.25
Project frame rate      23.9    1.30
Camera index                    1.50
Camera index color              1.65
Next reel count                 1.80
Lens squeeze factor             2.00
Production info
```

ALEXA LF gets new anamorphic desqueeze ratios: 1.8x for Cooke Anamorphic/i Full Frame Plus lenses and 1.65x for Panavision Ultra Vista Full Frame Anamorphic lenses. That brings the choice of squeezes to: 1x (normal, no squeeze), 1.25x, 1.3x, 1.5x, 1.65x, 1.8x and 2x. I imagine anamorphic lens makers will conjure up even more desqueeze ratios in the future.

LBUS Support

LBUS Support means you can use the new ARRI Operator Control Unit OCU-1, as well as Master Grips and much more on ALEXA LF. LBUS Support opens the world of lots of accessories for the ALEXA LF. LBUS is the high-speed data protocol used in cameras and accessories. It's a similar system to the electronics found in many automobiles.

When you connect a Lens Control System LCS-LBUS cable (Cable K2.0007318) to one of the two LCS connectors on the ALEXA LF, most of ARRI LBUS accessories will now work. LBUS devices can daisy chain together.

Note: cforce mini lens motors, cforce plus lens motors and cforce mini RF lens motors are now compatible. (Required: cforce mini RF SUP 1.1. The cforce mini RF motor must be set to "client mode." Then it works like a cforce mini motor without the RF, which is already built into the ALEXA LF.)

Master Grips & Operator Control Unit OCU-1

Requires Master Grip/OCU-1 SUP 1.1.2 or later. For override function, requires Master Grip/OCU-1 SUP 2.0.

Ensure that your OCU-1 has the required Master Grip/OCU-1 SUP 2.0 and that your Wireless Control Unit has WCU-4 SUP 3.2.

LCUBE CUB-1

With the CUB-1, you can connect an ARRI Ultrasonic Distance Measuring device (UDM) to the LBUS connector. While a different cable can also connect the UDM directly to the ALEXA LF EXT connector, the CUB-1 option might come in handy if the EXT connector is in use for something else (e.g. for sensor sync).

LCUBE CUB-2

The CUB-2 allows an ARRI LBUS device, for example Master Grips or Operator Control Unit OCU-1, to control the internal motors in ENG lenses, as well as a cmotion pan-bar zoom, cmotion steady zoom, or cmotion cfinder III.

When using cforce motors with ALEXA LF, separate power must be provided to the cforce lens motors from the other side of the daisy chain, for instance from an LBUS to D-tap cable (K2.0006758) connected to an on-board battery. This is because the output from the ALEXA LF LCS connectors do not provide sufficient power to the cforce motors.

Additional SUP 4.0 updates

• EXT Sync: sensor sync—for example to sync 2 ALEXA LF cameras for 3D work.

• Magnify: Each of the three sensor modes now has separate magnify values for EVF and MON OUT 1, 2 and 3. For example, you can zoom in on the image to check focus, without changing the director's monitor.

• Project Frame Rate: changing the menu item "Project frame rate" will set the project frame rate, the sensor frame rate, and the frame rates of the three MON OUT SDI outputs to the same value.

• Improved dynamic defect pixel correction.

ALEXA LF LBUS Accessories

cmotion cPRO

The cmotion cPRO system consists of a cPRO hand unit with a cPRO motor or a cPRO camin. The cPRO hand unit is ergonomic, well-balanced, has an intuitive interface, clever navigation, along with illuminated controls and buttons.

The cPRO motor has a built-in wireless receiver module and antenna that eliminates the need for an external motor driver/receiver unit.

The cPRO camin is a tiny wireless motor driver for cforce (non-RF) lens motors. It also provides wireless control of focus and iris on EF lenses working on RED cameras (RED camera protocol).

Here's a review of cPRO's current features and a look at what is planned for future updates. Nice graphics courtesy of cmotion. *cmotion.eu*

cPRO hand unit

cPRO motor w/ wireless module

cPRO camin for non RF motors

cPRO current capabilities

Select one of 14 RF channels.	Certified worldwide.	Update firmware via USB port.	Power via USB if battery's low.
Manual brightness.	Auto brightness.	Create, edit or delete lens data.	Auto save lens data.
Display Depth of Field.	6 assignable user buttons.	User button LED feedback.	Calculate m & ft conversions.
4-color status indicator.	5 pre-marked focus rings.	3 pre-marked iris strips.	Move between main screens.
Main screen shortcuts.	Haptic menu & screen feedback.	Lock knob, slider or joystick.	Speed, ramp, torque, direction.
Electronic lens rotation limits.	Speed, sensitivity, direction.	Range Finder & auto focus.	Stealth mode darkens displays.

cPRO future features

Assign camera user buttons.*	ARRI & RED camera control.*	1-3 cPRO hand units ctrl 1 motor.	Lens marker settings.
Limit travel of knob or slider.	Limit motor rotation.	Lens data import & export via USB.	Import ARRI LDS lens data files.
Save user settings.	Cinefade Pola & ND control.	Thumbwheel to 4th motor.	Low camera battery alert.
Speed lens data file creation.	Calibrate lenses w/out end stops.	Automatic sleep mode.	More new features to come.

* camera control licence required

Creative Solutions acquires Amimon

Why are we circling the yacht harbor in Herzliyah, Israel, a town just north of Tel Aviv that looks like Silicon Valley? Nicol Verheem, founder of Teradek and CEO of Creative Solutions, has something to say about that.

On November 9, 2018. Amimon Inc. was acquired by The Vitec Group plc. Amimon will be integrated into Vitec's Creative Solutions division. Creative Solutions, with headquarters in Southern California, comprises Teradek, SmallHD, Wooden Camera, Paralinx, Rycote—and now Amimon.

If you work with wireless video, chances are that an Amimon chipset is inside. It's somewhat like computers having the label "Intel Inside." Amimon designs and provides the proprietary chips and circuits inside most of the wireless products from Teradek, Paralinx and SmallHD, as well as ARRI and other companies. Teradek and Amimon have been working together closely since 2012. Amimon's technology paved the way for user-friendly and reliable wireless systems that "cut the cables" between camera, video village and video monitors on set. It began as a way to monitor complex camera moves, Steadicam or handheld scenes—but has grown to the point where wireless video is now an expected and essential ingredient of most productions.

Amimon was founded in 2004 by Dr. Zvi Reznic, Dr. Meir Feder and Noam Geri to provide instantaneous and visually lossless video transmission over the freely available unlicensed radio spectrum. This technology was originally aimed at consumers, essentially to replace HDMI cables by wirelessly connecting comvideo sources to a TV. But by 2012, the rapid growth of mobile devices and internet-equipped TVs meant that this was no longer so important. Televisions could stream directly from the internet. So, Amimon needed new outlets for its unique technology. Aha, the film industry was an ideal opportunity for a reliable, accurate, and delay-free video link. Today it is nearly impossible to work on a feature, commercial or episodic television production that is not using wireless video with Amimon inside.

The first CEO was Joav Nissan-Cohen. He was followed by Ram Ofir. And now, Nicol Verheem is CEO. Nicol is also CEO of Creative Solutions, and was the original founder of Teradek. The Teradek side of this story goes back to 2010, when it became one of the first companies to release an affordable way to view on-set HD video wirelessly. But camera crews complained about the latency (video delay) from these early CUBE systems because CUBE used H.264 WiFi technology. Fortunately, Nicol had already fallen in love with the cinema industry, and he didn't want to give up. He and his team identified the technology best suited to providing zero-delay wireless video for motion picture and television productions. That technology was from Amimon.

The result was the Teradek Bolt wireless video transmitter/receiver system that they launched in 2012. At that time, the majority of camera crews were still running cables across the set. The Teradek Bolt and Paralinx Arrow untethered cameras and changed everything. Steadicam operators were now free to do 360-degree shots without a cable wrangler. Dolly grips didn't have to worry about running over cables. Cinematographers could shoot handheld without seeing wires in the shot. It's not an exaggeration to say that wireless video was an important part of the technology for drones and gimbals to offer new ways of covering a scene.

All these things were made possible with Amimon's proprietary silicon chips and software that sends uncompressed video over a robust MIMO (multiple input / multiple output) link. That means there's less than 1 millisecond delay in viewing the camera's video output across the set. It's a sophisticated, patented process that utilizes the full bandwidth of a WiFi channel very effectively, even if the RF conditions change rapidly all the time. The system can also dynamically and seamlessly switch between different RF frequencies in between video frames, making it extremely reliable even in situations where there is RF interference.

Amimon R&D will continue to develop new technology with an even greater focus on the professional cinema and video markets. The team in Tel Aviv will be led by Dr. Zvi Reznec, Founder and CTO, and Tal Keren-Zvi, General Manager. They are both staying on with the company. Uri Kanonich, who has been with Amimon since 2006, continues as VP of Sales & Marketing.

Nicol Verheem gives Uri Kanonich "one half of the credit for the success that is Teradek, Paralinx and Amimon. We learned about Amimon at a consumer trade show. We tried to use of the shelf products, but Amimon sent Uri to visit us in Irvine to discuss the technology in depth. We launched the BOLT a few months later."

Amimon's facility in Israel will become a dedicated research and design center for all of Creative Solutions. A benefit of this acquisition is that it should enable the Product, R&D and Engineering Teams to work together intuitively and drive innovation even faster—resulting in rapid development of useful new tools for filmmakers. Currently, Creative Solutions wireless video products are 1080p/60, but certainly we can look forward to more-K in the future. Read on.

Top Sheet (Business Summary)

The business of this business is quite interesting. Someday, Amimon's acquisition by Vitec could be the subject of a successful case study in business school. And that is why it's covered in depth in the pages that follow. Like a good screenplay, there is conflict, struggle against obstacles, determination to reach a goal, and the promise of a bright tomorrow.

A few industry wags wagged their heads in wonder about the deal, perhaps with a mixture of Schadenfreude and envy. They asked, "How could Vitec have paid $55 million for a company that lost money last year?" That was quickly followed by, "Uh-oh, will Amimon become a monopoly and choke off our supply of wireless video products that we buy from them or Teradek?"

Those questions and more are answered in the interviews we pursued. Spoiler alert: it's a wild ride, but there is result, reward and reassurance. I have shortened the interviews from several hundred pages of notes and transcripts. The dialog has been edited for flow and readability but I did not alter the intent. Thanks to Tal and Uri, Nicol and Zvi for their comments.

Reading financial reports and industry reporting only tells part of the story. The official announcement reveals numbers and aspirations. The journalism views it from a different perch. If we were preparing a movie, this page would be the producer's Top Shot, an overview of the estimated budget. The real story comes in the next pages as a documentary and behind the scenes look, in-depth view of the company, the people and the tech.

ACQUISITION OF AMIMON INC.

Here's an edited summary of the official Vitec Group plc announcement. You can read the full text online (vitecgroup.com). Vitec is a publicly traded company (VTC) on the London Stock Exchange. The following is not an offering.

The Vitec Group plc ("Vitec" or the "Group") is pleased to announce that it has acquired Amimon Inc., consisting primarily of its Israeli subsidiary Amimon Limited (together "Amimon").

Acquisition and integration of Amimon

Vitec acquired Amimon on 8 November 2018 for $55.0 million

(£42.3 million) in cash, with an expected total investment of $59.9 million (£46.1 million) on a cash / debt free basis, including employee retention, deal and integration costs. The total investment will be funded from Vitec's committed bank facilities.

Established in 2004, Amimon operates primarily from its R&D centre in Israel, where the majority of its 60 employees are based. Vitec will integrate Amimon into its Creative Solutions Division. Amimon brings extensive software, chipset design and electronics hardware development expertise, and opens up growth opportunities to develop innovative new products for adjacent markets. Amimon's Israel facility will primarily become an R&D centre of excellence for Creative Solutions.

Financial aspects of the acquisition

Amimon reported consolidated audited results for the year to 31 December 2017 of $18.6 million (£14.4 million) revenue and reported an operating loss of $0.7 million (£0.5 million). Gross assets were $10.5 million (£7.8 million) at 31 December 2017. For the nine months to September 2018, revenue was $13.4 million (£9.9 million) and EBITDA was $0.8 million (£0.6 million).

Stephen Bird, Group Chief Executive of Vitec, commented, "Vitec is the natural home for Amimon and I am really delighted to welcome this talented team of engineers to the Group. They bring exclusive software and hardware expertise that will add real value to our customers and our shareholders."

Analysis

Two days after the acquisition, the Israeli business daily Globes, (en.globes.co) wrote, "Vitec buys Israeli video transmission solutions co Amimon. The acquisition price is $55 million in cash, slightly more than the $53.6 million Amimon has raised since it was founded in 2004."

The financials alone do not tell the story. Globe's reporting explains a bit more. $53.6 million had been invested in the past by Venture Capitalists to nurture the company's technology and patents to where they are today.

So, there's much more to this journey than pondering EBITDA (Earnings Before Interest Earnings, Tax, Depreciation and Amortization.) The actual wisdom behind the acquisition, the real behind-the-scenes story, and the reason why Amimon is such a valuable company despite having lost money—that story unfolds on the next pages.

Cast of Characters

Nicol Verheem, CEO and Dr. Zvi Reznic, CTO (left to right)

Marius van der Waat, COO and Nicol Verheem, CEO

Tal Keren-Zvi, General Manager

Uri Kanonich, VP of Marketing

Uri Kanonich, Tal Keren-Zvi and Nicol Verheem with Amimon patents.

Teradek Bolt Transmitter, Amimon Inside.

Teradek Bolt Receiver, Amimon Inside.

Creative Solutions, Teradek and Vitec products surrounding camera.

Nicol Verheem on the Acquisition

Amimon headquarters north of Tel Aviv

Teradek headquarters in Irvine, CA

> "We fell in love with the Amimon technology because it is really special and uniquely suited to the motion picture market with its mission-critical requirement of no delay, high quality and high reliability wireless video."

Nicol Verheem, seen here at Amimon, is the Founder of Teradek, CEO of Creative Solutions and now CEO of Amimon as well.

JON FAUER: Nicol, now that we are sitting in a conference room in Ra'annah, thousands of miles from your office, I hope you'll explain why you acquired Amimon?

NICOL VERHEEM: Creative Solutions is one of Vitec's three divisions. Amimon technology will be applied across all the Vitec Creative Solutions brands, so it's equally applicable to Teradek, Paralinx, SmallHD and even to Wooden Camera.

Teradek is one of the companies in the Creative Solutions group. We are known for our wireless video systems. The technology inside Teradek wireless video receivers and transmitters, is the technology developed by Amimon. Their technology is unparalleled. It's incredibly insightful, novel, positioned to take on all the problems of wireless video. Amimon spent many years and tens of millions of dollars developing their wireless video system.

When was Amimon founded?

Dr. Zvi Reznic was the original founder of Amimon in 2004 with two colleagues. Some of the team have been with Amimon for a long time. Others came more recently. There were periods of growth, raising money from venture capital for expansion, then not being as successful and scaling back. We helped Amimon focus on the pro market in 2012.

Remind me, when did you start Teradek?

In January 2008. We were acquired by Vitec in late 2013.

And in this chronology, where does Creative Solutions fit in?

Creative Solutions has really evolved by adding a number of creative people over the years. Some joined us through acquisitions. The common thing was that they had worked on motion picture sets, on high-end feature films, commercial, documentaries and independent projects.

We have people like Greg Smokler from Paralinx, Ryan Schorman from Wooden Camera and Dale Backus from SmallHD.

They were actually all shooters first, that then started to develop products based on that experience. These guys saw opportunities. Then they helped us identify gaps in the tools and develop products to address these needs.

They help shape what the product looks like based on their experience in actual productions. With Amimon joining us, we now have a huge workforce of very technical talent, with Marius van der Watt, our COO, electronic engineers like myself, or algorithm guys like Zvi, who can now build the products to truly match what the industry wants.

Let me explain the most important rationale for the acquisition. It boils down to serving an industry that really benefits from wireless video. When we started doing this, the industry mostly wasn't using wireless video. It was using coax cables with BNC connectors. We saw a real need. We thought we could add value to this industry and we keep on innovating this product to make it better. It was a decisive moment when we thought this could be our future. We've been working at this tirelessly for the last 10 years now. That's the story of Teradek.

Along the way, we've done wired video. We've done wireless video. We've done wireless over Wi-Fi, over cellular, over bonded cellular, and over Amimon's proprietary technology. They all have different operations. We fell in love with the Amimon technology because it is really special and uniquely suited to the motion picture market with its a mission-critical requirement of no delay, high quality and high reliability wireless video.

There were a number of additional factors influencing the acquisition. We asked ourselves, "Can we ensure a continued supply?" Also, "Will this technology scale and adapt to what we all see as the future, 4K for example?"

Teradek was using the technology but was not controlling it and that was somewhat of a concern. But that's pretty par for the course. We are a systems company, we end up depending on other people to provide some of the underlying fundamental technology, just as Apple relies on suppliers in making the iPad. But you

Nicol Verheem on the Acquisition, cont'd

> "We want to build an ecosystem of accessories that surrounds the camera, that extends its capabilities, but in a way that's very carefully thought out and crafted to be very elegant, with fewer connectors and cables and fewer failure points because of poor design."

always want to make sure that there's a reasonable comfort level in the continuation of supply or access to the technology.

How do you ensure that?

Normally, you would have a supply agreement before you launch a product. You say, "We want a supply agreement that you will keep things at this price, and you will keep availability to us for this long."

Amimon seemed kind of mysterious to many of us in the industry. At trade shows, it wasn't clear if they were a competitor of yours or a supplier.

At one point, it was secretive and we actually were in competition on some products. But now, we are all on the same team.

That must have been another incentive for the acquisition.

We looked at Amimon with a very fond respect and admiration for quite some time, but also with some frustration. There have always been some challenges with their ability to focus on what we believed was the best possible application for the technology. If you go all the way back, you'll see that they had a really fantastic idea 14 or 15 years ago. They raised good money on the premise and promise of this idea, started developing technology, built chips, and went after the consumer market. Unfortunately that was a mistake because what the consumer market actually required was not superb video quality and incredibly low delay and incredibly unparalleled robustness of the signal. The consumer industry just required more interoperability.

So, using something like Wi-Fi is far more attractive to the consumer than the proprietary link that Amimon was proposing. Plus consumers were more interested in a product that was less expensive. It was OK if it had slightly lower reliability or lower video quality or a small delay. But Amimon began as a company focused on consumer technology.

To do what? To transmit how?

Their plan was to replace every HDMI cable with a wireless link.

Like from a camera to a monitor?

Not that one. They were thinking about the cable from your DVR,

Xbox or DVD player to your home TV set that was sitting in your living room. That's essentially what an HDMI cable was meant for.

Amimon's zero delay did have a clear benefit for gaming. You don't want a delay from the Xbox to your TV. But for the rest of us, we don't really care if the cable box is delayed by a few milliseconds. But, to make matters worse for Amimon's business plan, almost all consumer TV sets became smart TVs. Netflix, Roku, Apple TV and other streaming players were built right into the TV, which was at odds with the Amimon concept. So, it wasn't really that appealing from a consumer's point of view.

Was it expensive for consumers?

It was on the expensive side. Some of those products are still floating around, really just trying to be wireless HDMI. There were a few different commercial names. It had great video quality. It was reliable. It had zero delay. But it had a relatively short range and it was packaged into a big plastic box that fit on your mantelpiece or in a conference room—but not suited for a film set or location.

And so, in 2012, Teradek, Paralinx and Amimon started talking because we realized that their video modem was truly unique. We recognized the huge opportunities in taking this zero-delay technology and applying it in professional applications. Amimon came back to us and agreed to start making components to help us address the specifics of our professional market. And neither of us have looked back since then. We came out with the Teradek Bolt that quickly became the defacto standard in wireless video.

Let me come back to your original question. Why would Vitec's Creative Solutions acquire Amimon? We already had a successful relationship with them. They were our largest supplier and we were their largest customer. Why go and buy your own supplier?

Well, the problem was that Amimon still had the distraction of trying to be successful in the consumer space, whether that was in a living room, or more recently with consumer drones. They're a Venture Capital backed company, so they were always under pressure to find the next big thing and be a runaway hit. Plus, they ended up in a pickle with some of their customers taking the technology and then applying it in ways that were not really anticipated, appropriate and in some cases, it was flat out illegal.

Nicol Verheem on the Acquisition, cont'd

> "That's not just an opportunity,
> but almost a responsibility
> to clean this mess up, to work with
> the camera manufacturers to get to
> a system where we retain
> modularity and options
> but also have
> something of a standard."

Amimon just didn't have the means to really address this. The result was a very complicated market with official adopters of their technology, their own brand of technology, and then unofficial people inappropriately also using this technology. They found themselves all bound up in this bowl of spaghetti that they simply couldn't resolve it. It was a concern to all of us. That's when we looked into joining forces to refocus the business, take this technology, and apply it purely to the professional industries. But it's not only cinema. We'll also expand in broadcast and the professional health care companies they already support (with endoscopic products) and one or two select security projects.

Life on set became too complicated.

Taking a step back, we've had this discussion before: I think life on set became too complicated, for the camera operator, the first AC and the camera crew, when there was this explosion of camera accessories kicked off by the digital revolution started by RED and Canon and later everybody else.

There are too many devices that go on a camera. Their design is completely agnostic of the existence of any other camera accessory. Most of them has a different power cable with different power requirements. There are multiple video cables. Trying to mount all of these little boxes in the appropriate spot on the camera becomes quite silly. It's a running joke in our company: people send us funny pictures crying out that somewhere in there is a camera and beneath the ball of wires. Generally, you can see a mattebox on one end and hopefully you see an Anton Bauer battery on the back, and an OConnor head at the bottom. But the camera could be a RED, an Alexa 65 or a Sony a7S, you can't tell because of all the wires and accessories. That's not just an opportunity, but almost a responsibility to clean this mess up, to work with the camera manufacturers to get to a system where we retain modularity and options but also have something of a standard.

I desperately want to try and unify these things into an interoperable, simple to use, lower risk system. It should have fewer points that break, and it should also be stylish. It pains me to think our customers are in the business of creating beautiful images. They create art. They all have a deep sense of artistic awareness and we give them these ugly rectangular boxes that Velcro to their cameras.

I don't think we have paid enough attention to design, to elegance, to the fundament of making the tool something that disappears so you can just get the job done. You don't want to focus on the tool. But the tool should still be something that gives you joy because it's actually elegant and it's borderline pretty.

So, I'm officially a fan boy. Everybody knows this about me. If I look at your average Dell keyboard, I can't get excited. But the moment I open my MacBook, I honestly enjoy the interaction with a Mac. It's something that's carefully crafted. It's beautifully designed. Yes, I'm more productive on it than I am on a PC, but it's not only about that. It's because I'm actually interacting with a thing of beauty.

And so, if we are providing tools for cinematographers who are in the business of creating beautiful things, then obviously they're going to appreciate the tool if it is beautiful or elegant, as opposed to some clunky box of little black rectangles.

So, that's the big picture for Creative Solutions. We want to build an ecosystem of accessories that surrounds the camera, that extends its capabilities, but in a way that's very carefully thought out and crafted to be very elegant, with fewer connectors and cables and fewer failure points because of poor design.

That is a multidisciplinary approach. It's mechanical, electronic and software. And it's RF. And so if you look at that context, then the Amimon acquisition has always been dead obvious. But, enough of sitting here in a conference room.. Let's meet some of the key people here at Amimon and tour the facility.

First of, Amimon is ISO 9000 certified. This is not a trivial accomplishment. ISO 9000 holds a company accountable. It that means that all of the manufacturing and engineering has a well-documented process. It makes it repeatable and trusted. Amimon has a level of maturity and manufacturing technical ability that's higher than most.

I'd like to introduce you to the Amimon team, show the sophistication of their technology and what it takes to achieve this level of performance. I'd like to explain how difficult it is, how special it is, why it matters and why this is the right choice at this point in time.

Dr. Zvi Reznic

Dr. Zvi Reznic is the Founder and CTO of Amimon.

JON FAUER: How did it all begin with you and Amimon?

ZVI REZNIC: It's a funny story. I received my Masters Degree at Cornell University and PhD at Tel Aviv University. Originally, there were three of us who founded Amimon. Professor Meir Feder was my PhD advisor and Noam Geri was a friend of mine who lived in the U.S. The three of us together were thinking about a new start-up. It was in 2003. We began by thinking that adding MIMO (Multiple Input, Multiple Output.) to Wi-Fi was a good idea. We got an offer of funding. But then we decided that Wi-Fi was a game for big guys like Broadcom and Intel.

MIMO refers to having multiple antennas on both the transmitter and the receiver. Each transmit antenna is transmitting a different signal, but they all transmit simultaneously and in the same frequency. Hence the receiver receives a mixture of all the transmissions. Nevertheless, since the receiver has also multiple antennas, it is able to separate the signal to its individual components. It is like solving multiple equations with multiple unknowns.

Basically, MIMO increases the channel capacity by a factor that equals the number of transmitter antennas. It's a very powerful tool. It was invented at Bell Labs in the mid '90s. So we were thinking about bringing MIMO to Wi-Fi, but then we dropped that idea.

We thought that our expertise was in bandwidth utilization, extracting the most out of every hertz. We asked, "Where is the need for that? Where is the bandwidth shortage?" I remember, I had a whiteboard. We sat three across in our tiny, one-room office in Herzliya. I cleaned the whiteboard. It was now blank. And I wrote, with a big question mark, "Who needs bandwidth?" We thought about it for a while. And then we got a telephone call saying that a guy from Toshiba was visiting Israel and wanted to talk with us. It was very difficult to understand what he wanted. Back at the office, we realized that maybe he meant wireless DVI.

We started reading about DVI and HDMI and realized that the work I was doing on my PhD thesis might be relevant. My research was about communications with distortion on channels of unknown signal-to-noise ratio. That's exactly what you have in wireless video. And the goal is to minimize the distortion. So that was the beginning.

How did you come up with the name Amimon?

When we started the company, as I mentioned, we thought of developing MIMO for WiFi, and we called ourselves Hydra Wireless. Later, we changed our plan to Wireless DVI/HDMI. When we found investors for the new venture, the investors wanted us to start a new company, so we had to find a new name. We couldn't think of a name, until one evening I was on my way to a meeting with the investors and the other founders. The lawyer called and said that we must decide on a name, otherwise it will delay the deal. Since I was driving, I called my wife and asked her to search the Internet for something connected to Hydra in Greek Mythology. She looked up Hydra in Wikipedia and quickly scanned for a nice name. She found AMYMONE (the spring of Amymone was Hydra's lair). When I arrived, I met the other founders and suggested this name. They didn't like it, but said they could accept it if we changed the name to AMIMON, which is a simpler spelling and also has MIMO in the middle. The investors then entered the room. We told them the name of our company was "Amimon." They didn't like it either, but we closed the deal anyway.

Sorry for the long story, but that is how it was.

What makes your technology special?

Basically, the challenge is that you want to send pixels wirelessly over noisy channels. This goes back to Claude Shannon's original paper from 1948 where he invented and introduced the field of "Information Theory." Shannon suggested that the way to solve this is to first compress the signal, and generate bits at the rate of R bits per second. You take these bits and transmit them reliably over the channel. And in order to transmit them reliably, you compress your video to a bit rate of R bits per second, such that R is below the channel capacity. Then, you will be able to transmit these bits to the other side reliably. And then, at the receiving end, you do the opposite—you take the bits and you decompress them.

However, in order for this to work, the bit rate R must be smaller than the channel capacity C. However, in wireless channels, the capacity C changes rapidly.

So if you want to have a robust system, you want to tune the bit rate R of your compression to be below the worst case of the channel, with even some extra margin, so that, even in the worst case, your communication link will not break. Another way of doing that is to say, "Okay. I'll take the risk and I'll retransmit from time-to-time. I'll compress it to a slightly higher rate. Most of the time it will be okay. But occasionally, it will not be okay. And when it will not be okay, the packet will be lost. But then I will retransmit the packet." The problem with retransmission is that it adds delay to the system, which is latency.

Our solution is that we're able to basically vary the amount of information that we receive to match the instantaneous capacity of the channel.

And nobody else thought of this before?

The idea of joint source channel coding was studied in the universities and academia before. But we invented the way to connect video compression and joint source channel coding this specific way. On top of that, we take the most significant part of the video, what visually matters the most, which is usually the low frequencies and we protect them with high compression, low bit rate, so that they will always pass through.

We give weaker protection to the less significant video information. Actually, most of the information is less important. So there is a little information that is important, and tons of information that is less important. But you want to have them all, because that's where the quality comes from. As for audio, we send that at very low bit rates to make sure it is very robust.

But your video is great because we see details and edges nicely for focus. You can even see the texture of someone's eyelashes.

And that's the good thing, that's the idea. We do send the high frequencies because we want to have that information. I'm not saying it's not important. But if something goes wrong, for example, a channel drops, I want to make sure that only the high frequency part is being affected, and not the low. It is also proportional and might only be the duration of a frame, or much less than a frame.

Probably the person who benefits the most from this low latency and high quality is the focus puller who is focusing off the monitor constantly. And it's usually the pupil of the actor's eye.

If you would use a traditional system, that information would not even be transmitted. We're sending much more information, including the very high frequencies. It's just that, from time-to-time, if the channel is degraded for a small duration of time, then that could be affected briefly.

Zvi, since you're the algorithm architect, perhaps a future focus friendly model will take the actors' eyes into account.

This calls for a "region of interest" algorithm, in which the system automatically identifies important regions within the frame, and allocates more bandwidth for that region. We can look into what it takes to apply the region of interest to actors' eyes in future chips.

Do video signals from sensors start out life as analog signals and then go through an analog-to-digital conversion process?

That's the thing. Traditional digital video compression involves the process of quantization. But that's evil. For example, look at a gradient—a blue sky is a good example. If you take a blue sky and put a strong JPEG compression on it, it's going to look bad, with bands

and blockiness. Basically, all of the different values in that area are now described as the same value. That's quantization and those errors are visually very painful. Instead, let's send some of this reliably with error correction, digitally. Send a little bit more with less error correction, but also digital. And then send the rest analog. You have to compare it to the alternative. Because it goes back to Shannon. If you have a limited capacity, then eventually you will suffer from some distortion. And the trick is to minimize that distortion.

You mentioned analog. In the days where film cameras had video taps, video assist was mostly analog transmission via standard TV channels. How do you get around the transmission distance problem in the analog portion of your process?

We are using five receive antennas, and either two or four transmit antennas. Having more receiver antennas than transmitter antennas increases the range and the robustness.

You asked before about a purely analog system. Video has an inherent redundancy. So purely analog is not trying to remove that redundancy. Color information from one pixel next to the other is usually similar. There are similarities between neighboring pictures. In purely analog, you don't take advantage of that. You treat every pixel as very new information.

But when you go to digital, things like DCT take advantage of this and remove the redundancy, reduce your bandwidth. This was done in compression with JPEG and MPEG and so on. But then other problems were encountered, because analog was completely robust and digital is not robust. So we found a way to get the best out of the two worlds. We have the robustness of analog with the bandwidth efficiency of digital. This would be the equivalent of a 4 Million QAM modulation (quadrature amplitude modulation).

ARRI Alexa LF with Amimon inside.

Amimon Technology

JON: Why is Amimon alone in building video modems for cine?

NICOL VERHEEM: It is an interesting coincidence. I almost want to call it a series of unfortunate events. Over 10 years or so, Amimon raised or spent something like $50 million dollars on R&D to develop their video modem to where it is today. They raised money on the premise that they'd replace every HDMI cable on earth. There were Venture Capitalists, VCs, who thought this company would be worth billions of dollars.

That's a lot of HDMI cables to replace.

They put in tens of millions of dollars because they thought they'd make billions of dollars in return. Unfortunately, consumers basically said, "We're going to replace the HDMI cable, you're right. But we're going to replace it with Wi-Fi, not with your propriety link. Because we want Packetized IP. We want Smart TVs that have the Netflix app running inside. The Amimon technology was not that applicable, so that's the first unfortunate event.

The other relates to their starting the company in the heyday of fabulous semiconductor companies in San Jose. Everybody was making chips. And those chips ended up in a massive variety of devices. But then, over the last decade or so, that whole industry changed. And now there are essentially 5 or 6 platforms that you want your chips to be designed in and they're mostly cell phones. The cost to design a chip has become more expensive. There are not as many people around with the appetite to fund chip companies. Apple makes their own chips. Samsung make their own chips. Google makes their own chips. Facebook now makes their own chips.

So the notion of another fabulous semiconductor chip company is a relic of the past. Luckily for Amimon, they did not fail because they pivoted away from being only a chip company and reinvented themselves as a module and product company. That kept them going. But it's a much more modest revenue model. Fortunately, we're now in a position where we're benefitting from the heyday of VCs investing in fabulous semiconductor companies that resulted in this amazing technology.

It's something that is not likely to repeat again. So that's why there are not a dozen other people building video modems. It's actually a niche market. Luckily for all of us, some VCs miscalculated and thought that it was going to be a massive opportunity and invested in a lot of this IP.

Then how are you investing in the next generation chips?

Once you have the basic intellectual property framework, including the patents, then the incremental cost is less. You still should keep a reasonably modest approach rather than trying to build to the newest 7 nanometer standard.

Amimon makes the chips and circuits in Teradek and Paralinx wireless systems as well as ARRI and Transvideo. Do these different receivers and transmitters all work with each other?

Not all, and here's a little bit background. The wireless link that we use is encrypted so that other people cannot eavesdrop. This is very important to a lot of our customers. There is a process that's called a "key exchange" between the transmitter and the receiver. They become trusted parties to each other. You can pair more than one receiver to the transmitter, but you have to physically set the links up beforehand.

There is a private and a public key, just like the encryption that you use for your online banking. The keys used by the different companies are all unique to each, like different banks. We made a choice, after acquiring Paralinx, to share keys with them. So Teradek and Paralinx units work with each other. But ARRI, or any of the other manufacturers, all have their own unique keys. The systems are not interoperable. They're exclusive by design.

Of course, that's not what our industry wants. It is my hope that we can all come together and create a standard in which the systems are interoperable, but still protected as required.

It's awkward that the different systems do not work together.

By design, each link is protected with encryption because we don't want unintended parties to eavesdrop. But you do want interoperability, which we as an industry failed to get, because we are too busy competing with each other. Now it really makes sense to reach out and try and establish a common standard. Clearly, it needs to be something for which people opt in and there needs to be some responsibility. We don't want a partner to give these keys out and jeopardize the whole systems integrity.

Some of the Amimon counterfeit products out there are using an older generation of the Amimon technology. They all use the same key across multiple manufacturers and across multiple devices. They just hard coded. So you set the transmitter channel and then dial the receiver until it connects, as opposed to negotiating a secure link between units. The transmitter then is just literally broadcasting. The problem is, if someone nefarious gets to within 10,000 feet of a new Marvel Movie that is using one of these transmitters. They just dial back and forth between the 11 channels until they find your signal. They now have an uncompressed video feed off Camera "A" in the apartment next door to the studio.

But can you reassure existing customers of legitimate products that they will be supported going forward?

Let's take ARRI as an example. ARRI is a brand that does not do stuff halfway. ARRI's wireless video products based on this technology were all developed in conjunction with Amimon, using the approved Amimon hardware and Amimon provided software, and they got it certified according to all the proper regulations in all the markets in the world. So that is what I would call a legitimate product.

Teradek Bolt 3000 TX Transmitter on left and RX Receiver on right

Teradek Bolt on VENICE

Teradek Bolt on RED DSMC2

Any manufacturer that has only legitimate products will likely continue to receive our support. But there are products that are based on recycled Amimon hardware, with illegal copies of old Amimon software, which has never been certified to be used outside of a lab. It's really just test software, that hasn't been properly tested for the proper FCC, DFS, or FAA regulations.

We know through some of the testing that these products are illegal. They're operating with too much power and on channels for which they were not certified. It's the Wild West. There are counterfeit products that take some consumer products of Amimon, but then repurpose them, change the electronics to boost the output power in a very illegal way, use them on channels for which they were never certified or ignore all the regulations about channel selection, but then, the products might have pretty good performance.

Think of it this way. If we had a street race from Point A to Point B across town, you can take a little Nissan Sentra and I can have the best-designed Lamborghini. If I then stop at each stop sign and red traffic light, but you don't, then quite likely you'll win in your Nissan Sentra.

Sometimes people do product shootouts, and they find that these other products work better than the Teradek product. Well, that's because they don't follow the rules. It is important to understand why those rules are there in the first place. Some of these rules are about health and safety. The output power is governed so that we don't all fry our brains. Some of these other products are actually interfering with aircraft or weather radar systems that are used by air traffic control to figure out what the conditions are.

These are serious rules. They're not silly bureaucracy. Every government on Earth tries to manage the wireless frequency, the RF radio spectrum, to allow multiple conflicting applications to co-exist peacefully.

You've got broadcasters trying to send television signals. You're got first responders and police trying to communicate with each other. You've got cellular providers trying to provide bandwidth. You've got weather systems, airplanes, microwaves, X-Ray machines. All of these things are using RF. And the government allocates it in buckets of bandwidth, and you really have to comply.

Coming back to your question, people with legitimate products based on Amimon technology that were developed in collaboration with Amimon will continue to be supported. The other people, we'll address one-by-one.

I had no idea there were two different worlds of "legal" and "illegal" wireless video. Are you at liberty to say who the supported, good guys are?

I'm still learning. I know, ARRI and Transvideo are "legal." It's hard to separate it in two camps. Over time, we'll clean this up. And we'll implement new license agreements so any legitimate party will not have an issue.

Looking at it from the outside, it seems it is in Teradek's and Vitec's interest to keep supporting the legitimate companies and not try to drive them away.

Definitely. May I try to explain it a different way? If I were to justify our acquisition to a bank and not to somebody from the industry, I would only talk about a lot of the opportunities for us to create new technology which we cannot do alone, in house.

We cannot do it by ourselves because we don't have the underlying technology, the R&D resources and the skill sets.

We acquired Amimon because we now gain 65 brilliant R&D engineers. We only have 20 people in R&D in Irvine at Teradek. It's still a small company.

Amimon is a really high-tech facility, with incredible existing intellectual property that we can build upon. But it's impossible for us to do what Amimon does from scratch. We're not a chip company. We can't build our own video modem. For us to build one would take 65 people and another 10 years. And then we'd end up with something that Amimon already has.

So, we acquired Amimon to partner with their R&D teams because we see an opportunity: If we focus those resources on the right market, the cinema market. We think that, together, we can add value and make a substantial difference. We can make a meaningful impact on the industry if we navigate the right way.

I bet you wanted to do this for quite a long time.

Yes. I've been making a case for Vitec to acquire Amimon since 2014. I've probably written 200,000 words to that effect over my tenure there. I've been trying to convince Amimon to sell to Vitec for just about just as long. It just took a really long time for each of them to realize it's an excellent opportunity for all. It has been, by far, the most difficult acquisition I've ever done.

And it's your biggest as well.

Ikigai

Nicol Verheem and I were walking along a windy Herliya Beach. Nicol asked me:

Have I ever spoken to you about Ikigai? As you know, I love analogies.

This was a rhetorical question. Nicol did not wait for a reply nor did he need prodding. He was in a contemplative mood and this was to be a philospher's walk. After several days of deep diving into wavelengths, frequencies, 1024 QAM, WIMO, MIMO, Fourier, Shannon and Einstein, Nicol needed to exercise his creative side as well as our legs. And so the wrap-up began with Ikigai.

Nicol continued:

Ikigai means, "A reason for being." It is a Japanese philosophy about the meaning of life and how to achieve fulfillment. And it proposes that life becomes meaningful if we actually do something that is worthwhile and impactful to the rest of the world.

We can't ignore the fact that we spend much of our life at work. If you put in 10-hour or 12-hour days like we do, and you need some time to get ready for it, to unwind from it, then hopefully you get seven or eight hours of sleep at night. Your life outside of work is actually very small. If you have happiness at work, chances are you are a happy and fulfilled person.

This Japanese concept of Ikigai addresses how you might achieve that. It explains that there are four things you should value in your reason for being. You should do what you love, do something that the world needs, that you can be paid for, and that you're good at. Those are the four elements. When they all intersect, you have achieved Ikigai.

But if you only have two of these, say, what you love and what the world needs, but you can't get paid for it, that's a mission. But it's not Ikigai. If you do what the world needs, and you can get paid for it, but you don't love it, that's a vocation. What you're good at and can be paid for is a profession. What you love and are good at it is a passion. All four have to intersect to get Ikigai.

I feel that with Teradek and Creative Solutions, I have found Ikigai. I love what I do. Love the people I do it with. And so on.

Let's go back to talking about Amimon. When I started Teradek, it was bootstrapped from my second home mortgage. And then there was a turning point in 2010 where we pivoted and started embracing the market of creatives.

That's where I started having more Ikigai, because I loved creating tools for creatives. I identified with it on some level. I've never been a cinematographer like you and your colleagues. But at one point I was a very passionate landscape photographer. As you know, I'm absolutely obsessed with this stuff. I still have a respectable collection of 4x5 lenses for my Arca Swiss Field Camera. That's still my favorite tool even though I never get enough time with it anymore.

When we actually started building tools that creative people used
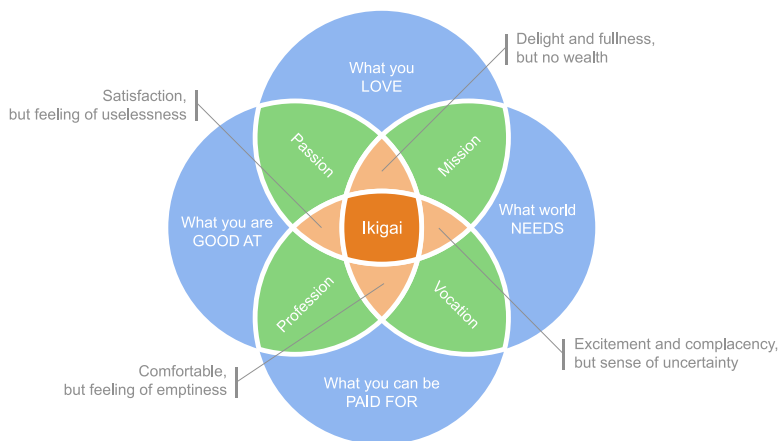
> **"Dr. Reznic and the team at Amimon realized that we can get much closer to Shannon's theoretical limits by treating the video and the channel as one, as opposed to treating them as two separate things. They're not violating Shannon's Law. They're embracing it, pushing it right up to the limit."**

in the process of making a movie, a TV show or a commercial, I felt much more fulfilled than when I was just making a security camera at GE or working as a rocket scientist. Those jobs were technically challenging but they were not as rewarding. They didn't speak to my artistic side. Even though I'm still not an artist I now enjoy working with artists. I absolutely love watching a behind the scenes video and get a thrill whenever one of our products shows up.

It gives me a sense of pride. From that pivot, everything has led up to the acquisition of Amimon. As you know, I fell in love with the cinema industry and building tools for it. But I was vexed that our contribution was perhaps a bit superficial. We took something and we subtly shaped it, molded it a bit, badged it, and then sold it to someone working in cinema. But the underlying part wasn't ours in the sense that we deserved most of the credit for it. More importantly, it wasn't ours to completely direct.

Some people might be tempted to think we acquired Amimon simply for supply chain reasons or because we wanted to control all the access to this technology. Or maybe in astute business model mode, some people might say we wanted to secure access to this technology because we, like anyone else, we were at risk of losing it at some point if the company failed or we were acquired by someone else outside our industry.

Those are not the reasons. We acquired Amimon because we want to influence and direct this technology, so that we can apply it to what we're really passionate about, which is the cinema industry.

If you think back, Dr. Reznic, you and I sat in a room and he explained the technology. We discussed three scientific/mathematical theorems and how you can prove them from within the rules of math itself. We talked about the Shannon Information Theory. Everybody who studied electronic engineering or anything in communication will be familiar with Claude Shannon and his paper "A Mathematical Theory of Communication," also referred to as Shannon's Limit. It basically says, here is a physical channel, and the physical channel has some physical characteristics that give you an absolute maximum amount of information that can be sent through that channel. You will never be able to exceed it. Just like entropy or relativity, it was derived from fundamental math. Like Entropy, and unlike Einstein's Relativity, people don't question this. They just accept Shannon as gospel. Nobody is trying to prove Shannon wrong. Since 1948, everybody agreed that his math was correct.

Dr. Reznic and the team at Amimon realized that we can get much closer to Shannon's theoretical limits by treating the video and the channel as one, as opposed to treating them as two separate things. They're not violating Shannon's Law. They're embracing it, pushing it right up to the limit.

The Amimon concept was something fantastic, incredibly smart, but it was misdirected in the markets in which it was applied. It

was this fundamentally beautiful thing but all they wanted it to do was to replace a damn HDMI cable. They took something that was so special and applied it to something that was so mundane. Enter Teradek in 2012. We took that concept and applied it to the world of cinema. In the process, I nearly went bankrupt, but ultimately, we were rather successful. Amimon survived because of it. Everyone in the industry benefitted.

I found myself in a very lucky position. I became sort of a translator between the Amimon team, with their incredible talent and intellectual property, and the industry with its requests. I was the translator of things that Amimon could implement, and then translating that into something people could apply. That was my role.

Sometimes we get a pushback from the industry because we're considered a big dumb company with a good market share. I can see how people might feel that way. But, the reality is, it's a good market share in a very small market. We still are a very small company. You visited my office last year. I actually still have the original, cheap open office furniture I bought open box from Plummer's. That's a furniture store in California, like an Ikea. I remember starting Teradek from my second mortgage, and going to the local furniture store. I picked up a bunch of chairs and a glass table. They were floor models, flimsy stuff. And that's the office furniture I still have today together with my 2011 iMac! We are absolutely still a scrappy startup. The fact that we achieved a decent market presence and market share in a little niche market doesn't change who we really are.

You might ask, "But aren't you part of a big corporation which is Vitec?" Yes we are but we continue to fight long and hard to maintain our identity. That's why we are part of Creative Solutions, a separate division of Vitec. We focus specifically on exciting, younger brands. It's been about 5 years now since Vitec acquired Teradek. The journey continued with SmallHD, Paralinx, Wooden Camera, Off Hollywood, Rycote, RT Motion and now Amimon joining Creative Solutions. There are 350 people working in 10 locations.

Nicol in the Teradek Irvine office with open box furniture and old iMacs.

Ikigai, Art and Analogies, cont'd

Herods Hotel in Herzliya. Stay there if you go to visit Amimon.

Detail of Norman Teeling's *O'Connell Street in Dublin.*

There is another analogy that comes to mind. We were in Tel Aviv a few weeks ago. It was incredibly stressful. The closer you get to the finish of an acquisition, the more stressful it usually becomes. We finished the work in the nick of time. We were standing in front of our hotel, Herods in Herzlyia: Marius, our COO and a team from Amimon. Not to sound too Biblical, but the heavens opened up. It rained two inches solid. We had just come from California where the forest fires were burning and is was smoky, dry, and miserable. So we loved the rain. Here we were, standing in Israel, in a place that I would expect seeing so much rain. I said, "That has to be a good omen: two Californians standing here in Israel in two inches of rain." The locals, of course, did not like the rain.

I replied, "You know, I'm at that point in life where I'm just starting to perceive things a little bit differently and starting to appreciate smaller things. Like rain in dry places."

It's similar to how I learned to appreciate art. These days whenever we go on a trip, I try to find an affordable art gallery and buy an original painting by a local artist. Hopefully, it captures the landscape or the city we are visiting. Originally, I just wanted to take my own photos. To me, art was landscape photography. But later on, I learned to appreciate painting. I enjoy paintings where the artist uses a palette knife or very rough brush strokes. I appreciate impressionism and pointillism. Above all, I like texture.

And then I thought, "Maybe this is how life is, how your perception of art develops, or even how your senses develop." Think of it: when babies are born, one of the first things they notice is color. It might be a giant red or green blob above the crib and a blue thing that spins. Then they develop a sense of space and dimensions and shapes. But texture come much later.

Maybe that's how it was in trying to build Teradek and Creative Solutions. Initially, it was just, "Build a company. Try to earn a living." That was the baby's red, blue, and green. And then we grew. We added more companies, built more pieces that attached to cameras. But now I'm at a point where it's not good enough for me to just run a bunch of brands. I want to have real excellence in design, and smooth integration, and build things that can stand the test of time , hopefully be around a hundred years from now.

That's texture. It's one of the last things for which you develop appreciation. But in a way, it's the most rewarding. The paintings that I love the most, all have texture. If you look at a painting up close, you can see the brush strokes, some colors and textures. Very often, you do not see the actual objects or the purpose of the picture. But step back, and it becomes clear. It's a wooden cart or someone standing on a hillside or a landscape at sunset.

A good example is Norman Teeling's *O'Connell Street in Dublin*. Go up close and you can't make head or tail of it. You see yellow, blue and red splotches, and a patch of purple. When you step back, all these colors start to blend. You can't find that purple again. But you see the people, and the cars.

That's analogous to my journey. Merely looking at Amimon as a supplier, or Teradek as a brand, you're just seeing the colors in the picture. You might be seeing the objects of the scene. But you're not paying attention to the texture. Only once we appreciate texture do we truly understand the scope of what we're trying to achieve.

Above: Norman Teeling. *O'Connell Street in Dublin.* Oil on canvas. 32 x 32 in. Norman Teeling is a leading Irish Impressionist. He graduated from the National College of Art and Design, Dublin. He also worked in animation and on features as a background artist. *normanteeling.com*
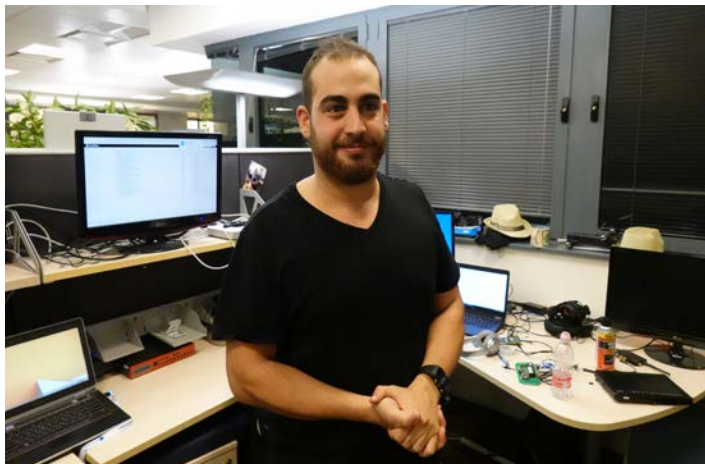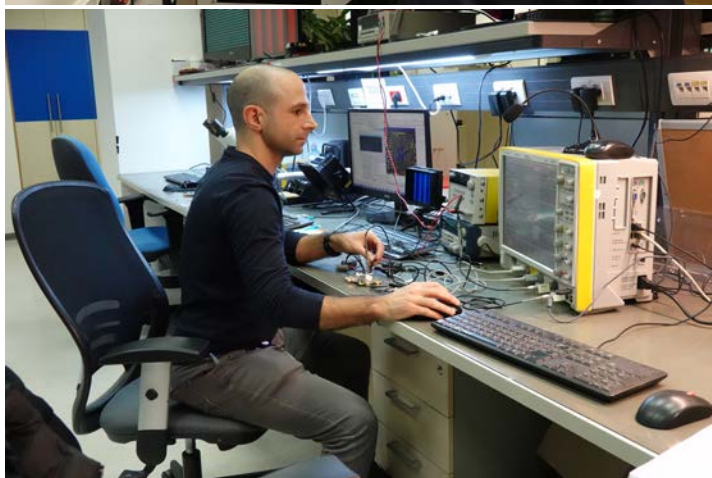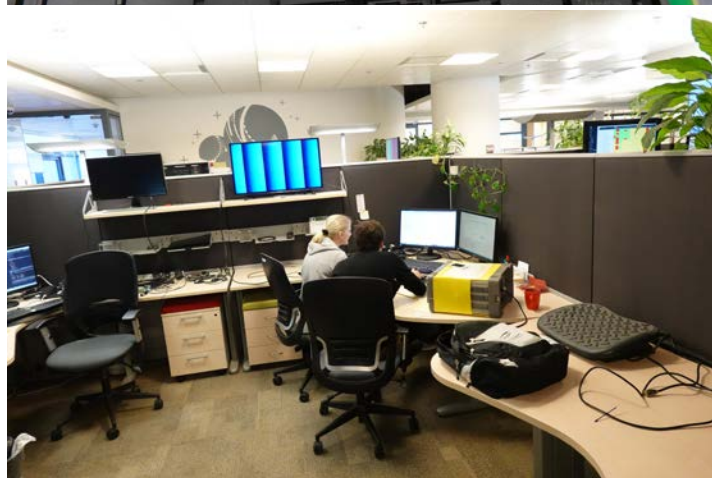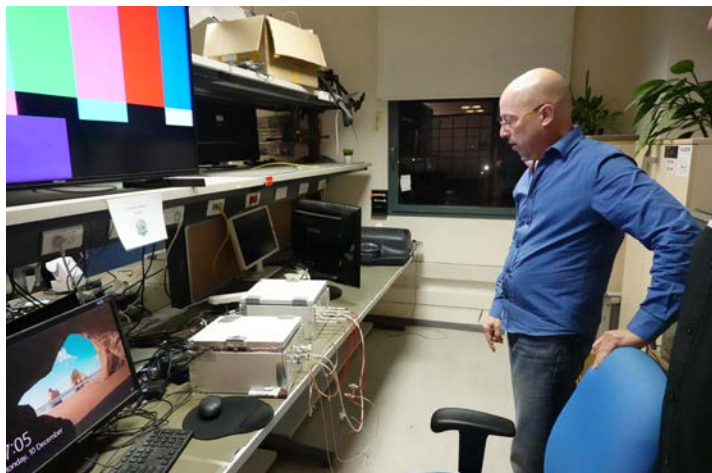
Amimon, cont'd
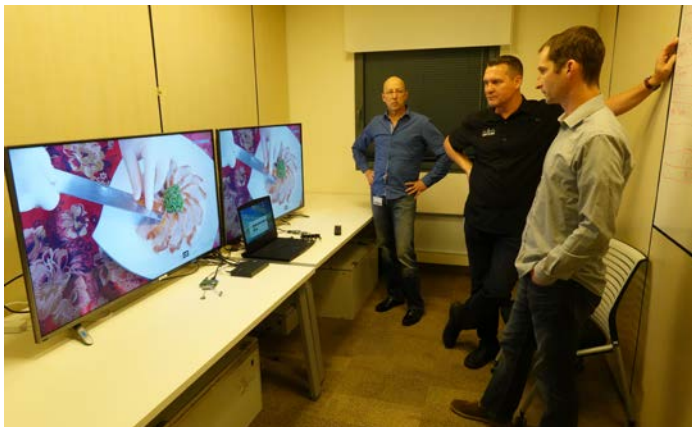
Testing 4K system, comparing latency and quality.

Testing wireless video in real time on real cameras, gimbals and rigs.

Testing chips.
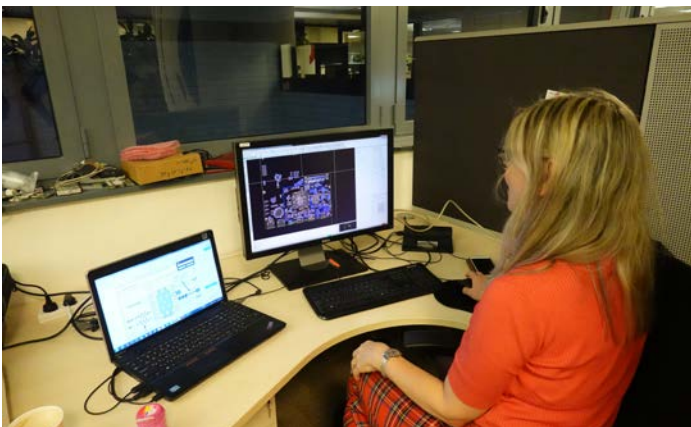
Designing circuitry.

Amimon Celebration, cont'd

If you go, hopefully Amimon will throw another party like this End of Year + Acquisition celebration. It wins FDTimes Best Company Celebration of the Year Award. Studious engineers by day, they sure know how to party. Fabulous Peking duck, fine local wine, speeches, videos, singing, dancing.

Ray's Photos: Uzi Saltoon

CVP Creative Experience - Newman Street, London

Business magazines brim with advice on how retail stores can increase traffic by offering a "unique customer experience." And so we have Apple Stores, NikeLabs, Leica Galleries and places with great service where customers can "play."

CVP has been doing business for 30 years in the United Kingdom and Europe. Now they have opened a veritable playground for camera crews in a unique showroom in Newman Street, London. Their CVP Fitzrovia townhouse is called CVP Creative Experience and has five floors of production equipment from major manufacturers, including Sony, Canon, ARRI, RED, ZEISS, Panasonic, Blackmagic and many more.

The CVP Creative Experience currently houses:

- Canon floor with a selection of their professional and consumer cameras, C700 FF, EOS R, third-party accessories, and a separate room with Canon monitors.
- Sony floor with VENICE, Alpha series mirrorless, pro and consumer cameras, along with third-party accessories.
- Europe's largest display of ZEISS lenses. You can bring your own camera to test the lenses or use CVP's.
- Cameras from ARRI, RED, Panasonic and Blackmagic.
- Blackmagic suite with DaVinci Resolve grading and editing and other Blackmagic converters, recorders and adapters.
- Lenses from Angenieux, Cooke, Canon, Fujinon, Leica, Panasonic, Sigma, Sony, ZEISS, etc.

- Gimbals and accessories from DJI, Freefly, Cinemilled, etc.
- Camera accessories from Wooden Camera, Bright Tangerine Vocas, SHAPE, 16x9 Inc, Sachtler, Ronford Baker, OConnor, Manfrotto, Anton/Bauer, Tiffen, Tilta, Easyrig...

The Motion Room is filled with gimbals and there's a Monitor Wall with the latest displays on display, synced together via a video router to compare the same feed. Visitors can plug in any camera and the same image will be displayed across all 20 or more on-board monitors at the same time.

Test Areas are available to obsess over lenses, cameras and filters.

CVP Creative Experience, cont'd

Jon Fry, Sales Director of CVP (above), said, "The concept behind the Newman Street facility is to provide visitors with an engaging experience in an environment designed to connect creativity and technology. This permanent display of equipment is a playground where people can come to see, handle and test every single bit of kit required to bring their project to life. From an HDMI cable to large format cameras and everything else in between, this creative space gives everyone in the industry a place to learn new skills and get hands-on with all the latest equipment, all year round."

The CVP Creative Experience also welcomes crews, manufacturers and industry professionals to their event space for lectures, seminars and screenings.

cvp.com   *27 Newman St, Fitzrovia, London W1T 1PN, UK*

CVP & ARRI Creative Space

It's a short walk from Newman Street to the CVP & ARRI Creative Space in a nearby Fitzrovia townhouse on Charlotte Street.

The facility was set up in April 2018 and is run by CVP. Here, the latest ARRI cameras, ALEXA LF, ARRI Signature Primes, lenses and accessories are on display in the showroom. Support equipment is supplied by Codex, OConnor, Ronford-Baker and more.

81 Charlotte Street, London, W1T 4PP, UK.

CVP & BSC Expo

CVP brings a mini version of their newly-opened Creative Experience facility to the BSC Expo 2019 at Battersea Evolution, London on February 1-2, 2019.

CVP's presence echoes the thinking behind their Newman Street and Charlotte Street creative facilities in London, which are designed to provide visitors with the time, space and impartial expert advice to explore a wide range of leading production equipment and find the right combination for each project.

The aim is to give visitors a taste of the customer-focused experience they can enjoy at Newman Street and Charlotte Street.

Along with a huge assortment of equipment, CVP also provides visitors with tastes of a different kind in their bar and lounge area.

bscexpo.com

CVP Pro Authorized Service

CVP Pro Repairs is a respected, authorized service center for cameras, tripods, monitors and lenses from major manufacturers, including ARRI, RED, Sony, Panasonic, OConnor, Sachtler, Vinten, Litepanels, Cartoni, SmallHD, Angenieux, Canon, Fujinon and Cooke. The facility handles repairs from all of Europe.

CVP's team of more than a dozen factory-trained, skilled in-house engineers are there to offer expertise, support and service with short turnaround times. The newly developed "track and trace" system lets customers follow their equipment throughout the process and lets them know when their job has been completed.

23 Shield Dr, Brentford TW8 9EX, UK
cvp.com/services/professional_repairs

RED Authorized Service

CVP is not only a RED Authorized Dealer for the UK but also a RED exclusive Certified Service Center in the UK and Europe.

Staff from RED have joined the team of CVP engineers based at CVP's Brentford facility to increase the size of the service and support group.

"When you have a product issue, you want to be able to speak to a human being who fully understands the problem and can offer efficient solutions," said Jon Fry. "Our service capabilities, built on many years of industry experience, enable us to offer RED customers a more in-depth level of service, excellent product expertise and faster turnaround times. We're proud to be one of a handful of RED Certified Service Centers around the world."

CVP took on service, top-tier support and repairs for RED's cameras and accessories beginning October 17, 2018. Customers can schedule service inquiries and in-house repairs in the new Service Center at CVP Brentford.

RED's new facility in Gresse Street, London, together with the Creative Experience on Newman Street and the CVP & ARRI Creative Space on Charlotte Street creates a "Camera Triangle" where film and television creatives can gain a wealth of hands-on experience and technical advice, all within a few minutes' walk of each other, in the center of London.

cvp.com/services/professional_repairs

CVP Large Format Test with ARRI

ALEXA LF (Full Frame) with 75mm Signature Prime
photographed directly off CVP's Sony Trimaster EL Monitor screen.

ALEXA Mini (Super35) with 50mm Master Prime
photographed directly off CVP's Sony Trimaster EL Monitor screen.

CVP recently hosted a Large Format event in collaboration with ARRI at the CVP & ARRI Creative Space. The CVP team set up a test with the ALEXA LF, ALEXA Mini (fitted with LPL mount) and ARRI Signature primes. The lenses were 18, 25, 35, 47, 75 and 125 mm. The event was overseen by CVP Account Manager Aaron George, who prior to joining CVP in 2017, spent almost 12 years at ARRI as UK Head of Camera Service.

Aaron explained, "We set it up as a very informal event, no presentations, just the chance to test and discuss the results with peers. It was an opportunity to look at how these cameras and lenses handled light, skin tones (with and without filters) and depth of field, especially with fairy lights in the background.
[Collins Dictionary: Fairy lights are small electric lights that are hung up as decorations, for example on a Christmas tree.]

Two studio sets were available, each with an ALEXA LF and an ALEXA Mini. The bar set was lit with ARRI SkyPanels, candles and fairy lights. The lounge scene had natural light from a large window augmented by SkyPanels.

"One of the things our visitors found most fascinating about the Signature primes was the magnetic filter holder at the rear," said Aaron. "It lets you add nets, glass elements, fishing line for streaking effects, aluminum foil, stockings and anything else. You can create completely different looks with the same lens." Tests were viewed on a large Sony Trimaster EL OLED monitor.

The event attracted cinematographers, camera operators, focus pullers, 2nd ACs, members of the ACO, BSC, GBCT and Illuminatrix, producers, directors, film school faculty and students, editors and colorists. ARRI Product Managers Marc Shipman-Mueller and Thorsten Meywald were on hand along with Milan Krsljanin from ARRI and CVP technical staff to answer questions.

Aaron summed it up: "We had a good turnout with a lot of genuine interest in Large Format and the ARRI range. There have been a wave of people looking for vintage glass with a unique look. ARRI's Large Format cameras and Signature Prime lenses, particularly with their magnetic filter holders, opened up the imaginations of DPs and Directors to see how they could achieve some unique looks."

ARRI's test footage of the magnetic backs: vimeo.com/307477493

The test above compares the same scene in Large Format (Full Frame) and Super35. There's a parallax error because the cameras are side by side. To calculate which lenses give you the same field of view at the same distance to the subject, and at the same aperture, divide the Full Frame lens by 1.4 or 1.5 and that's the Super35 focal length to use. So, above left, the Full Frame lens was a 75mm ARRI Signature Prime on an ALEXA LF. And, above right, 75 ÷ 1.5 = 50mm Master Prime on ALEXA Mini.

Marc Shipman-Mueller of ARRI commented, "This shows the difference in depth of field and perspective nicely. It illustrates that you need a longer Large Format lens to get the same angle of view as Super35. This usually leads to a discussion of how longer focal lenses look more interesting and more natural for faces." Also notice the bigger bokehs of the Large Format lens, and also how the background appears closer.

Above: bar set at CVP & ARRI Creative Space.
Below: Signature Prime Magnetic Filter Holders

More Lens Tests at CVP

Left to right: Faith Glenister (VMI), Gerard Botha (VMI), Carey Duffy (Cooke Optics), Greg Duffield (DP), Dave Broomhead (Grip), Ian Jackson, Assoc. BSC (VMI), Emma Friend (1st AC), Genevieve Subbotin (CVP).

by Carey Duffy, Director of Sales - Europe, Cooke Optics Ltd.

There has been a lot of lens testing lately. We shot some tests recently on the ground floor of CVP's new Newman Street offices in central London. This Georgian Grade II listed townhouse (built circa 1760-70) was chosen for its characterful setting.

The test was designed by VMI's Commercial Director Ian Jackson, BSC Associate Member, to be presented during BSC Expo at CVP's stand and will appear online in various formats.

When asked about the setup, Ian explained, "There are two very popular aspect ratios at the moment for television work—2.0:1 and 2.35:1. These are possible using either spherical or anamorphic lenses. With the availability of more Full Frame lenses, more pleasing perspectives are now readily available. This test is the first version of an on-going process to explore these characteristics and will be repeated as other products become available.

"Sony Venice was chosen as our benchmark camera as it can achieve Full Frame 6K and also Super35 4:3 4K. We shot in both 2.0:1 and 2.35:1 aspect ratios, using both anamorphic and spherical lens sets. We also did some vignetting tests that demonstrated illumination coverage in Full Frame and Super 35mm formats.

"Most major manufacturers' lenses were tested. We designed the test to highlight the differences between them and also to compare lenses from low-budget to high-end. While comprehensive, it is not exhaustive, as we did not have access to Panavision glass, for example. But we have tried to keep the parameters as homogenised as possible."

The test conditions maintained a constant lighting rig and a consistent T-stop measured on a light meter and applied to the lens (no histograms or scopes were used). The lenses all captured the same shot in 6K and 4K (where possible) in 2:1 and 2.35:1 aspect ratios, at near or minimum focus. The only variation was to increase the ASA rating on the VENICE when a lens could not open to the base stop of T2.5.

Shot on Cooke

by Carey Duffy

#shotoncooke and *shotoncooke.com* are designed to present content from our current and some of our discontinued lens series.

The unique look of Cooke lenses means that one test film doesn't really do justice to the different lens series. Cooke lenses' dimensionality, roll-off and edge fall-off are present across all the different lens series. But T-stop, lighting, focal length choice, combined with composition and movement, made me realize that we had to produce something completely different that incorporated all the wonderful material that I knew we could get from a wide array of different types of productions: Commercials, Drama, Docos, Features, Music Videos. It is nearly endless.

I then sat down with Les Zellan and poured out my thoughts and ideas about lenses, technical data, cinematograpers' insights, the genres Cooke lenses are used on, the material that was available and how we could get the community involved in contributing material and information about what is #shotoncooke. A few days later Les sent me an email with words to the effect that he had registered the *shotoncooke.com* website name and I should get on with it.

Navigation of shotoncooke.com is designed to search by genre and lens series. So if you want to look for a Music Promo shot on S4/i you click the drop down menus and highlight this and up they come. We have built a unique motion gallery that has many opportunities to show the wonderful work cinematographers using all of our lenses series, and it's mobile too.

In submitting their work to *shotoncooke.com*, cinematographers include Lens Series, Format, Aspect Ratio, Rental House, name and website. We added other fields of information to complete if the data is available. The most interesting area is where the submitting cinematographer describes why they used Cooke lenses on their project.

So far, I have been blown away by the contribution so many cinematographers have made with their insight. I hope you find *shotoncooke.com* enjoyable to watch and feel the data that the cinematographers have contributed is interesting and useful.

More Than Just Parks *is an online short film series by Will and Jim Pattiz to celebrate our National Parks. They also produce* Your Forests Your Future *with the National Forest Service.*

JON FAUER: Tell us about your projects.

WILL PATTIZ: *More Than Just Parks* is a project that my brother and I started about 4 or 5 years ago after a spur-of-the-moment first-time road trip with a bunch of buddies to the Grand Canyon and Petrified Forest. Setting foot inside a National Park was a life-changing experience and one that we encourage everybody to do. We asked, "How many other folks have gone their whole lives and never been to one of these places?" And that eventually turned into, "We've got to share these places with as many people as possible to ensure that the parks are always here." And so, *More Than Just Parks* was born. It's a visually stunning journey through our national parks. And the way we're doing that is primarily through video.

What equipment do you use?

We were using the Blackmagic URSA Mini 4.6K. We recently got their Pocket Cinema Camera 4K, which we absolutely love. I don't think any DSLR right now can come close to the Pocket Cinema Camera 4K for video. Shooting RAW is massive for us.

The second reason we like the Pocket Cinema Camera 4K is because it's so lightweight. With the work we do, for example hiking 20 miles to location with all the equipment in a backpack, size and weight are very important. The camera is wildly lightweight. You don't even feel the weight in your backpack. It's versatile and rugged. We've dropped it on pavement [*do not attempt*] and it still

works just fine. I can't believe the results we can get out of that camera in such a small package.

Take us through the editing and grading process from the Pocket Cinema Camera 4K.

We bring the media files into DaVinci Resolve Studio, and then edit, grade and deliver.

And what are your deliverables?

If you walk into a Best Buy, Target or Costco, you can see a lot of our footage on their display TVs. Those are often DPX sequences. For YouTube or Vimeo, we usually export the video in H.264 or H.265 formats.

Take us through a memorable sequence.

With the Pocket Cinema Camera 4K, one of the coolest things is the dynamic range. We were recently in the Bridger-Teton National Forest and were shooting a sunset. We thought the sky would be way blown out because we wanted to keep the foreground detail. We basically exposed for the sky and thought the foreground would be like a silhouette. When we brought the footage into DaVinci Resolve Studio and started editing the RAW files, it was amazing. The entire foreground was completely recovered. That's been the case for a lot of shots. We've shot dark creeks on an overcast day, close to sunset with flowing water and the amount of shadow detail you're able to recover is surprising, without getting grainy.

Size, weight and portability are important because you are trekking long distances, and the entire camera truck is in your backpack? And the editing room?

Exactly. It is a combination of portability and quality. We love how portable the Pocket Cinema Camera 4K is. We have Lowepro backpacks. They have a top hatch and good side pockets and they're a good hybrid between a hiker's backpack and a camera bag. Inside, we carry the camera, lenses, batteries, media cards, our clothing and food. We strap a tripod to the side. A lot of times we'll edit a sequence quickly on location and we'll just use the Blackmagic Camera RAW tool. The workflow with this camera is fast and easy.

How do you recharge your batteries?

That's the trickiest thing. We bring car chargers, but the camera can take down a battery pretty quickly. One battery will run the camera continuously for about 30 minutes. So we bring a lot of extra batteries, and sometimes we'll bring an external power source.

I guess you carry many media cards with you?

We carry a bunch of CFast cards. We're mostly shooting 4096x2160 Cinema DNG RAW.

You pack a laptop as well?

We usually leave it in the car. For the most part, we go out on day trips. We have 7 to 10 days to shoot an entire park. We have a similar project with the Forest Service called *Your Forests Your Future* and we'll be given 7 to 10 days to cover a National Forest. It's more about getting many of the locations in, and not spending too much time trying to get into the craziest spot. We're also lucky to be working with the Park Service and the Forest Service. They give us a lot of access into places via helicopter and boats, and make it easier for us to get to some of the locations.

How do you shoot aerials and moving shots?

Because we try to keep things lightweight, we work with the DJI Inspire 2 and Mavic 2 Pro. We like the Ronin-S handheld stabilizer; it supports the Pocket Cinema Camera 4K nicely.

Do you use sliders for camera moves and timelapse?

If there's a camera move, we try to use a handheld rig like DJI's new Ronin-S with the Pocket Cinema Camera 4K attached. That's because we have limited setup and breakdown time and we try to do things as simply as possible—unless it's time-lapse. Sometimes for time-lapse we work with sliders from Dynamic Perception. The Pocket Cinema Camera 4K does timelapse really well. That's a big component of what we use it for and it offers a different perspective. The camera shoots 4K timelapse and it allows our workflow to be a little faster on the back-end. The Blackmagic camera has all the time-lapse settings in the menu. You can choose number of frames and intervals between frames.

If it rains or snows, how do you keep the camera dry?

A lot of the time we just use whatever we've got: like a rain jacket or plastic bag. Jim and I were in Zion National Park and a snowstorm hit us out of nowhere. We were doing a time-lapse with the Blackmagic camera. You see this big red canyon. Then, all of a sudden, a huge snowstorm comes in to white-out conditions and the screen goes white. As the storm passes through, you're left with a beautiful blanket of white snow on the red canyon. We were just covering the camera with a rain jacket.

So the National Park Service or the U.S. Forest Service are the sponsors and fund these films?

For *More Than Just Parks,* we work in collaboration with the Park

Service. Most of the funding comes from us and then from back-end licensing. It's really more of a passion project. The National Forest Service project was co-founded with them to bring awareness to our forests. They saw our work on *More Than Just Parks* and reached out to us. We worked together to develop *Your Forests Your Future*. And if you throw a ".org" on the end of that you get the website. It is great because it's getting Americans involved with forest plan revisions, which may sound like the most boring thing in the world, but is probably the most important thing happening on public grant lands right now that nobody knows about. Basically it involves all 193 million acres in the 155 National Forests. The public is invited to get involved in determining how these forests will be managed. So we're really trying to create awareness around that to make sure everybody's voice is heard.

How threatened are our forests?

Any National Forest could be "threatened." Unlike a National Park, the forests are managed under a multiple-use rules. Forests can have active oil, gas and timber permittees. On the flip side, there are folks working all the time to try to protect more forest wilderness area that will never be allowed to be mined or impacted in any way. So it's kind of a battleground for public lands. In our official capacity, we cannot choose one side or the other. We just put the information out there. But I think if you put the information out there, usually the right sides win.

Especially when people see your beautiful images.

Thanks. We love to chat and spread the word about the good side of public lands, the fun side that everybody can get behind.

morethanjustparks.com   yourforestsyourfuture.org

Blackmagic Pocket Cinema Camera 4K

The Blackmagic Pocket Cinema Camera 4K is rugged, compact, lightweight and shoots video, stills and timelapse. It was introduced at NAB 2018 and is shipping now.

This is the camera to take when you want to blend in as someone with something that looks and feels like an ordinary still camera. But unlike ordinary mirrorless still cameras, this one records 4K 10-bit ProRes or 12-bit RAW internally.

When you're not doing street cinematography, the Blackmagic Pocket Cinema Camera 4K is great on stunts, car rigs, skydiving and skiing helmets, gimbals, drones, independent films, docs, fashion, sports, action, travel blogs and corporate videos.

The multi-function grip has logically placed buttons and dials for quick access to essential shooting functions like record start/stop, still photos, ISO, shutter, aperture, white balance, power, etc.

Video is recorded onto an internal SD card, (faster UHS-II SD recommended) or CFast 2.0 card in either ProRes or CinemaDNG RAW. Blackmagic RAW is expected soon via a firmware update. You can record directly onto external USB-C solid state drives. When ready to edit and grade, just unplug the USB-C drive from the camera and connect it to DaVinci Resolve. That speeds things up because you don't have to transfer files.

The Blackmagic Pocket Cinema Camera 4K has a Micro Four Thirds (MFT) size 18.96 x 10 mm sensor. (Officially, MFT is 18 x 13.5 mm, but that's about as official as trying to say what Super35 is. The MFT lens mount's Flange Focal Depth is 19.25mm and its inside diameter is 21.64 mm Ø. A vast selection of lightweight and inexpensive MFT lenses abound: from Sigma, Panasonic, Cosina Voigtländer, DJI, Kowa, Olympus, Samyang, Tamron, Tokina, Veydra and more. Also, there are many mechanical adapters available for PL, LPL, PV, M, F, C, EF and other lenses.

The Blackmagic Pocket Cinema Camera 4K uses the same MFT lens mount as the original Pocket Cinema Camera, shown below. That sensor is 1920x1080 HD, 16mm size (7.02 x 12.48 mm). By

comparison, an Arriflex 16SR3 gate is 7.5 x 12.5 mm, give or take, depending on whose groundglass you have. The original Pocket Cinema Camera was introduced at NAB 2013. It fit easily into your pocket. The new Blackmagic Pocket Cinema Camera 4K needs a larger cargo pocket, but not deeper pockets: it costs an astonishingly low $1295, and includes a full version of DaVinci Resolve Studio.

The Blackmagic Pocket Cinema Camera 4K has dual native ISO ratings of 400 and 3200. You do not have to switch from normal to high. Instead, when you adjust from 100 to 1,000 ISO, the camera automatically uses 400 as the base. When you want a rating from 1250-25,600 the camera goes to 3,200 ISO as the base reference. By the way, 1250 will look better, with less noise, than 1000.

At NAB 2018, Grant Petty described the evolution of the new camera: "The original Pocket Cinema Camera was nice, little and popular. People started asking us about a 4K version of it. So we started the project. We wanted to improve on the original—to make something more professional. We wanted the same Active MFT lens mount so you could use the same lenses and adapters. And we know that people have a lot of those.

"At the same time, the design had to be able to handle extra heat. If you've got a 4K sensor, you need more power. And you need a big screen. Without a big screen, seeing critical focus is difficult. We also wanted really good ergonomics. Then we started to work on the handle design. It has a grippy, rubber surface with a nice feel. And we wanted really good audio. So we put four microphones in it. They define the form factor in many ways. And you have good controls. There are high frame rate, shutter angle and iris adjustment controls.

"The body is carbon fiber polycarbonate composite. It's strong

The original Pocket Cinema Camera

Blackmagic Pocket Cinema Camera 4K

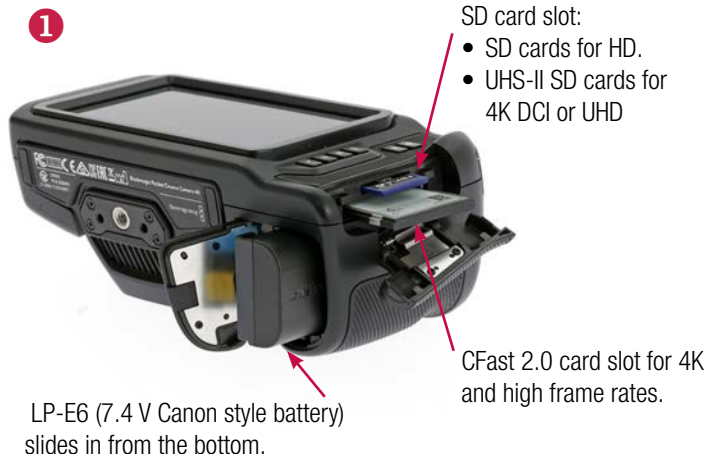Grant Petty unveiling camera at NAB. Photos: Mark Forman

and light weight and protects the camera from bangs, drops and you'll be able to take it almost anywhere. On the side, we put connectors for full-size HDMI, USB-C expansion port for external recording, XLR audio and 12 Volt external power. There are internal media slots for a CFast and SD card.

"In fact, there's only one part on this camera that is the same as the original Pocket Cinema Camera—and it's just a small ring inside the lens mount. Everything else is different."

Blackmagic Pocket Cinema Camera 4K Specs

- Micro Four Thirds (MFT) CMOS sensor: 18.96 x 10 mm.
- 4096 x 2160 (4K DCI), 3840 x 2160 (Ultra HD), 1920 x 1080 (HD) resolutions.
- Records CinemaDNG RAW uncompressed 4K 12-bit RAW. and ProRes 422 HQ 10-bit 4:2:2 internally to CFast 2.0 media.
- MFT lens mount Flange Focal Depth: 19.25mm.
- MFT mount ID: 21.64 mm Ø.
- Active MFT mount for auto focus, auto iris on enabled lenses.
- Dual native ISO: 400 and 3200, adjustable from 100-25,600.
- Records 4K up to 60 frames per second and windowed HD at up to 120 frames per second.
- 7"W x 3.8" H x 3.4" D.   Weight: 1.59 lb.
- Power: 12-20 V DC or internal LP-E6 (7.4 V Canon battery).
- Multi function grip for quick access to recording start/stop, still photos, ISO, shutter, aperture, white balance, power.
- CFast and SD card slots.
- USB-C connector for recording to external SSD.
- External 10-bit 4:2:2 ProRes recording via HDMI.
- External 12-bit RAW recording via USB-C.
- Full size HDMI connector for monitoring with camera status graphic overlay.
- Mini XLR audio input with 48 V phantom power.
- 3.5mm audio jack, headphone jack, and 12 VDC power and charging connector .
- Built in 5" LCD 1920x1080 touchscreen.
- LCD screen supports "touch to focus" control.
- LCD screen shows status, histogram, focus peaking, and transport controls.
- 3D LUTs can be applied to both monitoring and recording.
- Familiar Blackmagic menus as used on URSA Mini and URSA Broadcast cameras.
- Remote camera control via Bluetooth.
- ¼-20 mounting thread on top and bottom.
- Includes full license for DaVinci Resolve Studio.

Blackmagic Pocket Cinema Camera 4K

❶

SD card slot:
- SD cards for HD.
- UHS-II SD cards for 4K DCI or UHD

CFast 2.0 card slot for 4K and high frame rates.

LP-E6 (7.4 V Canon style battery) slides in from the bottom.

❷

For extra security, tape the battery compartment door with electrical or gaffers tape

The ¼-20 threaded socket is centered below the lens and the balance point.

❸

Uncompressed still photo, saved as .DNG file to root directory of media card

Settings DIAL

RECORD Start - Stop

Press each of these buttons to adjust with Settings Dial:
ISO
Shutter
White Balance.
You can also auto-adjust White Balance by holding this button down for 3 secs.

Power ON - OFF

This ¼-20 threaded socket is not a mounting point. It cannot support the camera. It is for lightweight accessories. To underling, use a cage.

❹

3.5mm Mic or Line Audio Input. Also Timecode IN, which can be jam-synced.

3.5mm Headphone Output

Full-size HDMI Output: for Monitoring with or without text and External Recording

USB-C port for recording to external SSD. Also to recharge battery and update software.

External 12-20 V DC Power Input and Battery Charger

Mini 3-pin XLR Mic Input

❺

Touch to Autofocus on any specific area of the screen (with MFT autofocus enabled lenses)

IRIS: push for auto exposure with auto enabled lenses

FOCUS: push for focus with auto enabled lenses

HFR: toggles between High Frame Rate and project's normal fps

ZOOM in to check focus

MENU   PLAYBACK

MEDIA Card Cover: slide back to open

❻

RECORD Start - Stop

PL to MFT Mount Adapter by Wooden Camera

Settings DIAL

Blackmagic Pocket Cinema Camera 4K

7

A cage like this one from Wooden Camera helps to support the PL to MFT adapter with a heavy lens like this Tokina Vista Prime 18mm T1.5. It's also essential if you're mounting the camera from its top.

Controls and Settings

8

The Blackmagic Design Pocket Cinema Camera 4K menus and navigation will feel familiar to anyone who has used the URSA Mini Pro Cameras. For full details, download the Manual from: blackmagicdesign.com/support/family/professional-cameras

FRAME RATE: tap here to adjust and also to toggle OFF SPEED FRAME RATE on and off at the lower right of the touchscreen. Here, we have a Project Frame Rate of 23.98 fps and we're shooting at 51 fps for slightly slow-motion.

SHUTTER

IRIS. You can toggle Auto Iris on and OFF here.

TIMECODE Hrs: Mins: Secs: Frames

ISO

WHITE BALANCE

TINT Green-Magenta

BATTERY Status. One battery will run about 30 minutes continuously.

Swipe up or down on touchscreen for clear image without icons. Swipe left or right for Slate.

Touch to RECORD Start-Stop

MENU takes you to the Dashboard with settings for RECORD, MONITOR, AUDIO, SETUP, PRESETS and LUTS

MEDIA Card status. Touch for details and to FORMAT

9

Timelapse

RED Clock-like icon means we are in TIMELAPSE mode. Turn it on and off from the Dashboard (push MENU, RECORD, 3rd screen)

DJI Ronin-S

Tilt Motor

Roll Motor

Pan Motor

Joystick

M Button to switch tuning profiles

Monopod extension or tripod

Focus knob for compatible cameras

USB-C Power & Charging Port

Gimbal Power on/off

Start/Stop for compatible cameras. Blackmagic Pocket Cinema Camera 4K does not yet have electronic control of start/stop or servo focus, but the list continues to be updated.

Trigger

Because the Blackmagic Pocket Cinema Camera 4K has a ¼-20 bottom thread that is directly below the lens, you can use Wooden Camera's Easy Stick to offset the camera so it clears the tilt motor and bracket.

DJI Ronin-S is a pillar of stability. It definitely stabilizes cameras and sort of looks like a pillar. Or maybe a flashlight. Flashlight mode, it turns out, is actually what DJI calls one of the three shooting modes. The other two operating modes are upright and underslung.

This single-handed, 3-axis stabilizer weighs 1.9 kg (4.1 lb) with battery handle. It supports cameras up to 3.6 kg (8 lb). Essentially, you get many of the functions of the bigger two-handled Ronin (that has a16 lb payload), but in a sporty, lighter, smaller system.

The beauty of the single stick is that you have one hand for the camera and your other hand is free for focus, zoom or to hang on to whatever will prevent your demise (rock face, sailboat mast...)

The battery pack comes off and you can mount the gimbal to a DJI vehicle mount. Control the Ronin-S with DJI Master Wheels and you have a complete stabilized remote head system for under $10,199 (Ronin-S $749 + Master Wheels $9,500).
dji.com/ronin-s

Flashlight operating mode

Underslung

Upright

DJI Ronin-S

Blackmagic Pocket Cinema Camera 4K, with MFT lens and internal battery weigh about 1 kg (2 lb) combined.

Press the **battery power** button once to turn it on.

To turn battery power off: press once, release, then press and hold until the status lights go out.

Lock to secure gimbal to battery handgrip

Battery status

Press and hold the **gimbal power** button to turn it on.

To turn gimbal off, press once, release, then press and hold.

Command Unit to set up and control Ronin-S without its app: motor settings, switch operation modes, and select remote control settings using joystick and display.

3 Profile LEDs show "stiffness" of how the motors react: low, medium and high.

DJI Pocket Osmo

Operating a gimbal skillfully takes time and practice. Now that Ronin, Ronin-M and Ronin-S stabilizers are increasingly part of a camera operator's repertoire, wouldn't it be nice to have a practice partner, a gimbal Mini-Me? DJI's new Pocket Osmo performs many of the things its bigger relatives can do with gorgeously gliding grace and a very affordable price. ($349)

They say the best camera is the one that is with you all the time. The DJI Pocket Osmo is just that. It's a tiny gimbal with an astonishingly good still and 4K UHD video camera that you can take everywhere. It's smaller and lighter than most smartphones and unlike things with ringtones, shoots your smooth moves with the elegance and stabilization of much larger gimbals like the Ronin-S

"Osmo Pocket is a portable personal camera crew," said Roger Luo, President at DJI. Correct. You are not only the DP, AC, AD, PA and DIT, but also the transportation department.

- Size: 122 x 37 x 29 mm (4.8 x 1.4 x 1 in)
- Weight: 116g (4 oz)
- Sensor: 1/2.3" CMOS, 12 MP effective pixels
- Lens: Field of View: 80°
- ISO: 100 - 3200
- Video: 4K Ultra HD: 3840×2160 24/25/30/48/50/60p & HD
- Format: MP4 / MOV (MPEG-4 AVC /H.264 maximum bitrate 100 Mbps

Vocas Cage for Blackmagic Pocket Cinema Camera 4K

At the BSC EXPO 2019 in London, Vocas introduces a cage specially designed for the Blackmagic Pocket Cinema Camera 4K. camera.

The Vocas C-cage weighs a mere 255 grams complete with its angled HMDI connector, top Handgrip Mini, and SSD holder.

All the parts of the Vocas C-cage for the Pocket Cinema Camera 4K can be ordered separately: C-cage including the angled HDMI connector (0600-1000), Top Handgrip Mini (0600-1010), and the SSD holder (0600-1020).

The new Vocas C-cage is mounted to the threaded ¼-20 socket at the bottom and the top of the camera.

To keep the camera from twisting, two locating pins at the bottom of the C-cage engage in the locating holes of the Pocket Cinema Camera 4K.

Both the Top Handgrip Mini and the SSD holder can be mounted to other rigs and cheese plates as well by using the ¼-20 bolts. The Top Handgrip Mini includes a 15 mm monitor/viewfinder rod adapter, a cold shoe and several ¼-20 threaded sockets.

Also, since the Pocket Cinema Camera 4K uses a Micro Four Third (MFT) lens mount, the Vocas MFT-to-PL lens mount adapter (0900-0011) will definitely come in handy.

Vocas is at stand 003 of the BSC Expo.

For more information, availability and delivery see: *vocas.com*

Pocket Cinema Camera 4K in combination with the Vocas rig FCR-15.

Vocas MFT-to-PL lens mount adapter (0900-0011)

Wooden Camera Cage Blackmagic for Pocket Cinema Camera 4K

Wooden Camera also has an entire line of accessories and kits for the Blackmagic Pocket Cinema Camera 4K, from bare or rare essentials to pro production ready.

Shown here with Wooden Camera Unified BMPCC4K Camera Cage and PL-to-MFT adapter.

tiny.cc/woodencamera-pcc4K

woodencamera.com

The vertical post on the camera left side is essential because the top ¼-20 mounting thread on the camera is not rated for underslinging by itself. That's why a cage is important.

SHAPE System for Blackmagic Pocket Cinema Camera 4K

Top left:

Blackmagic Pocket Cinema Camera 4K fully configured with a SHAPE BM4KIT:

- Cage For Blackmagic Pocket Cinema Camera 4K (CBM4K)
- Top Handle With SHAPE Patented Push-Button Technology
- 15mm LW Quick Release Rod Base System
- (1 Pair) 15mm Rods 14"
- Follow Focus Friction & Gear Clic
- 4x4 Mattebox
- D-Box Power Distribution and SHAPE FULL PLAY Rechargeable Li-Ion V-Mount Battery
- 2-Axis Push-Button Magic Arm
- HDMI to HDMI 4K Cable

Bottom left:

Blackmagic Pocket Cinema Camera 4K outfitted with the SHAPE BM4KHH Handheld Cage:

- Cage For Blackmagic Pocket Cinema Camera 4K (CBM4K)
- Left Side Wooden Handle

Made in Canada using CNC Machined Aluminum. The lifetime warranty is reassuring.

shapewlb.com

Still Moving Pictures: *The Favourite*

Director Yorgos Lanthimos with Leica Q on the set of *The Favourite*. Photo by Atsushi Nishijima. © 2018 Twentieth Century Fox Film Corporation.
Below: Leica Q photo of Yorgos Lanthimos by Emma Stone. © 2018 Twentieth Century Fox Film Corporation.

Still Moving Pictures: *The Favourite*

Above: Emma Stone in *The Favourite*. Leica SL photo by Yorgos Lanthimos. Vario-Elmarit 24-90 ASPH IS. ISO 1600, f/3.0, 1/250 sec.
Below: Leica Q Photo by Yorgos Lanthimos of 1st AD Atilla Salih Yücer, Emma Stone and crew. Summilux 28mm ASPH, ISO 3200, f/2.8, 1/500 sec.

Paul Edwards ACO – Steadicam on *The Favourite*

Paul Edwards, ACO, Associate BSC, is a Steadicam operator based in the UK. He started as a BBC trainee, and after leaving to pursue a freelance career, signed up for a Steadicam course and never looked back. He studied Mechanical Engineering and combined with his BBC experience, enabled him to quickly feel at one with Steadicam and its operation. Deciding that this was his future, he invested in his first Steadicam rig. Over time he has always upgraded his rigs and now owns both the latest Steadicam M-1 and M-1 Volt.

Working as a Steadicam operator and B Camera/Steadicam Operator, Paul's credits include 7 of the Harry Potter *films,* Robin Hood King Arthur, The Man from U.N.C.L.E., Aladdin, *and lately, as Steadicam Operator on T*he Favourite*.   www.steadicam-op.com*

Paul spoke with Mel Noonan of StylusMC:

What are your recollections of working on *The Favourite*?

Steadicam wasn't needed for the whole movie, so I was asked by Robbie Ryan BSC to come in and cover the Steadicam on a daily basis, as and when required. It was good to see him again and also his 1st AC Andrew O'Reilly. If I remember correctly, most of the Steadicam was in the early part of the schedule, around the end of March 2017.

It was great to get back to shooting on film. There's something about the physicality—feeling the vibration through the rig when the camera runs. But having painted that rosy picture, I also remember the night exteriors when Harley (Nicholas Hoult) and Abigail (Emma Stone) are walking through the gardens and he's trying to recruit her as an informant. It was very low light and, because of the combination of the camera's video tap and the monitor, I was struggling to see the frame.

Since the production was nearly 2 years ago, can you remember any shots that were particularly difficult?

One shot sticks out in my mind because it was the first one I did on my first day. Lady Sarah (Rachel Weisz) has been handed a note and she strides off with conviction to go and see Queen Anne. We did a fast pull back with Rachel Weisz alongside the windows of a long narrow room, and as we approached the door I had to do a 180 degree whip pan into a POV, without breaking pace—the footman opens the door and I fly through it to find Olivia Colman standing up on the window sill—about to jump. Rachel comes immediately past camera back into shot so she has to fight her way through the entourage, focus puller, sound, etc. Rachel was great and very consistent with her pace, so all I had to do was to be sure of the mark at which I did the whip, and then

just go for it and hope the door would open before I hit it.

The Favourite has a particular style of framing and moving the camera. Did that affect how you operated? And, because this was before the M-1 Volt was available, would having the Steadicam Volt have benefitted you?

Yes, the very central "cross hairs on the subject" framing style that director Yorgos Lanthimos likes, and the way the subject stays central as you follow them rather than pivoting and opening up the background, plays against your instinct. The one big give-away for Steadicam is obviously if there's any horizon shift. Yorgos was very aware of this and liked having the Betz-Tools Wave to take out any slight shift. Steadicam was just one of the camera tools to be used and it was important that it fitted in seamlessly with everything else.

I didn't feel the need to use the Wave for any interiors, but I did for the exterior, as it was breezy and there was uneven ground. We were shooting very wide lenses against architectural backgrounds and so the Wave was a help. But having the camera rigged so high on top (because the Wave goes between the Steadicam and the camera, lifting it up) meant I had to have the post of my M-1 sled set very long, making it a bit unwieldy. The Volt would have been the perfect thing, had it been available at the time. It's quite unobtrusive and you completely forget it's there; it just plays in the background and lets you get on with operating.

You've had the Volt on your M-1 for a while and have been using it for real. What are your feelings regarding it?

I'm very happy with it. The Volt is a brilliantly simple idea and it allows me to balance the Steadicam M-1 sled completely neutrally. The Volt produces a virtual pendulum, which means that energetic moves especially are a lot more stable, and unwanted outside influences, like wind, get damped out. I've also noticed that my hands are less tired after lots of frenetic moves. Your hand isn't having to do as much horizon guiding because you're not fighting an inertial pendulum. This leaves you to concentrate on operating the shot.

It's also really good for those non-Steadicam style shots that we get asked to do: slow push-ins and slow side-to-side moves. Being able to take so much of your attention away from the horizon is liberating. Using the dials, I can set the stability in the tilt and roll axes completely independently and there's even a "sticky tilt" mode where you can redefine where gravity is acting. This is great for architectural shots.

Now that the Volt has been made available for other Tiffen and third party rigs, what would you want to pass on to those Steadicam operators who don't have it yet?

Go and try it out. The Volt is simple, lightweight, low power, reliable and subtle. Volt makes shots so much more relaxing to shoot because it allows you to place more of your concentration away from maintaining the perfect horizon.
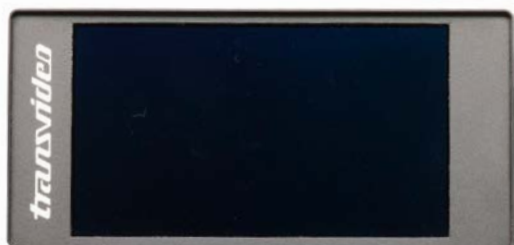
It's like an extra layer of help superimposed on your operating and helping you rather than interfering something in any way. The Volt is not going to mask bad technique, but it will certainly enhance good operating. There is no doubt that Steadicam operating has just taken a huge step forward.
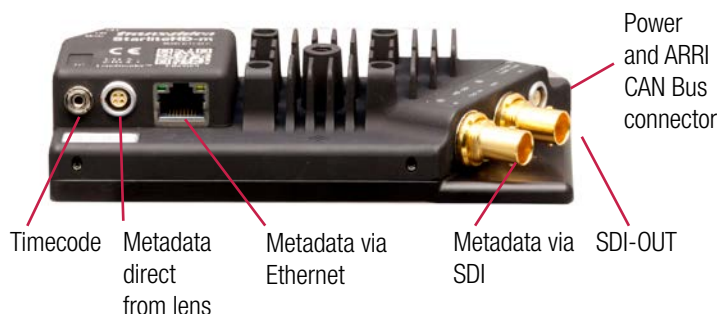
tiffen.com   flysteadicam.tiffen.com

Transvideo Metadator

Feed your beast. Transvideo's StarliteHD-m ("m" for Metadata fed to the Metadator) is a compact monitor/recorder that attaches onboard a camera. It has touchscreen control and a high resolution video display. Here an update on the StarliteHD-m and its essential metadata tools:

- For focus pullers: lens information, depth of field, focus magnification, focus peaking, camera status and data.
- For script supervisors: record/playback, data, PDF report.
- For camera operators: virtual horizon, data, shot playback.

The StarliteHD-m records lens data directly from the camera and lens via the serial connector of the lens or mount, SDI or Ethernet connection.

For example, Cooke /i and the latest ZEISS lenses provide data via their Lemo connector or through the lens mount. This lens metadata can include details about lens shading, distortion mapping, illumination, etc. It can then be imported into applications such as Blackmagic Design DaVinci Resolve, Adobe After Effects, Premiere Pro, The Foundry's Nuke, Pomfort LiveGrade Pro, Silverstack, Silverstack XT and Silverstack Lab.

Jacques Delacoux, President of Transvideo, explained, "The metadata can be used by VFX to map a virtual space following the lens distortion in order to include synthetic objects with the correct rendering from the point of view of the camera. They can be also use to remove the distortions of the image in several applications. Examples include stitching several pictures to create a wall, a circular projection, or scientific applications."

transvideo.eu/StarliteHD-m

Transvideo Metadator records lens data from various manufacturers: Cooke /i, ARRI LDS, ZEISS XD on RED, Panasonic, ARRI. Sony VENICE is in progress.

Timecode — Metadata direct from lens — Metadata via Ethernet — Metadata via SDI — SDI-OUT — Power and ARRI CAN Bus connector

StarliteHD-m Metadator on RED Helium 8K with ZEISS eXtended (XD) lens data from ZEISS CP.3 XD lens.

StarliteHD-m with Panasonic Varicam LT.

StarliteHD-m on ARRI Alexa Mini with ZEISS CP.3 XD lens

The Gods of Focus: Luke Thomas

by Luke Thomas

Thanks for the opportunity to share with your readers and fellow ACs a couple of tales of how the Preston Light Ranger 2 (LR2) has helped to "even out the playing field" for me.

As a 20+ year 1st AC, I feel that I can confidently say I've witnessed the changing of the process of filmmaking as well as the technologies required to keep up with it. In my opinion, the LR2 has been (as much as I don't like the term) an absolute "game-changer".

A great example of this was a shot we did in Wales in mid-2018. We were shooting on Alexa 65 cameras with Auto/Ultra Panatar lenses (the original 1.25x anamorphic "Ben-Hur" lenses, or "Panavision's Crown Jewels" as Hugh Whittaker at Panavision London called them).

This particular set-up was on beach on the end of a 73' Chapman Hydrascope, with our 60mm lens at around T4.

The shot started full extension 73' up the beach, and then sucked and armed in, and then back out again to be 73-ish feet out over the water on a mid-shot (around 5' in that format) of our #1 being rowed ashore, which then proceeded to bring him out of the boat and back up the beach.

Essentially, I guess it was like a 140-foot track onto a constantly-moving subject where it was wasn't possible to lay any marks whatsoever, on possibly the most unforgiving combination of camera and lens there can be for a 1st AC.

On top of this was the fact that we were battling an incoming tide, so after each take it took about 20 minutes to move the crane base and all its accompaniments up the beach to then wait for the tide to start lapping at the crane base before we rolled (so there was enough water to row the boat in). It was a pretty high-pressure situation for all involved.

I really can't imagine being able to pull that shot off without the Light Ranger 2.

It was a saviour to be able to get a real-time focus guide from the "green bars" that the LR2 displays on the monitor whilst in a tight midshot of someone being rowed ashore on a boat was invaluable for being able to instantly adjust to the rhythm of the ocean and oarsman, and to be able to get a solid fix of where our hero actor was from way more than 30 feet out (not to mention that he wasn't in the foreground for the push-in.)

It was something that no other focus aid could provide. The DP even commented that he thought he would probably have to shoot that scene at T8 or T11 (which even then would have been a tricky proposition.)

Another situation where the LR2 made me look way better than I am was on a beer commercial in Melbourne, Australia.

The director imagined up a shot of one of the performers running across a pub straight towards camera and then doing a somersault off a mini trampoline at around 96fps, so on went the 150mm T-series anamorphic.

The Gods of Focus: Luke Thomas

Above, Light Ranger 2 on Alexa 65 with a 75mm Ultra-Panavision 70 lens.

Below, Luke Thomas on location in Tokyo with LR2.

The part of the shot he wanted to use was the close-up moment as the performer launched off the trampoline. Having also been thrown the curveball of 96 fps, we had to shoot wide open with a 358 degree shutter to get some kind of exposure.

There's no way I'm good enough to be able to nail a shot like that. So after a very quick chat with the DP/Operator whereby I told him I was going to "auto" it and asked if he could try extra hard to keep the talent's head in frame, we rolled.

We played back the shot from the camera, frame by frame, looking for the mid-air closeup the director wanted post mini-tramp launch, and the LR2 and I had kept every frame perfectly sharp. The director kept telling everyone that the hero frame "was the poster." Of course, nobody had the heart to remind him we weren't shooting a movie.

I really can't imagine being able to achieve either of those shots without the assistance the LR2 gave me in both manual and auto modes, and it 100% helped realize the shots that the DP and director imagined without compromise.

In fact the only negative thing I could really say about the LR2 is that Directors and DPs will start to expect what was previously pretty much impossible because of it, which will suck for ACs who don't have access to one.

prestoncinema.com   *lukethomas.co.nz*

Louma 2 Point & Plane

by Adam Samuelson, owner of Louma UK

In the ever evolving development of the Louma 2, Loumasystems has released its latest software upgrade which continues to innovate, creating functions perhaps never seen before, and to aid the on-set use of telescopic camera cranes.

Louma 2 had, for a few years now, the ability to automatically telescope in or out to perform a straight-line camera move which is known as **Planing**. Think of a sheet of glass. A two-dimensional "plane" in virtual space is created on which the camera will position itself vertically and horizontally as the grip manoeuvres the crane arm during the shot.

The angle of the plane, up until now, could either be determined by a default perpendicular direction in relation to the arm (or crane base) or by drawing a line that passes through two camera positions.

Once a plane has been created, it can be adjusted (either horizontally or vertically) if need be. Even though the arm is being swung in an arc, the camera travels in a straight line and points in the same direction thanks to the back pan function.

Benefiting from the internal digital network that links the crane arm and the remote head, Louma 2 now has a function called **Point & Plane**. The horizontal angle of the plane (all planes are set vertical by default) can now be done with the single push of a button in the same orientation as that of the camera mounted on the remote head.

The result is the super-fast and efficient ability to set up camera moves "on the line" of the lens. The arm is positioned by the grips to an opening mark, the camera operator puts the center cross-hair on the place they would like to travel to, the Louma 2 technician presses a button—and that's it! When the arm is swung by the grips, the camera will travel in a straight line as if the camera operator was sitting on a dolly on tracks.

A real-time graphic on the control desk provides information as to where the plane is. The red lines show the maximum mechanical length of the arm, the green line is the angle that the camera is pointing (with the blue dot indicating the front of the lens) while the blue line is that of the plane.

On a recent shoot for the rebranding of the well-known UK department store John Lewis, production company Blink used the Louma 2 on location in a school hall. The two minute commercial featured children performing a stage show to the music of *Bohemian Rhapsody*.

UK Key Grip Adrian McCarthy explains, "I have used the Louma 2 many times in the last few years and once I saw the tight schedule of how many shots were to be achieved during the five-day shoot, I did not hesitate to recommend that it should be the crane that they went with. Point and Plane was new to me but wow, what an amazing feature it is.

"I had used the Louma 2 with director Dougal Wilson on previous jobs, but this was the first time that DP Linus Sandgren had used it. We could tell he was excited from the first morning onwards. Whether it was a big crane move or a simple push in on the line of the mag, Linus would tell us that's the move he wanted, and within the time it takes to push a button, the camera move was set. Many shots we did without rehearsals, meaning that we could get more shots with the children in the time they were allowed on set, and retakes were not a result of the camera move. Shots where we would normally prefer to reposition the crane base to minimise the coordination of the arm movement to the telescopic action, now we didn't care.

"Twenty moving crane shots a day was normal and it is very doubtful if it could have been achieved without compromising the camera movement had it been any other system."

In other Louma news, Loumasystems are delighted to announce that they have appointed Elite Camera Support in Los Angeles as their agent whose rental fleet now includes the Louma 2. Contact James Favazzo at Elite: 818-577-3834.

loumasystems.biz   louma.co.uk   louma2.com

Louma 2 Point & Plane Driving School

❶ The Louma 2 operator sits at the console.

The viewing monitor is directly in front.

The controls and menu display are directly above the pan and tilt handwheels.

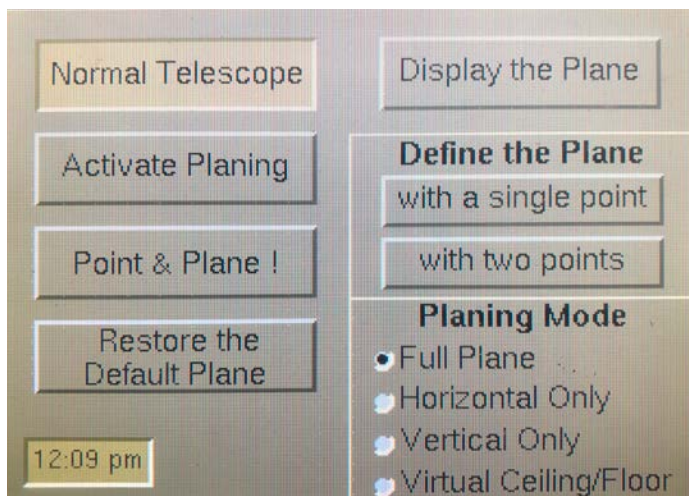*The "storyboard" that follows shows how to set up Point and Plane.*

❷ Here's what you see on the Louma 2 display screen:
The green line shows the direction the camera is pointing (in this case, forward.) The blue dot shows the front of the lens.
The red lines describe the maximum mechanical limits of the arm.

❸ Here's the planing menu touchscreen. "Point and Plane" is the third button from the top left. With an exclamation point!
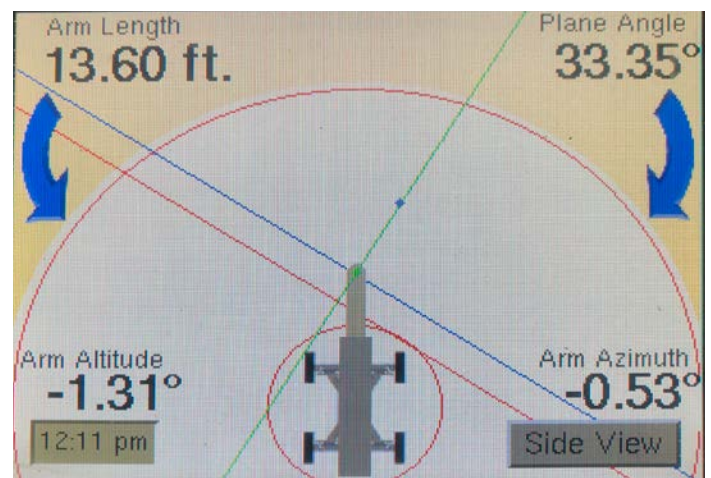

❹ The camera is pointing 45 degrees to the left. The angle of the plane to be created has to be at an angle in relation to the arm such that the green line does not intersect the inner red circle (chassis).

❺ Press "Point and Plane" to create the plane. It is shown here by the blue line (on top of the green line). That's the sheet of glass analogy.

❻ The camera is now able to track anywhere left or right along the plane, as shown by the blue line. We can pan the camera in any direction (like being on a dolly). In this example, we panned right.
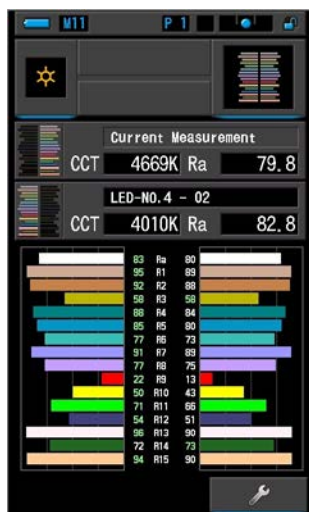
Sekonic C-800 Color Meter
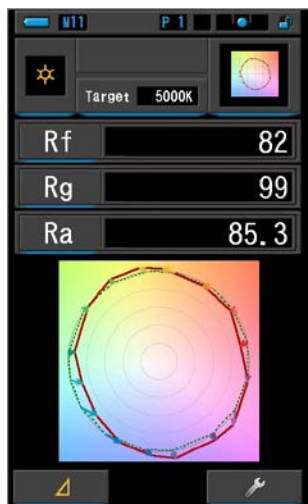

C-800 showing multiple sources
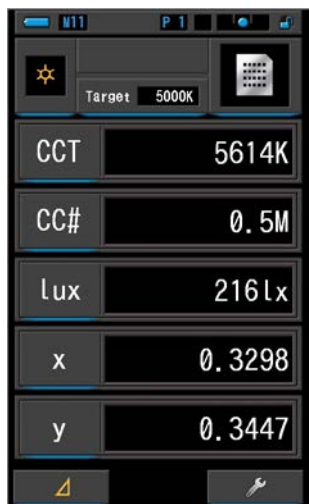

C-800 showing SSI

Main Menu

CRI Comparison of 2 sources

TM-30

TEXT showing x, y

In our article about *VICE*, Greig Fraser mentions "color meter" and gaffer Mike Bauman jumps in enthusiastically about the new Sekonic C-800 Color Meter. I agree. Here's why.

Once upon a time, measuring the color of light was simpler. You checked color temperature and it was usually daylight or tungsten. When HMIs arrived, we learned about Plus and Minus Green because the bulbs aged and changed hue and we corrected with the green or magenta gels that the meter told us to use.

And then LEDs changed everything. Metering and matching lights became much more "interesting." As Mike Bauman said in his discussion of *VICE*, "The new Sekonic Spectromaster C-800 is a game-changer."

Turn the Sekonic C-800 meter on and press the menu button.

Let's begin with **CRI**. This was the jumping-off point in 1965 and revised in 1974, although research began around 1937. The International Commission on Illumination (CIE) specified measuring 8 color samples, R1-8. A few more were added later, so now we see R1-R15 on the meter. CRI is a measurement of color fidelity. It works nicely with an incandescent lamp because of its continuous spectrum. But what happens when there are spikes in the light source, which can happen with LEDs and fluorescents?

Push the menu button again and select **TM-30**. The official name is IES TM-30-15 and it is a newer standard from the Illuminating Engineering Society that shows the results in 3 values. Rf is the color fidelity based on 99 colors, and rated on a scale of 1-100. Rg is the color gamut index, showing saturation, from 60-140. Ra is the CRI value, the same number you'd get from the CRI menu reading. So now we have 3 values instead of 1. The higher the numbers, the truer your color will be on film or video. In other words, you could have several shades of blue on set and a lousy LED light would make them all look the same.

SSI is the Spectral Similarity Index. It was developed by the Academy (*oscars.org*): "SSI is not based on human vision, nor any particular real or idealized cameras. Rather, it measures how close a given spectrum is to a specified reference spectrum, such as tungsten or daylight. It is a single value and indicates the predictability of color rendering with the given source. SSI is scaled so that a score of 100 indicates a spectral match." In other words, SSI lets us see how our LED fixture compares to a tungsten or daylight source. It takes subjectivity out of the equation.

The x, y color mode is my new darling now that Michael Wagner at ARRI introduced us to the ARRI Stellar app for SkyPanels and L-Series fixtures. Let's say you want to match your SkyPanels to some really weird mercury vapor street lamps in a night exterior scene. Measure the practical mercury vapor lights with your Sekonic C-800. Note the x and y values that are displayed. Then, in the ARRI Stellar app, enter those same x and y numbers. Your SkyPanels or L-Series lights will now match the street lights beautifully.

The Sekonic C-800 is incredibly configurable. You can set up x, y coordinates to appear in a number of screens. In the picture at left, we have it in the TEXT Menu that we have programmed to include Color Temperature, Color Correction, Lux (you can change it to Footcandles), and of course, our new friends x and y.

Thanks to Ab Sesay, Sekonic Brand Manager at MAC Group for his terrific tutorial. More to follow.   *sekonic.com*

Panther S-Type Dolly

The Panther S-Type Dolly was introduced at IBC Amsterdam in September 2018. It is an innovative, meticulously crafted, precision dolly that combines the long range of a scissor arm with a compact chassis typically associated with a center column design.

Scissor Arm

The scissor arm is the jaw-dropping feature that grabs your attention immediately. Panther's patented full-range technology enables the arm to move the same distance up as it can drop down, "below sea level." Swapping high and low rigs is a thing of the past.

Panther has been doing dollies since 1982, when they introduced the prototype of their iconic and eponymous electro-mechanical center-column dolly.

It was beloved by many but had the same drawback of any center column dolly: you couldn't do a continuous move from low to high because of the physics of moving a telescoping column. If you needed a low angle, a Z-bar was attached. But then you couldn't get high enough.

That has all changed with the S-Type Dolly. I assume that "S" stands for Scissor-Arm. Not only can it make an elegant, smooth move from high to low, but it also can drop down as low as it can go up.

Picture this. EXT. TALL OFFICE BUILDING - DUSK. James Bond is fighting with the villain at the edge of a roof. The camera dollies towards them. Bond slips. He grabs the villain's leg just in time. Bond dangles above the city streets far below. Our dolly grip deftly maneuvers toward the precipice. At the same time, the *Locus Puller* (new job category, thanks to this S-Type Dolly) gently presses the zoom control...umm...the up-down control of the dolly's Wireless Hand Unit and guides the arm below the level of roof. The camera stares directly at Bond's grimacing face.

Wireless FITZ Hand Unit

Rhymes with Focus Puller, the *Locus Puller* (*Locus: noun, center of attention*) will certainly attract attention. The S-Type Dolly's Wireless Hand Unit looks and works in much the same manner as a Focus Puller's FIZ.

Instead of FIZ, can we it "FITZ," in honor of the Fitz family who founded and own Panther? The FITZ is waterproof. It has an electronic display menu; a zoom control type rocker bar to move the arm up and down; buttons to set start, stop, speed; and readouts of battery status, etc.

Batteries and Electro-Mechanical drive

The S-Type Dolly is powered by two 24 Volt batteries that slide easily into the side of the base. The arm is powered by an electro-mechanical drive system. Andy Fitz, Executive President of Panther, explained, "This has many advantages: no dripping of hydraulic fluid, no pump, longer run-time without having to recharge, quick swap of batteries, electronic programming of moves and stops, and lots more."

More information: *panther.tv/en/product/s-type/*

Watch the excellent Panther S-type dolly video: *youtu.be/cpGAFRP9J54*

4 Steering Modes: Crab, Round, Conventional Front and Conventional Rear

The wheels are arranged in square symmetry. The dolly can be moved lengthwise or sideways on track.
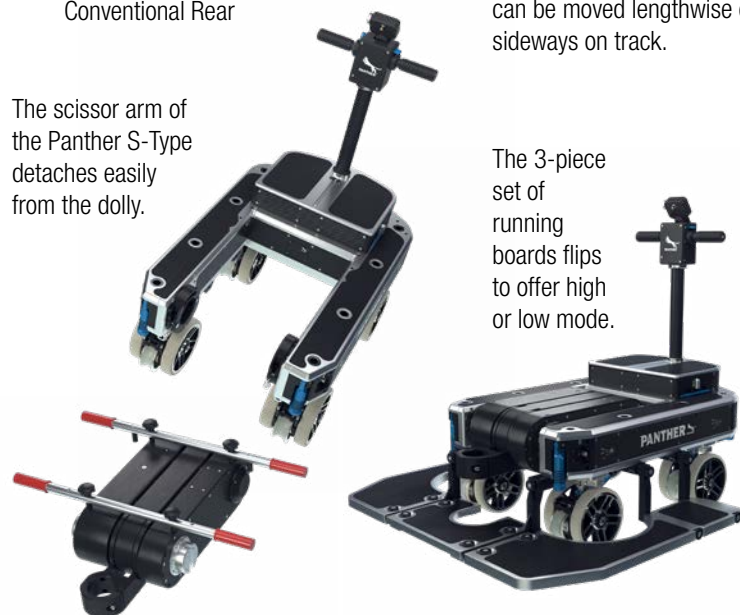
The scissor arm of the Panther S-Type detaches easily from the dolly.

The 3-piece set of running boards flips to offer high or low mode.

P+S Technik Evolution 2x Anamorphic Kowa-Style

Now there are two additional focal lengths in the P+S Technik series of Evolution 2x lenses: 32mm T2.4 and 135mm T3.5.

Evolution lenses are based on the optical design and front anamorphic elements of the original Kowa Anamorphics. Modern mechanical design updates the Kowa vintage look with a rugged and serviceable set of anamorphic lenses.

The original Kowa Cine Prominars are Japanese 2x Anamorphic Super35 lenses from the 1960s. They are low in contrast and warm in color. They easily flare with a warm hue rather than typical anamorphic blue. They are small in size and very light, with a front anamorphic cylinder. The original Kowa Anamorphic prime lenses were produced until the 1970s and four different focal lengths were available: 40mm T2.3, 50mm T2.3, 75mm T2.8 and 100mm T3.4.

A set of P+S Technik Evolution 2x Anamorphic Primes consists of: 32mm T2.4, 40mm T2.4, 50mm T2.4, 75mm T2.5, 100mm T3.2 and 135mm T3.5.

P+S Technik builds the Evolution 2x lenses in a compact, lightweight housing with modern, cam-driven, internal focus mechanisms. Lens barrel rotation has been improved significantly compared to the originals: 200° for focus and 90° for aperture. M0.8 gear rings are in the same position throughout the set. The front diameter is 80mm with a 77mm thread for screw-in filters (except the 32mm). Evolution 2x anamorphics come with IMS—Interchangeable Lens Mount System, with PL as standard. Optional mounts include EF, E-mount, MFT and probably more to come.
pstechnik.de

Evolution 2X Technical Specifications

	32mm	40mm	50mm	75mm	100mm	135mm
T-Stop Range	T2.4 / 22	T 2.4 / 22	T 2.4 / 22	T 2.5 / 22	T 3.2 / 22	T 3.5 / 22
Angular Rotation of Iris Scale	~ 90°	~ 90°	~ 90°	~ 90°	~ 90°	~ 90°
MOD Min. Marked Object Distance	0.65 m / 2'2	0.90 m / 3'	0.90 m / 3'	1.0 m / 3'	1.5 m / 5'	1.5 m / 5'
Close Focus from Lens Front	0.51 m / 20"	0.86 m / 2.82'	0.85 m / 2.78'	0.86 m / 2.82'	1.35m / 4.43'	1.5m / 4.92'
Angular Rotation to MOD Endstop	200°	200°	200°	200°	200°	270°
Image Circle	31.1mm*	31.1mm*	31.1mm*	31.1mm*	31.1mm*	31.1mm*
Length from Front to Lens Mount	134mm	85mm	95mm	140mm	145mm	177mm
Filter Thread	None	77mm	77mm	77mm	77mm	77mm
Front Diameter	110mm	80mm	80mm	80mm	80mm	80mm
Total Weight	1.750 gr	1.060 gr	1.200 gr	1.500 gr	1.600 gr	1.900 gr

Mount: PL.   compatible with IMS exchange mounts
Markings: approx. 20 - in metric and imperial
Iris Drive Gear: teeth 0.8 metric module industrial standard.hard stops. 70 mm from image plane
Focus Drive Gear: teeth 0.8 metric module industrial standard with hard stop. 90 mm from image plane
Additional Notes: image circle covers minimum Arri Alexa 4:3. See also P+S Technik Image Circle Charts. Specs may change without notice.

Focus Scales: metric or footage scales - on both left and right sides
Iris Scales: iris scales on Camera Operator side

ZEISS Supreme Prime 135mm T1.5

ZEISS will be showing their new 135mm T1.5 Supreme Prime at the BSC Expo in London. As planned it will ship in Q3 2019.

The 65mm T1.9 Supreme Prime is ahead of schedule, shipping in Q1, within the next few months.

Additional News

Follow the Supreme journey on Instagram: #zeisssupremeprime

Tutorials about ZEISS eXtended Data can be found on YouTube:

- Masterclass Intro: youtu.be/Ii1ApKssZGw
- Tutorial 1, Recording ZEISS eXtended Data with the Transvideo Startlite HD-m Monitor: youtu.be/k6OgDjuEzz0
- Tutorial 2, How to transfer the ZEISS lens correction files from a Transvideo Starlite HD-m SD card to Nuke and After Effects for VFX work with the ZEISS Plugins: youtu.be/lzR3IDkQszk

Updated ZEISS Supreme lens chart below.

ZEISS Supreme Primes

Lens	Release	Aperture	Close focus	Length	Front ⌀	Weight	AoV FF	AoV S35
15 mm	2020	T1.8 - T22	tbd	tbd	114 mm / 4.5''	tbd	tbd	tbd
18 mm	2020	T1.5 - T22	tbd	tbd	114 mm / 4.5''	tbd	tbd	tbd
21 mm	Q2 / 2019	T1.5 - T22	0.35 m / 13.7''	119 mm / 4.7''	95 mm / 3.7''	1.5 kg / 3.3 lb	79.5°	59.8°
25 mm	May 2018	T1.5 - T22	0.26 m / 10''	119 mm / 4.7''	95 mm / 3.7''	1.42 kg / 3.13 lb	70.8°	52.3°
29 mm	May 2018	T1.5 - T22	0.33 m / 13''	121 mm / 4.8''	95 mm / 3.7''	1.61 kg / 3.55 lb	64°	46.8°
35 mm	May 2018	T1.5 - T22	0.32 m / 13''	119 mm / 4.7''	95 mm / 3.7''	1.40 kg / 3.09 lb	55°	39.6°
50 mm	May 2018	T1.5 - T22	0.45 m / 18''	119 mm / 4.7''	95 mm / 3.7''	1.22 kg / 2.69 lb	39°	27.5°
65 mm	Q1 / 2019	T1.5 - T22	0.6 m / 2'	121 mm / 4.8''	95 mm / 3.7''	1.63 kg / 3.59 lb	30.5°	21.3°
85 mm	May 2018	T1.5 - T22	0.84 m / 2'9''	119 mm / 4.7''	95 mm / 3.7''	1.42 kg / 3.13 lb	24°	16.7°
100 mm	Dec 2018	T1.5 - T22	1.1 m / 3'9''	119 mm / 4.7''	95 mm / 3.7''	1.7 kg / 3.74 lb	20,4°	14,2°
135 mm	Q3 / 2019	T1.5 - T22	1.35 m / 4'5''	146 mm / 5.7''	114 mm / 4.5''	2.3 kg / 5.4 lb	15.6°	10.9°
150 mm	Q4 / 2019	T1.8 - T22	1.5 m / 4'11'	146 mm / 5.7''	114 mm / 4.5''	2.3 kg / 5.4 lb	13.7°	9.5°
200 mm	2020	T2.1 - T22	tbd	tbd	114 mm / 4.5''	tbd	tbd	tbd

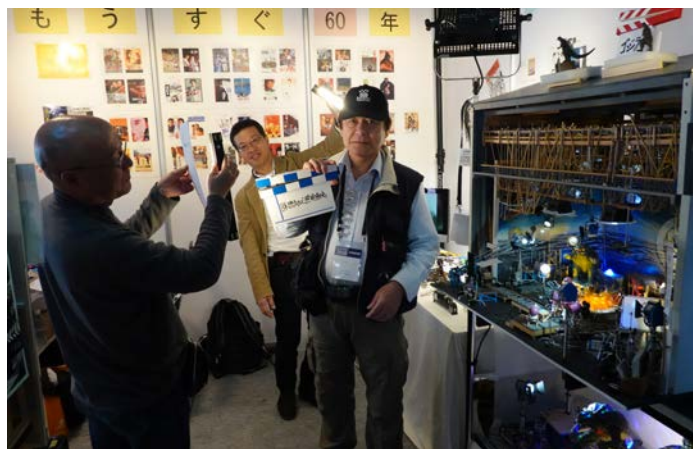ZEISS Supreme Team in Oberkochen, Germany with FDTimes Supreme Report.

InterBEE 2018 Highlights
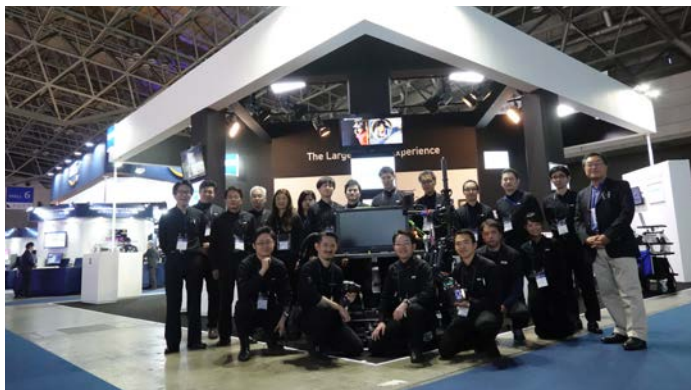
Above: The NAC team at InterBEE. Below: NAC modified ZEISS CP.2 primes with an oval mask (oval bokehs) and calls them *Anamorfaux*.

Above: Hirakawa Inc. makes the Zabu-Hakko, an Applebox with 7 functions. Below, miniature studio built by Gaffer Hokoku Hayashi.

Film and Digital Times Japan 5th Annual Meeting at InterBEE – Makuhari, Chiba, Japan. Nov. 13, 2018. Leading luminaries of Japan's cine business, shoguns and guests included:

Front row, L-R: Arato Ogura (ZEISS), Yasuo Ueda (Sony), Sadanobu Ueda (Sony), Shinji Yamaki (SIGMA), Toshihisa Iida (Fujifilm), Takuya Noguchi (Fuijifilm), Matthew Duclos (Duclos Lenses), Jon Fauer (FDTimes), Kazuto Yamaki (Sigma), Stephen Chappell (cmotion), Osamu Tsukada (Leitz), Michael Schiehlen (ZEISS), Sae Nakatani (Panasonic), Yasuaki Mitsuwa (NAC), Isamu Senoo (Canon).

Middle row, leaning forward, L-R: Yasuo Okuyama (Koki Hifumi Rental), Thomas Greiser (Cooke), Shizuru Aoki (SIGMA), Yotaro "Jay" Sanjo (Canon),

Yasutake Ouchi (Fujifilm), Hiroyuki Onishi (Panasonic), Tomonori Abe (DJI).

Rear row, L-R: Yutaka Okahashi (Sony), Yasuyuki Tomita (Canon), Astrid Preston (Artist), Michelle Duclos (Duclos Lenses), Svetlana Serga Delacoux (Aaton-Transvideo), Maki Itakura (RAID), Jacques Delacoux (Aaton-Transvideo), Tadashi Sasaki (Fujifilm), Mark Amir (Sigma), Sasha Freedman (Filmmaker), Greg Smokler (Teradek), Howard Preston (Preston Cinema), Tim Schumann (Blackmagic Design), Max Preston (Neo Future Labs Tokyo), Larry J. Thorpe (Canon), Masa Yasumoto (Sanwa), Yosuke Kamata (Canon), Masako Misaki (ZEISS), Yasuhiko Mikami (Angenieux), Seiji Nakajima (NAC), Kazumasa Yoshikawa (Canon), Tetsushi Hibi (Canon), Masaki Akamatsu (Canon). Nick Rashby (AJA) and Andy Bellamy (AJA) were also present but mysteriously missing from this photo.

NAB Show 2019 Preview

Photo: Mark Forman

The 2019 NAB Show exhibits will be open from April 8-11 in the Las Vegas Convention Center with many product announcements, a greater focus on cinema and a new area in Central Hall called Cine Central. Register online (*tiny.cc/nabshow-reg*). Enter *MP01* for a free Exhibits Pass Code and other savings by March 24. Here are some of the trends in motion picture production that might be seen:

More LED fixtures. Remote control via apps. Any color imaginable.

More K, larger formats, larger sensors, shorter FFD, more AKS.
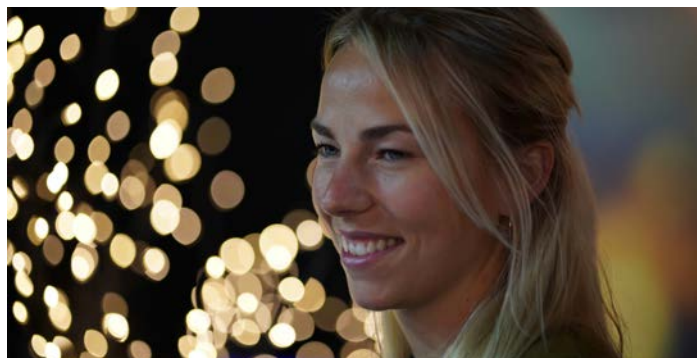
At the NAB Show, we'll agonize over ovals and bokehs. To flare or not flare.

To compare and to test. High resolution or softer look. Lots of lenses.

What launches at NAB Show? Can't say, but IBC and InterBEE foreshadow.

Bigger displays, HDR, more resolution, higher framerates, oh my!

www.fdtimes.com

On Paper, Online, and now on iPad

Subscribe

Online:
www.fdtimes.com/subscribe

Call, Mail or Fax:

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

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

- ☐ 1 Year Print and Digital, USA   6 issues $ 49.95
- ☐ 1 Year Print and Digital, Canada   6 issues $ 59.95
- ☐ 1 Year Print and Digital, Worldwide 6 issues $ 69.95
- ☐ 1 Year Digital (PDF) $ 29.95

- ☐ 1 year iPad/iPhone App upgrade   + $ 9.99
  (normally 29.99) *Get FDTimes on Apple
  Newsstand with iPad App when you order
  a Print or Digital Subscription (above)*

Total $ _____

Payment Method (please check one):

☐ VISA   ☐ Mastercard   ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code_____

Expiration Date_____

Signature _____

Name _____

Company _____

Title_____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code_____

Phone _____

Fax_____

Email_____

Sponsors and Educational Partners

Titans of the Industry
arri.com
blackmagicdesign.com
canonusa.com
creativesolutions.io
leitz-cine.com
sony.com/professional

Moguls
abelcine.com
aja.com
Angénieux.com
bandpro.com
cookeoptics.com
cvp.com
dji.com
fujifilm.com
ocon.com
panasonic.com
prestoncinema.com
red.com
sigma-global.com
teradek.com
zeiss.com/cine
zgc.com

Executive Producers
ibe-optics.com
leica.com
litepanels.com
panavision.com
servicevision.es
smallhd.com
tiffen.com
woodencamera.com

Producers
antonbauer.com
cartoni.com
cinemaelec.com
emit.fr
hawkanamorphic.com
ottonemenz.com
photocineshop.com
C&L Studio: camarasyluces.com
transvideo.eu

Co-Producers
aatondigital.com
BandH.com
chrosziel.com
manfrotto.us
mole.com
msegrip.com
orcabags.com
pstechnik.de
steadicam.com

Associate Producers
16x9inc.com
bertonevisuals.com
brighttangerine.com
cinetech.it
cmotion.eu
dmglumiere.com
denz-deniz.com
easyfocus.at
easyrig.se
filmtools.com
gecko-cam.com
hd-systems.biz
jlfisher.com
K5600lighting.com
kinoflo.com
leefilters.com
loumasystems.biz
lowel.com
oppenheimercameraproducts.com
ronfordbaker.co.uk
rosco.com
schneideroptics.com
sekonic.com
shapewlb.com
vocas.com
whitepointoptics.com

Rental Houses
abelcine.com
arri-rental.com
camalot.com
camarasyluces.com
camtec.tv
cinediving.com
www.hd-systems.biz
jpfcine.cl
keslowcamera.com
koernercamera.com
lemac.com.au
lites.be
musitelli.com
nacinc.com
panalight.it
photocinerent.com
rawcamera.com
rvz.fr
sanwa-group.com
servicevision.es
storyline.no
vantagefilm.com

Media Partners
afcinema.com
airstar-light.us/film
bscexpo.com
camerimage.com
cinec.de
cinegearexpo.com
ibc.org
icgmagazine.com
imago.org
inter-bee.com
nabshow.com
soc.org

Sponsors and Educational Partners

Associate Producers

SHAPE

Vocas

BRIGHT TANGERINE

Ronford-Baker
CAMERA SUPPORT TECHNOLOGY

louma systems

Easyrig

KINO FLO
Lighting Systems

Cinetech

J.L.Fisher

LEE Filters

PANTHER

Filmtools

PRÄZISIONS-ENTWICKLUNG
denz
DENZ

OPPENHEIMER
CAMERA
PRODUCTS

K 5600
LIGHTING

16X9
INC.

ROSCO

DMG LUMIÈRE
BY ROSCO

cmotion

PHANTOM
VISION RESEARCH

BERTONE
VISUALS

lowel

Schneider
KREUZNACH

W. WHITEPOINT
OPTICS

GECKO-CAM
PROFESSIONAL FILMEQUIPMENT & SERVICE

Rental Houses

CAM-A-LOT
AUDIOVISUAL FACILITIES

RVZ
LOCATION

C&L
RENTAL

SERVICE
VISION

KESLOW
CAMERA

OPPENHEIMER
CAMERA
PRODUCTS

VANTAGE
WEIDEN BERLIN PRAGUE PARIS

CAMERAS BY
OTTO
NEMENZ

LITES

CINE DIVING
UNDERWATER FILMING

nac
IMAGE TECHNOLOGY

Lemac

HD systems
camera rental

ARRI Rental

KOERNER
CAMERA SYSTEMS

MUSITELLI

Storyline

PHOTO
CINE
RENT

sanwa
CINE EQUIPMENT
sanwa
PRO LIGHT

Panalight

JPF
JPF CINE EQUIPMENT RENTAL
SANTIAGO - CHILE

CAMTEC
MOTION PICTURE CAMERA SYSTEMS

AbelCine

Media and Production Partners

cinec

NABSHOW

Micro Salon Show
2019
AFC
February 8-9
La Fémis - Paris

BSC expo

cine gear
ENTERTAINMENT•DIGITAL
EXPO

ibc

IMAGO
EUROPEAN FEDERATION OF CINEMATOGRAPHERS
For the art of Cinematography

CAMERIMAGE

ICg

SOCIETY OF
CAMERA OPERATORS

Inter BEE
International Broadcast Equipment Exhibition

AIRSTAR

Titans of the Industry

SONY
Leitz
ARRI
Canon
CS — CREATIVE SOLUTIONS
Blackmagicdesign

Moguls

Cooke
RED DIGITAL CINEMA PROFESSIONAL
CVP
ZEISS
FUJIFILM FUJINON
Leica
SIGMA
AJA VIDEO SYSTEMS
Angénieux
DJI PRO
Panasonic
PRESTON CINEMA SYSTEMS
AbelCine
TERADEK
ZGC
bandpro FILM & DIGITAL INC.

Executive Producers

oconnor
PANAVISION
smallHD.com
Litepanels
I3E OPTICS
TIFFEN
SERVICE VISION
WOODEN CAMERA

Producers

C&L RENTAL
Emit
Tokina VISTA BEYOND FULL FRAME
TILTA
PHOTO CINE SHOP.com
HAWK
ANTON BAUER
CARTONI
CAMERAS BY OTTO NEMENZ
CINEMATOGRAPHY electronics
transvideo
sachtler

Co-Producers

TERADEK RT
Manfrotto Imagine More
ORCA
P+S TECHNIK
THE STUDIO B&H
Chrosziel ...for optical excellence
AATON DIGITAL
STEADICAM
Mole-Richardson Co.
matthews studio equipment

Associate Producers, Rental Houses, Media and Production Partners on previous page